GOVERNMENT OF TELANGANA
FOREST DEPARTMENT

From
Sri R.M.Dobriyal IFS.,
Principal Chief Conservator of Forests
& Head of Forest Force,
Telangana State, "Aranya Bhavan",
Saifabad, **Hyderabad.**

To
The Prin. cipal Secretary to Government,
EFS & T Department,
Telangana State,
Hyderabad.

Ref.No. FC4/FC29/6/2022 , Dated:23/02/2024.

Madam,

Sub: TSFD – F(C) Act, 1980 –Diversion of 649.3014 ha forest land in Ramavaram RF of Ramavaram Range of Kothagudem forest division for grant of mining lease for proposed VenkateshKhani OCP from Underground rights to Surface rights in Kothagudem Area in Bhadradri Kothagudem District in favour of M/s.SCCL – **Additional Information Sought by GoI, MoEF& CC, New Delhi– Information Furnished** - Regarding.

Ref:
1. GoI, MoEF & CC, New Delhi F.No.8-05/2021-FC Dt.21.11.2023.
2. GoI, MoEF & CC, Hyderabad F.No.4-TSA284/2022-HYD/675 Dt.20.09.2023.
3. General Manager, Kothagudem area, SCCL, Kothagudem District Ref No.KGM/EST/F/33/601 dt:20.12.2023.
4. PCCFs Rc.No. FC4/FC29/6/2022 dt.03.01.2024.
5. Chief Conservator of Forests, Bhadradri Rc.No.501/2023/DM dt.31.01.2024.

Vide ref 1st cited, the GoI, MoEF & CC (FC Divn), New Delhi has sought for additional information on the subject proposal.

Accordingly, vide ref 3rd and 5th cited, the Chief Conservator of Forests, Bhadradri and General Manager, Kothagudem area, SCCL, Kothagudem District has furnished information as desired by the GoI, MoEF & CC, New Delhi which are furnished as follows, with remarks:

Point No.1: *- it was noted that different User Agencies whose proposals are processed under FCA,1980, are depositing amounts related wildlife conservation plan w.r.t. their respective proposals in the Biodiversity Conservation Society of Telangana (BIOSOT) account of Chief Wildlife Warden, Telangana. AC decided that State Govt. shall deposit such entire amount in CAMPA immediately as the process adopted by State Government is not as per rules.*

Reply:- The Wild life Conservation plan was prepared for the overall landscape of the area including core & buffer zone after due studies of flora and fauna in the area and was approved by the Chief Wild Warden & Prl. Chief Conservator of Forests, TS, vide

Ref No. 5694/2021/WL-1, Dt.12.10.2021 for Rs.4.78 Crores and the SCCL has deposited the amount vide challan dated.20.03.2022 into BIOSAT account.

Now, the DFO, Bhadradri Kothagudem has revised the Wild life Conservation plan for an amount of Rs.731.60 Lakhs and the plan has been scrutinized and re-casted and approved by the Chief Wild Warden & Prl. Chief Conservator of Forests, TS, vide Ref No. 5694/2021/WL-1, Dt.14.02.2024 for Rs.7.31 Crores.

As desired by the MoEF&CC, GoI, the amount will be transferred to the CAMPA Account after the issual of Stage-I approval.

***Point No.2**:- AC also decided that the State Govt. shall comply with all the condition and submit the report to this Ministry w.r.t. the four proposals (linked with the instant proposal) as per observations noted in the report submitted (enclosed for reference) by the IGF(C) Sub-office Hyderabad within a period of two months.*

Reply:- The reply to the points raised by the Inspector General of Forests (C) and Dy. Inspector General of Forests (C), Integrated Regional Office, Hyderabad are as follows:

a. **Cost Benefit Ratio Study Report:**

As per the condition imposed by the MoEF&CC, GoI, the Cost Benefit analysis was conducted by the IIFM, Bhopal, and arrived the Cost – Benefit ratio as 12:53. However, the IIFM, Bhopal considered the NPV as Rs.8.03 lakhs (Class-III, Dense Forest) for the calculation as per the old NPV rates.

Further, by considering the revised NPV rates issued by the MoEF&CC, GoI, vide guidelines dated 06.01.2022, the revised Cost –Benefit analysis ratio is arrived as 10:95 (by considering the Rs.12:28 Lakhs per ha for Class-III, Dense Forest). As coal is to be produced to supply to mainly thermal power plant, the SCCL is willing to work the mine with this C: B ratio.

The loss of public utilities was considered for an amount of Rs.2000 Lakhs due to diversion of NH-30 and some power transmission lines. However, SCCL has diverted the NH-30 and Power lines with a cost of about Rs.25 crores. Further, an amount of Rs.2000 Lakhs was considered due to rehabilitation and resettlement of habitations existed in the Non forest land of Vanama nagar and Maya Bazaar, which is essential and mentioned as R&R required in Non RF land.

Further, the District Forest Officer, Bhadradri Kothagudem has informed that the SCCL has given willingness to work with the revised Cost Benefit Analysis ratio of 10:95.

b. **Biodiversity report:**

The District Forest Officer, Bhadradri Kothagudem has submitted that, the Biodiversity study was conducted by the Environment Protection Training and Research Institute, Hyderabad (EPTRI) for the Core area comprising of 2403.17 Ha. of project area of VK Coal Mines as well as Buffer area which includes the area of within 10 kms zone from the boundary of the core zone. In both the areas, i.e., Core & Buffer, extensive study was conducted on Flora and Fauna and they were listed. Even Fauna which were not observed during the study were also included in the study report basing on the secondary data, i.e. working plan

of the Forest Division.

The study was conducted on all the Flora and Fauna found in the area and was not a species specific study. Now, rapid assessment survey was again carried out during the month of November 2023, and all the important/ endangered Fauna & Flora found in the area were listed.

As mentioned earlier 19 different Mammal species were observed during study and on page 60 as pointed out the number of animals mentioned as 26, are Herpetofauna and not Mammal. Now, nine more wild animals such as Panther, Wild dog, Jungle Cat, Sloth bear, Indian Palm Civet Cat and Tiger are also recorded basing on the record of the working plan. A Tiger is said to be an occasional visitor to this area. The last it was reported during November, 2022 in the areas adjacent to Buffer zone at a distance of more than 25 kms from the Core Zone. The degraded and fragmented landscape and absence of prey base is not allowing this tiger to become resident.

Now, the wild life conservation plan is proposed for development of general landscape for all the important wild animals and accordingly mitigation plan was proposed duly incorporating measures like Soil Moisture Conservation works, fire control and water conservation etc., The wildlife Conservation plan is now proposed for the period co-terminus to the life of the project duly incorporating activities like monitoring of the change in landscape/fauna & flora by engaging wildlife expert. The mitigate measures proposed in the wildlife conservation plan have been now included in to the Bio-diversity study report. These details of these measures were also discussed with the SCCL authorities and accordingly revisions have been made.

Now, the Wildlife Conservation & Mitigation plan has been prepared for the proposed Venkatesh Khani coal mine, Gautham Khani Opencast, Venkatesh Khani No.7 and Padmavathi Khani No.5 incline for **Rs.731.60 Lakhs.**

The plan has been scrutinized and re-casted and approved by the Chief Wild Warden & Prl. Chief Conservator of Forests, TS, vide Ref No. 5694/2021/WL-1, Dt.14.02.2024 for Rs.731.60 Lakhs.

Reply to the brief note of DGF(C) on Non compliance of FC conditions for the associated (4) diverted forest lands with the proposed diversion of 649.3014 Ha of VKOCP.

1. Diversion of 124.00 ha of Forest land for OCP GKOC Phase-II, Kothagudem in Ramavaram RF, Kothagudem Division of Bhadradri Kothagudem District. Stage-II clearance letter & date: No. 8-17/1998-FC, dated 08.02.99. Proposal No.: FP/TG/MIN139311998.

(i) The User agency had handed over 124.00 ha of non-forest land in Sy.No. 116 of Rasannagudem village, Paloncha Forest Division during 1990 and also

paid Rs. 49,60,000/- lakhs towards Compensatory Afforestation charges. The State Forest Department informed that an area of 61.66 ha out of this NFL is overlapping with the CA land given for diversion of forest land for SRLIP (Irrigation project). Further, 81.04 ha of this NFL land is under encroachment. DIGF (Central) during inspection of this area noticed that the encroachments are mainly by way of cultivation of Eucalyptus by the locals. The area is also not demarcated and there are no display board indicating that this is a CA-NFL Land. It appears that the State Forest Department had not raised any CA plantation in this area. The State Forest Department could not furnish any details on the action taken on the encroachments. It appears that the already encroached forest land has been accepted while considering SRLIP project by the State Forest Department. NFL land handed over to the Forest department is not notified as RF/PF by the State Government.

a. M/s.SCCL has agreed to handover 142.07 Ha. of Non forest land in Rajupet Block, in Chunchupally, Wadaguda and Ramachandrunipeta villages (i.e Rajupeta CA Block) of Mangapet Mandal in lieu of 81.04 Ha. of encroachment in CA land and 61.66 Ha. overlapped CA land of SRLIP. Further, it is to submit that this land was handed over to the forest department as land bank vide Charge Certificate dt.07.09.2007 and mutated vide Lr No. B/1452/2007, Dt.07.09.2007 by Tahsildar.

b. As the area was having good growth & subsequently encroached, the Forest Department has raised CA in equivalent RF land at the following places :

S. No	**Range**	**Year**	**RF**	**Comp. No.**	**Area in Ha.**	**Amount Spent (Rs. in Lakhs)**
1	Aswapuram	2001-02	Kondapur	7	60.00	39.392
2	Aswapuram	2002-03	Kondapur(Bit-A)	7	22.50	
3	Aswapuram	2002-03	Kondapur(Bit-B)	7	22.50	
4	Aswapuram	2002-03	Nellipaka	4	19.00	
Total					**124.00**	

c. These plantations were also inspected by the Dy. Inspector General (O/o IRO) Hyderabad on 11.09.2023.

d. The CA land was handed over to forest department on 06.03.1990 and the encroachment was happened in the subsequent years under influence of Naxals. During the period from 1988 to 2005, Naxal activities were on peak and moreover most of the employees retired long back, who were responsible for encroachment and action could not been taken against them.

(ii) The boundary demarcation pillars in the mine area are not intact and contiguous. 14 nos.of pillars are found to be constructed freshly by the User agency on the OB Dump area

a. Initially, M/s.SCCL constructed all the pillars and due to Mining operations all the pillars were disturbed. Out of total excavated area of 124 Ha. at present void is 63 Ha. and in 61 Ha. refilling of overburden has been carried as part of Mine Closure plan of GKOC. After refilling of overburden, SCCL constructed 14 pillars and the balance pillars will be constructed after reclamation. As the area is quarry/voids of other two diversions, boundary pillars were not possible till working of mine. Further, it is to inform that if proposals of VKOC are agreed then in entire area of 124 Ha. (void as well as refill dump area), OB from VKOC will be dumped upto maximum height of 70 Mts from ground level. After finishing of dumping, the total area will be reclaimed and demarcated as per the approved Mine Closure Plan of VKCM.

(iii)The User agency had transferred Rs. 3.66 Lakhs towards plantation in the safety zone area and afforestation on one and half times of safety zone area. During monitoring, it was noticed that there is no safety zone maintained and the DFO could not show the one and half times of DFL on which Safety Zone Afforestation was carried out.

a. Initially, SCCL deposited an amount of 3.66 Lakhs towards plantation in degraded forest land for 1 ½ times of safety zone area on 2.11.1998. The plantation was taken up by the Forest Department in this area of 9.31 Ha . Due to the proposed diversion area, the plantation is lost and SCCL shall pay the amount for raising plantation in alternate DFL site of 9.31 ha as proposed by the Forest department and the same has been agreed by SCCL.

b.Regarding Safety zone of 7.5 Mtrs the area of 124.00 Ha. is mainly diverted for Quarry purpose. Hence, safety zone is not maintainable in the quarry area as the area is presently at a depth of 70 mtrs from the ground level. However, in lieu of this plantation was raised along the boundary of GKOC in 26 Ha.

(iv) Reclamation of mined out area is not done and informed that the reclamation will be done as per the revised plan of the VKOC project. However, OB dump and mined out area of Phase-I is reclaimed partially and plantation raised.

a. The proposal of 124 Ha of forest land has been diverted vide MoEF Letter No 8-17/98-FC, dtd 08.02.1999 for Quarrying purpose. Presently, out of total excavated area of 124 Ha, an area of 63 Ha is void and 61 Ha was back filled with overburden material as part of mine closure plan of GKOC. Plantation was also done in the re-filled area of 61 ha as per the approved Environment Management Plan and Mine

closure Plan of GKOCP.

b. As per the approved Mine closure Plan of VKCM, the entire area of 124 Ha. will be back filled upto a height of 70 mtrs from the ground level. After, back filling with OB material, the Plantation will be taken up with local species.

2. Diversion of 154.96 ha of Forest land in Kothagudem Forest Division (Ramavaram RF Compt.11,12&13) for Gauthami Khani OCP, Phase-III in Kothagudem District in favour of M/s Singareni Collieries Company Limited. Stage-11 clearance letter & date: No.8-62/2005-FC, dated 15.07.2008. Proposal No. : FP/TG/MIN/970/2005

(i) CA land is reported to be given in Mulapet village, Ranasthalam Mandal, Srikakulam district, Andhra Pradesh. The status of CA plantation is not available. The User agency had transferred Rs. 2.89 Lakhs towards one and half time safety zone area afforestation in DFL, Rs. 7.690 Lakhs towards fencing of safety zone and 0.220 Lakhs towards regeneration of safety zone area. However, there is no safety zone of 7.5m width noticed in the field during monitoring. The details of one and half times safety zone area afforestation carried out on DFL was not shown during monitoring.

a. M/s.SCCL handed over and mutated the Non forest land of 154.96 Ha. towards CA in Mulapet Village, Ranasthalam Mandal, Srikakulam District of Andhra Pradesh vide Mandal Revenue Officer, Santhabommali Mandal letter Rc.No. 95/91, dated 30.09.2001.

b. SCCL has deposited Rs. 2.890 lakhs towards 1½ times safety zone, Rs.7.690 lakhs towards fencing of safety zone area and Rs.0.220 lakhs towards regeneration of safety zone area with the District Forest Officer, Kothagudem on Dt.14-09-2006 vide Cheque No.239739 of SBH, Rudrampur.

c. An area of 3.18 Ha of area has been raised in compt no.11 of Ramavaram RF, Gareebpeta beat, Ramavaram section and range of kothagudem division towards 1½ times safety zone.

d. Regarding Safety zone of 7.5 Mtrs the area of 154.96 Ha. is mainly diverted for Quarry purpose. Hence, safety zone is not maintainable in the quarry area as the area is presently at a depth of 240 mtrs from the ground level. However, in lieu of this plantation was raised along the boundary of GKOC in 26 Ha.

(ii) Information regarding notification of NFL as RF/PF is not available as the NFL land falls in Andhra Pradesh.

a. The District Forest Officer, Srikakulam, vide reference number 1822/2018/A4, dated 17.11.2023 has informed that the process of notification is being perused with the District Administration for notification of CA land. (Copy of the DFO letter enclosed). It is expected that the notification process may be completed within 3 months time.

(iii) Out of 42 boundary pillars reported to be fixed, only 26 pillars are existing in the

field.

a. Initially, SCCL constructed 42 numbers boundary pillars around the diverted forest land and subsequently pillars were gone in quarry area due to mining operations. At present 26 Pillars are intact. Out of total excavated area of 154.96 Ha. at present void is 79 Ha. and in 55 Ha. back filling of overburden has been carried as part of Mine Closure Plan of GKOC. After refilling of overburden, SCCL constructed 26 pillars and the balance pillars will be constructed after reclamation. It is brought to kind notice that as area is quarry/voids of other two diversions adjoining, boundary pillars were not possible till working of mine is completed. Further, it is to inform that if proposals of VKOC are agreed then in entire area of 79 Ha. (void), OB from VKOC will be dumped up to maximum height of 70 Mts from ground level. After finishing of dumping, the total area will be reclaimed and demarcated as per the approved Mine closure plan of VKCM.

b.There pillars were inspected and reported by the District Forest officer, Kothagudem, vide Rc.No. 52/2016/D1, dated 17.06.2023. While mining of VKCM, the OB material will be back filled in to the void of 154.96 Ha. as per approved Mine Closure Plan. After completion of back filling the boundary pillars will be constructed all around the 154.96 Ha. area.

(iv) Detailed reclamation plan and annual report about the progress of reclamation is not furnished to the R.O. by the User agency. as per the Stage-II conditions.

The reclamation as per the approved Environmental Management Plan was carried out. As against the target of 432 Ha. an area of 538 Ha. was planted and it is coming up well.

3. Diversion of 261.31 ha of forest land for renewal of Gauthami Khani Opencast Mining Project (Phase-I) for surface use in Bhadradri Kothagudem District- Kothagudem Division in favour of M/s Singareni Collieries Company Limited. Stage-II clearance letter & date: No.8-117/2002-FC, dated 01/02/2010 Proposal No. : FP/TG/MIN/49212002.

(i) Only 14 demarcation pillars are available in the field, out of the 35 pillars reported to be fixed.

a. Initially, SCCL constructed 35 numbers boundary pillars around the diverted forest land and subsequently pillars were disturbed due to mining operations. In the area diverted for 261.31 Ha. area of 140 Ha. has been back filled and remaining area of 120.31 Ha. is void. 100 Ha. of diverted forest land was back filled and surrender to Forest Department 07.07.2010. The area is being maintained by the SCCL under the guidance of forest department.

b. Out of 35 pillars, 27 pillars are intact and balance pillars are disturbed in void / dump. These pillars were inspected and reported by the District Forest officer, Kothagudem, vide Rc.No. 62/2023/D1, dated 17.06.2023. As these all 3 diverted areas of GK OC are part of project area of VKOC, soon after receipt of Stage-I for VK

OC, pillars will be completed along the Project boundary.

(ii) CA land is given in two patches at Rasannagudem (V), Paloncha Forest Division, Kothagudem District. Part of the CA-NFL land is under encroachment (exact extent can be known after detailed survey only) by way of cultivation of agricultural crops, Eucalyptus. Cashew nuts etc. The hilly portion of the CA-NFL is devoid of encroachment and is having natural forestry vegetation. It appears that the State Forest Department had not raised any plantation in this area except some plantations on the bund of the trenches dug.

a. M/s. SCCL handed over an extent of 261.31 Ha. non forest land in Sy.No 116 of Rasannagudem Village of Mulakalapally Mandal, in erst while Khammam District towards CA to the Forest Department in two patches for this project and land was mutated in favour of to Forest Department vide M.R.O Lr B/912/98 dated 07.07.1991. One part of the non forest land of 261.31 Ha. was notified under Section 4 of the Indian Forest Act,1927 vide GO.RT No. 935 (For.VI-2) Dept dated 05.12.1992 and the other patch has not been notified due to encroachment.

b. The CA Land handed over is having good forest growth and the plantation has been raised in the degraded forest land.

(iii) Reclamation of the mined out area will be carried out as per the revised Mine Closure Plan/EMP for the VKOC project as per the information given by the User agency during the monitoring.

a. Out of 261.31 Ha. of forest land an extent of 140 Ha. has been back filled with Over burden and plantation was taken up. The balance area of 121 Ha. is having structures (4 Ha.) and void and over burden (65.13Ha.). Out of the reclaimed area of 140 Ha. an extent of 100 Ha. was handed over back to the Forest Department vide Charge Certificate dated 07.07.2010. However, the area is being maintained by the SCCL on the request of Forest Department.

b. However, final reclamation will be taken up as per the approved Mining Plan of VKCM.

4. Renewal of Mining Lease of 1174.18 Ha of Forest Land in Kothagudem Forest Division of Khammam Circle for Underground mining in favour of SCCL Stage-II clearance letter & date: F.No.8-277185-FC, dated 17/02/2009 Proposal No. : FP/TG1MIN/1948112007

(i) The Underground mining is completed and the diverted land was not handed over to the State Forest Department.

a. Underground Mining operations (extraction of coal) of VK 7 Incline Mine was completed in the year 2022 and other mine named as PVK 5 Incline Mine in the same lease area will be working up to 2030. However, the Mine closure activities, i.e. extraction of material, sealing of working places are going on as per the approved Mine closure plan of VK 7 Incline Mine.

b. Further, the VKCM mining plan (conversion of VK 7 Incline UG mine to OCP) was approved in the year 2020 by the Ministry of Coal. The SCCL is having only UG rights for these lands and surface rights is with the Forest Dept.

(ii) Reclamation of the mined out area will be carried out as per the revised Mine Closure Plan/EMP for the VKOC project as per the information given by the User agency during the monitoring.

a. The reclamation of Mined out area in VKOC and leftover UG mine of PVK No. 5 Incline will be carried out as per the approved Mine Closure Plan of VKCM.

The above information is submitted as per the observations pointed out by the DIGF(C), IRO, Hyderabad during the monitoring of the diversion proposals and the the District Forest Officer, Bhadradri Kothagudem has also requested to consider the facts submitted by the SCCL and recommended the proposal to forward the same to the GoI, MoEF& CC, New Delhi for consideration of this proposal.

In view of the above, stating all the above facts the State Government are requested to forward the information to GoI, MoEF& CC, New Delhi with recommendation for consideration of this proposal.

Encl: As above.

Yours faithfully,

Signed by Rakesh Mohan Dobriyal
Date: 23-02-2024 16:19:37
Reason: Approved

Prl. Chief Conservator of Forests
Head of Forest Force(HoFF)

Advance Copy submitted to the Director General of Forests & Special Secretary to the Govt, MoEF& CC, GoI, Indira Paryawarana Bhawan, Jorbagh Road, New Delhi – 110003 for information and necessary action.

Advance copy submitted to the Inspector General of Forests (FC), MoEF& CC, GoI, Indira Paryawarana Bhawan, Jorbagh Road, New Delhi – 110003 for information.

Copy to

The Conservator of Forests, Bhadradri Circle and the District Forest Officer, Bhadradri Kothagudem for information

The General Manager, M/s Singareni Collieries Corporation Limited, Kothagudem Area, Bhadradri Kothagudem District, PO: Venkatesh Khani – 507103 for information.

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24/2/24

for Principal Chief Conservator of Forests

24/2/2024

GOVERNMENT OF TELANGANA
FOREST DEPARTMENT

From:
Sri. D. Bheema Naik., IFS.,
Chief Conservator of Forests,
Bhadradri Circle, Warangal.

To:
The Prl.Chief Conservator of Forests (HoFF), Telangana State,
H Y D E R A B A D

Rc.No.501/2023/DM, Dated: 31.01.2024

Sir,

Sub: TSFD – Forest (Conservation) Act 1980 – Diversion of **649.3014 Ha** of Forest land in Ramavaram RF, Ramavaram Range of Kothagudem Forest Division for grant of Mining lease for proposed Venkatesh Khani OCP from Underground rights to Surface rights in Kothagudem area in favour of M/s. SCCL Kothagudem – Submission of EDS information as desire by the GoI, MoEF & CC, New Delhi – Further information – Submitted - Reg.

Ref:
1. Prl.CCF, TS, Hyderabad Rc.No. FC4/FC29/6/2022, Dt, 03.01.2024
2. The IGF(C), Hyd Lr.No. 4-TSA284/2022-HYD/675, Dt.20.09.2023
3. DFO, Bhadradri Kothagudem Rc.No.241/2020/D1, Dt.19.01.2024

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Adverting to the reference 1st cited above, the District Forest Officer, Bhadradri Kothagudem vide reference 3rd cited above has submitted that, as per the instructions issued by the Principal Chief Conservator of Forests (HoFF), T.S. Hyderabad vide reference 1st cited, the following specific remarks on the (2) point furnished by the General Manager, S.C.Co.Ltd., Kothagudem area vide reference 2nd cited regarding the proposals for diversion of **649.3014 Ha** of Forest land in Ramavaram RF, Ramavaram Range of Kothagudem Forest Division for grant of Mining lease for proposed Venkatesh Khani OCP from Underground rights to Surface rights in Kothagudem area in favour of M/s. SCCL Kothagudem are submitted herewith as follows.

Point No.1: *- it was noted that different User Agencies whose proposals are processed under FCA,1980, are depositing amounts related wildlife conservation plan w.r.t. their respective proposals in the Biodiversity Conservation Society of Telangana (BIOSOT) account of Chief Wildlife Warden, Telangana. AC decided that State Govt. shall deposit such entire amount in CAMPA immediately as the process adopted by State Government is not as per rules.*

The District Forest Officer, Bhadradri Kothagudem has submitted that, the SCCL authorities submitted that, the Wild life plan was prepared for the overall landscape of the area including core & buffer zone after due studies of flora and fauna in the area. This Plan was approved by the Chief Wild Warden & Prl. Chief Conservator of Forests, TS, vide Ref No. 5694/2021/WL-1, Dt.12.10.2021 for Rs. 4.78 Crores and the SCCL has deposited the amount vide challan dated.20.03.2022 into BIOSAT account

and now, as desired by the MoEF&CC, GoI, this amount is to be ordered to be transferred to the CAMPA Account.

Point No.2:- *AC also decided that the State Govt. shall comply with all the condition and submit the report to this Ministry w.r.t. the four proposals (linked with the instant proposal) as per observations noted in the report submitted (enclosed for reference) by the IGF(C) Sub-office Hyderabad within a period of two months.*

In this regard, the District Forest Officer, Bhadradri Kothagudem has submitted that, the SCCL authorities submitted that, The Inspector General of Forests (C), Integrated Regional Office, MoEF&CC, Hyderabad vide reference 2nd cited has submitted remarks on 649.3014 Ha. of proposed forest land for diversion and monitoring report on the compliances for the diverted forest lands linked in the proposed VK Coal Mines. The reply to the points raised by the Inspector General of Forests (C) and Dy. Inspector General of Forests (C), Integrated Regional Office, Hyderabad furnished by the SCCL authorities are submitted hereunder.

a. **Cost Benefit Ratio Study Report**

The District Forest Officer, Bhadradri Kothagudem has submitted that as per the condition imposed by the MoEF&CC, GoI, the Cost Benefit analysis was conducted by the IIFM, Bhopal, and arrived the Cost – Benefit ratio as 12:53. However, the IIFM, Bhopal considered the NPV as Rs.8.03 Lakhs/Ha (for Class-III, Dense Forest) for the calculation as per the old NPV rates.

Further, by considering the revised NPV rates issued by the MoEF&CC, GoI, vide guidelines dated 06.01.2022, the revised Cost –Benefit analysis ratio is arrived as 10:95 (by considering the Rs.12:28 Lakhs/ Ha (for Class-III, Dense Forest). The revised calculation sheet is enclosed herewith for kind perusal. As coal is to be produced to supply to mainly thermal power plant, the SCCL is willing to work the mine with this C: B ratio.

The loss of public utilities was considered for an amount of Rs.2000 Lakhs due to diversion of NH-30 and some power transmission lines. However, SCCL has diverted the NH-30 and Power lines with a cost of about Rs.25 crores. Further, an amount of Rs.2000 Lakhs was considered due to rehabilitation and resettlement of habitations existed in the Non forest land of Vanama nagar and Maya Bazaar, which is essential and mentioned as R&R required in Non RF land.

The District Forest Officer, Bhadradri Kothagudem has submitted that, the proposal submitted by SCCL along with revised Cost Benefit Analysis was examined and concluded that earlier IIFM Bhopal was conducted the Cost Benefit Analysis and considered the old NPV rates i.e, 8.03 Lakhs /Ha for class-III dense forest. Now, the SCCL submitted the revised Cost Benefit Analysis as per the guidelines dated 06.01.2022 issued by MoEF&CC, GoI regarding revised NPV rates by considering 12.28 Lakhs/ Ha. The SCCL also given willingness to work with the revised Cost Benefit Analysis ratio10:95.

b: **Biodiversity report**

The District Forest Officer, Bhadradri Kothagudem has submitted that, the Biodiversity study was conducted by the Environment Protection Training and Research Institute, Hyderabad (EPTRI) for the Core area comprising of 2403.17 Ha. of project area of VK Coal Mines as well as Buffer area which includes the area of within 10 kms zone from the boundary of the core zone. In both the areas, i.e., Core & Buffer, extensive study was conducted on Flora and Fauna and they were listed. Even Fauna which were not observed during the study were also included in to the study report basing on the secondary data, i.e. working plan of the Forest Division.

Further, the District Forest Officer, Bhadradri Kothagudem has submitted that, the study was conducted on all the Flora and Fauna found in the area and was not a species specific study. Now, a rapid assessment survey was again carried out during the month of November 2023, and all the important/ endangered Fauna & Flora found in the area were listed.

And the District Forest Officer, Bhadradri Kothagudem has further submitted that, as mentioned earlier 19 different Mammal species were observed, but during recent study report on page 60 as pointed out the number of animals mentioned as 26, are Herpetofauna and not Mammal. Now, nine more wild animals such as Panther, Wild dog, Jungle Cat, Sloth bear, Indian Palm Civet Cat and Tiger are also recorded basing on the record of the working plan. A Tiger is said to be an occasional visitor to this area. The last it was reported during November, 2022 in the areas adjacent to Buffer zone at a distance of more than 25 kms from the Core Zone. The degraded and fragmented landscape and absence of prey base is not allowing this tiger to become resident.

Now, the wild life conservation plan is proposed for development of general landscape for all the important wild animals and accordingly mitigation plan was proposed duly incorporating measures like Soil Moisture Conservation works, fire control and water conservation etc.,

The wildlife Conservation plan is now proposed for the period co-terminus to the life of the project duly incorporating activities like monitoring of the change in landscape/fauna & flora by engaging wildlife expert. The mitigative measures proposed in the wildlife conservation plan have been now included in to the Bio-diversity study report. These details of these measures were also discussed with the SCCL authorities and accordingly revisious have been made.

The District Forest Officer, Bhadradri Kothagudem has submitted that, the SCCL authorities have prepared the Wildlife Conservation & Mitigation plan for the proposed Venkatesh Khani coal mine, Gautham Khani Opencast, Venkatesh Khani No.7 and Padmavathi Khani No.5 incline for **Rs.731.60 Lakhs.**

In this regard, the District Forest Officer, Bhadradri Kothagudem has requested that, the above said Wildlife Conservation & Mitigation plan may kindly be forwarded to the Principal Chief Conservator of Forests (HoFF), T.S., Hyderabad with a request to approve the said Wildlife Conservation & Mitigation plan for **Rs. 731.60 Lakhs.**

Further, the District Forest Officer, Bhadradri Kothagudem has submitted that, the above said reply submitted by the SCCL authorities to the points raised by the Inspector General of Forests (C) and Dy. Inspector General of Forests (C), Integrated Regional Office, Hyderabad may be considered and same may be forwarded to the Principal Chief Conservator of Forests (HoFF), T.S., Hyderabad for further necessary action in the matter.

Therefore, based on the report of the District Forest Officer, Bhadradri Kothagudem the Wildlife Conservation & Mitigation plan for **Rs.731.60 Lakhs and** the above said reply submitted by the SCCL authorities to the points raised by the Inspector General of Forests (C) and Dy. Inspector General of Forests (C), Integrated Regional Office, Hyderabad are submitted to the Prl.Chief Conservator of Forests (HoFF), Telangana, Hyderabad with a request to approve the Wildlife Conservation & Mitigation plan and taking further necessary action in the matter.

This is submitted for favour of kind information and necessary action.

Encl: As above

Yours faithfully,

Signed by Daravath Bheema
Date: 31-01-2024 12:09:11
Reason: Approved

Chief Conservator of Forests,
Bhadradri Circle, Warangal.

Copy submitted to the Prl.Chief Conservator of Forests (FCA), Telangana, Hyderabad for favour of kind information and necessary action.

Copy to the District Forest Officer, Bhadradri Kothagudem for information.

//t.c.b.o.//

Superintendent 31/01/2024

GOVERNMENT OF TELANGANA
FOREST DEPARTMENT

PCCF & HoFF
T.S. PESHI
01 FEB 2024

From:
Sri. D. Bheema Naik., IFS.,
Chief Conservator of Forests,
Bhadradri Circle, Warangal.

To:
The Prl.Chief Conservator of Forests (HoFF),
Telangana State,
H Y D E R A B A D

Rc.No.501/2023/DM, Dated: 31.01.2024

Sir,

Sub: TSFD – Forest (Conservation) Act 1980 - Diversion of **649.3014 Ha** of Forest land in Ramavaram RF, Ramavaram Range of Kothagudem Forest Division for grant of Mining lease for proposed Venkatesh Khani OCP from Underground rights to Surface rights in Kothagudem area in favour of M/s. SCCL Kothagudem – Submission of EDS information as desire by the GoI, MoEF & CC, New Delhi – Further Report – Submitted - Reg

Ref:
1. GoI, MoEF&CC, F.No. 8-05/2021/FC, Dt, 21.11.2023
2. IGF (C), Hyderabad Ltr. No. 4-TSA284/2022-HYD/675, Dt. 20.09.2023
3. DFO, Bhadradri Kothagudem Rc.No.241/2020/D1, Dt.29.01.2024

* * * * * *

Adverting to the reference 1st cited above, the District Forest Officer, Bhadradri Kothagudem vide reference 3rd cited above has submitted that, the Forest Divisional Officer, Kothagudem has submitted a report stating that, the Dy. Inspector General, IRO, Hyderabad, MoEF&CC has raised the EDS objection that, *"the User Agency had transferred Rs.3.66 Lakhs towards plantation in the safety zone area and Afforestation on one and half times of safety zone area. During monitoring, it was noticed that there is no safety zone maintained and the DFO could not show the one and half times of DFL on which Safety Zone Afforestation was carried out."*

In this regard, the District Forest Officer, Bhadradri Kothagudem has submitted that, the Forest Divisional Officer, Kothagudem has reported that, he has verified the records and found that the 1½ times of safety zone area in degraded forest land for the proposal of 124 Ha of GKOC Phase-II, for an extent of 9.311 Ha was raised in Compt., No. 3, Ramavaram Beat, Ramavaram Range of Kothagudem Division.

Further, the District Forest Officer, Bhadradri Kothagudem has submitted that, the Forest Divisional Officer, Kothagudem has reported that, as per his instructions, the Forest Range Officer, Ramavaram has submitted a detailed report that, she was inspected the plantation area on 25.01.2024 and found that an extent of 9.311 Ha have been raised in

Compt., No. 3, Ramavaram Beat of Ramavaram Range of Kothagudem Division and reported that, the said plantation area was not falling in the proposed diversion of 649.3014 Ha of Forest land in Ramavaram RF of Ramavaram Range of Kothagudem Forest Division for grant of mining lease for proposed Venkatesh Khani OCP from Underground rights to Surface rights in Kothagudem area in Bhadradri Kothagudem District in favour of M/s. SCCL.

In view of the above, the District Forest Officer, Bhadradri Kothagudem has submitted the TOPO Graphical map, Photographs and Plantation Journal of above said 9.311 Ha of safety zone area received from the Forest Divisional Officer, Kothagudem and requested to forward to the Prl.Chief Conservator of Forests (HoFF), Telangana, Hyderabad for further action.

Therefore, based on the report of the District Forest Officer, Bhadradri Kothagudem The TOPO Graphical map, Photographs and Plantation Journal of above said 9.311 Ha of safety zone area received from the District Forest Officer, Bhadradri Kothagudem are submitted herewith in (3) sets for favour of kind further necessary action.

This is submitted for favour of kind information and necessary action.

Encl: As above

Yours faithfully,

Signed by Daravath Bheema
Date: 31-01-2024 12:22:26
Reason: Approved

Chief Conservator of Forests,
Bhadradri Circle, Warangal.

Copy submitted to the Prl.Chief Conservator of Forests (FCA), Telangana, Hyderabad for favour of kind information and necessary action.

Copy to the District Forest Officer, Bhadradri Kothagudem for information.

//t.c.b.o.//

Superintendent 31/01/2024

1½ times of safety zone area in degraded forest land for the proposal of 124 Ha of GKOC Phase-II, for an extent of 9.311 Ha was raised in Compt., No. 3, Ramavaram Beat, Ramavaram Range of Kothagudem Division

DISTRICT FOREST OFFICER
Bhadradri Kothagudem Dist
Kothagudem

29/1/24

2386193/2024/FCA SECTION-PCCF

DISTRICT FOREST OFFICER
Bhadradri Kothagudem Dist
Kothagudem

29/1/24

CTION-PCCF

C.A. PLANTATION

BEAT: RAMAVARAM

AREA:

YEAR: 2001

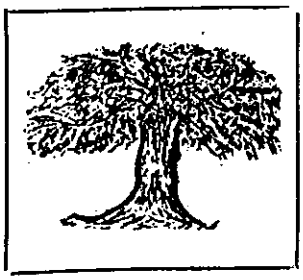
2386193/2024/FCA SECTION-PCCF

GOVERNMENT OF ANDHRA PRADESH

FOREST DEPARTMENT

KHAMMAM GIRCLE

FOREST WEALTH



SOURCE FOR HEALTH

PLANTATION JOURNAL

OF

YEAR 2001

1. Division : KOTHAGUDEM
2. Range : RAMAVARAM
3. District : KHAMMAM.
4. ~~Taluk~~ M. : KOTHAGUDEM
5. Panchayat Samithi : KOTHAGUDEM
6. Panchayat : S Incline.
7. ~~Sy. No.~~ R.F. Compt No. 3.

i) ✓ Territorial Division

ii) Functional Division

i) ✓ Territoriai

ii) Functional

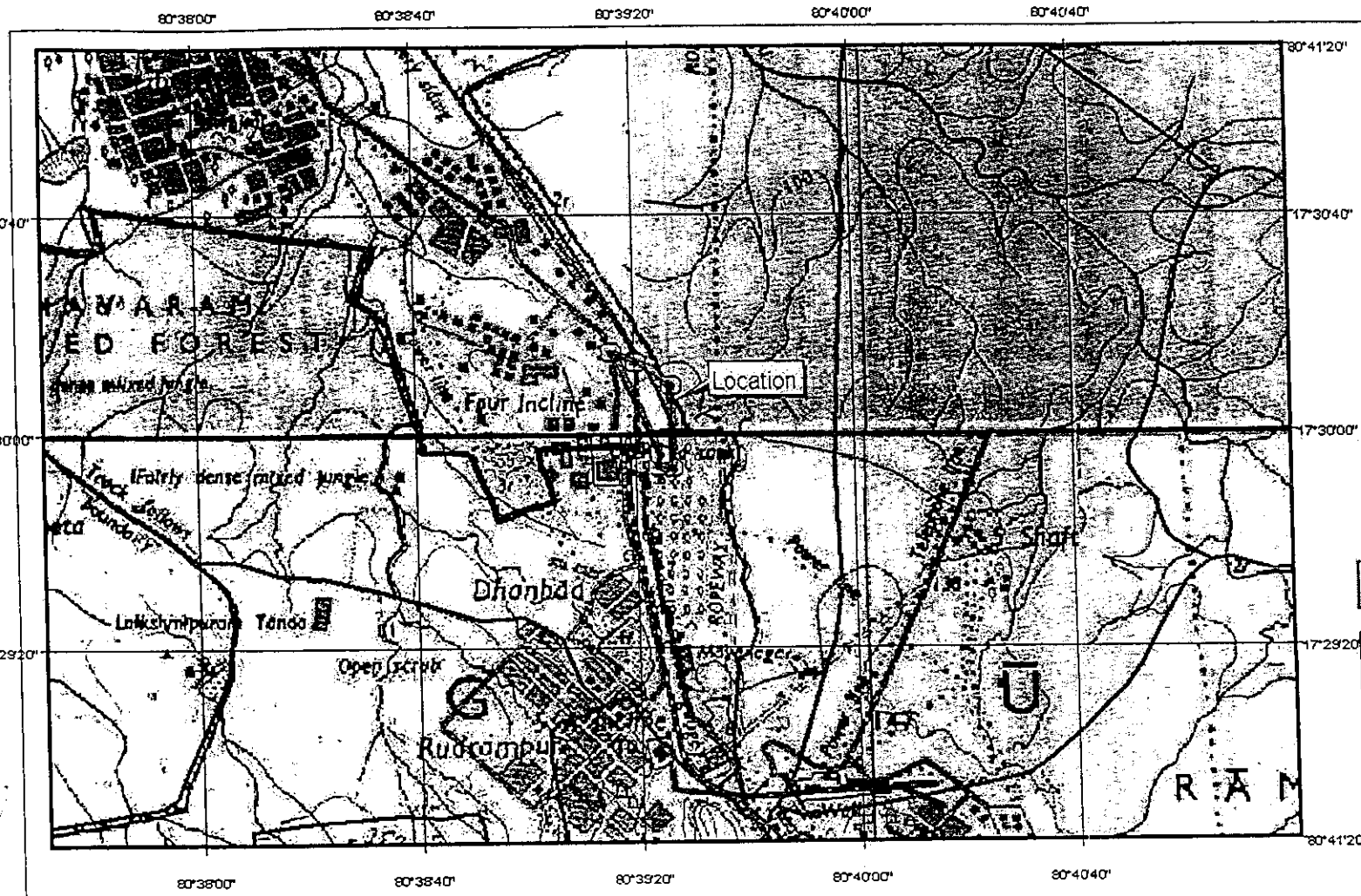
Name of Plantation : C.A.

Year of Plantation : 2001

Area : 9.311 Hr.

No. of Sectors : 4.

Location map of CA Plantation in Ramavaram Beat



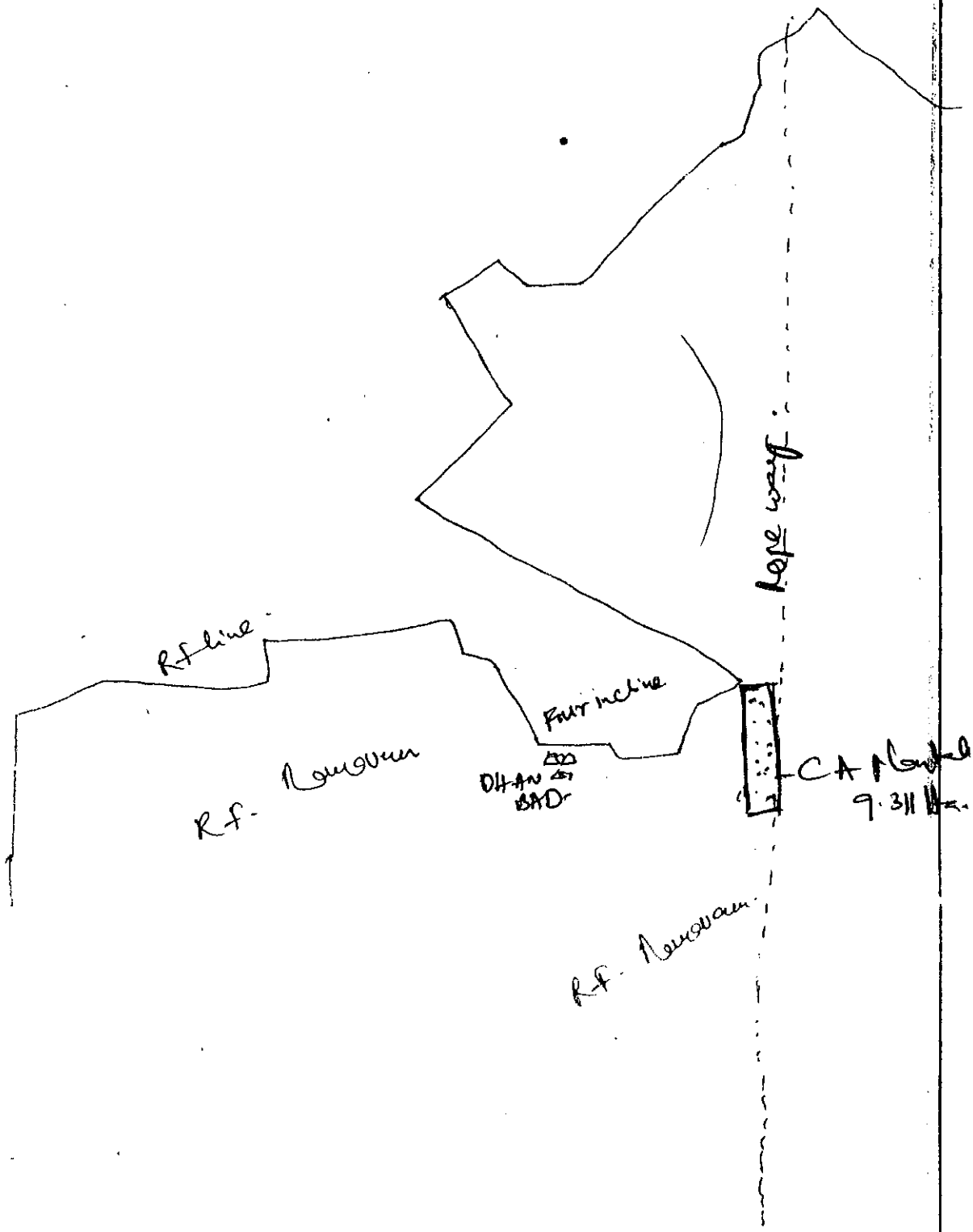
1:30472

Gross Area : 9.510 Ha
Net Area : 9.311 Ha

Compt.No. : 2 & 3
Beat : Ramavaram
Section : Ramavaram
Range : Ramavaram

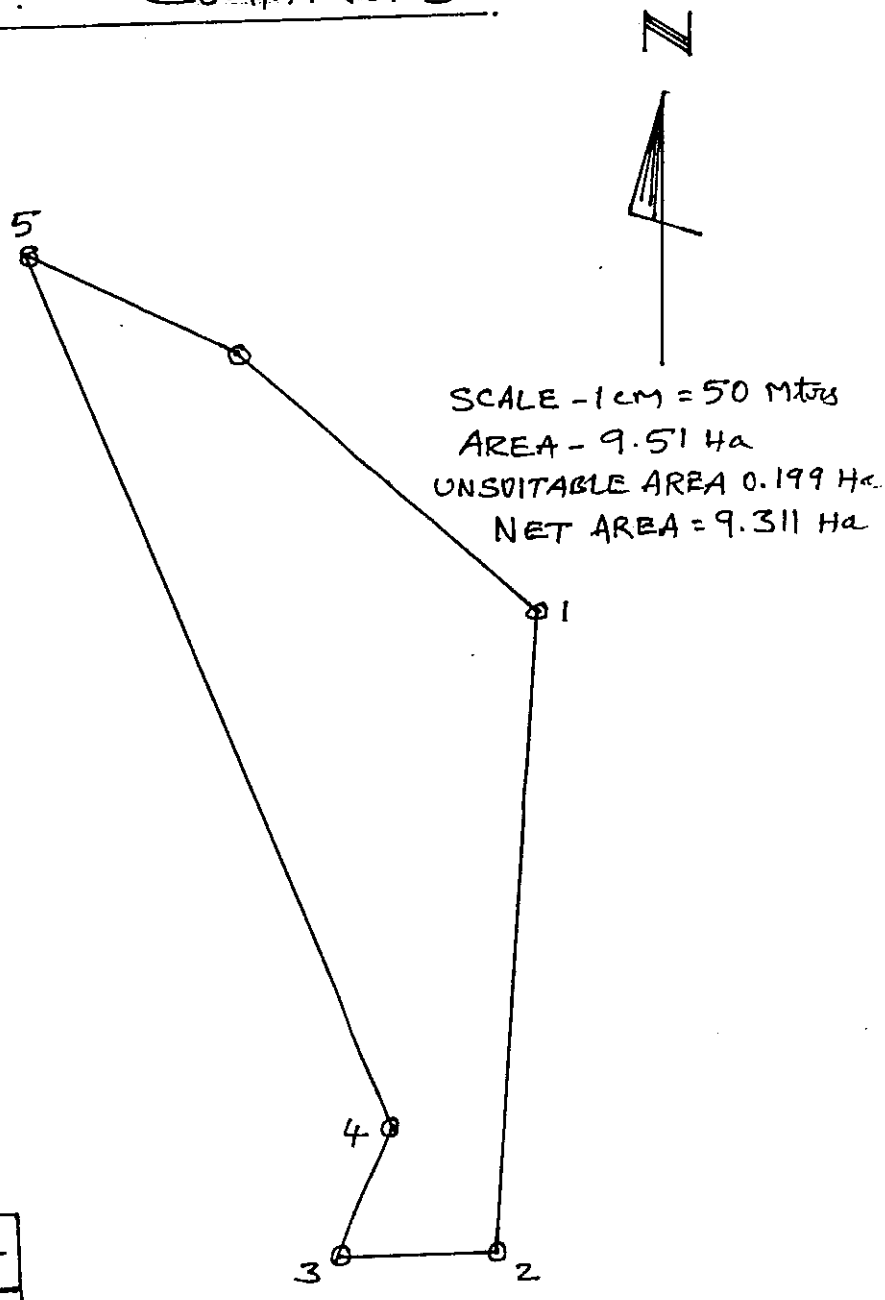
Sl.No	Latitude	Longitude
1	17.50236	80.65744
2	17.49817	80.65744
3	17.49820	80.65672
4	17.49879	80.65685
5	17.50400	80.65436
6	17.50354	80.65558

I. LOCATION MAP IN SCALE 1 CM=640 Mts. (1" = 1 MILE)



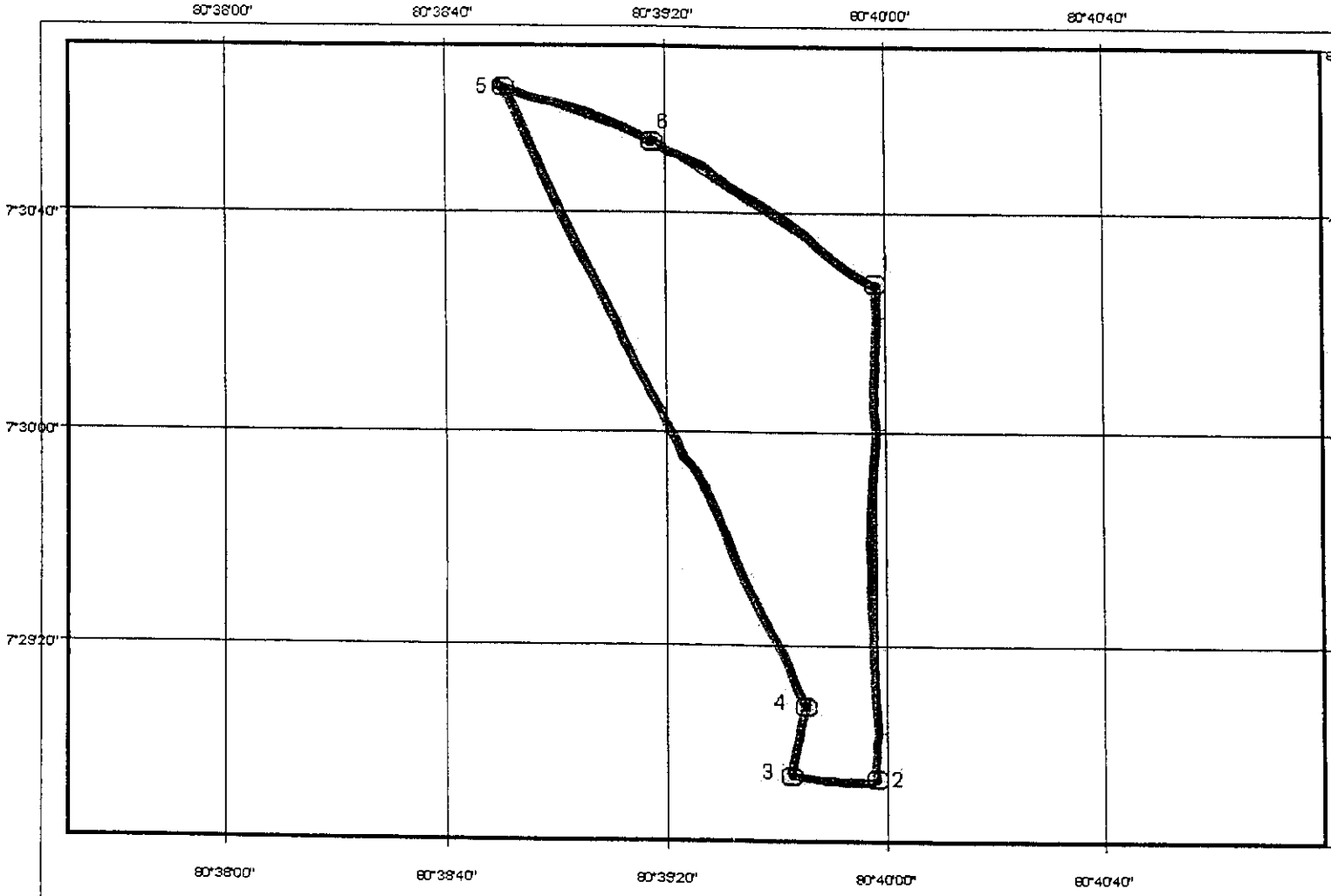
II. SURVEYED SKETCH IN SCALE 1 CM=160 Mts. (4" = 1 MILE)

SURVEYED SKETCH OF C.A PLANTATION IN RAMAVARAM BEAT. COMPT. NO: 3



STATION	BEARING	DISTANCE (mtrs)
1 TO 2	185°	425.8
2 to 3	270°	103
3 to 4	22°	90.8
4 to 5	339°	633.
5 to 6	116°	157.4
6 to 1	132°	263.6

Surveyed sketch of CA Plantation in Ramavaram Beat



N

1:5000

Gross Area : 9.510 Ha
Net Area : 9.311 Ha

Compt.No. : 2 & 3
Beat : Ramavaram
Section : Ramavaram
Range : Ramavaram

Sl.No	Latitude	Longitude
1	17.50236	80.65744
2	17.49817	80.65744
3	17.49820	80.65672
4	17.49879	80.65685
5	17.50400	80.65436
6	17.50354	80.65558

2386193/2024/FCA SECTION-PCCF

III. TREATMENT MAP

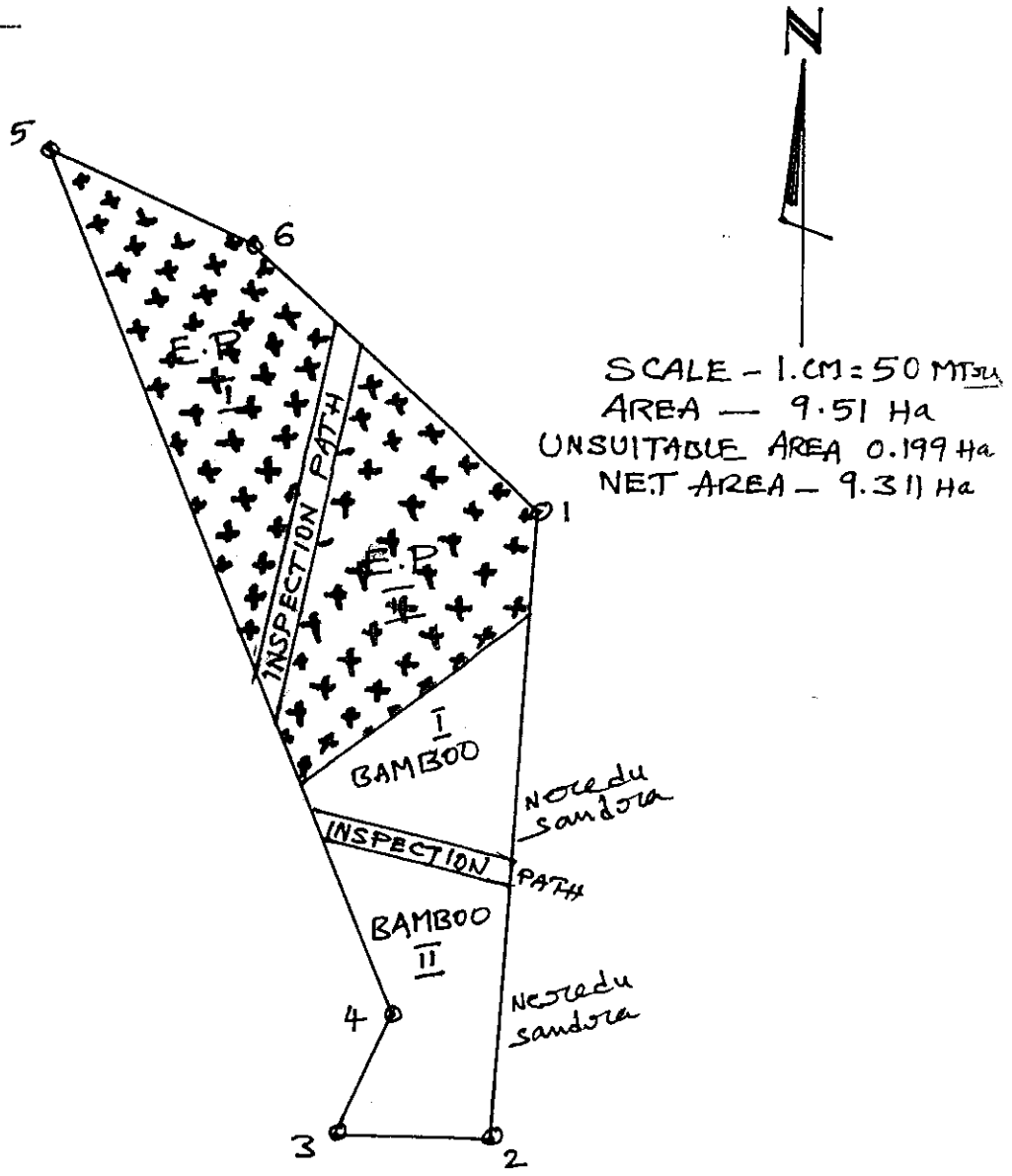
(Scale :- 1 CM = 80 Mts. (8" — 1 MILE)

(Stocking, Soil Type, Location of Soil pits, Natural features)

NOTE :— A minmum of 1 Soil pit for every 10 hects. area is to be dug where there is no change in soil texture.

TREATMENT MAP OF C.A PLANTATION IN RAMAVARAM BEAT

COMPT. NO. 3



SCALE - 1 CM = 50 MTS

AREA — 9.51 Ha

UNSUITABLE AREA 0.199 Ha

NET AREA — 9.311 Ha

STATION	BEARING	DISTANCE (MTS)
1 to 2	185°	425.8
2 to 3	270°	103
3 to 4	22°	90.8
4 to 5	339°	633
5 to 6	116°	157.4
6 to 1	132°	263.6

E.P. — 5 Ha — 5555 NOS

I — 2960

II — 2595

5555

BAMBOO - 4.311 Ha - 1725 NOS

I — 1059

II — 666

1725

IV. DETAILS OF PLANTATION

i) **Name** of the Reserved Forest/block — RAMAVARAM.

ii) Compartment No. : 3.

iii) Name of the series : CA. PLANTATION.

iv) Name of the plantation : CA. PLANTATION.

v) Species planted : E.P clones and Bamboo.

vi) Year of plantation : 2001

vii) Area in hectares : 9.311 Hr.

viii) Espacement : E.P clones – 3x3 mts = 5 Hq
Bamboo – 5x5 mts – 4.311 Hr.

ix) Total No. of planting points : E.P Clones – 5555
Bamboo – 1725, Nagadu – 800.
Sandra – 150

x) No. of Sectors : 4

xi) Area/planting points of each sector.

Sector No.	Area	Planting points
I	EP 2960 – 2.670 Hect	2960
II	" 2595	2.330 Hect	2595
		5.00	5555
III	I Bamboo	2.650 Ha	1059
IV	II "	1.661 Ha	666
		4.311	1725
V			
VI			

VI. (1) HISTORY IN NARRATIVE FORM

I. SITUATION

Location, Means of approach, Nearby Roads, Rivers, Water-facilities, Villages and labour available, previous experience gained and Techniques adopted, Plantations Altitude, Aspect, slopes etc., Geography, Topography etc., to be given in as much detail as possible.

Locality :- This plot is located in Compt No. 3 of Rameswaram Block in Rameswaram Reel.

Means of approach — Jeep and motor cycle.

Near by Roads — Aerial Rope way Road and KTG to Tiruvuru Roads. (CRAB)

villages — 3 inches, 4 inches and 5 inches.

Labour available — 3 inches, 4 inches and 7 inches.

Aspect — west to South East.

VI. 2. (a) GEOLOGY, ROCK & SOIL

(Type, Depth Drainage, Laterrite or Rocky out - crops)
Soil profile, Soil Analysis Date & Profile diagram

GEOLOGY & ROCK : Sedimentary terrain having mostly sand stone silt some clay and shale layers.

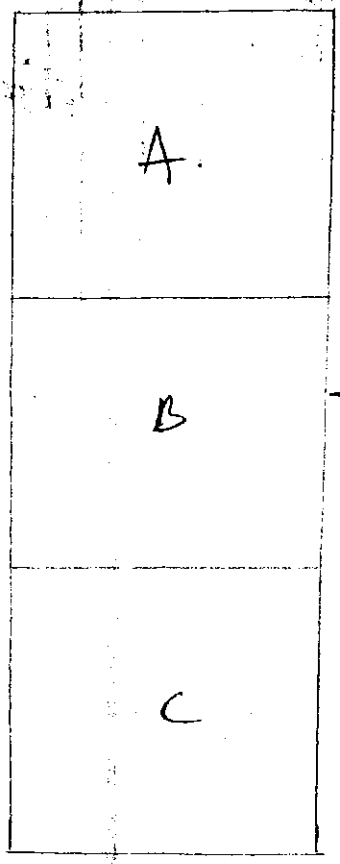
DRAINAGE : well drainage.

10

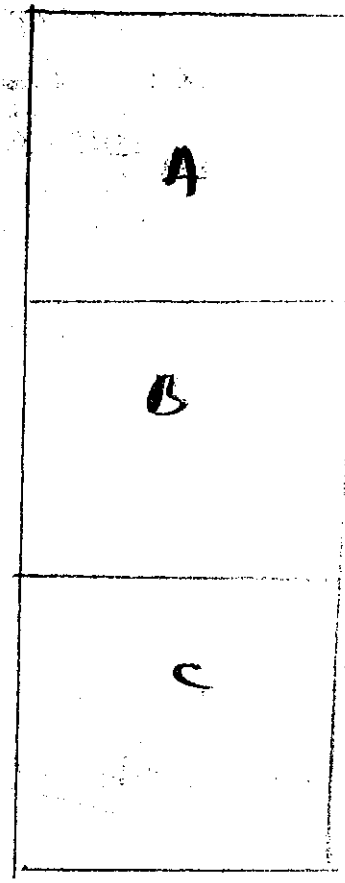
10 (b) SOIL DESCRIPTION

(i) PROFILE DIAGRAM:

(4) Pits



5th pit.



10 (c) SOIL DESCRIPTION

Area (09.311) Hectares (15) Bags Collected

వ్యవసాయ శాఖ - సాయిల్ హెల్త్ కార్డ్

భూసార పరీక్షా ఫలితాలు (సూక్ష్మపోషక పదార్థములతో సహా) మరియు ఎరువుల సిఫారస్సు

భూసార పరీక్షా కేంద్రము కొత్తగూడెం నమూనా సంఖ్య 2618-2629 తేది 9/12/24

రైతు పేరు AP-Forest Range Officer గ్రామము Ramavaram సర్వే నెం. C.A. Mambaka

మండలం Kothagudem జిల్లా ఖమ్మం Light soils and clayee soils

I.

1. నేల స్వభావము	(51)	తేలిక నేలలు ✓	మధ్యరకపు నేలలు	బర్రువు నేలలు ✓
2. ఉదజని సూచిక (పి.హెచ్.)	(7.26)	ఆమ్లము	తటస్థము ✓	అల్ప/మధ్య/అధిక క్షారము
3. లవణ సూచిక (ఇ.సి.)	(0.19)	సామాన్యం ✓	మొలకెత్తుట కష్టం	పంటలకు హానికరం
4. సేంద్రియ కర్బనము (ఓ.సి.)	(M)	తక్కువ	మధ్యస్థము ✓	ఎక్కువ
5. లభ్య భాస్వరము(పి) కి.గ్రా/ఎ.	(43)	తక్కువ	మధ్యస్థము ✓	ఎక్కువ
6. లభ్య పొటాష్ (కె) కి.గ్రా/ఎ.	(167)	తక్కువ	మధ్యస్థము ✓	ఎక్కువ
7. లభ్య జింకు (పి.పి.యం.)	(—)	తక్కువ	ఎక్కువ	
8. లభ్య మాంగనీసు (పి.పి.యం.)	(—)	తక్కువ	ఎక్కువ	
9. లభ్య ఇనుము (పి.పి.యం.)	(—)	తక్కువ	ఎక్కువ	
9. లభ్య రాగి (పి.పి.యం.)	( )	తక్కువ	ఎక్కువ	

(Urea)	DAP	(MOP
N - 1000	P - 2000	K 0500

వేయవలసిన పైరు Teak, Eu clonal & Bamboo ఖరీపు/రబీ

II. పైరుకు అవసరమైన పోషక పదార్థములు — సిఫారసు చేయబడిన పోషక పదార్థములు — స్థానికంగా లభ్యమగు ఎరువుల మోతాదు

1. సేంద్రియపు ఎరువులు ట/ఎ 5 (Tons) Farm Yard Manures
2. నత్రజని కి.గ్రా/ఎ. .... అమోనియం సల్ఫేట్ .... యూరియా 1000 .... కాంప్లెక్స్ ఎరువులు ....
3. భాస్వరము (పి) కి.గ్రా/ఎ, ... సూపర్ ఫాస్ఫేట్ .... డి.ఎ.పి. 2000 .... కాంప్లెక్స్ ఎరువులు ....
4. పొటాష్ (కె) కి.గ్రా/ఎ. .... మ్యూరేట్ ఆఫ్ పొటాష్ ....0.500.... కాంప్లెక్స్ ఎరువులు ....

లభ్యతను బట్టి వివిధ రసాయనిక ఎరువులను వాడవచ్చును

పైన సూచించిన వాటికి బదులుగా ఇతర రసాయనిక ఎరువులు వాడవలసి వచ్చినప్పుడు పాటించవలసిన సమీకరణ.

$$\text{వాడవలసిన ఎరువు మోతాదు కి./ఎ.} = \frac{\text{సూచించిన పోషక పదార్థము మోతాదు కి.గ్రా ఎకరాకు}}{\text{ఎరువు సంచి మీద సూచించిన పోషక విలువ}} \times 100$$

Agricultural Officer
A.M.C. Soil Testing Lab
KOTHAGUDEM

VII (a) ABSTRACT ESTIMATE

Name of the Estimate :- Advance operation in C.A Ramavaram plantation area.

S. No. :- 633/2000-2001.

Name of Division :- Kothagudem.

Amount sanctioned Rs. :- 115,100-00

Name of Range :- Ramavaram

Budget Head :- 4406-01-1-1-05 C.A.

Sl. No. 1	Quntity 2	Description of work 3	F. S. R. Item No. 4	Rate 5 Rs. P.	Per 6	Amount 7 Rs. P.
1.	1.6 KM.	Survey and demarcation.	1.10.	456	KM.	730-00.
2.	9.311 Hac.	Clearance of min growth;	32.1	722.75	Hac.	6729-00.
3.	9.311	Evenly spreading the growth lopping and burning the area twice, dragging of cut growth material out side the plantation	32.2	722.75	Hac.	6729-00
4.	744.576 CM	Uprooted of Stumps to a depth of 45 cm.	32.3	123.25	Cm	91769-00
5	78 days.	Watch and ward one person.	-	53	day.	4134-00.
6	140 RKM	Digging of cattle proof trench. (manually)	2.13	36	RKM	5040-0
					Total.	115,100-00

Forest Range Officer
RAMAVARAM

VII (a) ABSTRACT ESTIMATE

Name of the Estimate :- C.A. enrichment Plantation.

S. No. :- 633/2000-2001 dt. 2-5-

Name of Division :- Kothagudem.

Amount sanctioned Rs. :- [illegible]

Name of Range :- Ramavaram.

Budget Head :- C.A.

Sl. No. 1	Quntity 2	Description of work 3	F. S. R. Item No. 4	Rate 5 Rs. P.	Per 6	Amount 7 Rs. P.
1.	1.6 KM	Survey and demarcation	1.10	456=00	KM	7[illegible]
2.	9.311 Ha.	Clearance of Misc growth cutting of dead stumps and billeting fascili...	32.1	722=75	1 Ha	67[illegible]
3.	9.311 Ha	Evenly spreading the felled growth heaping and burning of the area twice dragging of cut growth material out side the Plantation.	32.2	722=75	9.311 Ha	67[illegible]
4.	744.516 cmt	uprooting of the stumps to a depth of 40 cms	32.3	123=25	1 Cent	91,7[illegible]
5.	78 days	watch and ward one person	—	53=00	1 day	4,1[illegible]
6.	1140 Rmt	Digging of cattle proof trench (manually)	2.13	36/-	Rmt	50,[illegible]
						1,15,1[illegible]

VII (a) ABSTRACT ESTIMATE

Name of the Estimate :- Raising of C.A. Mountcli Ramavaram.

S. No. :- 85 | 2001-2002 Dt. 12-

Name of Division :- Kothagudem

Amount sanctioned Rs. :- 76,940

Name of Range :- Ramavaram.

Budget Head :- CA

Sl. No. 1	Quntity 2	Description of work 3	F. S. R. Item No. 4	Rate 5 Rs. P.	Per 6	Amount 7 Rs. P.
1.	5 Ha. / 5 Ha.	Ploughing with heavy duty tractor above 45 H.P. Ist time / IInd time	32.4 / 32.5	2032=00 / 1355	Ha. / Ha.	10,160=00 / 6,775=00
2.	5 Ha.	Alignment of staking including preparation of stakes 3m x 3m.	32.6 (a)	234=00	Ha.	1170=00
3.	4.311 Ha.	Alignment & staking 5m x 5m	32.6 d	105=75 (4.311 Ha. struck)	Ha.	456=00
4.	5555 Nos	Scooping of the Earth	32.8 (a)	0.75	Pit	4,166=00
5.	1724 Nos	Digging of Pits 5m x 5m ...	32.8 (b)	1.25 (1724 struck)	Pit	2155=00
6.	7279	Transport of seedlings from nursery to Mountcli site including loading and unloading	33.1 (a)	407=40	1000	2965=00
7.	7279	Internal transport in Mountcli on head load	33.3 (a)	96=75	1000	704=00
8.	7279	Planting the seedlings	33.4 (a)	33=25	100	2,420=00
9.	5 Ha.	Ist soil working by digging with crowbar or Pickaxe.	33.11 (c)	668=00	Ha.	3340=00
10.	4.311 Ha.	Ist soil working by digging with crow bar or Pickaxe to a depth of 10 cm 5m x 5m.	33.11 (d)	334=00	Ha.	1440=00
			33.19	As per actuals		700=00
11	7279	Cost of Chloradin dust 5%	33.20	As per actuals.		1000=00
12.	—	Cost of fertilizer	33.21 (c)	111=00 (struck)	(Ha. struck)	555=00
13.	5 Ha.	Application of fertilizer	33.22 (a)	36=75	Ha.	158=00
14.	4.311 Ha.	Application of fertilizer.	33.22 (c)	24=12	Ha.	120=00
15.	5 Ha.	Enumeration of Plants	33.22 (d)	14=75	Ha.	63=00
16.	4.311 Ha.	Enumeration of Plants	—	58=00	day	15080=00
17.	260 day	Pay of watchman	6.9	22=12	Rmt	22499=00
18.	1468 Rmt	Brushwood fencing	—	As per actual		700=00
19.	1 —	Mountcli Board				806=00
20.	80 Rmt	Formation of inspection path.	2.19	76=38	20 Rmt	
						76,940

2386193/2024/FCA SECTION-PCCF Advance opns. CA - Ramavaram, 2001.

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VII Expenditure Statement

(a) Pre-Planting Year

Name of the Estimate : CA.

Name of the Scheme under which the work is being executed : CA.

Note : (1) In the Vacant colums of the heading, the items of works with Quantities and amount sanctioned should be entered in RED INK

Date	Vr. No.	Item Work	Date of Execution From	Date of Execution To	Clearance of pro growth Qty.	Clearance of pro growth Exp.	Dragging to cut growth Qty.	Dragging to cut growth Exp.	Qty.	Exp.
1	2	3	4		5		6		7	
						Rs. P		Rs. P		Rs. p
31-1-2001	37	Clearance of pro growth	8		5 Ha	3614				
	38	"			4.31	3115				
	39	Dragging to cut growth					5	3614		
	40	"					4.31	3115		
	41	[illegible] of [illegible]								
	42	"								
	43	"								
-2-2001	61	Growing & [illegible]								
"	62 20 70	[illegible] of [illegible]								
3-2001	49	"								
	50	"								
	51	"								
	52	"								
	53	"								
	54									
	55	Pay of watcher								
	56	"								
	57	"								
	64	[illegible] of cattle [illegible]								
	65	"								

2386193/2024/FCA SECTION-PCCF

(EXTRACT OF WORKS REGISTER)

Head of Account

S.O.No. : 633/2000-2001 Dt 23-3-2001.

Amount Sanctioned Rs. 1,15,100.

(2) In the body the items of works executed Voucher wise, date wise, and amount Charge Should be filled in BLUE INK

Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Total Voucher Amount
8		9		10		11		12		13		14		15
	Rs. P		Rs. P		Rs. p		Rs. P		Rs. P		Rs. p		Rs. P	3614.
														3115.
														3614.
														3115.
														4875
0.75	4875 ~~5500~~													4875
0.75	4875													4875.
0.75	4875													675
		1.42	675											43931.
	43931													4930.
	4930													4920
	4920													4920
	4920													4920
	4920													4920
	4920													3636
50	3636													1378
		2		26	1378									1378
				26	1378									1378
				26	1378									4500
						125	4500							732
						2033	732				Total			1,15,100

Forest Range Officer
RAMAVARAM

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Raising of C A Polythene Nursery ~~VII/~~ Expenditure Statement

(b) Pre-Planting Year

Name of the Estimate : ~~CA~~ Raising of Polythene Nursery.

Name of the Scheme under which the work is being executed : C A.

Note : (1) In the Vacant colums of the heading, the items of works with Quantities and amount sanotioned should be entered in RED INK

Date	Vr. No.	Item Work	Date of Execution From	Date of Execution To	formation of sunken bed Qty.	formation of sunken bed Exp.	Pre treatment of seed Qty.	Pre treatment of seed Exp.	Qty.	Exp.
1	2	3	4		5		6		7	
						Rs. P		Rs. P		Rs. p
01-1-2001	25	formation of sunken bed			6	~~[illegible]~~ 514				
	26	pretreatment of seed			~~6~~	~~61.25~~	~~36~~ 6	367		
	27	watering								
	28	weeding formation of [illegible]								

(EXTRACT OF WORKS REGISTER)

Head of Account

S.O.No. : 635/2000-2001 Dt 28-2-2001

Amount Sanctioned Rs. 2,590=00

(2) In the body the items of works executed Voucher wise, date wise, and amount Charge Should be filled in BLUE INK

[illegible]		Weeding		[illegible]		[illegible]		[illegible]		weeding				Total Voucher Amount
Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	
8		9		10		11		12		13		14		15
	Rs. P		Rs. P		Rs. p		Rs. P		Rs. P		Rs. p		Rs. P	514=00,
														367
														472
6	472													142
6	~~472~~	6	92	6	50									1495=00

Forest Range Officer
RAMAVARAM

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VII Expenditure Statement

(c) Year of Planting

Name of the Estimate : Raising of Seedling Nursery [illegible]

Name of the Scheme under which the work is being executed : CA.

Note : (1) In the Vacant colums of the heading, the items of works with Quantities and amount sanctioned should be entered in RED INK

Date	Vr. No.	Item Work	Date of Execution From	Date of Execution To	Clearing of site [illegible] Per Bed 8.12 81 Qty.	Exp.	Alignment of Beds 1.75 43 Qty.	Exp.	Collection [illegible] Qty.	Exp.
1	2	3	4		5		6		7	
						Rs. P		Rs. P		Rs. p
31-1-2001	29	Clearing of site			10 Beds	81=00				
31-3-2001	66	Alignment of Beds					10 B	43		
31-1-2001	30,31	Collection [illegible]							10 B	59[illegible]
31-1-2001	32	opening & bag filling								
	33	Procuring [illegible] Seeds Transplanting into Beds								
31-1-2001	34	watering to beds								
28/2/2001	60									
31/3/2001	58									
31/1/2001	35	weeding								
	59,									
31/3/2001	55									
8/2/2001	58	[illegible]								

(EXTRACT OF WORKS REGISTER)

Head of Account C.A.
S.O.No. : 684/2009.
Amount Sanctioned Rs. 28497/-

(2) In the body the items of works executed Voucher wise, date wise, and amount Charge Should be filled in BLUE INK

peining bags with filling 346.62		Pricking 2 art 12 Seeded Nursery Into Bag		Pricking of art of Seedel nursery 23/100		Replating of Casuals 16.25/1000		watering to bag twice a day 60.25/704		weeding to bags twice on Mon 12.37/...		Shifting Grading of ... 49.50/...		Total Voucher Amount
Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	
8		9		10		11		12		13		14		15
	Rs. P		Rs. P		Rs. p		Rs. P		Rs. P		Rs. p		Rs. P	
														81
														43
														5990
10 B	3466													3466
														460
				2000	460									1806
						—	—	10 B	1806					
										10 B	741			741
												10 B	990	990
														13579

Forest Range Officer
[illegible]

VIII Expenditure Statement
(d) 2nd Year of Planting

Name of the Estimate :

Name of the Scheme under which the work is being executed :

Note : (1) In the Vacant colums of the heading, the items of works with Quantities and amount sanctioned should be entered in RED INK

Date	Vr. No.	Item Work	Date of Execution		Removing Chemf & OK engra 1550		Maintenance of Lengu do		raise expo tools imp 66	
			From	To	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.
1	2	3	4		5		6		7	
						Rs. P		Rs. P		Rs. p
31/3/201	60	cost & clearing			8 D	146				
	69, 70, 71	maintenance of lengu					10 D		1250	
31/3	68	raise tools expo								166
	69	cost & fencing								
31/4	9	cost & polythene bag								
31/3/201	61, 62, 63, 72, 73	pay to worker								

(EXTRACTION WORKS REGISTER)

Head of Account

S.O.No. : 634 |20|

Amount Sanctioned Rs.

(2) In the body the items of works executed Voucher wise, date wise, and amount Charge Should be filled in BLUE INK

Cost of Irrigation 16.50		Cost of Polythin bags 86/-		Weeding watering 53/-										Total Voucher Amount
Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	
8		9		10		11		12		13		14		15 13/5/??
	Rs. P		Rs. P		Rs. p		Rs. P		Rs. P		Rs. p		Rs. P	
														146
														1256
														160
	165													165
		90 5	~~1740~~ 86/10 1740	1740										~~1740~~
				108	5724									5724
														28,788 [illegible]

Forest Range Officer
RAMAVARAM

VII Expenditure Statement

(e) 3rd Year of Planting

Name of the Estimate : Kamdenle ~~Bamboo~~ Nursing 20,000 Bamboo Sedlg

Name of the Scheme under which the work is being executed : CA

Note : (1) In the Vacant colums of the heading, the items of works with Quantities and amount sanctioned should be entered in RED INK

Date	Vr. No.	Item Work	Date of Execution From	Date of Execution To	watering to beds 1986/- Qty.	watering to beds 1986/- Exp.	weeding to bags 412 Qty.	weeding to bags 412 Exp.	Shifting & grading 1637 Qty.	Shifting & grading 1637 Exp.
1	2	3	4		5		6		7	
						Rs. P		Rs. P		Rs. p
28/3/2001	13	watering to beds			10 B	1324				
28/7	12 } 45	weeding to beds					10 B	412		
28/8 28/7	14 } 46	Shifting & grading							10 B	1585
28/5	15 16	Pay 2 watchr 4/2001 5/2001								
28/7	47	" 6/2001								
28/5	17	cost diesel								

(EXTRACT OF WORKS REGISTER)

Head of Account C.A

S.O.No.: 5/2001-02

Amount Sanctioned Rs. 9540/-

(2) In the body the items of works executed Voucher wise, date wise, and amount Charge Should be filled in BLUE INK

Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Total Voucher Amount
8		9		10		11		12		13		14		15
	Rs. P		Rs. P		Rs. p		Rs. P		Rs. P		Rs. p		Rs. P	1824
														412
														458
		78	4524											4524
					510									510
														8355

Forest Range Office
RAMAVARAM

VII Expenditure Statement

(f) 4th Year of Planting

Name of the Estimate : C.A. Plantation [illegible] – 9.311 Ha

Name of the Scheme under which the work is being executed : [illegible] CA

Note : (1) In the Vacant colums of the heading, the items of works with Quantities and amount sanctioned should be entered in RED INK

Date	Vr. No.	Item Work	Date of Execution From	Date of Execution To	Ploughing 10160 [illegible] Qty.	Exp.	[illegible] 6775 Qty.	Exp.	Alignment [illegible] Qty.	Exp.
1	2	3	4		5		6		7	
						Rs. P		Rs. P		Rs. p
[illegible]	10,11	Ploughing			3966	7957				
[illegible]	59	"			1064	2227				
[illegible]	50 (52)	" [illegible]					5 / 400	6775		
[illegible]	53	Alignment							5 / 100	1170
[illegible]	54	Scraping [illegible]								
	55	Digging & pits								
	56	Transportation [illegible] Seeding								
	57	[illegible] transport							9.311	451[illegible]
	58	Planting [illegible]								
5-8-2001	12	Alignment & [illegible]								

(EXTRACT OF WORKS REGISTER)

Head of Account CA

S.O.No. : 85/201

Amount Sanctioned Rs. 46,940/-

(2) In the body the items of works executed Voucher wise, date wise, and amount Charge Should be filled in BLUE INK

Alignment		Scraping of 15 cents		Digging of pits 5555 M		Transport of seedy		Internal transports		Planting of seedy		1st soil working by		Total Voucher Amount
Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	
8		9		10		11		12		13		14		15
	Rs. P		Rs. P		Rs. p		Rs. P		Rs. P		Rs. p		Rs. P	
														7957
														2227
														6775
														1170
5555	4166	5555	4166											4166
		1724 M	2155	1724	2155									2155
						7279	2965							2965
								7279	704					704
										7279	2420			2420
														30539
														456

Forest Range Officer
RAMAVARAM

2386193/2024/FCA SECTION-PCCF

VII Expenditure Statement
(g) 5th Year of Planting

Name of the Estimate :

Name of the Scheme under which the work is being executed :

Note : (1) In the Vacant colums of the heading, the items of works with Quantities and amount sanctioned should be entered in RED INK

Date	Vr. No.	Item Work	Date of Execution From	Date of Execution To	Ist soil working [illegible] Qty.	Exp.	cost of Chlorodil [illegible] Qty.	Exp.	Cost of Palozia 100 Qty.	Exp.
1	2	3	4		5		6		7	
						Rs. P		Rs. P		Rs. p
26/7	59	cost of Chlorodil							100	
	60 to 63	Brush wood fencing								
	64	wages to watchers								
5-8-2001	13, 15	Brush wood fencing								
	16	Application of fertilizer								
"	17	-do-								
	18									
"	19									
"	21, 22	pay of watcher								
5-9-2001	10, 11	weeding								
	12	Ist soil working								
	13	Soil working			4.311	334	1440			
	14	Pay of watcher 9/2001								
5-10-2001	8	Pay of watcher 10/01								

(EXTRACT OF WORKS REGISTER)

Head of Account

S.O.No. : 88/201

Amount Sanctioned Rs.

(2) In the body the items of works executed Voucher wise, date wise, and amount Charge Should be filled in BLUE INK

Application & Fertilizer 555		Application & Removal 4.3113678 158		Bamboo & Plants 120		Bamboo & Plants 63		Reg & Weeding 260 15080		Brush wood Removing 22499		Planting & Bund 700		Total Voucher Amount 30,539
Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	
8		9		10		11		12		13		14		15
	Rs. P		Rs. P		Rs. p		Rs. P		Rs. P		Rs. p		Rs. P	700
									~~15830~~	715.64	15830			15,830
									1508					1508
														48,577
										669.369	14806			14806.
		4.311	158											158
[illegible]	555							~~52day~~	~~3016~~					555. ~~3016~~ 3016
								52day	3016					
														67,578
														4037
														3340
														1440
								26 d	1508					1508
														14,362
								26d	1508					1508
														1508

VII Expenditure Statement

(g) Subsquent Year Maintenance

Name of the Estimate :

Name of the Scheme under which the work is being executed :

Note : (1) In the Vacant colums of the heading, the items of works with Quantities and amount sanotioned should be entered in RED INK

Date	Vr. No.	Item Work	Date of Execution		Formation of Inspection Path		Circular weeding		Application of Fertilizer	
			From	To	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.
1	2	3	4		5		6		7	
						Rs. P		Rs. P		Rs. p
25-8-2001	19	Formation of inspection path			200	764				
"	20	circular weeding					1725	594		
"	23	Application of fertilizer								
25-9-2001	10, 11	weeding					85 Hec	8074		
25-12-2001	9	Pay of watcher 11/01								
25-2-02	4	Pay of watcher 1/02								

(EXTRACT OF WORKS REGISTER)

Head of Account

S.O.No. : 88/2007

Amount Sanctioned Rs.

(2) In the body the items of works executed Voucher wise, date wise, and amount Charge Should be filled in BLUE INK

														Total Voucher Amount
Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	Qty.	Exp.	B/F 67568
8		9		10		11		12		13		14		15
	Rs. P		Rs. P		Rs. p		Rs. P		Rs. P		Rs. p		Rs. P	764 594 920. 69846
														8074=00 1508=00 1508=00 11090=00
												G. Total.		88,[illegible]

Forest Range Officer

RAMA[illegible]

X. OBSERVATION OF RANGE OFFICERS

3-2-2001:- Today inspected CA area of 9.311 Ha. in Ramavaram Beat in compartment No. 3 of Block Ramavaram. Advance works are under progress. i.e clearance of the Advance works are under progress and dragging work in ... growth is almost completed and dragging work is under progress. Instructed the Forester to complete the balance work immediately and start the pit work.

3/2/2001
Forest Range Officer
Ramavaram.

27-3-2001:- Today inspected CA area of 9.311 Ha. in Ramavaram Beat in compartment No. 3 of Block Ramavaram. ... about complete Advance works are ... to complete neatly, instructed the uprooted work to complete neatly in stakes. Forester to keep the uprooted ...

27/3/2001
Forest Range Officer
Ramavaram.

?-6-2001:- Today inspected C.A. Plantation area 9.311 Ha. Ploughing in E.P cleared area of 5 Ha. Plot is under progress. 4 Ha. Ploughing is completed. balance 1 Ha area ploughing is to be completed tomorrow. Instructed the Forester to call the successful bidder to lift the balance uprooted material immediately and keep the area clean. Further instructed the Forester to start the Brush wood fencing immediately and keep the Plantation watcher strictly to avoid the cattle trespass and instruct the Forester to complete all operations one by one immediately and start the Planting. If fails the Plantation the FSO will be held responsible.

24/6/2001
FRO Ramavaram

X. OBSERVATION OF RANGE OFFICERS

5-7-2001 :- Today inspected C.A. Plantation area 9.311 Ha. Alignment and stacking in 5 Ha area at espacement of 3x3 mts is completed. The uprooted material which is laying on the plot has already lifted. The scattered uprooted material laying in the plot should be removed. Another instructed the forester in the plantation area some high stumps are appearing. They should be cut up to the ground level and dropped out side the plantation area. Brush wood fencing is under progress. Instructed the forester to complete all balance works immediately and start the planting work.

sd/- 5/7/2001
FRO Ranakar

11-7-2001 :- Today inspected C.A Plantation 9.311 Ha. Clonal planting is under progress. 4000 clonal planting ... clones were planted at an espacement ... clones are balance 1555 Nos of E.P clones are planted in the balance area of 5 Ha. Instructed the forester to start the ... and stacking and pitting work in 4.311 area for Bamboo plantation and start ... Bamboo planting and one side brush wood ... not completed, it should be finish it immediately.

sd/- 11/7
FRO ...

X. OBSERVATIONS OF RANGE OFFICERS

[illegible]-7-2001 :- Today inspected CA. Plantation 9.311 Ha area. Planting of Bamboo in 4.311 Ha is under progress. Instructed the Forester to complete the planting work immediately. The Forester should take care to filling the Pits by scrap during planting and see to [illegible] top soil around the pit and planting [illegible] and packing. The forester is instructed to complete the brushwood fencing immediately. Need to [illegible] a chance for grazing even provide Plantation watcher.

[illegible]
Forest Range Officer
[illegible]

2[illegible]-7-2001 :- Today inspected CA. Plantation 9.311 Ha. area, Planting of Bamboo 1725 Nos. in 4.311 Ha is completed. Instructed the Plantation watcher strictly to Forester to keep the Plantation site, [illegible] grazing should not be allowed. Keep the Plantation Board immediately. Instructed the Forester to carryout the other works like weeding, soil working as per the Calender of Operation.

[illegible]
FRO [illegible]

X. OBSERVATION OF RANGE OFFICERS

7-8-2001 :- Today inspected CA-Plantation 9.311 Ha of the Ramavaram Beat. E.P clones are well established and observed increment in growth. Bamboo also well establishing and found new shoots coming from ground level. Fertiliser applied in time and giving good results. Instructed the forester to verify the casualties if any and immediately replace it. Further instructed the forester to keep the plantation watcher strictly and protect the plantation.

7/8/2001
FRO Ramavaram

9-9-2001 . Today inspected CA.Plantation 9.311 Ha. The E.P clonal growth is very well [illegible]. E.P clones are 40 cm to 90 cm height of the E.P Clones are 4.311 Ha area Bamboo 5 Ha area. Remaining [illegible] It is observed that also well established. [illegible] around the plantation cattle are wandering [illegible] cattle grazing for B[illegible] and seen cattle [illegible] The forester is instructed to educate [illegible] see that not leave the cattle [illegible] the plantation [illegible] and the watcher should keep good watch on [illegible]

9/9/2001
FRO [illegible]

X. OBSERVATION OF RANGE OFFICERS.

23-11-2001 :- Today inspected CA. Plantation 9.311 Ha. in Ramavaram Beat of Compt No.3. inspected the E.P Clones and found in good condition. The in 5 Ha area. Then inspected the Bamboo patch in 4.311 Ha. area. The Neredu seedlings were planted in place of damaged Bamboo plants and in the area casualty (100) plants also planted in hard soil. Some Sandra plants were planted (800) No's of Neredu plants were planted during the second week of the month. The watering is being done manually for survival of Neredu plants. The 80% survival of plants are noticed. The Brush wood fencing is fully damaged due to heavy cattle pressure of seasonal labour. The cattle proof trench was dug up for left side of the plantation, due to hard soil other side trench were was not carried. The Forester is instructed to take up the cattle proof trench works with top priority to protect the plantation. Further the Forester has been instructed to carry out the soil working for plants.

23/11/01
FRO Ramavaram,

31-12-2001 :- Today proceeded to CA. Plantation 9.311 Ha. in Ramavaram Beat in Compt No.3. Inspected the E.P Clones in 5 Ha area, the growth of the plantation is good. then inspected the Bamboo patch in 4.311 Ha area. where the soil working was completed. the Neredu plants are also in good condition and 80% Neredu seedlings are drying up. The watering is carrying out regularly, instructed the Forester to carry out the soil working in E.P 5 Ha area even the Bamboo is browsed, the rhizomes are in living condition, If it protected the Bamboo also comes up with good clumps. Forester should ensure the protection of the Plantation.

31/12/01
FRO Ramavaram

Date of inspection	Observation of the Range Officer
2-2-2002	Today inspected to CA enrichment plantation 9.311 Ha. in Compt No. 3. E.P. Clones are found to be very good condition. Some planted nursery seedlings in 4.311 Ha. are also survived. Nursery of Bamboo also in survived condition. I instructed the Dy. R.O. Naranam to protect the plantation from grazing. E.P. attaining the height of 1.0 [illegible] — [signature] R.O. Naranam
28-8-2002	Today inspected the CA enrichment plantation in 9.311 Ha. in Compt No. 3. E.P. Clones growth is ~~of very~~ excellent. It attains the height of 2 to 4 mts. ~~circular~~ interval ploughing is completed and circular weedings are under progress. ~~Almost~~ Bamboo is grazed by cattle [illegible] cattle pressure is more. Again Neredu seedlings (1000) are planted in place of Bamboo, the [illegible] of the Neredu is good. CCT has taken up around the plantation for protection from cattle and as well as for water harvesting. Instructed the forester to apply the pesticides to E.P. Plants, as leaves are changing the [illegible] colour. — [signature] R.O. [illegible]

Date of inspection	Observation of the Range Officer
18-12-2023	Inspection the C.A. Plantation 9.311 Ha. observed the growth of E.P Clones in growth in 5 Ha area, the Clones are attained up to 6 mts above, the survival of the E.P Clones are more than 90%. In [illegible] of the E.P Clones are [illegible] the soil working [illegible] instructed to forester to take up the soil working. further inspection the 4.311 Ha. in E.P land area, further inspection weed growth is found, At some Neredu area, and Sandra plants are seen. Instructed the forester to close the ways formed at CCT to avoid the cattle pressure. coppice cutting also done to natural plants in 4.311 Ha area, [signature] 18/12/23 FRO. Ramavaram

XI. NOTES OF OFFICERS

(a) DIVISIONAL FOREST OFFICER

[illegible] 2001

This is my fourth visit. Earlier Journal was not kept ready by R.O. Only on pressure he has started P. Journal but all columns are not filled. He has not visited this plantation site after march and that is the reason why the planting has not started so far. Even ploughing, alignment and staking has not started. The uprooted material is lying on ground and cattle is stampling it freely. There is every possibility that planting will be delayed and will fail. In such case only the RO and FSO will be held entirely responsible as even after reminding he has not attended. Watcher and fencing are provided but nothing is seen. If because of [illegible] pressure browsing takes place early [illegible] staff will be held responsible [illegible] [illegible] [illegible]

25.7.01

Since last visit there is lot of improvement. E.B. clones are established as planted well in time and new flush of leaves added. Bamboo was planted late on 17th July because of delayed rains.

Ist dose of fertilizer as suggested in soil testing report should be given.

Fencing to be completed on one side.

Pl. journal has also improved.

V. Ch[illegible]
25/7/01

9.2.02:

Inspected the plantation today.

Total area = 9.31 Ha.

Eucalyptus clones = 5.00 Ha.

Misc. & Bamboo = 4.31 Ha.

(i) The survival and growth of Eucalyptus seedlings is good. More than 90%. Height growth is more than 2.0 M.

(ii) Initially Bamboo is planted in 4.31 Ha. But Seindra seedlings are planted as per the soil condition. The growth of the seedlings is not encouraging. The weed growth is also heavy. This area is not ploughed because of the undulated ground. Hence the weed growth. Survival percentage is around 80%. The menace from cattle is also heavy.

Instructions:

1. To take up trench work across the slope as [illegible] in the field.

2. To take up soil work for all the survived seedlings
3. To go for heavy replacements during next planting season in 4.31 Ha. that too with tall plants.
4. To go for trench work from NABARD funds to avoid grazing (all around the plantation).
5. To monitor the cultural operations for better growth.

[signature] 5/2/02
DFO. Kgm.

15.11.02:

Inspected the area. The survival of Eucalyptus plants is very good. Height - more than 4 M. Survival % is more than 90%. Replacements were done in July, 02. Replacements are planted Neredu seedlings (1000 nos.), tall seedlings are planted. It is during July, 02. Still, the survival is not good. It is because of bad condition of the soil and due to lack of rain fall.

Trench is dug all around the plantation. Still cattle are entering from one-two sites and grazing is not checked totally. The concerned watcher to be warned to protect the plantation.

(i) Ploughing and circular weeding are done in Eucalyptus.

Instructions:

1. Unless, the area is ploughed and planted, we cannot expect better growth. The FRO. is requested put up the proposals basing on the availability of funds.

[signature] 15/11/02
DFO. Kgm.

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A-830

Divisional Forest Officer
25 OCT 2001
KOTHAGUDEM

FIELD INSPECTION NOTE OF SRI S.K.CHHOTTRAY, IFS., CONSERVATOR OF FORETS, KHAMMAM IN KOTHAGUDEM DIVISION ON 9-8-2001

1.Compensatory Afforestation enrichment plantation.

This compensatory afforestation plantation over 9.311 Ha., has been taken up in the degraded reserve forest. It is located in Compt. No. 3 of Ramavaram Beat of Ramavaram Block. The area is found to be of site quality IV. Before the plantation it appears that there were only bush growth which have been cleared and plantation has been taken up. One small patch is found to be saline and highly degraded. Out of the whole area 5 Ha., have been planted with Eucolyptus clones in between 10-7-2001 to 16-7-2001. The balance area of 4.311 Ha., Bamboo has been planted at a spacement of 5 M X 5 M in between 17-7-2001 to 18-7-2001. The servival rate is quite high and is about 90 to 95 %. The entire area has been fenced with brushwood. The works have been neatly completed. However in the highly degraded small patch with one cornor it may be considered to plan hardy species like Sundra which may give better results. The growth is not very encouraging due lack of sufficient rains this year after planting. Protection of the area is required continuously since there is heavy Biotic pressure in the area. All the informations regarding the plantation may be posted in the plantation journal and the observations may be entered in the journal in detail.

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[illegible]

ii) CONSERVATOR OF FORESTS.

28/6/24

As per the plantation journal an area of 9.311 ha.,was taken up for CA plantation in 2001. (5)ha., area has been planted with planted with Eucalyptus Clones, at 3M x 3M 4.311 ha.,with Bamboo at 5M x 5M spacement. Some plants of Neredu and Sundra were also planted. Eucalyptus plants have grown up to 35 feet and the girth measurement of some of the plants in a single row is 23, 31, 37, 28, 29, 29, 33, 29, 29, 29 Cms., Thus average girth is around 30 Cms., The area seems to be devoid of much moisture and the plants have become very brittle as is seen from the fact that about 20 to 25 plants are broken in the middle because of wind. The floor of the plantation is having heavy misc.,growth. No SMC works were carried out in this plantation. In the Bamboo block almost 99.9% of the plants have died and there is hardly any survival except one or two plants here and there, which are also very weak. The area is covered with heavy misc.,growth. The Divisional Forest Officer is requested to attend the following works:

1. Get the area surveyed with the GPS;

2. Carry out 100% enumeration of the plantation and fix 10th line stone and enter the line-wise planting points and survival into the plantation journal;

3. As this area I was told falls in Garimalapadu VSS the Eucalyptus should be cut to the base and the poles may be taken by the VSS for their domestic use after duly entering into the VSS register and passing a resolution.

(KANWALJIT SINGH)
C.F. Khammam

WILDLIFE CONSERVATION & MITIGATION PLAN FOR THE PROPOSED VENKATESH KHANI COAL MINE, GAUTHAM KHANI OPENCAST, VENKATESH KHANI NO.7 INCLINE AND PADMAVATHI KHANI NO. 5 INCLINE

Revised during November/December – 2023

Index

Summary

This Wildlife Conservation Plan is complimentary to the Wildlife Plan of the Forest Department. This will be implemented in the Core and Buffer zones of project area. Due biodiversity study has been taken up. The list of species observed and subsequently added from the working plan of the Forest Department is include.

Initially the mining by underground method started in Kothagudem Area during 1937. In the early 70s, underground mines in the name of 8, 9, 10, 11 incline in an area of 408 Hectares were operational in the proposed study area, which were subsequently closed in 1992. From these underground mines, 5.56 million tons of coal have already been extracted. Subsequently, one opencast mine by the name of Goutham Khani (GKOC) started in the year 1993 in a total area of 902 Ha, which has been closed during March 2022. This opencast was the conversion of the four underground mines, where the 74.29 million tons of Coal was left over from earlier underground operation. In total, 76.91 million tons (underground – 5.56 + OC – 71.35) of coal has already been removed from this area.

On average manpower used in these underground mines was around 7000 and in the GK Opencast it was 1611. Besides that, many coal loaded lorries/ vehicles move from mines to different places on daily basis (300 to 400 lorries per day). Also, a National Highway (NH 30) connecting Kothagudem to Vijayawada passes through the forest and mine area, connected with many small public roads which is used by people actively. So, this also shows that there is not any fresh intrusion to the biodiversity/ wildlife by this proposed mine. Since, last 50 years of mine operations in this area, already movement of vehicles, people, constructions

have started and as such hardly any area left undisturbed. The impact of the mining on the flora was observed as minimal, as no felling of trees were there in UG surface areas except areas of the Gautham Khani OC project. It was observed during the mining process that the fauna has moved away from this area to the nearby adjacent forest areas. Plantation raised by SCCL and Forest department within Core and Buffer areas are also serving as refuge to the wildlife. The SCCL and Forest department has taken many individual initiatives and joint actions in protecting, enhancing, and sustaining the biodiversity in the habitats in adjoining forest areas of the buffer areas.

The method of mining will use controlled blasting techniques using milli-second delay, detonators & relays will be adopted which will reduce noise disturbances. Creation of green belts of dense foliage between mine and buffer area will act as noise attenuator. Anti-vibration paddings for all machines in CHP and rubber or any other wear resistant material liners for all transfer chutes and hoppers will be provided. All these measures will reduce the impact on wild animals in buffer area. The flora existing in the core zone will be harvested with the progress of mine. However, more number of trees will be planted in the area after mine closure.

In the quarried area of GK OC, the SCCL has now proposed to dump the overburden material going to be excavated from the proposed VKOC, which will diversion of fresh forest land. All the Overburden areas of the proposed VKOC will be rehabilitated as per approved mine closure plan and voids will be maintained to serve as big water body suitable for wild animals.

Background

As demand for energy increases, in absence of sufficient alternative energy source, Coal mining will remain an important part of global, national, and local economies in the foreseeable future. To meet the ever-increasing demand for Coal and to achieve the targets fixed by the Government of India from time to time, SCCL has embarked upon expansion of coal mining to increase coal production. Venkatesh Khani Coal Mine is one of the new Project identified in Ramavaram RF, Ramavaram Range of Kothagudem Forest Division.

Rapid increase in human population and its need and use of natural resources like land, soil, water, wood biomass and energy have impinged heavily on earth's biodiversity (Mooney et al. 1995). In the past decade or more, in the face of climate change and allied threats to human welfare, loss of earth's biological diversity has become one of the major concern. In addition to direct loss of forests, incompatible resource use by human had resulted in depletion of biotic wealth and degraded the forest lands, as a consequence of agricultural expansion and urban development (Puri et al. 1983). Further development of network of roads and railways, urban and other energy related development projects have fragmented forests with long-term consequences (Turner et al.1996, Rajvanshi et al.2001). The combination of loss of natural habitat, reduction in habitat size and isolation of habitat patches are the results of forest fragmentation. All this led to decline in biological diversity within the original habitat and even the entire ecosystem as well (Wilcox 1980, Wilcox, and Murphy 1985). For economic growth and human development to be sustainable, the environmental costs associated with growth and development must be identified, understood, and mitigated without forgoing those benefits (Gubbi et al.2012). In India, the demand for energy is ever increasing with growing economy and population (Chabukdhara and singh 2016).

Mining apart from meeting the energy demands of the industry, also play a vital role in the economic growth of the nation (Chaulya and Chakraborty 1995). Globally, coal is one of the important fossil fuels found in abundance, meeting the energy requirements. After China and USA, India is the third largest producer of coal in the World. In India, coal is the most abundant fossil fuel available and more than 70% of power is produced by coal based thermal power plants (Mishra 2004, WII 2021). In 2021-22 and 2022-23, all India coal production stands at 778.21 MT and 893.08 MT respectively, with a positive growth of 14.76% (https://coal.gov.in/en/major-statistics/production-and-supplies). As per Coal Inventory published by GSI, cumulative total estimated coal reserve (resource) for the country is 361411.46 million tones as on 01.04.2022. (https://coal.gov.in/en/major-statistics/coal-reserves).

In both developed and developing countries, natural resources are extracted to attain economic growth and development. Tropical forests are one of the most threatened ecosystems, rapidly undergoing enormous land use changes (Hill et al.2011, Ramachandran et al. 2018, Nayak et al.2020) due to various developments. This has led to habitat fragmentation resulting in area reduction, eventually affecting the biodiversity and wildlife movement of small and isolated populations. Connectivity is an important parameter in determining the dispersal ability of a species in a landscape (Tischendorf and Faheig 2000, Neldner et al.2017). Landscape connectivity refers to a species ability to move between suitable habitat parcels throughout a landscape and has significant consequences on the

survival of the species (With 2004). In low-connectivity landscapes, populations become isolated and are susceptible to genetic suppression and local extinction (Bennet et al.2000). Among the developmental activities, mining has major environmental impacts such as soil erosion, reduction in forest cover, loss of biodiversity and wildlife, pollution of air, water, and land. Some of the direct effects of mining on wildlife includes disturbance and displacement of the populations from the mine site and long-term changes in the land use pattern (Buehler and Percy 2012). Habitat loss and landscape modification are considered as severe threat to global biodiversity (Fischer and Lindenmayer 2007.) Mining activities, especially open cast mining has a wide range of environmental consequences. At landscape level, activities such as clearing of forests, alteration of the habitat results in movement of wildlife from areas of operation to adjacent forest areas if available otherwise to open agricultural landscape leading to increased men-animal conflicts. The fragmentation, degradation poses serious threat to biological diversity. New sources of funding and new forms of partnership in wildlife conservation are critically required.

Need for preparation of Wildlife Conservation Plan:

As per the standard ToR condition "A detailed biological study of the study area (core zone and buffer zone, 10 km radius of the periphery of the mine lease) shall be carried out. Details of flora and fauna, Rare, Endangered, Extinct and Threatened (REET) Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost."

About the Industry

The SCCL (Singareni Collieries Company Limited) is a Govemment coal mining company jointly owned by the Govemment of Telangana and Government of India on a 51:49 equity basis. The SCCL is the largest public sector undertaking in the State with manpower of 46,021 as on 31.03.2023. It is the only coal mining company in the State, catering to the needs of coal-based industries mainly thermal power plants. The company was initially incorporated as "Hyderabad (Deccan) Company Limited" in England and acquired mining rights in 1886 to exploit coal found in Yellandu area. The present Company was incorporated on 23rd December 1920 under the Hyderabad Companies Act as a public limited company with the name 'The Singareni Collieries Company Limited' (SCCL). In the year 1945, the State of Hyderabad, the Nizam"s Dominion, took over Singareni Collieries Company Limited by acquiring all the stocks in the company, thereby continuing the mandate to mine coal from entire Godavari Valley Coal Field. IIn 1948, with annexation of Nizam's Dominion into Union of India, SCCL became a Government Company. From 1960, Govemment of India participated in Equity with 49% shares. In 1972-73,all coking coal mines of private operators (except the captive mines of IISCO, TISCO, and dvc) were nationalized and brought under coal India Limited with a view of centralized the Coal mining operation in all Coal fields, other than Godavari Valley Coal Field. Since then, Ministry of Coal has been referring to Godavari Valley Coal Field as command are for SCCL. The mining rights of SCCL cover a stretch of 350 km in Godavari Valley with proved coal reserves of about 10,474.90 million Tons as on 01.04.2018 as per SCCL estimation. SCCL currently operates 29 underground mines and 19 opencast mines located in 6 districts of Telangana State.

Type of the Project:

The proposed Venkatesh Khani Coal Mine (VK Coal Mine) Project (opencast cum underground) is classified as category "A" under Mining of Minerals sector as per the MoEF &CC, GOI, notification, SO 1533, dated 14th September 2006, and subsequent amendments.

The present proposal involves diversion of 649. 3014 Ha of Forest Land from Underground rights to Open Cast (surface use) purpose. This area is part of the total project area of 2403.17 ha (1568.22 ha is Forest Land and 834.95 ha is Non-Forest Land) located near Rudrampur village, Chunchupalli Mandal, Bhadradri Kothagudem District (Telangana State).

Need of the Project

SCCL is the major coal mining company in Southern India supplying coal to the major power utilities like NTPC, TSGENCO, APGENCO, KPCL and Maha GENCO.

Presently in Kothagudem Area, PVK No. 5 incline (0.825 MTPA production) underground (UG) mine is in operation. Coal mining operations in Gautham Khani Open Cast Mine (GK OC 4.00 MTPA) and Venkatesh Khani No-7 (VK No.7 incline 0.843 MTPA) underground mine were closed in March 2023. The Coal reserves in UG mines beyond 300m depth were completely extracted and the reserves up to 300 m depth which were developed and standing on pillars will be extracted by opencast in the present proposal.

Coal extracted from the GK OC and PVK No.5 mines were supplied to Kothagudem Thermal Power Station (KTPS) of TS GENCO (1800 MW), Nava Bharath ventures (264 MW), etc., in Bhadradri Kothagudem District, Telangana State situated within 20 km under Fuel Supply Agreement.

Hence, the proposed project is formulated:

- In order to sustain the coal supplies to KTPS of TSGENCO, Nava Bharath Ventures, etc.,
- To extract the coal left in the standing pillars in underground mine (VK-7 & PVK-5) thus conserving the coal reserves.
- Re-deployment of manpower of GK OC and VK No.7 Incline.

Location of the Project

VK Coal Mine falls in Chunchupalli Mandal of Bhadradri Kothagudem district of Telangana State and located between latitude of N 17° 26' 14.52" to N 17° 31' 32.95" and longitude of E 80° 37' 50.80" to E 80° 41' 31.08" and falls in Survey of India Topo sheet 65C/10, 65C/11. The project covers an area of 2403.17 ha.

Details of Environmental Setting

S.No.	Particulars	Details
1	Location	Rudrampur (V)
2	Elevation	160m above MSL in southern part to 100m above MSL in the northern part and average elevation is 138 above MSL.

3	Land use of the project area	Type	Land use (proposed) in ha
		Excavation area (Including road diversion of 5.05 ha)	1344.580
		External dump	349.110
		Safety Zone/Rationalization area	160.800
		Road diversion	0.850
		Stowing arrangements & diverted portion of the nallah	6.571
		Infrastructure area	65.080
		Green belt	6.480
		Undisturbed (mining rights for UG)	469.699
		Total	**2403.170**
4	Nearest tourist place	No tourist place	
5	Defense installation	Nil	
6	Archeologically listed important places	Nil	
7	Ecologically sensitive zones	There are no wetlands, coastal zone, and biospheres in the study area. However, the project boundary falls at a distance of 6.33 km away from Eco-Sensitive Zone boundary of Kinnerasani Wildlife Sanctuary. A certification has been obtained from the PCCF (HoFF), Government of Telangana stating that the project area doesn't fall under Eco-sensitive Zone of Kinnerasani wildlife Sanctuary and any other corridor of Elephants & Tigers.	
8	Reserved / Protected Forest	Ramavaram RF, Paloncha RF, Chatakonda RF, Mulkalapalli RF, Pengadadapa RF fall within the study area of 10 km radius.	
9	Roads and other infrastructure	National highway (NH-30) road from Kothagudem to Vijayawada connecting Bhadrachalam, Manuguru passes across the project area. The road will be diverted, and the diversion length of this road is about 5.00 km. The existing 33/3.3KV VK & AK Sub-stations, Power transmission lines, Telephone lines and other communication Lines of SCCL are passing over the proposed VK Coal mine quarry area and these will be diverted around for about 5 km length.	
10	Nearest streams/Rivers	No diversion or shifting of Rivers /Streams is involved	
11	Other Industries/ Mines	At present, 1 underground mine and 1 opencast mine (closed), and two major Industries, namely KTPS (part), Navabharath Ventures Ltd., fall in the study area.	
12	Coal user locations	Kothagudem Thermal Power Station (KTPS) of TS GENCO (1800 MW), Nava Bharath ventures (264 MW) etc. Bhadradri Kothagudem District, Telangana State under Fuel Supply Agreement.	
13	Socio-economic factors	• Social infrastructure already available in the area caters the needs of working employees • As the project is an amalgamation of the GK OC, PVK -5, VK-7, further development of the area will take place	
14	Seismic zone	The mine falls under Zone – II (Least active) of seismic zone.	

Proposed schedule for approval and implementation

The proposed project activities will be commenced after obtaining Forest Diversion Permission and Environmental Clearance from Ministry of Environment and Forests & Climate Change, GOI. The details of statutory obligations as specified by MoC / MoEF&CC / DGMS etc. are given below:

Sl. No.	Subject	Status
1.	**Mining Lease:** The total project area of 2403.17 ha is covered under two mining leases. 1. Kothagudem Mining Lease (KGML): 2241.86 ha covered in the 2nd Renewal of KGML (5158 ha) granted vide G.O.Ms. No.324, dated 12.12.2008, valid up to 26.04.2029. 2. Goutham Khani Opencast Mining Lease (GKOC ML): 161.31 ha, 1stRenewal of GKOC ML (261.31 ha) granted vide G.O.Ms.No.211, dated: 08.08.2008, valid up to 18.09.2034.	
2.	Mining Plan	Mining Plan and Mine Closure Plan (2nd Revision) was approved by MoC, GOI, Vide Lr. No. 38011/12/2017-PCA dated 27th January,2020.
3.	Consent For Operation (CFO)	CFOs of VK-7, PVK-5, GK OC Incline were obtained from TSPCB. 1. VK No.7 Incline vide consent order no. 17082598755, valid up to 31.03.2022 (Mine closed in 2020-21). 2. PVK No. 5 Incline vide consent order No. 220523337889, valid up to 30.09.2026. and 3. GK OC vide consent order no. 220523336893, valid up to 30.09.2026.
4.	Ground Water Clearance	Ground water clearance was obtained for existing mines in this expansion project. Application for Ground water clearance for the proposed VK Coal Mine was submitted on 12.07.2021.
5.	Forest Clearance	Total forest land involved in the project area is 1568.22 ha of which 449.22 ha is with Surface rights and remaining 1119.00 ha with UG rights is in possession of SCCL. **Surface rights available with SCCL** : 449.22 ha 449.22 ha FL was diverted of which 287.91 ha of Forest land is covered under Kothagudem Mining lease and 161.31 ha covered in the Goutham Khani Opencast Mining Lease. Major area of this area of 449.22 Ha forms part of GKOC (Closed mine) and proposed to be utilized for dumping of over burden in existing voids to a height of 120.00 M.

Area in ha.	Stage-II FC issued vide letter no. & date	Validity period of FC
154.96	8-62/2005-FC 09th /15th July 2008.	20 years.
124.00	8-17/98-FC 8th February 1999.	20 years. Applied for Renewal on 05.04.2017.
0.90	8-227/1985 FC (Vol. I) Dated 12th May 2021.	Co-terminus with mining lease up to

		2029.
2.85	Stage-1 8-277/1985-FC (Vol) dated 22nd June 2018.	Co-terminus with mining lease up to 2029.
161.31	8-117/2002-FC 1st February 2010.	20 years.
5.20	Memo No.1435/For. I(1)/2022, dated:24.02.2023	Co-terminus with mining lease up to 2029.
449.22		

Underground rights:
1119.00 ha Forest land is covered under Kothagudem Mining lease (1174.18 ha FL) with UG rights diverted vide Lr. No.8- 277/85-FC, dated:17.02.2009 and valid for a period of 20 years up to 16.02.2029.

Out of 1119.00 ha of forest land with UG rights, the proposal was submitted for diversion and conversion to surface rights to an extent of 649.3014 ha to facilitate OC operations. The balance forest land (469.699 ha) will be continued with UG rights.

Physiographic Features
Buffer zone: The buffer zone comprises the area within 10 Km from the boundary of the project area. The buffer area is a plain terrain with relief of 160m in the south and 80m in the north and sloping towards north and northeast. Few hillocks located Kanigiri gutta (432m) and an unnamed hillock (360m) in the northeast, Balusu gutta (328m) in the southeast, and Bolli gutta (340m) at the periphery of the project are existing in the buffer area.

Core zone: The core zone includes the area proposed for diversion and the remaining project area. The VK Coal Mine project area is of flat topography, Bolligutta hill stands out as a prominent landmark of this area along the northern boundary. The general topographic elevation of the project area varies from 160m above MSL to 100m above MSL. In the south part of the project is covered by existing GKOC project area.

Drainage
Buffer zone: The buffer zone is drained by Murredu stream, Edula vagu(stream) flowing in the western half and joins to Murredu river near Gollagudem village in the northern part of the buffer area. Tellavagu flowing in the eastern part and joins to Edulavagu near Penuballi village. The drainage of the area is dentritic to parallel type with a density of about 1.80 km/ sq.km. Singabhupalam Cheruvu (Tank) a major irrigation tank is located in the western part about 7 km away from the proposed VK Coal Mine project.

Core zone: Tellavagu, an ephemeral stream, which is a tributary of Edula vagu and flowing in the northern part of the project area. Drainage is moderately developed, and few ephemeral streams are flowing and joins the Tellavagu. The drainage density of the block area is about 1.65 km/ sq.km.

Geology and Coal Reserves
The Kothagudem Coal Belt is located to the South of Kothagudem Township up to Penagadapa village. This coal belt is bound by North Latitude 17o25'30" and 17o32'30" and East Longitude 80o37'30" and 80o42'0" enclosed with an area of 284.00 km2.

Geology of VK Coal Mine Block: Stratigraphic Sequence: The block area is covered with Barakar, Barren measure and Lower Kamthi formations; western part of the block is abutted with basements. The coal bearing Barakar Formation consists of Predominantly Grey white sandstone with subordinate shales and coal seams. Geological reserves of VK Coal Mine are calculated with the help Carlson Mine Planning Software. Percent of extraction is 70.79%.

Technology and Process Description

Venkatesh Khani Coal Mine (VK Coal Mine) (OC cum UG Mine) with a production capacity of 6.30 MTPA in an area of 2403.17 ha is proposed by amalgamation of existing Goutham Khani opencast mine, PVK No.5 Incline and closed VK No.7 Incline.

As such, the two mines, PVK-5 Incline and VK-7 Incline Underground Mines are proposed to be converted into Opencast. With earlier experiences of GK OC Mine workings (which is also conversion of Underground Mines to Opencast mine), it is proposed to continue with the shovel dumper technology for extraction of coal in VK Coal Mine also.

In the amalgamation project:

- The coal reserves of GK OC (4.00 MTPA) exhausted.
- In order to sustain the coal supplies to KTPS of TSGENCO, Nava Bharath ventures, etc., initially VK No.7 incline underground mine up to a depth of 300 m will be converted into opencast mine by utilizing the voids of GK OC for dumping of OB .
- For conservation of coal reserves and manpower re-deployment, underground mining will be continued in PVK No.5 Incline between 300 & 450 m depth with existing continuous miner technology and LHDs and these operations will be closed by the year 2029-30. Subsequently, the balance reserves of PVK No.5 incline up to 300m depth will also be extracted through opencast method of mining merging with the existing opencast operations.
- With the above sequence of mining operations, the proposed VK Coal Mine will continue as OC cum UG mine up to 2029-30, later on only OC operations will be continued.

The mining sequence has been planned in such a way as to permit mining the coal reserves in a more effective manner and at the same time allow backfilling of considerable quantity of overburden.

This aspect considerably mitigates the adverse environmental impact generally associated with opencast mining. Sequence of mining is also planned considering the lay and disposition of the deposit.

Pre-mining Land Use Pattern

Total land within the project boundary of VK Coal Mine is 2403.17 ha. The pre-mining land use pattern in the proposed project area is as furnished below.

	Pre-mining Land Use (ha)	
Tenancy/Private	Agricultural	--
	Grazing	--
	Water Bodies	--
	Road	--
	Other (Patta Land)	10.99
	Sub Total	**10.99**

Govt (Non- Forest)	Agricultural	--
	Grazing /other	--
	Road	--
	Water body	--
	Others (SCCL Land)	823.96
	Sub total	**823.96**
Forest	Reserve (including 12.03 ha of Tella vagu stream)	**1568.22**
	Protected	--
	Sub Total	**1568.22**
	Total	**2403.17**

Proposed Land Use Pattern (Land Use During Mining)
The proposed land use of the forest land to be diverted during mining in the VK Coal Mine is furnished below.

Propsed land use of the forest land to be diverted (during Mining (ha))

Type	Land use (ha)
Excavation Area (Including 5.05 ha of road diversion area)	573.4251
Safe distance, Berm/Toe Wall, Inspection Road, Drains and Transmission Lines Etc.	75.8763
Total	**649.3014**

Land Use Pattern (End of Life)
The proposed land use during post closure in the proposed VK Coal Mine is furnished as follows:

Post Closure Land Use Plan (ha)

Type	Plantation	Water Body	Public/ Company Use	Undisturbed	Total
Excavation Area					
1) Backfilled Area	947.876	0.850 (GD)	9.520		958.246
a. Road Diversion			5.050		
b. Power lines and Toe walls			4.470		
2) Excavated Void		386.334			386.334
Sub Total	947.876	387.184	9.520		1344.580
External Dump	349.110				349.110
Green belt / Safety Zone /Rationalization area	152.740	5.140 (GD)	9.400 (R)		167.280
Roads			0.85		0.850
Sand stowing arrangements etc.	6.571				6.571
Infrastructure area	65.080				65.080
Undisturbed FL with UG rights				469.699	**469.699**
Total	**1521.377**	**392.324**	**19.77**	**469.699**	**2403.170**

*Note: GD- Garland Drains, R- Roads

Coal Transportation System
Coal will be transported from face to in-pit crushers by dumpers. Then coal will be elevated by

belt conveyors up to CHP / Railway siding by series of belt conveyors. Transport from main CHP to end users will be by rail mode. **This will even reduce the environmental load in the area and even wildlife will not be disturbed as in case of road transport system.**

Meteorology and Climatology of this area as per IMD

A comparative analysis was taken up for the Meteorological data of the study area collected by the project team in 2021. Secondary data used for the purpose i.e. more than 20 years average IMD data from 1999-2021 is taken from Kothagudem IMD station. Kothagudem area experiences typical tropical climate of a distinct hot summer from March to May with occasional dust storms, a good monsoon between middle of June and September and a pleasant winter from December to February. The temperature varies between 9.10 C and 48.60 C.

Rainfall: The nearest rain gauge station is located at Kothagudem. The rainfall data from 1999 to 2021 indicates that, the annual rain fall is widely varied from 777.4 mm (2009-2010) to 1876.3 mm (2020-2021) with a mean rainfall of 1198.7 mm. The maximum monthly rainfall is 660.2 mm August 2008. The data indicates that, the maximum daily rainfall was 220.6 mm (3rd November 2012). The average number of rainy days in a year is 70 days. The southwest monsoon contributes 80% of total rainfall. The year wise status of rainfall conditions (i.e., Normal, Excess and Deficient) of this area is furnished below.

Annual Rainfall data and Percent of deviation from Mean Rainfall

RF Year	Annual Rainfall (mm)	Mean Rainfall (mm)	Deviation % from Mean RF	Status
1999-2000	1092.7	1198.7	-8.8	Normal
2000-2001	1075.0	1198.7	-10.3	Normal
2001-2002	1050.2	1198.7	-12.4	Normal
2002-2003	808.8	1198.7	-32.5	Deficient
2003-2004	1393.8	1198.7	16.3	Normal
2004-2005	1528.4	1198.7	27.5	Excess
2005-2006	1438.0	1198.7	20.0	Normal
2006-2007	963.4	1198.7	-19.6	Normal
2007-2008	1195.2	1198.7	-0.3	Normal
2008-2009	1548.4	1198.7	29.2	Excess
2009-2010	774.4	1198.7	-35.4	Deficient
2010-2011	1398.4	1198.7	16.7	Normal
2011-2012	827.0	1198.7	-31.0	Deficient
2012-2013	1425.2	1198.7	18.9	Normal
2013-2014	1305.2	1198.7	8.9	Normal
2014-2015	898.6	1198.7	-25.0	Deficient
2015-2016	1200.8	1198.7	0.2	Normal
2016-2017	1206.8	1198.7	0.7	Normal
2017-2018	1059.6	1198.7	-11.6	Normal
2018-2019	1211.4	1198.7	1.1	Normal
2019-2020	1094.0	1198.7	-8.7	Normal
2020-2021	1876.3	1198.7	56.5	Excess

As per Indian Meteorological Department (IMD), the annual rainfall is considered to be "normal", if the deviation % from Mean Rainfall ranges from 19% to -19%, "excess" if the annual rainfall is in between 20% to 59% and "large excess" if it is 60 percent and above. While the annual rainfall is considered to be "deficient", if it ranges from -20% to -59% and "large deficient" if it is between -60 to -99 percent. As a part of micro-meteorological study, micrometeorological and microclimatic parameters were recorded by installing an auto

weather monitoring station within the core zone. Data on wind speed, wind direction, ambient temperature, relative humidity, and rainfall was recorded on hourly basis.

Summary of Ambient Air Quality

Core Zone:

PM10 concentration in core zone range from 52.0 to 196.0 μg/m3, minimum concentration was observed at Padmavathi Khani-5 UG Mine (CA-2) and maximum concentration was observed at Rudrampur-CHP (CA-3) and PM2.5 concentration was in the range of 21.2 to 81.6 μg/m3, minimum concentration was observed at Gowtham khani OC PO Office (CA-1) and maximum concentration was observed at Rudrampur-CHP (CA-3).

SO2 concentration in core zone ranges from 11.4 to 15.5 μg/m3. The minimum concentration was observed at Padmavathi Khani-5 UG Mine (CA-2) and maximum concentration was observed at Rudrampur-CHP (CA-3). NO2 concentrations are in the range of 16.6 to 23.3 μg/m3 with minimum concentration was observed at Padmavathi Khani-5 UG Mine (CA-2) and maximum concentration was observed at Rudrampur-CHP (CA-3). The study indicates that the observed concentrations in core zone are within the Coal mine standards (commenced prior to 25.09.2000), GSR 742 (E), dated 25.09.2000.

Buffer Zone:

PM10 concentration in Buffer zone ranges from 43.0 to 70.0 μg/m3. Minimum concentration was observed at Gareebpeta (BA-10), and maximum concentration was observed at Penagadapa village (BA-1) & 3 Incline (BA-7). PM2.5 concentrations were in the range from 17.2 to 29.4 μg/m3 and minimum concentration was observed at Gareebpeta (BA-10) whereas maximum value was observed at Rudrampur (BA-6).

SO2 concentration in buffer zone ranges from 10.2 to 15.0μg/m3 the minimum concentration was observed at Sitampet Village (BA-4) and maximum was observed at 3 Incline (BA-7). NO2 concentration is in the range from 14.7 to 22.5 μg/m3, the minimum concentration was observed at Sitampet Village (BA-4) and maximum was observed at 3 Incline (BA-7). Carbon monoxide levels are Below Detection Limit (BDL) at all the locations. The AAQ study indicates that the observed concentrations in Buffer zone are well within the National Ambient Air Quality Standards (NAAQS) as notified on 18.11.2009 by CPCB.

Noise Environment

A detailed survey on noise environment was carried in and around the project area to study the hourly equivalent noise levels as per IS: 4594-1968. This study was necessary as the high noise levels may cause adverse effect on human beings and associated environment, including structures, domestic & wild animals, and natural ecological systems. Spot noise levels were measured for 24 hours on hourly basis by using a high precision Sound Level Meter at thirteen locations within the study area.

Summary of Noise level data: Out of 13 locations, three locations fall in core zone and 10 are in buffer zone. In core zone, maximum Day Leq value is 69.5 dB (A) at Rudrampur CHP (CN-3) and minimum is 56.5 dB (A) at Padmavathi Khani-5 UG Mine (CN-2). Maximum value of Night Leq is 52.7 dB (A) at Rudrampur CHP (CN-3), and minimum value is 46.9 dB (A) at Padmavathi Khani-5 UG Mine (CN-2).

The results shows that the noise levels in terms of Leq (day) and Leq (night) are well within the standards stipulated at all the locations as applicable to Industrial area. In buffer zone, maximum value of Day Leq is 51.8 dB(A) observed at Ramavaram (BN-8), and minimum is 48.3 dB(A) at Rampur Village (BN-2) and maximum value of Night Leq observed is 41.5dB(A) at Rudrampur (BN-6), and minimum is 38.5 dB(A) observed at Chandrukunta (BN-5). The results show that high noise levels at few locations is due to vehicular movement and local

activities. However, the noise levels in terms of Leq (day) and Leq (night) are well within the standards stipulated at all the locations as per the residential area.

Details of Environmental Impacts

Environmental impacts both direct and indirect on various environmental attributes due to proposed mining activity in the surrounding environment, during pre-operational, operational, and post-operational phases are discussed in this chapter. The impacts due to mining operations commence from the exploration activities, extend through extraction and processing of minerals, may continue up to post-closure of the operation, with the nature and extent of impacts varying throughout the stages of project development. The following are the main environmental impacts due to the location of the project.

Impacts during project construction

The proposed Venkatesh Khani Coal mine (VK Coal mine) project is an open cast cum underground mine involving both opencast and underground method of mining. In this project, initially VK No.7 Incline underground mine will be converted into opencast mine by utilizing the voids of existing GK OC mine and underground operations will be continued in the PVK No. 5 Incline utilizing the existing infrastructure later on after 10 years PVK No.5 Incline will also be converted into opencast mine.

Since, initially VK 7 Incline will be converted into OC the infrastructure like service buildings, workshop, pit magazine etc. pertaining to this UG mine will be demolished and project/site office, unit workshops, Pit head CHP, stores, magazine, lamp cabin, sub-station etc. will be constructed for the opencast operations. The various activities involved in the construction stage, which have impact on the environment and the potential environmental impact of the same are given in below.

The major environmental parameters affected during construction stage are noise and dust pollution. Continuous water spraying arrangements will be made to minimize dust level to a large extent. However, the effects due to construction activities are of temporary nature and will have no permanent impact on environment.

Impact during Construction Stage

Construction Stage	Activity	Potential Environment Impact
a) Pre-construction Activities	i. Soil investigation	Negligible
	ii. Environmental monitoring	Negligible
b) Site work / other facilities	Clearing and grading	Negligible
	Temporary facilities, such as, sheds, approach roads, sanitary facilities	Dust emission and change in traffic intensity
	Earth work comprising of excavation, garlanding and trenches	Soil erosion, run off, increase in traffic, Dust emission
	Foundation work, piling and drainage system or construction of check dams	Dust, visual and noise pollution
	Construction of roads,	Dust and noise pollution
	Equipment erection and utility systems.	Dust, noise and visual impact

Impacts during regular project operations

In the VK Coal Mine project, PVK No.5 Incline underground mine is in operation and VK No.7 Incline mine is closed which will initially be converted into opencast by utilizing the void area of GK OC for dumping of OB. The underground and opencast operations will be continued up to 2029-30, later only OC operations will be carried out. Hence, the environmental impacts due

to both underground and opencast mining operations on various environmental attributes are described hereunder:

The impacts during Construction, Operation and Decommissioning stage are not widespread and are limited to the area of mining operations. The impacts of opencast and underground mining on various environmental parameters are discussed in detail and efforts will be made to assess the degree of impact on the basis of past experience.

It is necessary to analyze the nature of the impact on these environmental parameters in detail, in order to formulate an effective Environment Management Plan (EMP) for Venkatesh Khani Coal Mine Project (VK Coal mine) (Amalgamation of Venkatesh Khani No. 7 Incline, Padmavathi Khani – 5 Incline & Gautham Khani OC mine).

The activities in the regular operations stage for underground mining identified to have impact on the environment can be broadly classified into surface coal handling arrangements and transportation of coal.

The impacts due to opencast mining can be classified into drilling, blasting, excavation, dozing, transportation, dumping and wind erosion of dumps. Environmental impacts associated in operations stage include dust, noise, visual, water pollution, etc.

The various activities involved in the operations stage, which have impact on the environment and the potential environmental impact of the same, are given below.

Impact during Regular Operations Stage

i. Under ground operations

Regular Operations Stage	*Activity*	**Potential Environmental Impact**
Solid waste during Shaft sinking, Tunnelling, Coal extraction and transportation	i) Coal Extraction	Dust, wastewater generation and noise
	ii) Coal handling arrangements (Including crushing, loading & unloading operations)	Dust, noise and visual
	iii)Transportation	Dust, noise and visual

ii. Opencast operations

Regular Operations Stage		*Activity*	**Potential Environmental Impact**
OB Excavation and Coal Extraction	i)	Excavation	Dust, soil erosion, wastewater generation and noise
	ii)	Drilling and blasting in OB & Coal	Dust, noise, and vibrations
	iii)	Dumping of OB & coal	Dust, noise and visual
	iv)	Coal handling arrangements (Including crushing, loading & unloading operations)	Dust, noise and visual
	v)	Transportation	Dust, noise and visual

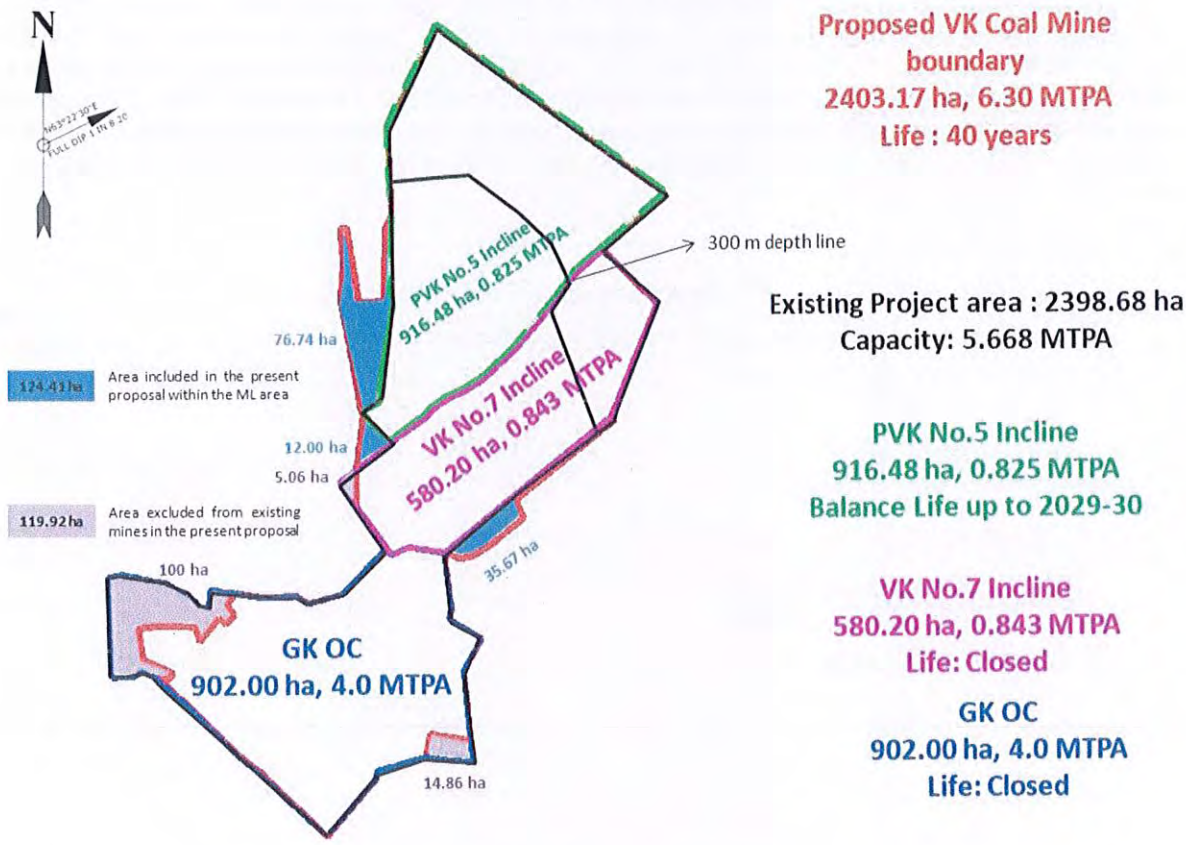
Impact on Land Environment

The total land requirement for the project is 2403.17 ha. The detailed breakup of the existing mines and the proposed mine is shown in the Table. Existing area of three mines i.e., VK No.7, PVK No.5 & GK OC is 2398.68 ha and an area of 119.92 ha from the existing mines has

been excluded in the present proposal (100 ha forest land was returned to Forest Department, 5.06 ha is forest land non coal bearing area and 14.86 ha private land non coal bearing area) and an additional area of 124.41 ha is included in the present proposal for the quarry operation and infrastructure facilities (CHP, Railway siding, work shop and office buildings).

A plan showing the area excluded and included in the present proposal is shown in the Figure. All the infrastructure like office buildings, CHP, ETP and coal yard are proposed in the non-coal bearing non forest area only.

Present Proposed Mine Area



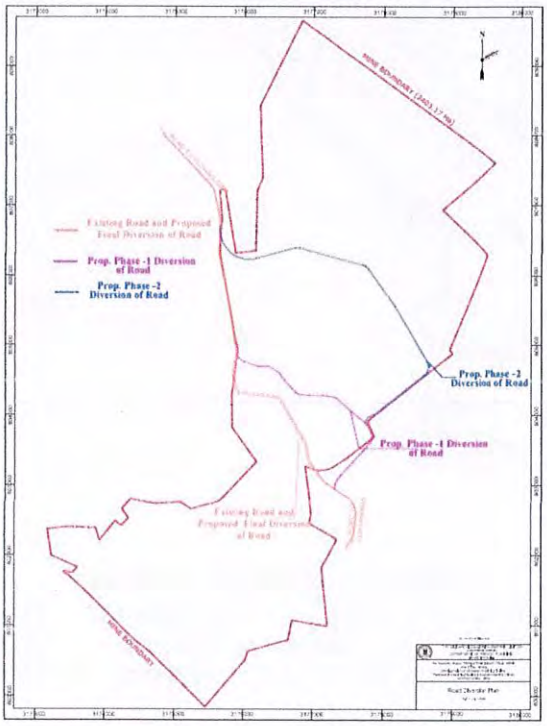
Existing vs Present proposal

S.No.	Mine	Existing Area (ha)	Area considered in VK coal mine (ha)	Existing EC Capacity (MTPA)	Proposed Capacity (MTPA)	Remarks
1	VK No.7 Inc	580.20	575.14	0.843 (Closed)	6.3 (OC: 5.3 UG:1.0)	5.06 ha of Non-Coal Bearing Area (NCBA) is not considered in the present proposal.
2	PVK No.5 Inc	916.48	916.48 (No Change)	0.825 (Proposed for 1.00 MTPA)		No change in land extent
3	GK OC	902.00	787.14	4.00 (Closed)	0.00	100 ha of Forest land (Reclaimed OB dump) was surrendered to Forest department during the year 2010.

4	Additional Non-Coal bearing area within the lease	--	124.41	--	--	Additional land of 124.41 ha within the ML is considered for quarry operations and infrastructure facilities (CHP, Railway siding, workshop and office buildings)
	Total	**2398.68**	**2403.17**	**5.668**	**6.30**	

The major diversions or shifting of surface features over the project area of the proposed project are as follows: A 2 km length of National highway (NH-30) (from Kothagudem towards Vijayawada) is passing over the project area. It is proposed to divert the road in phases to facilitate OC operations. In 1st phase road diversion will be taken up for a length of 3.3 km before the start of OC operation in VK No.7 area. 2nd phase road diversion will be taken up for a length of 5 km after 5th year and final phase diversion will be taken up and the road will be re-stored back to its original position After 15th years. NOC for diversion of the road obtained from the R&B department vide Lr. No. 3773/DCE/NH/DEEII/AEF/2019, dated 06.04.2021(Annexure 4A). Plan showing the different phases of road diversion is shown in `
ure.

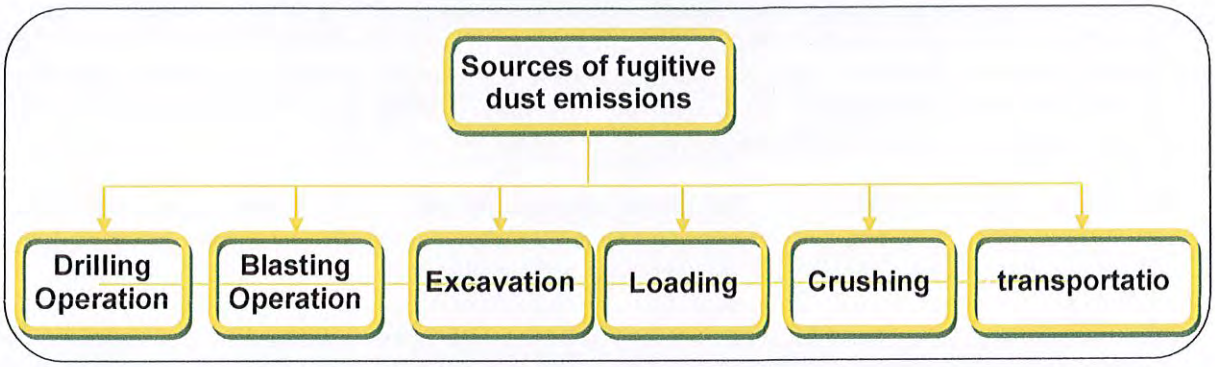
Road Diversion Plan



Power lines:
Shifting of existing 33/3.3KV Venkatesh Khani & Anada Khani Sub-stations of SCCL, Power transmission lines, Telephone lines and communication Lines of SCCL which area passing over the proposed VK coal mine quarry area will be diverted along the diverted road.

Impact on Air Quality
Mining operation and associated activities are potentially air polluting and major air pollution is the Particulate Matter (PM10). Most of the air pollution problems are due to fugitive dust emissions which is more prominent in opencast mines in comparison to underground mines. The flow chart showing air pollution at various stages are furnished in Figure and sources of air pollutants in Table.

Flow Chart showing Air Pollution at various stages



Source of Air Pollution in Mines

Sl. No.	Sources of Air pollution	Air pollutants
1.	Drilling	PM
2.	Blasting	PM, SO_x, NO_2
3.	Loading & unloading	PM
4.	Crushing & Screening	PM
5.	Transportation	PM, SO_x, NO_2

The likely sources of air pollution will be:

a) Generation of dust during mining operation viz. drilling, blasting, excavation, dozing, loading, mine exhaust air, transportation of coal & material
b) Generation of dust from coal handling operation like screening, crushing, etc.

The impacts of the various pollutants in the underground mining area are given below: Particulate Matter (PM10): Since the mining activities are primarily restricted to underground only in PVK No.5 Incline, there will not be any significant impact on air quality. However, the mine exhaust air contains minor percentage of methane and CO2, which are easily diffused in the ambient atmosphere and does not have any effect on the quality of ambient air.

The return air analysis, in general is as follows:

O2	:	20.20%
CO2	:	0.20%
N2 by difference	:	79.60%

It is harmless when diffused into the atmosphere. The only effect on air quality is a marginal increase over the baseline PM10 due to vehicular traffic deployed for coal transport and other allied activities.

Sulphur dioxide (SO2): In case of sulphur dioxide, it is observed that the concentrations of SO2 in ambient air are very low and there appears to be no impact on the ambient air quality. Moreover, there is no significant source of sulphur dioxide in the mine area.

Oxide of Nitrogen (NOx): The main sources of oxides of nitrogen in the area are the exhaust gases due to the movement vehicles. The observations of nitrogen oxides indicated that there is no significant impact of this pollutant in the area.

Carbon monoxide (CO): The sources of carbon monoxide in the area are identical to those of NOx. The concentrations observed are below the threshold values and there is no impact in the area due to carbon monoxide.

The impacts of the various pollutants in the opencast mining area are given below: Considerable amount of air pollution will be generated from Opencast mine at various stages of mining operations such as drilling, blasting, excavation, dozing, loading, crushing, transportation of material and wind erosion of dumps. Particulate Matter less than 10 microns (PM10) and less than 2.5 microns (PM2.5) size are the main source of pollution due to the mining activities / operations. Large quantity of dust becomes air borne and is carried away from coal stocks and overburden dumps due to winds.

The fugitive dust released from the mining operations may cause immediate effect on the mining workmen who are directly exposed to it. Simultaneously, the dust may travel to longer distances and cause some impact on the neighboring villages.

As the existing background level of dust and gaseous pollutants indicated by the baseline data is less and well within the permissible standards, the estimated dust level rise and gaseous concentration will not cause any significant impact on the surrounding environment.

The ambient air quality data monitored at 13 locations during October – December 2021 in the proposed VK Coal Mine shows that concentration of PM10, PM2.5, SO2, NOx and CO in core zone is within the Coal Mine Standards GSR 742 (E), dated 25.09.2000 (for the mines commenced prior to 25.09.2000) and in the buffer zone are within the National Ambient Air Quality Standards (NAAQS) as notified in 18.11.2009 by CPCB.

Impact on Flora & Fauna

The project involves 1568.22 ha of forest land which fall in Ramavaram RF. The forest land in the buffer zone falls in 5 RFs namely Ramavaram RF, Chatakonda RF, Penagadapa RF, Mulakalapalli RF and Paloncha East RF of Kothagudem and Paloncha divisions.

In the core zone, there are species like *Tectona grandis, Cleistanthus collinus Xylia xylocarpa, Boswellia serrata*. Most of the species are of coppice in nature. As, the mining operations in the GK OCP and PVK No.5 Incline were carried out since long and due to the mitigative measures already in position the flora and fauna of the buffer zone may not be affected due to further mining operations. In the core zone the existing trees have to be extracted during life of the project. However, the existing fauna will move to buffer area and take refuge. Their habitat and landscape in the buffer zone will be improved by taking suitable measures like adding water points like percolation tanks and check dams, grass plots, fire lines. These changes will be monitored duly employing a wildlife expert for the project, camera traps and other methods.

Overall brief of the proposal:

Initially permission for Forest diversion was obtained for underground rights for 1174.18 Ha vide MoEF, Government of India, vide Lr.No.8-277/85-FC, dated 17.02.2009 with validity for 20 years i.e., till 16.02.2029. In this area of UG there are two Underground mines viz., Venkatesh Khani No.7 Incline (VK 7) (384.40 Ha. R.F) and PVK No.5 Incline (789.78 Ha. R.F).

Sl. No.	Purpose of RF diverted	Extent (in Ha.)	MoEF&CC Letter No.	Validity till
1	VK No.7 In- UG	384.40	Lr.No.8-277/85-FC, Dt 17.02.2009	16.02.2029
2	PVK. No.5-UG	789.78	-Do-	-Do-
	Total	**1174.18**		

Similarly, permission under F (C) Act-1980, was also obtained for doing Opencast Mining on the name of Goutham Khani Opencast project (GKOCP), details of which are as follows:

Sl. No.	Purpose of RF diverted	Extent (in Ha.)	MoEF&CC Letter No.	Validitytill
1	1st Renewal of GKOCP (Phase-I)	161.31	MoEF&CC Letter No.8-117/2002 – FC, Dated: 01-02-2010.	31.01.2030
2	GK OCP (Phase-III)	154.96	MoEF&CC Letter No.8-62/2005 – FC, Dated: 09/15-07-2008.	14.07.2028
3	1st Renewal of GK OCP (Phase- II)	124.00	MoEF&CC Lr. No.8-17/98-FC, Dated: 08-02-1999	Renewal orders pending with MOEF &CC,GOI
	Total	**440.27**		

In the present proposal, it is proposed to utilize parts of the existing forest area of the underground (UG) Mines of VK-7 incline and PVK-5 Incline by converting parts of underground mining into open cast and continuing part of UG Mining in 469.6336 Ha. This amalgamated mine will be called Venkatesh Khani coal mine. The details of area proposed for utilization in the new project from underground mines is as follows:

Sl. No	Name of the UG Mine	Total	RF Area proposed forcontinuation under UG	RF land proposedfor conversion (in Ha.)
1.	VK 7 In.	384.40	146.5431	237.8569
2.	PVK 5-In	789.78	378.3355	411.4445
		1174.18	**524.8786**	**649.3014**

The total project area of Venkatesh Khani Coal Mine is 2403.17 Ha. This area is covered in 2 existing Mining Leases granted under MM (D&R) Act, 1957.The details of Mining Leases as per MMDR Act 1957 are as follows:

Fig in Ha.

Name of Mining Lease	Lease Area	NFL	FL	
			Surface rights	UG rights
Kothagudem Mining Lease (2nd Renewal)	5158.00	3692.00	291.82	1174.18
GK OC Mining lease(1st renewal)	261.31	0.00	261.31	0.00

The balance extractable coal reserves of PVK No.5 & VK No.7 Inc is 190.11 million Tons of which about 64.18 million Tons is in Forest Land in Compartment Nos.2, 3, 4, 5 & 11 of Ramavaram RF, and the balance of 125.93 million Tons is in non-Forest land. However, mining in VK OC will simultaneously start both in forest and non-Forest land as per the approved Mining Plan.

The proposed fresh diversion of forest land for surface use from underground to opencast is 649.3014 Ha for which proposal has been submitted. However, this area will be mainly used for quarrying and excavated material will be taken into the left-over quarry as well over burden dumps of the GKOCP for which already permissions are available. The FC diversion

permission will be co-terminus with the mining leases and accordingly at appropriate time (before two years after expiry of permission) proposal will be submitted for continuation of mining activities.

The present proposed area for diversion for VKOC is falling in Compartment Nos.2, 3, 4, 5 & 11 of RF in Ramavaram R.F. of Kothagudem Division. In the process the National Highway-30, passing through the non-forest land to the extent of 3.20 Kms will be diverted as per norms of the NHAI after obtaining suitable no objection certificate. Further, most of the forest area proposed for diversion either falls in to open forest, scrub forest or having grasses and degraded, wherever, better density is there it is because of plantations raised by the SCCL over the surface of the ongoing UG Mines.

Venkatesh Khani Coal Mine is planned to produce 6.3 (OC 5.3 + UG 1.0) million Tons of coal per annum (peak production) with a net capital out lay off about Rs.480.00 Crores and has a life of 40 years including pre-mining and post mining activities. The Mining plan including Mine closure plan has been approved by Ministry of Coal, Govt. of India vide Lr. No. 38011/12/2017-PCA, dated 27.01.2020.

The Nation will benefit by achieving increased coal production by exploiting coal reserves of the project and gets benefited financially by way of Royalty, excise Duty, Sales tax, and electricity supply continuously. Further, this project will also contribute benefit to the society by way of increased direct and indirect employment resources resultant improvement in standard of living and rise in per capital income of the population of surrounding villages of this area.

Generally, mining activities could potentially pose some threats to biodiversity. A mining company must have a better understanding to appreciate the value of biodiversity in its long-term operations under its sustainable mining practice. It should consider all environmental impacts. Habitat clearing during mining is generally unavoidable. However, impacts on fauna, including rare or threatened species, can be reduced through careful planning. Progressive clearing allows time for the animals to move into adjoining unmined/forest habitats. Despite the significant potential for negative impacts on biodiversity from mining operations, there are many opportunities for a mining company to enhance biodiversity conservation within their areas of operations. Being proactive in the assessment, monitoring, and management of biodiversity is important not only for new mine operations but also for those that have been operating for many years.

Density enrichment by Forest Department & SCCL within Buffer Zone:

Density enrichment by Forest Department:

The proposed core zone of the project falls in Ramavaram RF and Buffer zone is occupied by 5 RFs namely Ramavaram RF, Chatakonda RF, Penagadapa RF, Mulakalapalli RF and Paloncha East RF of Kothagudem and Paloncha Divisions. The forest department has raised density enrichment plantations in a total of 234 Ha, in 5 forest Beats within the radius of 10 Kms.

Total area of Beat wise plantations by Forest department

Sl. No.	Beat	Plantation in Ha			Grass land		
		Ha	Latitude	Long.	Ha	Latitude	Long.
1	Tungaram	30	17.44781	80.61903	0		
		20	17.4386	80.61918			
		20	17.43909	80.62068			
		10	17.4454	80.62151			
		5	17.44800	80.61940			

		14	17.43915	80.62355			
	Sub-Total:	**99**			**0**		
2	Tippanapalli	20	17.4364	80.62889	15	17.43769	80.64544
		25	17.4296	80.62501			
		25	17.4287	80.61866			
		20	17.42656	80.63245			
		25	17.42041	80.62945			
	Sub-Total:	**115**			**15**		
3	Penagadapa	20	17.42395	80.68048	0		
	Grand Total:	**234**			**15**		

There are no National Parks, Biosphere Reserve, Tiger Reserves and Elephant Reserve/Corridor in the study area.

Density enrichment by SCCL within the 10 Kms radius:
A total of 1056 Hectares of (Block, OB, and Avenue) plantations have been raised by SCCL since 1984 in this area towards ecological restoration processes. These restoration practices are highly upsurging in reversing the habitat degradation happened in and around the mine areas. These plantations have provided pasture and shelter to various wildlife. However, out of these plantation about 300 Ha of plantations have been felled for various land use. Still these plantation are existing in 816 Ha and will serve the purpose of the ecological restoration practices of the mines, which focusses on the processes such as perseverance of species through natural recruitment and survival, functioning food webs, system-wide nutrient conservation via relationships among plants, and animals.

List of plantation of Kothagudem area (10 Km radius from GKOC mines) as on 13.12.23 (from 1999-2023) by SCCL

(A) OB Plantations

S.No	Year of raising	Location	Name of the Species planted	Area in Ha	No. of seedlings planted	Survival in Nos.	Survival %	Legal status (RF/ SCCL)	Lat & Long.
1	1999	GKOCP, OB	M	2	2500	2125	85.00	RF	N 17.4457 E 80.6456
2	2001	GKOCP, OB	M	10	11500	10062	87.50	SCCL	N 17.4495 E 80.6441
3	2002	GKOCP, OB	M	23	57119	48893	85.60	SCCL	N 17.4578 E 80.6285
4	2003	GKOCP, OB	M	52	65000	55250	85.00	SCCL	N 17.4558 E 80.6329
5	2004	GKOCP, OB	M	65	167400	147312	88.00	RF	N 17.4585 E 80.6294
6	2005	GKOCP, OB	M	48	120000	104280	86.90	RF	N 17.4640 E 80.6298
7	2006	GKOCP, OB	M	31	71198	61230	86.00	RF	N 17.4618 E 80.6328

8	2007	GKOCP, OB	M	7	21977	18900	86.00	RF	N 17.4600 E 80.6368
9	2008	GKOCP, OB	M	8	19761	16006	81.00	RF	N 17.2086 E 80.8122
10	2009	GKOCP-West Dump-RF, OB	M	44	109000	89380	82.00	RF	N 17.4618 E 80.6328
11	2010	GKOCP-OB	M	28	35922	28738	80.00	RF	N 17.4466 E 80.6591
12	2011	GKOCP, OB	M	19	47119	40357	85.65	SCCL	N17.44881 E80.65703
13	2012	GKOCP OB dumps	M	25	61023	51870	85.00	16Ha RF and 9Ha SCCL	N17.44663 E80.65681
14	2013	GKOCP, OB	M	33	80000	57650	72.06	24Ha RF and 8.5Ha SCCL	N17.2643 E80.3919
15	2014	GKOCP, OB	M	12	29120	26980	92.65	SCCL	N17.2871 E80.3949
16	2015	GKOCP, OB	M	12	30000	25000	83.33	SCCL	N17.2718 E80.3815
17	2016	GKOCP, OB	M	24	59120	53790	90.98	SCCL	N17.2871 E80.3949
18	2017	GKOCP, OB	M	12	30000	27785	92.62	RF	N17.45198 E80.64663
19	2018	GKOCP, OB	EC & M	46	115598	96405	83.40	SCCL	N17.45115 E80.64784
20	2023	GKOCP, OB	M	6	16340	15035	92.01	SCCL	N 17.45930 E 80.64234
		Total OB		**507**	**1149697**	**977048**	**84.98**		
(B) Block plantations									
1	2000	7 Shaft dispensary, Block	EC	5	14196	5983	42.15	SCCL	N 17.4725 E 80.6656
2	2004	St. Josephs, Block	EC&M	7	6825	2164	31.71	SCCL	N 17.4983 E 80.6510
3	2005	GKOCP Block	M	10	11110	9998	89.99	SCCL	N 17.5345 E 80.6315
4	2005	5 & 7 Shaft, Block	EC,M& B	35	27614	16157	58.51	SCCL	N 17.4830 E 80.6647
5	2005	VK compound wall, Block	EC&M	7	7800	1545	19.81	SCCL	N 17.4783 E 80.6729
6	2006	Vanama nagar, Block	EC&M	2	4439	3245	73.10	SCCL	N 17.4702 E 80.6682

7	2006	Goutampur, Block	M	4	1764	1073	60.83	SCCL	N 17.4815 E 80.6446
8	2006	5Shaft, Block	M	10	7223	5876	81.35	SCCL	N 17.4968 E 80.6692
9	2006	GKOCP Block	M	10	9143	8120	88.81	RF	N 17.5423 E 80.5563
10	2007	Goutampur, Block	EC&M	1	3461	1612	46.58	SCCL	N 17.4828 E 80.6463
11	2007	7 Incline, Block	EC&M	2	4616	2318	50.22	SCCL	N 17.4748 E 80.6678
12	2007	7 Incline (S), Block	EC&M	8	3862	2840	73.54	SCCL	N 17.4838 E 80.6719
13	2007	Tellavagu, Block	M	6	2339	2094	89.53	RF	N 17.4931 E 80.6850
14	2008	Subsidence panel 1 & 1A, Block	M	3	6212	4848	78.04	RF	N 17.4922 E 80.6625
15	2009	Behind VK-7 Incline Mine-RF, Block	EC	9	7160	2026	28.30	RF	N17.5770 E 80.6379
16	2009	Evacuated Colony of VK-7 Incline, Block	EC	3	10782	9345	86.67	SCCL	N 17.4761 E 80.6680
17	2010	GKOCP-Block	EC&M	8	7494	6739	89.93	RF	N 17.4466 E 80.6609
18	2011	RF area in KGM near Deport., Block	M	15	10718	9110	85.00	RF	N17.57247 E80.63274
19	2012	GKOCP Vacant patches, Block	M	4	3426	3200	93.40	SCCL	N17.46223 E80.65163
20	2012	VK-7 Incline Vacant patches, Block	M	4	6159	5704	92.61	SCCL	N17.48161 E80.67233
21	2014	VK-7 Incline	EU	10	13465	7452	55.34	SCCL	N17.2848 E80.4014
22	2016	RF plantation near Gaddalamadugu	M	22	24650	19960	80.97	RF	N17.3301 E80.3830
23	2016	RF plantation near 5B shaft	M	42	47020	38560	82.01	RF	N17.3012 E80.4018

24	2017	RF plantation at Gaddalamadugu	EC & M	50	53938	48790	90.46	SCCL	N17.49473 E80.65745
25	2019	Garimellapadu, Block	M	2	2220	2015	90.77	SCCL	N17.52723E .80.64835
		Total Block		**279**	**297636**	**220774**	**74.18**		
(C) Avenue plantations									
1	2001	Goutampur, Avenue	M	2	400	360	90.00	SCCL	N 17.4809 E 80.6478
2	2002	Rudrampur, Avenue	M	5	1000	905	90.50	SCCL	N 17.4984 E 80.6527
3	2004	Rudrampur, 5shaft, Avenue	M	5	1924	1781	92.57	SCCL	N 17.4984 E 80.6527
4	2005	5&7 shaft, Avenue	M	5	1400	1208	86.29	SCCL	N 17.4842 E 80.6679
5	2008	Kothagudem area, Avenue	M	2	773	217	28.07	SCCL	N 17.4988 E 80.6530
6	2010	GKOCP-Avenue	M	2	184	184	100.00	RF	N 17.4466 E 80.6591
7	2014	PVK-Guest House Avenue	M	1	960	768	80.00	SCCL	N17.2911 E80.3929
8	2022	Avenue Plantation near penagadapa vilage & newly diverted highway Road	M	8	4500	4500	100.00	SCCL	N17.2337 E80.7775
		Total Avenue		**30**	**11141**	**9923**	**89.07**		

*(EC- Eucalyptus; B – Bamboo; M – Mixed/Miscellaneous)

Total Summary of Kothagudem

Description	Area in Ha	No. of seedlings planted	Survival in Nos.	Survival percentage
OB (A)	507	1149697	977048	84.98
Block (B)	279	297636	220774	74.18
Avenue (C)	30	11141	9923	89.07
Grand Total (A+B+C)	**816**	**1458474**	**1207745**	**82.81**

Planting suitable vegetation can help to re-establish habitats rapidly after mining disturbance. This may benefit varied biodiversity/wildlife of the area.

List of mixed/miscellaneous species planted by SCCL:

1. *Hardwikia binata*
2. *Dendrocalamus strictus*
3. *Ficus religiosa*
4. *Azadirachta indica*
5. *Limonia acidissima*
6. *Ficus bengalensis*
7. *Aegle marmelos*
8. *Mitragyna parvifolia*
9. *Dalbergia latifolia*
10. *Pterocarpus marsupium*
11. *Emblica officinalis*
12. *Syzygium cumini*
13. *Alstonia scholaris*
14. *Albizzia procera*
15. *Annona squamosa*
16. *Terminalia bellarica*
17. *Spathodea campanulata*
18. *Pongamia pinnata*
19. *Ficus mollis*
20. *Lagerstroemia parviflora*
21. *Bauhinia purpurea*
22. *Millingtonia harrtensis*
23. *Madhuka indica*
24. *Ficus carica*
25. *Tamarindus indica*
26. *Cassia fistula*
27. *Anthocephalus kadamba*
28. *Pithecelobium dulci*
29. *Sterculia urens*
30. *Tectonia grandis*
31. *Dalbergia sissoo*
32. *Cassia siamea*
33. *Adina cordifolia*
34. *Putranjeeva raxuburgi*
35. *Bombax ceiba*
36. *Mimusops elangii*
37. *Terminalia chebula*
38. *Peltophorum ferruginum*
39. *Albizzia lebbek*
40. *Couravpita guinensis*
41. *Holoptelea integrifolia*

In the proposed project of VKOC, extraction of tree growth will be taken up progressively as the mining process progresses.

Environmental Details of the Proposed Project Area

State	:	Telangana
District	:	Bhadradri – Kothagudem
Forest Division	:	Kothagudem
Forest Range	:	Ramavaram
Forest Section (s)	:	Ramavaram & Penagadapa
Total study area	:	2403.17 Ha as Core Zone and area within 10 Km from the boundary of the Core Zone as Buffer Zone.
Forest Type	:	Tropical Dry Deciduous Forest – Mainly Coppice growth
Habitat Type	:	Mixed-dry-deciduous forest type with wide variety of microhabitats, ranging from open grasslands, water bodies and hillocks, plantations, and woodlands to scrub lands.

The study area does not form a part of any National Park or Sanctuary or Critical Wildlife habitat. No protected area is situated in the vicinity or within the Impact area of 10 Kms radius. The proposed study area in Core zone is existing mine. No important wild major animals like Panther, Tiger, Sloth Bear, Indian Bison, Nilgai & Mouse deer were noticed in the area during the study. However, secondary data were relied. Even Tiger has not been reported in the Buffer area or even within 20 Km from the mine boundary. In the Wildlife Plan of Kinnersani Wildlife Sanctuary (which is about 17 Km from the Project area) during the wildlife census of 2022 only one Panther was reported in the Buffer area, important Schedule-I fauna found are Sloth Bear, Indian Bison, Mouse deer, Asian Palm Civet Cat, Small Indian Civet Cat, Panther, Indian Monitor Lizard, Sand Boa and Indian Peafowl.

Physiographic Features of the study area:

The core zone in this case covers project area while the buffer area covers the area within 10 Kms area around the core area.

Core zone: VK Coal Mine project area is of flat topography, Bolligutta hill stands out as a prominent landmark of this area along the northern boundary. The general topographic elevation of the project area varies from 160m above MSL to 100m above MSL. The south part of the project is covered by the existing GKOC project area.

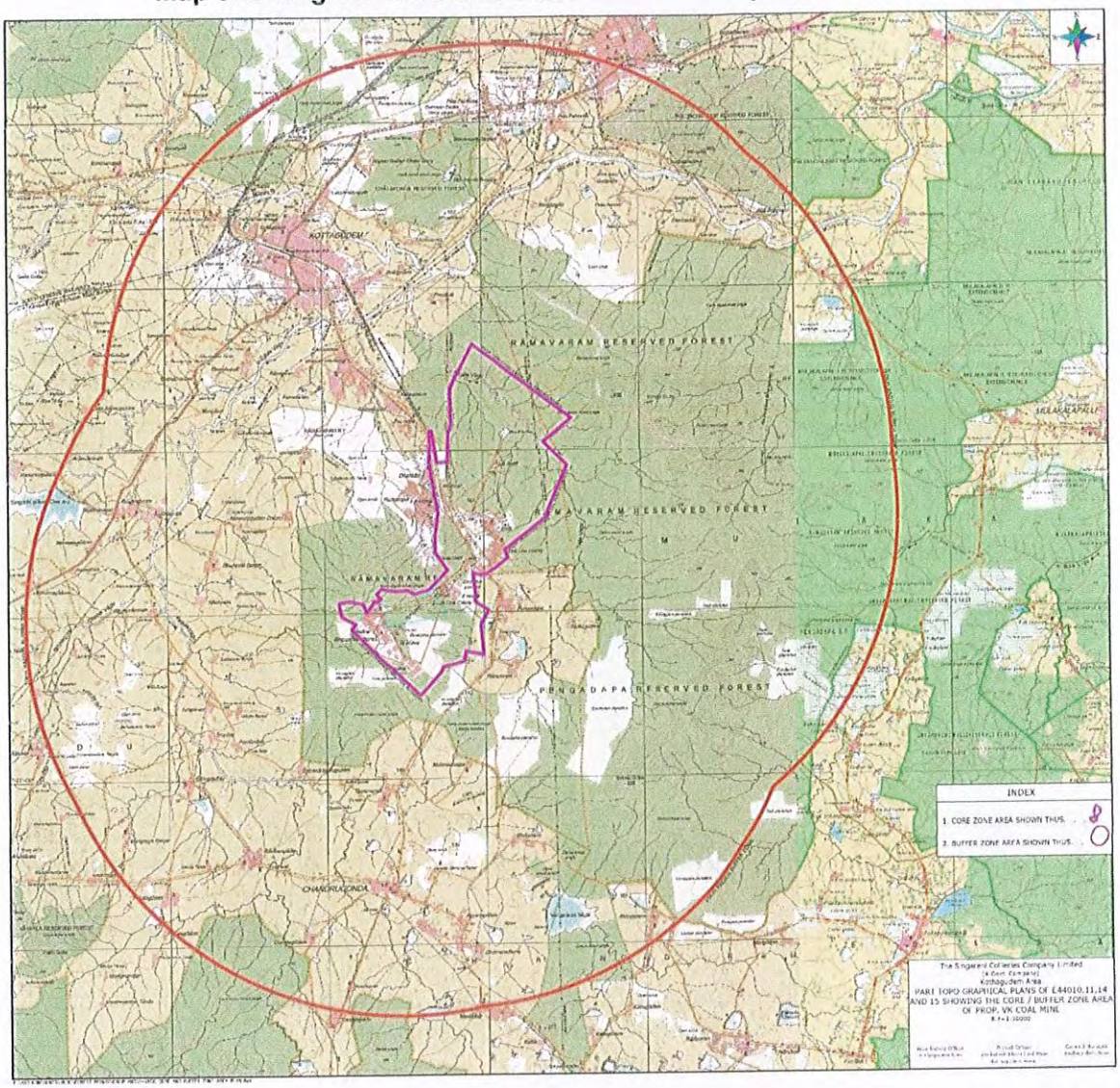
Buffer zone: The buffer area is a plain terrain with relief of 160m in the south and 80m in the north and sloping towards north and northeast. A few hillocks located are Kanigiri gutta (432m) & an unnamed hillock (360m) in the northeast, Balusu gutta (328m) in the southeast, and Bolli gutta (340m) at the periphery of the project are existing in the buffer area.

Drainage:

Core zone: Tellavagu, an ephemeral stream is a tributary of Edula vagu and flowing in the northern part of the project area. Drainage is moderately developed, and a few ephemeral streams are flowing and join the Tellavagu. The drainage density of the block area is about 1.65 Kms/ sq.Kms.

Buffer zone: The buffer zone area drainage is drained by Murredu stream, Edula vagu flowing in the western half and joins to Murredu river near Gollagudem village in the northern part of the buffer area. Tellavagu flows in the eastern part and joins Edulavagu near Penuballi village. The drainage of the area is dentritic to parallel type with a density of about 1.80 Kms/ Sq.Kms. Singabhupalam Cheruvu a major irrigation tank is in the western part about 7 Kms away from the proposed VK Coal Mine project.

Map showing the Core and Buffer Zone of the proposed Area



Establishments/structures already existing in the Core and Buffer Zones of the proposed area:

The core and buffer zones are highly fragmented and developed with established buildings, roads in connection to the mine operations since the past 70 years of time in this area.

A total of 2403.17 ha in the core zone established mine operational structures, voids and overburden dumps are there. Hence, there may be less chance of impact of the proposed new mine operation on the wildlife presence and abundance in this area.

Establishments/structures already existing in the Core Zone of the proposed area

Sl.no.	Name of structure	Area	
		Sq. mtrs.	Ha.
1	PVK shaft and buildings	5,864	0.586
2	No.5 shaft & agent office	21,306	2.131
3	No.7 shaft& buildings	44,994	4.499
4	Magzine	9,464	0.946
5	Mayabazar, private houses	69,431	6.943

6	PVK no.5 incline and buildings	63,257	6.326
7	S & pc office	8,845	0.885
8	5 incline, civil office & MVTC	40,474	4.047
9	Cone	589	0.059
10	VK7 top seam air shaft	7,142	0.714
11	GM office	13,088	1.309
12	Sub-station	2,096	0.210
13	VK7 incline & buildings	16,316	1.632
14	Area workshop	17,583	1.758
15	Abandoned stores & LW shed	9,464	0.946
16	RCHP and buildings	40,210	4.021
17	Temple at RCHP	138	0.014
18	GL bunker & weighbridge of RCHP	4,533	0.453
19	Venkateswara temple	6,710	0.671
20	Filter bed	1,111	0.111
21	Pumps	1,200	0.120
22	Pumps	1,130	0.113
23	Diesel bunk at GKOC	1,601	0.160
24	GKOC site office	14,973	1.497
25	GKOC base workshop	49,099	4.910
26	GKOC CHP belts & bunkers	7,224	0.722
27	GKOC belts control room	134	0.013
28	Sub-station at GKOC CHP	421	0.042
29	GGKOC CHP office & buildings	205	0.021
30	GKOC project office	3,888	0.389
31	GKOC void area	2,100,881	210.088
32	GKOC internal & external dump with plantation	5, 001,360	500.136
33	GKOC internal dump	385,325	38.532
	Total	**7,950,056**	**795.005**

Establishments/structures already existing in the Buffer Zone of the proposed area

S.no.	Name of structure	Area	
		sq. Mtrs	Hectares
1	Hemachandrapuram anadha saranalayam	1100.162	0.11
2	Hemachandrapuram amma anadha saranalayam	4882.104	0.488
3	Hemachandrapuram-1	38166.98	3.817
4	Hemachandrapuram-2	256500.389	25.65
5	Hemachandrapuram-3	1349.256	0.135
6	Hemachandrapuram sccl filter bed	6574.661	0.657
7	Hemachandrapuram crp camp	103814.593	10.381
8	Hemachandrapuram crp fire shooting training site	9577.962	0.958
9	Hemachandrapuram jangili rajeswar rao poultry	4741.094	0.474
10	Laxmidevipalli-6	193960.092	19.396
11	Kothagudem-6	1581971.045	158.197
12	Madigaprolu-1	27267.525	2.727
13	Madigaprolu-2	62009.38	6.201
14	Yellandu x road lenin nagar	2526.664	0.253
15	Palvoncha-38	36273.279	3.627
16	Palvoncha-40	1509.448	0.151
17	Palvoncha-39	5591.867	0.559
18	Laxmidevipalli-1	57899.449	5.79

19	Laxmidevipalli-2	485468.975	48.547
20	Laxmidevipalli-3	291167.261	29.117
21	Yellandu bunglows	276143.708	27.614
22	Sccl nursery	31432.817	3.143
23	Haritha convention hall, yld x road	25830.976	2.583
24	Vanvihar kothagudem to palvoncha road	21566.25	2.157
25	Sccl filter bed kothagudem to palvoncha road	7819.298	0.782
26	Govt.medical college palvoncha road	10010.383	1.001
27	Ksm office palvoncha road	8109.683	0.811
28	Boys hostel palvoncha road	18323.082	1.832
29	Palvoncha-31	5566.368	0.557
30	Palvoncha-32	31594.191	3.159
31	Palvoncha-28	1470652.07	147.065
32	Annapurna gosumrakshana, palvoncha	17857.057	1.786
33	Palvoncha-29	11211.603	1.121
34	Palvoncha-27	2052.896	0.205
35	Palvoncha-26	70695.609	7.07
36	Nmdc-palvoncha	576938.44	57.694
37	Palvoncha-24	26965.131	2.697
38	Genco colony	98031.348	9.803
39	Palvoncha-25	112625.243	11.263
40	Atmalingeswara temple, palvoncha	12167.903	1.217
41	Palvoncha-23	529298.872	52.93
42	Palvoncha-22	2659826.477	265.983
43	Palvoncha-21	267649.986	26.765
44	Palvoncha920	47855.853	4.786
45	Palvoncha hill samakka sarakka temple	952.694	0.095
46	Srinu family dhaba, palvoncha	881.41	0.088
47	Hill view resorts & garden, palvoncha	6553.63	0.655
48	Palvoncha-18	20034.982	2.003
49	Palvoncha-17	92181.529	9.218
50	Palvoncha-16	10193.444	1.019
51	Palvoncha-8	9681.578	0.968
52	Palvoncha-7	6016.97	0.602
53	Palvoncha-3	40657.213	4.066
54	Palvoncha-2	110087.148	11.009
55	Palvoncha-4	33057.281	3.306
56	Palvoncha-6	37076.667	3.708
57	Palvoncha-5	5782.424	0.578
58	Palvoncha-9	13827.127	1.383
59	Palvoncha-10	24888.125	2.489
60	Palvoncha-11	15418.975	1.542
61	Palvoncha-19	20762.377	2.076
62	Ngo tribal school	71132.534	7.113
63	Palvoncha-12	35408.645	3.541
64	Palvoncha-13	41538.035	4.154
65	Palvoncha-14	71196.362	7.12
66	Palvoncha-15	52577.553	5.258
67	Palvoncha-35	6237.956	0.624
68	Palvoncha-36	2801.854	0.28
69	Palvoncha-37	29866.827	2.987
70	Navabharat-1	1397434.449	139.743
71	Lv prasad eye hospital,palvoncha	2694.843	0.269
72	Venkateswara temple,palvoncha	4581.325	0.458

73	Palvoncha-30	1746.197	0.175
74	Pipeline atvenkateswara temple,palvoncha	404.04	0.04
75	Collector office,palvoncha	79189.117	7.919
76	Engineer college,palvoncha	34191.838	3.419
77	Palvoncha-1	81386.721	8.139
78	Chathakonda-14	35130.725	3.513
79	Chatakonda-13	12093.612	1.209
80	Chatakonda-12	14400.906	1.44
81	Rajugari kalyana mandapam,chatakonda	2792.671	0.279
82	Chatakonda-11	2914.968	0.291
83	Chatakonda-15	3664.097	0.366
84	Chatakonda-9	27563.658	2.756
85	Chatakonda-8	14441.158	1.444
86	6th (ir)bn tssp-1, chathakonda	25042.056	2.504
87	6th (ir)bn tssp-2, chathakonda	24472.942	2.447
88	Chathakonda-1	197401.914	19.74
89	Chathakonda-2	4838.284	0.484
90	Chathakonda-3	3589.914	0.359
91	Chathakonda-4	1885.437	0.189
92	Chathakonda-6	51330.085	5.133
93	Chathakonda-5	32111.581	3.211
94	Chathakonda-7	56886.6	5.689
95	Sccl solar power plant,penuballi	131114.041	13.111
96	Penuballi	105027.673	10.503
97	Mallesh farm house	2407.886	0.241
98	Itda garimallapadu	5433.172	0.543
99	Garimallapadu	24651.11	2.465
100	Kothagudem-7	2537295.971	253.73
101	Kothagudem-5	519284.634	51.928
102	Sccl solar power plant,penuballi	362118.776	36.212
103	Ramavaram-1	532825.039	53.283
104	Sccl solar power plant-3,kothagudem	109686.847	10.969
105	Ramavaram-3	58445.643	5.845
106	Sccl mines rescue station,kothagudem	48817.102	4.882
107	Sccl proposed area work shop & coal testing lab	18551.257	1.855
108	Kothagudem iti	38283.106	3.828
109	Sccl solar power plant-4, kothagudem	247014.461	24.701
110	Ramavaram-2	218271.262	21.827
111	Ramavaram-4	1515535.417	151.554
112	Kothagudem-3	1186097.441	118.61
113	Kothagudem-4	466416.169	46.642
114	Kothagudem-1	2998732.942	299.873
115	Kothagudem byepass-1	13379.916	1.338
116	Venkateswara temple on hill,kothagudem byepass	14721.724	1.472
117	Kothagudem byepass-2	1872.304	0.187
118	Saravaram-2	71444.842	7.144
119	Saravaram-1	16996.093	1.7
120	Gopithanda-1	279826.778	27.983
121	Laxmidevipalli-4	391933.705	39.193
122	Kothagudem-2	14498.92	1.45
123	Chunchupalli-1	223419.827	22.342
124	Chunchupalli-2	94961.541	9.496
125	Chitti ramavaram	16380.536	1.638
126	Samakka sarakka gaddelu, garibpet	3112.655	0.311

127	Govt.hospital,ramavaram	9763.677	0.976
128	Emrs ramavaram	56596.8	5.66
129	Krushi vigyan kendram,ramavaram	4471.129	0.447
130	Sccl 3 incline bunglows	169697.436	16.97
131	Sccl 3 incline & 4 incline area	201460.533	20.146
132	Kothagudem, mission bageeradha	8200.806	0.82
133	St.joseph school,dhanbad,kothagudem	34947.784	3.495
134	Dhanbad,kothagudem	50449.829	5.045
135	Dhanbad-1,kothagudem	1404.061	0.14
136	Dhanbad-2,kothagudem	1741.367	0.174
137	Rudrampur thanda	20825.07	2.083
138	Sccl rudrampur & gowthumpur colony	1145048.139	114.505
139	Garibpet-1	26788.022	2.679
140	Near vk7 incline tellavagu	38650.936	3.865
141	Sandrukunta-2	11196.224	1.12
142	Sandrukunta-1	1041.31	0.104
143	Mulugudem	34106.03	3.411
144	Penagadapa-6	22633.882	2.263
145	Penagadapa-7	7888.848	0.789
146	Knr ghat,penagadapa	891.785	0.089
147	Penagadapa-5	104437.722	10.444
148	Penagadapa-4	42094.678	4.209
149	Penagadapa-3	377.599	0.038
150	Penagadapa-2	41427.549	4.143
151	Penagadapa-1	21980.173	2.198
152	Rampuram	113695.834	11.37
153	Chunchupalli-5	48258.503	4.826
154	Chunchupalli-3	209020.287	20.902
155	Chuchupalli-4	92303.528	9.23
156	Laxmidevipalli-5	46463.287	4.646
157	Vepalagadda-19	1868.82	0.187
158	Vepalagadda-18	7041.67	0.704
159	Vepalagadda-17	4559.342	0.456
160	Vepalagadda-16	1078.054	0.108
161	Hanuman nursery & garden	5402.071	0.54
162	Vepalagadda-15	2216.308	0.222
163	Vepalagadda-14	1114.967	0.111
164	Farmhouse	1765.655	0.177
165	Vepalagadda-13	52489.594	5.249
166	Iti, vepalagadda	5649.57	0.565
167	Gayathri nagar	12889.047	1.289
168	Sujathanagar-15	8476.671	0.848
169	Thatipalli,sujathanagar-11	7386.237	0.739
170	Bharat petroleum,sujathanagar-10	2122.723	0.212
171	Sujathanagar-16	333.432	0.033
172	Vepalagadda-1	154409.469	15.441
173	Sai durga para boiled rice mill	14033.591	1.403
174	Vepalagadda-2	126185.76	12.619
175	Anjanapuram-1	79415.151	7.942
176	Vepalagadda-3	9132.171	0.913
177	Vepalagadda-5	4485.05	0.449
178	Vepalagadda-4	5222.493	0.522
179	Vepalagadda-6	504.511	0.05
180	Vepalagadda-7	593.538	0.059

181	Vepalagadda-8	1265.073	0.127
182	Dhanvantari college,vepalagadda	6125.321	0.613
183	Hemachandrapuram	1163.851	0.116
184	Vepalagadda-10	359.113	0.036
185	Vepalagadda-11	488.897	0.049
186	Vepalagadda-12	4848.103	0.485
187	Nursery	32164.515	3.216
188	Sujathanagar-1	2337.049	0.234
189	Sujathanagr-2	3994.977	0.399
190	Sujathanagar-3	470.522	0.047
191	Sujathanagar-4	1010.292	0.101
192	Sujathanagar-5	371275.325	37.128
193	Sujathanagar-6	127983.827	12.798
194	Suajathanagar-18	15353.923	1.535
195	Konda krishna farm house,sujathanar-7	2865.617	0.287
196	Rk abhishek brick industry,sujathanagar-8	8705.178	0.871
197	Komatipalli-2	21356.596	2.136
198	Komatipalli-3	5360.731	0.536
199	Komatipalli-4	7803.283	0.78
200	Komatipalli	50300.508	5.03
201	Seethampet banjara-1	165915.43	16.592
202	Siva tekple,sujathanagar-9	2973.193	0.297
203	Sujathanagar-14	1840.938	0.184
204	Gollagudem	28606.612	2.861
205	Sujathanagar-19	157257.853	15.726
206	Sujathanagar-12	15737.432	1.574
207	Sujathanagar police station-17	2525.768	0.253
208	Sujathanagar-13	2128.016	0.213
209	Rathan naik thanda	122334.939	12.233
210	Degalamadugu	36830.665	3.683
211	Manjeet cotton	24236.432	2.424
212	Sujathanagar-20	10897.17	1.09
213	Seethampet banjara-3	141151.405	14.115
214	Seethampet banjara-4	42547.259	4.255
215	Seethampet banjara-2	8027.116	0.803
216	Ramji thanda-1	13851.881	1.385
217	Reddy palem	26804.987	2.68
218	Jarpurla thanda	11434.792	1.143
219	Mohammed nagar	56874.14	5.687
220	Seethaigudem	235821.194	23.582
221	Abbugudem-1	293151.218	29.315
222	Maddukuru-4	7991.295	0.799
223	Maddukuru-3	2450.428	0.245
224	Maddukuru-2	5936.132	0.594
225	Maddukuru-1	44294.711	4.429
226	Sr gardens, chndrugonda	10471.818	1.047
227	Chandrugonda-2	1336411.07	133.641
228	Chandrugonda-1	74277.55	7.428
229	Chandrugonda sub-station	15897.214	1.59
230	Chandrugonda-3	6352.998	0.635
231	Chandrugonda-4	12215.506	1.222
232	Chandrugonda-5	3240.419	0.324
233	Hp petrol bunk,chandrugonda	2187.099	0.219
234	Chandrugonda-6	17610.569	1.761

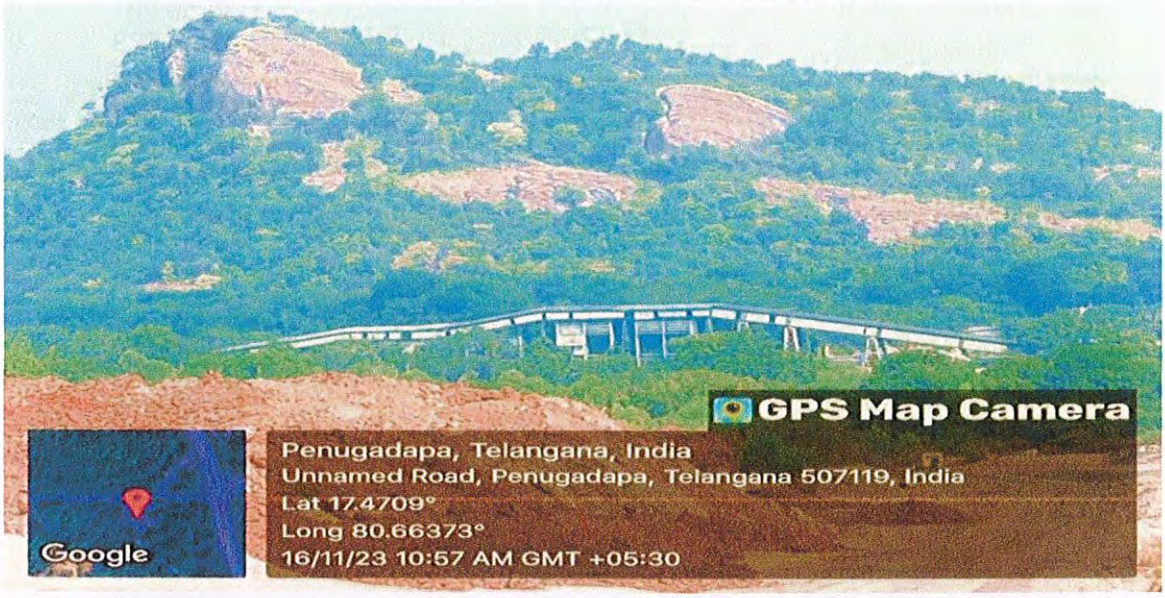
235	Chandrugonda-7	6358.654	0.636
236	Penagadapa-8	7216.651	0.722
237	Thipanapalli-1	399437.794	39.944
238	Thipanapalli-2	21642.483	2.164
239	Guruvaigudem-2	2158.574	0.216
240	Guruvaigudem-4	55307.73	5.531
241	Guruvaigudem-1	90656.901	9.066
242	Pokalagudem-4	4155.999	0.416
243	Pokalagudem-3	1804.292	0.18
244	Pokalagudem-2	10900.181	1.09
245	Pokalagudem-1	172018.503	17.202
246	Pokalagudem-8	2969.067	0.297
247	Pokalagudem-5	6415.963	0.642
248	Pokalagudem-6	28075.003	2.808
249	Pokalagudem-7	267931.031	26.793
250	Sathyanarayanapuram	50044.634	5.004
251	Repallevada	143235.668	14.324
252	Ganugapadu	196611.463	19.661
253	Managaiah banjara-1	45061.142	4.506
254	Managaiah banjara-2	16045.606	1.605
255	Santhanavenugopala swamy temple	1525.575	0.153
256	Annaram thanda-1	54856.485	5.486
257	Thungaram-1	193199.354	19.32
258	Thungaram-3	34702.619	3.47
259	Thungaram-2	5207.06	0.521
260	Baranbhapuram	29681.2	2.968
261	Machinenipeta	34925.969	3.493
262	Guruvaguthanda	25963.751	2.596
263	Sujathanagar-22	1512.576	0.151
264	Sujathanagar-23	47256.116	4.726
265	Vaguvoduvthanda	35464.72	3.546
266	Sujathanagar-21	11657.751	1.166
267	Ideal explosives industry	19438.272	1.944
268	33/11kv sub-station,kothagudem	17190.922	1.719
269	Bhadrachalam road railway cabin	2699.651	0.27
270	Bhadrachalam road railway station area	43036.719	4.304
271	Tsnpdcl circle office,kothagudem	2601.715	0.26
272	Farm house,bethumpudi	1244.546	0.124
273	Gpstw,satvarigudem	16362.826	1.636
274	Kothagudem 132kv rtss tstransco	10801.902	1.08
275	Sativarigudem-1	8292.296	0.829
276	Burugudem-1	5393.558	0.539
277	Burugudem-2	1735.249	0.174
278	Health sub-centre,chathakonda-1	3879.451	0.388
279	Health sub-centre,chathakonda-2	938.743	0.094
280	Palvoncha-41	12226.043	1.223
281	Maddukuru-5	6100.631	0.61
282	Palvoncha road side	37656.665	3.766
283	Ramalyam,pathacheruvu	1066.019	0.107
284	Repallevada-2	3635.602	0.364
285	Repallevada-2	2821.65	0.282
286	Thipanapalli doubble bed room	12907.859	1.291
287	Ukkenagaram	11017.554	1.102
288	Dhammapet road	22832.86	2.283

289	Laxmidevipalli-7	41922.253	4.192
290	Laxmidevipalli-8	13744.723	1.374
291	Laxmidevipalli-9	23639.597	2.364
292	Laxmidevipalli-10	1800.06	0.18
	Total	**33662883.25**	**3366.288**

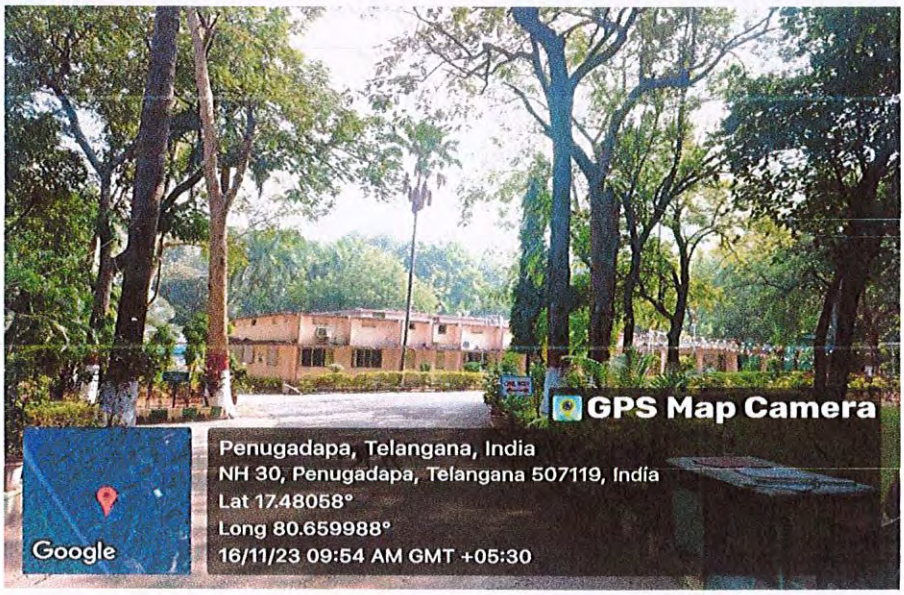
This is the evidence to say that the wildlife in the area has adjusted to these changes.

Already existing Mine Operational structures in the Core and Buffer Zones of the proposed area

CHP structures in the Core and Buffer Zone



GM Office and other offices in the Core and Buffer Zone



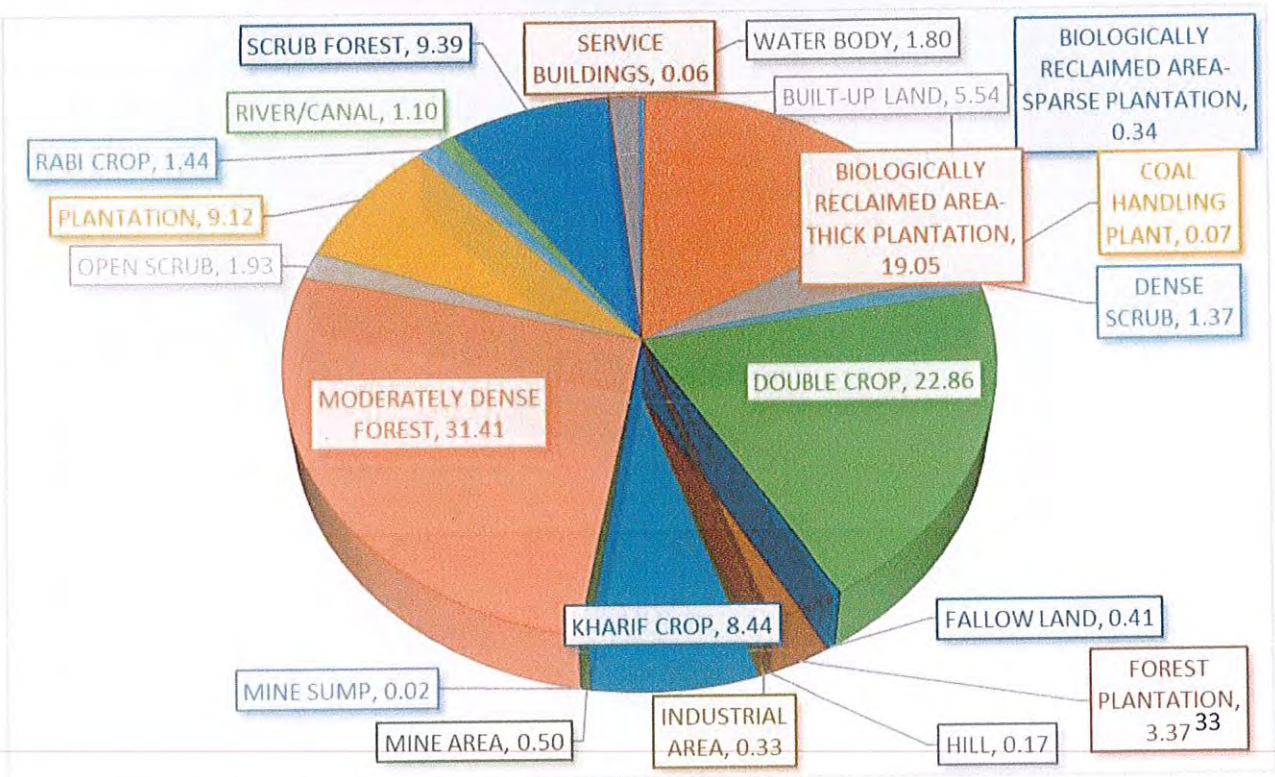
Land Use and Land Cover (LULC) Analysis in the Core and Buffer Zones of the

proposed area:

LULC of the proposed area

Land use	10 km radius		5 km radius		3 km radius	
	Area (ha)	% of area	Area (ha)	% of area	Area (ha)	% of area
Biologically reclaimed area-sparse plantation	200.3	0.34	200.3	0.86	200.30	1.52
Biologically reclaimed area-thick plantation	201.7	0.34	201.7	0.87	201.70	1.53
Built-up land	3266.4	5.54	934.1	4.02	423.58	3.21
Coal handling plant	40.8	0.07	40.8	0.18	40.77	0.31
Dense scrub	804.9	1.37	462.9	1.99	269.41	2.04
Double crop	13477.3	22.86	4022.9	17.30	1447.72	10.96
Fallow land	239.5	0.41	50.6	0.22	10.48	0.08
Forest plantation	1989.0	3.37	743.0	3.19	153.98	1.17
Hilly area	99.0	0.17	99.0	0.43	99.00	0.75
Industrial area	197.4	0.33	46.3	0.20	0	0
Kharif crop	4974.1	8.44	1438.2	6.18	598.65	4.53
Mine area	292.0	0.50	292.0	1.26	292.00	2.21
Mine sump	9.5	0.02	9.5	0.04	9.54	0.07
Moderately dense forest	18514.0	31.41	8913.0	38.32	6326.14	47.91
Open scrub	1138.1	1.93	379.4	1.63	188.32	1.43
Plantation	5373.8	9.12	1912.5	8.22	751.64	5.69
Rabi crop	847.6	1.44	188.2	0.81	92.86	0.70
River/canal	650.7	1.10	273.6	1.18	121.29	0.92
Scrub forest	5538.0	9.39	2802.5	12.05	1809.73	13.70
Service buildings	37.0	0.06	37.0	0.16	37.00	0.28
Water body	1058.9	1.80	209.1	0.90	131.07	0.99
Total	**58949.8**	**100.0**	**23256.4**	**100**	**13205.18**	**100**

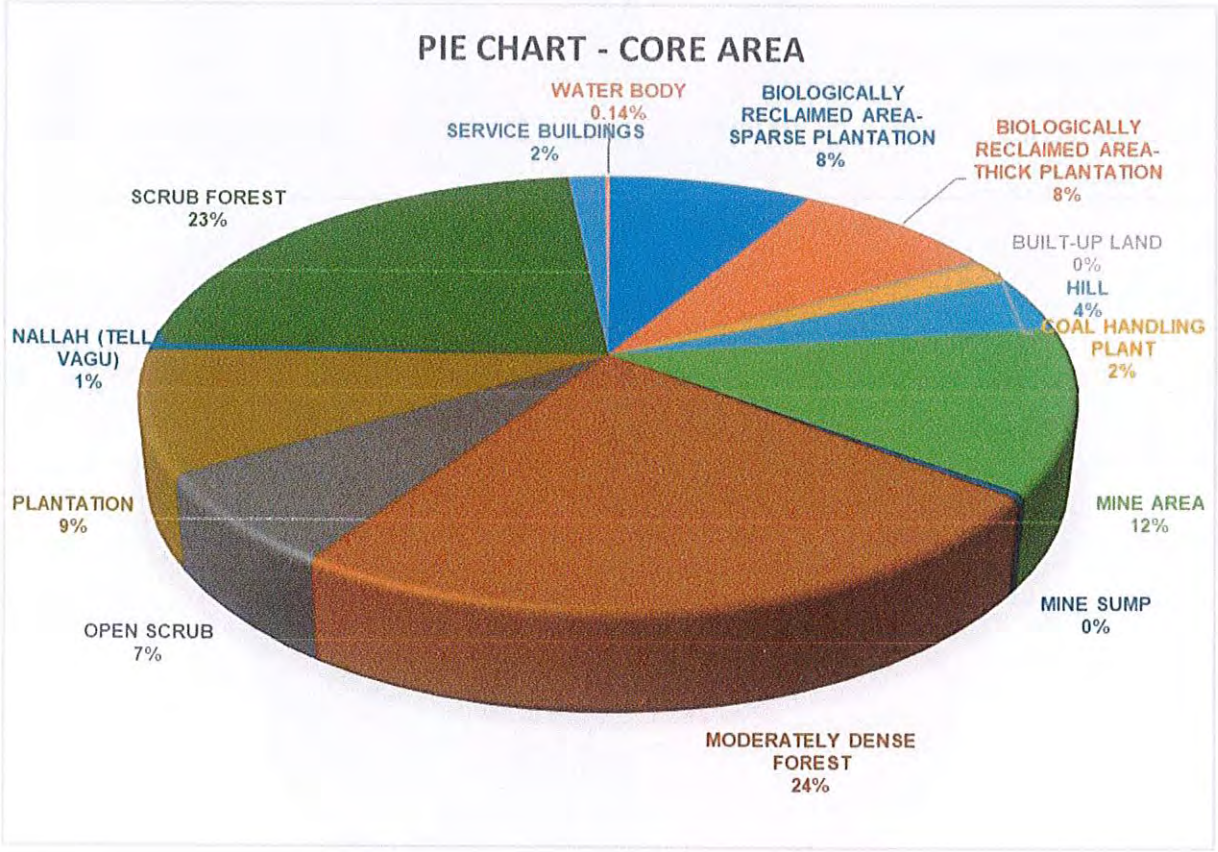
PIE Diagram of the LULC of the proposed area



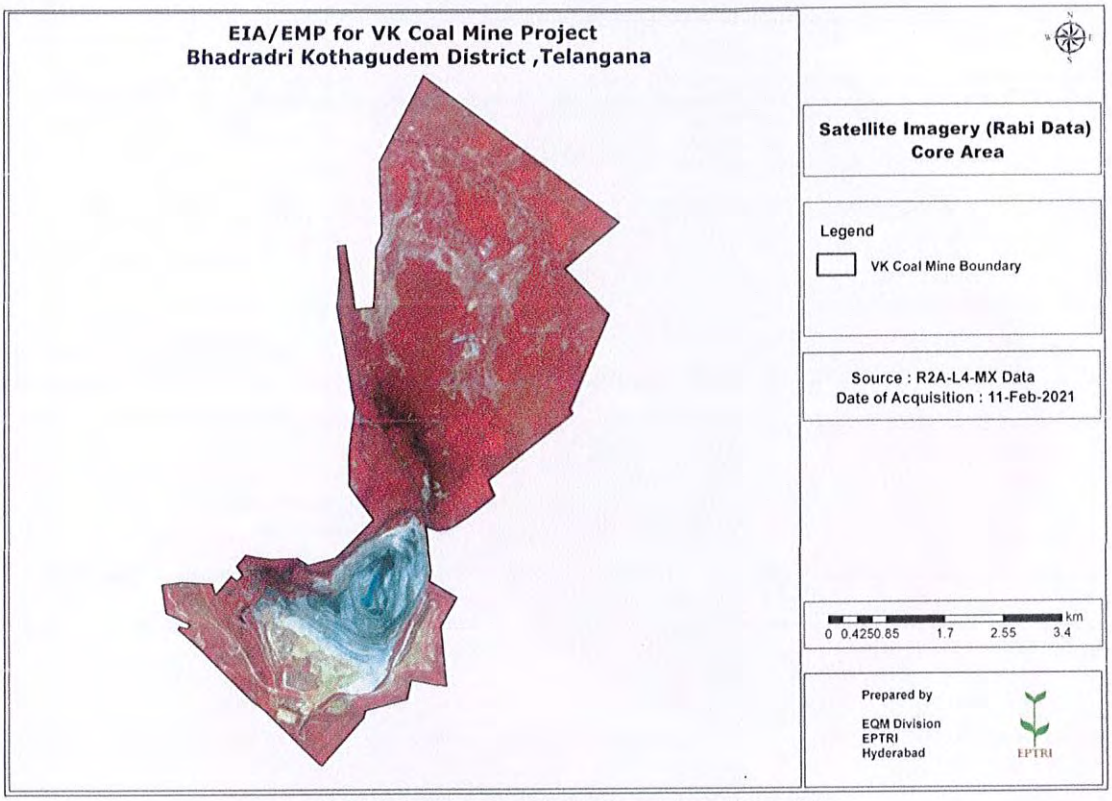
Land use of Core Zone

Sr. No.	Land use	Area (Ha)	%
1.	Biologically reclaimed area-thick plantation	201.70	8.39
2.	Biologically reclaimed area-sparse plantation	200.30	8.33
3.	Block Plantation in VK-7, PVK-5 and GK OC	215.35	8.96
4.	Mine area (GK OC Quarry)	292.00	12.15
5.	Mine sump (GK OC Sump)	9.54	0.40
6.	Coal handling plant	40.77	1.70
7.	Built-up land	6.70	0.28
8.	Service buildings	37.00	1.54
9.	Hill	99.00	4.12
10.	Open scrub	168.21	7.00
11.	Moderately dense forest	573.21	23.85
12.	Scrub forest	544.04	22.64
13.	Nallah (Tella vagu)	12.03	0.50
14.	Water body	3.32	0.14
	Total	**2403.17**	**100**

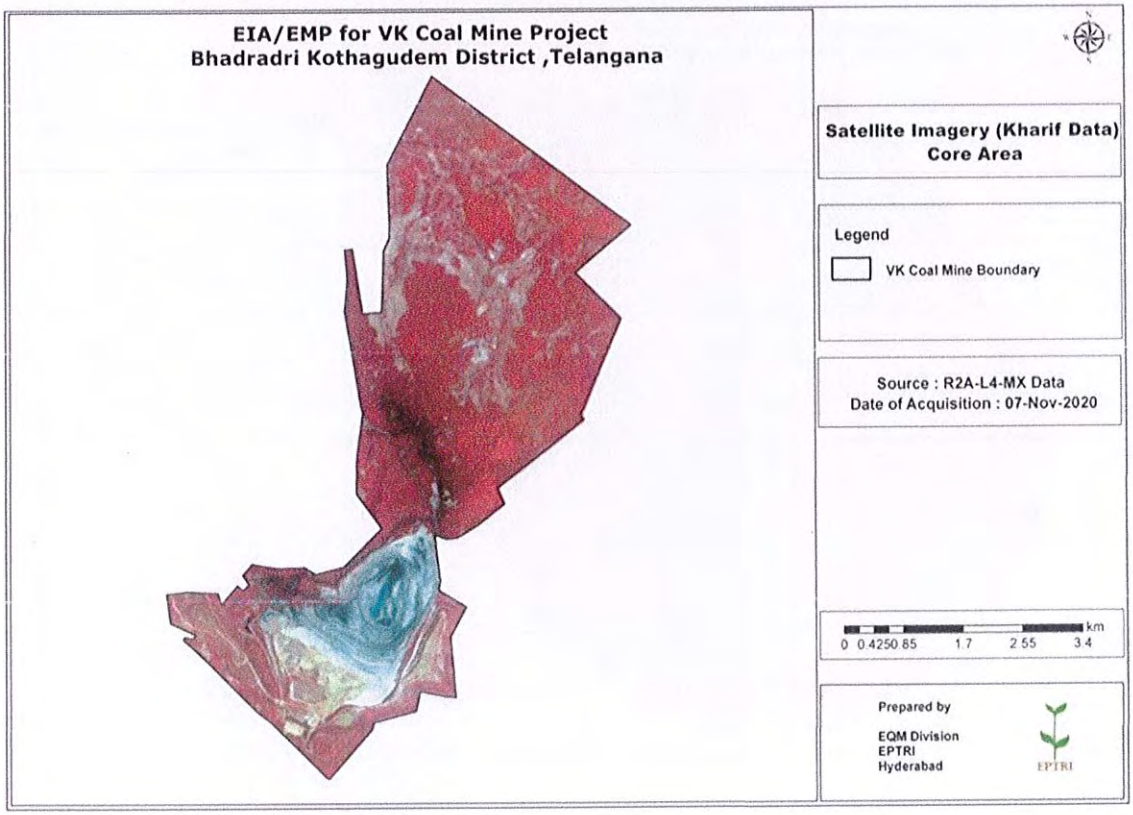
PIE Diagram of Land Use of Core Area



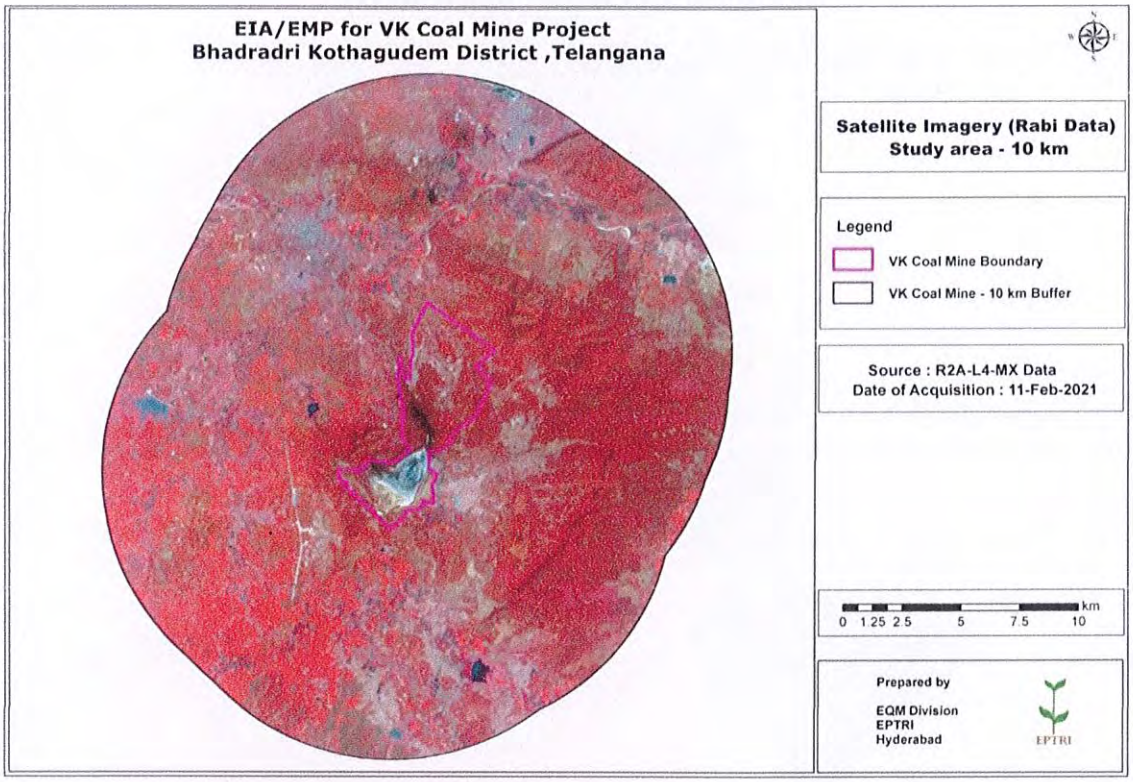
Satellite imagery of the Core area (Rabi)



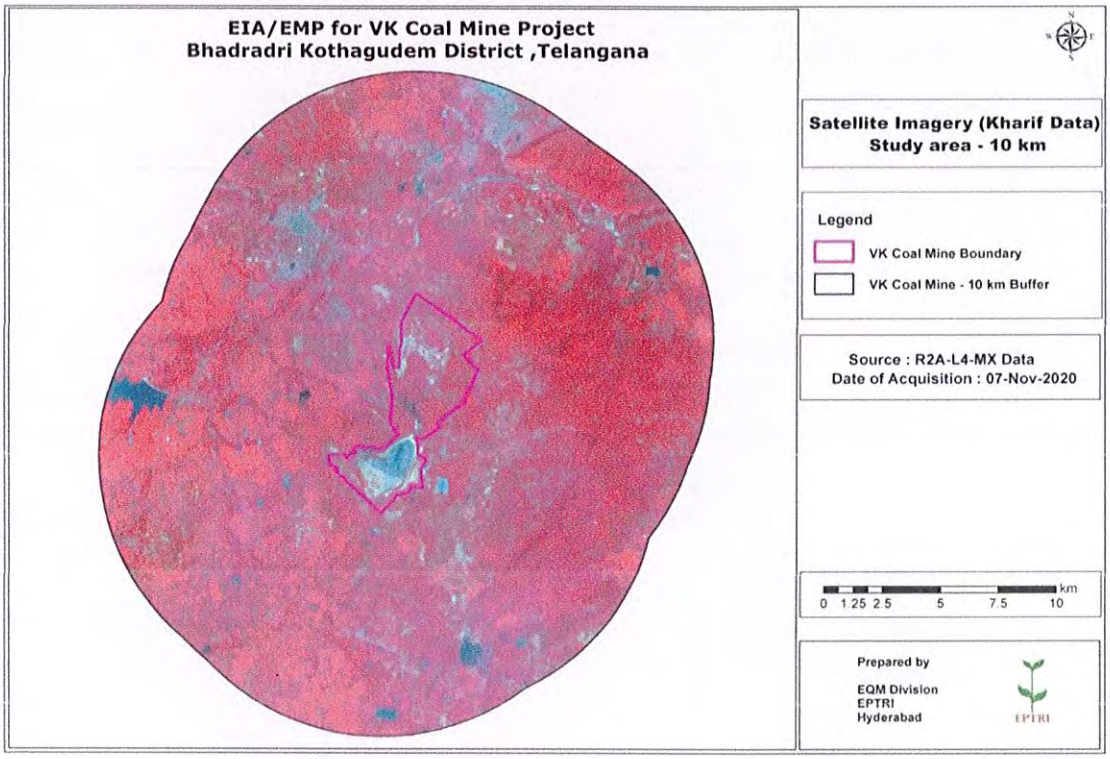
Satellite imagery of the Core area (Kharif)



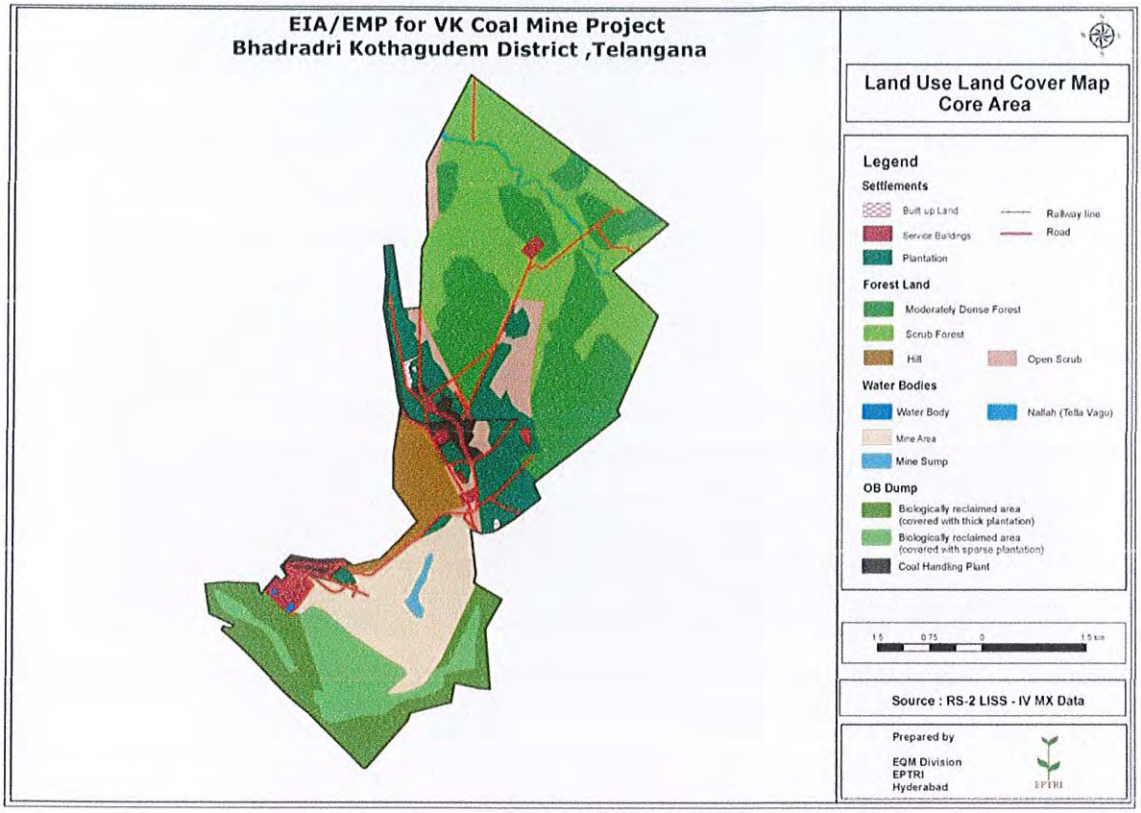
Satellite imagery of the Buffer area (Rabi)



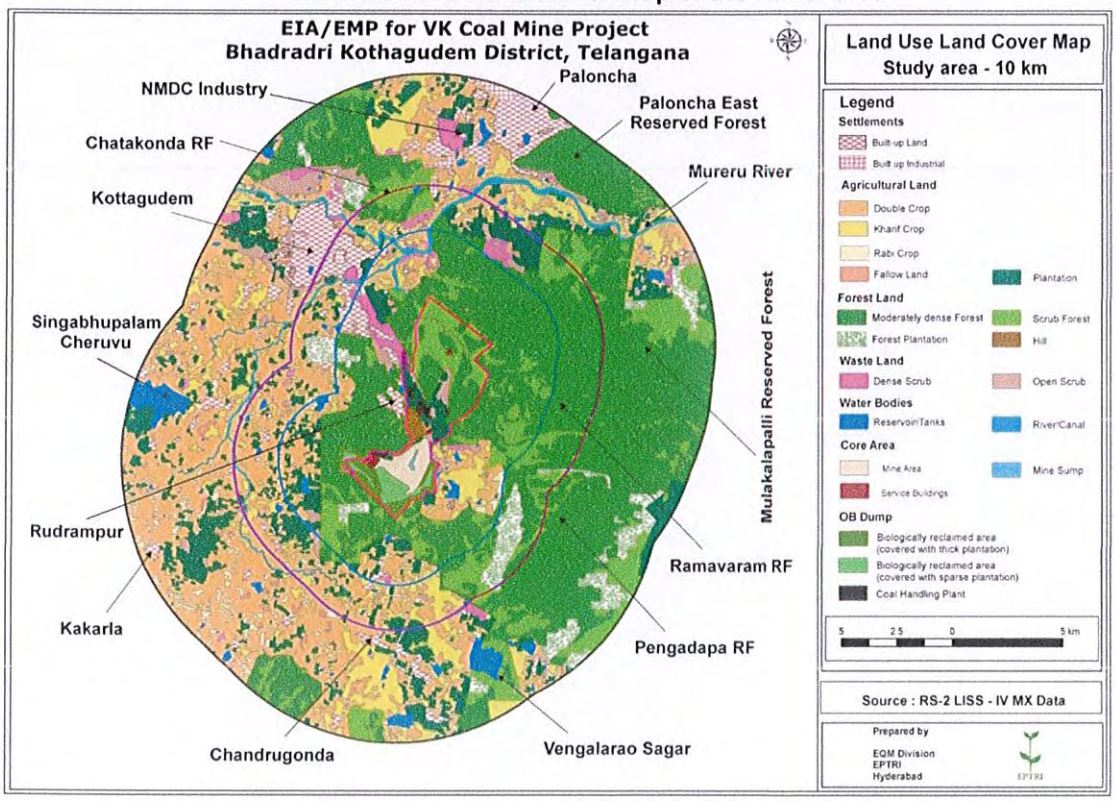
Satellite imagery of the Buffer area (Kharif)



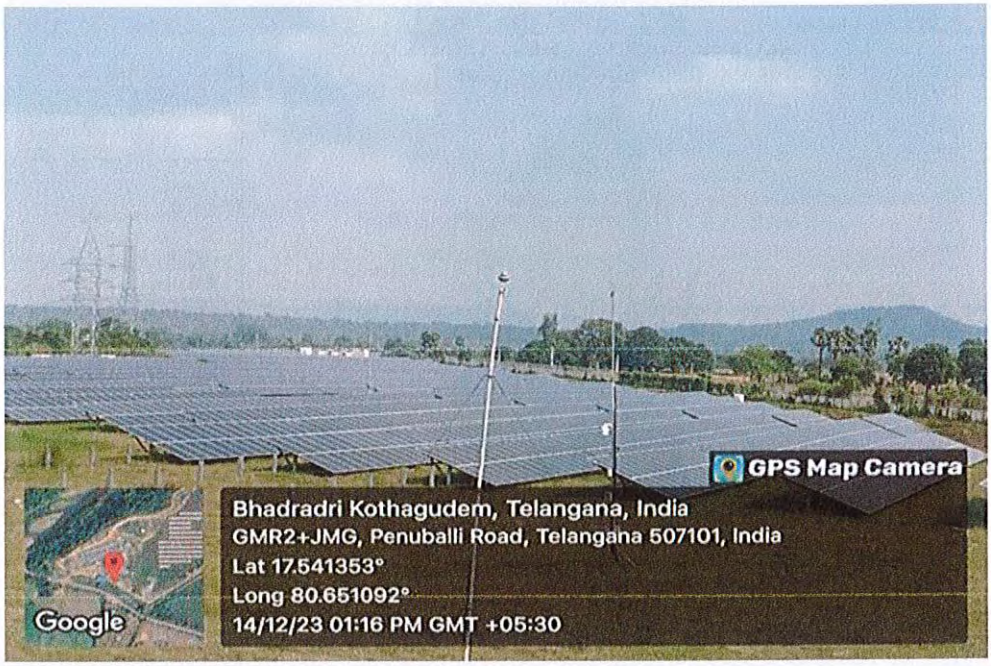
Land Use and Land Cover Map of the Core area



Land Use and Land Cover Map of the Buffer area



37 MW Solar Plant in Buffer area



Presence of these structure shows that the disturbances are already available to the wildlife and area is fragmented. However, it has stabilized in this landscape.

Species Evaluation

The varying habitats in these areas give rise to diverse ecosystems providing nesting and roosting site for birds, mammals, reptiles, amphibians, insects, and butterflies.

Due biodiversity study has been taken up. The list of species observed and subsequently added from the working plan of the Forest Department is include.

The procedure therefore involved field surveys of selected components of biodiversity such as plants, butterflies, amphibians, reptiles, birds, and mammals. Intensive survey methods (including night trails in the proposed area) were used involving Forest Beat Officers. The team walked the pre-identified nature trails in the study area extensively to enumerate different species as and when they were encountered or sighted. For faunal diversity, both diurnal and nocturnal timings were used. Point counts on the nature trials were performed to document the bird species, Opportunistic surveys and listing encounters in random trails were also performed. All observations were aided by 80x40 binoculars. Photo records were obtained with the help of Nikon 24-3000 mm camera with 125x wide optical zoom lens.

Species were identified using

- "A pictorial guide to the mammals of the India". Avifauna species were identified using "A pictorial guide to the birds of the Indian Sub-Continent".
- Reptiles and amphibians were identified with the available identification keys include Fauna of British India.
- Filed guides and published literature were used for the identification of Odonates, butterflies, arachnids, fishes, and other invertebrates.

Geographic coordinates of the nature trails

Trail	Starting		Ending		Distance in M
	Lat	Long	Lat	Long	
1.	N17°30'14.598"	E80°39'29.022"	N17°30'38.128"	E80°39'51.403"	1100
2.	N17°28'59.555"	E80°40'20.490"	N17°29'28.267"	E80°40'40.853"	1100
3.	N17°28'58.613"	E80°40'20.907"	N17°29'12.146"	E80°40'55.242"	1100
4.	N17°28'39.982"	E80°39'38.146"	N17°28'23.562"	E80°39'41.339"	1100
5.	N17°29'38.4"	E80°39'32.526"	N17°30'11.703"	E80°39'39.723"	1100
6.	N17°30'10.379"	E80°40'22.720"	N17°30'31.013"	E80°40'31.786"	1100
7.	N17°29'41.580"	E80°40'25.348"	N17°29'41.328"	E80°40'48.795"	1100
8.	N17°30'8.180"	E80°40'18.141"	N17°30'34.688"	E80°40'0.076"	1100
9.	N17°29'29.789"	E80°39'37.310"	N17°29'47.372"	E80°40'4.776"	1100
10.	N17°29'55.422"	E80°40'7.0173"	N17°29'55.960"	E80°39'37.669"	1100
11.	N17°28'37.455"	E80°40'17.723"	N17°28'53.052"	E80°40'48.081"	1100

Line Transect Method:
The line transect method of Gaston (1975) is adopted in most of the population estimation studies.

Procedure: At the start of the transect, the transect name, transect bearing, locality, date, starting time and other details were noted in proforma, especially designed for the purpose. Then the team walked along the transect carefully and silently looking for animals on both sides of the transect. On sighting an animal or group of animals, the number is counted, and their position is noted. Then, their angular distance i.e., the distance from the observer to the animal was measured visually. The sighting angle was derived from the compass bearing of

the animal's location and the transect compass bearing. The perpendicular distance of the animal from the transect was estimated by multiplying the angular distance with Sin of the sighting angle. The data obtained from different nature trails were pooled and mean perpendicular distance was estimated. The density of the animal was calculated using the following formula, Density= n / 2l* r Where, n= number of animals sighted l= total length of the transect r= Angular distance.

Mammalian herbivore presence was assessed through direct sighting only along the trails, and around watering points.

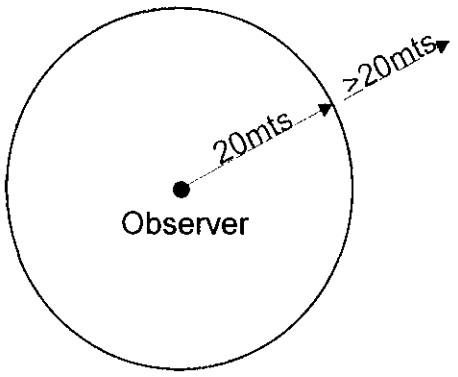
Carnivore presences were also studied through direct sighting only. However, secondary data of the Forest Department like Working Plan and Compartment history were also relied upon to list the wild animals.

Direct sighting and vocalizations were recorded to study bird presence and validate existing data on birds of the all the Parts in the study area. Early morning and evening studies were carried out when bird activity is at its peak. The point- count method was used on the nature trails by marking each point at 200mts interval along each trail and the bird count was performed within a radius of 25mts at each point.

Bird Point-count Method:

Procedure: A point count consists of standing in a specific location and counting birds. One counted the number of individual birds (of each species) within a circle of 20mts radius. When gathering data to compare one point count to the next, radius size was kept consistent. The radius of 20mts was as large as possible kept in the study area based on the vegetation type (mostly open forest) to maximize information gathering, and the birds could not be seen are heard and recorded throughout the nature trails in the study area. The 20mts radius point count at each point was performed to record all the birds seen or heard within a 5-minute period. We have recorded all birds that are seen or heard within the normal 20mts radius. At the same time, we have also recorded the birds that are heard or seen within a selected distance outside this 20mts radius. The birds counted within the 20mts radius were marked in the "Number of Birds" column of the data sheet and the birds seen or heard outside the 20mts radius (within a specified distance) are marked in the "Outside" column of the data sheet. Counting the same bird twice during the survey was avoided. A bird that moves from the 0 - 20mts area was not counted twice. Birds were counted where it first appeared or sighted. The purpose of surveying birds in this manner is that it allows one to compare across sites. A total of 5 points were marked and used for the bird point- count at each trail. We collected the data from 55 points established systematically and have been marked in all 11 nature trails of 1100mts each in the study area.

Diagrammatic representation of bird point-count design



The following details provide the protocol adopted for bird count:

Selection of points: The study are satellite images were captured, and the bird points at 200mts distance each was fixed on the image having the pre-existing nature trails covering the vegetation sampling grids. The center point of each point has been chosen based using GPS and systematic sampling was followed.

Duration and time of counts: Counts were done within three hours after sunrise. This is when birds are most active. Also done night-time surveys to count nocturnal species (done within three hours after sunset). During point counts, recorded all birds seen and heard within the survey area. The team initially stood for two minutes to allow some settling time for the birds that were disturbed. Observations were recorded for five minutes.

Recording method: For each sighting, the number of individuals, and the sighting distance was recorded. Flying birds and calls of the birds were recorded separately.

Counting FO (Flyovers): All higher-flying birds (above the tallest structure in the study area) were also noted if they are within the boundaries of the point count area.

Counting Birds Outside of Survey Area: Only birds seen or heard within the point count area were recorded .

Estimating Abundance: When multiple sightings of a species occurred within a point count, we have included only multiple entries for a species of sure that they are different individuals.

Avoided Artificial Densities: No sounds used that can attract birds to our trail or in the study are. No recorded calls, or any other methods that encourage birds to show themselves was used.

Set-up: Before conducting the point count, the boundaries of the area marked visually by using some identifiable object (e.g., a large tree). Also, marked the center spot where we stood and observed the birds with GPS. The exact place was used each time for the survey.

Distance estimation: Ocular estimates of the distance were taken.

Weather: While conducting the point count, the general climatic conditions were recorded; Wind intensity (calm, slight, gusty, strong) and sky condition (clear, cloudy). This is important because climatic variables are known to affect bird activity. Bird point count studies were avoided on rainy days or extremely windy days because birds don't produce calls during that time, hence affecting the detectability.

Geographic coordinates of the Bird Point-count

Point No.	Latitude			Longitude			Trail No.
	Deg.	Min.	Sec.	Deg.	Min.	Sec.	
1	17	30	18.85598	80	39	34.08737	Trail-1
2	17	30	24.67052	80	39	36.66052	
3	17	30	30.91033	80	39	38.53268	
4	17	30	33.07393	80	39	44.58386	
5	17	30	35.00443	80	39	50.55766	
6	17	29	5.08251	80	40	23.53231	Trail-2
7	17	29	10.25375	80	40	27.62735	
8	17	29	15.67464	80	40	31.34328	
9	17	29	21.37146	80	40	34.45858	

10	17	29	26.24166	80	40	38.56585	
11	17	29	1.19389	80	40	27.01192	Trail-3
12	17	29	3.57506	80	40	33.31775	
13	17	29	6.04545	80	40	39.59193	
14	17	29	8.59187	80	40	45.83286	
15	17	29	11.1573	80	40	52.06552	
16	17	28	34.17069	80	39	41.11204	Trail-4
17	17	28	28.39292	80	39	44.23322	
18	17	28	22.61514	80	39	47.35436	
19	17	28	18.32158	80	39	47.712	
20	17	28	21.37383	80	39	43.75726	
21	17	29	44.00492	80	39	32.96772	Trail-5
22	17	29	50.47755	80	39	32.36692	
23	17	29	56.85014	80	39	33.10816	
24	17	30	3.02317	80	39	35.25616	
25	17	30	8.97316	80	39	37.93188	
26	17	30	11.83627	80	40	29.0699	Trail-6
27	17	30	16.12002	80	40	34.13094	
28	17	30	19.33687	80	40	39.49441	
29	17	30	23.89631	80	40	38.67032	
30	17	30	28.66663	80	40	34.05654	
31	17	29	42.04538	80	40	31.44358	Trail-7
32	17	29	43.25359	80	40	37.26235	
33	17	29	42.75506	80	40	43.93841	
34	17	29	42.3786	80	40	49.78611	
35	17	29	47.57437	80	40	53.87023	
36	17	30	12.89298	80	40	14.26144	Trail-8
37	17	30	18.38437	80	40	12.59121	
38	17	30	23.12239	80	40	8.92722	
39	17	30	26.85979	80	40	3.71859	
40	17	30	33.02159	80	40	2.18556	
41	17	29	34.25556	80	39	42.03252	Trail-9
42	17	29	36.4816	80	39	47.27233	
43	17	29	37.6769	80	39	53.8697	
44	17	29	40.31582	80	40	0.05682	
45	17	29	44.22869	80	40	3.9016	
46	17	29	56.47055	80	40	0.40638	Trail-10
47	17	29	58.69132	80	39	54.07332	
48	17	29	59.93205	80	39	47.43811	
49	17	30	1.8855	80	39	41.05976	
50	17	29	59.19858	80	39	37.43828	
51	17	28	41.15651	80	40	22.38711	Trail-11
52	17	28	42.92922	80	40	28.6734	
53	17	28	45.98556	80	40	34.26492	
54	17	28	48.81467	80	40	40.07795	
55	17	28	50.98344	80	40	45.74362	

Herpetofauna Estimation:

Reptiles and amphibians were recorded in through incidence rate along nature trails as well as occurrence and interception rates along water holes. Other than the day counts, sampling was also conducted during the early evening and night, when incidence rates are expected to be highest.

Invertebrates Estimation:
Invertebrates were estimated through incidence rates and direct sighting. Butterflies, ants, spiders, dragonflies, scorpions, bees, wasps, beetles, grasshoppers, and other prominent invertebrates were check-listed. Where identification is not possible in the field, photographs were taken for taxonomical purpose.

Special habitats and eco-tones, especially fields and grasslands were surveyed for estimating the presence of grassland birds, rodents, and small mammals.

Source of secondary information on wildlife:

- Secondary information on flora, fauna and their distribution were collected from the bio diversity studies carried out during EIA/EMP preparartion and Forest Department, Kothagudem (Working Plan/Management Plan of Kothagudem) Division, 2014-2024 of Bhadradri Kothagudem district. Data were also collected on wildlife census conducted, incidents of forest fires, man-animal conflicts, compensation cases/details, water sources, Pisces, (natural and man-made structures), density enrichment plantations by Forest Department and SCCL, grassplots developed.

- Faunal availability was also verified from the local people and staff working in the forest department.

- Conservation status of the flora and fauna were cross checked under IUCN Red list through published literature and online as well as Indian Wildlife Protection Act (IWPA), 1972 and further Amendments.

Species Compositions

Floral Diversity:

A total of 313 plant species belonging to 241 genera and 83 families were documented in the study area (Core and Buffer zone) (shown in below Table). These are found inter-mixed, and occurrence is less in Core zone compared to buffer zone. Among 313 species listed, 89 species are trees, 41 shrubs, 14 lianas, 22 climbers, 117 herbs, 29 aquatic herbs and one is epiphyte. As the vegetation analysis suggests there are more herbaceous species (117 species) in comparison to tree species or other life forms as shown in figures.

List of floral species documented in Core & Buffer Zone

Sl. No	Scientific Name	Family	Habit	Vernacular Name	Study Zone	IUCN Status
1	*Abildgaardia ovata*	Cyperaceae	H	-	B	LC
2	*Abrus precatorius*	Fabaceae	C	Guruginja	C&B	NA
3	*Abutilon hirtum*	Malvaceae	S	Palabenda	C&B	NA
4	*Abutilon indicum*	Malvaceae	S	Thuttutubenda	B	NA
5	*Acalypha capitata*	Euphorbiaceae	S	Kuppinta	C	NA
6	*Acalypha indica*	Euphorbiaceae	H	Muripinda	C&B	NA
7	*Achyranthes aspera*	Amaranthaceae	H	Uttareni	B	NA
8	*Acmella paniculata*	Asteraceae	H	Maratimoggal	C&B	LC
9	*Actinoscirpus grossus*	Cyperaceae	AH	-	B	NA
10	*Adina cordifolia*	Rubiaceae	T	Rudraganapa, Patchabotruka	C&B	NA
11	*Aegle marmelos*	Rutaceae	T	Maredu,	C&B	NA
12	*Afrohybanthus enneaspermus*	Violaceae	H	Ratna purusha	C	NA
13	*Agave americana*	Asparagaceae	S	Kathaichettu	B	NA
14	*Ageratum conyzoides*	Asteraceae	H	Adavipudeena	C&B	NA
15	*Ailanthus excelsa*	Simaroubaceae	T	Pedda manu	C&B	NA
16	*Alangium salviifolium*	Cornaceae	T	Nallaoodaga	C&B	LC
17	*Albizia amara*	Leguminosae	T	Narlingi,Chigara	C&B	LC
18	*Albizia odoratissima*	Leguminosae	T	Chinduga	C&B	LC
19	*Albizia thompsonii*	Leguminosae	T	-	C&B	NT
20	*Alternanthera pungens*	Amaranthaceae	H	Mulla Ponnaganti	C&B	NA
21	*Alternanthera sessilis*	Amaranthaceae	H	Ponnaganti	C&B	LC
22	*Alysicarpus hamosus*	Leguminosae	H	-	C	NA
23	*Alysicarpus monilifer*	Leguminosae	H	Poosalamokka	B	NA
24	*Amaranthus spinosus*	Amaranthaceae	H	Mundla	C&B	NA
25	*Amaranthus viridis*	Amaranthaceae	H	Chilaka thotakura	B	NA
26	*Ammannia baccifera*	Lythraceae	AH	Nela Citramulam,	B	LC
27	*Ammannia multiflora*	Lythraceae	AH	-	B	LC
28	*Andrographis echioides*	Acanthaceae	H	-	C&B	NA
29	*Andrographis paniculata*	Acanthaceae	H	Belavemu	C&B	NA
30	*Annona squamosa*	Annonaceae	T	Seetaphalam	C&B	LC
31	*Aponogeton crispus*	Aponogetonaceae	AH	Nammapuvvu	B	LC
32	*Aristida adscensionis*	Poaceae	H	Cheepuru	C&B	NA

Sl. No	Scientific Name	Family	Habit	Vernacular Name	Study Zone	IUCN Status
33	*Aristida hystrix*	Poaceae	H	Chinnameesala gaddi	C&B	NA
34	*Aristida setacea*	Poaceae	H	Chipurugaddi	C&B	NA
35	*Aristolochia indica*	Aristolochiaceae	C	Iswaraveru	C&B	NA
36	*Asparagus racemosus*	Asparagaceae	C	Sathavari	C&B	NA
37	*Ayenia herbacea*	Malvaceae	H	Magasirigadda	C&B	NA
38	*Azadirachta indica*	Meliaceae	T	Vepa chettu	C&B	LC
39	*Bacopa monnieri*	Plantaginaceae	AH	Brahmmi	B	LC
40	*Balanites aegyptiaca*	Zygophyllaceae	T	Garachettu	C	LC
41	*Bambusa bambos*	Poaceae	T	Veduru	C&B	NA
42	*Barleria prionitis*	Acanthaceae	H	Mullagorinta	B	NA
43	*Bauhinia racemosa*	Leguminosae	T	Arichettu	C&B	NA
44	*Bergia capensis*	Elatinaceae	AH	Neerupavila	B	LC
45	*Blepharis integrifolia*	Acanthaceae	H	Chatuspathri	C&B	NA
46	*Blepharis maderaspatensis*	Acanthaceae	H	Anthritapoolu	C&B	NA
47	*Blumea axillaris*	Compositae	H	Kukkapogaku	C	NA
48	*Blumea lacera*	Compositae	H	-	B	NA
49	*Boerhavia diffusa*	Nyctaginaceae	H	Punarnava, Atikimamidi	B	NA
50	*Boerhavia erecta*	Nyctaginaceae	H	Punarnava	B	NA
51	*Bombax ceiba*	Malvaceae	T	Buruga	B	LC
52	*Bonnaya ciliata*	Linderniaceae	AH	-	B	LC
53	*Boswellia serrata*	Burseraceae	T	Anduga	B	NA
54	*Brachypterum scandens*	Leguminosae	L	Nallateega	C&B	NA
55	*Bridelia montana*	Phyllanthaceae	S	Adavi jama	C&B	NA
56	*Bridelia retusa*	Phyllanthaceae	T	Mullumaddi	C&B	LC
57	*Buchanania cochinchinensis*	Anacardiaceae	T	Chinna morli	C&B	NA
58	*Butea monosperma*	Leguminosae	T	Moduga	C&B	LC
59	*Butea superba*	Leguminosae	L	Teega modiga	C&B	NA
60	*Cajanus scarabaeoides*	Leguminosae	C	-	C&B	LC
61	*Calotropis gigantea*	Apocynaceae	S	Tella Jilledu	B	NA
62	*Calotropis procera*	Apocynaceae	S	Erra jilledu	B	NA
63	*Canavalia gladiata*	Leguminosae	L	Thammakaya	B	NA
64	*Canscora heteroclita*	Gentianaceae	AH	Thambakaya	B	NA
65	*Canthium coromandelicum*	Rubiaceae	S	Sinnabalusu,	C&B	NA
66	*Capparis sepiaria*	Capparaceae	S	Nallauppi	B	LC
67	*Capparis spinosa*	Capparaceae	L	-	C&B	LC
68	*Careya arborea*	Lecythidaceae	T	Budadarmi	C&B	NA
69	*Carissa carandas*	Apocynaceae	S	Kalivi	B	NA
70	*Cassia fistula*	Leguminosae	T	Rela chettu	C&B	LC
71	*Cassytha filiformis*	Lauraceae	C	Pasuputivva	C&B	NA
72	*Catunaregam spinosa*	Rubiaceae	S	Manga	C&B	NA
73	*Celastrus paniculatus*	Celastraceae	L	Jyothismathi, Teegapalleru	C&B	NA
74	*Ceratopteris thalictroides*	Pteridaceae	AH	-	B	LC
75	*Chara globularis*	Characeae	AH	Chara	B	LC
76	*Chloris barbata*	Poaceae	H	Jada kunchula gaddi	C&B	NA
77	*Chloroxylon swietenia*	Rutaceae	T	Billudu	C&B	VU

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78	*Chromolaena odorata*	Compositae	S	Porangi	C&B	NA
79	*Chrozophora rottleri*	Euphorbiaceae	H	Lingamirapa	B	NA
80	*Chrysopogon fulvus*	Poaceae	H	-	C	NA
81	*Cleistanthus collinus*	Phyllanthaceae	T	Kodise	C&B	VU
82	*Cleome viscosa*	Cleomaceae	H	Kukka vominta	C&B	NA
83	*Clitoria ternatea*	Leguminosae	C	Dintena teega	B	NA
84	*Coccinia grandis*	Cucurbitaceae	C	Donda	B	NA
85	*Cocculus hirsutus*	Menispermaceae	C	Chinnadusar teega	C&B	NA
86	*Coldenia procumbens*	Boraginaceae	H	Bukkinaaku	C&B	LC
87	*Colocasia esculenta*	Araceae	H	Chemadumpa	B	LC
88	*Combretum albidum*	Combretaceae	L	Yadateega	B	NA
89	*Commelina benghalensis*	Commelinaceae	AH	Vennadevikura	C&B	LC
90	*Commelina imberbis*	Commelinaceae	H	-	C&B	LC
91	*Cordia dichotoma*	Boraginaceae	T	Iriki	B	LC
92	*Crateva adansonii*	Capparaceae	T	Uskimanu,	B	LC
93	*Crotalaria hebecarpa*	Fabaceae	H	-	C&B	NA
94	*Croton bonplandianus*	Euphorbiaceae	H	Vanamokka	B	NA
95	*Cryptolepis buchananii*	Apocynaceae	C	Adavipalateeg	C	NA
96	*Curculigo orchioides*	Hypoxidaceae	H	Nelathadi	C&B	NA
97	*Curcuma pseudomontana*	Zingiberaceae	H	Adavipasupu	C&B	VU
98	*Cyanotis axillaris*	Commelinaceae	AH	Neelavanthi	C&B	LC
99	*Cyanthillium albicans*	Compositae	H	Garitakamma	C&B	NA
100	*Cyanthillium cinereum*	Compositae	H	Sahadevi	B	NA
101	*Cycas rumphii*	Cycadaceae	T	Ranhaguvva	C	VU
102	*Cymbopogon coloratus*	Poaceae	H	Bodagaddi	C&B	NA
103	*Cymbopogon martini*	Poaceae	H	Kamaanchi kasuvu	C&B	NA
104	*Cynodon dactylon*	Poaceae	H	Garika	C&B	NA
105	*Cyperus corymbosus*	Cyperaceae	AH	-	B	NA
106	*Cyperus difformis*	Cyperaceae	AH	-	B	LC
107	*Cyperus exaltatus*	Cyperaceae	AH	-	B	LC
108	*Cyperus michelianus*	Cyperaceae	AH	-	B	LC
109	*Cyperus mindorensis*	Cyperaceae	AH	Gandala	C&B	NA
110	*Cyperus pangorei*	Cyperaceae	AH	-	B	LC
111	*Cyperus rotundus*	Cyperaceae	H	Thunga	B	LC
112	*Dalbergia lanceolaria*	Leguminosae	T	Patchari	C&B	NA
113	*Dendrocalamus strictus*	Poaceae	T	Sadanam	C&B	NA
114	*Dendrophthoe falcata*	Loranthaceae	S	Jiddu, Yolinga	C&B	NA
115	*Dentella repens*	Rubiaceae	H	Katakura	B	LC
116	*Dentella repens* var. *serpyllifolia*	Rubiaceae	H	-	B	NA
117	*Dichanthium annulatum*	Poaceae	H	Errasangali gaddi	B	NA
118	*Dichrostachys cinerea*	Leguminosae	S	Velthuruchettu	C&B	LC
119	*Dioscorea pentaphylla*	Dioscoreaceae	C	Adaviginasu	C&B	NA
120	*Diospyros chloroxylon*	Ebenaceae	T	Ullinda	C&B	NA
121	*Diospyros melanoxylon*	Ebenaceae	T	Beediakulu,	C&B	NA

Sl. No	Scientific Name	Family	Habit	Vernacular Name	Study Zone	IUCN Status
				Thuniki		
122	*Diospyros montana*	Ebenaceae	T	Muchhathuniki	B	NA
123	*Dodonaea viscosa*	Sapindaceae	S	Bandari	C&B	LC
124	*Drimia indica*	Asparagaceae	H	Adavi ulli	C	NA
125	*Drypetes sepiaria*	Putranjivaceae	S	Putrajivika, Kuduru	B	NA
126	*Eclipta prostrata*	Asteraceae	H	Guntagalagara	C&B	LC
127	*Ehretia aspera*	Boraginaceae	T	Paldattam	C&B	DD
128	*Eleocharis geniculata*	Cyperaceae	AH	-	B	LC
129	*Elytraria acaulis*	Acanthaceae	H	Nela marri	B	NA
130	*Eragrostiella bifaria*	Poaceae	H	Noolugaddi	B	NA
131	*Eragrostis tenella*	Poaceae	H	Chinna garikagaddi	C&B	NA
132	*Eragrostis viscosa*	Poaceae	H	-	C&B	NA
133	*Eriocaulon quinquangulare*	Eriocaulaceae	H	-	C	NA
134	*Erythroxylum monogynum*	Erythroxylaceae	S	Gatiri, Adavi gongura	C&B	NA
135	*Euphorbia hirta*	Euphorbiaceae	H	Nanubalu	C&B	NA
136	*Euphorbia nivulia*	Euphorbiaceae	T	Aakujemudu	B	NA
137	*Euphorbia thymifolia*	Euphorbiaceae	H	Reddivaari	B	NA
138	*Evolvulus alsinoides*	Convolvulaceae	H	Vishnukrantha	B	NA
139	*Evolvulus nummularius*	Convolvulaceae	H	-	C&B	NA
140	*Ficus benghalensis*	Moraceae	T	Marri	C&B	NA
141	*Ficus hispida*	Moraceae	S	Bemmeduakulu	C&B	LC
142	*Ficus mollis*	Moraceae	T	Konda kalijuvvi	C&B	NA
143	*Ficus racemosa*	Moraceae	T	Medi	C&B	LC
144	*Ficus religiosa*	Moraceae	T	Ravi chettu	B	NA
145	*Fimbristylis aestivalis*	Cyperaceae	AH	-	B	NA
146	*Fimbristylis argentea*	Cyperaceae	AH	-	B	LC
147	*Fimbristylis quinquangularis*	Cyperaceae	AH	-	B	LC
148	*Flacourtia indica*	Salicaceae	S	Nakka neredu	C&B	LC
149	*Galactia striata*	Leguminosae	C	-	B	NA
150	*Gardenia gummifera*	Rubiaceae	T	Bikki	C&B	LC
151	*Gardenia latifolia*	Rubiaceae	T	Peddabikki	C&B	NA
152	*Garuga pinnata*	Burseraceae	T	Garuga, Kondavepa	B	NA
153	*Getonia floribunda*	Combretaceae	L	Pootangiteega	C&B	NA
154	*Gisekia pharnaceoides*	Gisekiaceae	H	Isukadantikura	B	NA
155	*Givotia moluccana*	Euphorbiaceae	T	Tella Poliki	C&B	NA
156	*Glinus lotoides*	Molluginaceae	H	Tellaporaku	B	LC
157	*Glinus oppositifolius*	Molluginaceae	H	Chayunta rashiaku	B	LC
158	*Gloriosa superba*	Colchicaceae	H	Naabhi,	C	LC
159	*Gmelina arborea*	Lamiaceae	T	Gummadi teku	C	LC

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160	*Gmelina asiatica*	Lamiaceae	L	Chinna adavigummadi	B	LC
161	*Gomphrena serrata*	Amaranthaceae	H	Bendumalli	B	NA
162	*Grangea maderaspatana*	Compositae	H	Mastaru	C&B	LC
163	*Grewia flavescens*	Malvaceae	T	Bankajaana	C&B	LC
164	*Grewia hirsuta*	Malvaceae	S	Nalla Kattelu	C&B	NA
165	*Grewia tiliifolia*	Malvaceae	T	Budamara	C&B	NA
166	*Grewia villosa*	Malvaceae	S	Banta, Chenula	C&B	LC
167	*Gymnosporia emarginata*	Celastraceae	S	Danthi	C&B	NA
168	*Habenaria panigrahiana*	Orchidaceae	H	-	C	NA
169	*Hackelochloa granularis*	Poaceae	H	Naalipunuku	C	NA
170	*Hardwickia binata*	Leguminosae	T	Naarepi	C&B	LC
171	*Helicteres isora*	Malvaceae	S	Gooba thada	C&B	NA
172	*Heliotropium indicum*	Boraginaceae	H	Nagadanti	B	NA
173	*Heliotropium marifolium*	Boraginaceae	H	-	C	NA
174	*Hemidesmus indicus*	Apocynaceae	C	Sugandhapala	C&B	NA
175	*Heteropogon contortus*	Poaceae	H	Yeddigaddi/Kesaragaddi	C&B	NA
176	*Hibiscus micranthus*	Malvaceae	S	Nityamalle	B	NA
177	*Holarrhena pubescens*	Apocynaceae	S	Kolamukhi	C&B	LC
178	*Holoptelea integrifolia*	Ulmaceae	T	Nemalinaara	C&B	NA
179	*Huberantha cerasoides*	Annonaceae	T	Chilakaduddu	B	NA
180	*Hydrilla verticillata*	Hydrocharitacee	AH	Poonaachu	B	LC
181	*Hygrophila auriculata*	Acanthaceae	AH	Mulla gobbi	B	LC
182	*Indigofera linnaei*	Leguminosae	H	Yerrapalleru	C&B	NA
183	*Ipomoea aquatica*	Convolvulaceae	C	Thootiloora	B	LC
184	*Ipomoea carnea*	Convolvulaceae	C	Pandiri thooti	B	NA
185	*Ipomoea nil*	Convolvulaceae	C	Kolivitthulu	B	NA
186	*Ipomoea obscura*	Convolvulaceae	C	Nallateega	C&B	NA
187	*Ipomoea pes-tigridis*	Convolvulaceae	C	Mekamadugu	B	NA
188	*Ipomoea sagittifolia*	Convolvulaceae	C	Purititeega	B	NA
189	*Ixora pavetta*	Rubiaceae	S	Koravi	C&B	NA
190	*Jasminum auriculatum*	Oleaceae	L	Adavi teega malli	C&B	NA
191	*Jatropha gossypiifolia*	Euphorbiaceae	S	Nela amudam	B	LC
192	*Justicia glauca*	Acanthaceae	H	-	C&B	NA
193	*Justicia vahliana*	Acanthaceae	H	-	C&B	NA
194	*Knoxia sumatrensis*	Rubiaceae	H	Kampurodda	C&B	NA
195	*Lagerstroemia parviflora*	Lythraceae	T	Chennangi	C&B	NA
196	*Lannea coromandelica*	Anacardiaceae	T	Gumpena	C&B	LC
197	*Lantana camara*	Verbenaceae	S	Seesa kammari	C&B	NA
198	*Lepidagathis cristata*	Acanthaceae	H	Nakka pintuka	B	NA
199	*Leptopetalum biflorum*	Rubiaceae	H	-	C&B	NA
200	*Leucaena leucocephala*	Leguminosae	T	Subabulu	C&B	NA
201	*Limonia acidissima*	Rutaceae	T	Velaga	C&B	NA
202	*Madhuca longifolia*	Sapotaceae	T	Ippa	C&B	NA
203	*Maerua apetala*	Capparaceae	T	Pilli Adugu	B	NA
204	*Malvastrum coromandelianum*	Malvaceae	H	-	B	NA
205	*Mangifera indica*	Anacardiaceae	T	Mamidi	B	DD

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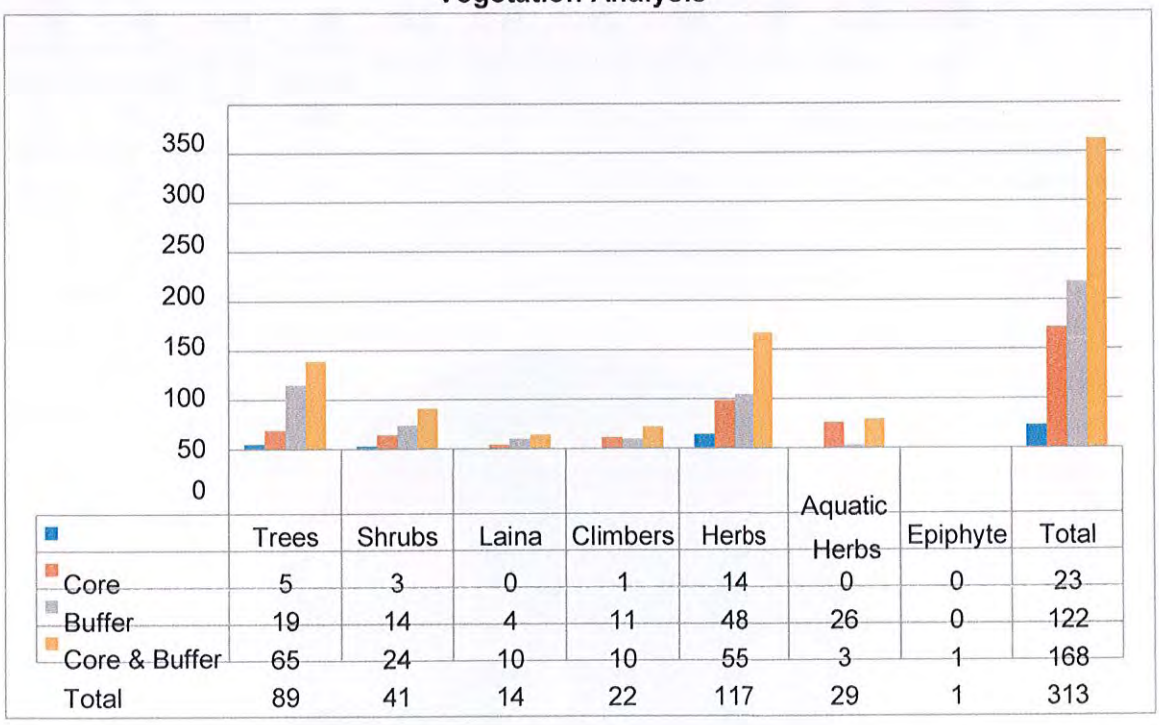
206	*Manilkara hexandra*	Sapotaceae	T	Pala chettu	C&B	NA
207	*Marsilea quadrifolia*	Marsileaceae	AH	Chandamama kura	B	LC
208	*Memecylon umbellatum*	Melastomataceae	T	Alli, Peddalli	B	NA
209	*Merremia gangetica*	Convolvulaceae	H	Elukagemudu	B	LC
210	*Mesosphaerum suaveolens*	Lamiaceae	H	Danthitulasi	C&B	NA
211	*Miliusa tomentosa*	Annonaceae	T	Barredudduga	C&B	NA
212	*Mimosa pudica*	Leguminosae	H	Attipatti,	B	LC
213	*Mitragyna parvifolia*	Rubiaceae	T	Kadamba	C&B	NA
214	*Morinda coreia*	Rubiaceae	T	Togaru	C&B	NA
215	*Naringi crenulata*	Rutaceae	T	Kukka velaga	B	NA
216	*Nelumbo nucifera*	Nelumbonaceae	AH	Kamalam	B	NA
217	*Nyctanthes arbor-tristis*	Oleaceae	T	Parijatham	B	NA
218	*Nymphaea nouchali*	Nymphaeaceae	AH	Thamara	B	LC
219	*Ochna obtusata*	Ochnaceae	T	Raktha sirishamu	C&B	NA
220	*Ocimum basilicum*	Lamiaceae	H	Kammagaggiri	B	NA
221	*Ocimum tenuiflorum*	Lamiaceae	H	Thulasi	B	NA
222	*Olax scandens*	Olacaceae	L	Yelaka Nakkera	C&B	NA
223	*Oldenlandia umbellata*	Rubiaceae	H	Chiriveru	B	NA
224	*Opuntia stricta*	Cactaceae	S	Jemudu	C&B	LC
225	*Orthosiphon rubicundus*	Lamiaceae	H	Podathulasi	C&B	NA
226	*Osbeckia zeylanica*	Melastomataceae	H	Burada alli	C	NA
227	*Ouret lanata*	Amaranthaceae	H	Kondapindi	B	NA
228	*Parthenium hysterophorus*	Compositae	H	Vayyaribhama	C&B	NA
229	*Pavonia zeylanica*	Malvaceae	H	Karubenda	B	NA
230	*Pergularia daemia*	Apocynaceae	C	Dustapa teega	C&B	LC
231	*Persicaria glabra*	Polygonaceae	AH	Neetiganneru,	B	LC
232	*Phoenix loureiroi*	Arecaceae	S	Konda itha	C&B	LC
233	*Phoenix sylvestris*	Arecaceae	T	Itha chettu	C&B	NA
234	*Phyllanthus amarus*	Phyllanthaceae	H	Nelausiri	B	NA
235	*Phyllanthus emblica*	Phyllanthaceae	T	Usirikaya	C&B	LC
236	*Phyllanthus maderaspatensis*	Phyllanthaceae	H	NelaUsiri	C&B	LC
237	*Phyllanthus reticulatus*	Phyllanthaceae	S	Purugudu	B	LC
238	*Phyllanthus virgatus*	Phyllanthaceae	H	Gadhausiri	C&B	NA
239	*Pleurolobus gangeticus*	Leguminosae	H	Kolakuponna	C&B	NA
240	*Pongamia pinnata*	Leguminosae	T	Kanuga	B	LC
241	*Portulaca oleracea*	Portulacaceae	H	Payalaku	B	LC
242	*Premna mollissima*	Lamiaceae	T	Kondamanga	C&B	NA
243	*Prosopis juliflora*	Leguminosae	T	Sarkar tumma	C&B	NA
244	*Pseudarthria viscida*	Fabaceae	C	Adavi chikkudu	B	NA
245	*Pteris argyraea*	Pteridaceae	AH	-	B	NA
246	*Pterolobium hexapetalum*	Leguminosae	L	Korintha	C&B	NA
247	*Pterospermum xylocarpum*	Malvaceae	T	Loluguchettu,	C&B	NA
248	*Pulicaria wightiana*	Asteraceae	H	Adavipoddutir ugudu	C&B	NA

Sl. No	Scientific Name	Family	Habit	Vernacular Name	Study Zone	IUCN Status
249	*Pupalia lappacea*	Amaranthaceae	H	Yerra utthareni	C&B	LC
250	*Rhynchosia rufescens*	Leguminosae	C	-	B	NA
251	*Rivea hypocrateriformis*	Convolvulaceae	L	Bodditeega	C&B	NA
252	*Ruellia tuberosa*	Acanthaceae	H	Chitapatakayal	C&B	NA
253	*Saccharum spontaneum*	Poaceae	H	Naagaswaram, Adavicheruku	B	LC
254	*Santalum album*	Santalaceae	T	Swethagandha	C	VU
255	*Sapindus emarginatus*	Sapindaceae	T	Kunkudu	B	NA
256	*Schleichera oleosa*	Sapindaceae	T	Poosuga	C&B	LC
257	*Schoenoplectiella articulata*	Cyperaceae	H	-	C&B	LC
258	*Schrebera swietenioides*	Oleaceae	T	Magalinga	C&B	NA
259	*Scleria lithosperma*	Cyperaceae	H	-	C&B	NA
260	*Scoparia dulcis*	Plantaginaceae	H	Godathulasi	C&B	NA
261	*Senegalia chundra*	Leguminosae	T	Sandra	C&B	NA
262	*Senegalia torta*	Leguminosae	S	Korinta teega	B	NA
263	*Senna auriculata*	Leguminosae	S	Thangedi	B	NA
264	*Senna occidentalis*	Leguminosae	H	Kasinda	B	LC
265	*Senna tora*	Leguminosae	H	Thantepu	B	NA
266	*Sida acuta*	Malvaceae	H	Katari	B	NA
267	*Sida cordifolia*	Malvaceae	H	Badiyalaku	B	NA
268	*Solanum virginianum*	Solanaceae	H	Nela vaakudu	B	NA
269	*Soymida febrifuga*	Meliaceae	T	Somi	B	NA
270	*Spermacoce articularis*	Rubiaceae	H	Madanaku	B	NA
271	*Spermacoce pusilla*	Rubiaceae	H	Chukkakaada	B	NA
272	*Sphaeranthus indicus*	Compositae	H	Bodasaramu	B	LC
273	*Stemodia viscosa*	Plantaginaceae	H	Bodasaramam	C&B	NA
274	*Sterculia urens*	Malvaceae	T	Thapassi	C&B	NA
275	*Stereospermum tetragonum*	Bignoniaceae	T	Ummrttha	C	NA
276	*Streblus asper*	Moraceae	T	Barraniki	B	LC
277	*Striga angustifolia*	Orobanchaceae	H	Jonnamalle	C&B	NA
278	*Striga asiatica*	Orobanchaceae	H	Raathibadanik	C&B	NA
279	*Strobilanthes pavala*	Acanthaceae	H	-	C	NA
280	*Strychnos nux-vomica*	Loganiaceae	T	Mustichettu	C&B	NA
281	*Strychnos potatorum*	Loganiaceae	T	Chillanginja chettu	C&B	NA
282	*Tacca leontopetaloides*	Dioscoreaceae	H	Ritthakanda	C	LC
283	*Tamarindus indica*	Leguminosae	T	Chinta	C&B	LC
284	*Tarenna asiatica*	Rubiaceae	S	Konda Papidi	C&B	NA
285	*Tectona grandis*	Lamiaceae	T	Teku	C&B	NA
286	*Tephrosia purpurea*	Leguminosae	H	Vempali	C&B	NA
287	*Tephrosia villosa*	Leguminosae	H	Noogu vempalli	B	LC
288	*Terminalia anogeissiana*	Combretaceae	T	Sirimanu	C&B	NA
289	*Terminalia arjuna*	Combretaceae	T	Tellamaddhi	C&B	NA
290	*Terminalia bellirica*	Combretaceae	T	Thani	C&B	LC
291	*Terminalia elliptica*	Combretaceae	T	Nallamaddi	B	NA
292	*Trianthema portulacastrum*	Aizoaceae	H	Galijeru	C&B	NA
293	*Tridax procumbens*	Compositae	H	Gaddichamant	B	NA

Sl. No	Scientific Name	Family	Habit	Vernacular Name	Study Zone	IUCN Status
294	*Trigastrotheca pentaphylla*	Molluginaceae	H	Pichichatraku	C	NA
295	*Triumfetta rotundifolia*	Malvaceae	S	-	C	NA
296	*Typha angustifolia*	Typhaceae	S	Jammu	B	LC
297	*Urochloa ramosa*	Poaceae	H	-	B	LC
298	*Vachellia leucophloea*	Leguminosae	T	Tella thumma	C&B	LC
299	*Vachellia nilotica*	Leguminosae	T	Nalla thumma	C&B	LC
300	*Vanda tessellata*	Orchidaceae	ES	Badanika	C&B	LC
301	*Ventilago denticulata*	Rhamnaceae	L	Erra sanguru	B	NA
302	*Viscum articulatum*	Santalaceae	S	Jilledu badanika	C	NA
303	*Vitex negundo*	Lamiaceae	S	Nalla vavilli	C&B	LC
304	*Waltheria indica*	Malvaceae	S	Nallabenda	C&B	LC
305	*Woodfordia fruticosa*	Lythraceae	S	Jargi seringi	C&B	LC
306	*Wrightia tinctoria*	Apocynaceae	T	Palamaneru	C&B	NA
307	*Xanthium strumarium*	Compositae	S	Marulamathangi	B	NA
308	*Xenostegia tridentata*	Convolvulaceae	C	Mududantla	B	NA
309	*Xylia xylocarpa*	Leguminosae	T	Bojja	C&B	LC
310	*Ziziphus jujuba*	Rhamnaceae	T	Regu	C&B	LC
311	*Ziziphus oenopolia*	Rhamnaceae	L	Pariki kampa	C&B	LC
312	*Ziziphus xylopyrus*	Rhamnaceae	T	Gotti	C&B	NA
313	*Zornia gibbosa*	Fabaceae	H	Nelabariki	C&B	NA

*Note: T-Trees; S-Shrubs; H-Herbs; C-Climbers; L-Lianas; AH-Aquatic herb; EP-Epiphyte; C-Core zone; B-Buffer zone; LC-Least Concern; NA-Not Assessed; VU-Vulnerable; NT-Near Threatened

Vegetation Analysis



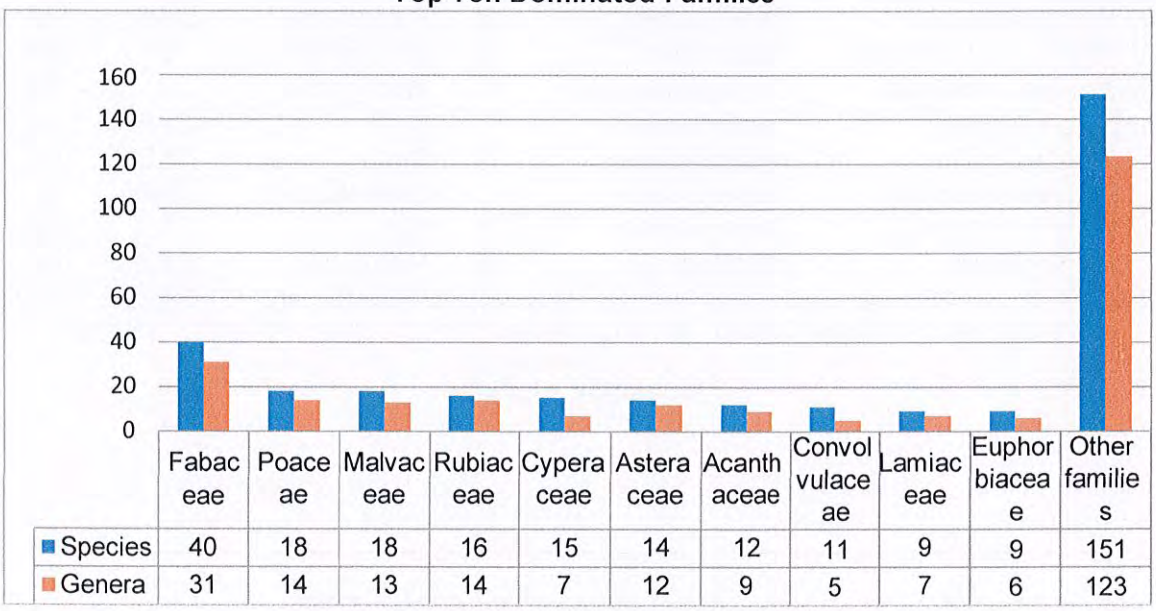
	Trees	Shrubs	Laina	Climbers	Herbs	Aquatic Herbs	Epiphyte	Total
Core	5	3	0	1	14	0	0	23
Buffer	19	14	4	11	48	26	0	122
Core & Buffer	65	24	10	10	55	3	1	168
Total	89	41	14	22	117	29	1	313

Twenty-nine Aquatic species were observed in the study area of which, 19 are Angiospems (*Actinoscirpus grossus, Ammannia baccifera, A. multiflora, Aponogeton crispus, Bacopa monnieri, Bergia capensis, Bonnaya ciliate, Canscora heteroclite, Commelina benghalensis, Cyanotis axillaris, Cyperus corymbosus, C.difformis, C. exaltatus, C. mindorensissubsp. pygmaeus, C. mindorensis, C.*

pangorei, Eleocharis geniculate, Fimbristylis aestivalis, F. argentea, F. quinquangularis, Hydrilla verticillata, Hygrophila auriculata, Nelumbo nucifera, Nymphaea nouchali and Persicaria glabra), three are Pteridophytes (*Ceratopteris thalictroides, Marsilea quadrifolia and Pteris argyraea*) and *Chara globularis* is Algae. The most dominant families are Fabaceae represented by 40 species of 31 genera followed by Poaceae 18/14, Malvaceae 18/13, Rubiaceae 16/14, Cyperaceae 15/7, Asteraceae 14/12, Acanthaceae 12/9, Convolvulaceae 11/5, Lamiaceae 9/7, Euphorbiaceae 9/6, Apocyanaceae 8/7, Amaranthaceae 8/6, Phyllanthaceae 8/3, Combretaceae 6/3, Moraceae 6/2, Boraginaceae 5/4, Rutaceae 4/4, Capparaceae & Lythraceae each with 4/3, Rhamnaceae 4/2, Anacardiaceae, Annonaceae, Asparagaceae, Oleaceae, Plantaginaceae and Sapindaceae each with 3/3, Commelinaceae & Molluginaceae eachwith 3/2, Ebenaceae 3/1, Burseraceae, Celastraceae, Dioscoreaceae, Melastomataceae, Meliaceae, Orchidaceae, Pteridaceae, Santalaceae & Sapotaceae each with 2/2, Arecaceae, Loganiaceae, Nyctaginaceae & Orobanchaceae each with 2 species in 1 generaand 41 families are represented each with one species of one genera.

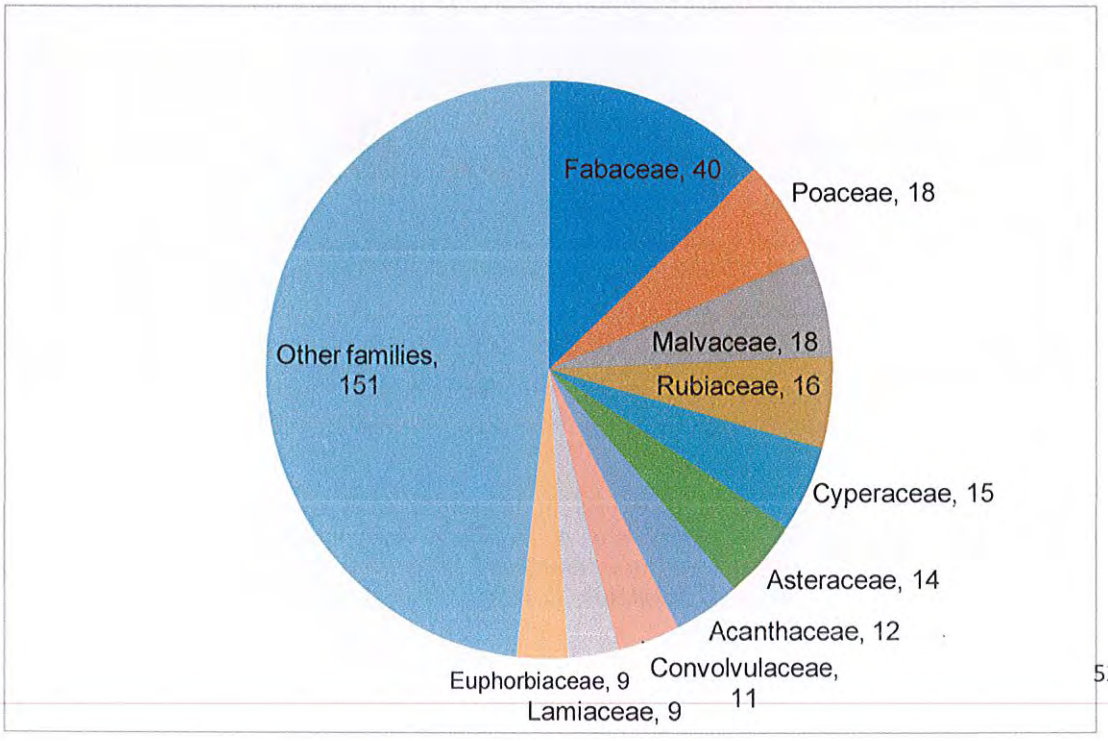
Top ten families are Fabaceae, Poaceae, Malvaceae, Rubiaceae, Cyperaceae, Asteraceae, Acanthaceae, Convolvulaceae, Lamiaceae and Euphorbiaceae are occupied 52% of the total vegetation structure.

Top Ten Dominated Families



	Fabaceae	Poaceae	Malvaceae	Rubiaceae	Cyperaceae	Asteraceae	Acanthaceae	Convolvulaceae	Lamiaceae	Euphorbiacea e	Other families
Species	40	18	18	16	15	14	12	11	9	9	151
Genera	31	14	13	14	7	12	9	5	7	6	123

Vegetation structure in the proposed area



Phyto-sociological features of trees, shrubs and herbs in core & buffer zones:

Core Zone

A. **Trees** – From Importance Value Index (IVI), it is inferred that for trees the dominant species is *Tectona grandis* is with 34.71 of Importance Value Index followed by *Cleistanthus collinus* (22.97), *Xylia xylocarpa* (20.24) and *Boswellia serrata* (18.73). Simpson's Index value (0.07) and Shannon Wiener Index value (1.24) for trees shows that diversity is more in comparison to species dominance.

B. **Shrubs** – *Butea superba* is identified as the most dominant species with 51.6 of Importance Value Index followed by *Helicteres isora* (42.07), *Waltheria indica* (37.56), Dioscorea pentaphylla and *Derris scandens* each with 33.98. Simpson's Index value is 0.13 and the Shannon Wiener Index value is 0.93, which shows that diversity is more.

C. **Herbs** – *Drimia indica* is identified as the most dominant species with 43.85 of Importance Value Index followed by *Andrographis paniculata* and *Cyanthillium albicans* each with 39.21 and *Gloriosa superba* (37.89). Simpson's Index value is 0.13 and the Shannon Wiener Index value is 0.92, which shows that diversity is more.

Phyto-sociological features in core zone

Core zone

31.62 x 31.62 m for Trees

S.No.	Name	IVI	Simpson	Shannon
1	*Tectona grandis*	34.71	0.028	-0.13
2	*Cleistanthus collinus*	22.97	0.009	-0.1
3	*Xylia xylocarpa*	20.24	0.005	-0.08
4	*Boswellia serrata*	18.73	0.005	-0.08
5	*Acacia chundra*	17.9	0.004	-0.08
6	*Diospyros melanoxylon*	17.88	0.004	-0.08
7	*Chloroxylon swietenia*	15.56	0.003	-0.07
8	*Lagerstroemia parviflora*	15.33	0.002	-0.06
9	*Dalbergia lanceolaria* subsp.*paniculata*	13.42	0.002	-0.06
10	*Grewia flavescens*	13.22	0.002	-0.06
11	*Aegle marmelos*	13.22	0.002	-0.06
12	*Firmiana simplex*	12.82	0.001	-0.05
13	*Acacia leucophloea*	11.51	0.001	-0.05
14	*Givotia moluccana*	10.87	0.001	-0.05
15	*Hardwickia binata*	10.87	0.001	-0.05
16	*Hardwickia binata*	9.7	0.001	-0.04
17	*Ochna obtusata*	9.19	0	-0.04
18	*Albizia odoratissima*	8.53	0	-0.04
19	*Stereospermum tetragonum*	8.53	0	-0.04
20	*Wrightia tinctoria*	7.37	0	-0.03
21	*Lannea coromandelica*	3.74	0	-0.01
22	*Ficus mollis*	3.74	0	-0.01
			0.07	**-1.24**
5 x 5 m for Shrubs				
1	*Butea superba*	51.6	0.047	-0.14
2	*Helicteres isora*	42.07	0.025	-0.13
3	*Waltheria indica*	37.56	0.019	-0.12
4	*Dioscorea pentaphylla*	33.98	0.014	-0.11

5	*Derris scandens*	33.98	0.014	-0.11
6	*Cajanus scarabaeoides*	25.89	0.006	-0.09
7	*Tarenna asiatica*	24.63	0.003	-0.07
8	*Phoenix loureiroi*	21.5	0.003	-0.07
9	*Catunaregam spinosa*	17.81	0.002	-0.06
10	*Grewia hirsuta*	10.99	0	-0.03
			0.13	**-0.93**
1 x 1 m for Herbs				
1	*Drimia indica*	43.85	0.026	-0.13
2	*Orthosiphon rubicundus*	41.51	0.026	-0.13
3	*Cyanthillium albicans*	39.21	0.02	-0.12
4	*Andrographis paniculata*	39.21	0.02	-0.12
5	*Byttneria herbacea*	29.55	0.006	-0.09
6	*Evolvulus nummularius*	26.09	0.006	-0.09
7	*Scleria lithosperma*	24.8	0.004	-0.07
8	*Phyllanthus virgatus*	17.92	0.002	-0.06
			0.13	**-0.92**

Buffer Zone

A. **Trees** – From Importance Value Index (IVI), it is inferred that, for trees *Xylia xylocarpa* is the most dominant species with 21.00 of Importance Value Index followed by *Tectona grandis* (16.27), *Lannea coromandelica* (15.85), *Anogeissus latifolia* (14.76), *Schleichera oleosa* and *Cleistanthus collinus* each with (10.3) and *Cleistanthus collinus* (10.36). Simpson's Index value is 0.042 and the Shannon Wiener Index value is 1.47, which shows that diversity is more.

B. **Shrubs** – *Woodfordia fruticosa* is identified as the most dominant species with 35.44 of Importance Value Index followed by *Canthium coromandelicum* (22.86), *Chromolaena odorata* (21.26), *Helicteres isora* (20.55) and *Getonia floribunda* (20.2). Simpson's Index value is 0.07and the Shannon Wiener Index value is 1.19, which shows that diversity is more.

C. **Herbs** – *Hybanthus enneaspermus* is identified as the most dominant species with 25.95 of Importance Value Index followed by *Orthosiphon rubicundus* (25.18), *Oldenlandia umbellate* and *Scleria terrestris* each with 23.84, *Byttneria herbacea* (22.88) and *Lepidagathis cristata* (21.02). Simpson's Index value is 0.07 and the Shannon Wiener Index value is 1.18, which shows that diversity is more.

This infers the buffer zone of woody species has more diversity when compared to other life forms of plants. Most of the natural growth recorded is of coppice in nature.

Phyto-sociological features in buffer zone

Buffer zone

31.62 x 31.62 m for Trees				
1	*Xylia xylocarpa*	21	0.01	-0.1
2	*Tectona grandis*	16.27	0.005	-0.08
3	*Lannea coromandelica*	15.85	0.005	-0.08
4	*Anogeissus latifolia*	14.76	0.004	-0.07
5	*Schleichera oleosa*	10.37	0.001	-0.05
6	*Cleistanthus collinus*	10.36	0.001	-0.05
7	*Miliusa tomentosa*	10.08	0.001	-0.05
8	*Wrightia tinctoria*	9.75	0.001	-0.04
9	*Madhuca longifolia* var. *latifolia*	9.62	0.001	-0.05
10	*Bombax ceiba*	9.17	0.001	-0.05

11	*Terminalia alata*	9.17	0.001	-0.05
12	*Lagerstroemia parviflora*	9.02	0.001	-0.05
13	*Dalbergia lanceolaria* subsp.*paniculata*	9.02	0.001	-0.05
14	*Hardwickia binata*	8.71	0.001	-0.04
15	*Albizia odoratissima*	8.51	0.001	-0.04
16	*Buchanania cochinchinensis*	8.26	0.001	-0.04
17	*Givotia moluccana*	8.09	0.001	-0.04
18	*Boswellia serrata*	8.01	0.001	-0.04
19	*Careya arborea*	7.5	0.001	-0.04
20	*Ochna obtusata*	7.49	0	-0.03
21	*Soymida febrifuga*	7	0	-0.03
22	*Diospyros melanoxylon*	7	0	-0.03
23	*Mitragyna parvifolia*	7	0	-0.03
24	*Grewia tiliifolia*	6.92	0	-0.03
25	*Bridelia retusa*	6.33	0	-0.03
26	*Pterospermum xylocarpum*	6.33	0	-0.03
27	*Gardenia latifolia*	6.33	0	-0.03
28	*Albizia amara*	5.99	0	-0.03
29	*Bauhinia racemosa*	5.99	0	-0.03
30	*Terminalia bellirica*	4.49	0	-0.02
31	*Butea monosperma*	4.49	0	-0.02
32	*Chloroxylon swietenia*	4.49	0	-0.02
33	*Aegle marmelos*	4.48	0	-0.02
34	*Acacia leucophloea*	4.48	0	-0.02
35	*Euphorbia nivulia*	4.48	0	-0.02
36	*Naringi crenulata*	3.23	0	-0.01
			0.042	**-1.47**
5 x 5 m for Shrubs				
1	*Woodfordia fruticosa*	35.44	0.025	-0.13
2	*Chromolaena odorata*	21.26	0.007	-0.09
3	*Canthium coromandelicum*	22.86	0.005	-0.08
4	*Helicteres isora*	20.55	0.005	-0.08
5	*Getonia floribunda*	20.2	0.006	-0.09
6	*Catunaregam spinosa*	19.14	0.005	-0.08
7	*Tarenna asiatica*	18.09	0.004	-0.08
8	*Erythroxylum monogynum*	18.09	0.004	-0.08
9	*Triumfetta rotundifolia*	16.16	0.001	-0.05
10	*Ixora pavetta*	15.97	0.003	-0.07
11	*Ziziphus oenopolia*	15.72	0.003	-0.07
12	*Grewia hirsuta*	12.3	0.001	-0.05
13	*Carissa carandas*	12.3	0.001	-0.05
14	*Butea superba*	12.3	0.001	-0.05
15	*Olax scandens*	11.31	0.001	-0.04
16	*Dichrostachys cinerea*	8.89	0	-0.03
17	*Acalypha alnifolia*	6.46	0	-0.02
18	*Flacourtia indica*	6.46	0	-0.02
19	*Phoenix loureiroi*	6.46	0	-0.02
			0.07	**-1.19**

1 x 1 m for Herbs				
1	*Byttneria herbacea*	22.88	0.008	-0.09
2	*Hybanthus enneaspermus*	25.95	0.011	-0.1
3	*Orthosiphon rubicundus*	25.18	0.01	-0.1
4	*Scleria lithosperma*	23.84	0.008	-0.09
5	*Oldenlandia umbellata*	23.84	0.008	-0.09
6	*Lepidagathis cristata*	21.02	0.006	-0.09
7	*Fimbristylis ovata*	20.91	0.003	-0.07
8	*Spermacoce articularis*	18.51	0.004	-0.08
9	*Phyllanthus virgatus*	17.74	0.004	-0.08
10	*Sida cordifolia*	17.06	0.003	-0.07
11	*Desmodium gangeticum*	16.26	0.003	-0.07
12	*Andrographis paniculata*	15.6	0.002	-0.06
13	*Evolvulus nummularius*	11.5	0.001	-0.04
14	*Alysicarpus monilifer*	11.5	0.001	-0.04
15	*Elytraria acaulis*	11.5	0.001	-0.04
16	*Eragrostis viscosa*	8.36	0	-0.03
17	*Cyanthillium albicans*	8.36	0	-0.03
			0.07	**-1.18**

IUCN Red list species

During primary data collection, *Chloroxylon swietenia*, *Cleistanthus collinus*, *Curcuma pseudomontana*, were found in good number, these are under Vulnerable (VU) category as per IUCN Red list. However, these species are in abundance in the study area as well as Telangana State and there is profuse regeneration. Most of these are coppice in nature.

Faunal Diversity:

Mammals:

Mining and associated infrastructure developmental activities in forested habitats could potentially affect a variety of taxonomic groups (Laurance 2010, Laurance et al. 2011). Large mammals serve as important "functional groups" in a biological community. They also help in exciting public interest, attention, support, and involvement in conservation. Large mammals also play critical ecological roles such as seed dispersal, pollination, nutrient cycling, regulation of zoonotic diseases and maintaining habitats (Sinclair 2003, Jones and Safi 2011, Ripple et al. 2014) in the ecosystem thereby maintaining the biodiversity of the area. Large mammals can be highly vulnerable to habitat-related threats like roads and mines as they can disrupt animal home ranges with long-term demographic, behavioral, and genetic consequences (Madhusudan and Mishra 2003, Ripple et al. 2015). Small mammals act as a main food resource for the predators and thus act as a link between primary and secondary producers (Sainz-Elipe et al. 2012), and aid in the process of seed dispersal and forest regeneration (Hollander and Vander Wall 2004, Ordonez and Retana 2004). Further, these mammals act as pollinators, maintain forest health, aerate soil, increase plant diversity, control insects, and also have an aesthetic value. Thus, small mammals are fundamental tools for the faunal rejuvenation, as they indicate the gradual recovery of the invertebrates, as in the case of insectivores, changes in vegetation structure and composition and soil conditions (Sainz-Elipe et al. 2012). Hence among mammals, small mammals are considered to be as an indicator of the health of any ecosystem. Hence, extraction of any mineral in the forested habitats has a significant influence on both small and larger mammals through large scale landscape modification, mainly in the form of loss of vegetation and habitat and hydrological regimes.

In addition, removal of vegetation, that is used as shelter, food, and cover from predators,

has a profound impact on their richness, density, and distribution. Therefore, in forested habitats, monitoring large mammals like carnivores (Panthera cats, sloth bear and large canids), their prey animals (large herbivores and primates), and meso-carnivores (viverrids, lesser cats and mustelids) can be useful for management to understand habitat status in general. Hence, the present wildlife status assessment study focused on assessing and monitoring of mammalian fauna which serve as an ideal option for monitoring the proposed area for mining.

In the proposed area, covering the core and buffer zones, a total of 26 species of mammals distributed in 15 families were recorded. The species include Wild Boar, Common Mongoose, Greater Indian fruit bat, Rhesus Macaque, Bonnet Macaque, Indian Palm Squirrel, Little Indian Field Mouse, Indian hare are common in their occurrence. (Table).

Field Methods: The mammalian status was evaluated in different habitats/land uses of the core zone (CZ) and buffer zone (BZ) using standard ecological methods to record both direct and indirect evidence.

Direct count: Direct count involved line transect/road count (Burnham et al. 1980, Sale and Berkmueller 1988, Rodgers 1991) along the route of movement inside the mine and respective land use/ habitats. Whenever, a species or species group was sighted while walking between the sample points (line transect) and travelling between the sampling location (road count), their numbers was counted and habitats it was seen were recorded.

Indirect evidence counts: The mammals are one of the most difficult groups to assess, as it includes animals that are very shy, elusive, and cryptic, which are rarely seen. However, most of these animals leave some signs like tracks (footprints /pugmarks), droppings (excreta), digging, scrap, scratch, rubbing or wallowing and dead remains, ecologically know as indirect evidence, that can be associated with their identity and presence. Hence this study included indirect evidence count method for quantifying mammals, mainly to know their relative occurrence.

- Intensive search was carried out for quantifying indirect evidence (pellets, dung, droppings, scats and other tracks and signs) along the transect (Thompson et al. 1989, Rodgers 1991, Henke and Knowlton 1995, Allen et al. 1996) in every sample plot laid at every 500 m intervals using 25 m radius plots.

- Opportunistic observations or encounters, while in the field outside sampling area, of both direct and indirect evidence were also recorded.

Interaction with the locals: Further presence of different mammal species was also ascertained and substantiated by interviewing the local people (villagers) with the pictorial representation and discussion with local experts.

Threatened species and other parameters studied: Threatened mammals in list prepared through field data collection and collation from the secondary source, were categorized referring to the Wildlife (Protection) Amendment Act 2022 and IUCN Red List of Mammals (IUCN 2023).

- A comprehensive list of mammals for the regions was prepared by combining the list of mammals reported from this study survey of the overall study area and the data available in the form of secondary information collected from different sources like concerned Forest Department Working Plans, from the bio diversity studies carried out during EIA/EMP preparartion of the VK OC project and published information from field guides on mammals.

- All the nomenclature, scientific names and their ecological status have been referred from standard pictorial guides for mammals (Menon 2014 and Prater 2005).

Estimation of abundance rate: Abundance rate was assessed based on mean number of animals counted (A) and indirect evidence (IE) recorded per species. Further, the overall

abundance rate was assessed across different study zones by assigning subjective value of low, medium, and high across different study zones considering the mean range of minimum and maximum number of animals and indirect evidence recorded. The details of subjective values assigned are given below.

Details of subjective rating of number of animals sighted and indirect evidence recorded per species

Mean range of Animals Sighted/species	Minimum of 2.6 A to maximum of 26.4 A/Species		
Assigned Subjective values	Low 1-10 A/species	Medium >10-20 A/species	High > 20 A/species
Mean range of Indirect Evidence/species	Minimum of 3.31 to maximum 9.84 IE/Species		
Assigned Subjective values	Low 1-4 IE/	Medium >4-8 IE/Species	High > 8 IE/Species

A-Animals Sighted, IE- Indirect Evidence

Overall Mammal species observed from the proposed area

S.No.	Species and Common Name	Core Zone (CZ)	Buffer Zone (BZ)	Project Study Area (CZ+BZ)	Secondary Source		CL	P SpL	Conservation status	
					EIA/ EMP	WKPL			IUCN	WPA 2022
1	**BOVIDAE**									
1	*Boselaphus tragocamelus*-Nilgai				✓	✓	**	?		
2	*Bos gaurus*- Indian gaur				x	✓	**	?	VU	I
3	*Tetracerus quadricornis*- Four horned antelope				x	✓	**	P	VU	I
2	**CANIDAE**									
4	*Canis aureus* - Golden Jackal				x	✓	**	?	LC	I
5	*Vulpes bengalensis*- Indian Fox				✓	✓	**	?	LC	I
3	**CERCOPITHECIDAE**									
6	*Macaca mulatta*- Rhesus Macaque	A-34	A-34	A-34	✓	✓	***	P	LC	II
7	*Macaca radiata*- Bonnet Macaque	A-22	A-22	A-22	✓	✓	***	P		
8	*Semnopithecus entellus*-Hanuman Langur	A-16	A-16	A-16	✓	✓	***	P	LC	II
4	**CERVIDAE**									
9	*Axis axis*-Indian Spotted Deer	IE-7	IE-5, A-2	IE-5, A-2	✓	✓	***	P	LC	II
10	*Rusa unicolor*-Indian Sambar				x	✓	**	?	VU	II
5	**FELIDAE**									
11	*Felis chaus*-Jungle Cat	IE-2	IE-2	IE-2	✓	✓	***	P	LC	I
12	*Panthera pardus*- Common Leopard				x	✓	**	?	VU	I
6	**HERPESTIDAE**									

13	*Urva edwardsii*-Common Grey Mongoose		A-4	A-4	✓	✓	***	P	LC	I
7	**HYSTRICIDAE**									
14	Hystrix indica-Indian Crested Porcupine		IE-1	IE-1	✓	✓	**	P	LC	I
8	**LEPORIDAE**									
15	Lupus nigricollis-Indian Hare	IE-16, A-7	IE-5, A-2	IE-21, A-9	✓	✓	***	P	LC	II
9	**MURIDAE**									
16	*Bandicota bengalensis*-Lesser Bandicoot Rat		A-5	A-5	✓	✓	***	P	LC	IV
17	*Bandicota indica*-Greater Bandicoot Rat		A-1	A-1	✓	✓	***	P	LC	IV
18	*Mus booduga*-Little Indian Field Mouse		A-1	A-1	✓	✓	***	P	LC	IV
19	*Mus musculus*-House Mouse		A-1	A-1	✓	✓	***	P	LC	IV
10	**SCIURIDAE**									
20	*Funambulus palmarum*-Indian Palm Squirrel	A-6	A-11	A-17	✓	✓	***	P	LC	IV
11	**PTEROPODIDAE**									
21	*Pteropus medius*-Indian Flying Fox	A-23	A-50	A-73	✓	✓	***	P	LC	II
12	**SUIDAE**									
22	*Sus scrofa*-Wild Boar	IE-9	IE-15, A-1	IE-24, A-1	✓	✓	***	P	LC	II
13	**TRAGULIDAE**									
23	*Moschiola indica*-Indian Spotted Chevrotain		IE-2	IE-2	✓	✓	***	P	LC	I
14	**URSIDAE**									
24	*Melursus ursinus*-Sloth Bear				x	✓	**	?	VU	I
15	**VIVERRIDAE**									
25	*Viverricula indica*-Small Indian Civet		IE-2	IE-2	x	✓	***	P	LC	I
26	*Paradoxurus hermaphroditus*-Asian Palm Civet		A-1	A-1	x	✓	***	P	LC	I
	Total Species	9	18F	18						
	A-Animal Counted	108	151	170						
	Indirect Evidence	34	32	57						

*IE-Indirect evidence, A- Animals Sighted, WKPL – Working Plan, Kothagudem Forest Division, CL – Cumulative List: ** reported only in the secondary source, *** common to both Present Study & Secondary Sources; P SpL – P = Possible Species List, ?-Presence of Species uncertain in OSA; IUCN Red List: EN- Endangered, VU-vulnerable, LC-Least concern, WPA - Wildlife (Protection) Amendment Act 2022) Sch- I – Schedule I; II – Schedule II; IV – Schedule IV.

Species of Conservation Significance (SCS): A total of 12 species belonging to 8 families recorded from the study area are categorized under IUCN as Least Concern (LC), Vulnerable (VU) and Endangered (EN) and in Schedule I Wildlife Protection Act (Amended

2022) respectively. Direct/indirect evidence for presence of Tiger, Leopard, Sloth Bear, Nilgai, Gaur, Golden Jackal, Wild Dog, Indian Fox, and Four-horned Antelope were not observed in the study area. However, Tiger has been reported as an occasional visitor in forest areas at a distance of 20-25 Km.

List of Species of Conservation Significance (SCS) of Mammals in the proposed area:

S.No.	Species and Common Name	Conservation status	
		IUCN	WPA 2022
1	**BOVIDAE**		
1	*Bos gaurus*- Indian gaur	VU	I
2	*Tetracerus quadricomis*- Four horned antelope	VU	I
2	**CANIDAE**		
3	*Canis aureus* – Golden Jackal	LC	I
4	*Vulpes bengalensis*- Indian Fox	LC	I
3	**FELIDAE**		
5	*Felis chaus*-Jungle Cat	LC	I
6	*Panthera pardus*- Common Leopard	VU	I
4	**HERPESTIDAE**		
7	*Urva edwardsii*- Common Grey Mongoose	LC	I
5	**HYSTRICIDAE**		
8	Hystrix indica-Indian Crested Porcupine	LC	I
6	**TRAGULIDAE**		
9	*Moschiola indica*-Indian Spotted Chevrotain	LC	I
7	**URSIDAE**		
10	*Melursus ursinus*-Sloth Bear	VU	I
8	**VIVERRIDAE**		
11	*Viverricula indica*-Small Indian Civet	LC	I
12	*Paradoxurus hermaphroditus*- Asian Palm Civet	LC	I

* IUCN Red List: VU-vulnerable, LC-Least concern, WPA – Wildlife (Protection) Amendment Act 2022) Sch- I – Schedule I.

Herpetofauna:

Herpetofauna assessment involves sampling of amphibians and reptiles. Reptiles and amphibians are not only important to food webs, but they commonly link aquatic and terrestrial systems (Urbina-Cardona 2008). Several herpetofauna species are in decline and at risk of extinction due to the changes in how the land is used, which affect the environment (Steihnke 2016). Further, habitat loss and climate change, can also result in changes in growth rate of individuals, as well as changes in activity pattern and microhabitat use (Urbina-Cardona 2008), leading to herpetofauna decline. Edge effects resulting from deforestation may impact wind speed, moisture levels, temperature regimes, solar penetration, and vapor pressure near forest edges, which may adversely impact herpetofauna (Lehtinen et al. 2003).

Amphibians are likely to have the largest contribution to aquatic ecosystem services, and their supporting services have structural (e.g., habitat) and functional (e.g., ecosystem functions and processes) components (Hocking and Babbitt 2014). In addition, their declines may be an early indicator of loss of freshwater aquatic ecosystem services (Collins et al. 2009) and help in predicting the biotic and abiotic changes, and loss of species (Sekercioglu

et al. 2004).

Reptiles which are predators of some animals, serve in keeping the pest species and rodents under control, and prey for fishes, some reptiles themselves, birds, and mammals, make them a very important component in the food webs in most ecosystems. All these show the sensitive nature of this group, and they are being an ideal ecological indicator of any development that involves vegetation and habitat loss. Though, all the above are clear evidence of this group's role as efficient and potential ecological indicators, in this study it was qualitatively assessed due to seasonal, and time constrains.

Field Methods: The systematic and quantitative survey of amphibians and reptiles was not possible due to the unfavorable season and time constraint. Therefore, only check list of herpetofauna (amphibian and reptile groups) was prepared based on the secondary information in the Working Plan/Management Plan of Kothagudem Division, 2014-2024 of Bhadradri Kothagudem district and from the bio diversity studies carried out during EIA/EMP preparartion. In the absence of systematic survey, opportunistic records of herpetofauna were made during the assessment of vegetation, using Ad libitum sampling, in which no systematic constraints are placed on what is recorded or when (Martin and Bateson 2007), but is informal, non-systematic survey, and often used in field notes.

The opportunistic field observation inventorized a total of 26 species belonging to 23 genera, 3 orders and 13 families; it includes reptiles and amphibians consisting of two major classes namely Squamata and Anura, of which 20 species of reptiles belonging to orders Squamata and Testudines and 6 species of amphibians belonging to order Anura.

Taxonomical status and species richness of herpetofauna in the proposed area

Parameters	Present Study (PS) 2023	EIA/EMP – M/s EPTRI	Working Plan _ Forest Department 2022	Total Species
Families	13	13	11	13
Genera	23	23	15	23
Species	26	26	17	26

A total of 26 species can possibly be present in the overall proposed project area of 10 km radius (shown in below Tables). A noteworthy mention to the reptile species is the record of fan throated lizards (*Sitana sp.*) that requires further investigation.

Overall list of herpetofauna species recorded in the proposed area

S.No.	Group/Family/Species and Common Name	Present Study	Secondary Source		CL	Conservation Status	
			EIA/ EMP	WK PL		IUCN	WPA 2022
1	**Dicroglossidae**						
1	Asian Grass Frog *Fejervarya limnocharis*		✓		**	LC	
2	Indian Skipper Frog *Euphlyctis cyanophlyctis*	✓	✓	✓	***	LC	Sch - II
3	Green Pond Frog *Euphlyctis hexadactylus*		✓	✓	**	LC	Sch - II
4	Indian Bullfrog *Hoplobatrachus tigerinus*	✓	✓	✓	***	LC	
2	**Rhacophoridae**						

	5	Common Tree Frog *Polypedates leucomystax*		✓	✓	**	LC	
3		**Bufonidae**						
	6	Asian Common Toad *Duttaphrynus melanostictus*	✓	✓	✓	***	LC	
4		**Agamidae**						
	7	Common Garden Lizard *Calotes versicolor*	✓	✓	✓	***	LC	
	8	Forest Blood Sucker *Monilesaurus rouxii*		✓		**	LC	
	9	Pondichéry Fan-throated Lizard *Sitana ponticeriana*	✓	✓	✓	***	LC	
5		**Boidae**						
	10	Red sand boa *Eryx johnii*	✓	✓	✓	***	NT	Sch - I
	11	Rough-scaled Sand Boa *Gongylophis conicus*		✓		**	NT	Sch - II
6		**Chamaeleonidae**						
	12	Indian Chameleon *Chamaeleo zeylanicus*		✓	✓	**	LC	Sch - I
7		**Colubridae**						
	13	Bronze-backed Tree Snake *Dendrelaphis tristis*		✓	✓	**	LC	
	14	Checkered Keelback *Fowlea piscator*	✓	✓	✓	***	LC	Sch - I
	15	Indian Wolf Snake *Lycodon aulicus*		✓		**	LC	
	16	Common Kukri Snake *Oligodon arnensis*		✓		**	LC	
	17	Green Vine Snake *Oxybelis fulgidus*	✓	✓	✓	***	LC	
	18	Indian Rat Snake *Ptyas mucosa*	✓	✓	✓	***	LC	
8		**Elapidae**						
	19	Indian Cobra *Naja naja*	✓	✓	✓	***	LC	Sch - I
9		**Gekkonidae**						
	20	Brooke's House Gecko *Hemidactylus brookii*		✓			LC	
	21	Common House Gecko *Hemidactylus frenatus*		✓			LC	
	22	Termite Hill Gecko *Hemiductylus triedrus*	✓	✓		**	LC	
10		**Scincidae**						
	23	Keeled Indian Mabuya *Eutropis carinata*		✓			LC	
11		**Varanidae**						
	24	Common Indian Monitor *Varanus bengalensis*	✓	✓	✓	***	NT	Sch - I

12	**Viperidae**						
25	Russell's Viper *Daboia russelii*	✓	✓	✓	***	LC	Sch - I
13	**Trionychidae**						
26	Indian Flapshell Turtle *Lissemys punctata*	✓	✓	✓	***	VU	Sch - I

*EIA/EMP Report, WKPL – Working Plan of the Kothagudem Forest Division; CL – Cumulative Species List: ** reported only from the Secondary Sources, *** Common to both Present Study & Secondary Source, IUCN Red List: VU-vulnerable, NT-Near Threatened, LC-Least Concern, WPA - Wildlife Protection Act-Amendment 2022: Sch- I Schedule I, Sch- II Schedule II

Species of Conservation Significance (SCS): All possible list of amphibian and reptile species reported in VK Opencast Coal Mining Project were categorized based on the IUCN conservation status and protection status based on the recently updated The Wildlife (Protection) Amendment Act 2022. This revealed that none of the six species of amphibians listed were of conservation importance. Out of 20 reptile species listed, 7 were listed as Schedule I species and 3 as Schedule II species in WPA Amended Act 2022. Among 7, only 3 species among them were listed as threatened (NT and VU) in IUCN Red List. These three IUCN threatened species are Common Indian Monitor *Varanus bengalensis* - NT, Red sand boa (*Eryx johnii*), and Indian flapshell turtle (*Lissemys punctata*) – VU. The 7 (The Wildlife (Protection) Amended Act 2022), listed schedule I species, include four snake species, one species of varanus, one species of turtles, and one species of chameleon (shown in below Tables). Considering all the above, a dedicated study of amphibians and reptiles with specific survey methods would yield more species of all groups in the proposed area under research and monitoring component of wildlife management plan.

List of Species of Conservation Significance (SCS) of reptiles in the proposed area:

S.No.	Group/Family/Species and Common Name	Present Study	Secondary Source		CL	Conservation Status	
			EIA/EMP	WK PL		IUCN	WPA 2022
1	**Boidae**						
1	Red sand boa *Eryx johnii*	✓	✓	✓	***	NT	Sch - I
2	**Chamaeleonidae**						
2	Indian Chameleon *Chamaeleo zeylanicus*		✓	✓	**	LC	Sch - I
3	**Colubridae**						
3	Checkered Keelback *Fowlea piscator*	✓	✓	✓	***	LC	Sch - I
4	**Elapidae**						
4	Indian Cobra *Naja naja*	✓	✓	✓	***	LC	Sch - I
5	**Varanidae**						
5	Common Indian Monitor *Varanus bengalensis*	✓	✓	✓	***	NT	Sch - I
6	**Viperidae**						
6	Russell's Viper *Daboia russelii*	✓	✓	✓	***	LC	Sch - I
7	**Trionychidae**						
7	Indian Flapshell Turtle *Lissemys punctata*	✓	✓	✓	***	VU	Sch - I

*EIA/EMP Report, WKPL – Working Plan of the Kothagudem Forest Division; CL – Cumulative Species List: ** reported only from the Secondary Sources, *** Common to both Present Study & Secondary Source, IUCN Red List: VU-vulnerable, NT-Near Threatened, LC-Least Concern, WPA - Wildlife Protection Act-Amendment 2022: Sch- I Schedule I

Avifauna:

Birds are considered good indicators, due to their widespread presence and diversity in most habitats (Bibby 2002) relative to other taxa, as they can be readily sampled, and their taxonomy is well known. Further, as they are sensitive to natural and anthropogenic environmental alterations (Fleishman and Mac Nally 2006), birds are highly potential ecological indicators.

Bird community composition reflects inter specific dynamics and population trends (Cody 1981) that reveal about the habitat quality and state of ecosystem functions. Birds exhibit numerous characteristics that suggest their potential as ecological indicators at a comparatively large scale. They form an essential part of the processes involved in ecosystem functioning.

Birds provide many direct and indirect ecosystem services, like several ecologically important plants require pollination by birds, to successfully reproduce; fruit-eating birds likewise aid the germination and spread of hundreds of species of plants and trees; hawks and owls are great consumers of pests such as rodents, while flycatchers and their allies consume lots of insects. Presently, changes in bird populations can tell us a great deal about the impacts of climate change, drought, weather, and habitat around the world.

Hence birds being one of the most important components of any study on wildlife assessment, were assessed as one of the main study components as part of this study. Birds in this study were broadly segregated into terrestrial/land, and aquatic/wetland birds. The birds that use terrestrial habitats for most of its activities were terrestrial birds, while birds that use aquatic ecosystem and its associated habitats for most of its activities were considered as aquatic birds.

A total of 86 bird species belongs to 70 genera, 18 orders and 42 families were recorded in core and buffer zone areas.

Among them, order Passeriformes represented with high number of species (37 species distributed in 28 genera of 19 families), followed by Pelecaniformes (8/7/3), Columbiformes & Gruiformes each with 5/4/1, Accipitriformes (4/4/1), Coraciiformes (4/3/3), Galliformes (4/3/1), Apodiformes (3/2/1), Bucerotiformes & Charadriiformes each with 2/2/2, Anseriformes, Ciconiiformes & Cuculiformes each with 2/2/1, Psittaciformes (2/1/1), Falconiformes, Piciformes, Podicipediformes and Strigiformes are represented with 1 species belong to 1 genera of 1 family respectively.

List of Terrestrial Birds observed in the proposed area

S.No.	Scientific Name	Common Name	FG	M/R	Core Zone (CZ)	Buffer Zone (BZ)	CS IUCN/ WLPA
1	**Phasianidae**						
1	*Coturnix coromandelica*	Rain Quail	G	R		√	II
2	*Coturnix cotumix*	Common Quail	G	R		√	II
3	*Ortygornis pondicerianus*	Grey Francolin	G	R	√	√	II
4	*Pavo cristatus*	Indian Peafowl	O	R	√	√	LC/I
2	**Accipitridae**						
5	*Accipiter badius*	Shikra	C	R	√	√	LC/I
6	*Butastur teesa*	White-eyed	C	R		√	LC/I

		Buzzard					
7	*Elanus caeruleus*	Black-winged Kite	C	R	√	√	II
8	*Milvus migrans*	Black Kite	C	R	√	√	II
3	**Columbidae**						
9	*Columba livia*	Rock Pigeon	G	R	√	√	II
10	*Spilopelia chinensis*	Spotted Dove	G	R	√	√	II
11	*Spilopelia senegalensis*	Laughing Dove	G	R	√	√	II
12	*Streptopelia orientalis*	Oriental Turtle Dove	G	R	√	√	II
13	*Treron phoenicoptera*	Yellow-footed Green Pigeon	G	R	√	√	II
4	**Cuculidae**						
14	*Clamator jacobinus*	Pied Crested Cuckoo	I	SV		√	II
15	*Eudynamys scolopaceus*	Asian Koel	F	R	√	√	II
5	**Strigidae**						
16	*Athene brama*	Spotted Owlet	C	R		√	II
6	**Caprimulgidae**						
17	*Caprimulgusasiaticus*	Indian Nightjar	I	R	√	√	II
7	**Apodidae**						
18	*Apus apus*	Common Swift	I	R	√	√	II
19	*Apus nipalesis*	House Swift	I	R	√	√	II
20	*Cypsiurus balasiensis*	Asian Palm Swift	I	R		√	II
8	**Upupidae**						
21	*Upupa epops*	Eurasian Hoopoe	I	MV	√	√	II
9	**Bucerotidae**						
22	*Ocyceros birostris*	Indian Grey Hornbill	F	R	√	√	II
10	**Meropidae**						
23	*Merops orientalis*	Little Green Bee-eater	I	R	√	√	II
24	*Merops philippinus*	Blue-tailed Bee-eater	I	R	√	√	II
11	**Coraciidae**						
25	*Coracias benghalensis*	Indian Roller	I	R	√	√	II
12	**Megalaimidae**						
26	*Psilopogon haemacephalus*	Coppersmith Barbet	F	R	√	√	II
13	**Psittaculidae**						
27	*Psittacula cyanocephala*	Plum-headed Parakeet	F	R	√	√	II
28	*Psittacula krameri*	Rose-ringed Parakeet	F	R	√	√	II

14	**Aegithinidae**						
29	*Aegithina tiphia*	Common Iora	I	R	√	√	II
15	**Campephagidae**						
30	*Pericrocotus cinnamomeus*	Small Minivet	I	R		√	LC/I
16	**Laniidae**						
31	Lanius schach	Long-tailed Shrike	I	R	√	√	II
17	**Dicruridae**						
32	*Dicrurus caerulescens*	White-bellied Drongo	I	R		√	II
33	*Dicrurus macrocercus*	Black Drongo	I	R	√	√	II
18	**Monarchidae**						
34	*Terpsiphone paradisi*	Indian Paradise flycatcher	I	SV		√	II
19	**Corvidae**						
35	*Corvus macrorhynchos*	Large-billed Crow	O	R		√	II
36	*Corvus splendens*	House Crow	O	R	√	√	
37	*Dendrocitta vagabunda*	Rufous Treepie	O	R	√	√	II
20	**Alaudidae**						
38	*Eremopterix griseus*	Ashy-crowned Sparrow-Lark	I	R		√	II
21	**Hirundinidae**						
39	*Cecropis daurica*	Red-rumped Swallow	I	R		√	II
40	*Hirundo smithii*	Wire-tailed swallow	I	R		√	II
41	*Hirundo rustica*	Barn Swallow	I	R		√	II
22	**Pycnonotidae**						
42	*Pycnonotus cafer*	Red-vented Bulbul	O	R	√	√	II
43	*Pycnonotus jocosus*	Red-whiskered Bulbul	O	R	√	√	II
44	*Pycnonotus luteolus*	White-browed Bulbul	O	R		√	II
23	**Cisticolidae**						
45	*Orthotomus sutorius*	Common Tailorbird	I	R		√	II
46	*Prinia inornata*	Plain Prinia	I	R	√		II
47	*Prinia socialis*	Ashy Prinia	I	R	√	√	II
48	*Prinia sylvatica*	Jungle Prinia	I	R	√	√	II
24	**Leiothrichidae**						
49	*Argya caudata*	Common Babbler	O	R	√	√	II
50	*Argya malcolmi*	Large Grey Babbler	O	R	√	√	II
25	**Sturnidae**						
51	*Acridotheres tristis*	Common Myna	O	R	√	√	II
52	*Sturnia pagodarum*	Brahminy Myna	O	R		√	II

26	**Dicaeidae**						
53	*Dicaeum erythrorhynchos*	Tickell's Flowerpecker	N	R		√	II
27	**Nectariniidae**						
54	*Cinnyris asiaticus*	Purple Sunbird	N	R	√	√	II
55	*Leptocoma zeylonica*	Purple-rumped Sunbird	N	R	√	√	II
28	**Motacillidae**						
56	*Anthus rufulus*	Paddyfield Pipit	I	R		√	II
57	*Motacilla alba*	White Wagtail	I	R		√	II
58	*Motacilla maderaspatensis*	White-browed Wagtail	I	R	√		II
29	**Passeridae**						
59	*Passer domesticus*	House Sparrow	G	R		√	II
60	*Gymnoris xanthocollis*	Yellow-throated Sparrow	G	R		√	II
30	**Estrildidae**						
61	*Lonchura punctulata*	Scaly-breasted Munia	G	R		√	II
62	*Euodice malabarica*	Indian Silverbill	G	R		√	II
31	**Falconidae**						
63	*Falco tinnunculus*	Common Kestrel	C	R		√	II
32	**Acrocephalidae**						
64	*Acrocephalus agricola*	Paddy field Warbler	I	R		√	II
65	*Iduna caligata*	Booted Warbler	I	R		√	II

*FG- Foraging Guild : C – Carnivore, F – Frugivore, G-Granivore, I – Insectivore, I/N-Insectivore/Nectarivore, O – Omnivore; M/R-Migrant/Resident: R – Resident; SV – Summer Visitor, MV- Monsoon Visitor; CS – Conservation Significance ; IUCN Red List of Birds : NT – Near Threatened, LC – Least Concern; WPA – Wildlife (Protection) Amendment Act 2022 – Sch-I Schedule I, Sch-II Schedule -II

List of Waterbirds observed in the proposed area

S. No.	Scientific Name	Common Name	FG	M/R	Core Zone (CZ)	Buffer Zone (BZ)	CS WLPA
1	**Anatidae**						
1	*Dendrocygna javanica*	Lesser Whistling Duck	H	R		√	II
2	*Nettapus coromandelianus*	Cotton Teal	H	R		√	II
2	**Podicipedidae**						
3	*Tachybaptus ruficollis*	Little Grebe	H	R		√	II
3	**Ciconiidae**						
4	*Anastomus oscitans*	Asian Openbill	M	R		√	II
5	*Mycteria leucocephala*	Painted Stork				√	
4	**Phalacrocoracidae**						

6	*Microcarbo niger*	Little Cormorant	P	R		√	II
7	*Phalacrocorax fuscicollis*	Indian Cormorant	P	R		√	II
5	**Ardeidae**						
8	*Ardea cinerea*	Grey Heron	P	R		√	
9	*Ardea purpurea*	Purple Heron	P	R		√	II
10	*Ardeola grayii*	Indian Pond Heron	P	R	√	√	II
11	*Bubulcus ibis*	Cattle Egret	P	R	√	√	II
12	*Egretta garzetta*	Little Egret	P	R	√	√	II
6	**Threskiornithidae**						
13	*Pseudibis papillosa*	Red-naped Ibis	O	R		√	NT/II
7	**Rallidae**						
14	*Amaurornis phoenicurus*	White-breasted Waterhen	I	R	√	√	II
15	*Fulica atra*	Common Coot	P	R		√	II
16	*Gallicrex cinerea*	Watercock	P	R		√	II
17	*Gallinula chloropus*	Common Moorhen	P	R		√	II
18	*Porphyrio porphyrio*	Purple Swamphen	P	R		√	II
8	**Charadriidae**						
19	*Vanellus indicus*	Red-wattled Lapwing	I	R	√	√	II
9	**Jacanidae**						
20	*Metopidius indicus*	Bronze-winged Jacana	I	R		√	II
10	**Alcedinidae**						
21	*Halcyon smyrnensis*	White-throated Kingfisher	P	R	√	√	II

*FG- Foraging Guild : C – Carnivore, F – Frugivore, G-Granivore, I – Insectivore, I/N-Insectivore/Nectarivore, P – Piscivore; O – Omnivore; M/R-Migrant/Resident: R – Resident; CS – Conservation Significance ; IUCN Red List of Birds : NT – Near Threatened; WPA - Wildlife (Protection) Amendment Act 2022 – Sch-II Schedule -II

Overall Species richness and density of bird population: The total numbers of individuals recorded in all the points are analyzed and tabulated. The highest number of (20max & 5 min) individuals was recorded in the buffer zone. The overall density of birds in this point is 49.2 hac. The reason behind the highest record of the individuals in the buffer zone, comparing to the core may be due to the habitat type. The buffer zone has shrub forest lands with thick canopies, plantations water sources and cattle movements.

Comparative Species richness of the core and buffer zones

Study Area	Min.	Max.	Mean (n=2)	SD	Cum Richness
Core	6	8	7.00	0.63	25
Buffer	4	10	7.17	2.56	25

Comparative Bird densities of the core and buffer zones

Study Area	Min.	Max.	Mean (n=2)	SD	Cum Richness
Core	6	12	8	2.2	40.7
Buffer	5	20	9.7	5.5	49.2

Species of Conservation Significance (SCS): A total of 5 species belonging to 4 families recorded from the proposed area are categorized under IUCN as Least Concern (LC), Near

Threatened (NT) and in Schedules I&II Wildlife Protection Act (Amended 2022) respectively.

List of Species of Conservation Significance (SCS) of birds in the proposed area:

S.No.	Scientific Name	Common Name	FG	M/R	Core Zone (CZ)	Buffer Zone (BZ)	CS IUCN/WLPA
1	**Phasianidae**						
1	*Pavo cristatus*	Indian Peafowl	O	R	√	√	LC/I
2	**Accipitridae**						
2	*Accipiter badius*	Shikra	C	R	√	√	LC/I
3	*Butastur teesa*	White-eyed Buzzard	C	R		√	LC/I
3	**Campephagidae**						
4	*Pericrocotus cinnamomeus*	Small Minivet	I	R		√	LC/I
4	**Threskiornithidae**						
5	*Pseudibis papillosa*	Red-naped Ibis	O	R		√	NT/II

*FG- Foraging Guild : C – Carnivore, F – Frugivore, G-Granivore, I – Insectivore, O – Omnivore; M/R-Migrant/Resident: R – Resident; CS – Conservation Significance ; IUCN Red List of Birds : NT – Near Threatened; WPA - Wildlife (Protection) Amendment Act 2022 – Sch-II Schedule -II

Bees, Dragonflies, Spiders and Butterflies (Invertebrates):

A total of 46 species of Invertebrates, of which Butterflies under the order Lepidoptera represented with 31 species belong to 26 genera of 5 families. Dragonflies under the order Odonata (9 species belong to 7 genera of 4 families). Hymenoptera is with 4 species belongs to 2 genera of one family. Spiders under the order Araneae represented with 1 species belong to 1 genus of Lycosidae family.

List of Invertebrates recorded from the proposed area

Sl. No	CommonName	ScientificName	Family	IUCN Status	IWPA Schedule
1	Common Funnel Web Spider	*Hippasa agelenoides*	Lycosidae	NA	NL
2	Indian Honeybee	*Apis cerana* subsp.*indica*	Apidae	NA	NL
3	Honeybee	*Apis mellifera*	Apidae	NA	NL
4	Violet CarpenterBee	*Xylocopa violacea*	Apidae	NA	NL
5	CarpenterBee	*Xylocopa tenuiscapa*	Apidae	NA	NL
6	PaperWasp	*Ropalidia marginata*	Vespidae	NA	NL
7	CommonBush Hopper	*Ampittia dioscorides*	Hesperiidae	NA	NL
8	CommonAwl	*Hasora badra*	Hesperiidae	NA	NL
9	Indian Grizzled Skipper	*Spialia galba*	Hesperiidae	NA	NL
10	Dark PalmDart	*Telicota ancilla*	Hesperiidae	NA	NL

11	AngledPierrot	*Caleta decidia*	Lycaenidae	NA	NL
12	CommonPierrot	*Castalius rosimon*	Lycaenidae	NA	NL
13	Lime Blue	*Chilades lajus*	Lycaenidae	NA	NL
14	GrassJewel	*Freyeria trochylus*	Lycaenidae	NA	NL
15	Pale GrassBlue	*Pseudozizeeria maha*	Lycaenidae	NA	NL
16	Dark GrassBlue	*Zizeeria karsandra*	Lycaenidae	NA	NL
17	Blue Grass	*Zizina labradus*	Lycaenidae	NA	NL
18	Tiny GrassBlue	*Zizula hylax*	Lycaenidae	NA	NL
19	TawnyCoster	*Acraea terpsicore*	Nymphalidae	NA	NL
20	CommonCastor	*Ariadne merione*	Nymphalidae	NA	NL
21	Plain Tiger	*Danaus chrysippus*	Nymphalidae	NA	NL
22	CommonTiger	*Danaus genutia*	Nymphalidae	NA	NL
23	Commoncrow	*Euploea core*	Nymphalidae	LC	NL
24	DanaidEggfly	*Hypolimnas misippus*	Nymphalidae	NA	NL
25	PeacockPansy	*Junonia almana*	Nymphalidae	NA	NL
26	YellowPansy	*Junonia hierta*	Nymphalidae	NA	NL
27	LemonPansy	*Junonia lemonias*	Nymphalidae	NA	NL
28	Blue Pancy	*Junonia orithya*	Nymphalidae	NA	NL
29	Common Bushbrown	*Mycalesis perseus*	Nymphalidae	NA	NL
30	Dark Tiger	*Tirumala hamata*	Nymphalidae	NA	NL
31	CommonBanded Peacock	*Papilio crino*	Papilionidae	NA	NL
32	CommonMormon	*Papilio polytes*	Papilionidae	NA	NL
33	Mottled Emigrant	*Catopsilia pyranthe*	Pieridae	NA	NL
34	Plain Orange Tip	*Colotis aurora*	Pieridae	NA	NL
35	CommonJezebel	*Delias eucharis*	Pieridae	NA	NL
36	Common Grass Yellow	*Eurema hecabe*	Pieridae	NA	NL
37	Yellow Orange Tip	*Ixias pyrene*	Pieridae	NA	NL
38	Pale- spotted Emperor	*Anax guttatus*	Aeshnidae	LC	NL
39	GoldenDartlet	*Ischnura aurora*	Coenagrionidae	NA	NL
40	Indian CommonClubtail	*Ictinogomphus rapax*	Gomphidae	LC	NL
41	Commonscarlet- darter	*Crocothemis erythraea*	Libellulidae	LC	NL
42	Ground Skimmer	*Diplacodes trivialis*	Libellulidae	NA	NL
43	Blue MarshHawk	*Orthetrum glaucum*	Libellulidae	NA	NL
44	GreenMarsh Hawk	*Orthetrum sabina*	Libellulidae	NA	NL
45	WanderingGlider	*Pantala flavescens*	Libellulidae	NA	NL
46	Crimson MarshGlider	*Trithemis aurora*	Libellulidae	NA	NL

*NA – Not Applicable; LC – Least Concern under IUCN Conservation Status; NL – Not Listed under the Wildlife Protection Act

Pisces:
A total of 14 species of fish belong to 5 orders and 5 families were recorded. The order Cypriniformes and Siluriformes each with 5 species in 3 genera of 1 family followed Synbranchiformes (2/1/1), Anabantiformes & Mugiliformes are represented with one species in one genus.

List of Pisces recorded from the proposed area

Sl. No.	Common/ LocalName	Scientific Name	Family	IUCN Status	IWPA Schedule
1	Climbing Perch/Goraka	*Anabas testudineus*	Anabantidae	LC	NL
2	Catla	*Labeo catla*	Cyprinidae	LC	NL
3	Rohu/Seelavathi	*Labeo rohita*	Cyprinidae	LC	NL
4	Buradamatta	*Channa punctata*	Cyprinidae	LC	NL
5	Korrameenu	*Channa striata*	Cyprinidae	LC	NL
6	Chittrai	*Cirrhinus reba*	Cyprinidae	LC	NL
7	Corsula	*Rhinomugil corsula*	Mugilidae	LC	NL
8	Long Whiskers Catfish/Jella	*Mystus gulio*	Bagridae	LC	NL
9	Errajella	*Mystus vittatus*	Bagridae	LC	NL
10	Golden Barb/Perka	*Puntius gelius*	Bagridae	LC	NL
11	Buddajella	*Rita chrysea*	Bagridae	LC	NL
12	Bondu	*Rita kuturnee*	Bagridae	LC	NL
13	Bommidai	*Macrognathus guentheri*	Mastacembelidae	NA	NL
14	Indian Spiny Eel/Kontemukku	*Macrognathus pacalus*	Mastacembelidae	LC	NL

*NA – Not Applicable; LC – Least Concern under IUCN Conservation Status; NL – Not Listed under the Wildlife Protection Act

Overall Faunal Composition in the proposed Area:

Faunal composition in the proposed area

Component	Mammals	Herpetofauna	Birds	Invertebrates	Pisces	Total
Family	15	13	42	5	5	**80**
No. of species	**28**	**26**	**86**	**46**	**14**	**200**

Floral and Faunal species documentation by the Forest Division of Kothagudem in the Buffer Zone:
A total of 118 species of flora comprising 73 trees, 12 shrubs, 6 climbers, 15 herbs and 12 grass species including bamboo were recorded by the forest department. Likewise, a total of 17 faunal (only mammals) species were listed by the forest department in the buffer area of the study area. However, no record on number of these animals is available with the forest department. No study was carried out to enumerate these species. Under the Wildlife Conservation Plan (now revised) one Wildlife Expert is proposed for the life of the project (though initially for 10 years), who will help in monitoring, training, conducting availability

survey etc. in the Buffer area.

List of floral species documented by the forest department in the adjacent areas including Buffer area

Trees

Sl. No.	Species	Common Name
1	*Acacia chundra*	Sundra
2	*Acacia leucophloea*	Tella Thumma
3	*Aegle marmelos*	*Maredu*
4	*Alangium salvifolium*	Uduga
5	*Albizia amara*	Nalla regu
6	*Albizia lebbeck*	Dirishanam
7	*Albizia odoratissima*	Chinduga
8	*Andina cordifolia*	Bandaru
9	*Anogeissus latifolia*	Chirumanu Yelama
10	*Azadirachta indica*	Vepa
11	*Bauhinia racemosa*	Ari
12	*Bombax ceiba*	Buruga
13	*Boswellia serrata*	Andugu
14	*Buchanania lanzan*	Sarapapu, Mori
15	*Cassia fistula*	Rela
16	*Cassine glauca*	Bhutangi
17	*Chloroxylon swietenia*	Billudu
18	*Cleistanthus collinus*	Bankanakkiri, Kodisa
19	*Cochlospermum religiosum*	Kondagogu
20	*Cordia dichotoma*	Iriki/BankaNakkera
21	*Dalbergia latifolia*	Jetregi
22	*Dalbergia paniculata*	Soppera/Pachari
23	*Dichrostachys cinerea*	
24	*Diospyros chloroxylon*	Illintha
25	*Diospyros melanoxylon*	Tuniki
26	*Erythroxylum monogynum*	Devadaru
27	*Eucalyptus tereticornis*	Nilagiri
28	*Feronia elephantum*	Velaga
29	*Ficus mollis*	Juvvi
30	*Ficus racemosa*	Medi
31	*Gardenia lucida*	Yerra bikki, Karinga
32	*Garuga pinnata*	Garga - Garugu
33	*Givotia rottleriformis*	Tella poliki
34	*Gmelina arborea*	Gummadi Teak
35	*Grewia tiliaefolia*	Jana/Thada
36	*Hardwickia binata*	Yepa
37	*Holarrhena pubescens*	Kodisepala
38	*Holoptelea integrifolia*	Nauli
39	*Ixora pavetta*	Koravi
40	*Lagerstroemia parviflora*	Chennangi
41	*Lannea coromandeliana*	Gumpena
42	*Madhuca longifolia*	Ippa
43	*Mangifera indica*	Mango
44	*Manilkara hexandra*	Pala/Pedda pala
45	*Miliusa tomentosa*	Nuluva/ Barre duddi
46	*Mitragyna parviflora*	Batta ganapa
47	*Morinda pubescens*	Thogarmogali

48	*Naringi crenulata*	Torrivelaga
49	*Nyctanthes arbor-tristis*	Parijatham
50	*Paasi nermis*	Pasi
51	*Phyllanthus emblica*	Usiri
52	*Polyalthia cerasoides*	Chilakaduddi
53	*Pongamia pinnata*	Kanuga
54	*Premna tomentosa*	Nagur
55	*Pterocarpus marsupium*	Yegisa
56	*Pterospermum xylocarpum*	Loluga
57	*Schleichera oleosa*	Rakot/Pusugu
58	*Schrebera swietenioides*	Mokkep, Makkam
59	*Semecarpus anacardium*	Jeedi
60	*Soymida febrifuga*	Somi
61	*Sterculia urens*	Thapsi chettu
62	*Strychnos nux-vomica*	Visha Mushti
63	*Strychnos potatorum*	Chilla
64	*Tamarindus indica*	Chintha
65	*Tectona grandis*	Teak
66	*Terminalia alata*	Nalla maddi
67	*Terminalia arjuna*	Tella/Veru maddi
68	*Terminalia bellirica*	Thani - Thandra
69	*Terminalia chebula*	Karaka
70	*Viscum heyneanum*	Karisha
71	*Ximenia americana*	Udutanakkera
72	*Xylia xylocarpa*	Bojja/Konda tangedu
73	*Ziziphus xylopyrus*	Gotti - Gotiki
	Shrubs	
1	*Canthium parviflorum*	Balusu
2	*Cissus vitiginea*	Gummadi Podha
3	*Dodonaea viscosa*	Bandaru
4	*Grewia hirsuta*	Bontha
5	*Helicteres isora*	Nulithada
6	*Jasminum arborescens*	Adavi malli
7	*Lawsonia inermis*	Kommi
8	*Maytenus emarginata*	Danthi
9	*Phyllanthus reticulatus*	Sunnambatti
10	*Randia spinosa*	Manga chettu
11	*Woodfordia fruticosa*	Jaji
12	*Ziziphus oenoplia*	Parikatheega
	Climbers	
1	*Acacia pinnata*	Chenchu campa
2	*Aganasoma caryophyllata*	Gudapala
3	*Asparagus racemosus*	Pilli bitiri
4	*Cocculus hirsutus*	Dusari teega
5	*Mucuna pruriens*	Adavi ulava
6	*Tylophora indica*	Teega Gaddi
	Herbs	
1	*Acalypha indica*	Muripindi teega
2	*Achyranthes aspera*	Uttareni/Antisa
3	*Aerva lanata*	Konda pindi
4	*Ageratum conyzoides*	Goat weed

5	*Andrographis paniculata*	Nelavemu
6	*Atylosia scarabaeoides*	Showy pigeonpea
7	*Combretum decandrum*	Yedagaddi
8	*Curculigo orchioides*	Eethakula Gaddi
9	*Hemidesmus indicus*	Sugandipala
10	*Hybanthus enneaspermus*	Ratnapurusa
11	*Hyptis suaveolens*	Sima tulasi/ Mahaveera
12	*Ocimum americanum*	Kukka tulasi
13	*Ocimum sanctum*	Adavi tulasi
14	*Phyllanthus niruri*	Nela usiri
15	*Sida acuta*	Chittemu
	Grasses	
1	*Aristida setacea*	Cheepuru gaddi
2	*Cymbopogon martinii*	Kasha gaddi
3	*Cynodon dactylon*	Garika gaddi
4	*Cyperus pertenius*	Nalla Tunga
5	*Cyperus rotundus*	Tunga
6	*Dioscorea bulbifera*	Adavi gaddu
7	*Echinochloa colona*	Kaproda gaddi
8	*Eclipta alba*	Gutta gaddi
9	*Eragistielia bifarice*	
10	*Eragrostis tenella*	Chinna Garika Gaddi
	Bamboo	
1	*Bambusa arundinacea*	Mullam Bongu
2	*Dendrocalamus strictus*	Sadanam

List of faunal species documented by the forest department in the adjacent areas including Buffer area

Sl. No.	Scientific Name	Common Name
1	*Boselaphus tragocamelus*	Nilgai
2	*Tetracerus qudricornis*	Four horned antelope
3	*Antilope cervicarpa*	Black buck
4	*Cervus unicolor*	Sambar
5	*Axis axis*	Spotted deer
6	*Sus scrofa*	Wild boar
7	*Bos gaurus*	Indian bison
8	*Melurus ursinus*	Sloth bear
9	*Herpestes edw ardej*	Common mongoose
10	*Canis aureus*	Jackal
11	*Vulpes bengalensis*	Indian fox
12	*Macaca mulatt*	Rhesus monkey
13	*Presbytis entellus*	Common langur
14	*Panthera pardus*	Leopard
15	*Felis chaus*	Jungle cat

Ecological parameters available in the adjoining forests in 10 Kms:

List of natural streams in the forest beats providing water to the wildlife in the 10 Kms radius

Sl. No	Beat Name	Streams	
		Nos	Names
1	Tungaram	1	Isuka Vagu
2	Tippanapalli	1	Edumelikala Vagu
3	Penagadapa	1	Tella Vagu
4	Ramavaram	1	Tella Vagu
5	Gareebpeta	3	Marri Vagu
	Total	**7**	

Conservative measures taken by the forest department for the wildlife in the Buzzer area of 10 Kms radius:

Fire-line developed by the Forest Department to avoid/control forest fires within 10 Kms radius

Sl. No.	Beat Name	Forest Fire Points
1	Tippanapalli	2
2	Penagadapa	1
3	Ramavaram	0
4	Gareebpeta	5
	Total	**8**

Water management initiatives developed by the forest department for wildlife in the buffer area of 10 Kms radius

Sl. No.	Beat Name	Percolation Tank (PTs)		
		Nos	Latitude	Longitude
1	Tungaram	1	17.44470	80.62874
2	Tippanapalli	1	17.43644	80.64424
3	Tippanapalli	1	17.43769	80.64544
	Total	**3**		

Water management initiatives developed by SCCL for Wildlife

Sl. No.	Location	Percolation Tank (PTs)	
		Nos	Amount in Lakhs
1	Tella Vagu	2	5 lakhs per PT x 4 nos.
2	Pengadappa	2	
	Total	**5**	20 Lakhs

Already existing Biotic pressure in the proposed area, causing damage and impact to forests, wildlife other than the expecting impact of the new proposed mine activity:
As per 2011 census, the total population in Kothagudem area is about 2,89,491 persons. In which around 9300 were inhabiting in the fringe villages of 5 forest beats in the buffer area. The existence of so many villages in the buffer area is the evidence of fragmentation and degradation of the natural landscape. Also, an estimated total of 7540 cattle existing in these villages, were already being a massive biotic pressure to the forests, while comparing to the impact caused by the new proposed mine operation to the buffer area.

List of forest fringe villages within Buffer Zone with people depending on the forest for livelihoods and livestock rearing

Sl. No.	Beat Name	No of Villages Nos	Names	Population	No. of Cattles
1	Tungaram	6	Tungaram Sunkara Banjara Tekula Banjara Jarpula Thanda Seemla Thanda Mala Banjara	3900	2000
	Sub-Total:	**6**		**3900**	**2000**
2	Tippanapalli	5	Tippanapalli Ahmednagar Venkata Puram Satyanarayana Puram Repallewada	4400	3200
	Sub-Total:	**5**		**4400**	**3200**
3	Penagadapa	3	Penagadapa Rampuram Ambedkarnagar	3000	1500
	Sub-Total:	**3**		**3000**	**1500**
4	Ramavaram	8	Garimellapadu Ramavaram 3 Incline 2 Incline 4 Incline 5 Incline Dhanbad Barium Thanda	4300	280

Sl. No.	Beat Name	No of Villages Nos	Names	Population	No. of Cattles
	Sub-Total:	**8**		**4300**	**280**
5	Gareebpeta	15	Gareebpeta Laxmipuram Thanda Rudrampur Laxmidevipalli Nimmalagudem Nimmalagudem Colony Marrithanda Chintal Thanda Komatpalli Seethampeta Seethampeta Banjara Reddipalem Ramji Thanda Sujathanagar Mangapeta	9375	560
	Sub-Total:	**15**		**9375**	**560**
	Grand Total	**37**		**24975**	**7540**

Wildlife Conservation Plan (WLCP) of the proposed project

As per the standard ToR condition "A detailed biological study of the study area (core zone and buffer zone, 10 km radius of the periphery of the mine lease) shall be carried out. Details of flora and fauna, Rare, Endangered, Extinct and Threatened (REET) Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost."

A Wildlife conservation plan was prepared for conservation of the schedule-I species, and this was approved for an amount of Rs. 478.6 lakhs by the PCCF (HoFF) & CWLW, Telangana State Forest Department, vide reference No. 5694/2021/WI-1 dated: 12.10.2021. This plan has been now revised to include activities which are going to be co-terminus with the life of the project as advised by the MOEF &CC,GOI. While preparing this plan presence of various water bodies, villages were considered.

This Wildlife Conservation Plan is complimentary to the Wildlife Plan of the Forest Department. This will be implemented in the Core and Buffer zones of project area.

Conservation Plans:
The suggested conservation plans to address the impacts of habitat loss, degradation (pollution) on wildlife values is to be implemented in specific locations within Core & Buffer zones. This plan shall be Co-terminus with the life of the project. However, as Soil Moisture Conservation Works are concerned, they will be completed within 3 years period and their impact will be there on the forest growth and wildlife for the period even beyond life of the project.

Even though the soil conservation activities around the over burden dump will be continued by the SCCL as the mining progress throughout the life of the project. Accordingly, a revised Wildlife Conservation Plan is drafted with suitable recommendations to improve the status of flora and fauna in the area particularly Buffer zone which will also help in improving landscape in adjacent forest areas.

The following conservative measures will be adapted into the Wildlife Conservation Plan. These measures will in two parts. PART – A will be carried out by SCCL and PART – B by the Forest Department.

PART – A of the conservative measures to be carried out by SCCL as follows:

PART – A (1). Soil Moisture Conservation Plan:
The main objective of the plan is to take up measures in order to mitigate the issues likely to be raised due to removal & dumping of OB and subsequent soil erosion from dumps. It envisages undertaking soil & moisture conservation activities to reduce the impact of soil erosion on flora and fauna in the adjacent forest area and taking up gap plantation. The entire procedure is taken up in three steps which is furnished hereunder:

1. Structural Measures
2. Biological Measures
3. General Measures

1. Structural Measures:

Structural measures are required to be taken before vegetative measures are adopted in order to control the soil erosion from the OB dumps. The objective behind building mechanical structures is to reduce the degree, length of slope and thereby run-off.

1.1 Terracing of OB Dump Slope:
The slope of individual dump shall be within the permissible range considering the angle of repose of the soil and space available, thereby maintaining the angle of repose at less than 280. Terracing will be done through the internal resources by deploying the operating mining equipment.

OB Management – Making garland drain to bring down run off in controlled manner

1.2 Dump Management:
A total quantity of 1508.55 M.Cu.m of hard OB will be removed during life of the project. Out of this, 40.31 M.Cu.m (2.6%) will be dumped externally and 1468.24 M.Cu.m (97.4%) will be backfilled. Total topsoil to be removed is 9.81 M.Cu.M. About 23.44 % of Topsoil i.e., 2.30 M.Cu.m is proposed to be spread externally and 76.55% of topsoil i.e., 7.51 M.Cu.m is proposed to be spread internally. Topsoil will be stored temporarily over backfilled area and later will be spread onto the finished decks

Design of dumps:
The design of overburden dump should be safe and economic in its purpose. The primary aim of proper designing an overburden dump is to ensure dump slope stability as well as optimum land usage considering favorable slope for growth of plants. A good design of overburden dump not only prevents accidents but also gives an aesthetic look. The maximum height of external dump will be 80m and internal dump will be 120m with each deck of 30m height considering the Factor of Safety as per the CMR 2017, Regulation NO 106. The overall slope angle will be maintained at less than 280. VK Coal mine project has been planned for drains on the berms of over burden dumps for safe disposal of Rainwater. To make appropriate grading/benching and dump stabilization, dozing, leveling& compaction of dump material is necessary. These works will be carried out by a Dozer, Water Sprinkler, Motor Grader, Shovel and other auxiliary equipment.

Dump Parameters:

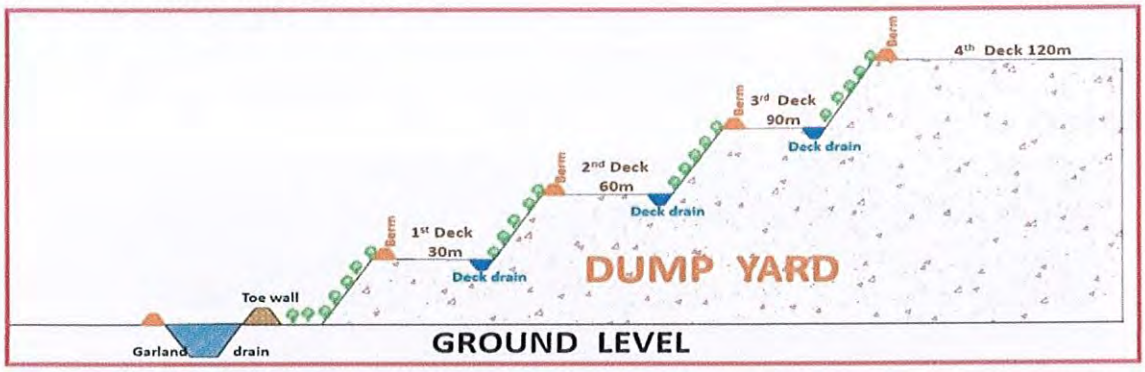
Parameters	External Dump Yard	Internal Dump Yard
Max. Dump Height (m)	80	120
Deck Height (m)	30	30
Berm Width (m)	30	30
Deck Slope (deg)	37.5	37.5
Overall Slope (deg)	25.58	23.13

Each deck will be formed in stages so that proper compaction of dump will take place. Further the dump deck will be designed with sloping inwards so that the water flows in to

garland drain constructed to prevent soil erosion.

III. Water management:

a) Rainfall over the mine area:



(Plan showing – Decks of OB & planting patterns) 120m dump height

The rainfall received in mine area will be accumulated in the mine pit instead of joining the natural drainage as runoff. The accumulated water will be pumped out to the surface to protect mine workings.

In the proposed project the length of the garland drain will be about 13.81 km which will be constructed with a cost of Rs.64.89 Lakhs.

b. Settling Tank:

The water during rainy season and during the course of its flow will pick of soil material along with it and same will be carried into streams. Hence, to prevent the same, the decks drains will be channeled into the settling tanks which are constructed at strategic locations.

The water from deck drains flowing at greater velocity will pick up soil with it and same will be carried into the garland drains and thereby into the streams. In order to prevent this, settling tanks are proposed at various locations where remaining suspended solids will be allowed to settle by sedimentation process as a residue. The sediments settled at the bottom of the tank will be cleaned at regular intervals before onset of monsoon.

The total land requirement of the VK Coal mine Project is 2403.17 Ha, out of which Afforestation will be done in phased manner in an area of 1521.377 Ha which includes plantation over the finished decks of dump yards, block plantation and avenue plantation etc. The cost of Plantation would be Rs 836.76 Lakhs for the proposed progressive plantation including Post Closure stage plantation.

SCCL Experience:

The Singareni Collieries Company is having its own Engineering wing which is having highly qualified engineers and experts who can take up Soil Moisture conservation works and formation of toe walls, garland drains as and when formation of overburden dumps

proceeds. Singareni Collieries Company itself could take up these works and monitoring can be done by the Forest Department and also raising nurseries, plantations and maintaining.

Benefits of Soil Moisture Conservation:
The following benefits will be achieved by implementing the above-mentioned soil moisture conservation measures in the project:

- Ecological Benefits: Preserving soil moisture helps maintain the local ecosystem supporting diverse flora and fauna and promoting biodiversity in the surrounding area.
- Vegetation Growth: Adequate soil moisture supports the growth of vegetation, leading to the re-establishment of vegetation cover in mined areas. This helps in reclaiming the land and restoring its ecological balance
- Soil Stability: Conserving soil moisture prevents erosion and helps maintain soil structure, reducing the risk of landslides and soil degradation.
- Water Management: Soil moisture conservation can contribute to better water management by reducing runoff and facilitating groundwater recharge. It may also help in mitigating potential water pollution issues
- Climate Regulation: Healthy soil with sufficient moisture help in increase the plant growth which in tum act as a carbon sink, contributing to climate change mitigation by sequestering carbon dioxide from the atmosphere.
- Dust Suppression: Adequate soil moisture can minimize dust generation in the mining area, leading to improved air quality and reduced health hazards for workers and nearby communities.

Conservation Plan for Threatened Birds, conservation in OB Plantations as part of the SMC plan:

Terrestrial Birds
Daton on terrestrial birds resulted in six threatened species in the core zone that includes Crested Serpent-Eagle, Tawny Eagle, White-eyed Buzzard, Shikra of Accipitridae family, and Indian Peafowl and Small Minivet that were widely distributed in the proposed area. Other than small minivet, the Indian peafowl, and the raptors, use different habitats like, forest, open scrub land, grassland, agriculture and urban areas and feed on diverse food, hence it is not necessary to suggest any species-specific conservation plan. However, the following mitigation and management plans are suggested specifically to mitigate the habitat loss and pollution impact and increase the vegetation cover to provide habitat for terrestrial avifauna.

1. Eco-restoration of Mine site – development of 150 ha of Forest Habitat within reclaimed mine pit area.
2. Development of Riparian Habitat Corridor along the natural stream
3. Strengthen the Riparian habitat along boundary of OB dumps.
4. Biofilter greenbelt- along the safe zone of mine lease boundary.
5. Biofilter greenbelt (3 tires planting) along the permanent mine roads.

Aquatic Birds
To enhance the biodiversity attributes of aquatic fauna like; aquatic invertebrates, fishes, amphibians, aquatic birds and possibly some reptile fauna, it is suggested to develop "Mine –Pit Wetlands" within the Core Area i.e., Void area of the VKOC.

Mine –Pit wetland habitat- Action plan: Post mining land use of the mine lease area shows that, out of 912.799 ha, 762.414 ha will be excavated of that, 479.546 ha will be backfilled and remaining 282.868 ha will remain as mine pit or void. This mine pit and siltation tanks already available will store rainwater and act as mine pit reservoirs and help in improving the ground water recharge. The approach to this void will be made in such way that shallow approach is available for wild animals.

Action plans-proposed mine pit wetland habitat development
Wetland – within the project site – aquatic biodiversity conservation

Management Themes	Action Plans
Creating new wetland habitats	1. It is suggested to develop Mine Void as wetland habitats of 387.184 ha within the refilled mine pit area
Habitat-Aquatic faunal diversity-fish, amphibian, aquatic birds	2. The engineered and structured mine pit wetland should have a maximum depth of 6m at one end. Siltation ponds in the Core zone will be converted to wetlands with a well- defined, shallow (grading from 0 – 1m) water littoral zone (edge).
Waterhole for Wildlife	3. Along the banks/ embankment and outer edge of the wetland habitats, medium to large size common tree species like (*Albizia ledbeck, Syzygium cumini, Azadirachta indica, Ficus benghalensis, Ficus religiosa, Mangifera indica, Madhuca longifolia, Babool, Terminalia,* should be planted. These trees can provide perching, roosting and possibly nesting sites for the aquatic birds.
Improve-Ground Water Resources	4. The second or inner middle layer needs to be developed with woody shrubs while the inner most layer and close to water edges should be grown with the locally available sedges and aquatic plants such as water lily, Indian lotus, Colocasia and Ipomoea aquatic.
Additional fish resource for locals	5. The basic concept to develop vegetation profile in different zones of wetland habitat (bank to submergence), is to provide niche for the birds to perch and rest.
	6. Bank stability, strategic access for wildlife/livestock, gradual sloping-depth profiles, enhanced water circulation, would provide habitable conditions for targeted aquatic species (plants, amphibians, turtles, fish and or invertebrates) and waterfowls.
	7. Create small island structures in the middle of the wetlands, to the extent of surfacing above the water as a mound, using boulders generated from the pit excavation and cover them with earthen materials to facilitate aquatic species.
	8. It is also suggested to incorporate dead tree like structures and snags in few locations in the middle and periphery of the wetland for the birds to perch.
	9. Releasing of fingerlings of local fish species into these wetlands is an option to provide additional fish resource for the aquatic birds and locals.
	10. Construct small watchtowers at strategic locations to facilitate bird watching and photography.

Overall, the recommended mine pit wetland and suggested check dams across local streams are expected to provide habitat for diverse aquatic waterfowls and enhance the species richness and abundance of aquatic avifauna of the project study area.

It may be concluded that the proposed soil moisture conservations measures will prevent erosion of the soil in to surrounding Nallahs, enrich the biodiversity & greenery in and around the project and the mine site can have better prospects for post-mining land use, such as agriculture or reforestation, ensuring the site's long- term viability beyond mining activities.

PART – A (2). Monitoring of impact on the wildlife movements in the core and buffer areas:

Restoration and reclamation process during and after mining in the proposed area and compensatory measures of SCCL and the forest department in the adjoining forests will provide alternate habitats for these species without much competition in resource partition with other existing species around the proposed area.

These processes should be monitored by a Wildlife Expert from the beginning of the mining operations, in a long-term period (till life of the project) continuously. The long-term monitoring will provide inputs and advisories to maintain and sustain the ecological balance of the proposed area.

This monitoring will help in creating a database by conducting the research covering all seasons as these may also lead to the management of the proposed area and the adjoining forest areas.

PART – B of the conservation measures to carried out by the Forest Department as follows:

The following measures specific to threatened biota are suggested to be implemented by the Forest Department with the funds provided under the approved Wildlife Conservation Plan for VKOC Coal mine, Kothagudem.

Conservation Plan for Scheduled-I Species (Mammals):

Species and Common Name	Conservation status	
	IUCN	WPA 2022
***Bos gaurus*- Indian gaur**	VU	I

Indian Gaur mostly occurs in dry deciduous forests, especially in areas that support short grasses with stunted and sparse tree growth. They prefer 'open' habitats, found using closed canopy thickets, with dense undergrowth or grass cover for resting. They occur at low densities across its distributional range and are predominantly solitary in nature, occasionally forming loosely associated groups of three to 10 animals and shows preference for browsing over grazing.

Gaur occurring in low density are vulnerable to human disturbance and might suffer local extinction too. Livestock grazing, illicit felling of trees is major and of high concern, when the population of a species is considered to be low and fragmented. The major diet of this Gaur is grass, followed by browse biomass of herbs and shrubs, leaves and fruits of few trees and in addition to dry and fleshly fruits, buds, flowers, and twigs.

Indian Gaur is vulnerable and schedule I species as per the Red List of IUCN and WPA (1972 amended 2022) respectively, and presence of this species was reported in the study zones. Therefore, with the understanding of the basic information on habitat preference, feeding, social organization and common threats, the following food plants

are suggested to enhance the food resource in the project area under habitat development plan. Overall, 26 food plants have been selected based on the literature and also cross checked with the list of plants recorded in the proposed area.

Food plant species recommended for restoration and development of habitat for Indian Gaur habitat:

1. *Acacia catechu*
2. *Acacia leucophloea*
3. *Asparagus racemosus*
4. *Bauhinia malabarica*
5. *Bauhinia racemosa*
6. *Bauhinia retusa*
7. *Bauhinia vahlii*
8. *Butea monosperma*
9. *Bombax ceiba*
10. *Bridelia retusa*
11. *Buchanania lanzan*
12. *Dendrocalamus strictus*
13. *Dichrostachys cinerea*
14. *Emblica officinails*
15. *Grewia hirsute*
16. *Helicteres isora*
17. *Hymenodictyon*
18. *Lannea coromandelica*
19. *Mallotus philippensis*
20. *Mitragyna parvifolia*
21. *Nyctanthes arbortristis*
22. *Phyllanthus emblica*
23. *Schleichera oleosa*
24. *Ziziphus mauritiana*
25. *Zizyphus xylopyrus*
26. *Acacia nilotica*

Action Plan:

1. Awareness generation among local communities, media, and officials of various

2. The species is vulnerable to diseases that infect domestic dogs and other carnivores. Appropriate interventions aimed at minimizing the likelihood of disease events occurring should be adopted to ensure a healthy population

3. Stopping poaching & controlling poachers by regular patrolling and anti-poaching awareness creation to locals and fringe village communities in the buffer areas.

4. Habitat Improvement, gap plantation can be done in the degraded reserved forest areas, mainly in the patches that are heavily degraded and lack natural regeneration. And the habitat improvement should involve developing grass patches in the area that are open

5. Control Foot and Mouth and rinderpest Disease. The disease usually spread from domestic cattle that graze inside the forest.

***Tetracerus quadricornis*- Four horned antelope** VU I

Four horned antelopes mostly occur in dry deciduous forests, especially in areas that support short grasses with stunted and sparse tree growth (Baskaran et al. 2011). Some studies suggest that they prefer 'open' habitats (Sankhala, 1977, Chundawat et al. 1999), while Sharma et al. (2009) reported that this species was found using closed canopy thickets, with dense undergrowth or grass cover for resting.

They occur at low densities across its distributional range and are predominantly solitary in nature, occasionally forming loosely associated groups of three to five animals and shows preference for browsing over grazing (Rice 1991 and Sharma et al.2009). Four-horned antelope occurring in low density are vulnerable to human disturbance and might suffer local extinction too (Baskaran and Desai 1999, Krishna 2006, Baskaran et al. 2009, Krishna et al. 2008). Hunting, livestock grazing, illicit felling of trees is major and of high concern, when the population of a species is considered to be low and fragmented.

The major diet of this antelope is grass, followed by browse biomass of herbs and shrubs, leaves and fruits of few trees (Baskaran et al. 2011) and in addition to dry and fleshly fruits, buds, flowers, and twigs (Krishna et al.2009, and Meghwal et al.2020). Four horned antelope is vulnerable and schedule I species as per the Red List of IUCN and WPA (1972 amended 2022) respectively, and presence of this species was reported in the study zones. Therefore, with the understanding of the basic information on habitat preference, feeding, social organization and common threats, the following food plants are suggested to enhance the food resource in the project area under habitat development plan. Overall, 26 food plants have been selected based on the literature (Kunwar et al.2016) and also cross checked with the list of plants recorded in the prposed area.

Food plant species recommended for restoration and development of habitat for Four-horned Antelope habitat:

1. *Acacia catechu*
2. *Acacia leucophloea*
3. *Asparagus racemosus*
4. *Bauhinia malabarica*
5. *Bauhinia racemosa*
6. *Bauhinia retusa*
7. *Bauhinia vahlii*
8. *Butea monosperma*
9. *Bombax ceiba*
10. *Bridelia retusa*

11. *Buchanania lanzan*
12. *Dendrocalamus strictus*
13. *Dichrostachys cinerea*
14. *Emblica officinails*
15. *Grewia hirsute*
16. *Helicteres isora*
17. *Hymenodictyon*
18. *Lannea coromandelica*
19. *Mallotus philippensis*
20. *Mitragyna parvifolia*
21. *Nyctanthes arbortristis*
22. *Phyllanthus emblica*
23. *Schleichera oleosa*
24. *Ziziphus mauritiana*
25. *Zizyphus xylopyrus*
26. *Acacia nilotica*

Action Plan:

1. Immediate need to initiate discussions with the local villagers to address the issues threatening the survival of this species and also undertake conservation awareness programs

2. Habitat Improvement, gap plantation can be done in the degraded reserved forest areas, mainly in the patches that are heavily degraded and lack natural regeneration. And the habitat improvement should involve developing grass patches in the area that are open.

3. Discussions with communities need to be undertaken immediately to address the issues of hunting and brewing.

4. Undertake detailed study on the feeding and breeding biology of the Four-horned Antelope in select habitats from the study area

***Canis aureus* - Golden Jackal**	LC	I
***Vulpes bengalensis*- Indian Fox**	LC	I

1. Habitat development plan - types of denning niches are proposed to be developed for the small mammalian fauna occurring in the proposed area, which includes development of rocky/boulder and earthen dens.

2. Rock/Boulders Den: This is similar kind of management plan like development of reptile habitat niche, the only change needed is, the size of rock/boulder should be 1 m3 and the heap dimension should be of 1.5m height covering 4-5 m radius, provide larger gaps and space between the rocks so that, small mammals can freely move in and out and occupy the niche as natural den.

3. Earthen Dens: it is also recommended to use mixture of local earthen materials with screen rejects to develop earthen denning sites for Jackals, and Indian fox. Develop earthen heaps of 1m height mixed with the ratio of 2:1 screen rejects and normal mud respectively, spreading over 3m radius. Cover both the rocky boulders and earthen heaps with topsoil to allow native grass and herbs to regenerate on it naturally.

4. Initially it is suggested to develop 10 such niches (5 rock and 5 earthen dens

within the Mine Lease area.

5. The areas selected should be free from human disturbance and that can be frequently monitored by the forest department and wildlife expert.

***Felis chaus*-Jungle Cat** LC I

1. Habitat development plan - types of denning niches are proposed to be developed for the Jungle Cat occurring in the proposed area, which includes development of rocky/boulder and earthen dens.

***Panthera pardus*- Common Leopard** VU I

To increase the prey base, it is important to increase the moisture regime for prolong period in the ground for development of pasture, which may allow grazing animals to proliferate. It is also important to create awareness among the villagers against the poaching.

Accordingly, 20 comparatively bigger percolation tanks at the cost of 10 Lakhs each is proposed in this area and suitable budgetary provision is made for creation of awareness among the people.

Action Plan:

1. Improve protection in the forest for tigers and other wildlife by building a strong network of trained and empowered frontline forest staff.
2. Monitor the movement of leopard and other wildlife in key wildlife corridors using state-of-the-art technology.
3. Reduce forest dependence of local communities, encourage them to support conservation initiatives like increasing green cover.
4. Garner political support and promote policy interventions.
5. Control of prey poaching
6. Creation of an inviolate area
7. Enlisting the support of the people
8. Control of Invasive species, especially the *Hyptis suaveolens*
9. Increase of prey base by translocation and soft releases.

***Urva edwardsii*- Common Grey Mongoose** LC I

1. Habitat development plan - types of denning niches are proposed to be developed for the Grey Mongoose occurring in the proposed area, which includes development of rocky/boulder and earthen dens.

Hystrix indica-Indian Crested Porcupine LC I

1. Habitat development plan - types of denning niches are proposed to be developed for the Porcupine occurring in the proposed area, which includes development of rocky/boulder and earthen dens.

***Moschiola indica*-Indian Spotted Chevrotain** LC I

In the forest division of Kothagudem, no study was carried out to arrive the number of Mouse Deer.

However, in the proposed area, their number is estimated between 10 to 15.

Accordingly, a rehabilitation centre is proposed at Kinnerasani WLS at the cost of 35 Lakhs, where injured/rescued animals will be taken for further care and release.

Action Plan:

1. Specific sites for the mouse deer should be identified based on the presence of dense vegetation thickets (tree and undergrowth density) that can serve as hideouts and planting of high number of fruiting trees will enhance its population.

2. Controlling Cattle infestations: Overgrazing might lead to several unproductive barren patches in the landscape that could wipe out dense forest dwelling small mammals like the mouse deer. Controlled livestock grazing can be used to enhance foraging conditions for wild ungulates by modifying plant communities that are preferred by wild ungulates and increase structural diversity in the landscape.

3. Planting fruit trees, maintenance of swamps, riparian vegetation, planting bamboo seedlings, and maintenance of saltlicks and water holes are likely to increase protection for mouse deer populations. Also, translocation of grasses species and food plants can be practiced to full-fill their habitat requirement.

4. Establishing the network of moist bamboo vegetation and maintenance of narrow trails with dense vegetation cover may be considered explicitly in management decisions for conservation of mouse deer.

5. Awareness to village fringe communities of the importance of the species.

6. Developing Ant-poaching intelligence network with village youths to monitor and control illegal activities causing damage and destruction to the habitat and as well as to the animal.

***Melursus ursinus*-Sloth Bear**	VU	I

Sloth bears (Melursus ursinus) are omnivorous with adaptation of myrmecophagy, and their diet composition varies according to season and habitat (Garshelis et al. 2014). It is endemic to Indian subcontinent and in contrast to its former distribution range, now is confined to some isolated patches, mostly in forested habitats outside protected areas (Sathyakumar et al. 2012; Dharaiya et al. 2016). It is listed as Vulnerable (VU) in the

IUCN Red List of Mammals and as Schedule-I species in the Indian Wildlife Protection Act (1972 & Amended 2022).

Human population growth, deforestation and land conversion for agriculture and other development, throughout its distribution range are resulting in ever-shrinking habitat, forming islands interspersed within human-dominated landscape (Dharaiya et al.2016).

Their principal diet is fruits (Baskaran et al. 1997), social insects (mainly ground living ants and termites) and sugar rich fruits (Garshelis et al. 1999), in addition to honey. They climb on the tree and feed on fruit and honey, picking fruits fallen on the ground and digging for the termites and ants. Sloth bears play a very vital ecological role in the form of seed dispersal (Willson 1993, Sreekumar and Balakrishnan 2002), that aid in improving the diversity of floral species in the forest.

With the available information on the food plants of the sloth bear, the action plan has suggested to focus on the habitat development to improve the food resources in the overall project area.

Food plant species recommended for habitat improvement and food resource enhancement for sloth bear:

1. *Aegle marmelos*
2. *Cassia fistula*
3. *Cordia macleodii*
4. *Cordia myxa*
5. *Diospyros melanoxylon*
6. *Emblica officinalis*
7. *Ficus benghalensis*
8. *Ficus glomerata*
9. *Ficus infectoria*
10. *Ficus racemosa*
11. *Ficus religiosa*
12. *Flacourtia indica*
13. *Madhuca longifolia*
14. *Mangifera indica*
15. *Syzygium cumini*
16. *Zizyphus mauritiana*

Action Plan:

1. Education will help to reduce bear-human conflicts and enhance a conservation ethic among locals.

2. Habitat improvements would be helpful in alleviating conflicts and enhance its population in the buffer areas.

3. Planting of fruit trees more particularly the species of Ficus which form an important diet to the animal.

4. Not allowing honey hives removals from forest beat areas in the buffer/ where sloth bear movements will serve as food.

5. A good source of water should be developed for drinking.

Viverricula indica-Small Indian Civet	LC	I
Paradoxurus hermaphroditus- Asian Palm Civet	LC	I

1. Habitat development plan - types of denning niches are proposed to be developed for the Civet cats occurring in the proposed area, which includes development of rocky/boulder and earthen dens.

2. Plantation of fruit yielding plants for food and shelter.

Conservation Plan for Threatened Herpetofauna:

Reptile habitat niche – habitat for ignored species group

Management Themes	Action Plans
Creation of additional Habitat	1. Development of Reptile Habitat Niche is proposed on OB plantation areas of the SCCL 2. As Phase I, 5 such reptile niches are proposed to be developed. 3. This can be initiated from the fourth year after start of the mine operation and once enough waste rock and boulders are generated from the mine excavation. 4. After three years monitoring of the management plan, it is suggested to develop another 5 such niches in forests areas.
Reptile Species Diversity Enhancement	5. Multiple 10 sq m asphalt surfaces may be created within each reptile niches which can provide hot surfaces for thermoregulation, an important requirement for reptiles especially snakes and lizards 6. Availability of rocky boulders and earthen materials in the mining site is common and using these waste materials to develop this kind of experimental reptile habitat is easy and economically viable.
Possibly habitat for threatened species	7. Availability of rocky boulders and earthen materials in the mining site is common using these waste materials to develop this kind of experimental reptile habitat is easy and economically viable. 8. Each reptile niches should be demarcated with signages not to trespass the area. This habitat development plan is expected to provide habitat for the reptiles in the study area. 9. This reptile niche plot should be monitored for efficacy. 10. Possibly identify python den/nest sites for protection under in-situ and ex-situ conservation with the help of the forest department.

Budget for the Action Plan

Because of diversion of forest land for increasing level ofcoal mining, there is likely impact on the wildlife and wildlife landscape of this area. The wildlife is forced to move to adjoining areas. All the adjoining forest areas are already under degraded categories & under tremendous biotic pressure beyond their carrying capacity. The nearby wildlife pool area is Kanakagiri Hills with a mixed-dry deciduous forest habitat, home range for wide species of wildlife. Suitable Mitigative and rehabilitative measures can compensate the impact. These works will help in restoration and amelioration of land scape for wildlife in general and Schedule-I animals in particular. To fulfill the requirements for conservation measures the various activities are proposed as mentioned in chapters 5.2. and 5.3. As per stipulations under the F (C) Act approval, the user agency need to do gap planting in 100 Meter areas around the boundaryif it isForest land. Accordingly, the SCCL willbe taking up gap planting in the periphery of about 32.70 Km at its cost. The area comes about 110Ha. However, actual; area will be arrived after taking up gap identification etc. and as proposed by the Forest Department.

PART-A: Conservation Measures to be carried out by the SCCL on their own cost

Sl.No.	Component with Justification	Unit cost	Physical	Financial (Rs in lakhs)
PART-A (1)	**Soil Moisture Conservation Plan:** Soil moisture conservation measures to enrich the biodiversity & greenery in and around the project and the Mine site can have better prospects for post-mining land use.			
1	SoilErosionTrench	1.00	22.00km	22.00
2	Plantation	0.55	1521.38ha	836.76
3	GrassSeeding	0.60	85.00ha	51.00
4	Toewall	20.00	8.87 km	177.30
5	GarlandDrains	4.70	13.81km	64.89
6	SettlingPonds/Tanks	0.11	11no.s	1.21
7	CheckDams	1.90	2no.s	3.80
8	Rainwaterharvestingstructure	1.50	16no.s	24.00
	TotalA(1)			**1180.96**
PART-A (2)	**Monitoring of impact on the wildlife movements in the core and buffer areas:**			
i	Engaging a Wildlife Expert initially for 10 years and to be continued till life of the project.	Rs.85000/month X 10 years initially + 10%annual increase	1 Wildlife Expert	163.00
ii	Purchase of Camera Traps for wildlife monitoring in both core and buffer areas.	Rs.25,000per camera trap	5	1.25
iii	Purchase of 1 Binoculars and 1 Digital Camera for documentation	Rs. 15,000 per binocular +Rs.85,000 per Digital Camera	1+1	1.00

		Total A(2)		**165.25**
	PART – A Total: A(1) + A(2)			**1346.21**

These works will be carried out by SCCL on their own and approval of the work will be taken from Singareni authorities at appropriate time.

PART-B: Wildlife Measures to be implemented by the Forest Department				
Sl. No.	**Component with justification**	**Unit cost**	**Physical**	**Fin.**
1	**Water Management**			
i	Creation of percolation tanks at natural depressions in forest areas (28172ha) within the buffer zone at 15 places for providing water to various wild animals (both pray base like Sambar, Chital and Chowsingha and predators including Leopard) moving in the buffer zones.	10.00	15 No.	150.00
ii	Drilling of bore-wells and fixing of solar pumps of 2HP in the forest for providing drinking water for wild animals continuously during the peak summers also.	6.00	4 Nos.	24.00
2	**Providing and Monitoring**			
i	Fire control measures along with periphery (113 km) and within forest (28127 ha) in buffer zone to control / avoid accidental incidents of forest fire, threatening the wildlife and their movements.	LS	1000 Ha	20.00
ii	Construction of watchtower for the surveillance of fire and biotic interference in the forest area.	5.00	2 No.	10.00
iii	Creation of earthen mounds in the periphery of the water bodies for resting and basking of wildlife.	0.10	20 No.	2.00
iv	Construction of Anti-Poaching hut for protection team to regularly monitor wildlife movements in the buffer forest areas.	8.00	1 No.	8.00
v	Engaging Anti-Poaching team of 5 Members for protection of wildlife by networking and intelligence gathering on poaching.	9 lakh / Yr x 3 yrs	1	27.00
3	**Capacity Building and Awareness Generation**			
i	Technical training to the Frontline staff regarding Wildlife census, rescue and rehabilitation of wildlife	LS	10 Nos.	2.00
ii	Awareness programme in the villages in the buffer zone (25) regarding importance and safety of wildlife to improve its protection and conservation of wildlife through multi-stakeholders participatory approach	LS	LS	5.00
4	**Infrastructure and Equipment**			
i	Purchase and installation of cameras – traps and water holes to monitor the movement of wild animals and for the surveillance of any illegal felling of trees, hunting, etc,., in WLM Kinnerasani.	0.25	20 No.	5.00
ii	Purchase of binoculars for monitoring wildlife movements in the forest beats in WLM Kinnerasani.	0.15	4 No.	0.60
iii	Mobile animal cages to rescue the wild animals strayed into the villagers and for shifting the injured animals in WLM Kinnerasani.	5.00	3 No.	15.00

iv	Creation / upgrading of infrastructure for conducting awareness meeting in WLM Kinnerasani.	5.00	1 No.	5.00
v	Creating advanced wildlife rehabilitation centre in Nehru Zoological Park, Hyderabad for post trauma care	90.00	1 No.	90.00
vi	Kakatiya Zoological Park, Warangal:			
a.	Construction and improvement of internal roads	LS	LS	8.00
b.	Procurement of battery operated vehicles	7.5	2 No.	15.00
c.	Construction of Tiger enclosures	LS	1 No.	35.00
d.	Procurement of Rescue mobile vehicles	LS	1 No.	10.00
e.	Improvement of visitor amenities	LS	1 No.	10.00
f.	Staff mobility and rescue operations	LS	LS.	10.00
g.	Veterinary facilities including man power requires infrastructure and medical facilities	LS	LS.	10.00
5	**Research**			
i	Study and documentation on corridors connecting Kinnerasani Wildlife Sanctuary and mining areas along with wildlife occupancy survey by taking technical guidance from expert for future management of the forest and wildlife of this area	2000	1 No.	20.00
6	**Mitigation of Man-Animal conflict in Bhadradri Circle**	LS	LS	30.00
7	**Procurement of Safari vehicles (5) Nos. for developing Eco-tourisim**	20.00	5 No.	100.00
8	**Procurement of Boats for developing Tourism in Kinnerasani lake**	20.00	2 No.	40.00
9	**Renovation of Environmental Education Center (EEC) at Kinnerasani Wildlife Sanctuary**	LS	1 No.	50.00
10 a.	**Office and Miscellaneous Expenses in Bhadradri Circle.**	LS	LS	20.00
b.	Monitoring cell in Head Office, Aranya Bhavan	LS	LS	10.00
	Total			**731.60**

A Wildlife conservation plan was prepared for conservation of the schedule-I species, and this was approved for an amount of Rs.478.6 lakhs by the PCCF (HoFF) & CWLW, Telangana State Forest Department, vide reference No.5694/2021/WI-1 dated: 12.10.2021 and the amount was already deposited by SCCL. This plan has been revised by including activities which are going to be co-terminus with the life of the project as advised by the MOEF &CC, GOI. While preparing this plan presence of various water bodies, villages were considered.

The additional amount proposed will be deposited with forest department after getting approval of the revised mitigation plan for conservation of Scheduled-I Species.

Conclusion

It is presumed thatno significant impact may be there on the wildlife as it maymove to buffer area. It is important to maintain and conserve the buffer areas duly with increase in moisture regime. The rehabilitation of about 1521.37 Ha on OBwill definitelyhelp inimprovingthe landscape in general. As these areas are to be re-grassed, these may help in pastureland to the wild animal. Since, no migratory route / corridors found in the core area, there may not be likely effect on wildlife migration due to mining.

The revised Wildlife Conservation Plan prepared for **Rs.731.60 Lakhs** and accordingly it may be got approved.

Prl. Chief Conservator of Forests
& Chief Wildlife Warden,
Telangana

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2414889/2024/FCA SECTION-PCCF

GOVERNMENT OF TELANGANA
FOREST DEPARTMENT

Rc. No.: 5694/2021/WL-1
Date: 14.02.2024

Office of Prl. Chief Conservator of Forests, Telangana
Aranya Bhavan, Saifabad, Hyderabad

Sri. M.C.Pargaien , I.F.S.,
Prl Chief Conservator of Forests (WL) &
Chief Wildlife Warden

Sub: TSFD – WL – Proposal for diversion of 649.3014 ha. of forest land in Ramavaram RF of Ramavaram Range of Kothagudem forest division for grant of mining lease for proposed Venkatesh Khani OCP from Underground rights to Surface rights in Kothagudem Area in Bhadradri Kothagudem District in favour of M/s.SCCL, Kothagudem – Wildlife Conservation Plan – Approved Regarding.

Ref: CCF, Bhadradri Circle, Warangal Rc.No.501/2023/DM, dt.31.01.2024.

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Vide reference cited the CCF, Bhadradri Circle has furnished a Wildlife mitigation plan for an amount of Rs.731.60 Lakhs with a request to approve the plan. In this regard, it is to inform that, the Wildlife mitigation Plan has been scrutinized and re-casted as under:

Sl. No.	Component with justification	Unit cost	Phy.	Fin.
1	**Water Management**			
i	Creation of percolation tanks at natural depressions in the forest areas (28172ha) within the buffer zone at 15 places for providing water to various wild animals (both prey base like Sambar, Chital and Chowsingha and predators including Leopard) moving in the buffer zones.	10.00	15 No.	150.00
ii	Drilling of bore-wells and fixing of solar pumps of 2HP in the forest for providing drinking water for wild animals continuously during the peak summers also.	6.00	4 No.	24.00
2	**Protection and Monitoring**			
i	Fire control measures along the periphery (113 km) and within forest (28127 ha) in buffer zone to control / avoid accidental incidents of forest fire, threatening the wildlife and their movements.	LS	1000 Ha	20.00
ii	Construction of watchtower for the surveillance of fire and biotic interference in the forest area.	5.00	2 No.	10.00
iii	Creation of earthen mounds in the periphery of the water bodies for resting and basking of wildlife.	0.10	20 No.	2.00
iv	Construction of Anti-Poaching hut for protection team to regularly monitor wildlife movements in the buffer forest areas.	8.00	1 No.	8.00
v	Engaging Anti-Poaching team of 5 Members for protection of wildlife by networking and intelligence gathering on poaching.	9 lakh / Yr x 3 yrs	1	27.00
3	**Capacity Building and Awareness Generation**			
i	Technical training to the Frontline staff regarding Wildlife census, rescue and rehabilitation of wildlife	LS	10 No.	2.00
ii	Awareness programmes in the villages in the buffer zone (25) regarding importance and safety of wildlife to improve its protection and conservation of wildlife through multi-stakeholders participatory approach	LS	LS	5.00
4	**Infrastructure and Equipment**			
i	Purchase and installation of camera –traps near water holes to monitor the movement of wild animals and for the surveillance of any illegal felling of trees, hunting, etc., in WLM Kinnerasani.	0.25	20 No.	5.00

ii	Purchase of binoculars for monitoring wildlife movements in the forest beats in WLM Kinnerasani.	0.15	4 No.	0.60
iii	Mobile animal cages to rescue the wild animals strayed into the villages and for shifting the injured animals in WLM Kinnerasani.	5.00	3 No.	15.00
iv	Creation / upgrading of infrastructure for conducting awareness meeting in WLM Kinnerasani.	5.00	1 No.	5.00
v	Creating advanced wildlife rehabilitation centre in Nehru Zoological Park, Hyderabad for post trauma care	90.00	1No.	90.00
vi	Kakatiya Zoological Park, Warangal			
a.	Construction and improvement of internal roads	LS	LS	8.00
b.	Procurement of battery operated vehicles	7.5	2 No.	15.00
c.	Construction of Tiger enclosures	LS	1 No.	35.00
d.	Procurement of Rescue mobile vehicles	LS	1 No.	10.00
e.	Improvement of visitor amenities	LS	1 No.	10.00
f.	Staff mobility and rescue operations	LS	LS	10.00
g.	Veterinary facilities including man power requires infrastructure and medical facilities.	LS	LS	10.00
5	**Research**			
i	Study and documentation on corridors connecting Kinnerasani Wildlife Sanctuary and mining areas along with wildlife occupancy survey by taking technical guidance from expert for future management of the forest and wildlife of this areas.	20.00	1 No.	20.00
6	**Mitigation of Man-Animal conflict in Bhadradri Circle.**	LS	LS	30.00
7	**Procurement of Safari vehicles (5) Nos for developing Eco-tourism**	20.00	5 No.	100.00
8	**Procurement of Boats for developing Tourism in Kinnerasani lake**	20.00	2 No.	40.00
9	**Renovation of Environmental Education Center (EEC) at Kinnerasani Wildlife Sanctuary**	LS	1 No.	50.00
10 a	**Office and Miscellaneous Expenses in Bhadradri Circle.**	LS	LS	20.00
b	Monitoring cell in Head office Aranya Bhavan	LS	LS	10.00
	Total			**731.60**

The revised Wildlife mitigation plan for an amount of Rs.731.60 Lakhs has been approved and the DFO, Bhadradri is requested to raise a demand notice with a User Agency to deposit the said amount into Adhoc CAMPA account, after the receipt of stage-I approval. The DFO is also requested to furnish year wise APO along with geo-coordinates for taking further necessary action in the matter before implementing the plan.

Sd/- M.C.Pargaien,
Prl. Chief Conservator of Forests (WL)
& Chief Wildlife Warden

To
The DFO, Bhadradri Kothagudem.
Copy to the CCF, Bhadradri Circle for information and necessary action.
Copy to the Prl. Chief Conservator of Forests (FCA) & Nodal Officer for FCA, O/o the PCCF(HoFF), Aranya Bhavan, Hyderabad for information.
Copy to the General Manager, Environment, SCCL Limited, Bhadrachalam Road Rly. Station, Kothagudem – 507 101 for information and necessary action.

// True Copy //

14/2/24

for Prl. Chief Conservator of Forests

ANDHRA PRADESH FOREST DEPARTMENT

KOTHAGUDEM DIVISION

Plantation Journal

GAREEBPETA
C.A. – 2011-12
RAMAVARAM RANGE
AREA: 3.18 Ha.

2414889/2024/FCA SECTION-PCCF

GOVERNMENT OF ANDHRA PRADESH

FOREST DEPARTMENT

Khammam Circle

PLANTATION JOURNAL

OF

2006.

1. Division : Kothagudem
2. Range : Ramavaram
3. Section : Ramavaram
4. Beat : Goreebpeta
5. Panchayat Samithi :
6. Panchayat :
7. Compartment No. :

i) Territorial Division

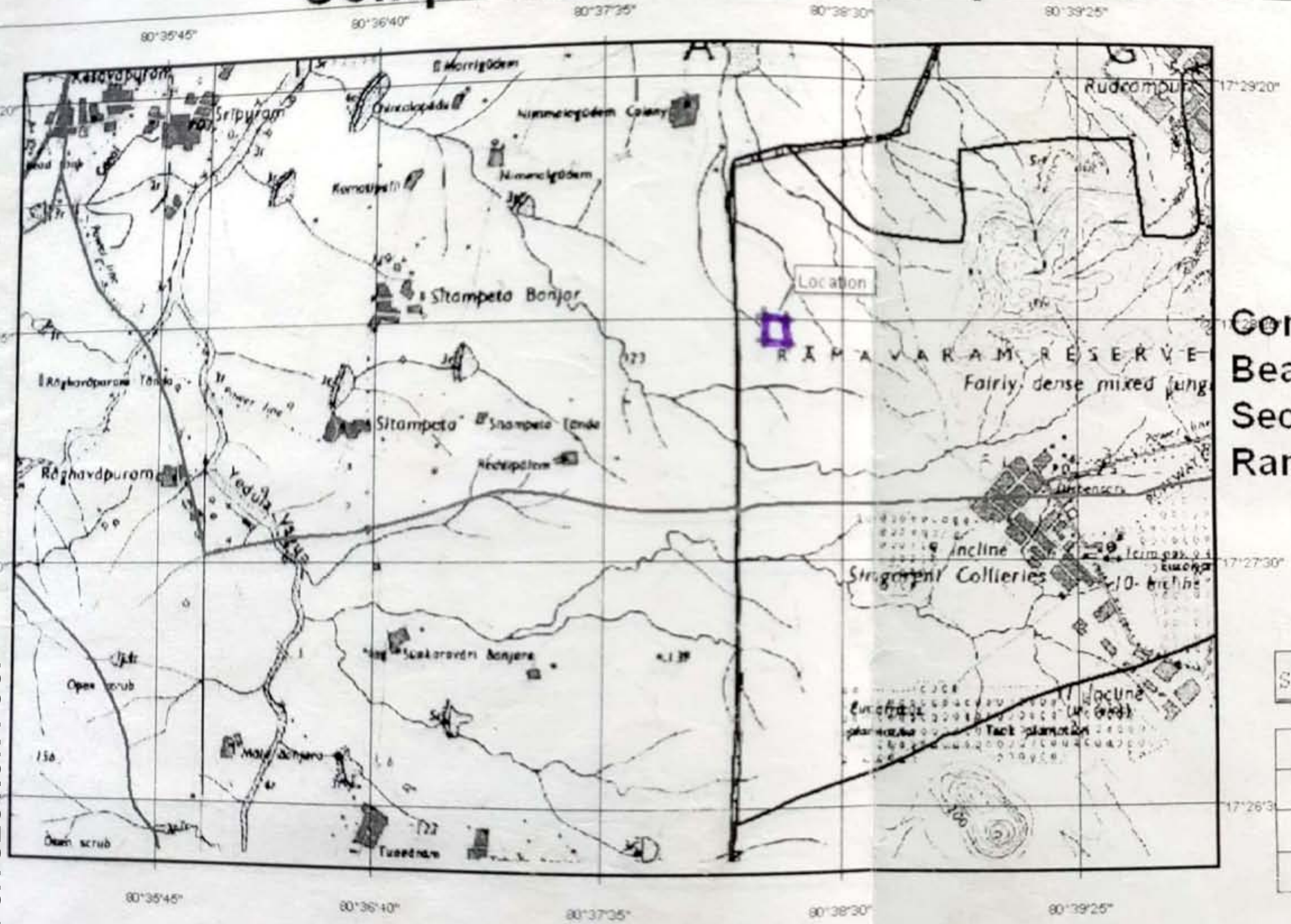
ii) Functional Division

i) Territorial

ii) Functional

Name of the V.S.S. : –
Name of Plantation : CA plantation
Year of Plantation : 2011. AR
Area : 3.18 Ha.
No. of Sectors :

Location map of CA Plantaion in 3.18 Ha in Compt. No.11 of Gareebpeta Beat



N

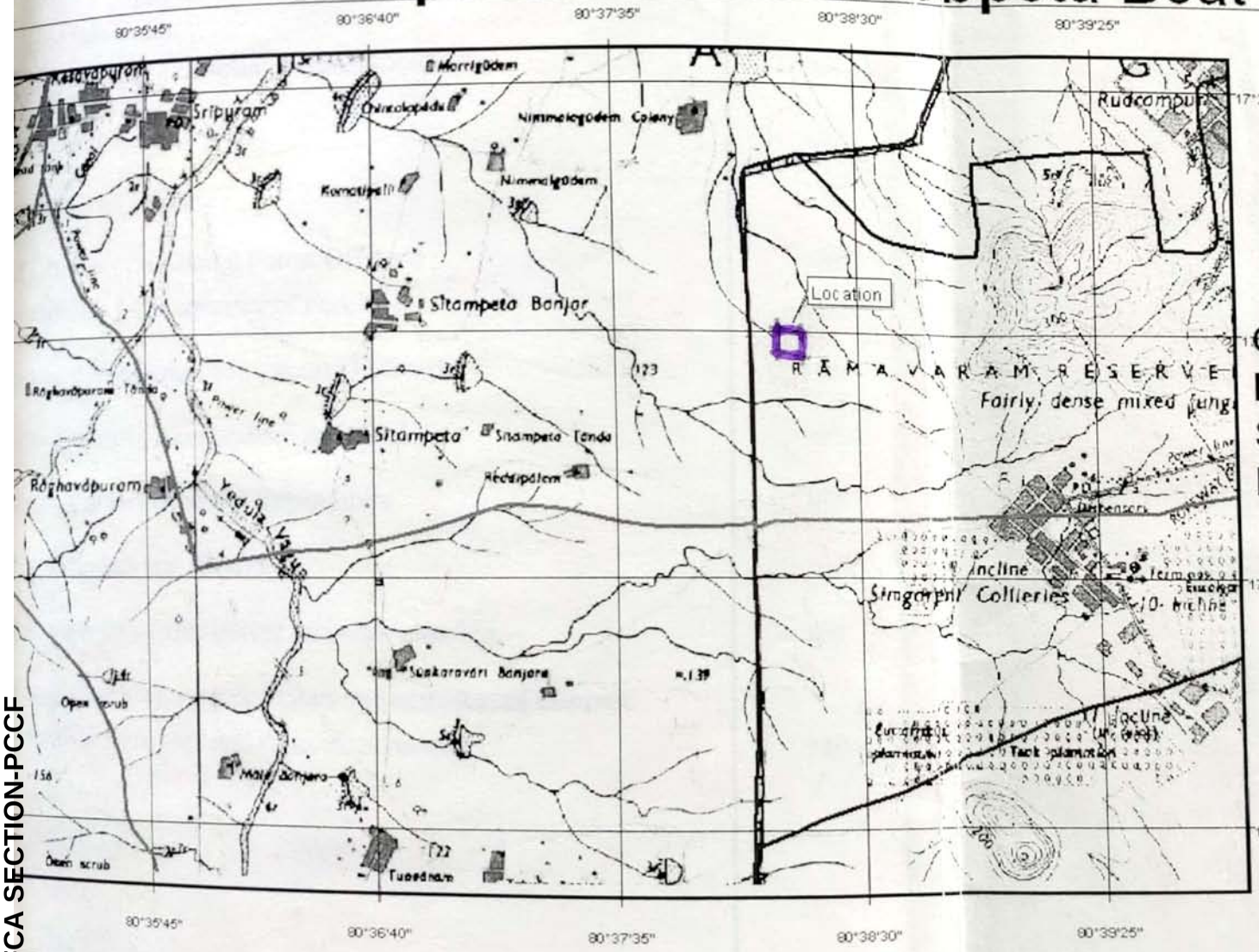
1:40220

Area: 3.18 Ha

Compt No.: 11
Beat :Gareebpeta
Section : Ramavaram
Range : Ramavarm

Sl.No	Lattitude	Longitude
1	17.46645	80.62429
2	17.46810	80.62420
3	17.46839	80.62264
4	17.46674	80.62270

Location map of CA Plantaion in 3.18 Ha in Compt. No.11 of Gareebpeta Beat



Sl.No	Lattitude	Longitude
1	17.46645	80.62429
2	17.46810	80.62420
3	17.46839	80.62264
4	17.46674	80.62270

F.B.O
I/C. Gareebpeta

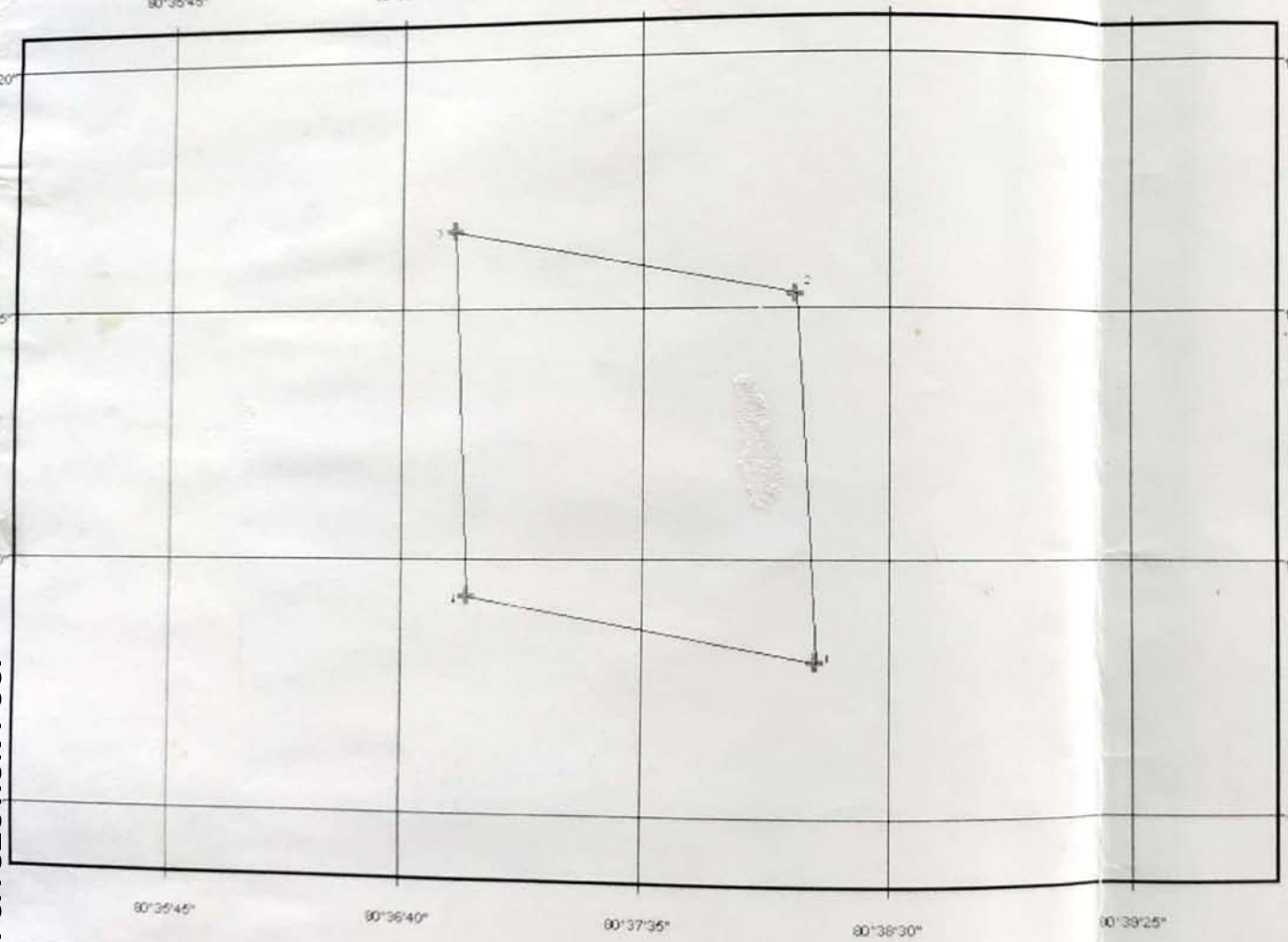
Deputy Range Officer
Ramavaram

Forest Range Officer
Ramavaram.

2414889/2024/FCA SECTION-PCCF

657

Surveyed sketch of CA Plantaion in 3.18 Ha in Compt. No 11 of Gareebpeta Beat



N

1:2816

Area: 3.18 Ha

Compt No.: 11
Beat :Gareebpeta
Section : Ramavaram
Range : Ramavarm

Sl.No	Lattitude	Longitude
1	17.46645	80.62429
2	17.46810	80.62420
3	17.46839	80.62264
4	17.46674	80.62270

F.B.O
I/C. Gareebpeta Beat.

Deputy Range Officer
Ramavaram

Forest Range Officer
Ramavaram.

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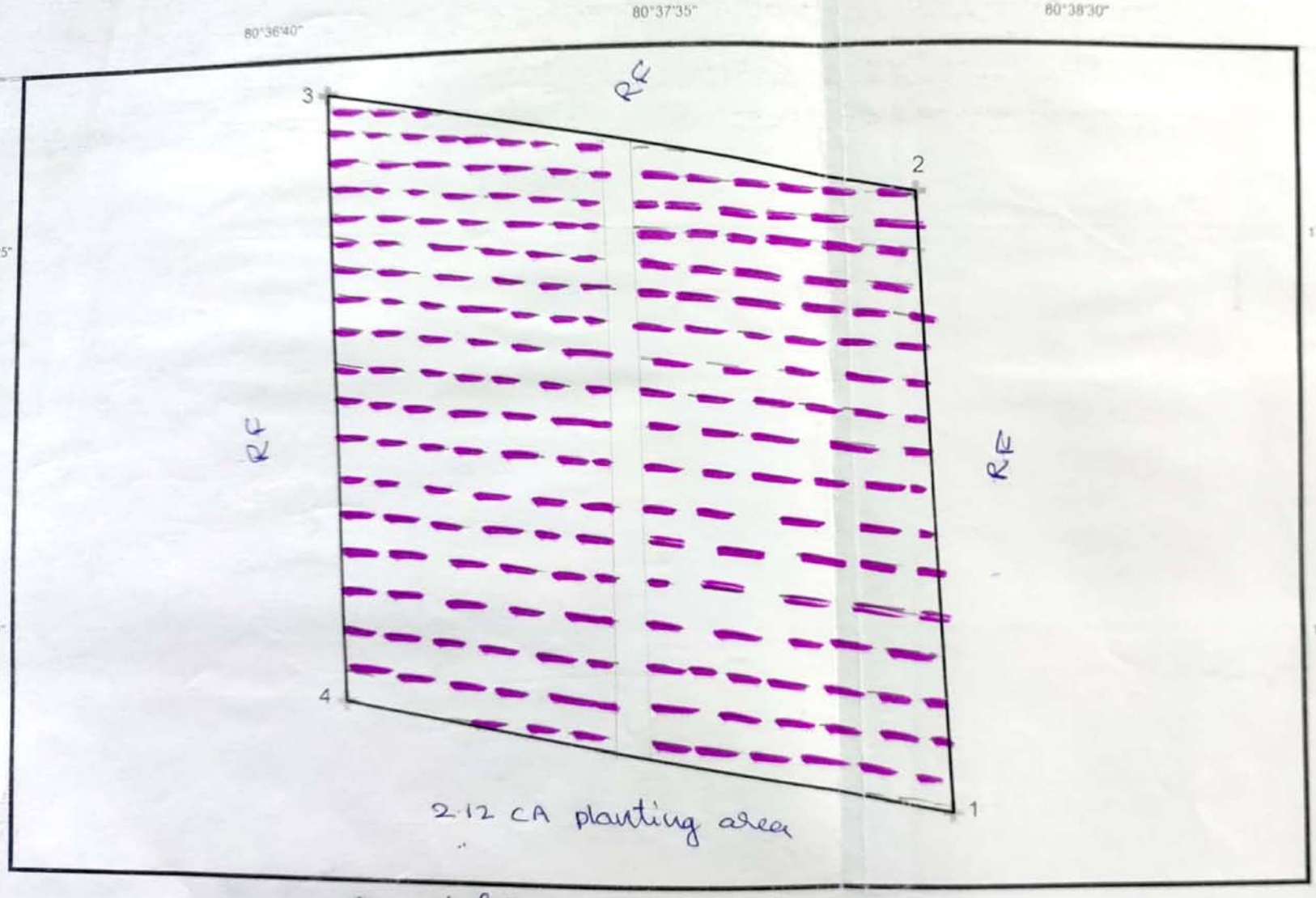
Treatment map of CA Plantation in 3.18 Ha in Compt.No.11 of Gareebpeta Beat



N

1:1662

Gross Area : 3.186 Ha
Net Area : 3.18 Ha

Planting sloap

Cmpt No.:11
Beat : Gareebpeta
Sectiona : Ramavaram
Range : Ramavaram

Sl.No	Latitude	Longitude
1	17.4664	80.6242
2	17.4681	80.6242
3	17.4683	80.6226
4	17.4667	80.6227

80°36'40" 80°37'35" 80°38'30"

Beat I/C. Gareebpeta

IV. DETAILS OF PLANTATION

i) Name of the Reserved Forest/block : Ramavaram RF.

ii) Compartment No. : 11, Gareebpeta Beat.

iii) Name of the series :

iv) Name of the plantation : Gareebpeta C.A plantation

v) Species planted : Eucalyptus

vi) Year of plantation : 2012.

vii) Area in hectares : 3.18 Ha. AR.

viii) Espacement : 3x2

ix) Total No. of planting points : 5247

x) No. of Sectors :

xi) Area/planting points of each sector :

Sector No.	Area	Planting points
I	3.18 Ha	5247
II		
III		
IV		
V		
VI		

V. (a) SCHEME AND AUTHORITY

i. Scheme under which the plantation raised.

ii. G.O. Ms. No. Dated :

iii. Sanctioned estimate No. & amount sanctioned : Rs. 86,000/-

a. Pre-planting year ~~O~~S.O. No. 68 /2011-12/ /date 3.2.12 ~~for~~ Rs.

b. Year of planting : S.O. No. / ,, for Rs.

c. 1st year maintenance : S.O. No. / ,, for Rs.

d. 2nd year maintenance : S.O. No. / ,, for Rs.

e. 3rd year maintenance : S.O. No. / ,, for Rs.

f. 4th year maintenance : S.O. No. / ,, for Rs.

g. Subsequent years : S.O. No. / ,, for Rs.

Note : Copy of estimates to be entered / filed in the plantation journal.

V. (b) AUTHORITY FOR SELECTION OF SITE :

i. Site selected by : K.V.S. Raghava Rao
Forest Range Officer
Ramavaram.

ii. Site approved by :

SOIL SUITABILITY CERTIFICATE

CERTIFIED that I have inspected and selected the site for raising ..... *plantation of* 3.18 *Hec.of* Eucalyptus ..... *Species in* Ganeebpeta ..... *and after ascertaining soil and rainfall requirements. I am satisfied that the site selected is suitable and fit for raising plantation of spieces* .....

DIVISIONAL FOREST OFFICER

Forest Range Officer
Forest Range Officer
Ramavaram.

VI. 2. (b) SOIL DESCRIPTION

(i) PROFILE DIAGRAM :

Eckalyptus plantation

వ్యవసాయ శాఖ - సాయిల్ హెల్త్ కార్డ్

FRO, Ramavaram

5091

20-7-2012

(SCL)
(7.91)
(M)
(21.84)
(11.8)

X 100

VI. 2. (b) SOIL DESCRIPTION

(i) PROFILE DIAGRAM :

Eekalyptus plantation

వ్యవసాయ శాఖ - సాయిల్ హెల్త్ కార్డ్

భూసార పరీక్ష ఫలితాలు (సూక్ష్మపోషక పదార్థములతో సహా) మరియు ఎరువుల సిఫారసు

భూసార పరీక్ష కేంద్రము : ఖమ్మం
నమూనా సంఖ్య 5091 తేది 20-7-2012
రైతు పేరు F.R.O, Ramavaram గ్రామము Ramavaram సర్వే నెం.
మండలం Kothagudem జిల్లా : ఖమ్మం.

I. 1. నేల స్వభావము	(SCL)	తేలిక నేలలు	మధ్యరకపు నేలలు	బరువు నేలలు
2. ఉదజని సూచిక (పి.హెచ్.)	(7.91)	ఆమ్లము	తటస్థము	అల్ప/మధ్య/అధిక క్షారము
3. లవణ సూచిక (ఇ.సి.)	(0.085)	సామాన్యం	మొలకెత్తుట కష్టం	పంటలకు హానికరం
4. సేంద్రియ కర్బనము (ఓ.సి.)	(M)	తక్కువ	మధ్యస్థము	ఎక్కువ
5. లభ్య భాస్వరము(పి) కి.గ్రా/ఎ.	(21.84)	తక్కువ	మధ్యస్థము	ఎక్కువ
6. లభ్య పొటాష్ (కె) కి.గ్రా/ఎ.	(111.8)	తక్కువ	మధ్యస్థము	ఎక్కువ
7. లభ్య జింకు (పి.పి.యం.)	(-)	తక్కువ	ఎక్కువ	
8. లభ్య మాంగనీసు (పి.పి.యం.)	(-)	తక్కువ	ఎక్కువ	
9. లభ్య ఇనుము (పి.పి.యం.)	(-)	తక్కువ	ఎక్కువ	
9. లభ్య రాగి (పి.పి.యం.)	(-)	తక్కువ	ఎక్కువ	

వేయవలసిన పైరు .....వంగడము .....ఖరీఫు/రబీ

II. పైరుకు అవసరమైన పోషక పదార్థములు	సిఫారసు చేయబడిన పోషక పదార్థము	స్థానికంగా లభ్యమగు ఎరువుల మోతాదు
1. సేంద్రియపు ఎరువులు ట/ఎ	.....	.....
2. నత్రజని కి.గ్రా/ఎ.	..... అమోనియం సల్ఫేట్.....యూరియా.....పి.ఎ.ఎస్.....కాంప్లెక్స్ ఎరువులు.....	
3. భాస్వరము (పి) కి.గ్రా/ఎ,	..... సూపర్ ఫాస్ఫేట్ .....డి.ఎ.పి. ..... కాంప్లెక్స్ ఎరువులు	
4. పొటాష్ (కె) కి.గ్రా/ఎ.	..... మ్యూరేట్ ఆఫ్ పొటాష్ .....కాంప్లెక్స్ ఎరువులు	

లభ్యతను బట్టి వివిధ రసాయనిక ఎరువులను వాడవచ్చును
పైన సూచించిన వాటికి బదులుగా ఇతర రసాయనిక ఎరువులు వాడవలసి వచ్చినప్పుడు పాటించవలసిన సమీకరణ.

వాడవలసిన ఎరువు మోతాదు కి./ఎ. = $\frac{\text{సూచించిన పోషక పదార్థము మోతాదు కి.గ్రా ఎకరాకు}}{\text{ఎరువు నంచి మీద సూచించిన పోషక విలువ}} \times 100$

2414889/2024/FCA SECTION-PCCF

E.P. Plantation in CA-Gareebpeta during 2012-13

Beat & Section	: Gareebpeta & Ramavaram
Range & Division	: Ramavaram & Kothagudem
VSS Formation	:
Compt No.	: 11
Reserve Forest	: Ramavaram
Area of Plantation	: 3.18 Ha.
Year of the Plantation	: 2012-13
Scheme	: CA (SZA)
Species Planted	: Eucalyptus (Clone-7)
Period of Planting	: 14-07-2012 to 16-07-2012
Model	: Semi Mechanical Method
Espacement	: 2M X 3M
No.of Planting Points	: 5247 Nos
S.O.No. & Date	: DSO No.6/2012-13, dt: 22-06-2012
Estimated Cost	: 65,000/-
Expenditure up to 7/2012	: 26,704/-
Name of the Chair person	: ---
Name of the Vice Chair person	: ---

Forest Range Officer,
Ramavaram