

Dr. Nitin S. Wagh

Executive Director (E&S)

MAHAGENCO

Maharashtra State Power Generation Co. Ltd.

Ref: ED (E&S and GP)/ GP-II/FC –I compliance/529

Date:09.12.2022

To,
The Divisional Forest Officer (DFO),
Raigarh Forest Division,
Chandra Nagar Colony, Kelo Vihar,
Raigarh -496001.

Sub: Diversion of Forest land for non-forest purpose under Forest Conservation Act,1980 proposed for Gare Palma Sector II Coal block allocated to Maharashtra State Power Generation Company Limited (Mahagenco) Coal block is located in Mand Raigarh Coal field of Raigarh District, Chattisgarh – 214.869 ha- **submission of Stage I Compliance as per MOEF & CC letter no 8-06/2022- FC dated 02nd June 2022 reg.**

Ref :

1. MOEF & CC letter no. file No 8-06/2022-FC dated 02.06.2022.
2. PCCF letter no. 331-229-1279 dated 09.06.2022
3. DFO Raigarh letter no.3551/2022 dated 20.06.2022.
4. DFO, Raigarh letter no.4705, dated.15.09.2022

Dear Sir,

This is with reference to your letter cited in ref. (3), wherein you have directed to fulfill the compliance stated in Forest Stage I clearance as per the directive of MoEF & CC letter dated 02.06.2022. We would like to submit that all the compliance stated in Part A & B for Forest stage I clearance has been completed.

We hereby submit the 4 set of compliance reports/letter & undertaking at your good office.

Pointwise reply and documents status is appended below: -

Part- A- Compliance which need to be complied prior to handing over of Forest land by the State Forest Department and compliance is to be submitted prior to stage II clearance		
Sr. No.	Condition	Compliance status
1 (i)	The Compensatory afforestation over equivalent non-forest land, shall be raised by the State Forest Department at the project cost. At least 1000 saplings per ha shall be planted over admissible CA land. If this not possible to plant these many seedlings in the identified NFL, the balance seedlings will be planted in degraded forest land as per the prescription of the Working Plan at the cost of the User Agency. Detail of such degraded forest land proposed for afforestation of surplus trees shall be submitted to the Ministry before Stage-II approval along with afforestation scheme, suitability certificate, KML files, etc. In such cases CA cost will be revised and duly approved by the competent	Total amount of Rs. 49,49,62,910/- have been deposited to the State CAMPA account no. 150645820495861 through UTR no. MAHBR52022081812655497 as per demand note received from DFO Office dated 20 th June 2022 including cost of compensatory afforestation of Rs. 18,88,24,084 over 214.938 ha of non-forest land (Copy of Challan enclosed as Annexure-I).



	authority and deposited online in the CAF managed by the CAMPA.	
1 (ii)	25% of the CA cost additionally will be spent towards soil and moisture conservation activities in the proposed CA area as per site requirement and deposited in CAF	Total amount of Rs. 49,49,62,910/- have been deposited to the State CAMPA account no. 150645820495861 through UTR no. MAHBR52022081812655497 as per demand note received from DFO Office dated 20 th June 2022 including 25% cost of CA scheme for soil and moisture conservation of Rs. 4,72,06,021 (Copy of Challan enclosed as Annexure-I).
1 (iii)	The cost of compensatory afforestation at the prevailing wage rates as per compensatory afforestation scheme and the cost of survey, demarcation and erection of permanent pillars, if required on the CA land, shall be deposited in advance with the Forest Department by the user agency. The CA will be maintained for 10 years. The scheme may include afforestation of indigenous species with appropriate provision for anticipated cost increase for works scheduled for subsequent years	Total amount of Rs. 49,49,62,910/- have been deposited to the State CAMPA account no. 150645820495861 through UTR no. MAHBR52022081812655497 as per demand note received from DFO Office dated 20 th June 2022 including cost of compensatory afforestation of Rs. 18,88,24,084 over 214.938 ha of non-forest land (Copy of Challan enclosed as Annexure-I).
1 (iv)	The non-forest land identified for CA shall be transferred and mutated in favour of the State Forest Department and subsequently notified by the State Government as RF under Section -4 or PF under Section-29 of the Indian Forest Act, 1927 or under the relevant Section(s) of the local Forest Act before Stage-II approval. A copy of the final Notification shall be submitted along with the compliance of Stage-I approval	Total 214.938 ha of non-forest land identified for CA scheme in three villages namely Natwarpur, Bangurasiya & Chakradharpur of Raigarh District (total 142 plots) has been mutated in favour of the State Forest Department vide Mutation order no. CG6208622072022003 dated 22 nd August. Details have been forwarded by APCCF (LM & FC) to Principal Secretary, Forest & Climate Change Department, Government of Chhattisgarh vide letter dated 12 th September 2022 (Copy enclosed as Annexure-IIA). Further, CA land notification as RF/PF has been approved by State Forest Department & same is under notification. Undertaking



		<i>for the same is enclosed as Annexure-II B.</i>															
2.	The KML files of diverted area, the CA areas, the proposed SMC treatment area and the WLMP area shall be uploaded on the e-Green watch portal with all requisite details prior to Stage II approval.	Same shall be done by State Forest Department.															
3.	The User Agency shall transfer online, the Net Present Value (NPV) of the forest land being diverted under this proposal, as per the guidelines issued by this Ministry vide its letters No. 5-3/2011-FC (Vol.) dated 06.01.2022 read with letter dated 22.03.2022. The requisite funds shall be transferred through online portal into National Authority (CAMP A) account of the State Concerned; new NPV guidelines	Total amount of Rs. 49,49,62,910/- have been deposited to the State CAMP A account no. 150645820495861 through UTR no. MAHBR52022081812655497 as per demand note received from DFO Office dated 20th June 2022 including cost of Net Present Value (NPV) of Rs. 23,28,06467 (<i>Copy of Challan enclosed as Annexure-f).</i>															
4.	Compensatory levies to be realized from the User Agency under the project shall be transferred/ deposited, through e-challan, into the account of CAMP A pertaining to the State concerned through e portal (https://parivesh.nic.in);	Total amount of Rs. 49,49,62,910/- have been deposited to the State CAMP A account no. 150645820495861 through UTR no. MAHBR52022081812655497 as per demand note received from DFO Office dated 20 th June 2022, as per details below- <table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Particulars</th> <th>Amount (Rs.)</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Compensatory Afforestation</td> <td>18,88,24,084/-</td> </tr> <tr> <td>2.</td> <td>Soil & Moisture Conservation</td> <td>4,72,06,021/-</td> </tr> <tr> <td>3.</td> <td>Safety Zone CA</td> <td>2,61,26,338/-</td> </tr> <tr> <td>4.</td> <td>NPV</td> <td>23,28,06,467/-</td> </tr> </tbody> </table> <p>(<i>Copy of Challan enclosed as Annexure-f).</i></p>	Sr. No.	Particulars	Amount (Rs.)	1.	Compensatory Afforestation	18,88,24,084/-	2.	Soil & Moisture Conservation	4,72,06,021/-	3.	Safety Zone CA	2,61,26,338/-	4.	NPV	23,28,06,467/-
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3.	Safety Zone CA	2,61,26,338/-															
4.	NPV	23,28,06,467/-															
5.	Mine is located close to Kelo River flowing in the area. Numbers of mines are operational in the area which may cause threat to hydrological regime viz. Kelo river and its rivulet, therefore, a study to assess the hydrological regimes and cumulative impact of mining and industrial activities being undertaken in the Gare Pelma area, on the hydrological regimes of area shall be undertaken in consultation with the Water Resource Department and the same shall be submitted along with considered opinion of Water Resource Department of the State	A detailed study to assess the hydrological regimes and cumulative impact of mining and industrial activities was undertaken by M/s Srushti Seva Private Limited in consultation with Water Resource Department (<i>Copy enclosed as Annexure-III-A</i>). Report was submitted to Water Resource Department; Govt. of Chhattisgarh vide letter dated 19 th July 2022. Same was approved by Water Resource Department vide its letter dated 2 nd December 2022 (<i>Copy enclosed as</i>															



	<p>before Stage-II approval. Recommendation to be made in the study shall be implemented by the State from the funds to be realized from the agencies, on pro rata basis, working in the area. The user agency shall also keep adequate area, as per the guidelines of DGMS (Director General of Mine Safety), along the bank of River Kelo as intact and no mining should be carried out in this area. Embankment should be constructed to ensure protection of river and its hydrology from the mining</p>	<p><u>Annexure-III-B</u>. An undertaking for protection of river and construction of embankment was also submitted to DFO (<u>Copy enclosed as Annexure-III-C</u>).</p>
6.	<p>A Soil and Moisture Conservation (SMC) work plan to mitigate the impact of the proposed mining activity on the local rivulets (nallah) shall be prepared by the user agency in consultation with the State Forest Department and the same shall be submitted along with Stage-I compliance. Cost of implementation of the provisions of the said Plan will be deposited into the CAMPA and the same shall be intimated to the Ministry before Stage-II approval.</p>	<p>A Soil and Moisture Conservation (SMC) work plan to mitigate the impact of the proposed mining activity on the local rivulets (nallah) was prepared by M/s Srushti Seva Private Limited in consultation with Forest Department (<u>Copy enclosed as Annexure-IV-A</u>) having a estimated cost of Rs. 42,07,127. An additional amount of Rs. 4,00,67,127 including Rs. 42,07,127 for Soil Moisture Conservation was deposited in CAMPA vide UTR no. BKIDA22291932229 dated 18th October 2022 (<u>Copy of the challan enclosed as Annexure-IV-B</u>).</p>
7	<p>Final Mining Plan, after rectifying the detail of forest area involved in the mining leases and being approved under the Forest (Conservation) Act, 1980, shall be submitted to the Ministry before Stage-II approval</p>	<p>MAHAGENCO vide its letter dated 27th June 2022 submitted intimation to Coal Controller Organisation (CCO), Ministry of Coal regarding minor change in land type within the leased area in the approved mining & mine closure plan as per forest proposal (<u>Copy enclosed as Annexure-V-A</u>) with Board Approval.</p> <p>Acknowledgment of the same was submitted to DFO vide letter dated 11th August 2022 (<u>Copy of the letter enclosed as Annexure-V-B</u>).</p>



8	<p>Area of green belt proposed by the user agency should be increased to cover maximum possible area under the green belt in the lease area of the agency and a report containing the detail of areas proposed to be kept as green belt should be submitted before Stage-II approval</p>	<p>Details of proposed greenbelt was submitted to DFO vide letter dated 11th August 2022 (<i>Copy enclosed as Annexure-VI</i>). Total Green belt of 36.07 Ha land will be developed in initial 5 years of mine operation. Proposed greenbelt details are mentioned below-</p> <table border="1"> <thead> <tr> <th>Particulars</th> <th>Area (Ha)</th> </tr> </thead> <tbody> <tr> <td>Along the lease boundary</td> <td>19.7</td> </tr> <tr> <td>Along the embankment of Kelo river</td> <td>16.37</td> </tr> <tr> <td>Back fill Dump area Reclamation</td> <td>2025.77</td> </tr> <tr> <td>Dump Area reclamation</td> <td>194.76</td> </tr> <tr> <td>Total greenbelt area end of mine life</td> <td>2256.6</td> </tr> </tbody> </table>	Particulars	Area (Ha)	Along the lease boundary	19.7	Along the embankment of Kelo river	16.37	Back fill Dump area Reclamation	2025.77	Dump Area reclamation	194.76	Total greenbelt area end of mine life	2256.6
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Along the lease boundary	19.7													
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Dump Area reclamation	194.76													
Total greenbelt area end of mine life	2256.6													
9.	<p>Following activities, as per approved plan / schemes, shall be undertaken in the lease area by the User Agency under the supervision of the State Forest Department. Approved scheme/plan shall be submitted to the Ministry along with compliance of Stage-I approval: -</p> <ol style="list-style-type: none"> i. Mitigative measures to minimize soil erosion and choking of stream shall be implemented within a period of three year with effect from the issue of Stage-II clearance in accordance with the approved Plan in consultation with the State Forest Department. ii. Planting of adequate drought hardy plant species and sowing of seeds, in the appropriate area within the mining lease to arrest soil erosion in accordance with the approved scheme; iii. Construction of check dams, retention /toe walls to arrest sliding down of the excavated material along the contour in accordance with the approved scheme; iv. Stabilize the overburden dumps by appropriate grading/benching, in accordance with the approved scheme, so as to ensure that angles of repose at any given place is less than 280. v. No damage shall be caused to the topsoil and the user agency will follow the topsoil management plan. 	<p>An undertaking for implementation of soil erosion and other measures have been submitted to DFO (<i>Copy enclosed as Annexure-VII</i>).</p>												



10.	User agency either himself or through the State Forest Department shall undertake gap planting and soil & moisture conservation activities to restock and rejuvenate the degraded open forests (having crown density less than 0.40), if any, located in the area within 100 meters from outer perimeter of the mining lease. The plan for plantation and SMC activities will be prepared and submitted to MoEF &CC before Stage-II Clearance.	As per comments received from Range Officer, Tamnar Range, Compartment no. 732 P, 740 P, 741 P, & 744 P & 745 P located within 100 meters from outer perimeter of the mining lease area of Gare Pelma-II are having crown density 0.4 or more than 0.4 & remaining area is falling within mining lease area of other Coal Blocks, hence, there is no need of gap plantation and soil & moisture conservation activities (<u><i>Copy of the comments of Range Officer with maps of the compartments enclosed as Annexure-VIII</i></u>).
11.	The User Agency shall prepare a list of existing village tanks and other water bodies with GPS co-ordinates located within five km from the mine lease boundary. This list is to be duly verified by the concerned Divisional Forest Officer. The User Agency shall regularly undertake desilting of these village tanks and other water bodies so as to mitigate the impact of siltation of such tanks/water bodies. A detailed approved plan for desilting of identified ponds and water bodies to be prepared in consultation with forest department and shall be submitted to MoEF &CC before Stage-II approval.	Mahagenco submitted the Report on Scheme for De-siltation of Village tanks and other Water Bodies within 5 kms radius in GP-II Coal Mine along KML of all ponds prepared by domain consultant – M/s Srushti Seva Private Limited to DFO (<u><i>Copy enclosed as Annexure-IX</i></u>).
12.	<p>Safety Zone Management: Following activities, at project cost, shall be undertaken by the user agency for the management of safety zone as per relevant guidelines issued by the Ministry's guidelines: -</p> <ol style="list-style-type: none"> User agency shall ensure demarcation of safety zone (7.5-meter strip all along the inner boundary of the mining lease area), and its fencing, protection and regeneration by erecting adequate number of 6 feet high RCC boundary pillars inscribed with DGPS coordinates with barbed wire fencing and deploying adequate number of watchers under the supervision of the State Forest Department. Boundary of the safety zone of the mining lease, adjacent to habitation/roads, should be properly fenced by the user agency. Safety zone shall be maintained as green belt around mining lease and to ensure dense canopy in the area, regeneration shall be taken up in this area by the user agency at project cost under the 	<p>Undertaking for safety zone management for point (i), (ii), (iii) & (v) was submitted to DFO (<u><i>Copy enclosed as Annexure-X</i></u>).</p> <p>Total amount of Rs. 49,49,62,910/- have been deposited to the State CAMPA account no. 150645820495861 through UTR no. MAHBR52022081812655497 as per demand note received from DFO Office dated 20th June 2022 including cost of CA in lieu of safety zone amounting to Rs. 2,61,26,338 for undertaking CA by State Forest Department in compliance to condition no. 12 (iv) (<u><i>Copy of the challan enclosed as Annexure-I</i></u>).</p>



	<p>supervision of the State Forest Department.</p> <p>iv. Afforestation on degraded forest land to be selected elsewhere, measuring one and a half times the area under safety zone, shall also be done at the project cost under the supervisions of the State Forest Department. The degraded forest land (DFL) so selected will be informed to the MoEF & CC with shape files before Stage-II approval and afforestation will be done within three years from the date of Stage-II clearance and maintained thereafter in accordance with the approved Plan in consultation with the State Forest Department.</p> <p>v. The State Government and the user agency shall ensure that safety zone is maintained as per the prescribed norms.</p>	
13.	The cost of felling of trees shall be deposited by the User Agency with the State Forest Department	Undertaking regarding deposition of cost of tree felling is submitted to DFO Office (<u>Copy enclosed as Annexure-XI</u>)
14.	Elephant/Wildlife Management Plans should be revised and prepared keeping in view the locality factors, occurrence of wildlife, management interventions required for areas. State Government may also get the revised Plan verified by an institute of repute. Cost of implementation of the Plan so finalized shall be deposited into State CAMPA and detail of the same along with approved Plan shall be submitted to the Ministry before Stage-II approval	<p>Wildlife Conservation Plan of Rs. 3,58,60,000 was approved by PCCF (Wildlife) vide its letter dated 20th January 2021. Same was deposited to IIFM, Bhopal vide letter dated 24th June 2022. IIFM, Bhopal submitted its Chapter-wise comments vide its letter dated 11th August 2022 (<u>Copy of comments of IIFM, Bhopal enclosed as Annexure-XII-A</u>) without any increase in the amount of the Plan. Comments along-with approved Wildlife Conservation Plan was submitted to DFO vide letter dated 22nd August 2022 (<u>Copy enclosed as Annexure-XII-B</u>).</p> <p>An additional amount of Rs. 4,00,67,127 including Rs. 3,58,60,000 for implementation of Wildlife Conservation Plan was deposited in CAMPA vide UTR no. BKIDA22291932229 dated 18th October 2022 (<u>Copy of the challan enclosed as Annexure-IV-B</u>).</p>



15	State Government shall complete settlement of rights, in term of the Scheduled Tribes and Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, if any, on the forest land to be diverted and submit the documentary evidence, along with compliance of Stage-I approval, as prescribed by this Ministry's letter No. 11-9/1998-FC (Pt.) dated 03.08.2009 read with 05.07.2013, in support thereof;	Copy of Settlement of Forest Rights documents enclosed as <u>Annexure-XIII</u> .
16	Proposal involves displacement from non-forest land. A copy of approved R&R plan, prepared in consonance with the R&R policy of the State, shall be submitted along with the compliance of Stage-I approval. It shall be ensured that no rehabilitation is proposed on the forest land.	Approved R&R Plan enclosed as <u>Annexure-XIVA</u> . Undertaking regarding no R&R over forest land enclosed as <u>Annexure-XIV-B</u> .
17	The compliance report shall be uploaded on e-portal (https://parivesh.nic.in/).	Compliance Report of the Stage-I FC shall be uploaded at Parivesh Portal.

Part B- Conditions which need to be complied on field after handing over of forest land to the user agency by the State Forest Department but the compliance in form of undertaking shall be submitted prior to Stage II approval

1.	Legal status of the diverted forest land shall remain unchanged;	Agreed. (<u>Undertaking attached as Annexure-XV</u>).
2.	At the time of payment of the Net Present Value (NPV) at the present rate, the user agency shall furnish an undertaking to pay the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India;	Agreed. (<u>Undertaking attached as Annexure-XVI</u>).
3.	Trees should be felled in phased manner as per the requirement in the approved Mining Plan with prior permission of concerned DFO;	Noted. Undertaking for the same attached as <u>Annexure-XVII</u> .
4.	The user agency shall explore the possibility of translocation of maximum number of trees identified to be felled and shall ensure that any tree felling shall be done only when it is unavoidable and that too under strict supervision of the State Forest Department;	Agreed. Undertaking regarding same attached as <u>Annexure-XVIII</u> .
5.	The User Agency shall comply with the Hon'ble Supreme Court order on re-grassing, and re-grass the mining area and any other areas which may have been disturbed due to mining to restore them to a condition which is fit for growth of fodder, flora, fauna, etc. in a timely manner;	Agreed. Undertaking regarding attached as <u>Annexure-XIX</u> .



6.	The User Agency shall undertake mining in a phased manner after taking due care for reclamation of the mined over area. The concurrent reclamation plan as per the approved mining plan shall be executed by the User Agency from the very first year, and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, in the concerned State Government and the concerned Regional Office of the Ministry. If it is found from the annual report that the activities indicated in the concurrent reclamation plan are not being executed by the User Agency, the Nodal Officer or the concern Addl. Principle Chief Conservator of Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities area satisfactorily executed.	Undertaking regarding same attached as Annexure-XX .
7.	Period of diversion of the said forest land under this approval shall be for a period co-terminus with the period of the mining lease proposed to be granted under the Mines and Minerals (Development and Regulation) Act, 1957, as amended and the Rules framed there-under;	Undertaking regarding the same attached as Annexure-XXI
8.	The User Agency shall obtain the Environment Clearance as per the provisions of the Environmental (Protection) Act, 1986, if required;	Complied. Environmental Clearance granted by MoEF&CC vide letter dated 11 th July 2022 (Copy enclosed as Annexure-XXII).
9.	No labour camp shall be established on the forest land and the User Agency shall provide fuels preferably alternate fuels to the labourers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas;	Noted. Undertaking regarding the same attached as Annexure-XXIII .
10.	The boundary of the diverted forest land, mining lease and safety zone, as applicable, shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, distance from pillar to pillar and GPS coordinates;	Noted. Undertaking regarding the same attached as Annexure-XXIV .
11.	The layout plan of the mining plan/ proposal shall not be changed without the prior approval of the Central Government and the forest land shall not be used for any purpose other than that specified in the proposal;	Noted. Undertaking regarding the same attached as Annexure-XXV .
12.	The forest land proposed to be diverted shall under no circumstances be transferred to any other agency, department, or person without prior approval of the Central Government;	Noted. Undertaking regarding the same attached as Annexure-XXVI .



13.	No damage to the flora and fauna of the adjoining area shall be caused;	Agreed. Undertaking regarding the same attached as Annexure-XXVII.
14.	The User Agency shall submit the annual self-compliance report in respect of the above stated conditions to the State Government, concerned Regional Office and to this Ministry by the end of March every year regularly;	Agreed. Undertaking regarding the same attached as Annexure-XXVIII.
15.	Any other condition that the concerned Regional Office of this Ministry may stipulate with the approval of competent authority in the interest of conservation, protection, and development of forests & wildlife; and	Agreed. Undertaking regarding the same attached as Annexure-XXIX.
16.	The user agency shall comply all the provisions of all Acts, Rules, Regulations, Guidelines, Hon'ble Court Order (s) and NGT Order (s) pertaining to this project, if any, for the time being in force, as applicable to the project.	Agreed. Undertaking regarding the same attached as Annexure-XXX.
17.	Violation of any of these conditions will amount to violation of Forest (Conservation) Act, 1980 and action would be taken as prescribed in para 1.21 of Chapter 1 of the Handbook of comprehensive guidelines of Forest (Conservation) Act, 1980 as issued by this Ministry's letter No. 5-2/2017-FC dated 28.03.2019.	Agreed. Undertaking regarding the same attached as Annexure-XXXI.

In view of the above stated compliance standards, it is requested to kindly acknowledge the same and expedite in processing the Forest Stage II approval so that Forest Clearance can be obtained from the competent authority and GP II Coal Mine can be operationalized on for before committed timeline of Oct- 2023.

With Regards,

Your Sincerely,

Executive Director (E&S and GP)

Annexure: Enclosed as Above.

Copy to:

1. Principal Chief Conservator of Forest, Raipur, C.G.
2. Chief Conservator of Forest, Bilaspur, C.G.



AGENCY COPY

यूनियन बँक  **Union Bank**
of India

NEFT / RTGS CHALLAN for CAMPA Funds
Date : 17-08-2022

Agency Name.	MAHARASHTRA STATE POWER GENERATION CORPORATION LTD
Application No.	5820495861
MoEF/SG File No.	8-06/2022-FC
Location.	CHATTISGARH
Address.	MSPGCL, 2ND FLOOR, PRAKASHGAD BUILDING, G-9, PROF. ANANT KANEKAR MARG, BANDRA (E) MUMBAI/Mumbai City
Amount(in Rs)	494962910/-


Amount in Words :Forty-Nine Crore Forty-Nine Lakh Sixty-Two Thousand Nine Hundred and Ten Rupees Only

NEFT/RTGS to be made as per following details;

Beneficiary Name:	CHATTISGARH CAMPA
IFSC Code:	UBIN0996336
Pay to Account No.	150645820495861 Valid only for this challan amount.
Bank Name & Address:	Union Bank Of India Lodhi Complex Branch, Block 11,CGO Complex, Phase I, Lodhi Road, New Delhi -110003

• This Challan is strictly to be used for making payment to CAMPA by NEFT/RTGS only

BANK COPY

यूनियन बँक  **Union Bank**
of India

NEFT / RTGS CHALLAN for CAMPA Funds
Date : 17-08-2022

Agency Name.	MAHARASHTRA STATE POWER GENERATION CORPORATION LTD
Application No.	5820495861
MoEF/SG File No.	8-06/2022-FC
Location.	CHATTISGARH
Address:	MSPGCL, 2ND FLOOR, PRAKASHGAD BUILDING, G-9, PROF. ANANT KANEKAR MARG, BANDRA (E) MUMBAI/Mumbai City
Amount(in Rs)	494962910/-

Amount in Words :Forty-Nine Crore Forty-Nine Lakh Sixty-Two Thousand Nine Hundred and Ten Rupees Only

NEFT/RTGS to be made as per following details;

Beneficiary Name:	CHATTISGARH CAMPA
IFSC Code:	UBIN0996336
Pay to Account No.	150645820495861 Valid only for this challan amount.
Bank Name & Address:	Union Bank Of India Lodhi Complex Branch, Block 11,CGO Complex, Phase I, Lodhi Road, New Delhi -110003

• This Challan is strictly to be used for making payment to CAMPA by NEFT/RTGS only

After making successful payment, User Agencies may send a line of confirmation through
Email: helpdeskampa@corpbank.co.in

Note:After making the required payment through challan, if the payment status has not been updated even after 7 working days, then kindly mail a copy of your challan with transaction date to
Email: cb0371@unionbankofindia.com

Print

Back

Chr NO. - MAHBR 5202 2081812655497



Online payment history table by their approval status

Sl. No.	Request Detail	Application No.	Applicant Name	Date of Payment	Amount to be Paid	Mode of Payment	Payment Status	Payment Detail	Request Status
1	Forest Clearance	123456789	ABC Ltd	10/10/2023	₹ 27,50.00	Bank Transfer	Paid	Bank Name: State Bank of India Branch: New Delhi Account No: 1234567890 IFSC: SBIN0012345	Completed





कार्यालय प्रधान मुख्य वन संरक्षक एवं वन बल प्रमुख, छत्तीसगढ़
अरण्य भवन, सेक्टर-19, नार्थ ब्लॉक, कैपिटल कॉम्प्लेक्स, नवा रायपुर, अटल नगर - 492002
(अपर प्रधान मुख्य वन संरक्षक - भू-प्रबंध)

दूरभाष: 0771 - 2512840

ई-मेल: apcef-lm.cg@gov.in

क्र./भू-प्रबंध/खनिज/331-245/2056

रायपुर, दिनांक 25/09/2022

प्रति,

प्रमुख सचिव

छत्तीसगढ़ शासन, वन एवं जलवायु परिवर्तन विभाग
मंत्रालय, महानदी भवन
नवा रायपुर, अटल नगर

विषय:- Diversion of forest land for non-forestry use under Forest Conservation Act, 1980 Proposed for Gare Palma Sector -II Coal Block has been allotted to Maharashtra State Power Generation Company Limited (MAHAGENCO) Coal block is located in the Mand Raigarh coaldfield of Raigarh district, Chhattisgarh area - 214.869 ha. - regarding.

पंजीयन क्रमांक:- FP/CG/MIN/20495/2016

- संदर्भ:- 1. भारत सरकार, पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, नई दिल्ली का पत्र F.No. 8-06/2022 FC दिनांक 02.06.2022
2. मुख्य वन संरक्षक, बिलासपुर वृत्त का पत्र क्रमांक/ तक/ 6178 दिनांक 26.08.2022
× × × × ×

विषयांतर्गत संदर्भित पत्रों का अवलोकन करने का कष्ट करें।

संदर्भ पत्र-1 माध्यम से प्रकरण में भारत सरकार, पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, नई दिल्ली के पत्र दिनांक 02.06.2022 द्वारा प्रथम चरण की स्वीकृति प्रदान की गई है।

उक्त के अनुक्रम में संदर्भ पत्र-2 द्वारा प्रथम चरण स्वीकृति के अधिरोपित शर्त क्रमांक (A) (iv) के पालन में वन मंडलाधिकारी, रायगढ़ वन मंडल द्वारा निर्धारित प्रपत्र में अधिसूचना प्रस्ताव तैयार कर क्षतिपूर्ति वृक्षारोपण हेतु चयनित निजी भूमि ग्राम नटवरपुर (रकबा 95.460 हे.), चक्रधरपुर (रकबा 115.184 हे.) एवं बंगुरसिया (रकबा 4.225 हे.) कुल 214.869 हे. भूमि वन विभाग छ.ग.शासन के पक्ष में हस्तांतरण/नामांतरण उपरोक्त हस्तांतरण से संबंधित दस्तावेज तथा भूमि का खसरा, नक्शा एवं अधिसूचना प्रस्ताव (हिन्दी एवं अंग्रेजी में) मुख्य वन संरक्षक, बिलासपुर वृत्त के माध्यम से अधिसूचित करने हेतु इस कार्यालय को प्राप्त हुआ है।

उपरोक्तानुसार अधिसूचना प्रारूप हिन्दी/अंग्रेजी में सुधार कर हार्ड एवं सॉफ्टकापी मुख्य वन संरक्षक, बिलासपुर वृत्त, बिलासपुर द्वारा इस कार्यालय को उपलब्ध कराई गई है। खसरावार विवरण निम्नानुसार है:-

स. क्र.	वनखण्ड का नाम	प.ह.नं. एवं राजस्व ग्राम जहाँ वनखण्ड स्थित है	खसरा नंबर	क्षेत्रफल (हे.) में
1	2	3	4	5
1	नटवरपुर	34 नटवरपुर	9	0.862
			11	1.501
			12	0.745
			13	2.096
			14	1.801
			15	0.757
			16	0.656
		17	0.652	

03/09/2022



			18	0.979
			19	3.439
			21	1.724
			22	1.040
			24	1.688
			144	1.210
			167	1.586
			165	1.882
			525	0.745
			528	1.651
			530	0.324
			533	1.165
			534	0.680
			472	1.485
			523	1.048
			470	0.356
			537	1.348
			563/1	9.000
			540	0.073
			193	5.735
			194/1	8.094
			194/2	6.750
			196	1.263
			197/1	1.960
			366	2.890
			378	4.387
			388	4.679
			6/2	0.478
			52/1	3.889
			52/2	0.607
			54	0.660
			55	0.704
			56	1.956
			57	0.611
			61	0.510
			65/2	1.921
			60	1.955
			62	0.656
			64	1.374
			65/1	3.893
		योग	48	95.460
2	चक्रधरपुर	33 बंगुरसिया	97/10/ख 97/1/अ/2 97/10/अ 97/21 97/22	1.214 0.202 0.405 1.595 0.809
		कुलयोग	5	4.225
3		33 चक्रधरपुर	8 74/ख 17 18/1 18/2 18/3 18/4 18/5 18/6 20 21 22 23 24	1.501 0.400 1.420 0.486 0.441 1.104 1.096 1.096 1.096 1.384 1.898 0.291 0.684 0.510

Page 10 of 11



			29	1.096
			30	0.611
			34/4	3.151
			35	0.656
			36/1/π	0.880
			37	0.559
			38/2	0.117
			38/3	1.214
			38/4	0.409
			38/5	0.809
			39	2.991
			43/8	0.584
			77	0.777
			49	0.267
			50	0.995
			51	2.497
			53/1	0.527
			53/2	0.822
			53/3	0.295
			54/1	0.093
			54/2	0.344
			54/3	0.251
			63/1	0.365
			63/2	0.793
			63/3	0.429
			87	1.360
			1/10	0.607
			1/21	0.607
			3/1	0.765
			3/2	0.809
			4	0.862
			5/1	0.396
			5/2	1.012
			6/7	0.405
			6/13	0.405
			6/16	0.405
			10/1	0.835
			10/2	1.011
			11/1	1.188
			11/2	2.023
			11/3	0.405
			12/2	1.619
			12/3	2.023
			13/2	2.833
			13/3	2.833
			14/1	1.869
			14/2	2.000
			34/2	0.135
			34/3	1.335
			34/5	1.330
			36/1/π/2	1.263
			40	1.668
			43/2	0.405
			43/3	0.809
			43/4	0.809
			43/5	0.809
			43/6	0.405
			43/7	0.809
			43/9	0.809
			43/10	0.809
				0.214
			56	0.283
			58	1.578



		62	3.311
		86/1	1.589
		65/53/4	0.461
		1/1	6.475
		1/3	6.475
		1/4	1.886
		1/5	6.475
		41	1.230
		67/11	4.330
		67/9	4.000
		67/10	4.000
		83	0.271
	योग	89	115.184
महायोग		142	214.869

अतः मुख्य वन संरक्षक, बिलासपुर वृत्त के प्रतिवेदन के अनुसार मेसर्स महाराष्ट्र स्टेट पावर जेनरेशन कंपनी लि द्वारा वैकल्पिक वृक्षारोपण हेतु घयनित निजी भूमि ग्राम नटवरपुर (रकबा 95.460 हे.), चक्रधरपुर (रकबा 115.184 हे.) एवं बंगुरसिया (रकबा 4.225 हे.) कुल 214.869 हे. छ.ग.शासन के पक्ष में हस्तांतरण/नामांतरण भूमि का अधिसूचना प्रस्ताव हिन्दी/अंग्रेजी में हार्ड एवं सॉफ्ट कापी 02-02 प्रतियों में अधिसूचना प्रकाशन हेतु अनुशसा सहित प्रेषित है। कृपया अनुमोदन पश्चात् वरिष्ठ कार्यालय को प्रेषित करने हेतु अनुरोध है।

उल्लेखनीय है कि इस क्षेत्र की अधिसूचना जारी करना वन संरक्षण अधिनियम, 1980 अंतर्गत व्यपवर्तन प्रकरण स्वीकृति हेतु वांछित है। अतः प्रकरण के विरुद्ध प्राप्त निजी भूमि का अधिसूचना प्रस्ताव हिन्दी एवं अंग्रेजी में तैयार कर हार्ड एवं सॉफ्ट कापी 02-02 प्रतियों में अधिसूचित कर प्रकाशन हेतु प्रेषित है।

संलग्न :- 1. अधिसूचना प्रस्ताव
(हिन्दी/अंग्रेजी हार्ड/सॉफ्ट कापी)
(वन बल प्रमुख द्वारा अनुमोदित)

अ.प्र.मु.व.स (भू - प्रबंध / व.सं.अ)
छत्तीसगढ़

पू. क्र./भू-प्रबंध/खनिज/331-245/2057
प्रतिलिपि सूचनार्थ एवं आवश्यक कार्यवाही हेतु:

रायपुर, दिनांक 12/09/2022

1. मुख्य वन संरक्षक, बिलासपुर वृत्त, बिलासपुर, छत्तीसगढ़।
2. वन मंडलाधिकारी, रायगढ़ वन मंडल, रायगढ़, छत्तीसगढ़।
3. **Executive Engineer (Addle) (Coal)**, महाराष्ट्र स्टेट पावर जेनरेशन कंपनी लि., गारे पेलमा कोल माईन्स सेक्टर-2 विद्युत भवन, कटोल रोड, नागपुर 440013

अ.प्र.मु.व.स (भू - प्रबंध / व.सं.अ)
छत्तीसगढ़



नगर तथा नगरेतर क्षेत्रों के ग्रामों के लिए नामांतरण पंजी

Print Date :22-Aug-2022

ग्राम : नटवरपुर

हल्का : 00034

रा नि : रायगढ़-1

तहसील : रायगढ़

जिला : रायगढ़

(1) नामांतरण क्रमांक	(2) प्रस्तावना या सूचना प्राप्त होने की तारीख	(3) परिकर्तन द्वारा प्रमाणित खसरा नंबर या सू-बैंड क्रमांक तथा अन्य संकेतक खसरा नं (संकेतक)	(4) नामांतरण का पूर्ण स्वीय	(5) वर्तमान भूमिस्वामी	(6) प्रस्तावित भूमिस्वामी	(7) प्रमाणिकरण अधिकारी का संक्षिप्त आदेश एवं तिथि यदि प्रयोग विवाद उत्पन्न हो तो मामला क्रमांक तथा आदेश की तारीख का उल्लेख भी किया जाए
CG6208622072022002	22/07/2022	6/2(0.4760), 65/2 (1.9210), 57 (0.6110), 55 (0.7040), 52/1 (3.8890), 525 (0.7450), 530 (0.3240), 563/1 (9.0000), 472 (1.4850), 540 (0.0730), 470 (0.3560), 64 (1.3740), 60 (1.9550), 194/1 (8.0940), 197/1 (1.9600), 388 (4.6790), 366 (2.8900), 15 (0.7570), 21 (1.7240), 22 (1.0400), 11 (1.5010), 144 (1.2100), 12 (0.7450), 18 (0.9780), 54 (0.6600), 61 (0.5100), 56 (1.9510), 52/2 (0.6070), 528	छत्तीसगढ़ शासन के पत्र नं टान पत्र नामांतरण हेतु प्रस्तावित	(1) नहराट्ट स्टेट पावर जनरेशन कंपनी लि.की ओर से प्रतिनिधि राजेश अमिमन्यु पाटील माता/पिता/पति -अमिमन्यु पाटील पता -नागपुर महाराष्ट्र	(1) छ.न.शासन जन विभाग महडान रायगढ़ की ओर से जन परीक्षक/अधिकारी लीला पटेल माता/पिता/पति -शशिकुण पटेल पता -सरकनी, रायगढ़	आदेश क्र.-CG6208622072022002 व दिनांक - 22/Aug/2022 प्रकरण नं इस्तहर प्रकाशित निपट समय में आपत्ति प्राप्त नहीं प्रकरण अवलोकन पश्चात आदेश उपरोक्त डा. घ. अमिलेख दुस्ती हेतु पटवारी की ओर प्रेषित

(Handwritten Signature)



नायब तहसीलदार- SHRUTI SHARMA

तहसील रायगढ़

नगर तथा नगरेतर क्षेत्रों के ग्रामों के लिए नामांतरण पंजी

Print Date :22-Aug-2022

ग्राम : नटवरपुर

हल्का : 00034

रा नि : रावगढ-1

तहसील : रावगढ

जिला : रावगढ

नामांतरण क्रमांक	प्रस्तावना या सूचना प्राप्त होने की तारीख	परिवर्तन द्वारा प्रस्तावित खसरा नंबर या भू-खंड क्रमांक तथा उनका क्षेत्रफल	नामांतरण का पूर्ण व्यौरा	वर्तमान भूमिस्वामी	प्रस्तावित भूमिस्वामी	प्रमाणीकरण अधिकारी का संक्षिप्त आदेश एवं तिथि यदि प्रविष्टि विवाद रहत है तो मामला क्रमांक तथा आदेश की तारीख का उल्लेख भी किया जाए
(1)	(2)	(3)	(4)	(5)	(6)	(7)
		खसरा नं (क्षेत्रफल)				
		(1.6510), 165 (1.8620), 533 (1.1650), 523 (1.0480), 534 (0.6800), 537 (1.3480), 651 (3.8930), 62 (0.6560), 196 (1.2630), 193 (5.7350), 194/2 (6.7500), 378 (4.3870), 17 (0.6520), 13 (2.0960), 16 (0.6560), 14 (1.8010), 24 (1.6880), 19 (3.4390), 167 (1.5860), 9 (0.8620)				

(Handwritten signature)



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 नायब तहसीलदार- SHRUTI SHARMA

तहसील रावगढ



फॉर्म बी-1 किशतबंदी खतौनी (आसामीवार)

वर्ष: 2021-2022

Document Id -20220823410300007

भूमि का स्वोरा हेक्टर में एवं कचो का स्वोरा रुपये पैसो में

शाम : बंगुरुसिया

हल्का : 00033 रा नि : रायगढ़-1

तहसील : रायगढ़

जिला : रायगढ़

खता क्रमांक	खतों के स्वोरी	खतों में शामिल प्रत्येक भू-आपन क्र. का कु. का कु.	प्रत्येक भू-आपन क्र. का क्षेत्रफल और खतों का कुल क्षेत्रफल	किशतों के स्वोरी	जानू और दक्का नाम			वस्तुस्थितियाँ			खतानों में जमा करने के स्वोरी			वर्ष की समाप्ति पर बाकी वस्तुस्थितियाँ			वर्ष की समाप्ति पर बाकी वस्तुस्थितियाँ	वर्ष की समाप्ति पर बाकी वस्तुस्थितियाँ	वर्ष की समाप्ति पर बाकी वस्तुस्थितियाँ					
					भू-राजस्व	उपकर	योग	भू-राजस्व	उपकर	योग	रकम जमा करने वाले का नाम	जमा करने की तारीख	चातान क्रमांक	भू-राजस्व	उपकर	योग				भू-राजस्व	उपकर	योग		
73	(1) नाम - छ.ग.शासन वन विभाग मंडलाधिकारी छ.ग.की ओर से वन परिदेहाधिकारी लीला पटेल पति शक्तिभूपन पटेल वंश- सज्जान्य (जाति) पता- रायगढ़ त्वामित्व भूमिस्वामी - कुश भूमि	97/1/5/2	0.2020 (21743.1 0 sq.ft.)		(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	सामांतरण क्रमांक 4103111/220822 /10157 आदेश क्रमांक CG 6208622072022 001 / 22 Aug 2022





फॉर्म बी-1 किरतवंदी खतौनी (आसामीवार)

वर्ष: 2021-2022

Document Id -20220823410300007

भूमि का व्योरा हेक्टर में एवं कतौ का व्योरा रूपरे पैसों में

ग्राम : बंगुरसिंग

हल्का : 00033

रा नि : रायगढ़-1

तहसील : रायगढ़

जिला : रायगढ़

खतौ के व्योरे	खतौ में शामिल प्रत्येक भू-भाग के क्र. का नाम	प्रत्येक भू-भाग के क्र. का क्षेत्रफल	किरतौ के व्योरे	चासू और बकाया माँग	वसुलियाँ	खतौ में जमा करने के व्योरे	वर्ष की समाप्ति पर बाकी	वर्ष की समाप्ति पर बाकी वसुलियाँ	वर्ष की समाप्ति पर बाकी	वर्ष की समाप्ति पर बाकी वसुलियाँ											
भू-स्वामी या शासकीय पट्टेदार का नाम	खतौ में शामिल प्रत्येक भू-भाग के क्र. का क्षेत्रफल	प्रत्येक भू-भाग के क्र. का क्षेत्रफल	किरतौ के व्योरे	चासू और बकाया माँग	वसुलियाँ	खतौ में जमा करने के व्योरे	वर्ष की समाप्ति पर बाकी	वर्ष की समाप्ति पर बाकी वसुलियाँ	वर्ष की समाप्ति पर बाकी	वर्ष की समाप्ति पर बाकी वसुलियाँ											
	97/10/ख	1.2140	(5)	भू-राजस्व उपकर योग	भू-राजस्व उपकर अबादाव भू-राजस्व उपकर योग	रकम जमा करने वाले का नाम	भू-राजस्व उपकर योग	भू-राजस्व उपकर योग	भू-राजस्व उपकर योग	भू-राजस्व उपकर योग											
(1)	(2)	(3)	(4)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)





फॉर्म बी-1 किशतबंदी खतौनी (आसामीवार)

वर्ष: 2021-2022

Document Id -20220823410300007

भूमि का ब्यापार हेतुपर में एवं करो का ब्योरा रूपसे पैसो में

ग्राम : बंगुरसिया

इन्का : 00033

रा नि : राबगढ़-1

तहसील : राबगढ़

जिला : राबगढ़

खता क्रमांक	खतों के ब्योरे	खतों में शामिल प्रत्येक भू-स्वापन प्रत्येक भू-स्वापन क्र. का क्र.	प्रत्येक भू-स्वापन क्र.का शीकफल और खतों का कुल शीकफल	किशतों के ब्योरे	घानू और बकषा माँग	वसुलियाँ	खजाने में जमा करते के ब्योरे	वर्ष की समाप्ति पर बाकी	वर्ष की समाप्ति पर बाकी वसुलियाँ	वर्ष की समाप्ति पर बाकी वसुलियाँ	वर्ष की समाप्ति पर बाकी वसुलियाँ	वर्ष की समाप्ति पर बाकी वसुलियाँ	वर्ष की समाप्ति पर बाकी वसुलियाँ									
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
		97/10/अ	0.4050		भू-राजस्व	उपकर	योग	भुगता न करने वाले व्यक्ति का नाम	भू-राजस्व की तारीख	भू-राजस्व अवकाश	उपकर	योग	रकम जमा करने वाले का नाम	जमा करने की तारीख	चाहाने क्रमांक	भू-राजस्व	उपकर	योग	भू-राजस्व	उपकर	योग	वारी की गई बलात आदिशिका के ब्योरे





फॉर्म बी-1 किशतबंदी खतीनी (आसामीवार)

वर्ष: 2021-2022

Document Id -202208234103000007

भूमि का ब्योरा हेक्टयर में एवं करो का ब्योरा रुपये पैसो में

ग्राम : बंगुरसिंघा

हल्का : 00033

रा नि : रावगढ़-1

तहसील : रावगढ़

जिला : रावगढ़

खता क्रमांक	खाने के ब्योरे	खाने में शामिल प्रत्येक मू-नापत क. का क.	प्रत्येक मू-नापत क.का क्षेत्रफल और खाने का कुल क्षेत्रफल	क्रिशतों के ब्योरे	घालू और बकाया माँग	वसुलियाँ	खजाने में जमा करने के ब्योरे	वर्ष की समाप्ति पर बाकी	वर्ष की समाप्ति पर बाकी वसुलियों	वर्ष की समाप्ति पर बाकी	वर्ष की समाप्ति पर बाकी												
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	
	मू-स्वामी या शासकीय पट्टेदार का नाम	खाने में शामिल प्रत्येक मू-नापत क. का क.	प्रत्येक मू-नापत क.का क्षेत्रफल और खाने का कुल क्षेत्रफल	क्रिशतों के ब्योरे	मू- राजस्व उपकर योग	भुगतान की तारीख	मू- राजस्व अवकाश उपकर योग	रकम जमा करने वाले का नाम	जमा करने की तारीख	चाकान क्रमांक	मू- राजस्व उपकर योग	मू- राजस्व उपकर योग	मू- राजस्व उपकर योग	मू- राजस्व उपकर योग	चाकान क्रमांक	मू- राजस्व उपकर योग	मू- राजस्व उपकर योग	मू- राजस्व उपकर योग	मू- राजस्व उपकर योग	मू- राजस्व उपकर योग	मू- राजस्व उपकर योग	मू- राजस्व उपकर योग	जारी की गई बिलाल आदेशिका के ब्योरे
		97/21	1.5950																				सामान्य क्रमांक 4103111/220822/10161 आदेश क्रमांक CG 6208622072022 001 / 22 Aug 2022





फॉर्म बी-1 किरतबंदी खतौनी (आसामीवार)

वर्ष: 2021-2022

Document Id -20220823410300007

भूमि का ब्योरा हेक्टर में एवं करो का ब्योरा रुपये पैसो में

ग्राम : बंगुरसिया

हल्का : 00033

रा नि : राबगढ़-1

तहसील : राबगढ़

जिला : राबगढ़

खता क्रमां क	खतों के भू-स्वामी या शासकीय पट्टेदार का नाम	खतों में शामिल प्रत्येक भू-नापन क्र. का क्र.	प्रत्येक भू-नापन क्र. का क्षेत्रफल और खतों का कुल क्षेत्रफल	खतों के ब्योरे	घानू और बकाया गोंग			वसुलियाँ			खजाने में जमा करने के ब्योरे			वर्ष की समाप्ति पर बाकी			वर्ष की समाप्ति पर बाकी वसुलियाँ			वर्ष की गई बतात आदेशिका के ब्योरे			
					भू- राजस्व	उपकर	योग	भुगतान की तारीख	भू- राजस्व अवकाश	उपकर	योग	रकम जमा करने वाले का नाम	जमा करने की तारीख	चालान क्रमांक	भू- राजस्व	उपकर	योग	भू- राजस्व	उपकर		योग		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	
		97/22	0.8090																				97/21
																							नामांतरण क्रमांक 4103111/220822 /10159 आदेश क्रमांक CG 6208622072022 001 / 22 Aug 2022
कुल		5	4.2250		4.4900	0	4.49 00																



नगर तथा नगरेतर क्षेत्रों के ग्रामी के लिए नामांतरण पंजी

Print Date :22-Aug-2022

ग्राम : चक्रधरपुर

हल्का : 00033

ग ति : रायगढ़-1

तहसील : रायगढ़

जिला : रायगढ़

(1) नामांतरण क्रमांक	(2) प्रमाण या सूचना प्राप्त होने की तारीख	(3) परिवर्तन द्वारा प्रभावित खसरा नंबर या भू-खंड क्रमांक तथा उनका क्षेत्रफल खसरा नं (क्षेत्रफल)	(4) नामांतरण का पूर्ण खोला	(5) वर्तमान भूमिस्वामी	(6) प्रस्तावित भूमिस्वामी	(7) प्रमाणिकरण अधिकाारी का संक्षिप्त आदेश एवं तिथि यदि प्रविष्टि विवाद अस्त से तो नामला क्रमांक तथा आदेश की तारीख का उल्लेख भी किया जाए
CG6208622072022003	22/07/2022	1/1(6.4750), 1/5(6.4750), 1/3(6.4750), 1/4(1.8860), 51(2.4970), 53/2(0.8220), 39(2.9910), 18/3(1.1040), 18/4(1.0960), 20(1.3840), 21(1.8980), 22(0.2910), 63/2(0.7930), 74/ख(0.4000), 77(0.7770), 43/8(0.5840), 63/1(0.3650), 53/1(0.5270),	छत्तीसगढ़ शासन के पक्ष में दान पत्र तामान्तरण हेतु प्रस्तावित	(1) महाराष्ट्र स्टेट पावर जनरेशन कंपनी लिमिटेड मुंबई की ओर से प्रतिनिधि सहित अशिमन्तु पाटील नामत/पिता/पति -अशिमन्तु निवृत्ति पाटिल पता -नागपुर (महाराष्ट्र)	(1) छ.ग.शासन दत्त विभाग मंडलाधिकारी छ.ग.की ओर से दत्त परीक्षेत्रधिकारी लीला पाटेल माता/पिता/पति -शक्तिभूषण पाटेल पता -सरकारी, रायगढ़	आदेश क्र.-CG6208622072022003 व दिनांक - 22/Aug/2022 प्रकरण नं इशतसर प्रकाशित , त्रियत समय में आपति प्राप्त नहीं , प्रकरण अवलोकन पश्चात आदेश उपरोक्त द. प्र. अभिलेख दुरुस्ती हेतु पटवारी की ओर प्रेषित



नायब तहसीलदार- SHRUTI SHARMA

तहसील रायगढ़

नगर तथा नगरेतर क्षेत्रों के ग्रामों के लिए नामांतरण पंजी

Print Date :22-Aug-2022

ग्राम : चक्रधरपुर

हल्का : 00033 रा नि : राकगढ-1

तहसील : राकगढ

जिला : राकगढ

(1) नामांतरण क्रमांक	(2) प्राप्तापना या सूचना प्राप्त होने की तारीख	परिवर्तन द्वारा प्रस्तावित खसरा नंबर या भू-खंड क्रमांक तथा उनका क्षेत्रफल खसरा नं (क्षेत्रफल)	नामांतरण का पूर्ण प्यौर	वर्तमान श्रमिस्वामी	प्रस्तावित श्रमिस्वामी	प्रमाणिकरण अधिकारी का संक्षिप्त आदेश एवं तिथि यदि प्रविष्टि विवाद वस्तु हो तो मामला क्रमांक तथा आदेश की तारीख का उल्लेख भी किया जाए
		(3)	(4)	(5)	(6)	(7)
		49(0.2670), 38/4(0.4050), 38/3(1.2140), 23(0.6840), 29(1.0960), 34/4(3.1510), 35(0.6560), 36/1/7(0.8800), 38/2(0.1170), 53/3(0.2950), 8(1.5010), 18/1(0.4860), 54/2(0.3440), 18/2(0.4410), 87(1.3600), 63/3(0.4250), 54/3(0.2510), 54/1(0.0930);				



नायब तहसीलदार- SHRUTI SHARMA

तहसील राकगढ

नगर तथा नगरेतर क्षेत्रों के ग्रामों के लिए नामांतरण पंजी

Print Date :22-Aug-2022

ग्राम : चक्रधरपुर

हल्का : 00033

रा नि : रायगढ़-1

तहसील : रायगढ़

जिला : रायगढ़

नामांतरण क्रमांक	प्रतापना या सूचना प्राप्त होने की तारीख	परिवर्तन द्वारा प्रभावित खसरा नंबर या सू-बैंड क्रमांक तथा उनका क्षेत्रफल	नामांतरण का पूर्ण व्यौरा	वर्तमान भूमिस्वामी	प्रस्तावित भूमिस्वामी	प्रमाणिकरण अधिकारी का संक्षिप्त आदेश एवं तिथि यदि प्रविष्टि विवाद अस्त हो तो मान्यता क्रमांक तथा आदेश की तारीख का उल्लेख भी किया जाए
(1)	(2)	(3)	(4)	(5)	(6)	(7)
		खसरा नं (क्षेत्रफल)				
		50(0.9950), 38/5(0.8090), 37(0.5590), 30(0.6110), 24(0.5100), 18/6(1.0960), 18/5(1.0960), 17(1.4200), 67/11(4.3300), 67/9(4.0000), 41(1.2300), 6/7(0.4050), 55(0.2140), 43/5(0.8090), 40(1.6680), 11/3(0.4050), 12/2(1.6190), 3/1(0.7650),				



नायब तहसीलदार- SHRUTI SHARMA

तहसील रायगढ़

नगर तथा नगरेतर क्षेत्रों के ग्रामों के लिए नामांतरण पंजी

Print Date :22-Aug-2022

ग्राम : चक्रधरपुर

हल्का : 00033 रा नि : रावगढ-1

तहसील : रावगढ

जिला : रावगढ

(1) नामांतरण क्रमांक	(2) प्रदायना वा सूचना प्राप्त होने की तारीख	(3) परिवर्तन द्वारा प्रभावित बसरा नंबर वा भू-खंड क्रमांक तथा उनका क्षेत्रफल बसरा नं (क्षेत्रफल)	(4) नामांतरण का पूर्ण पथीरा	(5) वर्तमान भूमिस्वामी	(6) प्रस्तावित भूमिस्वामी	(7) प्रमाणिकरण अधिकारी का संक्षिप्त आदेश एवं तिथि यदि प्रविष्टि विवाद रहस्य हो तो मामला क्रमांक तथा आदेश की तारीख का उल्लेख भी किया जाए
		14/1(1.8690), 11/1(1.1880), 43/6(0.4050), 1/2(0.6070), 56(0.2830), 43/3(0.8090), 43/2(0.4050), 62(3.3110), 36/1/क/2(1.2630), 0), 34/5(1.3300), 13/3(2.8330), 12/3(2.0230), 10/2(1.0110), 6/16(0.4050), 4(0.8620), 11/2(2.0230), 43/9(0.8090).				



नायब तहसीलदार- SHRUTI SHARMA

तहसील रावगढ

नगर तथा नगरेतर क्षेत्रों के बामों के लिए नामांतरण पंजी

Print Date : 22-Aug-2022

बाम : चक्रधरपुर

हल्का : 00033 रा नि : रायगढ़-1

तहसील : रायगढ़

जिला : रायगढ़

(1) नामांतरण क्रमांक	(2) प्राप्ति या सूचना प्राप्त होने की तारीख	(3) परिवर्तन द्वारा प्रस्तावित खसरा नंबर या भू-खंड क्रमांक तथा अन्य संबंधित खसरा नं (संकेत)	(4) नामांतरण का पूर्ण प्लान	(5) वर्तमान श्रमिस्वामी	(6) प्रस्तावित श्रमिस्वामी	(7) प्रमाणिकरण अधिकारी का संक्षिप्त आदेश एवं तिथि यदि प्रविष्टि विवाद वस्तु है तो मामला क्रमांक तथा आदेश की तारीख का उल्लेख भी किंचित नगर
		43/10(0.8090), 43/7(0.8090), 34/2(0.1350), 1/10(0.6070), 5/1(0.3960), 34/3(1.3350), 5/2(1.0120), 10/11(0.8350), 3/2(0.8090), 65/53/4(0.4610), 13/2(2.8330), 43/4(0.8090), 58(1.5780), 6/13(0.4050), 86/1(1.5890), 14/2(2.0000), 83(0.2710), 67/10(4.0000)				



नायब कमिश्नर - SHRUTI SHARMA

तहसील रायगढ़

Dr. Nitin S. Wagh
Executive Director (E&S)



MAHAGENCO
Maharashtra State Power Generation Co. Ltd.

Ref :ED (E&S and GP)/GP-II/Undertaking Part A/ 00528

Date :- 08 DEC 2022

To,
Divisional Forest Officer (DFO),
Raigarh Forest Division,
Chandra Nagar Colony, Kelo Vihar,
Raigarh -496001 (Chhattisgarh)

Sub: Diversion of forest land for non-forest purpose under Forest Conservation Act, 1980 proposed for the Gare Pelma Sector II Coal block has been allotted to Maharashtra State Power Generation Company Limited (MAHAGENCO) Coal block located in the Mand Raigarh Coalfield of Raigarh district, Chhattisgarh area- 214.69 ha-

✓

Reg. Undertaking in reliance to the condition stipulated in the Forest Stage-I Clearance Part A.

Ref: 1. MoEF & CC letter no.8-06/2022-FC, GoI, Dtd. 02.06.2022.
2. Letter from Forest Department, GoCG, Dtd.12.09.2022

Dear Sir,

It is to inform that as per the Forest stage-I compliance condition no. 1 (iv) of Part A, notification has been approved by the forest department. However, the Official Publication of Gazette notification is under publication.

Accordingly, we hereby submit an undertaking in this regards (Copy enclosed) that when the notification will be published, we will submit the copy of the same.

Meanwhile it is kindly requested to recommend the proposal for grant of Forest Stage II Clearance based on the Notification approved by State Forest Department.

This is for your kind information please.

Thanking you,

Yours sincerely

Executive Director (E&S and GP)

Encl:- As above.

Copy to

1. Nodal officer, State forest department GoCG.



Dr. Nitin S. Wagh
Executive Director (E&S)

CERTIFICATE OF UNDERTAKING

In compliance to condition no.-1 (iv) of Part A of Ministry of Environment, Forest and Climate Change, letter no.8-06/2022-FC dated 2nd June 2022, this is to certify that notification under Sec 27 has been approved by the State Minister of Environment & Forest. However, the Official Publication of the Notification is under process.

I, Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake that we will submit the actual Notification once it is published.

It is requested to recommend the forest diversion proposal for grant of Forest Clearance.


Executive Director (E&S and GP)



REPORT ON

**Hydrological Regime of Kelo River & Cumulative Impact of Mining
and Industrial Activities of Gare Pelma Area**

FOR

GARE PALMA SECTOR -II COAL MINE,

VILLAGE GARE & TEHSIL TAMNER,
DISTRICT RAIGARH, CHHATTISGARH

In compliance to condition no 5 of FC stage- I approval order vide letter no. 8-06/2022-FC
dated 02nd June 2022 by MOEF&CC, Govt. of India

PROPONENT



MAHARASHTRA STATE POWER GENERATION COMPANY LTD.

Prakashgad, Plot No. G-9 Anant Kanerkar Marg, Bandra (E), Mumbai-400051 (MS)

PREPARED BY

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Functional Area Expert (Hydrology & Ground Water) by NABET for MoEF & CC
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On behalf of

SRUSHTI SEVA PRIVATE LIMITED

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JUNE - 2022



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CONTENTS

1.0 INTRODUCTION:	1
1.1 General:.....	1
1.2 Location of Kelo River Watershed:	3
1.3 Location of Study Area:.....	4
1.4 Location of Gare Pelma Blocks:.....	5
1.5 Location of the GP II:.....	5
1.6 Concept of Hydrogeological Regime.....	6
1.7 Statement of Problem:.....	7
1.8 Solution of Problem:	7
2.0 Previous Work	8
2.1 Report on Regional Impact of Coal Mines of Gare Pelma Sector on Water Regime (With Reference To Gare Pelma Sector-III))	8
2.2 For Gare GP IV/6 Block:.....	10
2.3 Hydrological Study for Kelo Dam:	11
2.3.1 Catchment Area	11
2.3.2 Drainage Area.....	11
2.3.3 Water Availability and Utilization	11
2.3.4 Gauge Discharge Data.....	11
2.3.5 Sedimentation.....	12
2.3.6 Water use and Water Availability	13
3.0 Land Use:	14
3.1 Land Use of Kelo Watershed:.....	14
3.2 Land use - Mining Activity GP II:	14
4.0 Topography and Drainage:	16
4.1 Topography:.....	16
4.2 Drainage:.....	17
5.0 Geology of Kelo River:	21
5.1 Geological Structure:	21
5.2 Metamorphic Formation:.....	22
5.3 Barakar Formation:	22
6.0 Hydrology of Kelo Basin:	24
6.1 Hydrological Regime:	24



6.2	Climatic Water Balance	25
6.2.1	Rainfall:	25
6.2.2	Potential Evapotranspiration (PE):.....	26
6.2.3	Climatic Water Balance:.....	27
6.3	Runoff:.....	30
6.4	Mathematical Model for Peak Flood Estimation:.....	30
6.5	Synthetic Unit Hydrograph – Kelo River Watershed:.....	30
6.6	Calibration of Model:.....	41
6.7	Surface Runoff Yield - Availability of Water in Kelo River:.....	45
6.8	Kelo River - Mine Area	46
6.9	Ground Water Runoff (Base flow):	46
7.0	Hydrogeology:	47
7.1	Ground Water Regime in and around Coal Mines:.....	47
7.1.1	Regional Hydrogeological setting:	47
7.1.2	Aquifer details:.....	47
7.1.3	General Aquifer Parameter:.....	49
7.1.4	Water table and movement of groundwater:	49
7.1.5	Hydrograph:	52
7.2	Ground Water Modeling and its impact due to Mines:.....	53
8.0	Water Quality:	63
8.1	Ground water Quality:	63
8.2	Surface Water Quality:.....	64
9.0	Safety Zone & Embracement As per DGMS Rule:.....	65
10.0	Cumulative Impact of Mining and Industries on hydrological regime of Kelo River:.....	66
10.1	Surface Water Flow.....	66
10.2	Effect on Ground water level.....	66
11.0	Mitigation Measures:.....	67
11.1	Intake Water in Recharge Well – Barakar Formation:.....	67
11.2	Schematic Diagram – Artificial Recharge:.....	68
11.3	Rain Water Harvesting:.....	69
11.3.1	Proposed Rain Water Harvesting in Nala Bund:	69
11.3.2	Design of the Recharge Pit with Bore well:.....	73
11.3.3	Bore well Design:	75
11.3.4	Cover to Recharge Pit.....	75

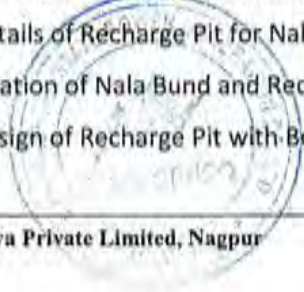
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11.3.5	GUIDELINES FOR OPERATION AND MAINTENANCE:	77
11.3.5.1	Water Quality Measurement:	77
11.3.5.2	Potential Problems:	77
11.3.5.3	Suspended Material:	77
12.0	Conclusion:	79
	Bibliography	82

TABLES

Table 2.1:	Annual Runoff Kelo River	12
Table 2.2:	Abstract Sediment Studies	12
Table 2.3:	water availability and requirement	13
Table 3.1:	Land use Cover of Proposed Mine	15
Table 5.1:	Regional Geology Map	22
Table 6.1:	Normal rainfall in Raigarh District	25
Table 6.2:	Distribution of Normal Rainfall of nearby stations	26
Table 6.3:	Potential Evapotranspiration	26
Table 6.4:	Climatic Water Balance of Kelo watershed	29
Table 6.5:	Time Distribution of Areal Rainfall	38
Table 6.6:	Hourly Effective Rainfall	38
Table 6.7:	Compilations of Design Flood Hydrograph	39
Table 6.8:	Validation of Proto Model & Actual Measure Peak Flood (CA – 404 km ²)	41
Table 6.9:	Discharge from various Methods	45
Table 6.10:	Kelo different Catchment Area	45
Table 7.1:	Hydrogeological Units	48
Table 7.2:	Aquifer Parameters	49
Table 7.3:	Well Inventory Data	51
Table 8.1:	Location of Ground Water quality	63
Table 8.2:	Ground Water Quality	63
Table 8.3:	Location of Surface Water Quality	64
Table 8.4:	Surface Water Quality	64
Table 11.1:	Dimension of Nala Bund	69
Table 11.2:	Details of Recharge Pit for Nala Bund	69
Table 11.3:	location of Nala Bund and Recharge Pit with 16 no	72
Table 11.4:	Design of Recharge Pit with Bore well in Pond	73

FIGURES

Figure 1.1: Geographic Location of Study Area 2

Figure 1.2: Location of Kelo River Watershed with Blocks 3

Figure 1.3: Location map of Study area 4

Figure 1.4: Location of GP blocks on toposheet 5

Figure 1.5: Location of GP II on Toposheet 6

Figure 2.1: Drawdown Model- Gare Pelma Blocks 9

Figure 3.1: Land Use map of Kelo Watershed 14

Figure 4.1: DEM Map 16

Figure 4.2: DEM map of Study Area 17

Figure 4.3: River Basin of Chhattisgarh 18

Figure 4.4: Drainage map of Kelo River 19

Figure 4.5: Drainage Map of Study Area 20

Figure 5.1: Regional Geological Map 23

Figure 6.1: Hydrological Cycle 24

Figure 6.2: Normal Rainfall 26

Figure 6.3: Potential Evapotranspiration 27

Figure 6.4: Catchment Area Plan 32

Figure 6.5: Longitudinal Section of Catchment Plan 33

Figure 6.6: Catchment Plan with Different Segment 34

Figure 6.7: Synthetic Hydrograph of Kelo Watershed 36

Figure 6.8: Isopluvial Map for 50 years return 37

Figure 6.9: Compilations of Design Flood Hydrograph with base flow 40

Figure 6.10: Peak Runoff Hydrograph 42

Figure 6.11: Cross Section of River near bridge 43

Figure 6.12: Annual Yield 46

Figure 7.2: Location of Well monitoring stations 50

Figure 7.4: Drainage Map of study area 53

Figure 7.5: Grid design of the study area 54

Figure 7.6: Elevation of the study area 55

Figure 7.7: Assigned Observation Wells 56

Figure 7.8: Assigned Hydraulic Conductivity 57

Figure 7.9: Assigned Recharge 57

Figure 7.10: Calibration of the model 58



Figure 7.11: Present groundwater level of the study area	59
Figure 7.12: Predicted groundwater level with the consideration of groundwater abstraction over 5 years.....	60
Figure 7.13: Predicted groundwater level with the consideration of groundwater abstraction over 10 years.....	61
Figure 7.14: Mass Balance	62
Figure 9.1: Safety zone area in green color	65
Figure 11.1: Steady-State Expression in Unconfined Aquifer	68
Figure 11.2: Schematic flow pattern under circular basin (J. C. Y. Guo-2001)	68
Figure 11.3: Google Map of Nala Bund Location	70
Figure 11.4: Location of Nala Bund.....	71
Figure 11.5: Design of Recharge Pit with Borewell In Pond.....	74
Figure 11.6: Design of Borewell for Recharge Pit	76



REPORT ON

Hydrological Regime of Kelo River & Cumulative Impact of Mining and Industrial Activities of Gare Pelma Area

1.0 INTRODUCTION:

1.1 General:

M/s Maharashtra State Power Generation Company Limited (MAHAGENCO) is in process of obtaining Forest Clearance stage II for Gare Pelma-II Coal Block which requires study of Hydrological Regime of Kelo River & Cumulative Impact of Mining and Industrial Activities of Gare Pelma Area. In order to comply M/s Srushti Seva Private Limited, Nagpur have been entrusted the Job vide LOA no. GP II/ESH/June 2022 dated 03.06.2022 to prepare report by NABET accredited N K Prasad Functional Area Expert (Hydrology & Ground water) for MoEF & CC and report is prepared in consultation with Water Resource Department Chhattisgarh.

There are 11 coal block in this segment of Gare blocks namely Gare-I, II, III, IV/1, IV/2, IV/3, IV/4, IV/5, IV/6, IV/7, IV/8 there is Thermal Power Plant of Ms. Jindal Power limited These blocks are also allotted for different companies for captive use. The study area for hydrological regime of all blocks will be 790 km². The total area of all coal block is 143 km². In the present Hydrological Report attempt have been made to predict cumulative impact of all coal mines on water regime of the area on regional scale and on Kelo River.

The Geographic location of study area is given in **Figure 1.1**.



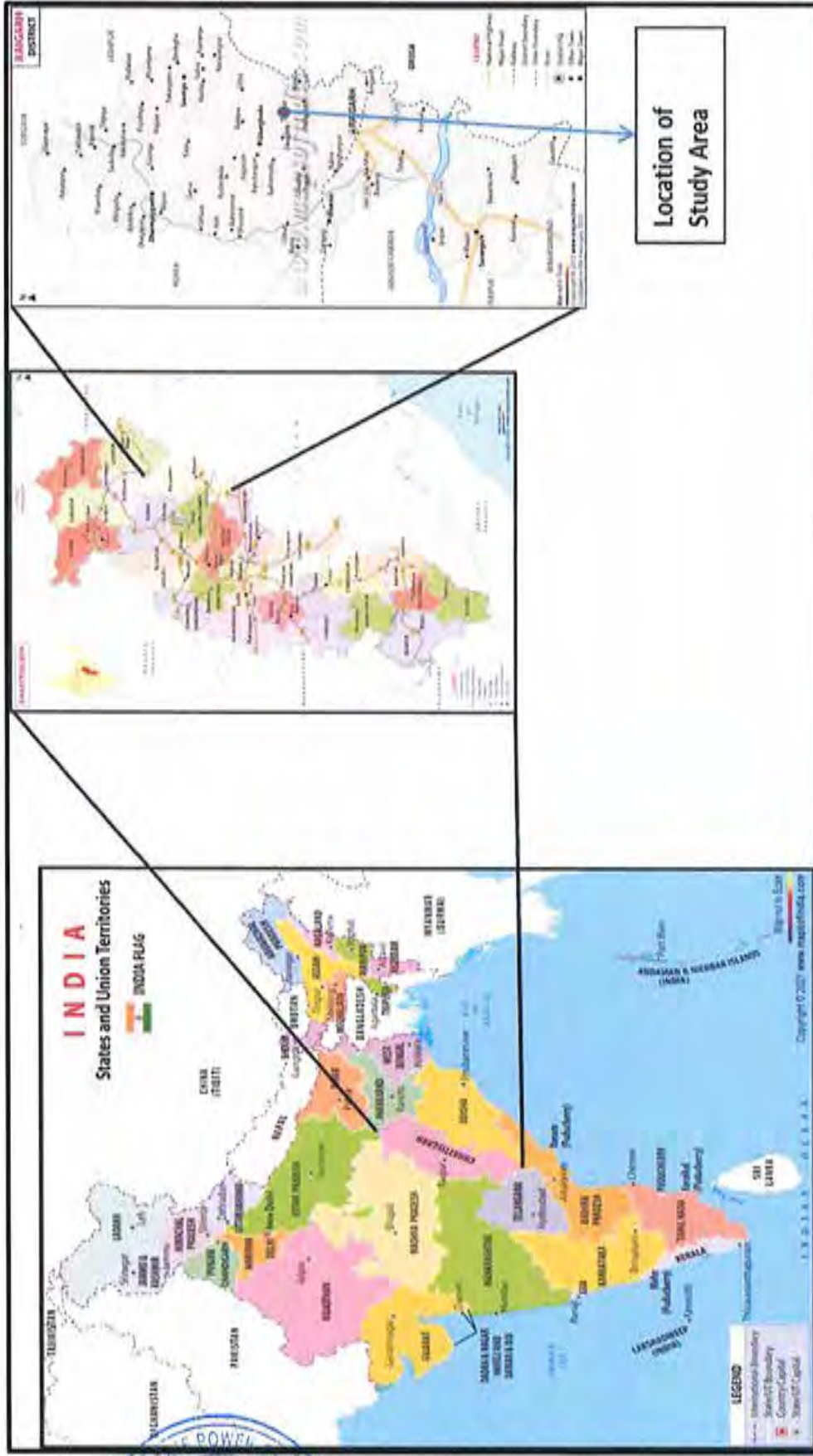


Figure 1.1: Geographic Location of Study Area

1.2 Location of Kelo River Watershed:

The Kelo Watershed is located in Chhattisgarh & Odisha State. It is bounded between coordinate as given below.

Latitude : 21° 30' to 22° 30'

Longitude : 83° 15' to 83° 45'

Toposheet No. : 64 N & 64 O

Scale: :1:2, 50,000

The area of Kelo watershed is 1352 km². Kelo watershed map is place in **Figure 1.2**.

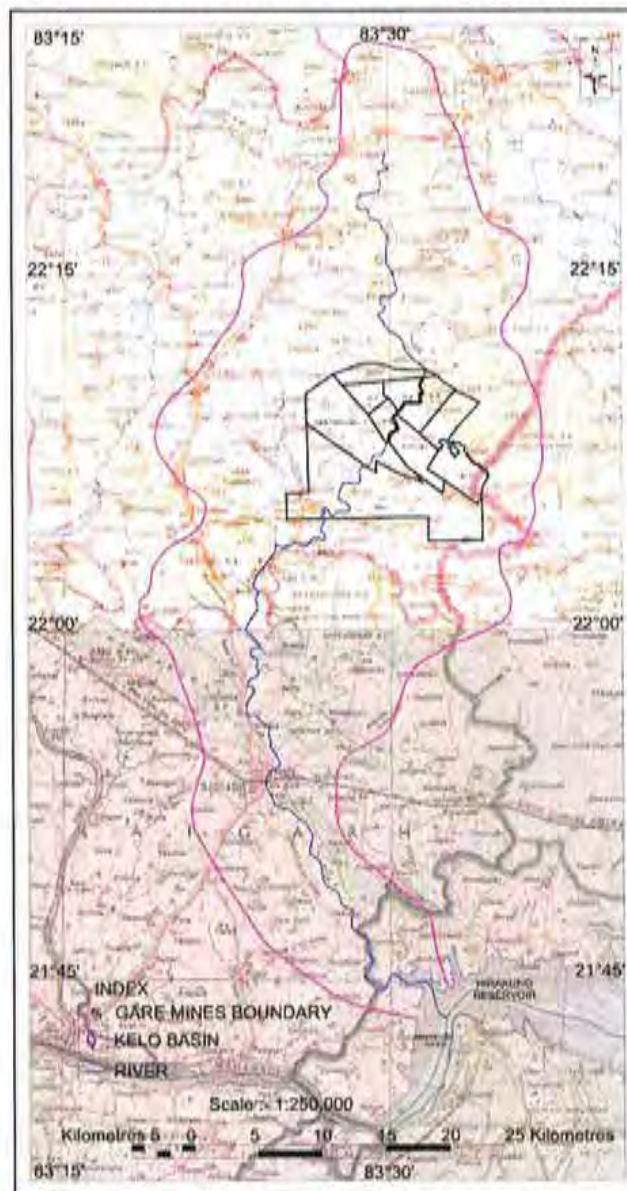


Figure 1.2: Location of Kelo River Watershed with Blocks



1.3 Location of Study Area:

Location of study area for cumulative impact of Coal Mines on Kelo Regime is covered by 790 km² and bounded between coordinates given as under.

Latitude : 22° 00' to 22° 30'

Longitude : 83° 15' to 83° 45'

Toposheet No. : 64 N

Scale : 1:2,50,000

Location map of study area on toposheet is given in **Figure 1.3**.

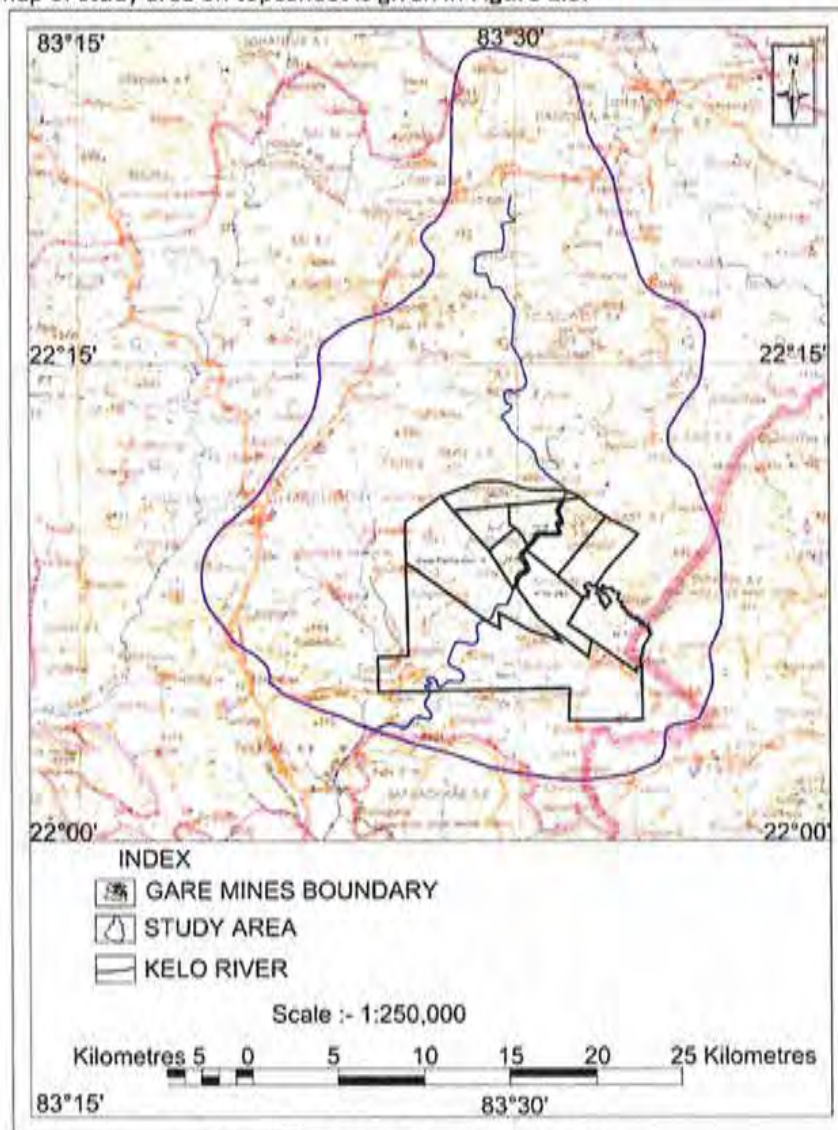


Figure 1.3: Location map of Study area



1.4 Location of Gare Pelma Blocks:

The all eight Coal Blocks are located which bounded by

Latitude : 22° 00' to 22° 15'

Longitude : 83° 17' to 83° 34'

Toposheet No. : 64 N/8 & 64 N/12

Scale : 1:50,000

Location of all Gare Pelma Blocks on toposheet is given in **Figure 1.4**.

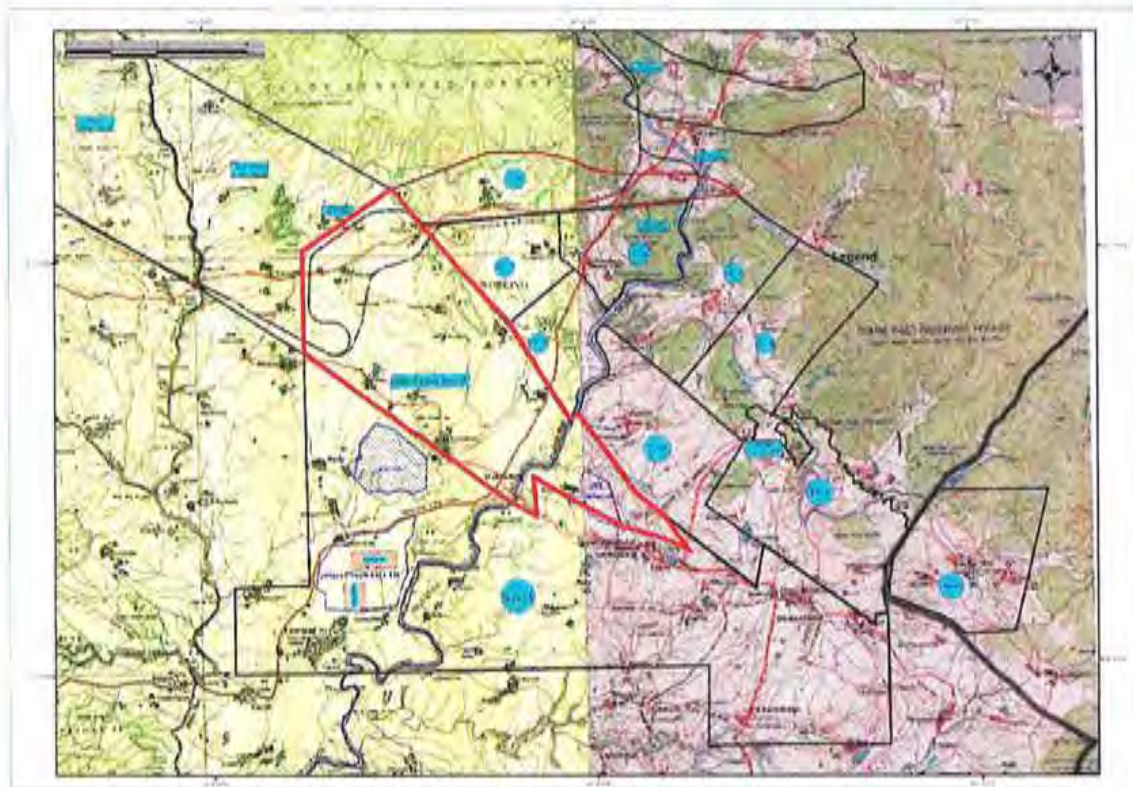


Figure 1.4: Location of GP blocks on toposheet

1.5 Location of the GP II:

The Gare Pelma Sector-II Coal Block lies in Mand Raigarh Coalfield in Raigarh district of Chhattisgarh State. The mine site is located at Tilhi Rampur, Kunjemura, Gare, Saraitola, Murogaon, Radopali, Pata, chitwahi, Dholnara, Jhinka Bahal, Dolesara, Bhalumura, Sarasmal and Libra village. The area is covered in the Survey of India Toposheet No. 64 N/8 & 12 (R.F.1:50,000) and is bound by

Latitude: 22° 06' 22.33" to 22° 10' 48" N

Longitude: 83° 26' 21.85" to 83° 31' 19.1" E



The location of GP II on toposheet showing Mine Lease area is given in **Figure 1.5**.

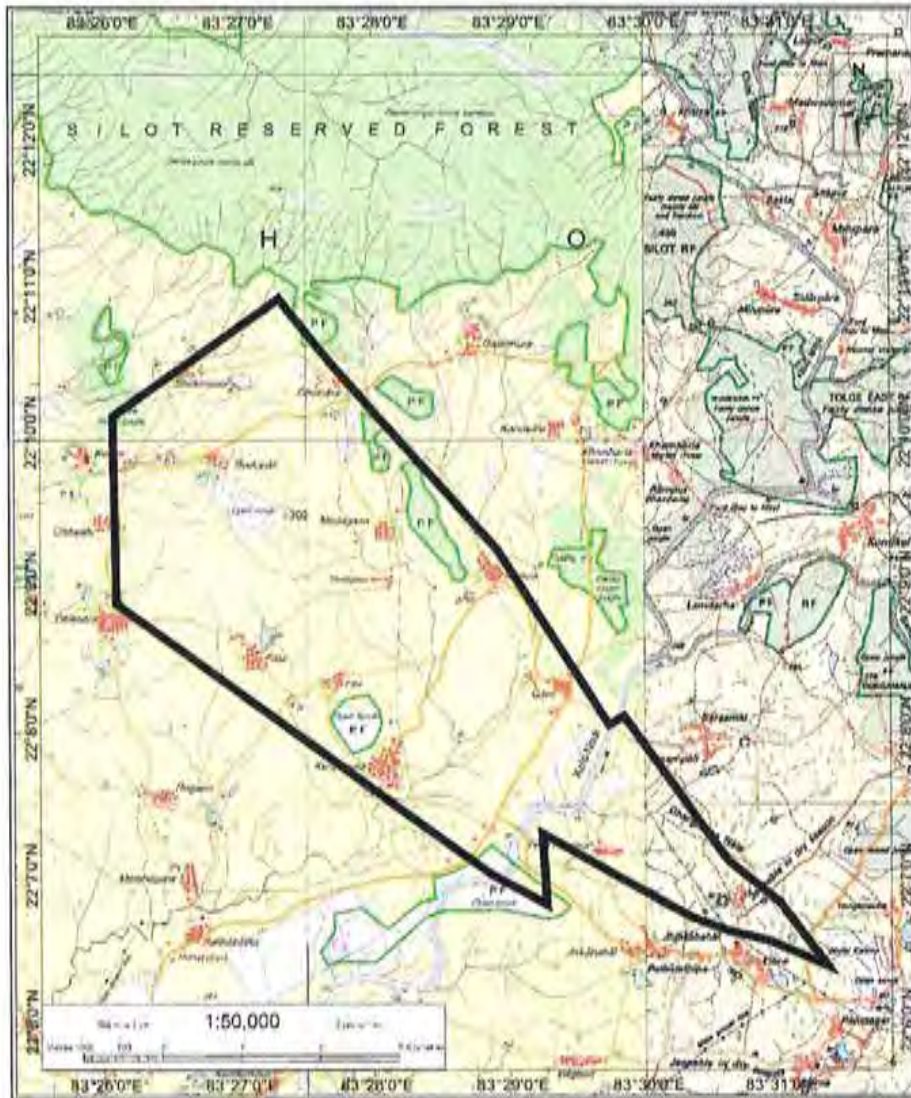


Figure 1.5: Location of GP II on Toposheet

1.6 Concept of Hydrogeological Regime

Hydrogeological Regime changes with time in the rates of flow of rivers and in the levels and volumes of water in rivers, lakes, reservoirs, and marshes. The hydrologic regime is closely related to seasonal changes in climate. In regions with a warm climate, the hydrologic regime is affected mainly by atmospheric precipitation and evaporation; in regions with a cold or temperate climate, the air temperature is a leading factor.



1.7 Statement of Problem:

As per Condition no. 6 for Forest Clearance Stage II

“Mine is located close to Kelo River flowing in the area. Numbers of mines are operational in the area which may cause threat to hydrological regime viz. Kelo river and its rivulet, therefore, a study to assess the hydrological regimes and cumulative impact of mining and industrial activities being undertaken in the Gare Pelma area, on the hydrological regimes of area shall be undertaken in consultation with the Water Resource Department and the same shall be submitted along with considered opinion of Water Resource Department of the State before Stage-II approval. Recommendation to be made in the study shall be implemented by the State from the funds to be realized from the agencies, on pro rata basis, working in the area. The user agency shall also keep adequate area, as per the guidelines of DGMS (Director General of Mine Safety), along the bank of River Kelo as intact and no mining should be carried out in this area. Embankment should be constructed to ensure protection of River and its hydrology from the mining”.

1.8 Solution of Problem:

The solution of problem will be dealt based on following methodology.

- Previous Work
- Land Use
- Topography and Drainage
- Climatic Water Balance
- Geology
- Hydrology
- Hydrogeology
- Water Quality
- Safety Zone and Embankment as per DGMS
- Impact of Mining on Hydrological Regime
- Mitigative Measures



2.0 Previous Work

2.1 Report on Regional Impact of Coal Mines of Gare Pelma Sector on Water Regime (With Reference To Gare Pelma Sector-III)

In July 2012 a study on regional impact of Coal Mining of Gare Coal Block (GCB) on water regime have been done and submitted to MoEF for Environmental clearance of GP III Block of M/s. Goa IDC. Based on the findings of report the EC was granted by MoEF. The salient features of report are reproduced as under. **The radius of influence of each mine have been estimated based on production and depth of mine. The resultant drawdown due to mining has been depicted in Figure 2.1 showing the zone of around Kelo River falls under Zero drawdown.** Thus, there is no depletion of water from Kelo River into mine. The other relevant findings are as under.

1. The cone of depression is small due to low hydraulic conductivity.
2. The cone of depression of each group of mines will be limited to the Kelo river boundary.
3. The cone of depression of operating mines has not extended beyond Kelo River from its center of working as observed through the recent water level in and around the mine.
4. The annual induced recharge to the system is almost equal to discharge from the system. This is due to creation of high infiltration rate by opencast mining operation.
5. There will be internal dump and as such it is expected that in the backfill area the rebound of water level may occur and recoup the water level to larger extent.

Thus, the impact of existing and proposed high capacity coal mines of Gare Pelma Sector on groundwater regime will not be adverse, but expected to be rather positive by increasing the surface flow of Kelo River. In addition, mitigation measures will be undertaken to rebound aquifer system.

(Source: Report on Regional Impact of Coal Mines of Gare Pelma Sector on Water Regime (With Reference to Gare Pelma Sector-III July 2012)



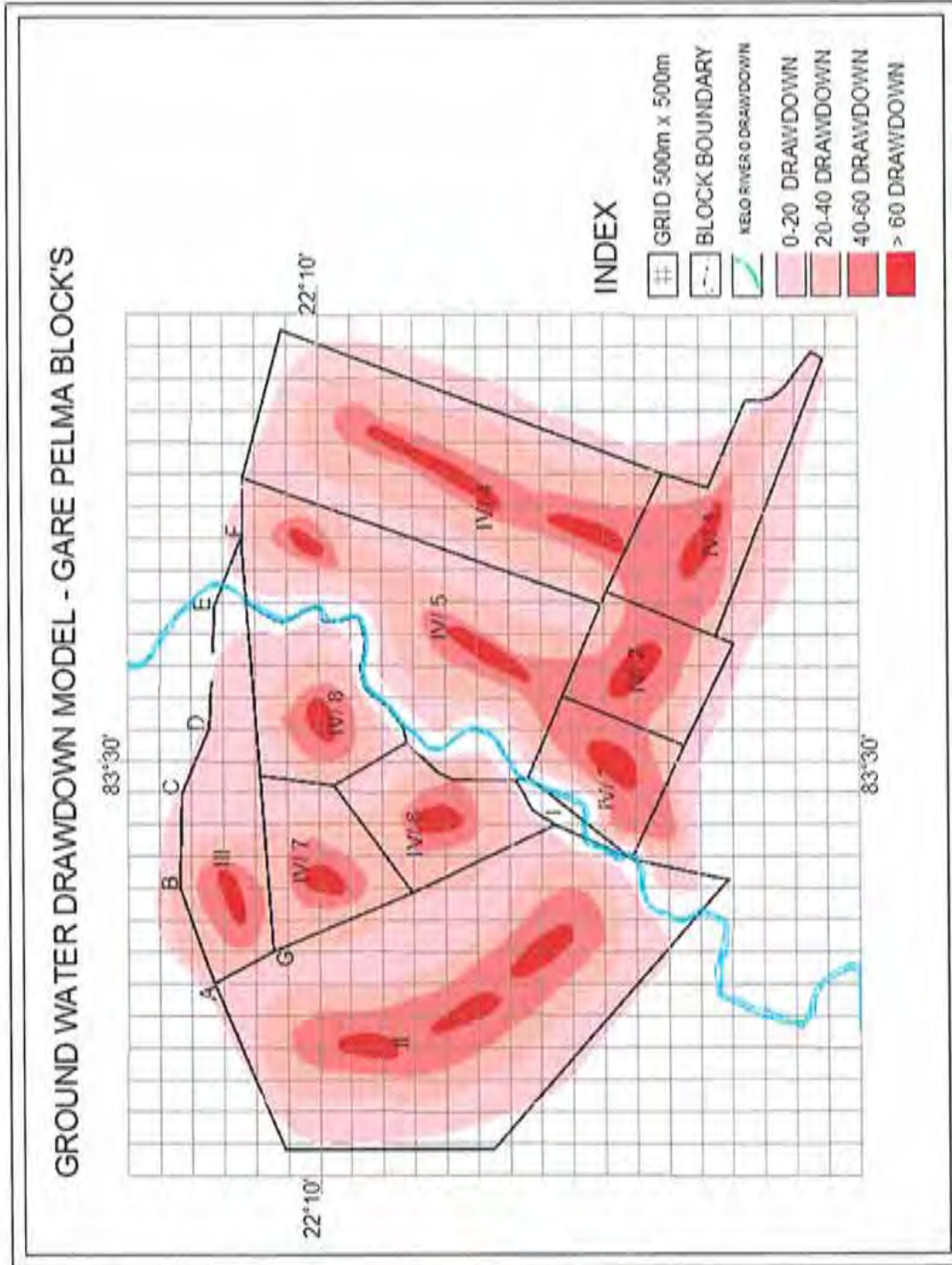


Figure 2.1: Drawdown Model- Gare Pelma Blocks

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2.2 For Gare GP IV/6 Block:

Hydrological study of Kelo River with reference to Gare IV/6 has been done by CSRI National Geographic Research Institute Hyderabad. The relevant abstract of the study is reproduced as under.

Abstract:

"Impact assessment of coal mining of Gare IV/6 Coal Block (GCB) on river water (Kelo River) and groundwater and the interaction between them were studied through hydrological studies like water-level monitoring, short and long-term river flow measurements, isotopic characteristics, and groundwater flow modeling. The hydrological study reveals that the groundwater flow is towards the Kelo River and the river is acting as effluent in nature. The flow direction is parallel to Kelo River in the downstream of the GCB. The isotopic study suggests that the Kelo River water is enriched with $\delta^{18}O/16O$ ratio as compared to watershed samples. Flow modeling suggests that the Kelo River, which is adjacent to the boundary of GCB, may contribute 88.38 m³ /day of groundwater. The groundwater effluence forms a meager component of the total groundwater effluence estimated for the entire length of the Kelo River passing through the study area. Based on the groundwater flow model results it is suggested that the proposed mining operation in GCB will not have any impact on the Kelo River water flow. The suspected Seepage from the Kelo River flooding on the GCB is unlikely as the hydraulic gradient is toward the Kelo River. It is suggested to have a buffer zone and an embankment between Kelo River and GCB to prevent flooding from river water breaching. The present study provides an overall understanding of the hydrogeological conditions in and around mining area which will help in Safe mining operations so that any hazard or threat to the local community may be prevented".

Conclusion:

The study conclude that *"Based on the groundwater flow model results, it is also suggested that the Proposed mining operation in GCB may not impact much on the surface water flow in the Kelo River. The suspected seepage from the Kelo River flooding the GCB may not happen as the hydraulic gradient is towards the Kelo River. The proposed buffer zone may be used for the construction of embankment of the Kelo River to prevent flooding of the GCB from surface water breaching from the Kelo river bank".*

(Source: Paper by Ratnakar Dhakate et al of CSIR NGRI Hyderabad)



2.3 Hydrological Study for Kelo Dam:

The relevant part from the report prepared by Department of Water Resources, Government of Chhattisgarh, Raipur is reproduced below with reference to Kelo Dam.

2.3.1 Catchment Area

The Catchment Area of Kelo River up to the proposed dam site near Danote (v) is 920.21 sq.km. Ninety five percent of the catchment area lies in Chhattisgarh state only. A marginal area of 5 percent lies in Orissa state.

2.3.2 Drainage Area

The area is characterized by dendritic pattern of drainage and mainly controlled by Kelo river and its tributaries. The project area is drained by Kelo river, Pajhar nadi, etc., The general topography of the Kelo command is broadly plain with elevation from 213.0 m to 243.0 m above MSL and slope direction is generally from North to South. The area is covered with several major and minor streams which collect the run off from the surface into the reservoir.

2.3.3 Water Availability and Utilization

The 75% dependable yield from Kelo catchment area as approved by CWC, is 388.23 M cum and yearly water utilization proposed for the project is 172.88 M cum (173 Mm³) only. The water use in Mahanadi basin from completed and ongoing major, medium and minor schemes of Chhattisgarh state has been worked out to about 730 M cum. With the proposed utilization under Kelo project of 173 Mm³, the total utilization works out to 7473 Mm³ which is about 28.15% of available yield of 6,542 Mm³ in Mahanadi water as per the share of Chhattisgarh, proportionate to its catchment area.

2.3.4 Gauge Discharge Data

The monthly discharge data of Kelo River observed by the Hydro meteorology division No. 4, Raipur at Kelo Bridge at Raigarh during the years from August 2001 to 2007. The observed annual run-off with peak and lean flows are tabulated in **Table – 2.1**.



Table 2.1: Annual Runoff Kelo River

Sl. No	Year	Annual run off (MCM)	Peak observed discharge (cumecs)	Lowest observed discharge (cumecs)
1	2001 - 2002	409	160 (22-08-2001)	7.94 (03.02.2002)
2	2002 - 2003	589	114 (12-09-2002)	8.47 (31.07.2002)
3	2003 - 2004	969	180(08.09.2003)	8.23 (08.07.2003)
4	2004 - 2005	911	394 (12.08.2004)	10.6 (30.04.2005)
5	2005 - 2006	928	180 (06.08.2005)	12.7 (26.05.2006)
6	2006 - 2007	653	218 (30.07.2006)	0.49 (11.04.2007)
	Average	743.17	207.67	8.07

(Source: EIA/EMP Agriculture Finance Corporation Limited 2008)

The mean annual run off considering the last six years worked out to 743.17 Mcm. The mean peak and lowest observed flows in the Kelo River are 207.67 cumecs and 8.07 cumecs respectively.

2.3.5 Sedimentation

The water available in Kelo River is free from any in hygienic solvents considered harmful for irrigation and domestic water supply purpose. The catchment area of 920.21 sq.km up to dam site has been considered for sedimentation studies. For calculation of silt reserve, rate of silting has been adopted as 0.52 ha. M/sq.km of catchment area per year (1.0 acre ft per sq. mile of CA per year) according to silt observations conducted at Harkin dam as suggested by CWC duly taking the life of the reservoir as 100 years. The zero elevation of the dam has been worked out at +219.51 m and the MDDL has been fixed at +227.0 m. The sediment distribution has been worked out for the period of 50 years and 100 years by need's method. Sediment distribution up to + 23933 m has been done. The abstract of sediment study are shown in **Table 2.2** computations of gross sediment deposits for 50 years and 100 years has been made in the studies.

Table 2.2: Abstract Sediment Studies

Sl.No	Particulars	Unit (Acre ft.)	Life in years	Quantity of Sediment deposits in acre ft
1	Total Silt	Acre ft.	50/100	35545.00
2	Zero elevation	Acre ft.	50/100	
3	Silt below zero elevation	Acre ft	50/100	1396.00
4	Silt above zero elevation	Acre ft	50/100	34149.00
5	Silt below 229.00 m	Acre ft	50/100	15433.00
	Silt above 229.00 m	Acre ft	50/100	20112.00



Hydrogeological Regime of Kelo River & Cumulative Impact of mining and other industrial Activities of GP Area

Keeping in view of the command level in view, the MDDL is fixed at RL 227.00 m. The silt sediment trapped by the upstream projects has not been considered in this computation, being very marginal or negligible quantity.

2.3.6 Water use and Water Availability

The project aims at making optimum use of water resources of Kelo River and its tributaries. Besides it has been estimated that upstream of Kelo Dam water requirement for irrigation by Minor Schemes and that of domestic and industrial supply of Water may be of the order of 0.0073800 M.ham. (67.20 thousand acres ft). This, the use of water from the Project itself would be 0.03115 M.ham (253.249 Thousand Ac.ft.) Against this, the water available at Kelo dam, Danote site C-C axis, without deduction of the upstream use, will be of the order of 0.038714 M.ham on the basis of the annual inflow i.e., (314.748 thousand acre ft) 0.03606 M.ham (293.172 thousand acre ft) on the basis of monsoon inflow from June to October at 75% dependability. The water available at the project site after deduction for the upstream use would be 0.027795 M.ham. (225.972 thousand acre ft) based on the monsoon inflows. Therefore some carry over storage s provided for this project taking into account the requirement anticipated from the water use on the upstream of the project. **Table 2.3** gives the idea of the water available and that proposed to be used for irrigation and other purposes.

Table 2.3: water availability and requirement

Sl.No	Item	Quantity of Water requirement	
		M.ham	Maacre ft
1	Water available	0.0387140	0.314
2	Upstream Utilisation	0.0073800	0.067
3	For Kelo Project Irrigation	0.0311500	0.25325
4	Water Supply for domestic and industrial purposes	0.0068856	0.0072
	Total	0.0454156	0.32745

(Source: Kelo Major Irrigation Project, Department of Water Resources, Government of Chhattisgarh, Raipur March 2008)



3.0 Land Use:

3.1 Land Use of Kelo Watershed:

Land Use map of Kelo Watershed has been prepared by using ISRO Bhuvan thematic data and the land use map of Kelo Watershed is given in **Figure 3.1**

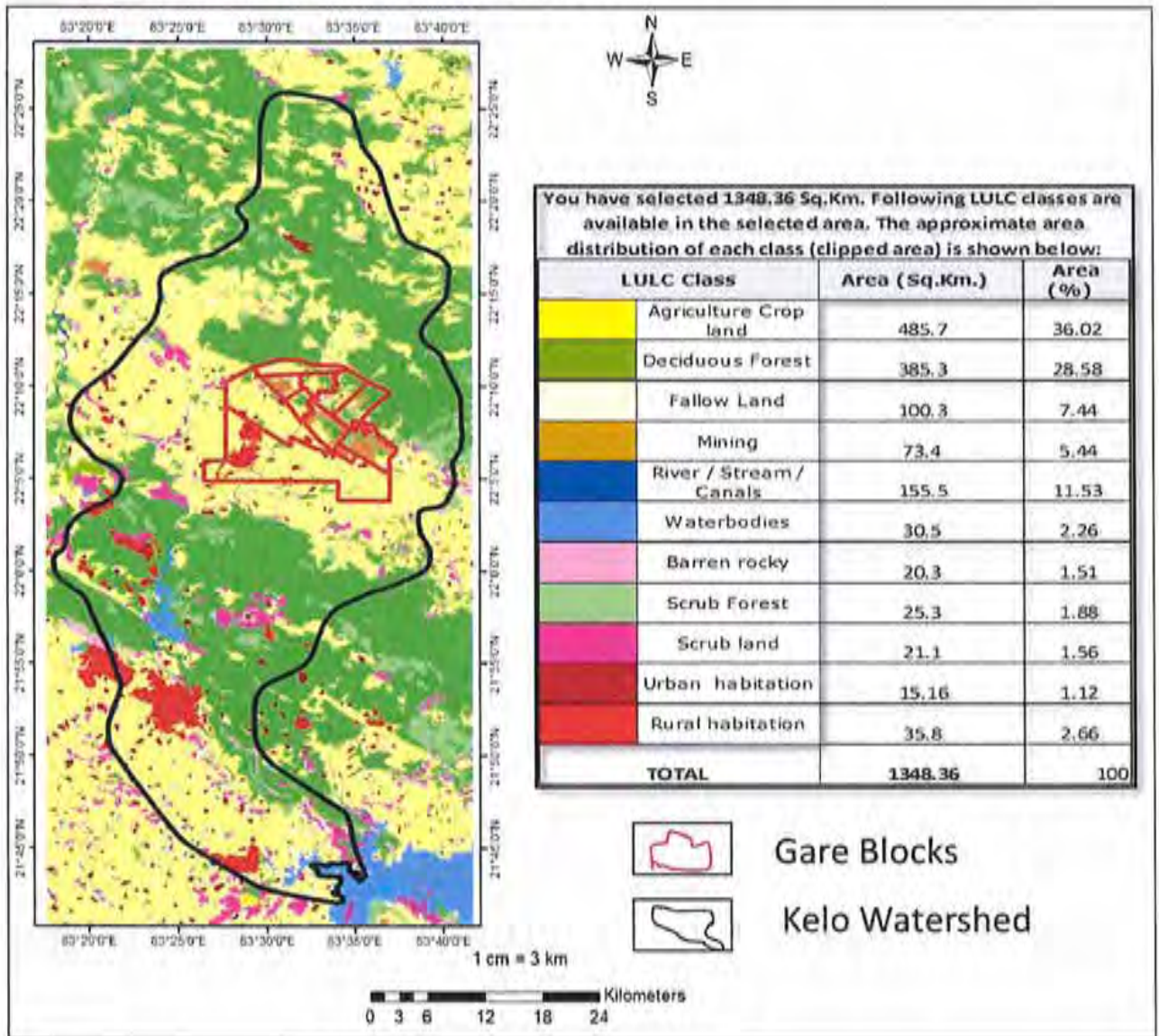


Figure 3.1: Land Use map of Kelo Watershed

3.2 Land use - Mining Activity GP II:

The entire land coming within lease hold area of coal mine is 2583.48 ha will be utilized for mining and ancillary activities are given in **Table 3.1**.



Table 3.1: Land use Cover of Proposed Mine

Sr. no.	Land use	At the end of 5 th Year Ha	At the end of 25 th Year Ha	At the end of OC mining 29 th Year Ha
1	Excavation	380.70	2272.42	2440.55
2	Backfill	0.00	1535.00	2248.77
3	Void	380.70	737.42	191.78
4	Surface dump	380.00	0.00	0.00
5	Bund	5.20	5.20	5.20
6	Green Belt	36.07	36.07	36.07
7	Top Soil Dump	60.00	00.00	0.00
8	Settling Pond	10.00	5.00	5.00
9	Road Diversion	30.30	30.30	30.30
10	Facilities (West)	50.94	50.94	50.94
11	Facilities (East)	68.54	0.00	0.00
12	Under Kelo River	15.42	15.42	15.42
13	Dismantling	0.00	0.00	0.00
14	Disturbed area	1017.17	2415.35	2583.48
15	Undisturbed	1566.31	168.13	0.00
	Total	2583.48	2583.48	2583.48



4.0 Topography and Drainage:

4.1 Topography:

All Gare Pelma blocks exhibit gently undulating topography. The ground elevation in this block ranges from 380 m to 230 m amsl. The highest elevation in Kelo Watershed area is 767 m amsl and minimum elevation is about 176 m amsl. The minimum elevation showing low topographic value along Kelo River, Kelo dam and Hirakund dam. Highest elevation is towards northern portion of the watershed which shows hills. The DEM Map is prepared by using ArcGIS tools and DEM is given in Figure 4.1.

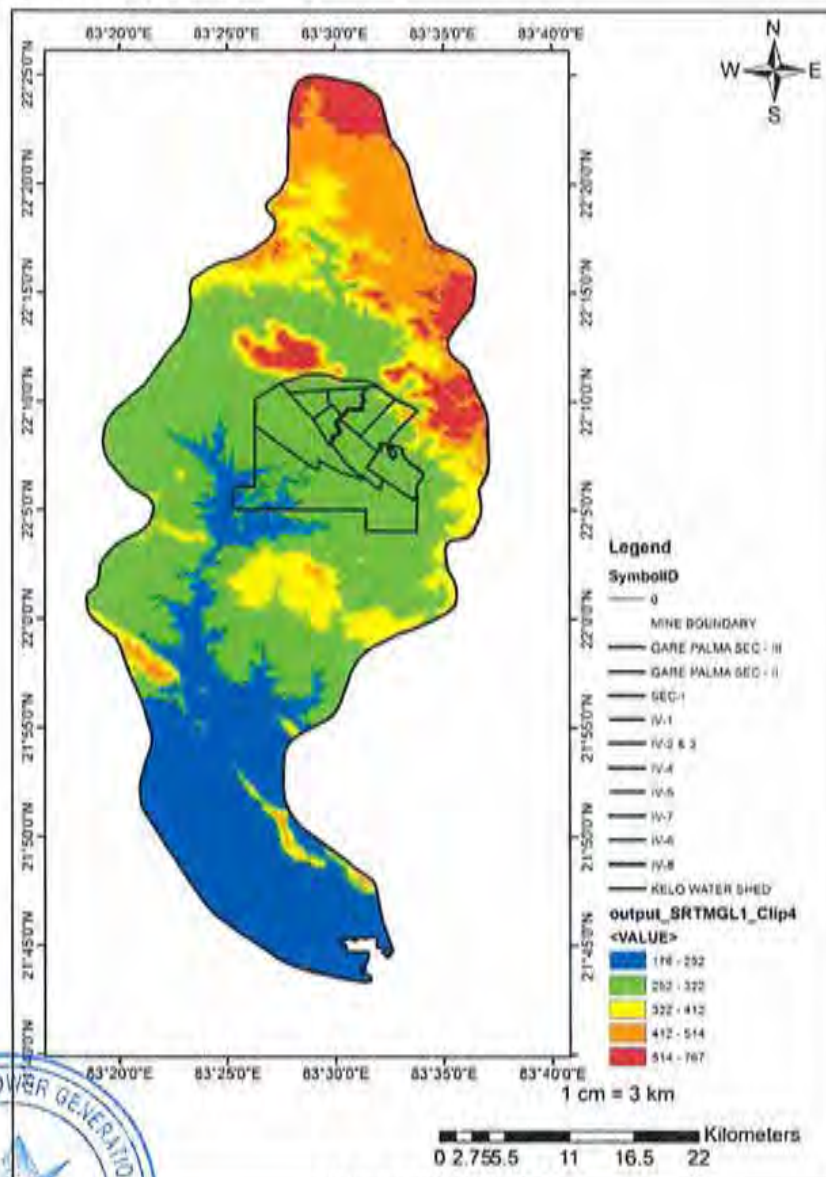


Figure 4.1: DEM Map

DEM Map of study area is prepared and which is also used in modeling is given in Figure 4.2.

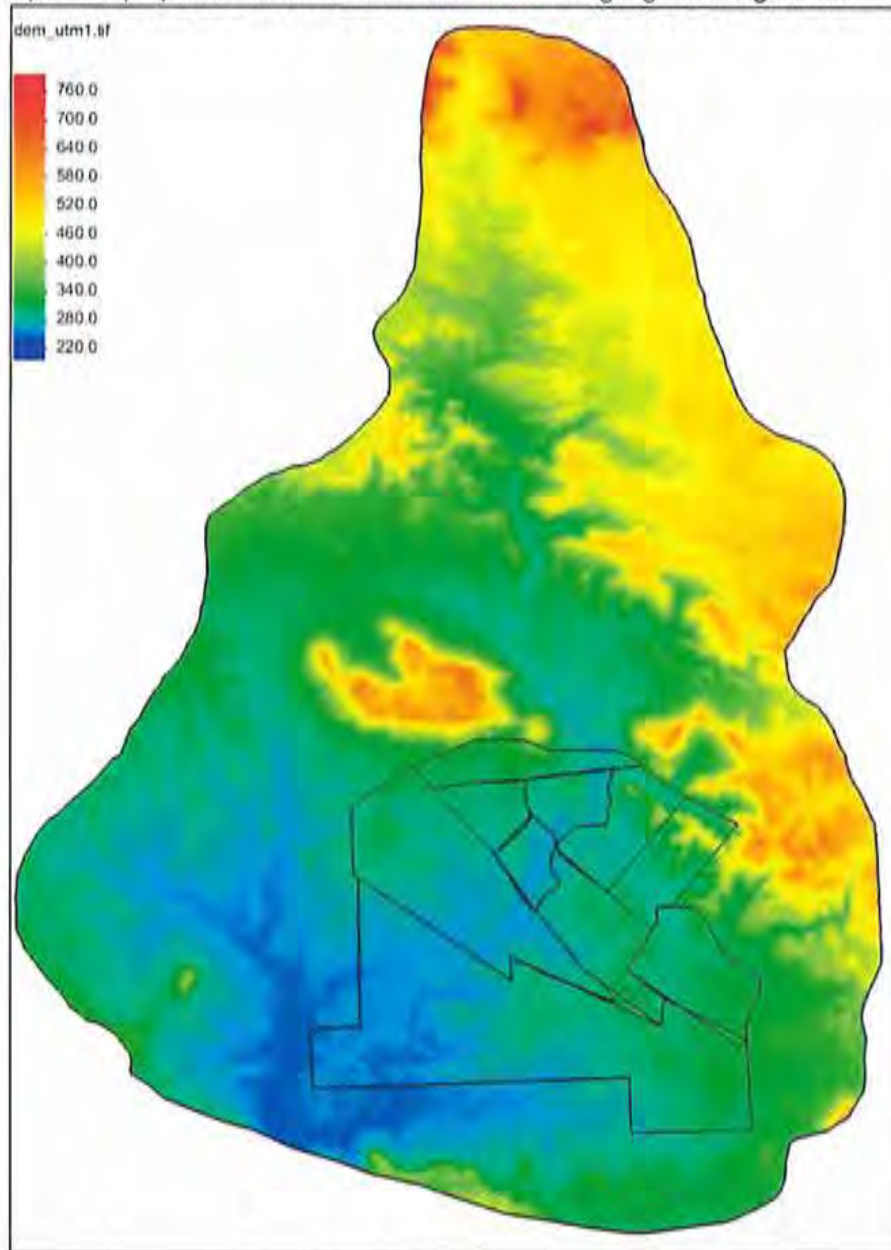


Figure 4.2: DEM map of Study Area

4.2 Drainage:

The area is characterized by dendritic pattern of drainage and mainly controlled by Kelo river and its tributaries. The project area is drained by Kelo River, Pajhar nadi, etc. The area is covered with several major and minor streams which collect the run off. River basin is given in Figure

4.3. Drainage map of Kelo basin is given in Figure 4.4.

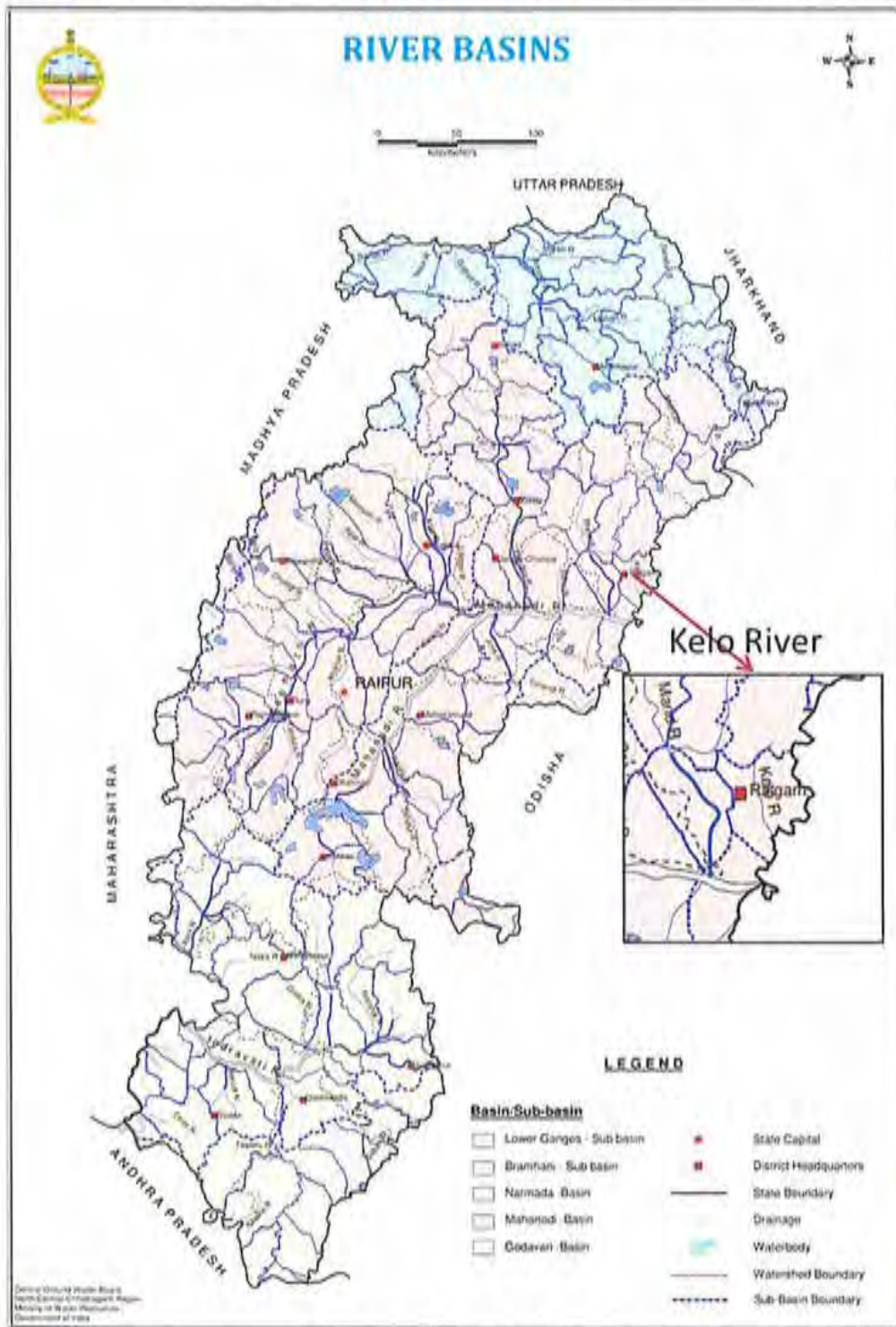


Figure 4.3: River Basin of Chhattisgarh



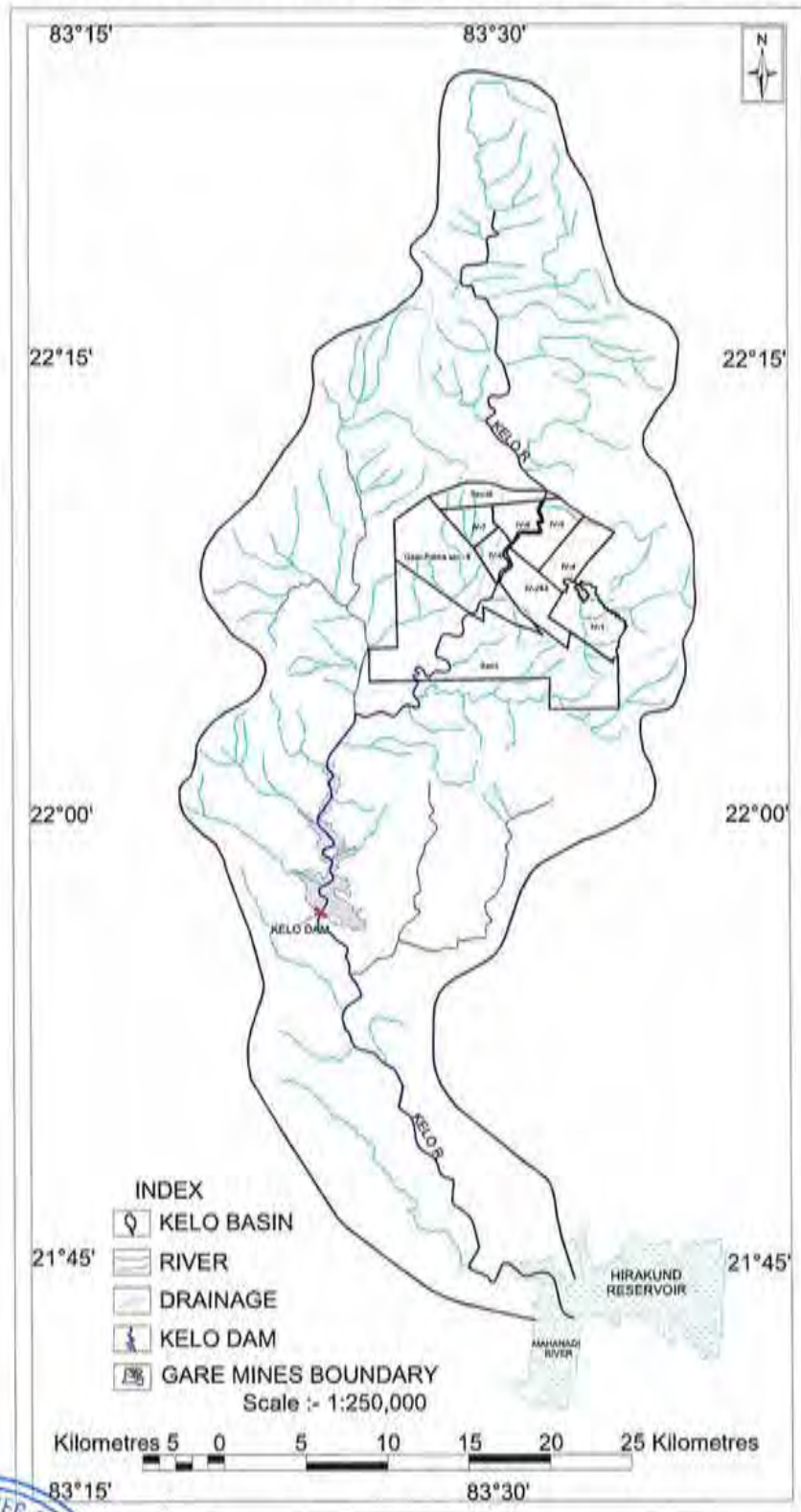


Figure 4.4: Drainage map of Kelo River



Drainage map of study area: Drainage map of study area with all Gare pelma Blocks, Kelo River and Pajhar Nala is given in Figure 4.5.

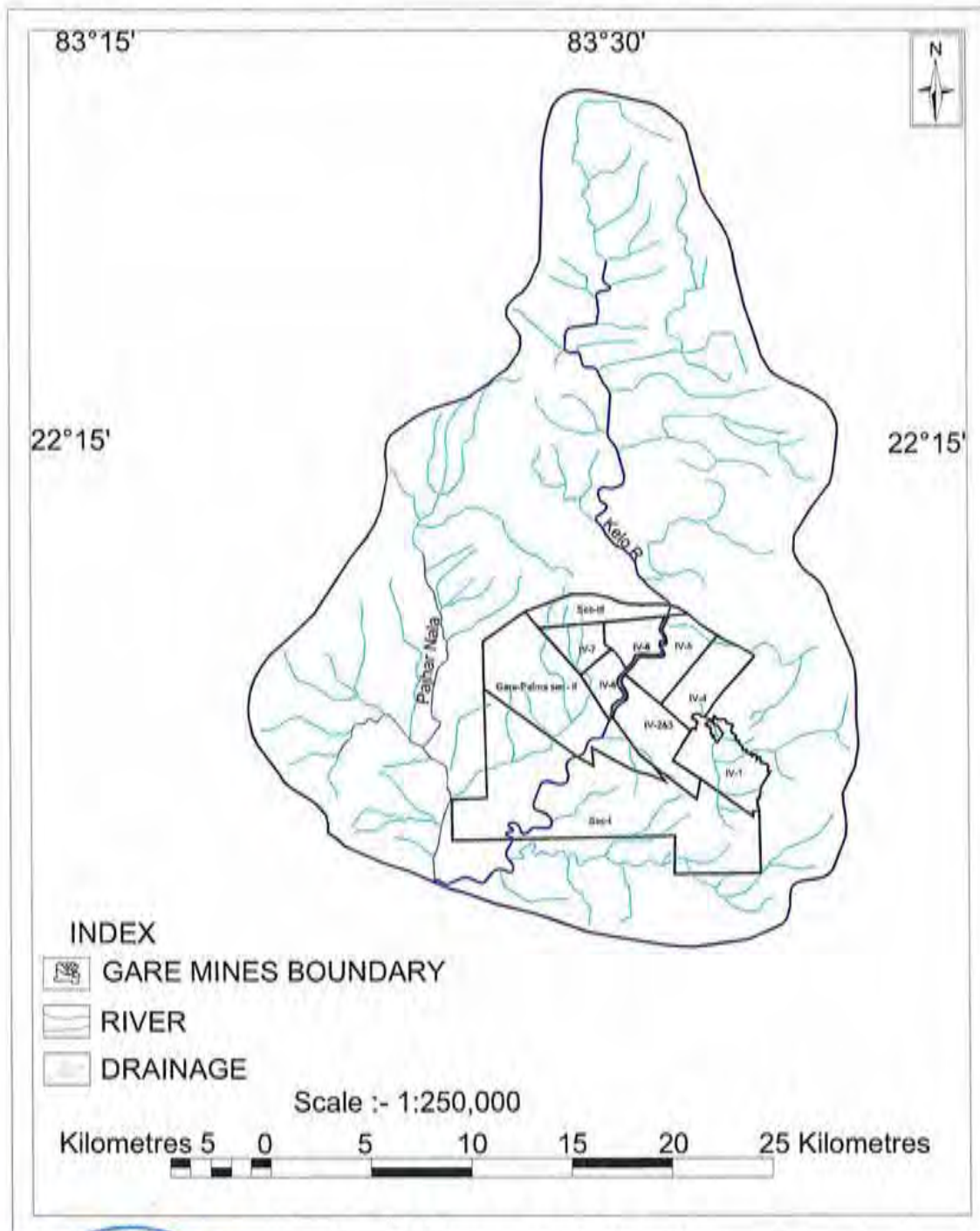


Figure 4.5: Drainage Map of Study Area



5.0 Geology of Kelo River:

Regional Geology of Kelo River:

The Barakar occurs as thin strip across Kelo River because of truncated sequence through it, consisting of a nearly 200 m thick pile of sediment in the main basin portion. The sub-arkosic character of the sandstone with calcareous and ferruginous cement resembles the known Barakar formation of the Mand Valley in the West and Ibb Valley in the East - South- East.

The Kamthi formation has wide extent towards NW-SE and rests over the Barakar just North of Danote-Lakha belt along the Kelo Valley. The lithological character of this member resembles the Kamthi of Hingir and Ibb valley. In the Kelo valley the thickness of this unit may not be appreciable and will be approximately 50-60 m.

Irregular patches of recent gravel and conglomerate occur over the ground especially on the higher contours in the proximity of Kelo River. The area in the vicinity of Raigarh has not shown any igneous emplacement.

The Gare area is located in the southeastern part of the Man-Raigarh coalfield (Figure 5.1). The Gare area of all block constitutes about 143 km². The stratigraphic sequence and broad lithology of the formations in Gare area, according to GSI, is given below.

5.1 Geological Structure:

The Kelo river valley coal fields represent the South-Western extremity of the major Gondwana basin aligned in NW- SE direction. The trend of this basin bears parallelism to the structural grain of the pre-Cambrian basement rocks. Regionally, the Kelo Valley coal fields forms part of the inter-connected Hasdo (Korba), Mand and Ibb river coal fields, the southern boundary of these basins locally marks a faulted contact. This follows an alignment of NW-SE alignment, which possibly limits the southern part of Mahanadi graben.

The basin floor in the Kelo Valley appears to be irregular and the Archean upland alignment is in a general NW- SE West of Lakha upto Chiraipani, the lower Gondwana formations abut against the Cuddapah and the pre-Cambrian, thereby indicating a faulted contact. The Kelo river basin occurs as broad and open syncline and the synclinal core lies along Bainsagahi and Taraimal in a NW - SE direction. Along the basin fringe, the beds dip at 10-12 degrees towards NE, whereas the general dip is low (2 to 5 degrees) towards NE, south of axis and SE towards both of fold axis. Near the synclinal core the dips are almost horizontal.

Another set of fault in NE-WE direction is developed across the basin fringe near Danote-Lakha. Apart from these features the Kelo River coal fields appears to be free from major structural disturbances.



The Geological sequence as established on the basis of available surface and sub-surface data is as below in Table 5.1.

Table 5.1: Regional Geology Map

Age	Group	Formation
Recent		Alluvium, Recent Gravel and Conglomerate some laterit
Upper Permian	Lower Gondwana	Ferruginous sandstone and shale
Upper Permian	Lower Gondwana	Current bedded feldspathic sandstone, fine to medium grained sandstone and coal seam
Lower Permian	Barakar Formation	Light green to grey silt stone, fine to medium grained sandstone and coal seam.
Lower Gondwana	Lower Coal formation Karhabari	
Unconformity		
Proterozoic	Cuddapah	Quartzites and red hard fine grained sandstone and limestones
Unconformity		
Archean	Basement Complex	Granites, gneisses, mica schists, quartzites, intruded by pegmatite and quartz veins.

(Source: EIA/EMP Agriculture Finance Corporation Limited 2008)

5.2 Metamorphic Formation:

There is a prominent exposure of metamorphic formation east and north of Beljor and Janjgir village located in the eastern most part of the Gare area. The exposure trends in N-S direction. The Barakars swerve around this exposure from N-S direction to an E-W direction in the eastern part.

5.3 Barakar Formation:

The coal bearing Barakars formation are exposed over a major part of the area starting from the northern faulted contact with Barren measures and upto the normal Barren measure contact in the south. Within this tract, all the coal seams incrop. In all, there are ten regionally co-relatable coal seams and ten local seams. Four regional seams (I to IV) and five local seams (1L1, 1L2, III L1, III L2 and IV L) occur in the Lower Member of the Barakar formation while six regional seams (V to X) and five local seams (VL, VIII L, IX L1, IX L2 and XL) occur in the upper member. The total thickness of the Barakar formation is estimated to be about 500 m.

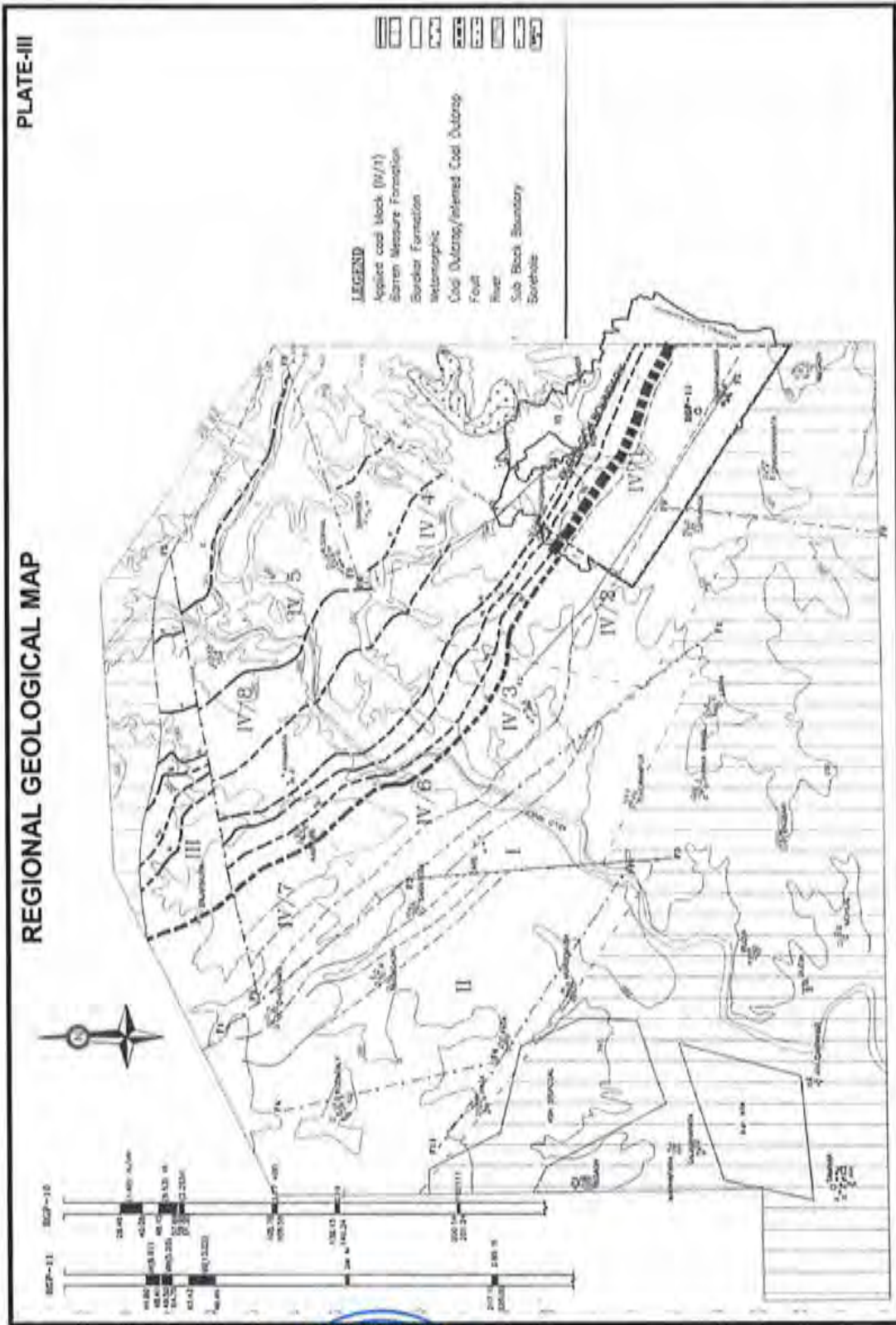


Figure 5.1: Regional Geological Map

6.0 Hydrology of Kelo Basin:

6.1 Hydrological Regime:

The hydrologic cycle involves the continuous circulation of water in the Earth-Atmosphere system. At its core, the water cycle is the motion of the water from the ground to the atmosphere and back again. Following are the process responsible for Hydrological cycle. The general hydrological cycle is given in Figure 6.1.

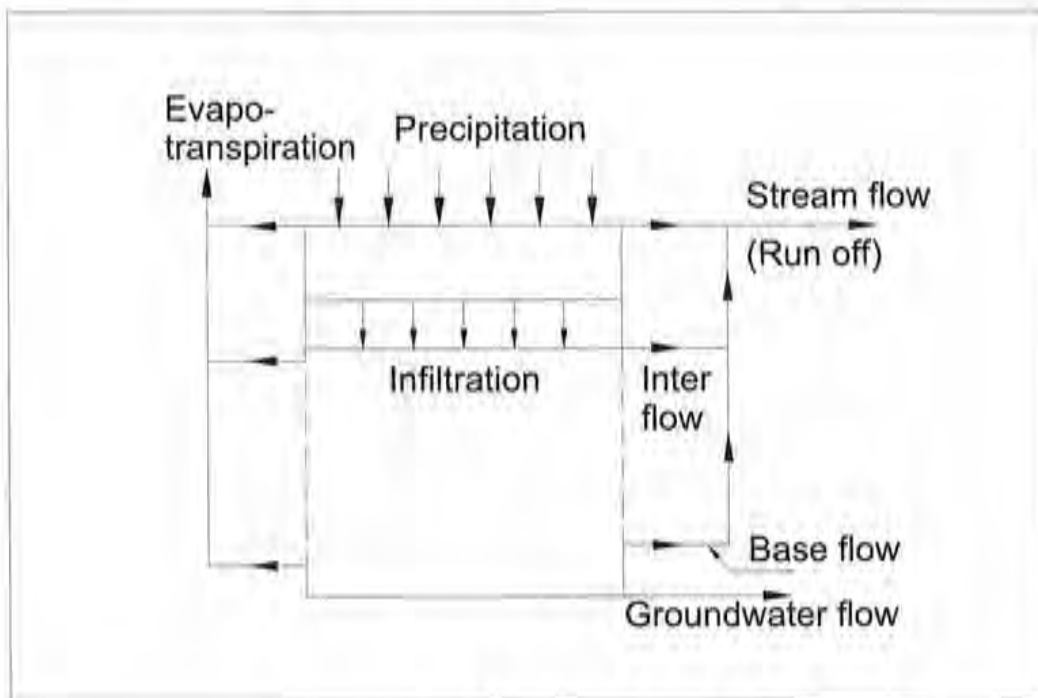


Figure 6.1: Hydrological Cycle

Evaporation: Evaporation is the change of state in a substance from a liquid to a gas. In meteorology, the substance we are concerned about the most is water.

Transpiration: Transpiration is the evaporation of water from plants through stomata. Stomata are small openings found on the underside of leaves that are connected to vascular plant tissues. In most plants, transpiration is a passive process largely controlled by the humidity of the atmosphere and the moisture content of the soil. Of the transpired water passing through a plant only 1% is used in the growth process of the plant. The remaining 99% is passed into the atmosphere.



Condensation: Condensation is the process whereby water vapor in the atmosphere is changed into a liquid state. In the atmosphere condensation may appear as clouds or dew. **Precipitation:** Precipitation is the result when the tiny condensation particles grow too large, through collision and coalescence, for the rising air to support, and thus fall to the earth. Precipitation can be in the form of rain, hail, snow or sleet.

Runoff: Runoff occurs when there is excessive precipitation and the ground is saturated (cannot absorb any more water). Rivers and lakes are results of runoff. There is some evaporation from runoff into the atmosphere but for the most part water in rivers and lakes returns to the oceans.

6.2 Climatic Water Balance

6.2.1 Rainfall:

Normal rainfall in the study area:

The annual normal rainfall of study area as considered for Raigarh district is 1394.7 mm. The month wise normal rainfall is tabulated in **Table 6.1**. The monsoon rainfall 1238.1 mm i.e. 89% and non-monsoon rainfall 156.6 mm i.e. 11% are tabulated in **Table 6.2**. The relevant climatological feature of nearest IMD station at Raigarh has been attributed for the present study. The Normal rainfall of Raigarh is given in **Figure 6.2**.

Table 6.1: Normal rainfall in Raigarh District

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
Raigarh station	11.6	10.8	11.6	11.7	21.3	205.0	390.8	363.7	227.5	50.8	8.7	7.7	1321.2



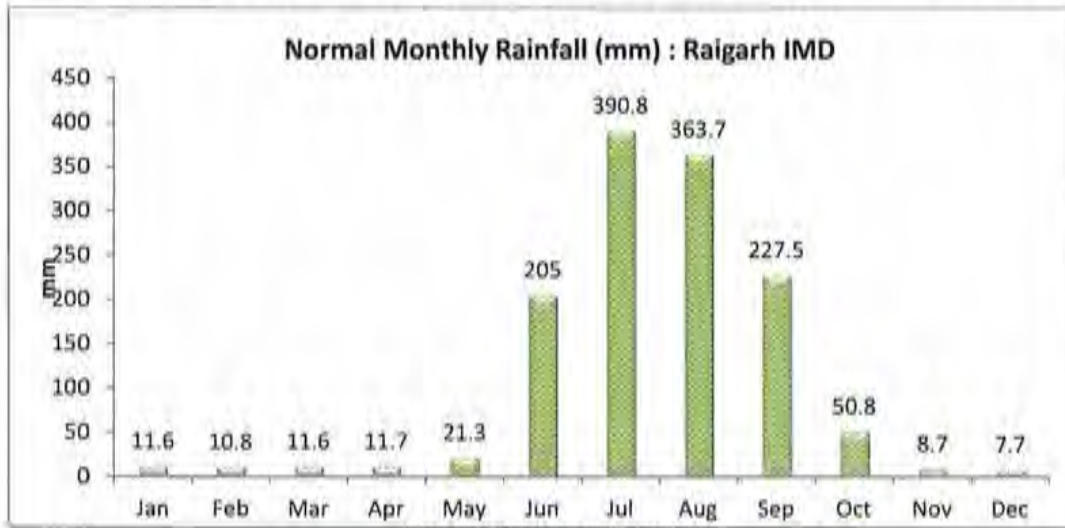


Figure 6.2: Normal Rainfall

Table 6.2: Distribution of Normal Rainfall of nearby stations

Season	Rainfall mm	Percentage %
Monsoon	1187.0	90%
Non-Monsoon	134.2	10%
Total	1321.2	100%

6.2.2 Potential Evapotranspiration (PE):

The PE value of Raigarh of EMP station has been considered for study. The PE value is given in

Table 6.3 and Figure 6.3

Table 6.3: Potential Evapotranspiration

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
PE	85	105.3	149.7	178	207	166	108.6	101.5	103.4	117.1	93	77.3	1492.4



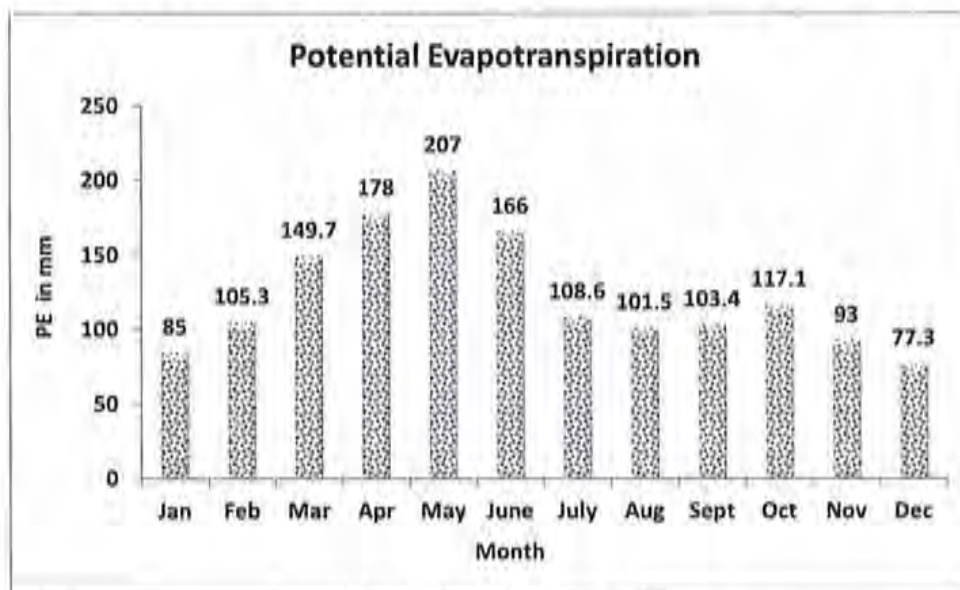


Figure 6.3: Potential Evapotranspiration

6.2.3 Climatic Water Balance:

The idea of climatic water balance was first put forth by Thornthwaite in 1944. Subsequently he developed water balance technique. Elements of climatic water balance for watershed located in and near the project area are computed.

Water Balance Techniques:

The term "Water Balance" refers to the balance between the incoming water from precipitation and the outgoing water by evapotranspiration resulting in change of soil moisture and runoff. It is a climatic balance obtained by comparing the match of precipitation with evapotranspiration, yielding a number of moisture parameters like water surplus, water deficiency, soil moisture change and runoff. The basic relation governing the water balance concept is;

$$P = E + AS + RO$$

Where,

- P = Is precipitation in mm
- E = is evapotranspiration in nun
- AS = Is change of soil moisture in mm
- Ro = is runoff in mm



An important feature of the water balance concept is the recognition of the part played by soil in the exchange of moisture between the earth's surface and the atmosphere. Soil-acts as a medium for storing water (up to a limit) in times of excessive rainfall and releasing the same (in a restricted manner) at other times for purposes of evaporation and transpiration.

Water Balance Table: Using the method described in the above paragraph, the climatic water balance has been computed with the following information for the normal rainfall and placed in **Table 6.4.**

- Potential evapotranspiration (PE)
- Rainfall (P)
- P-PE
- Accumulated potential water loss (accumulated negative value of P-PE) = ACC (P-PE)
- Storage (S)
- Storage change (ΔS)
- Actual evapotranspiration (AE)
- Water deficit (WD)
- Water surplus (WS)
- Runoff (R_0)

Discussion on climatic water balance: From the study of table and graph following important facts in respect of climatic water balance has emerged for study area.



Table 6.4: Climatic Water Balance of Kelo watershed

Parameter	Jan	Feb	Mar	April	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Total
PE	85	105.3	149.7	178	207	166	108.6	101.5	103.4	117.1	93	77.3	1492.4
P	11.6	10.8	11.6	11.7	21.3	205	390.8	363.7	227.5	50.8	8.7	7.7	1321.2
P-PE	-73.4	-94.5	-138.1	-166.3	-185.7	39	282.2	262.2	124.1	-66.3	-84.3	-69.6	-171.2
ACCP-PE	-293.6	-388.1	-526.2	-692.5	-878.2	0	0	0	0	-66.3	-150.6	-220.2	-3215.7
S	46.077	28.726	14.401	6.270	2.477	200	200	200	200	143.569	94.190	66.507	1202.217
ΔS	-20.430	-17.351	-14.325	-8.125	-3.793	197.523	0	0	0	-56.431	-49.379	-27.683	± 197.53
AE	32.03	28.151	25.925	19.835	25.093	166	108	101.5	103.4	107.231	58.079	35.363	810.607
WD	52.97	77.149	123.775	158.175	181.907	0	0	0	0	9.869	34.921	41.917	680.683
WS	0	0	0	0	0	39	282.2	262.2	124.1	0	0	0	707.5
Ro	10.332	5.166	2.583	1.295	0.645	19.500	150.85	206.52	165.31	82.65	41.328	20.664	706.843

Climatic Water Balance :-

$$P = AE + RO \pm \Delta S.$$

$$1321 = 811 + 707 - 197$$



6.3 Runoff:

The portion of the precipitation which by variety paths above and below the surface of earth reaches the stream channel is called runoff. Once it enter stream channel, runoff become stream flow. It is thus represent output from the catchment in a given unit of time.

The runoff estimation of Kelo catchment has been done for two time units.

- One day heaviest rainfall as peak flood runoff
- Annual monsoon rainfall as annual runoff yield.

The peak flood estimation will be done by two methods

1. Mathematical Model by CWC
2. Empirical Methods

6.4 Mathematical Model for Peak Flood Estimation:

Central Water Commission (CWC) of Govt. of India have prepared mathematical model document for estimation of peak flood for Mahanadi sub zone 3(d) (**Annexure – 1A**). The step suggested in CWC document has been followed. The peak flood estimation by unit hydrograph model has been done. Normally it is also known as Synthetic unit Hydrograph. The model is develop for Kelo River catchment area of (1353 km²) considering 50 years return period isopluvial map of CWC & IMD for 24 hours rainfall. The actual flood measurement at GP II coal mine site had been done for the catchment area of 404 km². On 28 August 2020 having rainfall in 24 hrs to the tune of 119.3 mm.

Unit Hydrograph:

The problem of predicting the flood hydrograph resulting from a known storm in a catchment has received considerable attentions. A large number of methods are proposed to solve this problem and one of them probably the most popular and widely used method is the unit hydrograph.

To develop unit hydrograph to a catchment, detailed information about the rainfall and resulting flood hydrograph are needed. However, such information are not available for the project due to paucity of time limit for study period. In order to construct unit hydrograph for this area, mathematical modeling based empirical equations of regional validity which relate the salient hydrograph characteristics to the basin characteristics are available. The unit hydrograph derived from such relationship are known as synthetic unit hydrograph.

6.5 Synthetic Unit Hydrograph – Kelo River Watershed:

The mathematical model suggested by CWC under flood estimations report for MAHANADI SUB ZONE 3(d) Revised Feb 1997 will be used for preparation of synthetic unit hydrograph



Hydrogeological Regime of Kelo River & Cumulative Impact of mining and other industrial Activities of GP Area

for the catchment area of Kelo River Watershed which is draining mine runoff. Procedure is explained in following step wise.

Step – 1:

Preparations of catchment area plan of Kelo River Watershed (Figure 6.4).



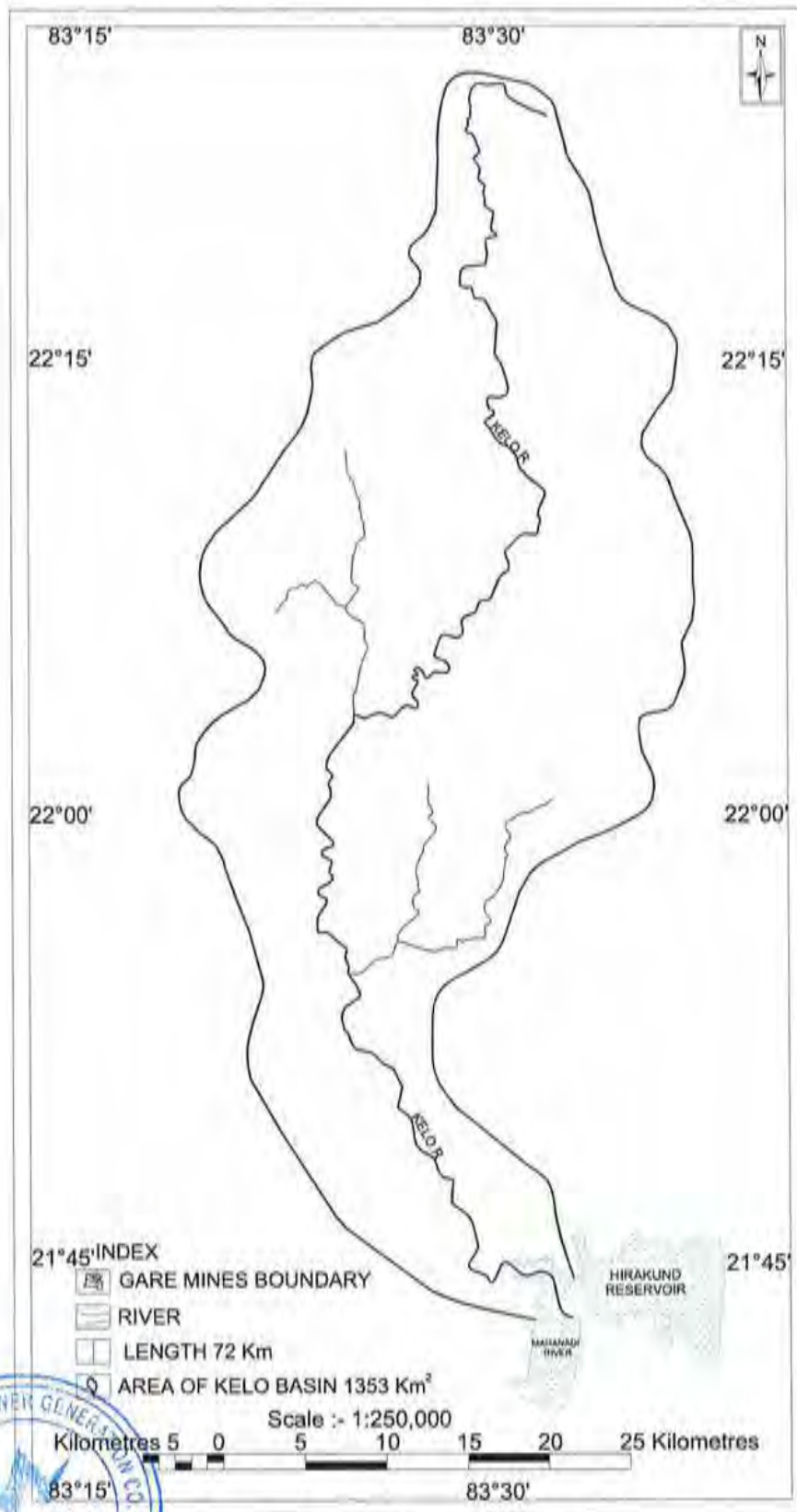


Figure 6.4: Catchment Area Plan



Determination of Physiographic Parameters, The following physiographic parameters were determined from the catchment area plan.

1. Area (A) : 1353 km²
2. Length of the longest stream : 72 km
3. Equivalent Stream Slope : $\frac{(440-190)}{72} = 3.47 \text{ m/km}$

(a) By Graphical Method:

Longitudinal sections of the longest main stream from contours crossing the stream and the spot level along banks of nala at different segment (Figure 6.5).

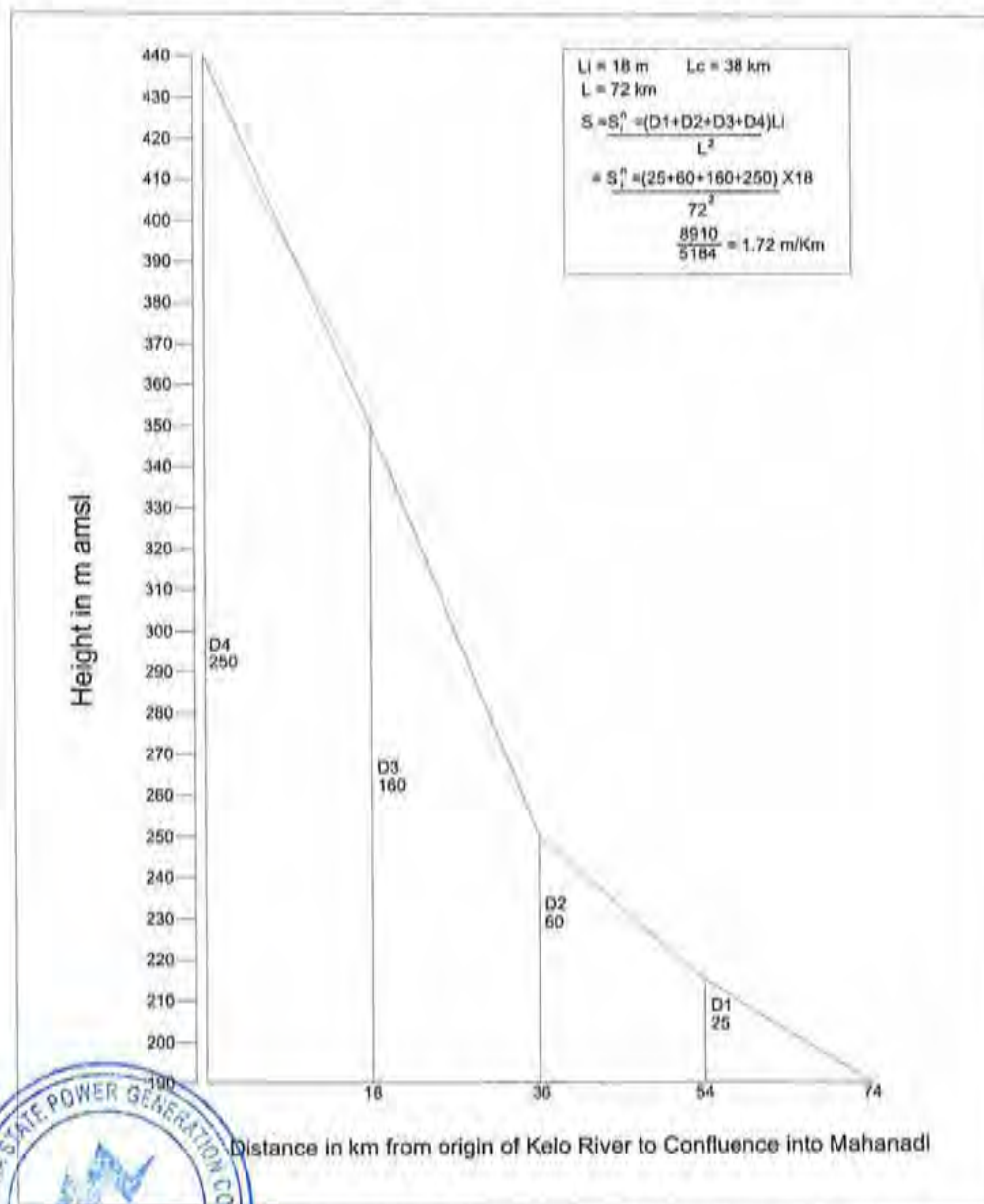


Figure 6.5: Longitudinal Section of Catchment Plan

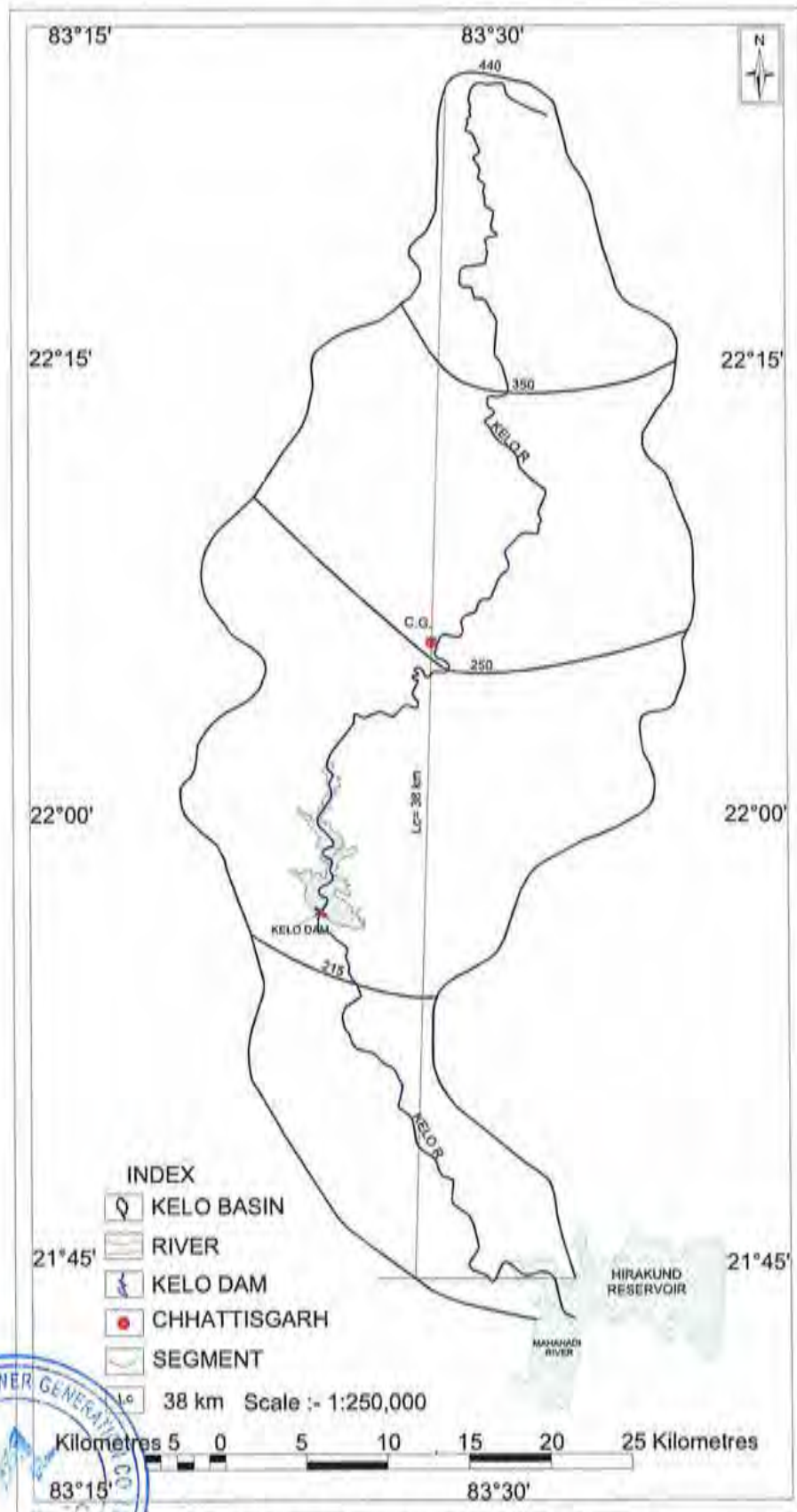


Figure 6.6: Catchment Plan with Different Segment



Step – 3:

Determination of Synthetic 1 hour unit Hydrograph Parameter:

The following equation were used to compute the unit hydrograph parameters with the known A, L and S value

- A = 1353 km²
 L = 72 km
 S = 1.72 m/km
- i. $t_p = 1.757 \left(\frac{L}{\sqrt{S}}\right)^{1.012} = 1.757 \left(\frac{72}{\sqrt{1.72}}\right)^{0.261} = 4.998$ say 5 hrs
 = 4.998 hour is more than 4.5 hr hence adopted t_p will be 5.5 hr as for model requirement.
 - ii. $q_p = 1.260 (t_p)^{-0.725} = 1.260 (5.5)^{-0.725} = 0.366 \text{ m}^3/\text{sec}/\text{km}^2$
 - III. $W_{50} = 1.974(q_p)^{-1.104} = 1.974(0.366)^{-1.104} = 5.99 \text{ hr}$
 - IV. $W_{75} = 0.961(q_p)^{-1.125} = 0.961(0.366)^{-1.125} = 2.98 \text{ hr}$
 - V. $W_{R50} = 1.150(q_p)^{-0.829} = 1.150(0.366)^{-0.829} = 2.64 \text{ hr}$
 - VI. $W_{R75} = 0.527(q_p)^{-0.932} = 0.527(0.366)^{-0.932} = 1.34 \text{ hr}$
 - VII. $T_B = 5.411 (t_p)^{0.826} = 5.411 (5.5)^{0.826} = 22.12$ adopted 22 hr as per model requirement
 - VIII. $T_m = 5.5 + \frac{1}{2} = 6.0 \text{ hr}$
 - IX. $Q_p = q_p \times A = 0.366 \times 1353 = 495.2 \text{ m}^3/\text{sec}$
 - X. $\sum Q = \frac{A \times d}{t_r \times 0.36} = \frac{1353 \times 1}{1 \times 0.36} = 3758.3 \text{ m}^3/\text{sec}$
 = 3758 m³/sec
 - XI. $d = 1.00 \text{ cm}$

Step – 4:

Drawing of Synthetic unit Hydrograph:

Estimated parameters of unit graph in step – 3 were plotted to scale on a graph paper as shown in **Figure 6.7**. The plotted points were joined to draw synthetic unit graph at $t_i = t_r = 1$ hr interval were summed up i.e. $\sum a_i t_r = 3758 \text{ m}^3/\text{sec}$ as shown in figure and compared with the volume of 1 cm direct runoff depth over catchment with formula.

Where,

- A = catchment area in km²
 d = 1.0 cm depth



$$t_i = t_r \text{ (the unit duration of the UG)} = 1.00 \text{ hr}$$

$$Q_i = \frac{1353 \times d}{0.36 \times t_r} = \frac{1353 \times 1}{0.36 \times 1} = 3758 \text{ m}^3/\text{sec}$$

Thus, the unit hydrograph so drawn is found to be in order.

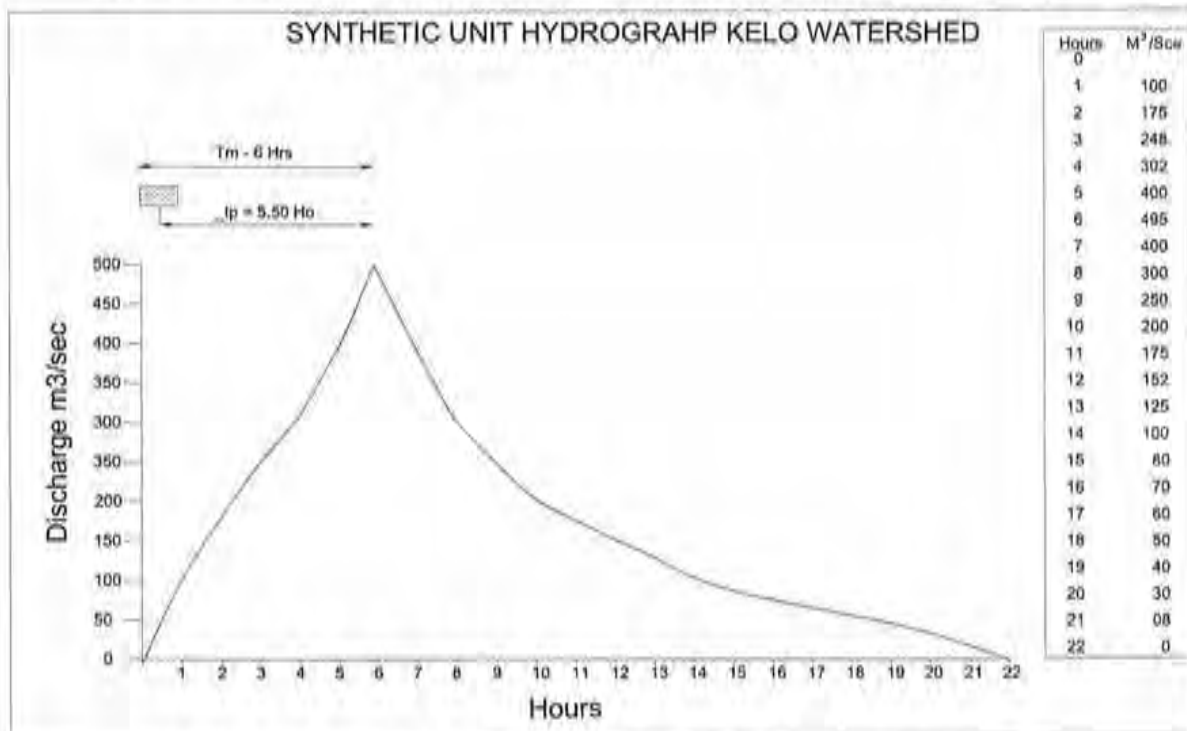


Figure 6.7: Synthetic Hydrograph of Kelo Watershed

Step – 5: Estimation of Design Storm

(a) Estimation of Design Storm Duration (T_D):

The design storm duration (T_D) = 1.1 × t_p = 1.1 × 5.5 = 6.05 hrs rounded off to 6 hrs.
 Adjusting the design storm duration to the nearest one hour, the adopted design storm duration T_D is 6.0 hour.

T_D = 6 hr

(b) Estimation of Point Rainfall and Area Rainfall:

The catchment under study, Kelo Watershed, was located on Isopluvial Map of Mahanadi 3(d) 50 years, 24 hour point rainfall. The Isopluvial map is placed at Figure 7.5. **(Annexure – 1B)(Figure 6.8).**



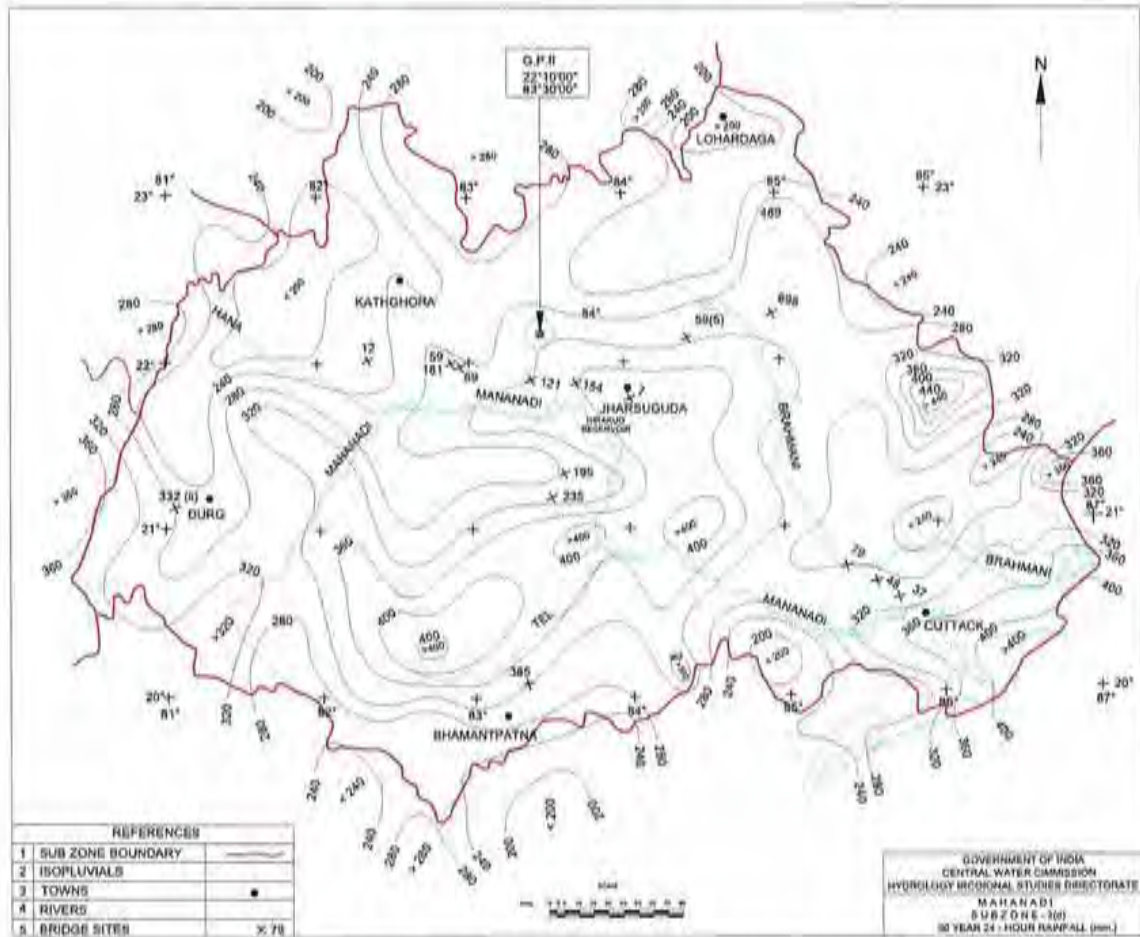


Figure 6.8: Isopluvial Map for 50 years return

From the map data of 50 years point rainfall over Kelo Watershed is recorded as 29 cm. Conversion factor 0.72 was read for TD = 6 hr following CWC figure 10 for Mahanadi sub zone (3 d) (Annexure – 1C). The point rainfall in 50 year return period for TD = 6 hr will be as follow.

$$\text{Point rainfall} = 29 \times 0.72 = 20.88 \text{ cm}$$

Areal reduction factor of 0.8023 corresponding to a catchment area of 1353 km² for TD = 6 hour was interpolated from Annexure 4.2 of Figure 12 (a) of CWC Mahanadi 3(d) (Annexure – 1D) in sections for conversion of point to areal rainfall 50 year 6 hours areal rainfall = 20.88 x 0.8023 = 16.75 cm.



Point Rainfall = 20.88 cm
Areal Rainfall = 16.75 cm

Time Distribution of Areal Rainfall:

50 year 6 hr areal rainfall = 16.75 cm was distributed with the time distribution coefficient (CWC of Table A-2 Annexure 4.1) (Annexure – 1E) or from mean average time distribution curve for storm of 3 hours to get 1 hour rainfall increments as follows (Table 6.5).

Table 6.5: Time Distribution of Areal Rainfall

Duration (hr)	Distribution of Coefficient	Storm Rainfall cm	1 hour Rainfall Increments cm
1	0.59	9.88	9.88
2	0.78	13.06	3.19
3	0.87	14.57	1.51
4	0.93	15.58	1.00
5	0.97	16.25	0.67
6	1.0	16.75	0.50

Hourly Effective Rainfall Increments:

Design loss of 0.21 cm / hr under sections has been adopted as per CWC norm for Mahanadi (3 d) sub zone page 5 as Annexure – 1F. The following table shows the computations of 1 hr effective rainfall (Table 6.6).

Table 6.6: Hourly Effective Rainfall

Duration hr	1 Hr. Rainfall Cm	Design Loss Rate cm/hr	1 hr Effective Rainfall cm
1	2	3	4 (2-3)
1	9.88	0.21	9.67
2	3.19	0.21	2.98
3	1.51	0.21	1.30
4	1.00	0.21	0.79
5	0.67	0.21	0.46
6	0.50	0.21	0.29

Step – 6:

Estimation of Base Flow:

Taking design of 0.010 cu mec per square meter as recommended in paragraph 3.6 of CWC 3(d) Sub zone Annexure 1(G). Base flow for Kelo River has been estimated to the tune of 135.3 Cumec for Catchment area of 1353 km².



Step – 7:

Compilations of Design Flood Hydrograph:

The direct runoff resulting from each of 1 hr effective rainfall units was obtained by multiplying the 1 hr effective rainfall with synthetic 1 hr UG ordinate. The base flow is added to direct runoff and flood runoff is estimated. The peak flood runoff for Kelo Watershed, based on 50 year return period of 24 hrs rainfall has been done based on table A-3 CWC sub zone 3 (d) (Annexure – 1H) is estimated 7073 m³/sec. the detail estimation is given in Table 6.7 and depicted in Figure 6.9.

50 year return period peak runoff Kelo Watershed – 7073 m³/sec

Table 6.7: Compilations of Design Flood Hydrograph

Compilation of Design Flood hydrograph of Kelo Watershed (1353 km ²)											
Time in hour	synthetic Unit	Effective Rainfall Unit						Direct	@0.1	Flood	Peak Flood
		Direct Runoff									
		0.46	2.98	9.67	1.3	0.76	0.29				
Hour	m ³ /sec	m ³ /sec	m ³ /sec	m ³ /sec	m ³ /sec	m ³ /sec	m ³ /sec	m ³ /sec	m ³ /sec	m ³ /sec	
0	0	0						0	135.3	135.3	
1	100	46	0					46	135.3	181.3	
2	175	80.5	298	0				378.5	135.3	513.8	
3	248	114.08	521.5	967	0			1602.58	135.3	1737.88	
4	302	138.92	739.04	1692.25	130	0		2700.21	135.3	2835.51	
5	400	184	899.96	2398.16	227.5	76	0	3785.62	135.3	3920.92	
6	495	227.7	1192	2920.34	322.4	133	29	4824.44	135.3	4959.74	
7	400	184	1475.1	3868	392.6	188.48	50.75	6158.93	135.3	6294.23	
8	300	138	1192	4786.65	520	229.52	71.92	6938.09	135.3	7073.39	Peak
9	250	115	894	3868	643.5	304	87.58	5912.08	135.3	6047.38	
10	200	92	745	2901	520	376.2	116	4750.2	135.3	4885.5	
11	175	80.5	596	2417.5	390	304	143.55	3931.55	135.3	4066.85	
12	150	69	521.5	1934	325	228	116	3193.5	135.3	3328.8	
13	125	57.5	447	1692.25	260	190	87	2733.75	135.3	2869.05	
14	100	46	372.5	1450.5	227.5	152	72.5	2321	135.3	2456.3	
15	80	36.8	298	1208.75	195	133	58	1929.55	135.3	2064.85	
16	70	32.2	238.4	967	162.5	114	50.75	1564.85	135.3	1700.15	
17	60	27.6	208.6	773.6	130	95	43.5	1278.3	135.3	1413.6	
18	50	23	178.8	676.9	104	76	36.25	1094.95	135.3	1230.25	
19	40	18.4	149	580.2	91	60.8	29	928.4	135.3	1063.7	
20	30	13.8	119.2	483.5	78	53.2	23.2	770.9	135.3	906.2	
21	8	3.68	89.4	386.8	65	45.6	20.3	610.78	135.3	746.08	
22	0	0	23.84	290.1	52	38	17.4	421.34	135.3	556.64	
23	0	0	0	77.36	39	30.4	14.5	161.26	135.3	296.56	
24	0	0	0	0	10.4	22.8	11.6	44.8	135.3	180.1	
25	0	0	0	0	0	6.08	8.7	14.78	135.3	150.08	
26	0	0	0	0	0	0	2.32	2.32	135.3	137.62	
27	0	0	0	0	0	0	0	0	135.3	135.3	



Completion of Design Flood hydrograph of Kelo Watershed (1353 km²)

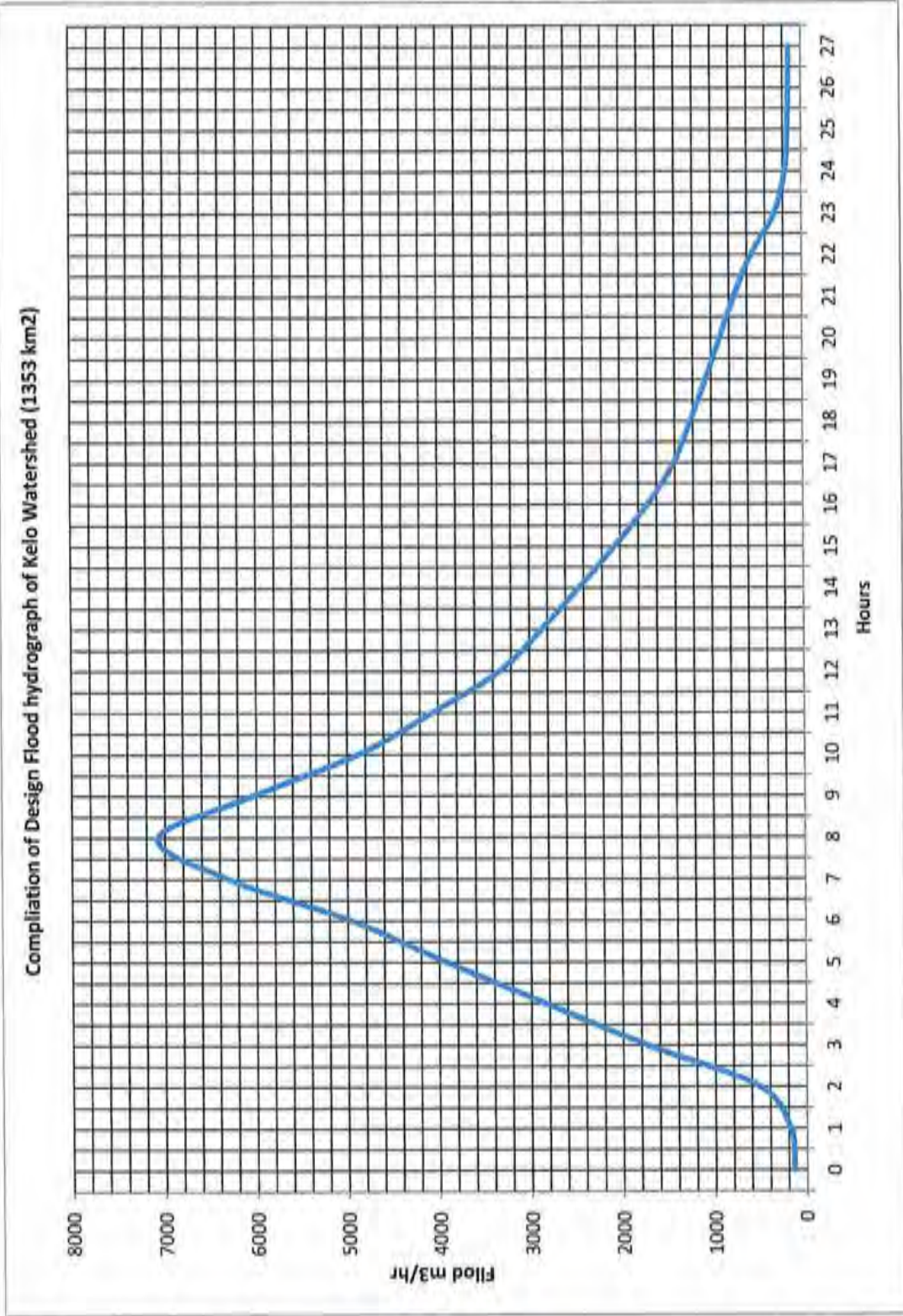


Figure 6.9: Completions of Design Flood Hydrograph with base flow

6.6 Calibration of Model:

The mathematical models develop for catchment area of 1353 km² for 200 mm rainfall of 50 years return period. A proto model has been calibrated for catchment area of 404 km² for current maximum rainfall of 119.3 mm in 24 hrs. The proto model is validated with actual stream gauging measurement data in Kelo River having 404 km² catchment area and 119.3 mm rainfall on 28th August 2020. The peak flood occurring for 24 hrs in respect of proto model (1259.86 m³/sec) is given in Table 6.8. Peak Runoff hydrograph for Kelo gauging station is given in Figure 6.10.

Table 6.8: Validation of Proto Model & Actual Measure Peak Flood (CA – 404 km²)

Time in hour	Peak runoff of Kelo River catchment area 1353 km ²		Peak runoff for 11.93 cm Rainfall for Study area and Catchment Area	
	Model Flood for 20 cm rainfall	Proto model flood for 11.93 cm	Peak runoff study area of 790 km ²	Peak runoff at GP II mine CA 404 km ²
Hour	m ³ /sec	m ³ /sec	m ³ /sec	m ³ /sec
0	135.3	80.71	47.12	24.10
1	181.3	108.15	63.14	32.29
2	513.8	306.48	178.95	91.51
3	1737.88	1036.65	605.28	309.54
4	2835.51	1691.38	987.58	505.04
5	3920.92	2338.83	1365.61	698.36
6	4959.74	2958.48	1727.42	883.39
7	6294.23	3754.51	2192.21	1121.08
8	7073.39	4219.28	2463.58	1259.86
9	6047.38	3607.26	2106.24	1077.11
10	4885.5	2914.20	1701.57	870.17
11	4066.85	2425.88	1416.44	724.36
12	3328.8	1985.63	1159.38	592.90
13	2869.05	1711.39	999.26	511.01
14	2456.3	1465.18	855.50	437.50
15	2064.85	1231.68	719.16	367.78
16	1700.15	1014.14	592.14	302.82
17	1413.6	843.21	492.34	251.78
18	1230.25	733.84	428.48	219.12
19	1063.7	634.50	370.47	189.46
20	906.2	540.55	315.62	161.41
21	746.08	445.04	259.85	132.89
22	556.64	332.04	193.87	99.14
23	296.56	176.90	103.29	52.82
24	180.1	107.43	62.73	32.08



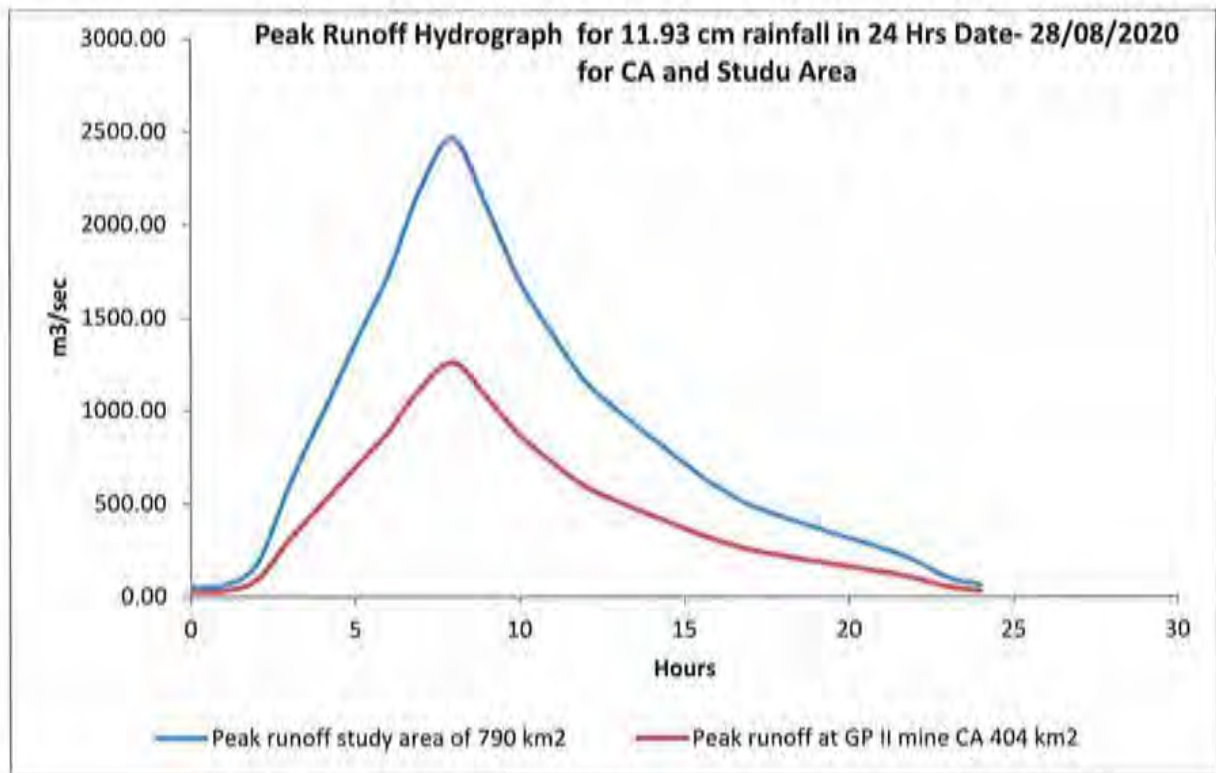


Figure 6.10: Peak Runoff Hydrograph

Empirical Method:

Discharge of Catchment Area- 404 km²

Method 1: Dicken's Formula

As per clause 3.2 of T.C. using Dicken's Formula

Discharge as per Dicken's Formula

M= Catchment Area- 404 km²

C= 19.60 (Above 10 km² catchment area as per ENC pub 70/1 para 2.2.7.2)

$$Q = CM^{3/4}$$

$$Q = 19.60 \times 404^{3/4} = 1766.20 \text{ m}^3/\text{s}$$

Method 2: Prolonged Flood Discharge

Determination of prolonged Flood Discharge as per clause 3.2 (b) (ii) of T.C.

- a) For catchment area up to 500 km² Runoff due to rainfall of 1.50 cm/hr for 24 hrs.
- b) For catchment area above 500 km² Runoff due to rainfall of 0.75 cm/hr for 24 hrs.

M= Catchment Area= 404 km²

$$Q = \frac{0.75}{100} \times \frac{M \times 1000 \times 1000}{60 \times 60}$$



$$Q = \frac{0.75}{100} \times \frac{404 \times 1000 \times 1000}{60 \times 60}$$

$$= 841.60 \text{ m}^3/\text{sec}$$

Method 3: Manning's Equation

Determination of Peak Flood Discharge by River Section.

As per Clause 3.2 © of T.C. using Manning's equation at observed HFL calculation of Bed Gradient.

1. HFL of River from Local Enquiry -254 m amsl
2. Up stream bed level - 248 m amsl
3. Down stream bed level -245 m amsl
4. Length of Proposed Canal - 445 m
5. Bed gradient - 445/248-245= 1 in 148
6. Cross Sectional Area as per Calculation A- 379 m² Cross sectional map is given in

Figure 6.11

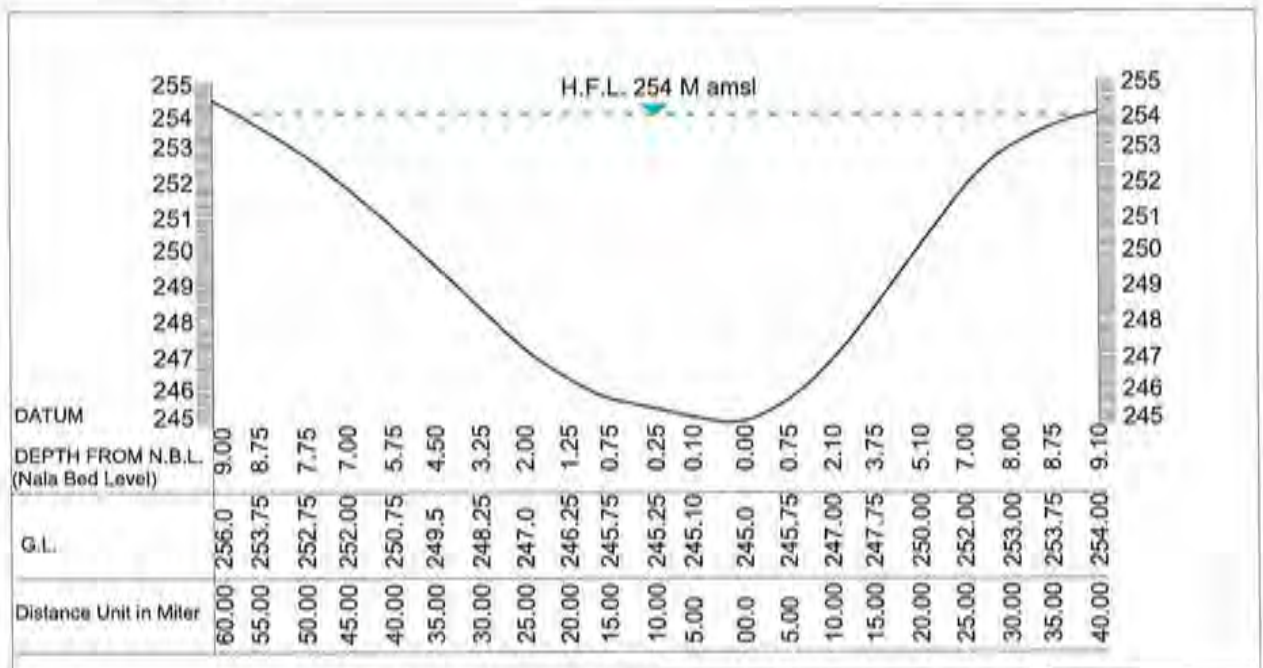


Figure 6.11: Cross Section of River near bridge



	Distance from Centre line (m)	Depth (m)	Mean Depth (m)	Length (m)	Area (m ²)
	0	0.00			
Left Side	10.0	0.25	0.125	10	1.25
	20.0	1.25	0.75	10	7.50
	30.0	3.25	2.25	10	22.5
	40.0	5.75	4.5	10	45.00
	55.0	7.75	6.75	15	101.25
Right Side	10.0	2.10	1.05	10	10.5
	15.0	3.75	2.925	5	14.625
	20.0	5.10	4.425	5	22.125
	25.0	7.00	6.05	5	30.25
	30.0	8.00	7.5	5	37.50
	35.0	8.75	8.375	5	41.875
	40.0	9.10	8.925	5	44.625
Total					379 m²

7. Wetted Perimeter of River at HFL-

$$P = 120 \text{ m}$$

8. Hydraulic mean depth

$$R = A/P = 379/120 = 3.16$$

9. Velocity of flood water in River = $V = \frac{1}{n} R^{2/3} 1/S^{1/2}$

Considering $n=0.05$ (Reference- Flow in Open channel by K Subramanya Page 102)

$$V = \frac{1}{0.05} 3.16^{2/3} 1/S^{1/2}$$

$$V = 20 \times 2.153 \times 0.082$$

$$V = 3.53 \text{ m/sec}$$

10. Discharge of River

$$Q = A \times V$$

$$Q = 379 \times 3.53 = 1337 \text{ m}^3/\text{sec}$$

Flow by Different Methods: The discharges calculated by all three methods are summarized in Table 6.9.



Table 6.9: Discharge from various Methods

Sr No.	Method	Catchment Area km ²	Peak flood runoff m ³ /sec	Remark
1	Dicken's Method	404	1762.20	Method Adopted by CWC Model is 1260 m ³ /sec may he considered for future prediction
2	Prolong Method	404	841.60	
3	Manning's equation	404	1337	
Average		404	1312	

6.7 Surface Runoff Yield - Availability of Water in Kelo River:

The total quantity of surface water that can be expected in a given period from a stream at the outlet of its catchment is known as yield of the catchment in that period.

The runoff coefficient of Mahanadi Basin as per CGWB Publication (2006) is 25% Hence, In Kelo River watershed the runoff coefficient is 0.25 of normal annual rainfall. The normal annual rainfall is 1,3212 m.

1. Kelo River Catchment Area for GP II:

Annual Yield of Kelo River at different Catchment area has been estimated and given in Table 6.10 and same is enclosed in Figure 6.12.

Table 6.10: Kelo different Catchment Area

Sr no.	Location of Kelo River	Catchment Area (km ²)	Average Rainfall (m)	Runoff Coefficient Rc	Annual Yield (MCM/year)
1	Confluence to Mahanadi	1353	1.3212	0.25	446.89
2	Kelo Dam	954	1.3212	0.25	315.11
3	Study area of model	790	1.3212	0.25	263.25
4	At GP II Coal Mine	404	1.3212	0.25	133.44
5	Within GP II Coal Mine	25.83	1.3212	0.25	8.53

Note-MCM = Million Cubic Meter

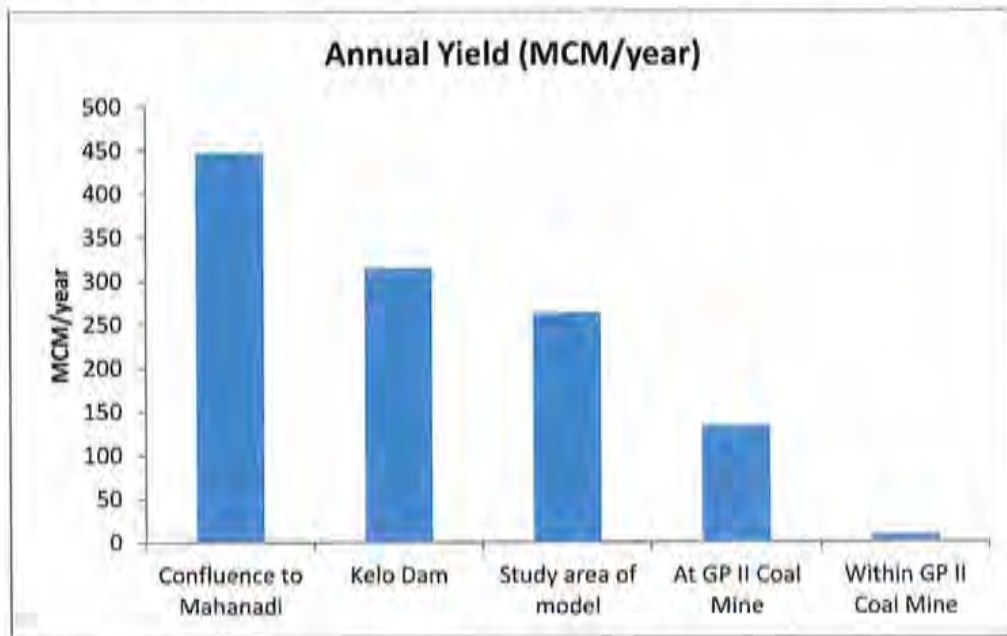


Figure 6.12: Annual Yield

6.8 Kelo River - Mine Area

Mine area (25.83 km²) part of Kelo River catchment area (404 km²). Kelo River is a Perennial River. This may be due to area occupied by GP II Mine is in valley area of Kelo Watershed. The water table is shallow enough that River seepages are noticed even in non-monsoon period. The maximum depth of nala is 7 m whereas groundwater level has been reported to around 5 m bgl. The contribution of base flow (ground water runoff) is essential component of perennial nature of stream. Kelo River in Mine area is Perennial River. The base flow generated in downstream of Kelo River is nearby from mine area. During mining intersection of groundwater occur whereby there will be reversal of ground water gradient to the extent of safety zone. As per DGMS rule there is statutory requirement of safety zone where mining will not occur. This zone create ground water divide between mine and Kelo River. The resultant effect is Kelo River maintain effluent nature and existence of base flow during mining.

6.9 Ground Water Runoff (Base flow):

Ground water runoff is also called as Base Flow. The term base flow is usually used by engineers in hydrology. This is defined as ground water flow from mine area into Kelo River. Central Water Commission recorded in flood estimation report sub zone 3 (d) as the average base flow rate of 0.10 m³/sec per km² may be adopted for estimation of base flow. Accordingly, the base flow generated from GP II having area of 25.83 km² will be to the tune of 2.583 m³/sec. It is also estimated that cumulative base flow into Kelo River down to GP II will be 40.4 m³/sec (404 x 0.10).



7.0 Hydrogeology:

7.1 Ground Water Regime in and around Coal Mines:

7.1.1 Regional Hydrogeological setting:

The Gare Pelma-II coal block of Mand-Raigarh Coalfield consists of Kamahi/Barakar stratified leaky aquifer system covered by a layer of soil cover/detrital mantle. The aquifer materials constitute of sandstones, medium to coarse grained having a double porosity system, one being the primary porosity of inter granular void spaces and the other being secondary porosity formed due to the fractures. These together form a conduit system making these formations good aquifers for movement and storage of groundwater. It has been generally noticed that the intensity of fracturing and the resultant increase in groundwater potential is fairly pronounced in the shallow coal seam in crop areas compared to deeper areas beyond the in crop zone.

The general direction of groundwater movement is from North to South, in the regional area and from North East to South West with local formation of groundwater mound and hydraulic troughs. Groundwater flow is mostly following the topography of the area.

Groundwater movement in the deeper aquifer system is also predominantly lateral coinciding with the water table. The deeper aquifer system is recharged by leakage from the overlying aquifers. The shale/clay bands create a semi-confined aquifer system having local flow path and act as aquitards through which vertical movement of groundwater takes place. So the degree of hydraulic connectivity varies from free hydraulic connection to very little connection through relatively impermeable intervening shale strata. Recharge to the aquifers is mainly through precipitation.

7.1.2 Aquifer details:

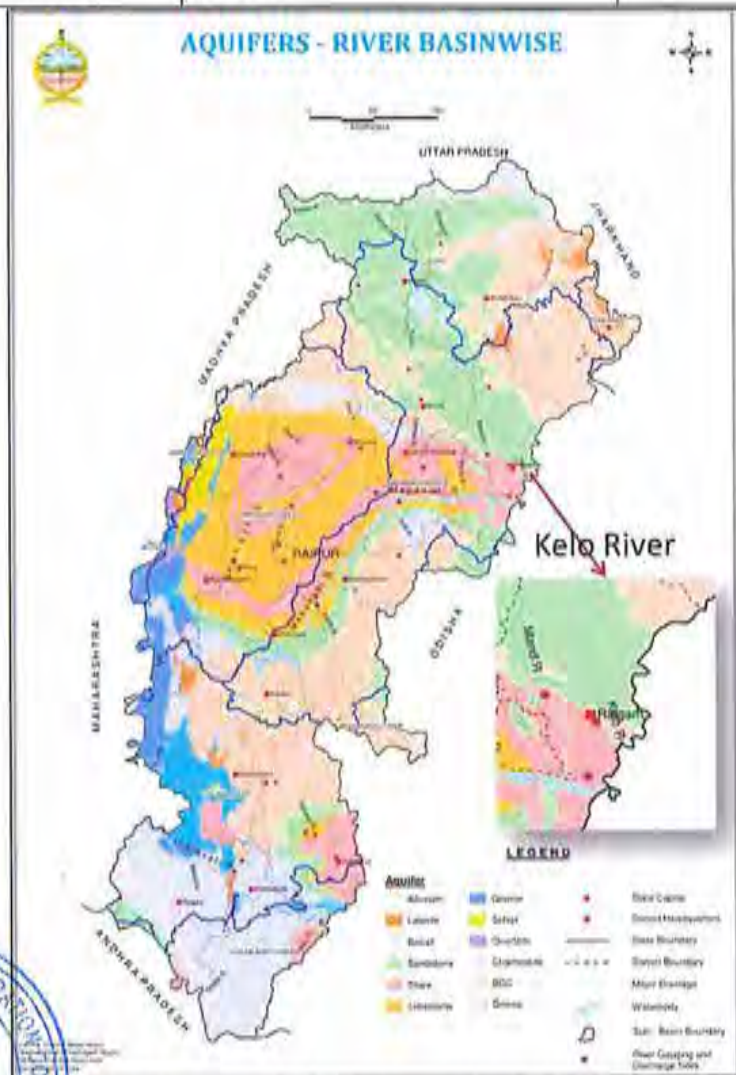
The aquifer units present in Kamthi/Barakar Sandstone are sandwiched with shale and coal beds. Thus, due to sedimentation/stratifications multiple aquifer system prevails. The top most sandstone bed, existing as overburden in the roof of coal seams, will be the major source of inflow into mine during opencast mining. The weathered formation with fractures behaves as unconfined aquifer and is the moderate aquifer.

The unconfined aquifer is mainly affected by opencast mining of seams. But in depth semi-confined aquifer during opencast mining become unconfined aquifer as such flow into the mine will continue and add up to mine flow during the entire life of mine. The aquifer system is having double porosity, one being primary porosity and other being secondary porosity

formed due to joints and fractures. These double porosity systems form a conduit system making this formation moderate to good aquifer for movement and storage of groundwater. The major hydrogeological units developed in coal block area are furnished below in **Table 7.1**. The Regional Aquifer River Basin Wise Kelo Basin is given in **Figure 7.1**.

Table 7.1: Hydrogeological Units

Sr. No.	Hydrogeological Units	Formation	Thickness range (m)
1.	Unconfined aquifer	Soil loosely cemented, poorly consolidated weathered fine to coarse grained sand stone with primary and secondary porosity	10-150
2.	Semi confined/ confined aquifer (Leaky condition)	Compact medium grained sand stone with primary & secondary porosity	150-400



(Source: Aquifer Mapping and Management of Ground Water Resource, Tamnar Block CG (CGWB 2020)

Figure 7.1: Aquifer- River Basin wise- Kelo Aquifer

7.1.3 General Aquifer Parameter:

The aquifer parameter has been evaluated for this project by pumping test. CGWB has also carried out exploration at Raigarh dist and conducted some pump test on deep wells. The lithological log of bore hole was also examined. The general aquifer system of Gondwana sandstone as established in this coal fields have also been taken into account. The aquifer parameters evaluated in different places on similar hydrogeological setup are also taken into consideration. The value attributed for the study area (core area) based on the best hydrogeological judgment is placed in **Table-7.2**.

Table 7.2: Aquifer Parameters

Aquifer parameter	Unit	Value
Hydraulic conductivity K	m/d	0.56
Hydraulic conductivity (K River Bed)	m/d	0.56
Transmissivity	m ² /d	56
Sy yield	-	0.03

7.1.4 Water table and movement of groundwater:

The Water level data has been collected in and around all block of Gare Pelma. Location of well monitoring is given in **Figure 7.2**. Water level data has been given in **Table 7.3**.



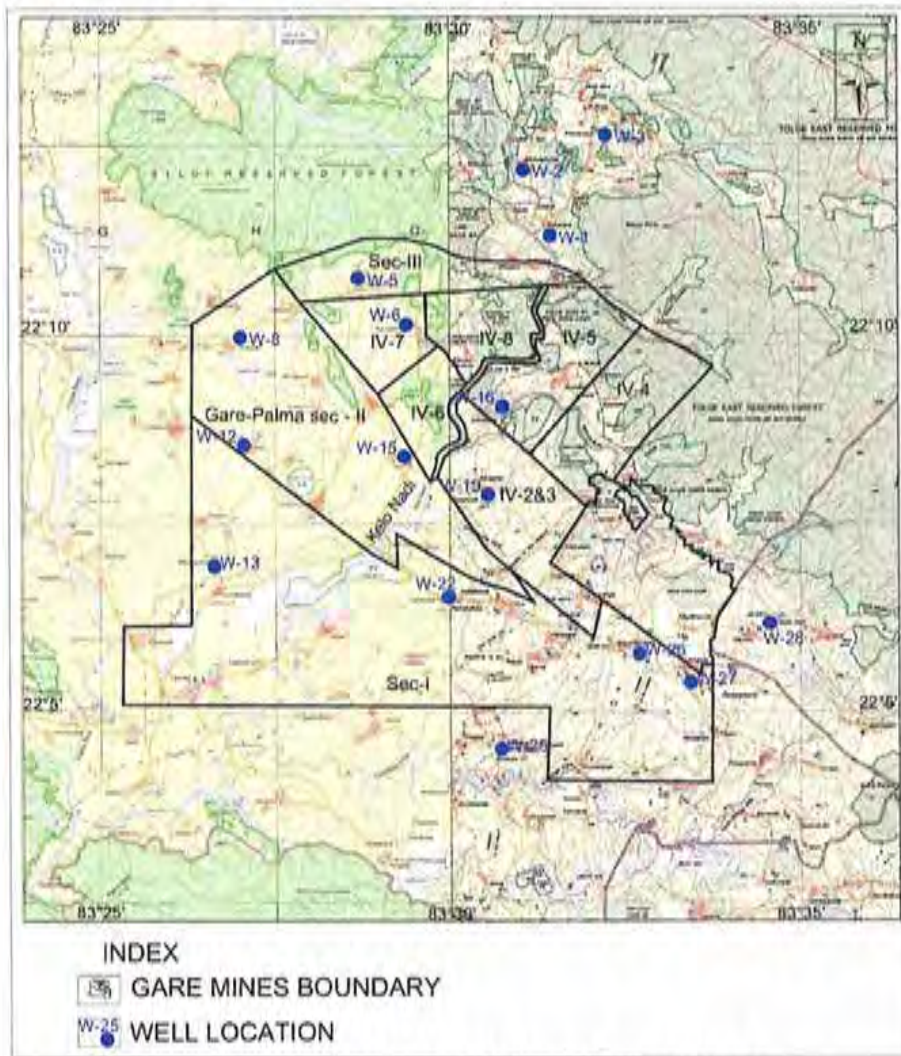


Figure 7.2: Location of Well monitoring stations



Table 7.3: Well Inventory Data

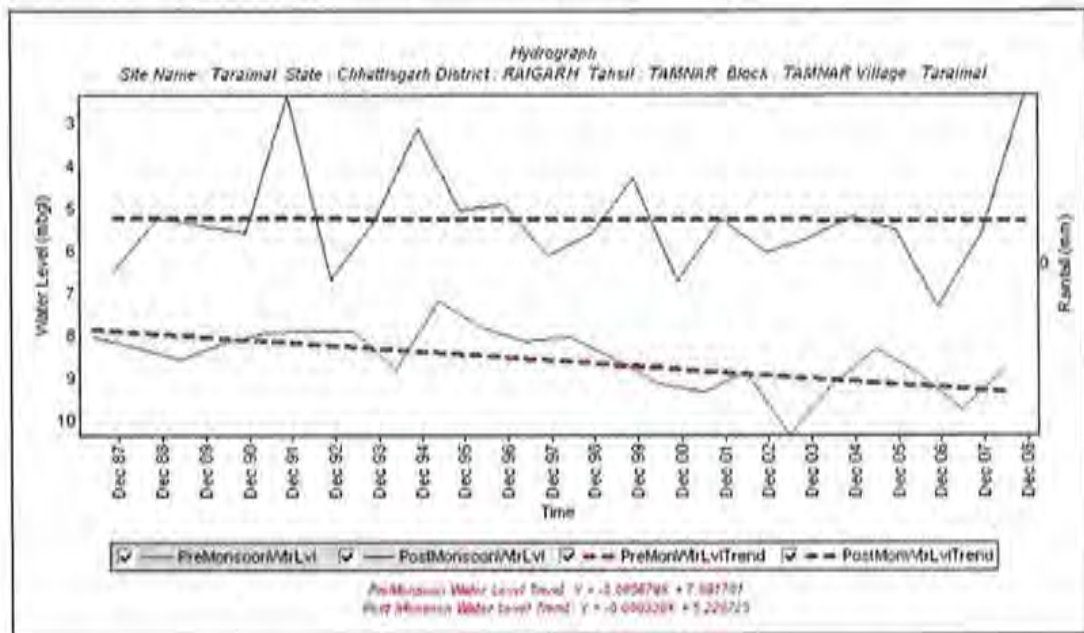
S.N	Name of Village	Coordinates		Dia (m)	Ht. Of Parapet (m)	Depth (m)	SWL (m)		A.F. (m)
		Latitude	Longitude				Pre-Mon	Post-Mon	
1	Milupara	22°11'19.85"	83°31'25.08"	3	0.9	11.85	11.65	6.9	4.75
2	Madwadomar	22°12'14.30"	83°31'3.95"	4	0.75	6.7	7.35	4.6	2.75
3	Urba	22°12'54.13"	83°32'3.60"	2.38	0.6	12	10.25	6	4.25
4	Bejarmuda	22°10'50.00"	83°28'35.98"	5.6	0	5.9	5.75	2	3.75
5	Kurwahi	22°10'2.91"	83°29'18.91"	5	0.9	7.8	8	5.7	2.3
6	Kolam	22°9'48.22"	83°26'12.25"	4.95	1.1	8.8	5.9	2.65	3.25
7	Pata	22°8'29.23"	83°27'2.43"	4.9	0.9	8.85	7.75	4	3.75
8	Salaibhatta	22°6'42.24"	83°26'36.23"	2.1	0.5	7.5	4.35	1.1	3.25
9	Gare	22°8'7.61"	83°29'18.59"	2.6	0.9	8	4.3	1.3	3
10	Lamdarha	22°9'0.33"	83°30'47.65"	3.4	0.7	12.1	12.25	8	4.25
11	Kasampali	22°7'51.24"	83°30'27.73"	2.95	1.05	11.5	11.25	6.4	4.85
12	Jinkabondi	22°6'31.42"	83°29'59.75"	2	0.8	5.3	5.45	2.1	3.35
13	Samkora	22°4'28.72"	83°30'46.11"	2.05	0.8	7.8	7.25	3.5	3.75
14	Dharubabhata	22°5'49.96"	83°32'44.56"	2.7	0.7	9.7	9.9	4.6	5.3
15	Amgaon	22°5'20.22"	83°33'41.01"	3.1	0.45	5.1	5.05	2.3	2.75
16	Jangir	22°6'13.81"	83°34'32.15"	3	0.6	8	5.05	2.1	2.95



The water table contour map has been prepared with reference to mean sea level at the contour interval of 20 m. The highest water table contour is 380 m MSL and lowest is in the order of 220 m MSL. Water divide of water table contour is almost coincides with the watershed boundary of micro sub-basins. This is indicative of recharge zone. As such recharge zone is around water shed boundary and discharge zone is around Kelo river course. **This corroborates the fact that Kelo River is a gaining river and groundwater runoff exist throughout the year.** The water table contours is subdued replica of topography. The flow of Kelo River is almost north-south with little swing here and there. There is deflection of flow around hilly region. The movement of groundwater is from recharge area to discharge area.

7.1.5 Hydrograph:

Hydrograph of Taraimal has been taken from Aquifer Mapping and Management of Ground Water Resource, Tamnar Block CG (CGWB 2020) and given in **Figure 7.3.**



(Source: Aquifer Mapping and Management of Ground Water Resource, Tamnar Block CG (CGWB 2020)

Figure 7.3: Hydrograph of Taraimal, Tamnar Block



7.2 Ground Water Modeling and its impact due to Mines:

Brief about Model Area

The model area is a watershed surrounding Gare Palma Coal Mines located at Tamnar tehsil of Raigarh district, Chhattisgarh.

Groundwater Flow Modelling has been attempted for assessing the impact of mining on groundwater regime & on Kelo River over a period of 5 years & 10 years. The drainage of Study area is given in **Figure 7.3**.

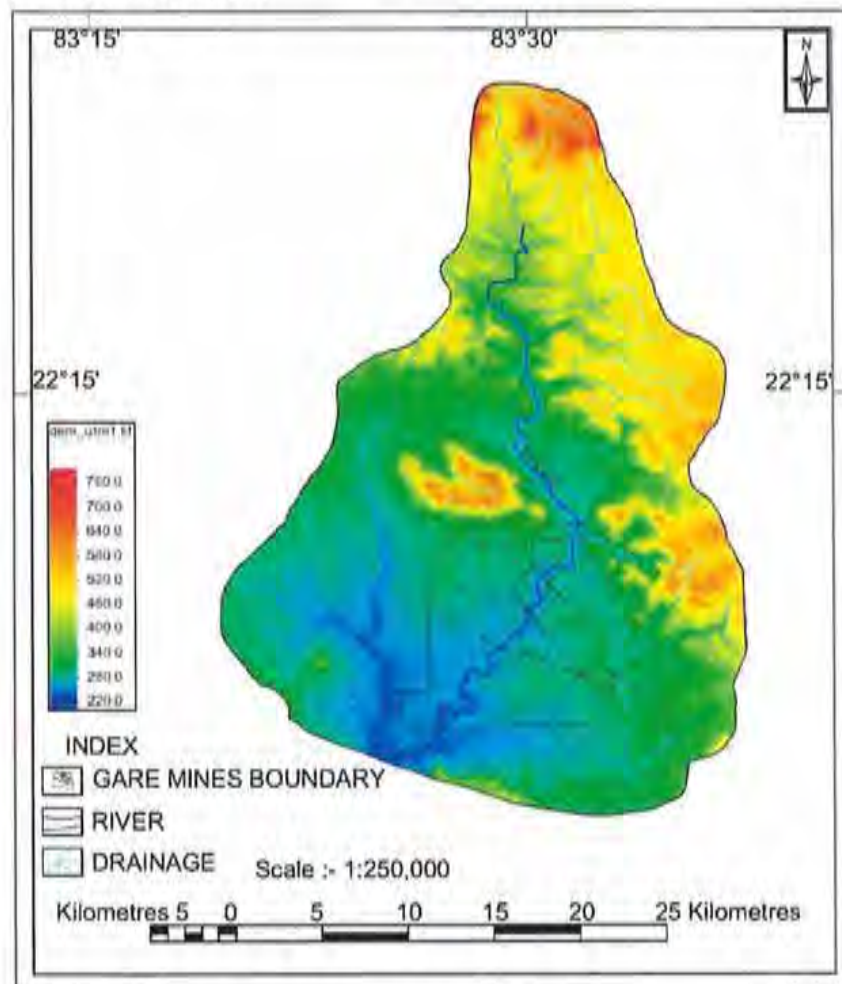


Figure 7.4: Drainage Map of study area

Model Conceptualization

Grid design

A single layered groundwater system is conceptualized by taking into account the hydrogeology of the study area.

The study area is delineated on the basis of watershed principle (ridge to valley) and is discretized into 100 rows and 100 columns (**Figure 7.4**) for the whole grid. The grid has 31600 m length in X and 43280 m length in Y.



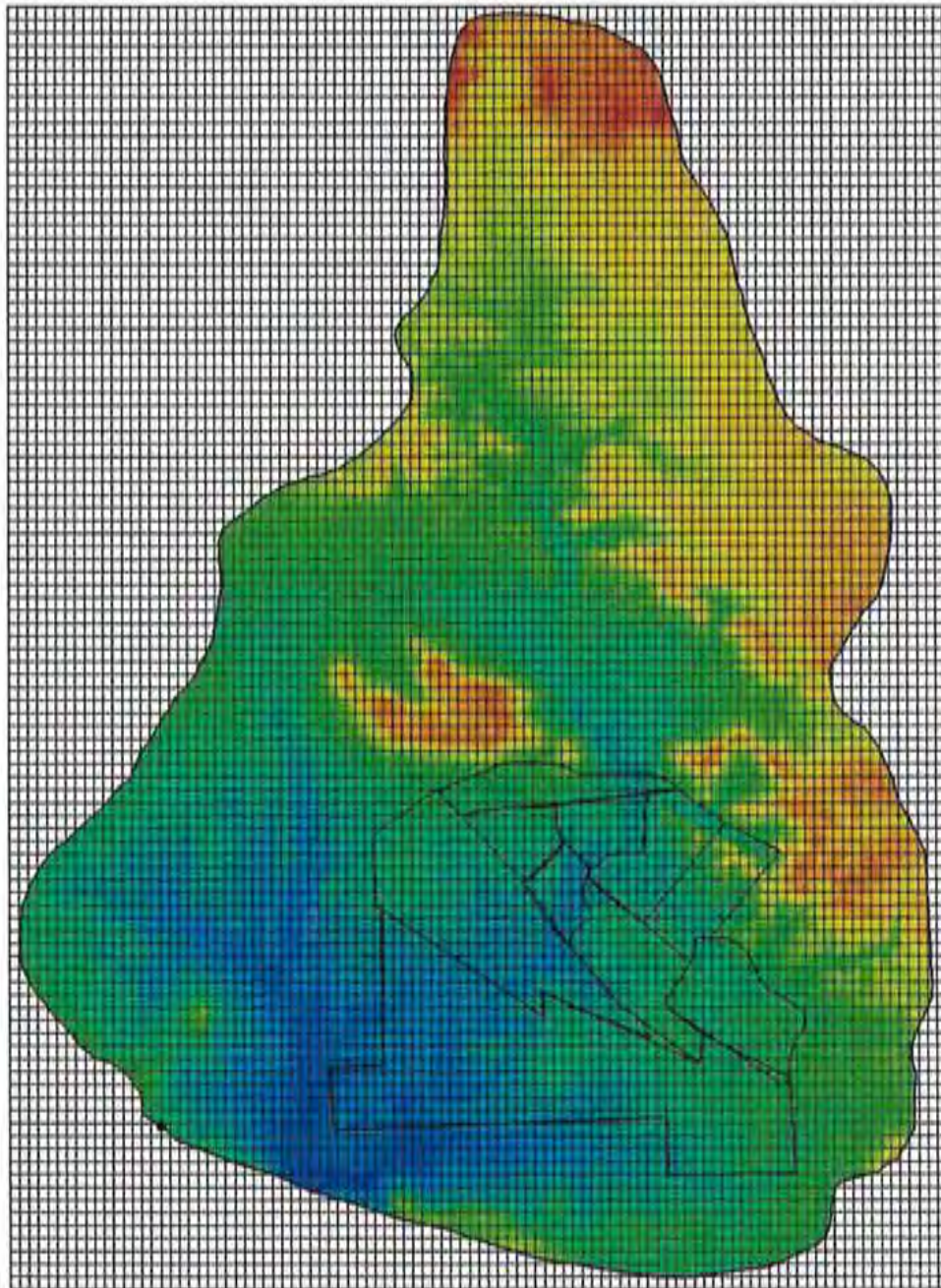


Figure 7.5: Grid design of the study area

Boundary Conditions and Input Parameters

Boundary conditions represent locations in the model where water flows into or out of the model region due to external factors. The selection of boundary conditions is dependent on hydrogeological conditions of aquifer of the study area and objectives of the model. The following boundary conditions are assigned to the present model.

1. Specified head
 - a. Constant Head (CHD)



2. Specified flux

- a. Well package
- b. Recharge package (RCH)
- c. River package

Elevation

The extracted elevation data (ASTER DEM) has been exported to the model and assigned as surface elevation (Figure 7.5) to the model. The topography of the watershed has been considered and assigned to the model.

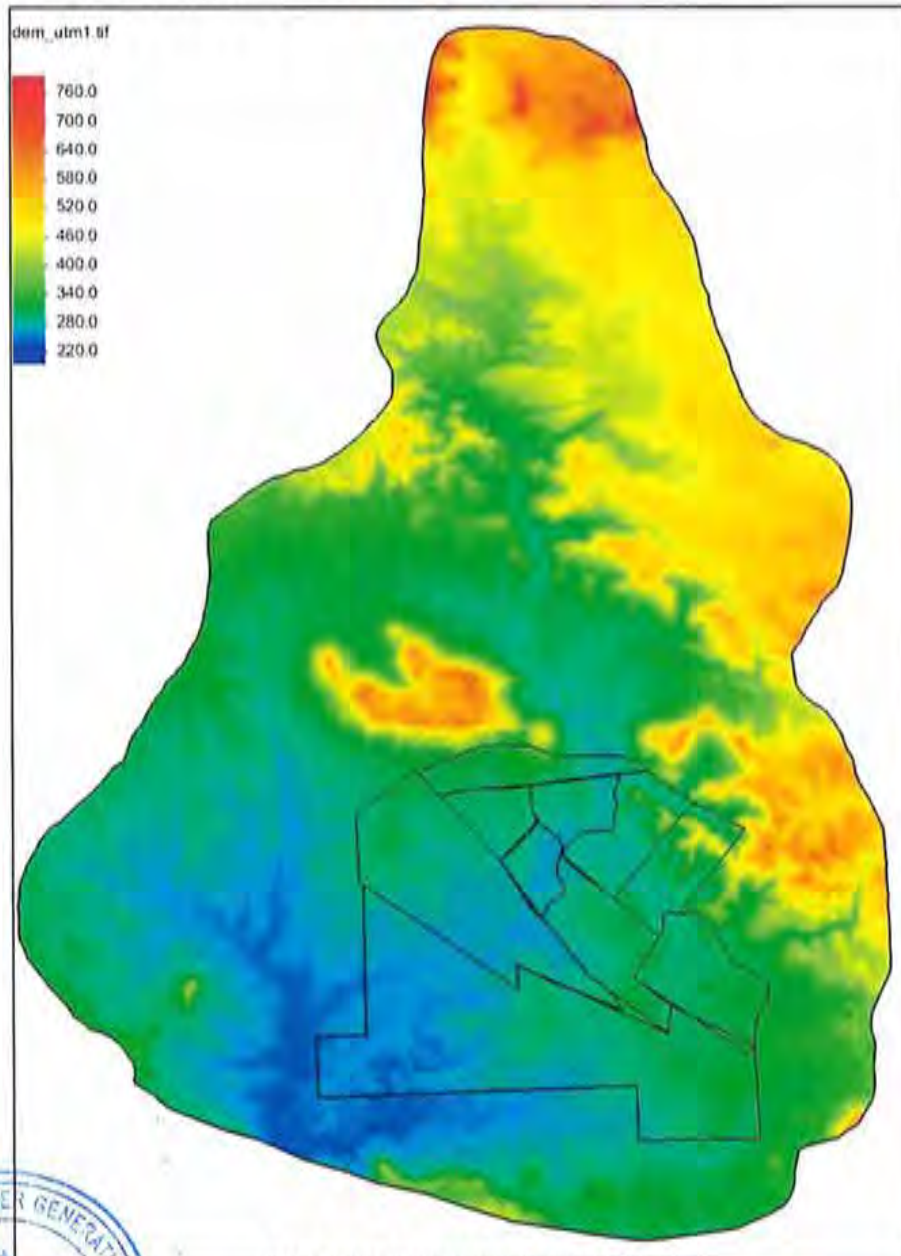


Figure 7.6: Elevation of the study area



Observation Wells & Pumping Wells

A network of 09 observation wells (Figure 7.6) has been set up for the water level measurement and the measured head (amsl) is assigned. The discharge of 35,000 m³/day from all the existing mines in the study area has been assigned to the model through pumping wells.

Hydraulic conductivity

The hydraulic conductivity (K; Figure 7.7) is one of the crucial parameter to the model. The K value is extracted from the pumping test conducted in the study area. i.e., $K_x = 0.56$ m/d and $K_y = 0.56$ m/d have been assigned to the model (whole study area).

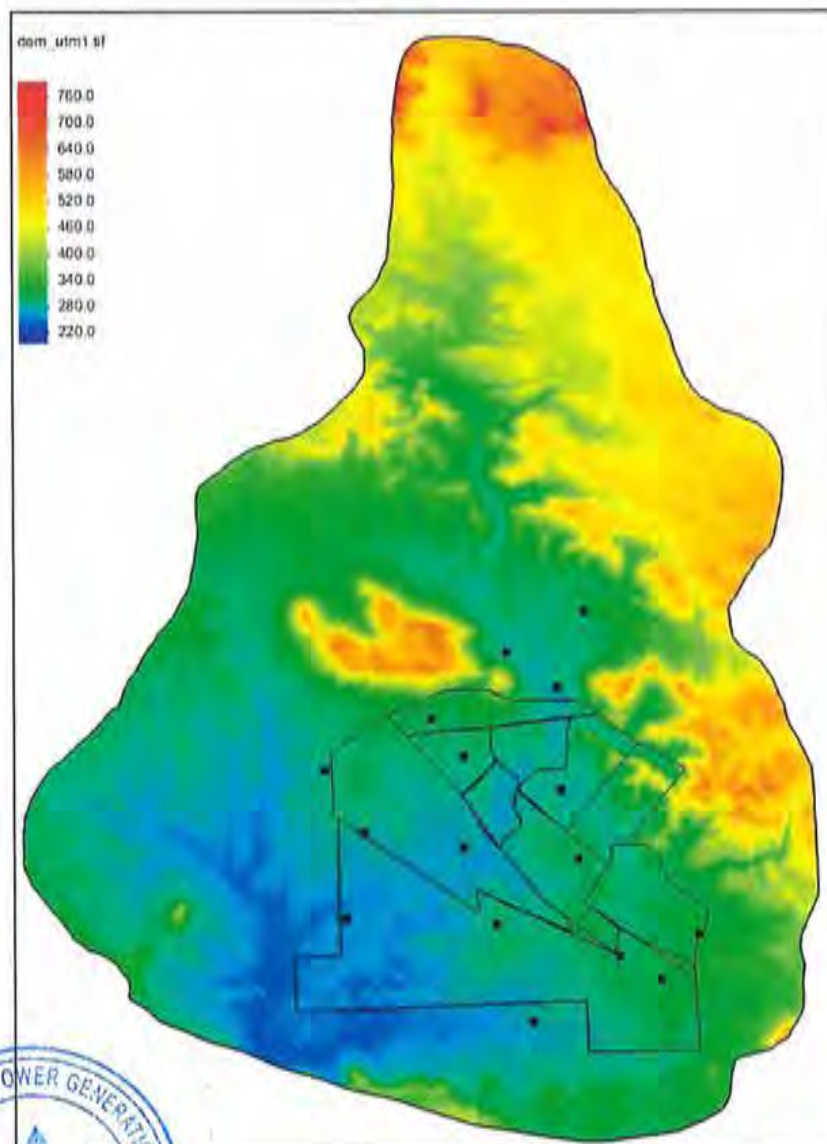


Figure 7.7: Assigned Observation Wells

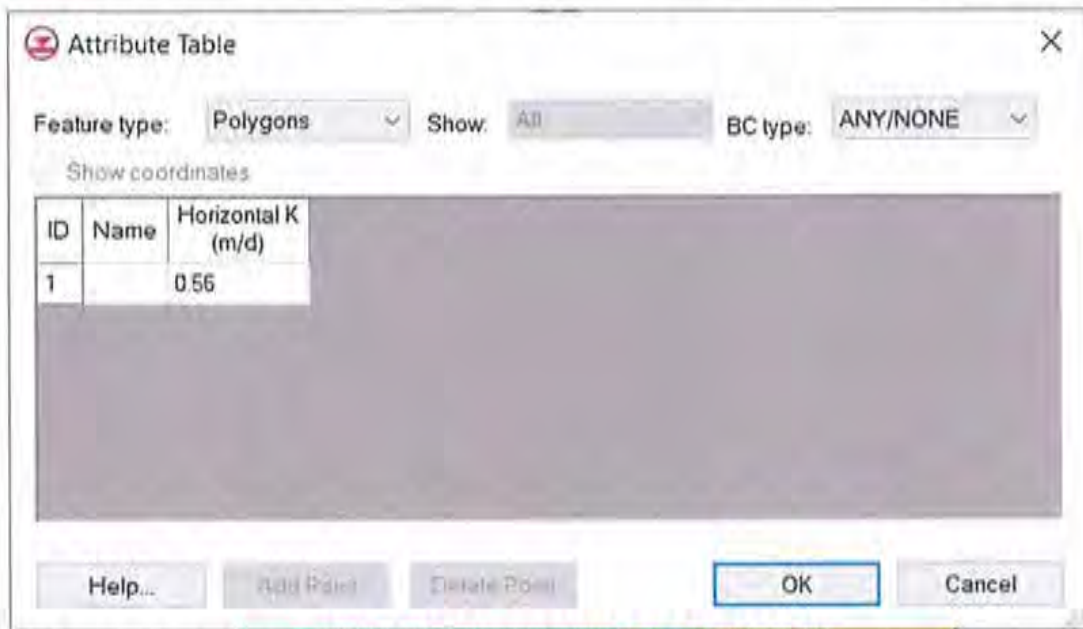


Figure 7.8: Assigned Hydraulic Conductivity

Recharge

As the average rainfall is 1316.2 mm/yr, recharge (Figure 7.8) of 0.00043 m/d (12% of rainfall) has been assigned to the model according to the stipulations of GEC 2015.

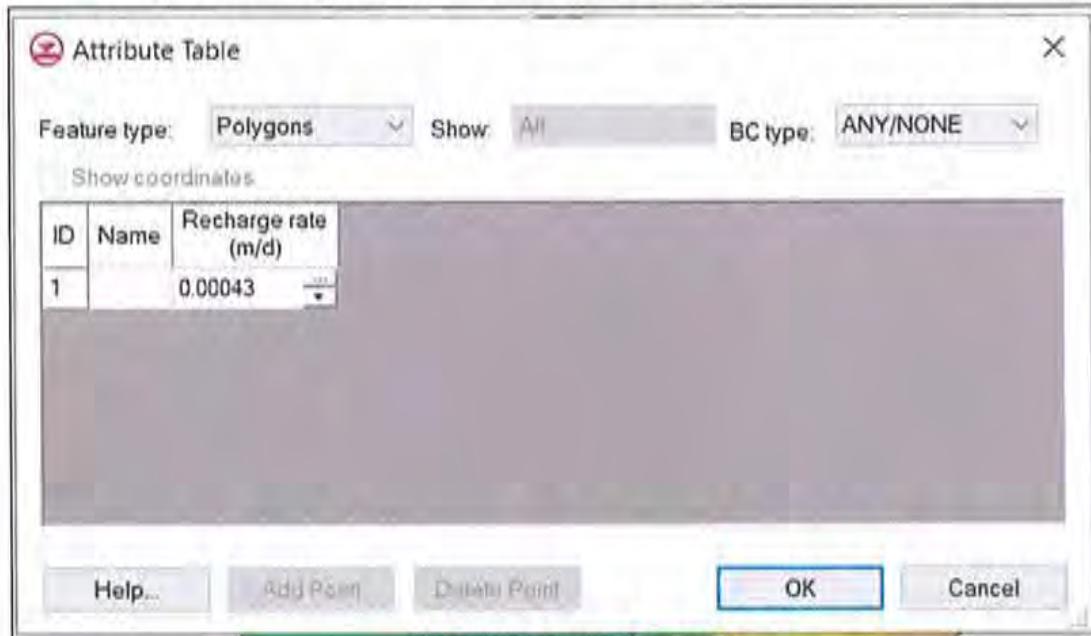


Figure 7.9 Assigned Recharge

Constant Head

The boundary condition constant head is assigned on the basis of the water level of the study area. The constant head has been assigned at two locations in the study area.



Model Calibration and Validation

A steady state groundwater flow for the watershed surrounding the Gare Palma has been simulated. The model is calibrated for steady state condition (Figure 7.9). The calibration has been attained by adjusting the hydraulic conductivity and recharge parameters. The scattered plot indicates a good fit between the observed head and calculated head with NRMS = 15.18%.

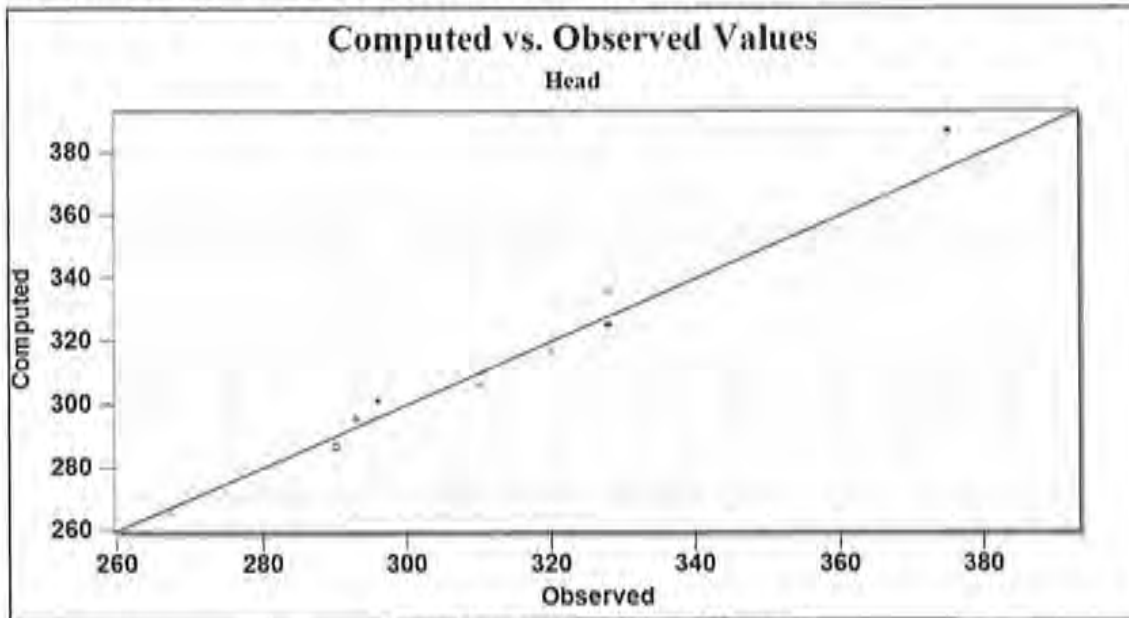


Figure 7.10: Calibration of the model

Predictive Model Results

A groundwater flow model has been developed for the prediction of groundwater level for affected aquifer over the period of 1825 days (5 years) & 3650 days (10 years) considering the mining. For the present scenario, the existing mining with the discharge of 35,000 m³/day has been considered and the groundwater level contours are shown in Figure 7.10. For the 5-year scenario & 10-year scenario, the same mining conditions & discharge have been considered and the groundwater level contours are shown in Figure 7.11 & Figure 7.12 respectively. The results of present scenario, 5-year scenario and 10-year scenario indicate that the groundwater flow direction is towards Kelo River. The results indicated that 5 year predicted water level contours & 10-year predicted water level contours shows that there is no significant change on groundwater regime with the consideration of mining and there is no adverse fall in head.



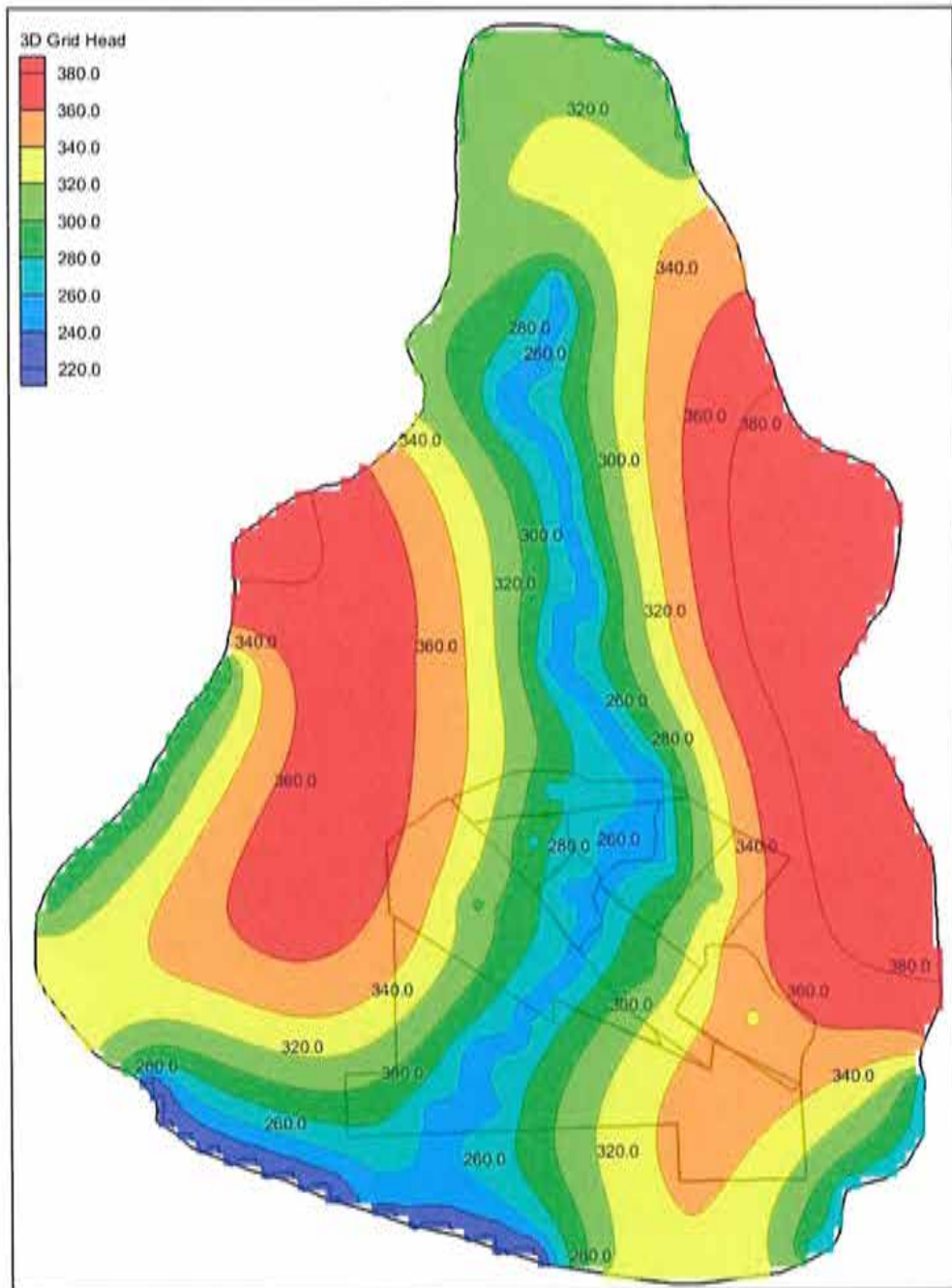


Figure 7.11: Present groundwater level of the study area



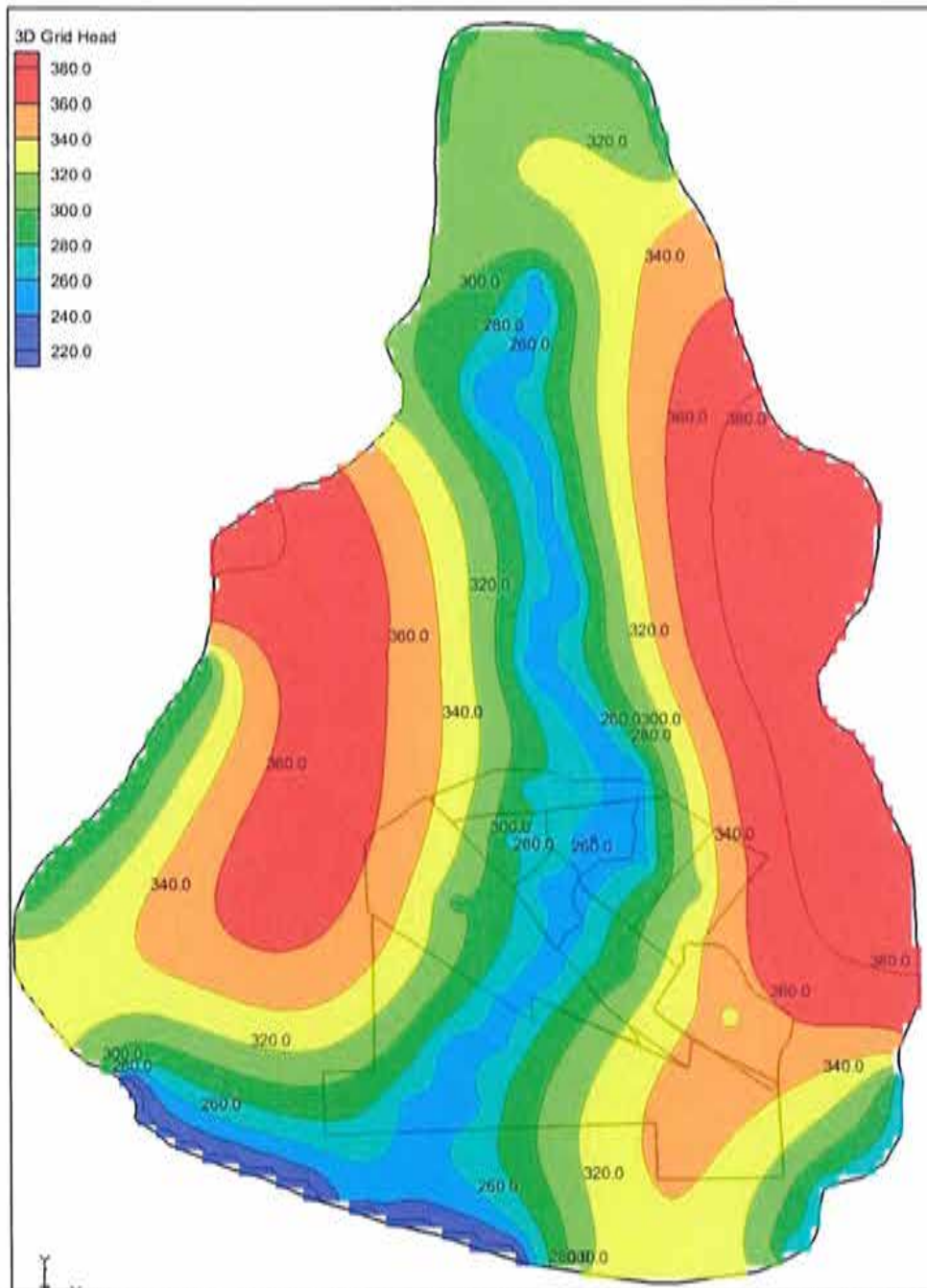


Figure 7.12: Predicted groundwater level with the consideration of groundwater abstraction over 5 years

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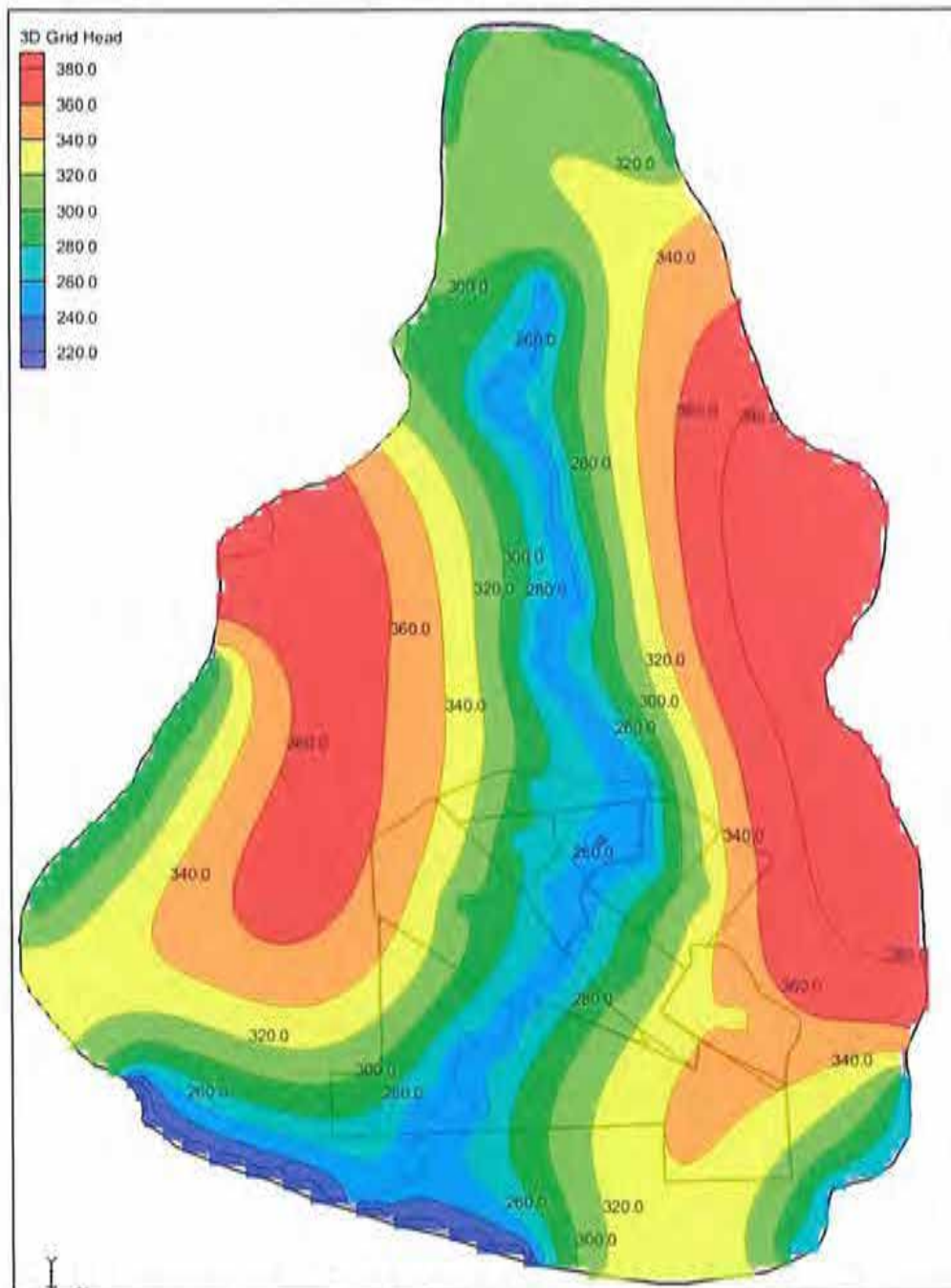


Figure 7.13: Predicted groundwater level with the consideration of groundwater abstraction over 10 years

Budgeting

The whole study area is considered as single zone and zone budgeting engine has been conducted. The percent discrepancy of the budget between inflow and outflow within the watershed (study area) is found to be $1.758392e-006$ (Figure 7.13).



Budget Term	Flow (m ³ /d)
Flow Budget for Zone 1	
IN:	
CONSTANT HEAD	705 22732162476
WELLS	0 0
RECHARGE	203545.99423218
Total IN	204251.2215538
OUT:	
CONSTANT HEAD	169251.21771812
WELLS	35000.000244141
RECHARGE	0 0
Total OUT	204251.21796227
SUMMARY:	
IN - OUT	0.0035915374756
Percent Discrepancy	1.75839218e-006

Figure 7.14: Mass Balance

Model Limitation

It has been assumed that the whole watershed is having uniform recharge rate and uniform hydraulic conductivity. The constant head has been assigned based on the water level from nearby observation wells and topography. The groundwater draft of 35,000 m³/day has been assigned through pumping wells with in the Gare Palma Coal Mines.

Conclusion

The results indicated that 5 year predicted water level contours & 10-year predicted water level contours shows that there is no significant change on groundwater regime. The results also indicated that the existing mining with the discharge of 35,000 m³/day has no significant impact on surface water flow in Kelo River.



8.0 Water Quality:

Water Quality data has been taken from EIA/EMP Report of GP II which has been already approved by MoEF & CC which is given below.

8.1 Ground water Quality:

Groundwater collected from the study area to assess the water quality during the study period. The groundwater samples were drawn from the hand pumps and open wells used by villagers for their daily use. Ground water location is given in **Table 8.1** and quality is given in **Table 8.2**.

Table 8.1: Location of Ground Water quality

Code	Name of the Location	W.R.T Site		Latitude (N)	Longitude (E)	Source
		Direction	Distance, km			
Ground water						
GW1	Kunjemura	Core zone	-	22°07'43.0"	83°28'08.2"	Openwell
GW2	Saraitola	Core zone	-	22°09'07.1"	83°28'51.1"	Hand pump
GW3	Milupara	NE	5.4	22°11'11.7"	83°31'32.0"	Openwell
GW4	Tamnar	SW	5.3	22°05'16.6"	83°26'17.0"	Hand pump
GW5	Khamharia	N	2.0	22°09'56.6"	83°29'58.6"	Borewell
GW6	Kerakhol	NW	3.6	22°11'55.2"	83°25'11.7"	Openwell
GW7	Ukaripali	W	8.3	22°08'10.9"	83°21'28.9"	Hand pump
GW8	Devgaon	S	6.8	22°03'54.7"	83°27'33.1"	Borewell
GW9	Dhaurabhanta	SE	2.4	22°05'49.4"	83°32'27.5"	Borewell
GW10	Kondkel	E	3.3	22°09'25.6"	83°31'33.8"	Borewell

Table 8.2: Ground Water Quality

Parameters	Unit	GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8	GW9	GW10	IS 10500:2012	
												Acc'ble	Per'ble
Ph	-	7.08	7.03	6.99	6.71	7.1	7.16	7.11	7.19	7.01	7.05	6.5-8.5	N R
Elec. Conductivity	µs/cm	438	402	152	549	197	347	348	412	195	163	-	-
Odor	-	Agreeable										Agreeable	
TDS	mg/l	302	265	104	345	133	224	234	254	131	112	500	2000
Turbidity	NTU	0.1	0.7	3.7	8.1	33.7	0.2	0.8	2.7	8.9	2.2	1	5
Alkalinity as CaCO ₃	mg/l	51	154	51	72	60	93	112	154	62	52	200	600
Chlorides as Cl	mg/l	60	26	17	74	19	36	24	28	16	18	250	1000
Sulphates as SO ₄	mg/l	48	18	8	54	12	22	25	18	11	9	200	400
Nitrate as NO ₃	mg/l	6.8	6.3	3.1	7.4	2.8	5.7	5.3	6.5	3.5	3.5	45	N R
Hardness as CaCO ₃	mg/l	105	130	70	205	87	155	140	175	95	72	200	600
Calcium as Ca	mg/l	22	32	14	42	18	36	38	36	16	12	75	200
Magnesium as Mg	mg/l	12	12	<10	24	10	15	10	20	13	10	30	100
Sodium as Na	mg/l	47	31	7	35	8	12	18	18	8	8	-	-
Potassium as K	mg/l	15	20	<5	5	<5	9	9	7	<5	<5	-	-
Iron as Fe	mg/l	0.23	<0.2	<0.2	0.24	<0.2	0.22	0.21	0.25	<0.2	<0.2	0.3	N R
Flouride as F	mg/l	0.58	0.56	0.51	0.56	0.52	0.53	0.53	0.54	0.53	0.51	1.0	1.5
Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	N R
Cadmium as Cd	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	N R
Zinc as Zn	mg/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	5	15
Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	N R
Phenolic Compounds	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.002



8.2 Surface Water Quality:

Surface water collected from the study area to assess the water quality during the study period.

Surface water location is given in **Table 8.3** and quality is given in **Table 8.4**.

Table 8.3: Location of Surface Water Quality

Surface water							
SW1	Khamharia pond	N	1.9	22°09'45.0"	83°30'00.4"	Pond	Used for washing cloths & bathing
SW2	Kelo river upstream	NE	5.0	22°10'46.7"	83°31'28.2"	River	Used for agricultural
SW3	Tapranga pond	SE	2.0	22°05'57.3"	83°32'15.1"	Pond	Waste water
SW4	Pajhar nadi	WNW	2.8	22°10'48.4"	83°24'46.9"	River	Used for agricultural
SW5	Devgaon pond	S	6.9	22°03'47.0"	83°27'33.8"	Pond	Used for washing cloths
SW6	Regaon pond	SW	2.2	22°07'13.0"	83°26'55.5"	Pond	Industrial waste water
SW7	Kelo river downstream	S	0.4	22°07'03.3"	83°28'56.9"	River	Used for agricultural
SW8	Rodopali pond	Core zone	-	22°09'40.8"	83°26'46.7"	Pond	Used for agricultural
SW9	Pata pond	Core zone	-	22°08'16.3"	83°27'25.6"	Pond	Used for agricultural & washing cloths

Table 8.4: Surface Water Quality

Parameters	Unit	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9
pH	---	6.97	6.89	7.03	7.02	7.01	6.51	6.98	6.99	7.12
EC	µS/cm	188	114	246	315	302	474	227	132	108
TDS	mg/l	128	78	164	205	206	328	156	91	72
TSS	mg/l	<10	<10	<10	<10	<10	<10	<10	<10	<10
Turbidity	NTU	0.8	5.2	2.3	6.6	12.5	5.4	4.3	5.0	1.5
Alkalinity as CaCO ₃	mg/l	38	51	65	76	76	86	41	38	28
Chloride as Cl ⁻	mg/l	26	12	26	34	38	53	28	14	12
Sulphate as SO ₄	mg/l	18	8	12	21	9	34	18	5	5
Nitrates as NO ₃	mg/l	2.3	2.5	3.8	4.2	3.9	5.6	4.5	2.2	1.8
Hardness as CaCO ₃	mg/l	76	69	122	97	92	188	105	69	69
Calcium as Ca	mg/l	12	11	30	22	20	52	20	11	11
Magnesium as Mg	mg/l	11	10	11	10	10	14	13	10	10
Sodium as Na	mg/l	8	8	9	28	22	16	11	7	6
Potassium as K	mg/l	6	<5	5	8	12	11	5	<5	<5
Iron as Fe	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fluoride as F	mg/l	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium as Cd	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Chromium as Cr	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper as Cu	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Zinc as Zn	mg/l	<1	<1	<1	<1	<1	<1	<1	<1	<1
Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DO	mg/l	5.2	5.6	4.8	5.1	5.1	4.8	5.2	4.9	5.2
COD	mg/l	17	12	22	22	21	24	15	20	18
BOD at 27°C	mg/l	5	3	6	6	6	7	4	6	5



9.0 Safety Zone & Embracement As per DGMS Rule:

Kelo River flows from north to South direction adjacent to the GP II coal block and form the eastern boundary of open cast mine. The approved mine plan have provision to leave sufficient area as per DGMS rule. This area will be used for non-mining purposes like green belt. Construction of embankment along Kelo River for protection from flood. This left out area will never be disturbed for open cast mining purposes. The area shown as per approved mine plan and EIA/EMP is placed at **Figure 9.1.**

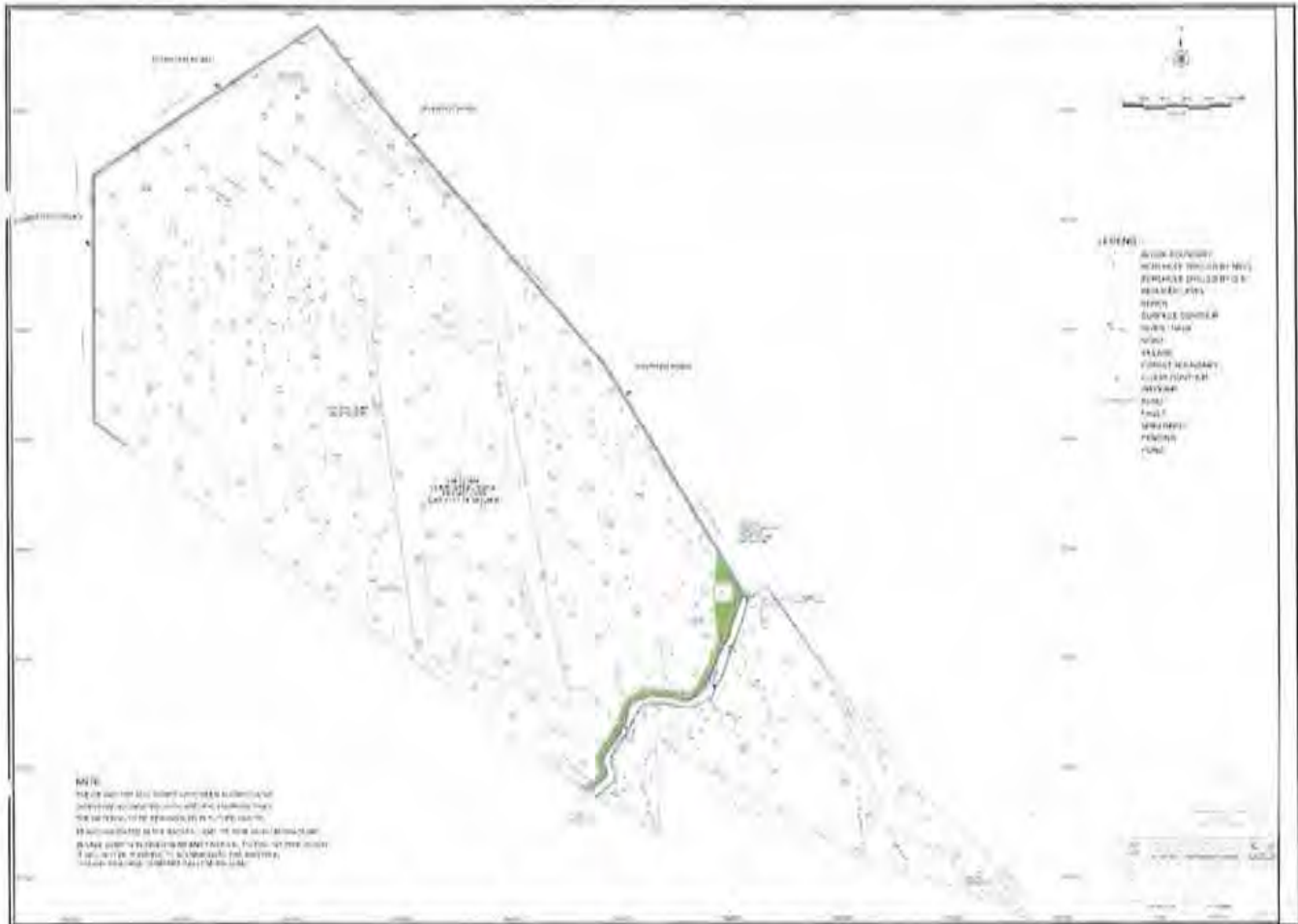


Figure 9.1: Safety zone area in green color



10.0 Cumulative Impact of Mining and Industries on hydrological regime of Kelo River:

The impact on hydrological regime of Kelo River is on two aspects

- Surface water flow
- Effect on groundwater level

10.1 Surface Water Flow

During the course of mining, the process of dewatering is an essential operation for safe and efficient mining. It is a common belief that mining will reduce the water flow of nearby River. The study suggests that there will not be significant reduction in surface flow, it is observed that same will be recouped with mine water flow. However, In order to avoid adverse public opinion, a mitigation measure is planned. The pumped out water will be put into Kelo River after due treatment. If this water course happens to have lost natural flow up stream due to any other reason, then the disposal of treated mine water will have the beneficial effect of providing compensation flow to make up for the so called water loss due to the mine. It is important to note that the mitigation measure of constant pumping effluent discharge to Kelo River will result in the river having very good hydrological regime to those competing users for irrigation and other purposes. There will be rise in water level on bank of river. A testimony to this is raise in water level is the report of CGWA decadal water level report.

10.2 Effect on Ground water level

The model study suggests that within the mine cone of depression due to drawdown will occur. The public opinion may state that lowering of groundwater level around the mine due to mine dewatering can impact other water users by lowering water level in their wells, thus incurring increased pumping cost or even drying the well entirely in some selected cases. In practice, it can be virtually impossible to prove beyond all doubt whether an observed lowering of water is attributable to dewatering of mine, some other local pumping activity or even climate change. Rather than waste money on fruitless litigation and public opinion, the mine owner is advised to mitigate potential adverse impact by supplying alternate source of water, deepening of wells or other activity of artificial recharge measure.



11.0 Mitigation Measures:

In order to keep the impact free hydrologic regime of Kelo River the Mitigative measure have to be undertaken as Rain water Harvesting. GP II management has prepared Detailed Project Report for Rain water harvesting structures and approved from CGWA for ground water recharge to the tune of 265335 m³/year. The details of Rain water Harvesting is given in subsequent paragraphs.

11.1 Intake Water in Recharge Well – Barakar Formation:

A recharge well may be defined as a well that admit water from the surface to fresh water aquifer. Recharge well is also known as disposal well or drain wells. A recharge wells flow is the reverse of a pumping well. If water is admitted into a well, a cone of recharge will be formed that is similar in shape but is the reverse of a cone of depression surrounding well. The equation for the curve can be derived in a similar manner to that for a pumping well. For confined or similar manner aquifer the water being recharged into a completely penetrating well at a rate Q_r , the approximate steady-state expression. (Ref - (D. K. Todd 3rd edition -2005 page 554). (Figure 11.1)

$$Q_r = \frac{\pi K (h_w^2 - h_o^2)}{L_n (r_o/r_w)}$$

Where,

Q_r = Recharge Rate in m³/d

K = Hydraulic Conductivity in m/d

h_w = Depth of intake water level to bottom of unconfined Aquifer in m

h_o = Depth of water table with reference to bottom of unconfined aquifer

r_o/r_w = Assumed value 200 as per above equation

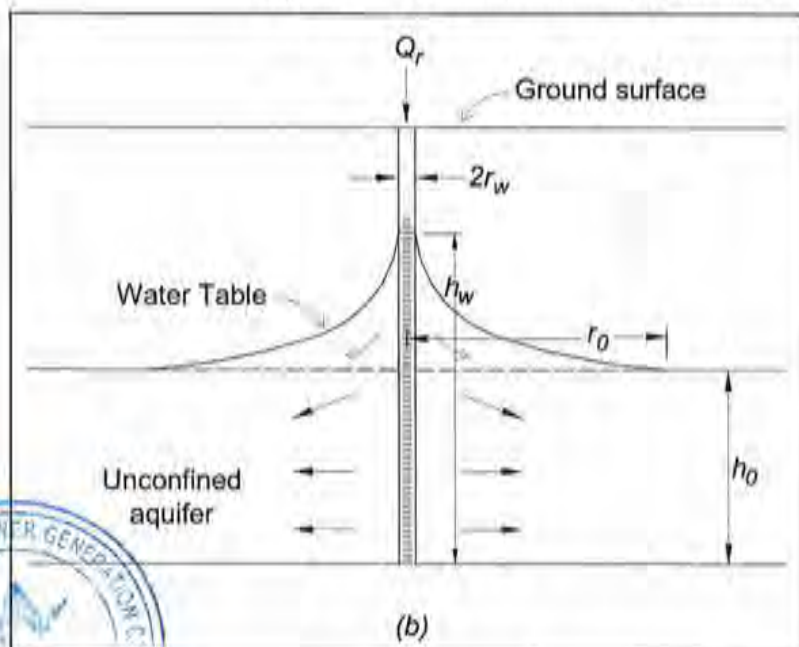


Figure 11.1: Steady-State Expression in Unconfined Aquifer

The recharge rate can be determined by substituting the required data in above equation:

Input data:-

$$K = 0.57 \text{ m/day}$$

$$h_w = 50 \text{ m}$$

$$h_o = 40 \text{ m}$$

$$r_o/r_w = 200$$

$$\pi = 3.14 \text{ (Universal Value)}$$

$$Q_r = \frac{3.14 \times 0.57 \times (50^2 - 40^2)}{\ln(200)} = \frac{1610.8}{5.298}$$

$$Q_r = 304.04 \text{ m}^3/\text{day}$$

Thus, the recharge capacity of borewell will be 304 m³/day in Barakar Sandstone and shale.

Recharge Capacity- 304 m³/day

11.2 Schematic Diagram – Artificial Recharge:

The difficulty lies in the fact that pumping and recharging differ by simple change of flow direction. The schematic diagram of radial flow direction from recharging well penetrating unconfined aquifer is depicted at Figure 11.2 for better understanding of artificial recharge. The notation in the diagram may be ignored for depicting value to obtain any result. The diagram may be used for illustration.

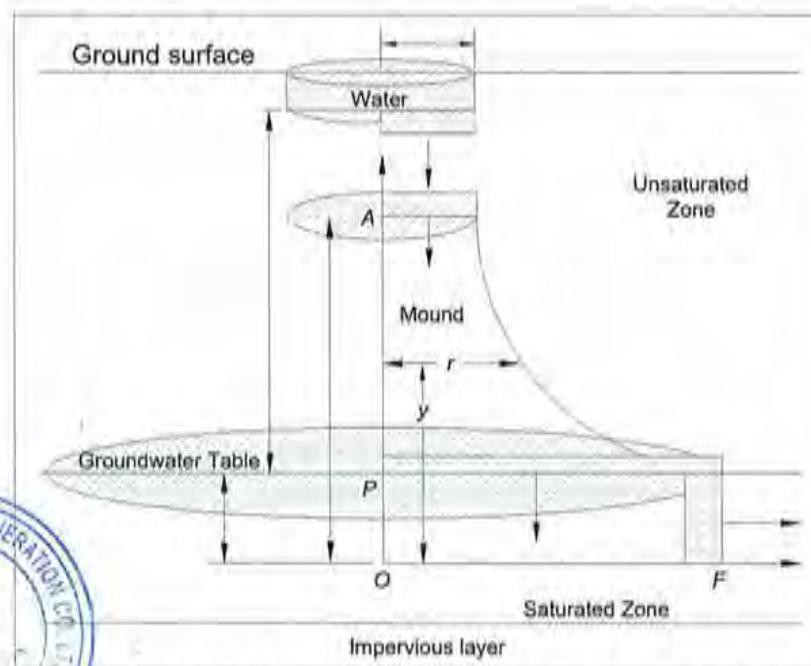


Figure 11.2: Schematic flow pattern under circular basin (J. C. Y. Guo-2001)



11.3 Rain Water Harvesting:

The area was thoroughly examined and detail project report is being planned for proposed in incorporating existing rain water harvesting for Pond – I & Pond – II in Sidapara & Milupara Village.

11.3.1 Proposed Rain Water Harvesting in Nala Bund:

The dimension of Nala Bund is given in **Table 11.1**.

Table 11.1: Dimension of Nala Bund

Sr. No.	Location	L	W	D	Unit Rainy Days Nala Bund	No. of Rainy Days	Total Availability
		m	m	m	m ³	Days	m ³ /year
1	Nala Bund	360	20	1	7200	55	396000

The details of recharge pit for Nala Bund is given is **Table 11.2**.

Table 11.2: Details of Recharge Pit for Nala Bund

Sr. No.	Location	Recharge pit (m) Single Unit	Filling Material	Borewell depth	Diameter of borewell	Recharge of capacity of borewell	No of days water available	No of pit	Quantity of water recharge
				m	mm	m ³ /d	m ³ /d		m ³ /y
1	Nala Bund	1.5 x 1.5 x 1.5	Core sand + Gravel + boulder	50	150	304	55	16	267520

The nala bund will recharge 267520 m³/year to ground water through sixteen recharge pit with bore well.

Location of Nala Bund:

The location of nala bund and recharge pit with 16 no. is given in **Table 11.3 & Figure 11.3** in google map & detail location in **Figure 11.4**.



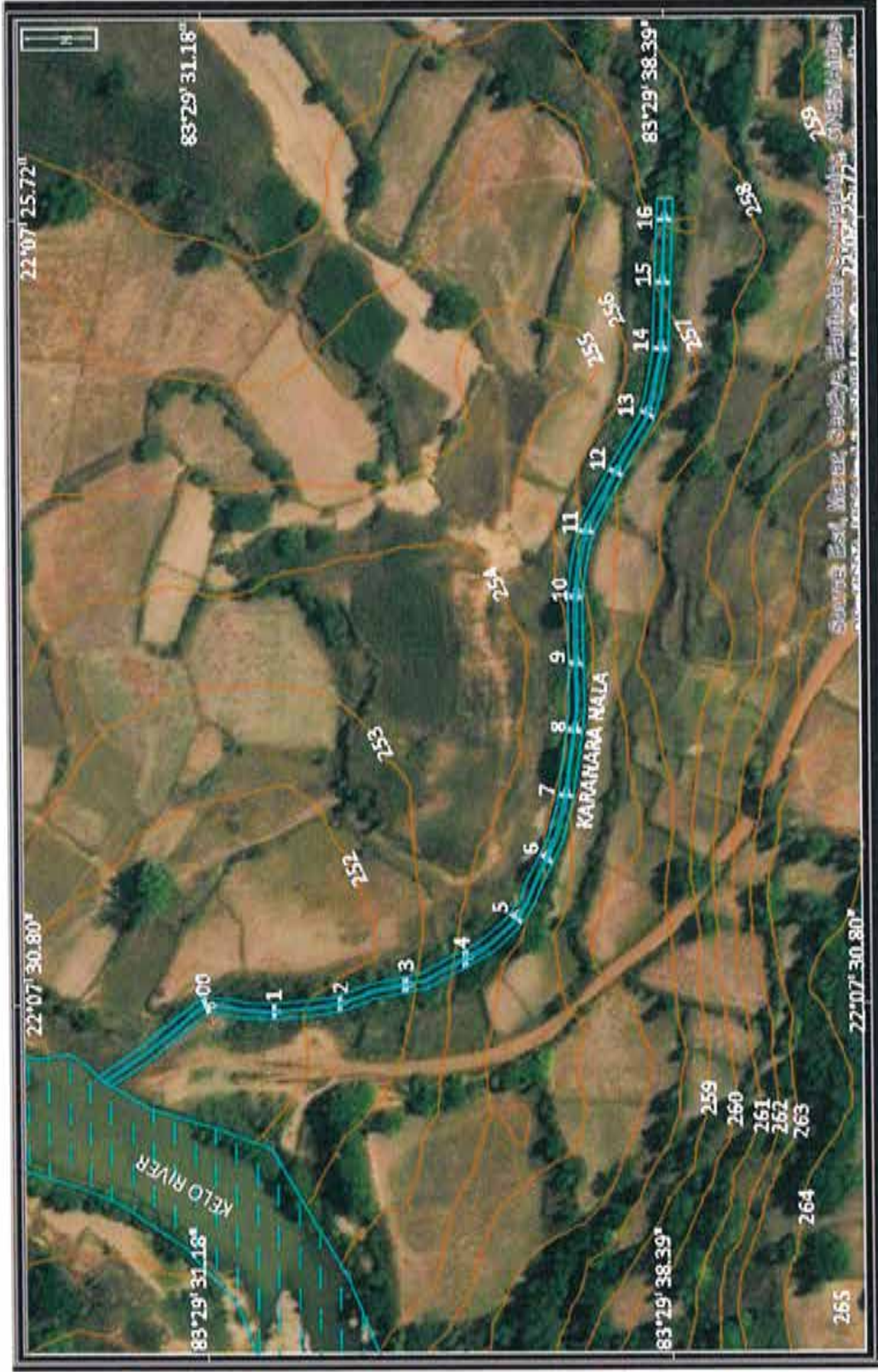


Figure 11.3: Google Map of Nala Bund Location

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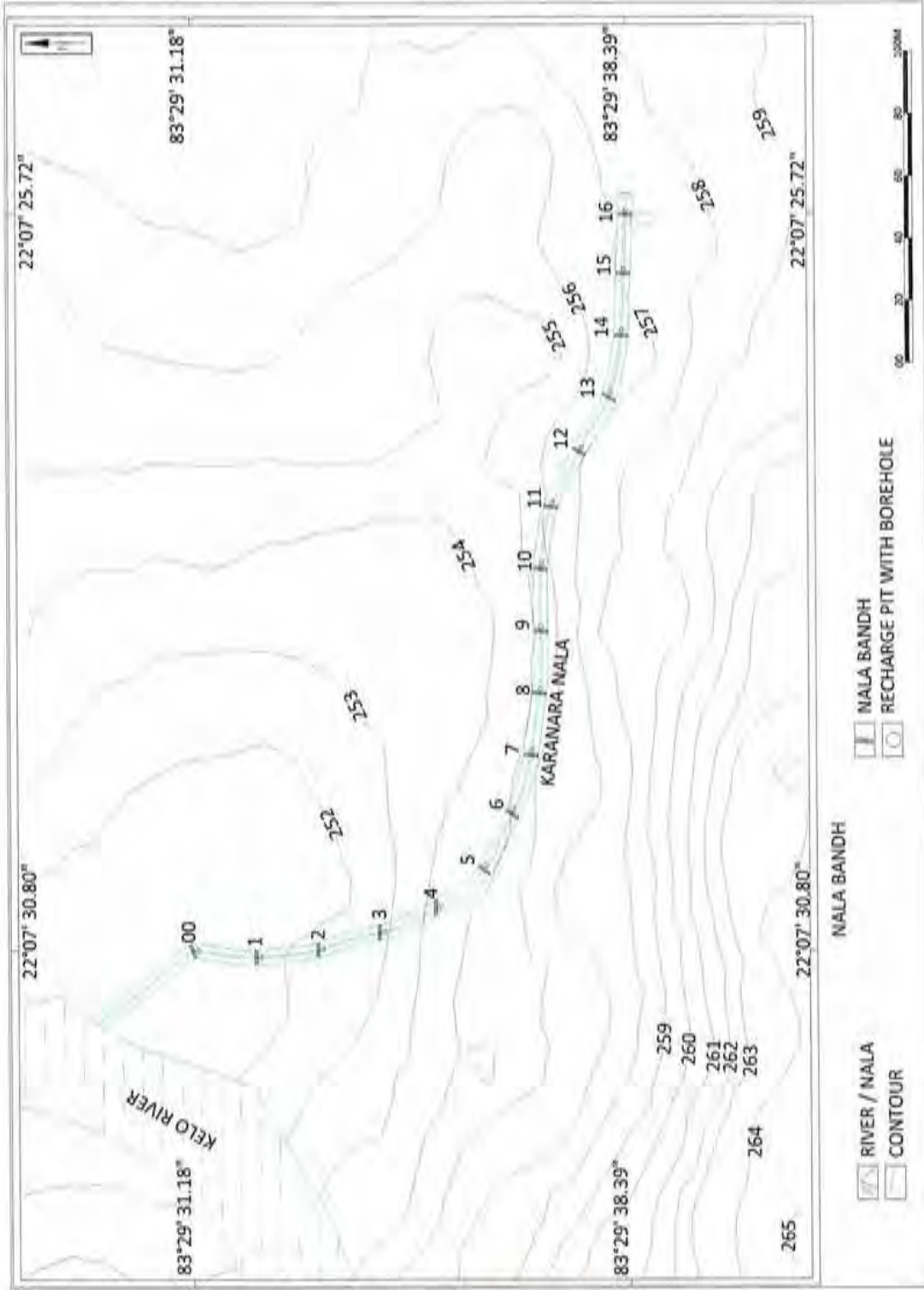


Figure 11.4: Location of Nala Bund



Table 11.3: location of Nala Bund and Recharge Pit with 16 no

RWH Structure No.	Distance to Nala	Co-ordinate		Bed RL m amsl	Pit Dimension m ³ (l x b x h)
		Latitude	Longitude		
1	0	22° 07' 30.80"	83° 29' 31.18"	252	1.5 x 1.5 x 1.5
2	20	22° 07' 30.14"	83° 29' 31.16"	252	1.5 x 1.5 x 1.5
3	40	22° 07' 29.50"	83° 29' 31.18"	253	1.5 x 1.5 x 1.5
4	60	22° 07' 28.86"	83° 29' 31.31"	254	1.5 x 1.5 x 1.5
5	80	22° 07' 28.26"	83° 29' 31.52"	255	1.5 x 1.5 x 1.5
6	100	22° 07' 27.71"	83° 29' 31.89"	255	1.5 x 1.5 x 1.5
7	120	22° 07' 27.24"	83° 29' 32.36"	255	1.5 x 1.5 x 1.5
8	140	22° 07' 27.03"	83° 29' 33.1"	255	1.5 x 1.5 x 1.5
9	160	22° 07' 26.86"	83° 29' 33.69"	255	1.5 x 1.5 x 1.5
10	180	22° 07' 26.72"	83° 29' 34.37"	256	1.5 x 1.5 x 1.5
11	200	22° 07' 26.68"	83° 29' 35.07"	256	1.5 x 1.5 x 1.5
12	220	22° 07' 26.66"	83° 29' 35.74"	257	1.5 x 1.5 x 1.5
13	240	22° 07' 26.49"	83° 29' 36.42"	257	1.5 x 1.5 x 1.5
14	260	22° 07' 26.17"	83° 29' 37.14"	257	1.5 x 1.5 x 1.5
15	280	22° 07' 25.81"	83° 29' 37.70"	257	1.5 x 1.5 x 1.5
16	300	22° 07' 25.72"	83° 29' 38.39"	257	1.5 x 1.5 x 1.5



11.3.2 Design of the Recharge Pit with Bore well:

The Design of Recharge Pit with Bore well in Pond is given in **Table 11.4 & Figure 11.5.**

Table 11.4: Design of Recharge Pit with Bore well in Pond

Sr. No.	Details	Value
1	Infiltration capacity for natural recharge – As per CGWB (GEC – 97)	1.44 mm/day
2	Hydraulic conductivity of aquifer Barakar	0.57 m/day
3	Specific yield average of filling material Barakar	0.20
4	Intake capacity of recharge well - Barakar	304 m ³ /day
5	Size of filling material: From Bottom (1.00 m) <ul style="list-style-type: none"> • Boulder (25 – 40 mm) • Gravel (5 – 10 mm) • Sand (1.5 – 2 mm) 	0 - 0.50 m 0.5 - 0.75 m 0.75 – 1.00 m
6	Depth of recharge pit	2 - 3 m, 0.10 above GL
7	Filling of material (thickness)	0.5 – 2 m
8	Clear water (Thickness)	1-2 m
9	Number of bore hole (excluding 2 old bore well)	16
10	Diameter of bore well	150 mm
11	Depth of bore well for pond	50 m in pond
12	Casing of bore well (down to loose material)	12 m



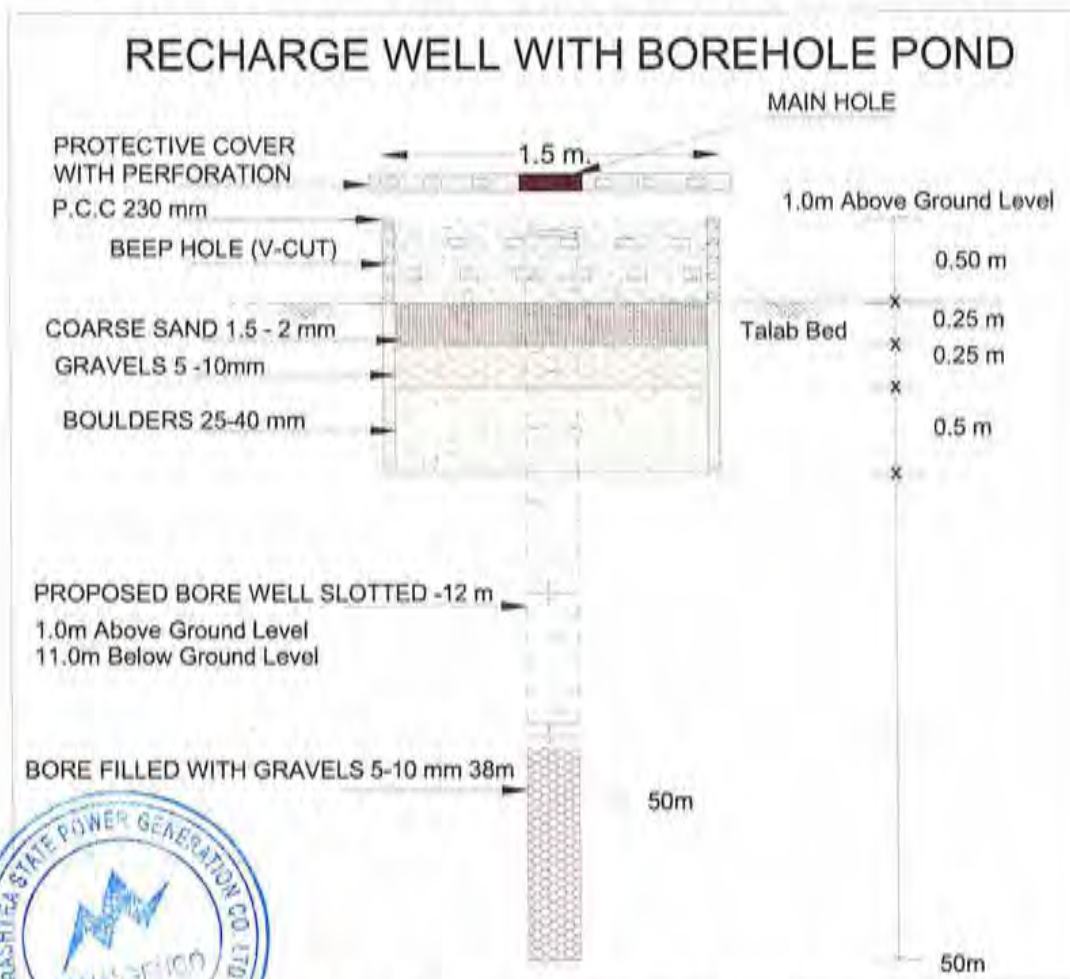
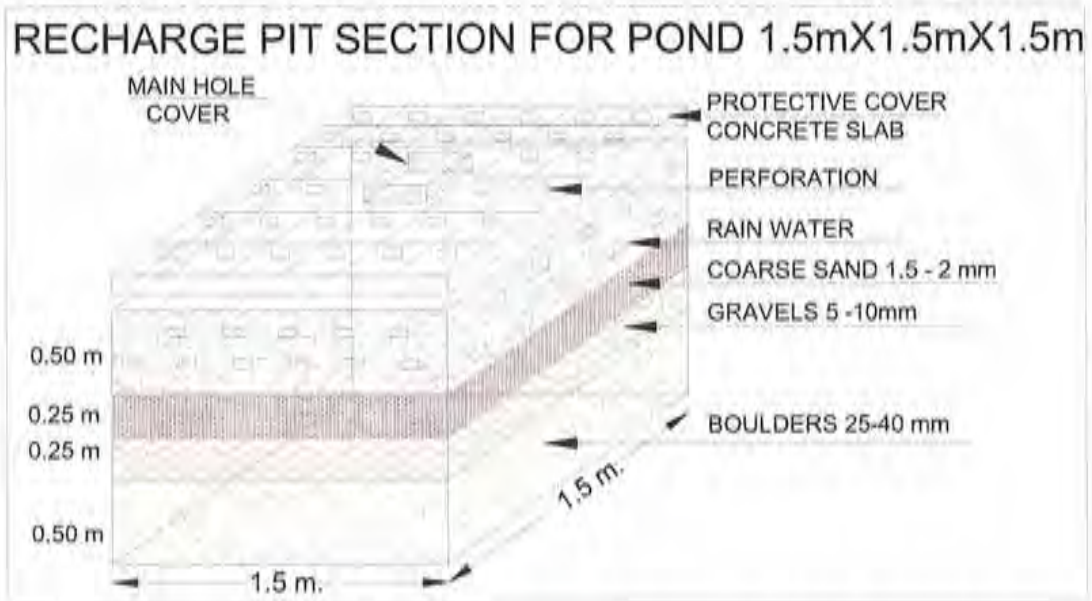


Figure 11.5: Design of Recharge Pit with Borewell in Pond

11.3.3 Bore well Design:

The depth of each bore well for roof top and pond recharge pit will be 50 m below ground level. The diameter of bore well will be 150 mm. The cased portion will be top 12 meter and remaining 38 m will be uncased filled with gravel. The diameter will be 150 mm. the cased portion of bore well will be 12 m (0.5 m above pond bed and 11.5 m below nala bed).

The casing of bore wells is slotted down to the depth of 12.00 m. The upper portion of casing above bottom of recharge pit is 0.5 for pond water. This portion will be circumference with coir rope so that entry of fine sand and silt can be avoided. The top of casing should be capped with stainless steel wire mesh so that clear water can be recharged directly without any floating particle. The casing pipe should be Mild Steel of at least 4 mm thick. The relevant design for bore well and casing with cap for pond is given in Figure 11.6 respectively.

11.3.4 Cover to Recharge Pit:

The cover for roof top recharge pit is essential to avoid evaporation of water. This can be best exemplified by climatic water balance study, revealed that maximum evaporation is taking place during monsoon period. The rain water harvesting is proposed to catch monsoon months. The recharge pit cover also safeguards the external pollutant like leaf and other local material. It is strongly recommend covering recharge pit by either concrete slab or steel sheet. The design of recharge pit is clearly exhibited for required cover.



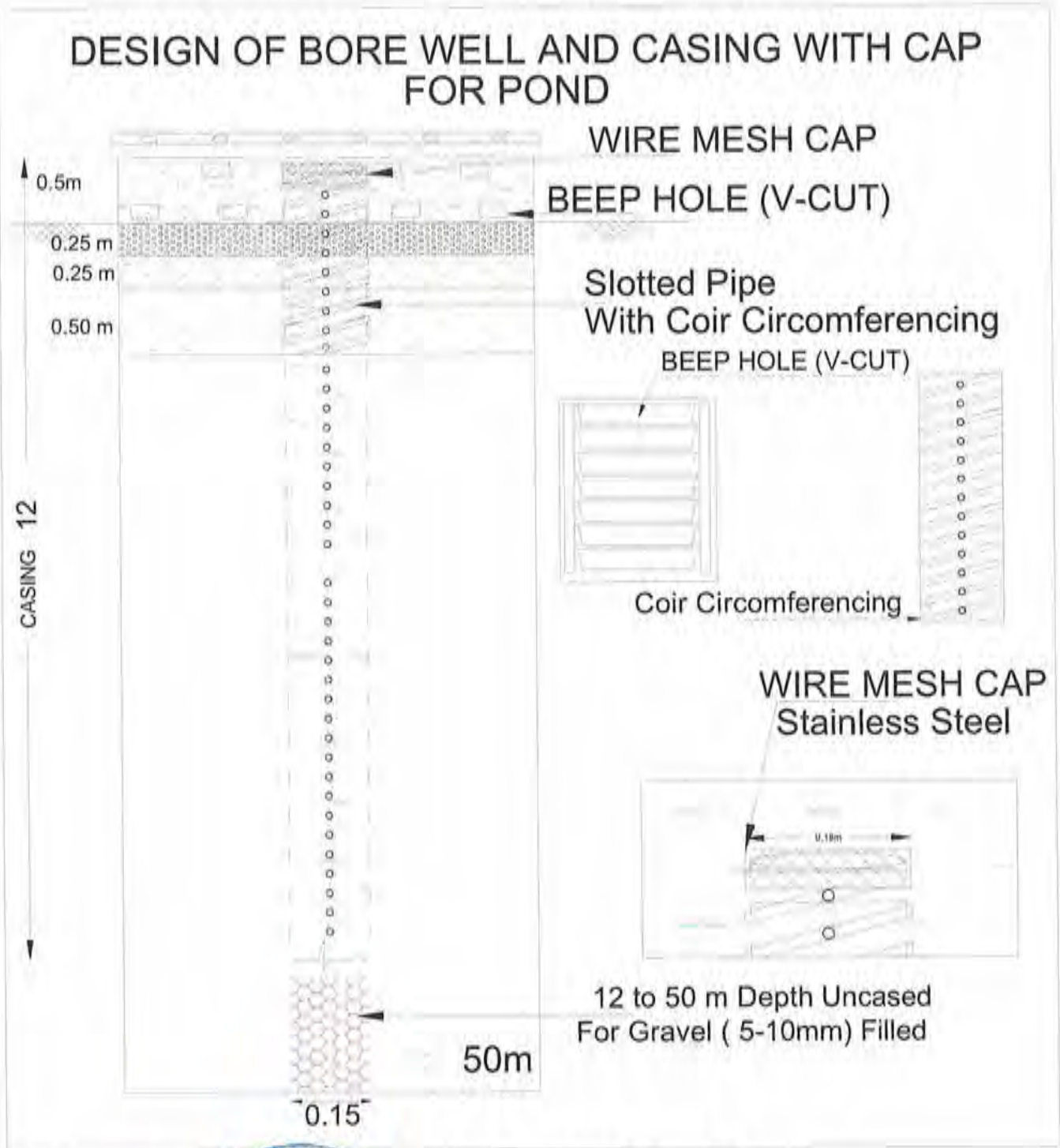


Figure 11.6: Design of Borewell for Recharge Pit



11.3.5 GUIDELINES FOR OPERATION AND MAINTENANCE:

Periodic maintenance of artificial recharge structures is essential because infiltration capacity reduces rapidly as a result of silting, chemical precipitation and accumulation of organic matter.

The data mentioned above helps fine-tune the recharge facility and provides the basis for corrections in case of problems. Periodic tests of pump efficiency, sampling of water quality and ground water level measurements should also be made and recorded on a defined schedule.

11.3.5.1 Water Quality Measurement:

Complete water quality sampling and testing of a recharge scheme including source and aquifer should be done initially to determine the suitability of water for the intended use. The testing will provide a basis for the design of any other water quality treatment facilities that may be needed. After implementation of the scheme, periodic water quality assessment as per guideline of CGWA,

11.3.5.2 Potential Problems:

The Problems normally encountered in recharge projects are mainly related to the source water available for recharge, which generally require some sort of treatment before use in recharge installations. The storm water needs to pass through filter media as filter trap (2 x 2 x 1 m).

11.3.5.3 Suspended Material:

A major requirement for waters that are to be used in recharge projects is that they should be silt-free.

- Cover all inlet and outlet pipes with closely knit nylon net or fine cloth or cap during non-rainy season to avoid entry of insects, worms and mosquitoes
- Leakage or cracks in the storage tank should be immediately, attended to. This will obviate the need for major repairs caused by propagation of cracks.
- Heavy loads should not be applied on the lid.
- Water should not be allowed to stagnate in the collection pit
- The cover should have lock system to prevent pilferage or wastage of water
- The filter material should be washed thoroughly before replacing in the filter Bucket



- paint at least once in 3 years and in other areas lime (Calcium Carbonate) based whitewash

Concerned authority may be educated by providing the above tips for maintenance of the system. The implementing agency should visit the structures as follow-up to monitor and motivate the users in proper maintenance of the systems.

As a precautionary and preventive measure, the water from the storage tank may also be tested for the presence of disease causing microorganisms. This task may be taken up by the implementing agency as an immediate follow up of the construction of the systems. This helps the agency to find out the users attention to the maintenance of the system as well as necessary awareness to be given on various maintenance aspects.



12.0 Conclusion:

1. M/s Maharashtra State Power Generation Company Limited (MAHAGENCO) is in process of obtaining Forest Clearance stage II for Gare Pelma-II Coal Block which requires study of Hydrological Regime of Kelo River & Cumulative Impact of Mining and Industrial Activities of Gare Pelma Area.
2. The Catchment area of Kelo Watershed is 1352 km². The land use of Kelo watershed has been studied and found that 36% belongs to agriculture and 30% belongs to forest area whereas, 5 – 6% comes under mining domain. The highest elevation of Kelo watershed is 767 m masl and minimum 176 m amsl. The drainage is characterized by dendritic pattern and mainly controlled by two measure tributaries Kelo and Pajhar nadi. The Kelo River confluence into Mahanadi River and merge with Hirakund dam
3. The study area comprises of 790 km² covering all blocks and thermal power station. The elevation ranges between 767 m amsl to 220 m amsl. The study area is selected down to confluence of Pajhar nadi to Kelo River
4. There are 11 coal block in this segment of Gare blocks namely Gare-I, II, III, IV/1, IV/2, IV/3, IV/4, IV/5, IV/6, IV/7, IV/8 there is Thermal Power Plant of Ms. Jindal Power limited These blocks are also allotted for different companies for captive use. The total area of all coal block is 143 km² the present Hydrological Report attempt have been made to predict cumulative impact of all coal mines on water regime of the area on regional scale and on Kelo River.
5. There is a dam constructed on Kelo River at Danota Village having catchment Area of 920 km². The dam is operational.
6. In past similar work has been undertaken for GP III and GP IV/6 by SrSPL and NGRI and in both studies it was concluded that the proposed coal mining operation may not impact on surface water in Kelo River. Rather, the treated mine discharge will enhance surface flow of Kelo River.
7. Geology of the area is controlled by Gondwana sandstone, shale in study area.
8. The normal annual rainfall is 1321 mm and Potential Evaporation is 1492.4 mm.
9. The Climatic Water Balance suggests that out of 1321 mm 811 mm is actual evaporation and 707 mm is runoff including ground runoff and there is negative change in storage to the tune of -197 mm.
10. In order to study hydrologic regime of Kelo River, the runoff estimation has been done for Peak flood runoff and Annual runoff yield.

11. For peak flood runoff estimation mathematical model by Central Water Commission is adopted along with conventional Empirical methods.
12. The peak flood estimation by Central Water Commission mathematical model may be 1260 m³/sec whereas, average empirical method will be 1312 m³/sec. Both the methods are analogous hence, Central Water Commission model is adopted.
13. The surface runoff yield of Kelo River at different attachment area has been attempted. The estimated value of surface runoff yield at confluence of Mahandi may be 466.89 MCM/year, Kelo dam is 315.11 MCM/year, the study area is 263.25 MCM/year. Whereas Kelo at GP II gauging station yield is 133.44 MCM/year. In case of yield area within GP II coal mines, the surface runoff yield is estimated to the tune of 8.53 MCM/year.
14. Hydraulic Conductivity of Gare blocks in general is 0.56 m/day.
15. To understand the cumulative impact of coal mining on Kelo River has been studied by well accepted ground water modeling methods. The model use is MODFLOW.
16. The modeling has been done and it is found that a steady state groundwater flow for the watershed surrounding the Gare Palma has been simulated. The model is calibrated for steady state condition. The calibration has been attained by adjusting the hydraulic conductivity and recharge parameters. The scattered plot indicates a good fit between the observed head and calculated head with NRMS = 15.18% with water budget input and output is near to zero.
17. Existing mining with expected discharge of 35000 m³/day and model is predicted for 5 years and 10 years impact assessment. The results of present scenario, 5-year scenario and 10-year scenario indicate that the groundwater flow direction is towards Kelo River. The results indicated that 5 year predicted water level contours & 10-year predicted water level contours shows that there is no significant change on groundwater regime with the consideration of mining and there is no adverse fall in head.
18. It is found that the results indicated that 5 year predicted water level contours & 10-year predicted water level contours shows that there is no significant change on groundwater regime. The results also indicated that the existing mining with the discharge of 35,000 m³/day has no significant impact on surface water flow in Kelo River.
19. Water quality is well within permissible limit.
20. The approved mine plan have provision to leave sufficient area as per DGMS rule. This area will be used for non-mining purposes like green belt. Construction of embankment along Kelo River for protection from flood.

21. Cumulative Impact of Mining and Industries on hydrological regime of Kelo River:

The impact on hydrological regime of Kelo River is on two aspects

- Surface water flow
- Effect on groundwater level

22. Surface Water Flow during the course of mining, the process of dewatering is an essential operation for safe and efficient mining. It is a common belief that mining will reduce the water flow of nearby River. The study suggests that there will not be significant reduction in surface flow, it is observed that same will be recouped with mine water flow. However, in order to avoid adverse public opinion, a mitigation measure is planned. The pumped out water will be put into Kelo River after due treatment. If this water course happens to have lost natural flow up stream due to any other reason, then the disposal of treated mine water will have the beneficial effect of providing compensation flow to make up for the so called water loss due to the mine. It is important to note that the mitigation measure of constant pumping effluent discharge to Kelo River will result in the river having very good hydrological regime to those competing users for irrigation and other purposes. There will be rise in water level on bank of river.

23. Effect on Ground water level the model study suggests that within the mine cone of depression due to drawdown will occur. The public opinion may state that lowering of groundwater level around the mine due to mine dewatering can impact other water users by lowering water level in their wells, thus incurring increased pumping cost or even drying the well entirely in some selected cases. In practice, it can be virtually impossible to prove beyond all doubt whether an observed lowering of water is attributable to dewatering of mine, some other local pumping activity or even climate change. Rather than waste money on fruitless litigation and public opinion, the mine owner is advised to mitigate potential adverse impact by supplying alternate source of water, deepening of wells or other activity of artificial recharge measure.

24. Rain Water Harvesting is used as Mitigative measure in which the nala bund will recharge 267520 m³/year to ground water through sixteen recharge pit with bore well and this will increase water level which in turn increase ground water runoff into Kelo River. The water flow in Kelo River during summer will increase.

The present Study corroborate the fact the impact assessment done in previous studies which concluded that there will not be any adverse impact due to mining on Hydrological regime of Kelo River.



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अधिकल्प कार्यालय विवरण
DESIGN OFFICE REPORT
M-3(d)/R-3/25/97

केन्द्रीय जल आयोग
CENTRAL WATER COMMISSION

महानदी उप अंचल - 3 (डी)
का बाढ़ आँकलन विवरण
(परिशोधित)

**FLOOD ESTIMATION REPORT FOR
MAHANADI SUB ZONE - 3 - (d)
(REVISED)**

जल विज्ञान निदेशालय
क्षेत्रीय अध्ययन
जल विज्ञान अध्ययन संगठन
नई दिल्ली - 110066

केन्द्रीय जल आयोग
भारत मौसम विभाग
अनुसंधान अभिकल्प एवं मानक संगठन
रेल मंत्रालय
जहाजरानी एवं परिवहन मंत्रालय
का संयुक्त कार्य

DIRECTORATE OF HYDROLOGY
(REGIONAL STUDIES)
HYDROLOGY STUDY ORGANISATION
NEW DELHI - 110066

A JOINT WORK OF
CENTRAL WATER COMMISSION
RESEARCH, DESIGNS AND
STANDARDS ORGANISATION
MINISTRY OF RAILWAYS
MINISTRY OF SHIPPING & TRANSPORT



फरवरी - 1997

FEBRUARY - 1997

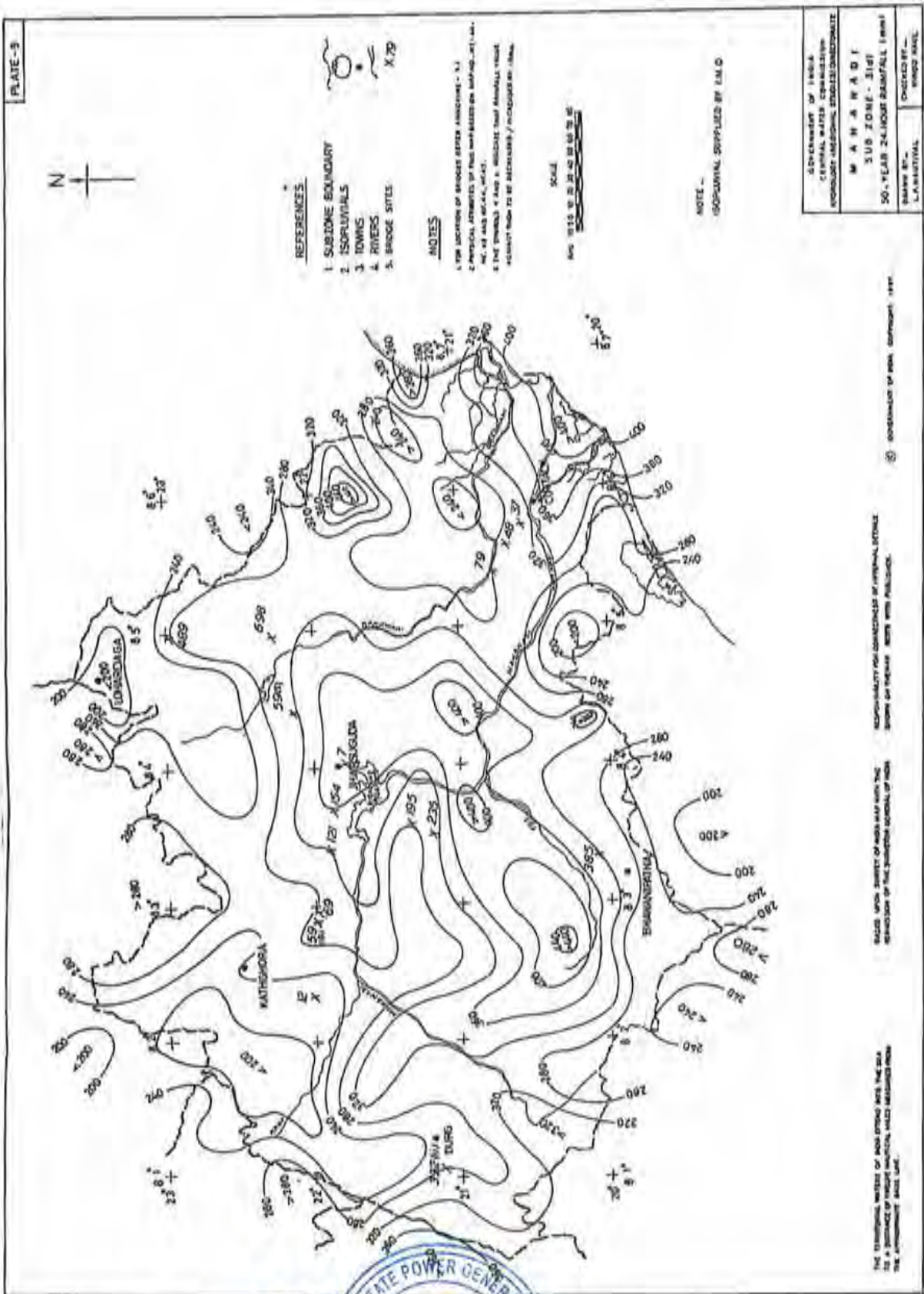
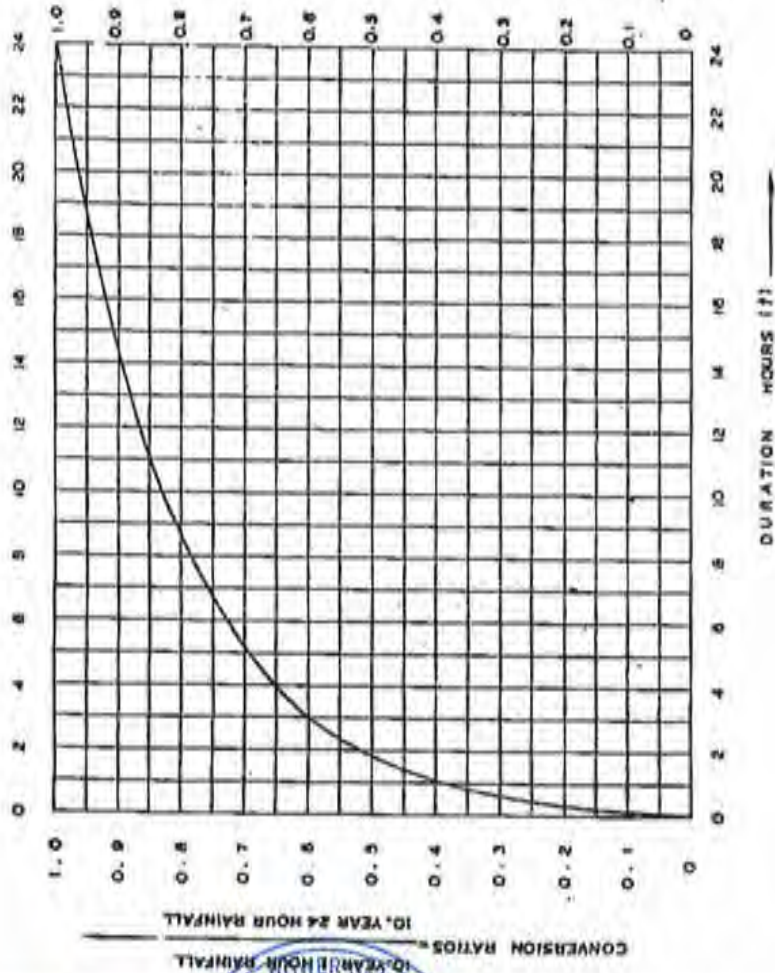


FIG. - 10

RATIOS OF 24-HOURS POINT
RAINFALL TO SHORT DURATION
RAINFALL

DURATION
(HOURS) R A T I O S

1	0.380
2	0.818
3	0.998
4	0.830
5	0.890
6	0.738
7	0.783
8	0.780
9	0.803
10	0.820
11	0.820
12	0.828
13	0.820
14	0.828
15	0.910
16	0.929
17	0.930
18	0.943
19	0.932
20	0.982
21	0.978
22	0.985
23	0.990
24	1.000

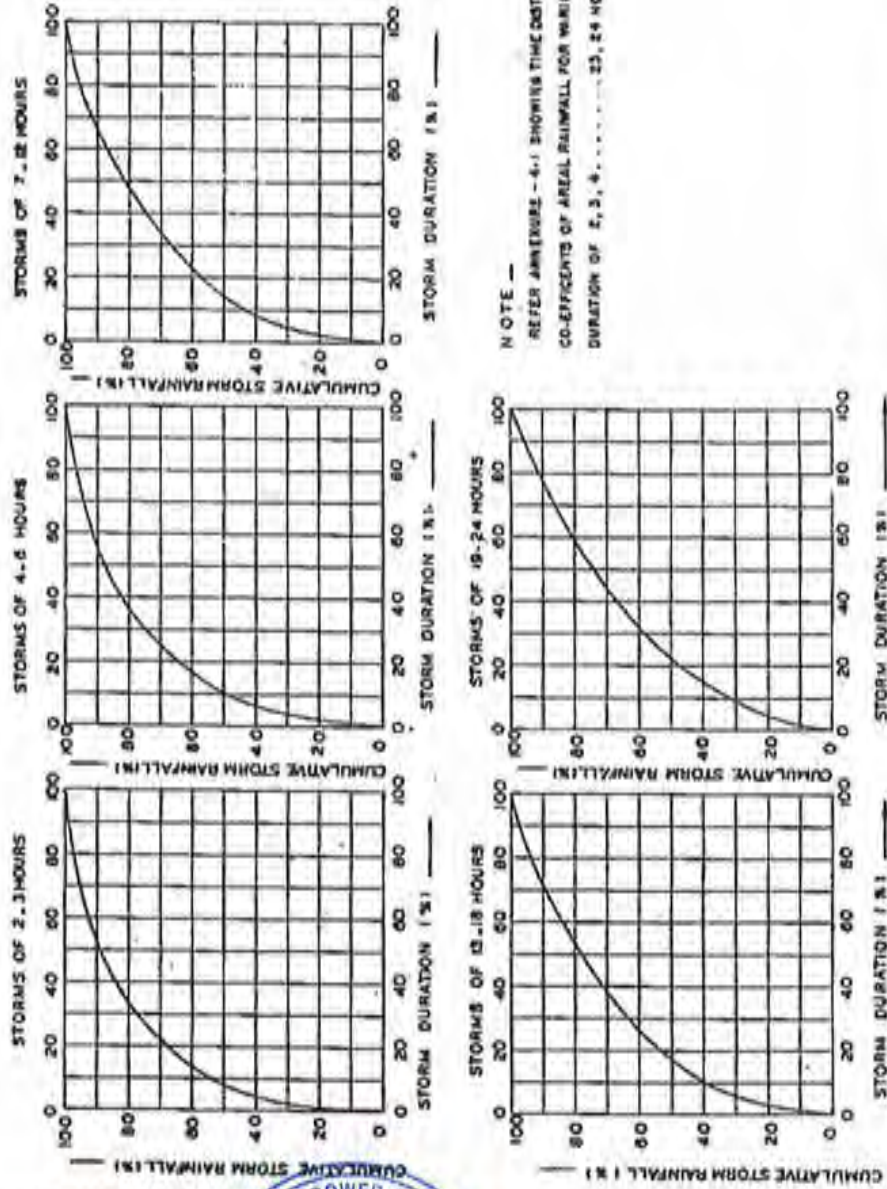


NOTE -
CURVE SUPPLIED BY I.M.O

GOVERNMENT OF INDIA CENTRAL WATER COMMISSION HYDROLOGY/REGIONAL STUDIES/DEL.	
MAHARAJI	
SUB ZONE - 3 (d)	
DURATION VS. CONVERSION RATIO	
DRAWN BY - L. A. PANT	CHECKED BY - VINOD KAUL



FIG. - II.



NOTE -
CURVES SUPPLIED BY I.M.D

GOVERNMENT OF INDIA
CENTRAL WATER COMMISSION
HYDROLOGY (REGIONAL STUDIES) SITE
MAHARAJGIRI
SUB ZONE - 3 (d)
MEAN AVERAGE TIME DISTRIBUTION
CURVES OF
STORMS OF VARIOUS DURATION
DRAWN BY - L.P. NAUGHTAL
CHECKED BY - C.S. AGARWAL

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TIME DISTRIBUTION CO-EFFICIENTS (PERCENTAGE) OF CUMULATIVE HOURLY RAINFALL

INTER-MEDIATE HOURS	DESIGN STORM DURATION (HOURS)																								INTER-MEDIATE HOURS
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	100	89	80	70	64	59	50	48	45	43	42	39	35	34	33	31	30	29	23	22	21	20	19	19	1
2		100	94	87	83	78	66	62	59	57	55	53	48	46	44	43	42	41	33	32	31	30	29	28	2
3			100	96	91	87	77	73	69	67	64	62	57	55	53	51	50	49	41	40	39	38	37	36	3
4				100	97	93	85	81	78	75	72	70	64	62	60	58	57	56	48	45	45	44	43	42	4
5					100	97	92	88	85	81	78	76	70	68	66	64	62	61	55	53	52	51	50	48	5
6						100	97	94	90	87	84	81	75	73	71	69	67	66	60	58	57	56	54	53	6
7							100	98	95	92	89	86	80	78	76	74	72	70	64	62	61	60	59	58	7
8								100	98	95	93	90	85	83	81	78	76	74	68	66	65	63	62	61	8
9									100	98	96	94	89	86	84	81	80	78	72	70	69	67	66	65	9
10										100	98	96	92	88	86	84	82	81	76	74	72	70	69	68	10
11											100	98	95	93	90	88	86	84	79	77	75	73	72	71	11
12												100	98	96	94	91	89	87	82	80	79	77	75	74	12
13													100	98	96	94	92	90	85	83	81	79	77	76	13
14														100	98	96	94	93	87	85	84	81	80	79	14
15															100	98	95	91	89	87	85	83	82	15	
16																100	98	97	93	91	89	87	85	16	
17																	100	98	96	93	91	89	87	86	17
18																		100	98	96	94	92	90	89	18
19																			100	98	96	94	92	91	19
20																				100	98	96	94	93	20
21																					100	98	96	94	21
22																						100	98	96	22
23																							100	99	23
24																								100	24



$d = 1.0$ cm depth

$t_i = t_r = 1$ hr. (the unit duration of UG)

$$Q = \frac{A * d}{0.36 * t_r} = \frac{194 * 1}{0.36 * 1} = 538.89 \text{ cumecs}$$

Note: In case, $Q_i * t_i$ for the unitgraph drawn is higher or lower than the volume of 1 cm., the falling limb of hydrograph may be suitably modified without altering the points of synthetic parameters.

Step- 3: Estimation of design storm

(a) Design storm duration

The Design Storm Duration (T_D) has been adopted as $1.1 * t_D$ as this value of storm duration gave higher value of flood peak (refer Step- 2, section 5.2). Rounding of the design storm duration to nearest hour, its value came as 8 hrs.

(b) Estimation of point rainfall and areal rainfall for storm duration

Catchment under study was located on Plate- 8 showing 50 year- 8 hr point rainfall. The point rainfall was found to be 32.00 cm. The conversion factor of 0.780 was read from Figure-10 to convert the 50 year- 24 hour point rainfall to 50 year- 8 hour point rainfall (since $T_D = 8$ hrs). 50 year-8 hr point rainfall was 24.96 cm.

Areal reduction factor of 0.9144 corresponding to the catchment area of 194 sq.km for $T_D = 8$ hour was interpolated from Annexure 4.2 or Fig. 12 (8) for conversion of point rainfall to areal rainfall. 50 year-8 hr areal rainfall thus worked out to be 22.82 cm.

The 50 year-8 hour areal rainfall was split into 1- hour rainfall increments using time distribution coefficients given in Annexure 4.1 or Figure 11.

A design loss rate of 0.21 cm/hr as recommended in para 3.5 was applied to get effective rainfall hyetograph.

The Table 5.1 given below gives the hourly effective rainfall increments.

D.J.



Table - 5.1 : Hourly effective rainfall increments

Dur- ati- on (hr)	Distri- bution coeff.	Storm rain- fall (cm)	Rainfall incre- ments (cm)	Loss per hr (cm)	Effective rainfall increments (cm)
1	2	3	4	5	6
1	0.48	10.96	10.96	0.21	10.75
2	0.62	14.15	3.20	0.21	2.99
3	0.73	16.66	2.51	0.21	2.30
4	0.81	18.49	1.83	0.21	1.62
5	0.88	20.08	1.60	0.21	1.39
6	0.94	21.45	1.37	0.21	1.16
7	0.98	22.36	0.91	0.21	0.70
8	1.00	22.82	0.46	0.21	0.25

Step- 4: Estimation of base flow

Taking design base flow of 0.10 cumecs per sq.km as recommended in para 3.6, the base flow was estimated to be 19.40 cumecs for the catchment area of 194 sq.km

Step- 5: Estimation of 50- year flood peak**a) Computation of flood peak**

For estimation of the peak discharge, the effective rainfall increments were re-arranged against ordinates such that the maximum effective rainfall is placed against the maximum U.G. ordinate, next lower value of effective rainfall against next lower value of U.G. ordinate and so on, as shown in col. (2) and (3) in Table 5.2. Sum of the product of U.G. ordinates and effective rainfall increments gives total direct surface runoff to which base flow is added to get total peak discharge.

Table - 5.2 : 50- year flood peak

Time (hrs)	U.G ordi- nate (cumecs)	1 hr effec. rainfall (cms)	direct runoff (cumecs)
1	2	3	4
5	30.5	0.25	7.63
6	40.2	1.39	55.88
7	49.0	2.30	112.70
8	56.26	10.75	604.80
9	50.00	2.99	149.50
10	43.80	1.62	70.96
11	37.70	1.16	43.73
12	31.30	0.70	21.91

Total DSRO
Base flow

1067.10
19.40

Total peak discharge

1086.50 cumecs

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SUBZONE 3(d)

ANNEXURE 5.4

COMPUTATION OF DESIGN FLOOD HYDROGRAPH OF BRIDGE CATCHMENT NO. 385

TIME (hrs)	S.U.H. ORDINATES	RAINFALL EXCESS IN CM								TOTAL BRD IN CUCECS	BASE FLOW IN CUCECS	TOTAL FLOW IN CUCECS
		0.70	1.16	1.62	2.99	10.75	2.30	1.39	0.25			
DIRECT RUNOFF (CUCECS)												
1	2	3	4	5	6	7	8	9	10	11	12	13
0	0.00	0.00								0.00	19.40	19.40
1	3.70	2.59	0.00							2.59	19.40	21.99
2	9.10	6.37	4.29	0.00						10.66	19.40	30.06
3	15.20	10.64	10.56	5.99	0.00					27.19	19.40	46.59
4	22.00	15.40	17.63	14.74	11.06	0.00				58.84	19.40	78.24
5	30.50	21.35	25.52	24.62	27.21	39.78	0.00			138.48	19.40	157.88
6	40.20	28.14	31.30	35.64	45.45	97.83	8.51			250.94	19.40	270.34
7	49.00	34.30	46.63	49.41	61.78	165.40	20.93	5.14	0.00	385.60	19.40	405.00
8	56.26	39.38	56.84	65.12	91.20	236.50	34.96	12.45	0.93	537.57	19.40	556.97
9	50.00	35.00	65.26	79.38	120.20	327.88	50.60	21.13	2.28	701.72	19.40	721.12
10	43.80	30.66	58.00	91.14	146.51	432.15	70.15	30.58	5.80	882.99	19.40	902.39
11	37.70	26.39	50.81	81.00	166.22	526.75	92.46	42.40	5.90	993.52	19.40	1012.92
12	31.30	21.91	43.73	70.96	149.50	604.79	112.70	55.88	7.63	1067.10	19.40	1086.50
13	24.00	18.20	35.31	61.07	130.96	537.50	129.40	68.11	10.05	991.60	19.40	1011.00
14	22.30	15.61	30.16	50.71	112.72	470.85	115.00	78.20	12.25	885.50	19.40	904.90
15	19.00	13.30	25.87	42.12	98.59	405.28	100.74	69.50	14.07	764.44	19.40	783.84
16	15.70	10.99	22.04	36.13	77.74	336.48	86.71	60.88	12.50	643.46	19.40	662.86
17	13.00	9.10	18.21	30.70	66.68	279.50	71.99	52.40	10.95	539.61	19.40	559.01
18	11.00	7.70	15.08	25.43	56.61	239.73	59.80	43.51	9.43	457.48	19.40	476.88
19	9.00	6.30	12.76	21.06	46.94	204.25	51.29	36.14	7.83	386.57	19.40	406.37
20	7.70	5.39	10.44	17.82	36.87	168.78	43.70	31.00	6.50	322.49	19.40	341.89
21	6.50	4.55	8.93	14.58	32.89	139.75	36.11	26.41	5.58	268.80	19.40	288.20
22	5.40	3.78	7.54	12.47	26.91	118.23	29.90	21.62	4.75	225.43	19.40	244.83
23	4.40	3.08	6.26	10.53	23.02	96.75	25.30	18.07	3.93	186.94	19.40	206.34
24	3.50	2.45	5.10	8.75	19.44	82.78	20.70	15.29	3.25	157.75	19.40	177.15
25	2.70	1.89	4.06	7.13	16.15	69.68	17.71	12.51	2.75	132.07	19.40	151.47
26	2.00	1.40	3.13	5.67	13.16	58.05	14.95	10.70	2.25	109.31	19.40	128.71
27	1.33	0.93	2.32	4.37	10.47	47.30	12.42	9.04	1.93	88.77	19.40	108.17
28	0.60	0.42	1.54	3.24	8.07	37.63	10.12	7.51	1.63	70.15	19.40	89.55
29	0.00	0.00	0.00	2.15	5.96	29.03	8.05	6.12	1.35	55.37	19.40	72.77
				0.97	3.98	21.50	6.21	4.86	1.10	38.62	19.40	58.02
				0.00	1.79	14.30	4.60	3.75	0.89	25.32	19.40	44.72
					0.00	6.45	3.06	2.78	0.66	12.96	19.40	32.36
						0.00	1.38	1.85	0.50	3.73	19.40	23.13
							0.00	0.83	0.33	1.17	19.40	20.57
								0.00	0.15	0.15	19.40	19.55
									0.00	0.00	19.40	19.40

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Govt. of Chhattisgarh,
Water Resources Department
Mantralaya, Mahanadi Bhawan,
Nava Raipur Atal Nagar,
Distt.- Raipur (C.G.)

Memo No. 5852 F-9-09/31/S-2/2022 Nava Raipur. Dated 02/12/2022

To,

The Executive Director (E&S and GP)
MAHAGENCO
HDIL Tower "A" Wing, 4th Floor
A K Marg, Bandra (E) Mumbai – 400051

Sub. :- Submission of Hydrology Report in compliance to Forest Stage-I conditions and request for opinion / recommendation thereon.

Ref. :- 1. Letter No.8-06/2022-FC, Dated 02.06.2022 of MoEF and CC, Govt. of India.
2. Your letter No. ED(E&S and GP)/GP-II/hydrology report/N00302 Dated 19.07.2022.

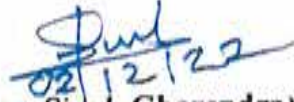
In compliance to the letter of Ministry of Environment, Forest and Climate change, Govt. of India under reference-1 above Hydrology Report submitted vide reference letter-2 and report submitted by the field officer of the department, the ecological balance is bound to be affected from the mining activities in long run however looking to sustainable development of the region, as per the report submitted by the project proponent conditional consent is given to the agency under following terms and conditions :-

1. As per the guidelines of DGMS (Director General of Mine Safety) along the river Kelo as intact and no mining should be carried out in this area. Embankment and green zone should be constructed to insure protection of River and its Hydrology from the mining after the flood plan of river or after minimum distance of 300 mtr.
2. A surface drainage plan to drain out the water from the catchment of rivulet must be constructed to safely dispose the maximum flood of the rivulet in to the main river.
3. From the rivulet water must be discharged in to the Kelo river as per the NGT norms. Sewage treatment plant may be established, If required.
4. With the mining of the coal in mines, Coal/Soil particle may be flow out in to the river which may cause sedimentation in to the Kelo reservoir. Hence proper arrangement for the trapping the silt & coal particle a catchment area treatment plan must be planned to execute in the area.
5. No water should seep in to the mining area from the Kelo River & its rivulet. Mining plan should be planned accordingly.
6. If any command area of any water resources structure is affected in mining area the agency must bear the whole cost for the development of affected command area in the other neighboring areas.
7. Neither surface nor ground water can be used by the agency without sanction by the competent authority.
8. While digging/blasting, the agency will have to pay special attention that the water of Kelo Dam should not enter the mining area due to fracture during blasting.

S.D.



9. If any significant degradation in the Hydrological System including ground water quality and level is observed during the mining activities in the Kelo river & its rivulets, then unilateral action may be taken to cancel the consent
10. For regulation, technical consultation, field verification and mutual coordination of the mining activities in the area. Chief Engineer, Minimata (Hasdeo) Bango Project will be the nodal officer from the department side till the completion of mining project. In case of any adverse impact on the storage and inflow of the river is observed the matter to be reported to the Chhattisgarh Govt. immediately.
11. For the implementation of all the above plan, whole expenditure must be born by the agency i.e. MAHAGENCO.
12. This consent shall stand cancelled if any adverse impact on the Kelo river and Dam is found in future due to mining.

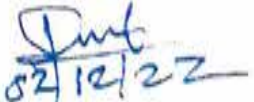

(Prem Singh Gharendra)
Under Secretary
Govt. of Chhattisgarh
Water Resources Deptt
Nava Raipur-Atal Nagar(C.G.)

End. No. ⁵⁰⁵³...../ F-9-09/31/S-2/2022

Nava Raipur. Dated 02/12/2022

Copy forwarded to

1. Engineer-in-chief, Water Water Resources Department, Shivnath Bhawan, Nava Raipur, with reference to his letter under reference.
2. Chief Engineer, Minimata (Hasdeo) Bango Project, Bilaspur for information and necessary action please.
3. Chief Engineer, Hasdeo Basin, Bilaspur for information and necessary action please.


Under Secretary
Govt. of Chhattisgarh
Water Resources Deptt
Nava Raipur-Atal Nagar(C.G.)





Dr. Nitin S. Wagh
Executive Director (E&S)



Annexure-III-C



CERTIFICATE OF UNDERTAKING

In compliance to condition no. 5 of Part-A of Ministry of Environment, Forest and Climate change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake to deposit necessary funds on pro rata basis for implementation of recommendations of cumulative impact assessment by State Water Resource Department. It will also keep adequate area, as per the guidelines of DGMS (Director General of Mine Safety), along the bank of River Kelo as intact and no mining shall be carried out in this area. Embankment shall be constructed to ensure protection of river and its hydrology from the mining. Protection of Kelo River, its hydrology from mining & embankment construction shall be done as per the approved report from Water Resource Department (WRD).


Executive Director (E&S and GP)





**REPORT ON
SOIL MOISTURE CONSERVATION WORK
PLAN**

FOR

GARE PALMA SECTOR -II COAL MINE,

**VILLAGE GARE & TEHSIL TAMNER,
DISTRICT RAIGARH, CHHATTISGARH**

In compliance to condition no 6 of FC stage- I approval order vide letter no. 8-06/2022-FC dated 02nd June 2022 by MOEF&CC, Govt. of India.

PROPONENT

MAHARASHTRA STATE POWER GENERATION COMPANY LTD.

Prakashgad, Plot No. G-9 Anant Kanerkar Marg, Bandra (E), Mumbai-400051 (MS)

PREPARED BY

**Nawal Kishore Prasad
(Accredited ground water professional)**

On behalf of

SRUSHTI SEVA PRIVATE LIMITED

**"Bilvadal" 8 Janta Layout, Deendayal Nagar,
Nagpur (Maharashtra) - 440022
Landline: 0712 2971968**

Email: srspl15@gmail.com, srushtisewa@yahoo.com

JUNE - 2022



Executive Summary:

- The Gare Pelma-II Coal Block comprising total lease area of 25.83 km² has been allotted to Maharashtra State Power Generation Company Limited (MAHAGENCO) in the district of Raigarh of Chhattisgarh state.

The area is covered in the Survey of India Toposheet No. 64 N/8 & 12 (R.F.1:50,000) and is bound by

Latitude: 22° 06' 22.33" to 22° 10' 48" N

Longitude: 83° 26' 21.85" to 83° 31' 19.1" E

Pre-mining Land use of mining area is 2583.487 ha. The Soil Moisture Conservation Plan (SMC Plan) is being prepared inclusive forest area of 76 km².

The Kelo dam is present in the southern portion of the mine site. RL of Kelo bed start of Coal Mine is 260 RL of Kelo bed and at end of Coal Mine it is 240 RL. The area of Kelo watershed is 1348.38 km²

- The basic relation governing the climatic water balance concept is;

$$P = AE + RO \pm \Delta S.$$

$$1321 = 811 + 707 - 197$$

- The intensity of Rainfall is 12.5 cm/ hour.
- Highest infiltration of 0.85 cm/hr has been recorded near Nala and lowest near Pondipali Pond to the tune of 0.30 cm/hr.
- The lowest water table contour is 250 m masl and highest is 290 m amsl during both pre and post monsoon.
- The erosion or soil loss for this condition is derived above to the tune of 8 tone/ ha/year.
- The main source of soil erosion and top soil stack and overburden dumps. It is expected that 2440.55 Ha area will be excavated. The probable soil eroded will be in the tune of 19524 tones during the period of 29th year of mining. Thus the average soil erosion may be 673 tones per year.
- In mitigative measures, Biological conservation plan and Engineering conservation plan will be adopted.
- Cost estimate for Biological Conservation Plan which include green belt and Sowing of seeds will cost around Rs. 35, 41, 695.
- Cost estimate for Engineering Conservation Plan which include Catch pits and Check dams or toe walls will cost around Rs. 6, 65, 432.

The Total Cost of Soil Conservation Plan is Rs. 42, 07, 127 in four stages

Pre!



CONTENTS

1.0	INTRODUCTION:.....	1
1.1	General:.....	1
1.2	Scope of Work:.....	2
1.3	Location of the Project:.....	2
1.4	Location of Study Area:.....	2
1.5	Research on Soil Moisture Conservation Work Plan:	4
1.5.1	Technique of Soil Moisture Conservation Work Plan:	4
1.6	Open-cast coal Mining Soil Moisture Conservation Problems	6
1.7	Soil Moisture Conservation Control Techniques	6
2.0	LAND USE PLAN:.....	7
2.1	Pre-mining Land use:	7
2.2	Land use - Mining Activity:.....	9
3.0	BASIC DATA GENERATION.....	11
3.1	Micro watershed.....	12
3.2	Digital Elevation Model (DEM):.....	13
3.3	Climatic Water Balance:.....	14
3.4	Intensity of Rainfall:	15
3.5	Runoff Coefficient:.....	15
3.6	Infiltration Test:	15
3.7	Water table:	16
3.8	Rainfall –Runoff – Infiltration Relation:	18
3.9	Soil Erosion:.....	19
3.10	Soil Loss and Sediment yield:.....	22
3.11	Discussion – Database Generation:	24
4.0	PROBABLE SOURCE OF SOIL EROSION:.....	25
4.1	General:.....	25

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4.2	Top Soil Management:.....	25
4.3	Overburden Dump.	25
4.4	Stabilization of Over Burden Dump	32
5.0	SOIL MOISTURE CONSERVATION WORK PLAN	33
5.1	Biological Conservation Plan:.....	33
5.1.1.	Approach Plan.....	33
5.1.2.	Post plantation care:.....	34
	Prescribed post plantation care shall be adopted to ensure maximum.....	34
5.1.3.	Fencing:.....	35
5.1.4.	Executing Agency:.....	35
5.2	Engineering Conservation Plan:.....	35
6.0	COST ESTIMATE OF SOIL MOISTURE CONSERVATION PLAN	38
6.1	Cost estimate for Biological Plan:.....	38
6.2	Cost estimate for Engineering Plan:.....	39
6.3	Total cost of Mitigative Measures for Soil Conservation:.....	41
7.0	CONCLUSION:.....	42
8.0	References	43

TABLES

Table 2.1:	Pre-mining Land Use Plan in Mine Lease Area in Ha	7
Table 2.2:	Extent of SMC Area & Land Schedule	8
Table 2.3:	Land use Cover of Proposed Mine	9
Table 3.1:	Climatic Water Balance of Kelo watershed.....	15
Table 3.2:	Intensity of Rainfall for 1 hrs.....	15
Table 3.3:	Infiltration Test Data	16
Table 4.1:	Dump Schedule	25
Table 5.1:	Afforestation Program	34
Table 6.1:	Cost estimate for Biological Conservation Plan	38
Table 6.2:	Catch Pits.....	39
Table 6.3:	Cost estimation for Check dam/ Toe walls.....	40
Table 6.4:	Total cost of Mitigative Measures.....	41




FIGURES

Figure 1.1: Location Map	1
Figure 1.2: Location of Mine Lease (Study area) on Toposheet	3
Figure 2.1: Land Use in Mine Lease Area	7
Figure 2.2: Distribution of Forest Land	8
Figure 3.1: Drainage map of Kelo River with Study Area	11
Figure 3.2: Micro Watershed Map	12
Figure 3.3: Digital Elevation Model (DEM)	13
Figure 3.4: Climatic Water Balance of Kelo watershed	14
Figure 3.5: Location of Infiltration Test Point	16
Figure 3.6: Pre-monsoon water table map	17
Figure 3.7: post-monsoon water table map	17
Figure 4.1: Mine Plan for the 1st Year	26
Figure 4.2: Mine Plan for the 5th Year	27
Figure 4.3: Mine Plan for the 10th Year	28
Figure 4.4: Mine Plan for the 20 th Year	29
Figure 4.5: Mine Plan for the 25th Year	30
Figure 4.6: Mine Plan for the 29th Year	31




REPORT ON

**SOIL MOISTURE CONSERVATION WORK PLAN OF GARE PELMA
SECTOR –II COAL BLOCK**

1.0 INTRODUCTION:

1.1 General:

The Gare Pelma-II Coal Block comprising total lease area of 25.83 km² has been allotted to Maharashtra State Power Generation Company Limited (MAHAGENCO) in the district of Raigarh of Chhattisgarh state. The location map is given in **Figure 1.1**.

M/s Maharashtra State Power Generation Company Limited (MAHAGENCO) is in process of obtaining Forest Clearance stage II for Gare Pelma-II Coal Block which requires Soil Moisture Conservation Work Plan (SMC). Accordingly, M/s Srushti Seva Private Limited, Nagpur have been entrusted the Job vide LOA no. GP II/SS/June 2022 dated 03.06.2022 with the following scope of work.



Figure 1.1: Location Map



1.2 Scope of Work:

Preparation of Report for Soil and moisture conservation in respect of GP II coal mine.

Objective is as follows:

- I. Climatic Water Balance
- II. Proposed open cast mining surface erosion problem
- III. Sediment control technique
- IV. Soil chemistry of mine area
- V. Land use
- VI. Pre mining
- VII. Forest land use
- VIII. Land use of mining activities
- IX. Surface runoff characteristics of micro watershed of mine
- X. Soil erosion: Soil loss & water runoff
- XI. Top soil management of mine and its stability
- XII. Soil moisture conservation plan
- XIII. Cost estimate

1.3 Location of the Project:

The Gare Pelma Sector-II Coal Block lies in Mand Raigarh Coalfield in Raigarh district of Chhattisgarh State. The mine site is located at Tilhi Rampur, Kunjemura, Gare, Saraitola, Murogaon, Radopali, Pata, chitwahi, Dholnara, Jhinka Bahal, Dolesara, Bhalumura, Sarasmal and Libra village. The area is covered in the Survey of India Toposheet No. 64 N/8 & 12 (R.F.1:50,000) and is bound by

Latitude: 22° 06' 22.33" to 22° 10' 48" N

Longitude: 83° 26' 21.85" to 83° 31' 19.1" E

The Gare Pelma is situated around 35 km towards north from Raigarh Township, which is also the nearest railway station on Mumbai-Howrah main line of SE Railway.

1.4 Location of Study Area:

The location of study area for soil moisture conservation work plan restricted to mine lease area. Hereafter, this refers as study area. The study area has been considered based on the Mine Plan limited to mine lease area. The study exclusively focuses on the soil erosion caused due to excavation of overburden, backfilling, and topsoil stability into mine. The area under study comprises 25.83 km². The location of study area on toposheet showing Mine Lease area is given in **Figure 1.2**.



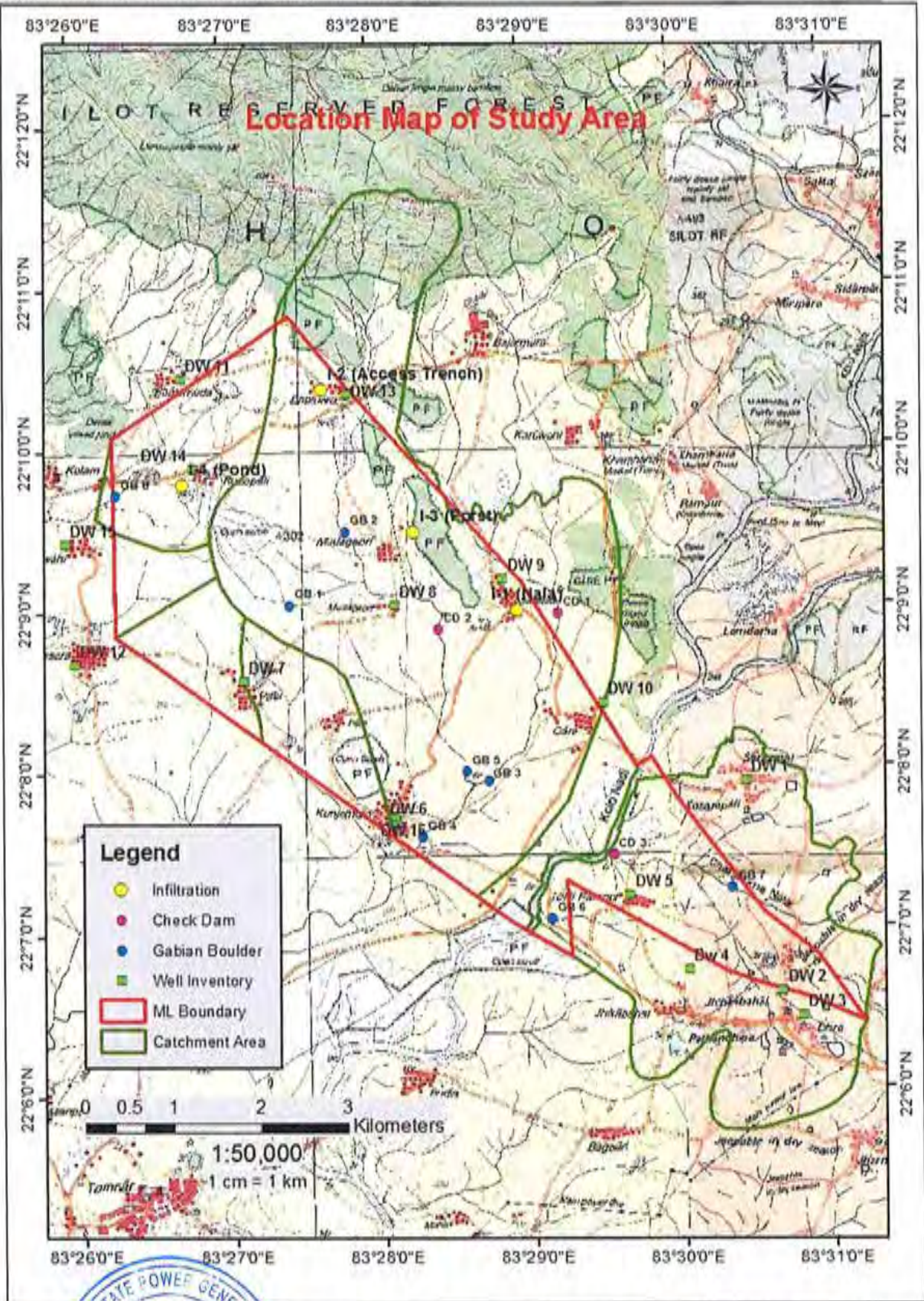


Figure 1.2: Location of Mine Lease (Study area) on Toposheet

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1.5 Research on Soil Moisture Conservation Work Plan:

1.5.1 Technique of Soil Moisture Conservation Work Plan:

Soil Moisture Conservation Work Plan is based on well accepted UNEP document. The salient part is reproduced as under.

Soil moisture content is most important nutrient present in the soil. Usually, soil moisture is affected by soil physical properties such as soil color, texture and structure and bulk density. It is significant parameter for several applications in hydrology, horticulture, agriculture and meteorology. It influences plant growth, percolation, evaporation and heat exchange.

The main objective of soil moisture conservation is to minimize the amount of water lost from the soils through evaporation (water loss directly from the soil) and transpiration (water loss occurring through the plants) – or combined, the evapotranspiration. Preserving soil moisture is important means to maintain the necessary water for agricultural production, and also helps minimize irrigation needs of the crops. This is especially important in areas where rainwater and/or groundwater resources for irrigation are scarce or decreasing due to climate change or other causes.

There are a variety of methods that can be used to conserve soil moisture. Most of these soil moisture conservation techniques are relatively low cost and complexity approaches, primarily relying on the presence of required materials and technical capacity locally. Many of the methods rely on providing some kind of cover for the soil to minimize evapotranspiration and direct soil exposure to heat and sun. Generally, most methods used for soil quality improvement and conservation, will also yield benefits to soil moisture conservation. Examples of methods for reducing excess soil moisture loss include following:

- **Spreading manure or compost over the soil** – this minimizes evapotranspiration and also provides valuable nutrients to the soil through processes of decomposition
- **Mulching** – mulch is a layer of organic (or inorganic) material that is placed on the root zone of the plants. Examples of mulch materials include straw, wood chips, peat. Inorganic mulch in form of plastic sheeting is also used. Mulching is most suited for low to medium rainfall areas, and less suited for areas with very wet conditions.



- **Contour ploughing** – by ploughing the soil along the contour instead of up- and downward slopes, the velocity of runoff is reduced, creating even barriers, and more water is retained in the soils and distributed more equally across the cropland.
- **Strip cropping** - growing erosion permitting crops and erosion resisting crops in alternate strips. Other soil moisture conservation techniques may include rainwater harvesting to minimize runoff and collect water for use on site. For more technologies on this see technology sheet Rainwater harvesting for infiltration.

The benefits of many soil conservation methods, depending on the material used, may also include better control of weeds, provision of additional nutrients to the soil, soil temperature control and protection of soil surface from the impacts of heavy rain and wind. Active reuse of waste organic materials also reduces waste management needs, returning the residue crops and plants to the soil through decomposition. Socioeconomic Benefits Potential to reduce water irrigation needs, increase crop productivity and improve soil quality

By extension, reduced irrigation needs may also reduce the costs and energy requirements of water pumping for irrigation.

(Source-UNEP-DHI Partnership- [Soil moisture conservation techniques](#))

1.5.2 Objective of SMC Plan: The objective of SMC is to mitigate the impact of the proposed mining activities on the local rivulets (nallas) to rejuvenate various potential and degraded ecosystems in the Mine area. The opencast mining activities disturb large tracts of land.

The objective of this report is to present the outline of opencast coal mining surface erosion problem, method of modeling sediment yield, measures to be taken for reducing or controlling sediment discharges. The action plans have been prepared for this purpose with the following objectives.

1. To facilitated the hydrological functioning of the mining area and augment the water quality of the Kelo River.
2. Conservation of soil cover and to arrest the soil erosion, flood and siltation of the river and its tributaries and consequent relation of siltation in the river of Kelo and its reservoir.
3. Soil conservation through biological & engineering measures to reduce sediment load in river and tributaries, thus improving quality of water.
4. Increase vegetative cover and water retaining properties.



1.6 Open-cast coal Mining Soil Moisture Conservation Problems

The problem related to soil moisture during open cast coal mine may be due to following.

1. Soil erosion and sediment transport depend on the following factors:
 - a. Climatic conditions,
 - b. Soil and spoil erosivity
 - c. Overland slope and slope length
 - d. Ground cover
 - e. Soil conservation control practices
 - f. Catchment drainage characteristics

2. Open-cast mining activities tend to change radically several of these factors and severe sediment production could occur in the following locations :
 - a. Topsoil stockpiles
 - b. Spoil piles
 - c. Waste dumps
 - d. Bare topsoil areas
 - e. Steep out slopes
 - f. Ramps
 - g. Haul roads

Scalping, blasting, material handling, heavy vehicular travel over replaced spoils and topsoiling activities generally produce compacted area of soil and spoil materials with a high colloidal content. Colloidal particles require a very long detention time in an impoundment before they will settle out of suspension and frequently deposition does not occur until the sediment laden flows discharge into dams.

1.7 Soil Moisture Conservation Control Techniques

The major causes of erosion problems in surface mining operation are due to disturbed areas, which are integrated with the mining operations. In developing a sediment control plan the following basic approach has been adopted

- ✓ Minimize the area which is disturbed at any one time
- ✓ Develop a drainage control, system for the mine lease area
- ✓ Integrate drainage, erosion and sediment control, into each stage of the mining operation.
- ✓ Develop a mining and rehabilitation plan prior to initiating mining activities.
- ✓ Construct drainage and erosion controls in advance of mining activities
- ✓ Divert storm runoff away from area with high erosion potential.
- ✓ Incorporate measures to reduce the flow velocity of storm runoff.
- ✓ Limit the handling of spoil and topsoil materials.
- ✓ Rehabilitate area as soon as possible.
- ✓ Maintain drainage and erosion control measure.



2.0 LAND USE PLAN:

The land use plan for pre-mining and post- mining including stages of mining is essential input for formation of Soil Conservation Plan. The data in respect of above has been adopted from approved Mine Plan.

2.1 Pre-mining Land use:

2.1.1 Mining Lease Area: Pre-mining Land Use Plan for Mine area is given below in **Table 2.1 & Figure 2.1.**

Table 2.1: Pre-mining Land Use Plan in Mine Lease Area in Ha

Private Land (Non Adivasi)	Adivasi Land	Government land				Forest land	Total
		Forest	Abadi	Others	Total		
987.505	1090.113	115.134	90.328	200.672	406.134	99.735	2583.487

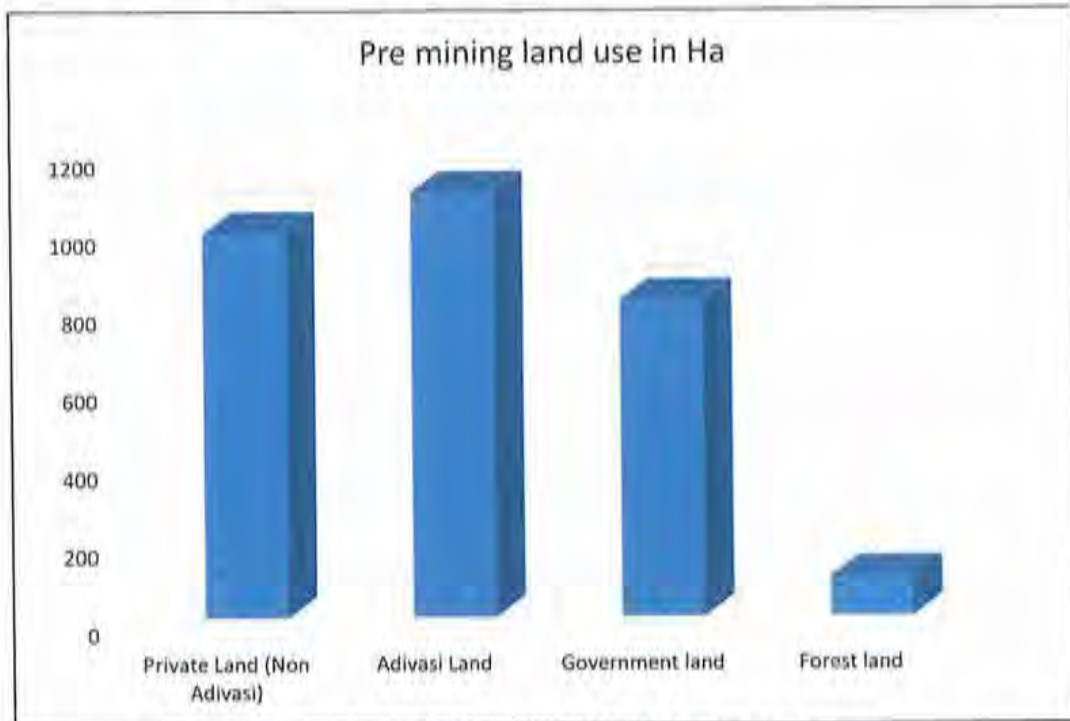


Figure 2.1: Land Use in Mine Lease Area



2.1.2 Forest Land Schedule:

The Soil Moisture Conservation Plan (SMC Plan) is being prepared inclusive forest area of 76 km². The land schedule for purpose of SMC in respect of forest area is given below in **Table 2.2 & Figure 2.2.**

Table 2.2: Extent of SMC Area & Land Schedule

Sr. No.	Reserved	Total area in Ha	Percentage %
1	Dense Forest	0	0
2	Open Forest Land	12	16
3	Open Mixed Forest Land	64	84
4	Total	76	100

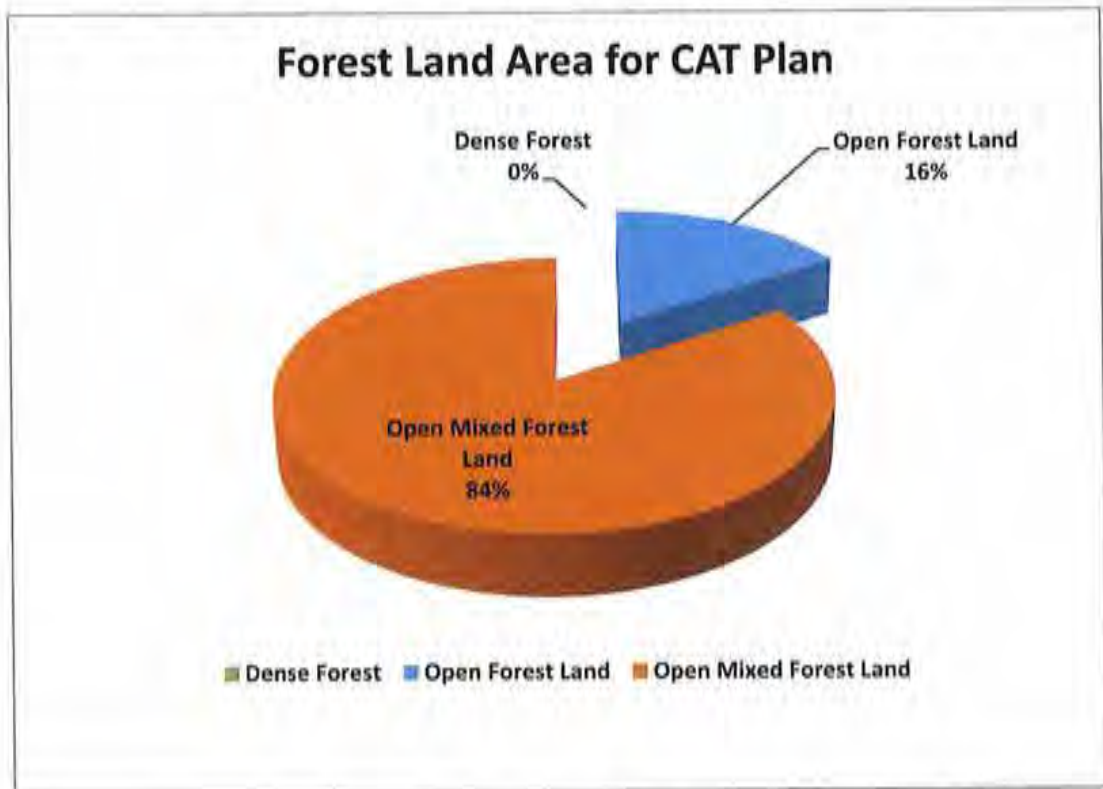


Figure 2.2: Distribution of Forest Land




2.2 Land use - Mining Activity:

The entire land coming within lease hold area of coal mine is 2583.48 ha will be utilized for mining and ancillary activities are given in **Table 2.3**.

Table 2.3: Land use Cover of Proposed Mine

Sr. no.	Land use	At the end of 5 th Year Ha	At the end of 25 th Year Ha	At the end of OC mining 29 th Year Ha
1	Excavation	380.70	2272.42	2440.55
2	Backfill	0.00	1535.00	2248.77
3	Void	380.70	737.42	191.78
4	Surface dump	380.00	0.00	0.00
5	Bund	5.20	5.20	5.20
6	Green Belt	36.07	36.07	36.07
7	Top Soil Dump	60.00	00.00	0.00
8	Settling Pond	10.00	5.00	5.00
9	Road Diversion	30.30	30.30	30.30
10	Facilities (West)	50.94	50.94	50.94
11	Facilities (East)	68.54	0.00	0.00
12	Under Kelo River	15.42	15.42	15.42
13	Dismatling	0.00	0.00	0.00
14	Disturbed area	1017.17	2415.35	2583.48
15	Undisturbed	1566.31	168.13	0.00
	Total	2583.48	2583.48	2583.48



3.0 BASIC DATA GENERATION

The Kelo dam is present in the southern portion of the mine site. RL of Kelo bed start of Coal Mine is 260 RL of Kelo bed and at end of Coal Mine it is 240 RL. The area of Kelo watershed is 1348.38 km². The Kelo watershed with location of Gare coal mines and Dam is given in Figure 3.1.

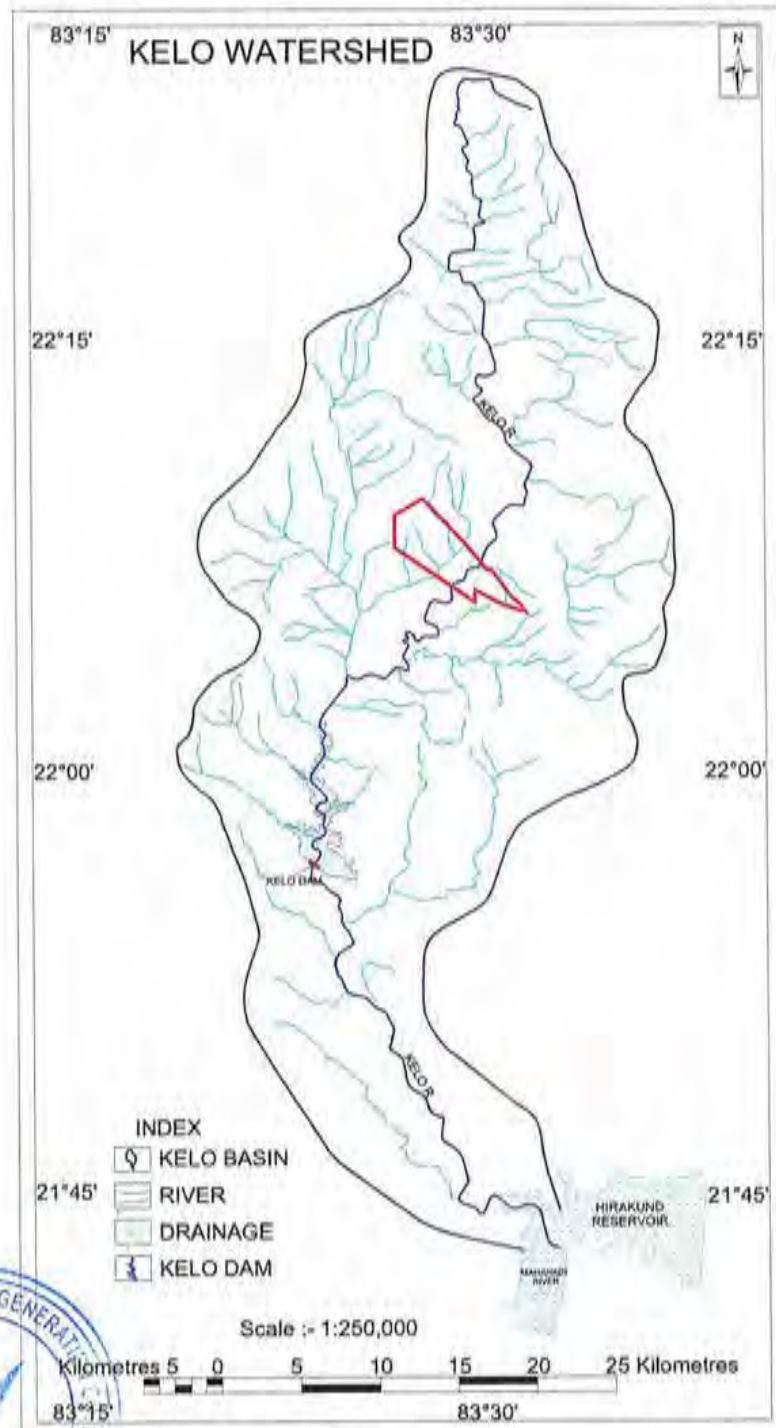


Figure 3.1: Drainage map of Kelo River with Study Area



The basic data have been generated and given in report for CAT Plan. However, in order to recapitulate the following basic information is reproduced for ready reference.

1. Micro Watershed including mine lease area.
2. Digital Elevation Model (DEM) of pre-mining.
3. Climate Water Balance
4. Intensity of rainfall
5. Runoff Coefficient
6. Infiltration test
7. Water table
8. Rainfall –Runoff-Infiltration relation.
9. Grain size & Silt Yield Index.
10. Soil loss & Sediment Yield

3.1 Micro watershed

The study has been subdivided into 7 numbers of Micro watershed which are the smallest size Hydrologic unit. The map is placed at Figure 3.2.

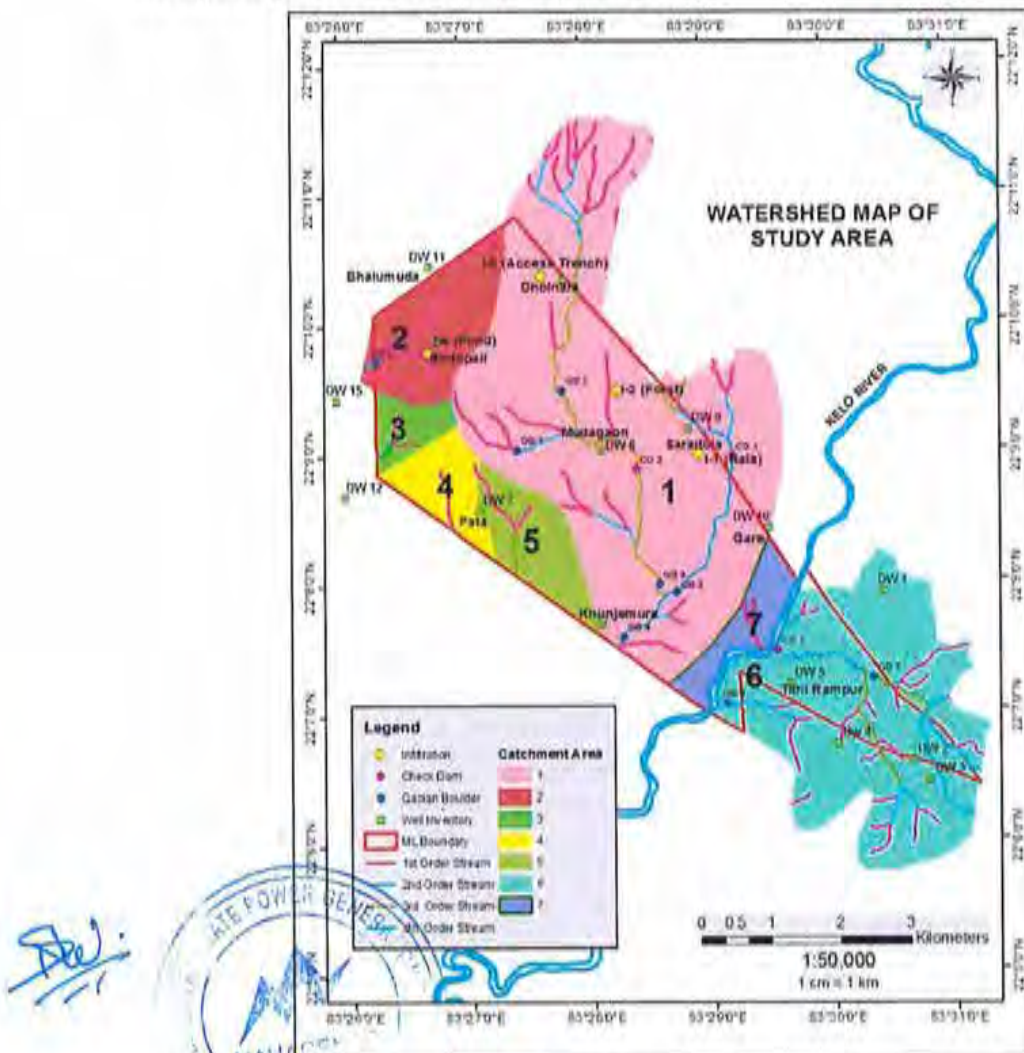


Figure 3.2: Micro Watershed Map

3.2 Digital Elevation Model (DEM):

The area under study is plain having rolling topography with occasional undulating feature, except a hillock in the north outside, Mine Lease area. In mine lease area the highest elevation is 320 m amsl in the North while lowest 246 m amsl around Kelo River. The Digital Elevation Model (DEM) is prepared by GIS tool and the same is reproduced below as **Figure 3.3.**

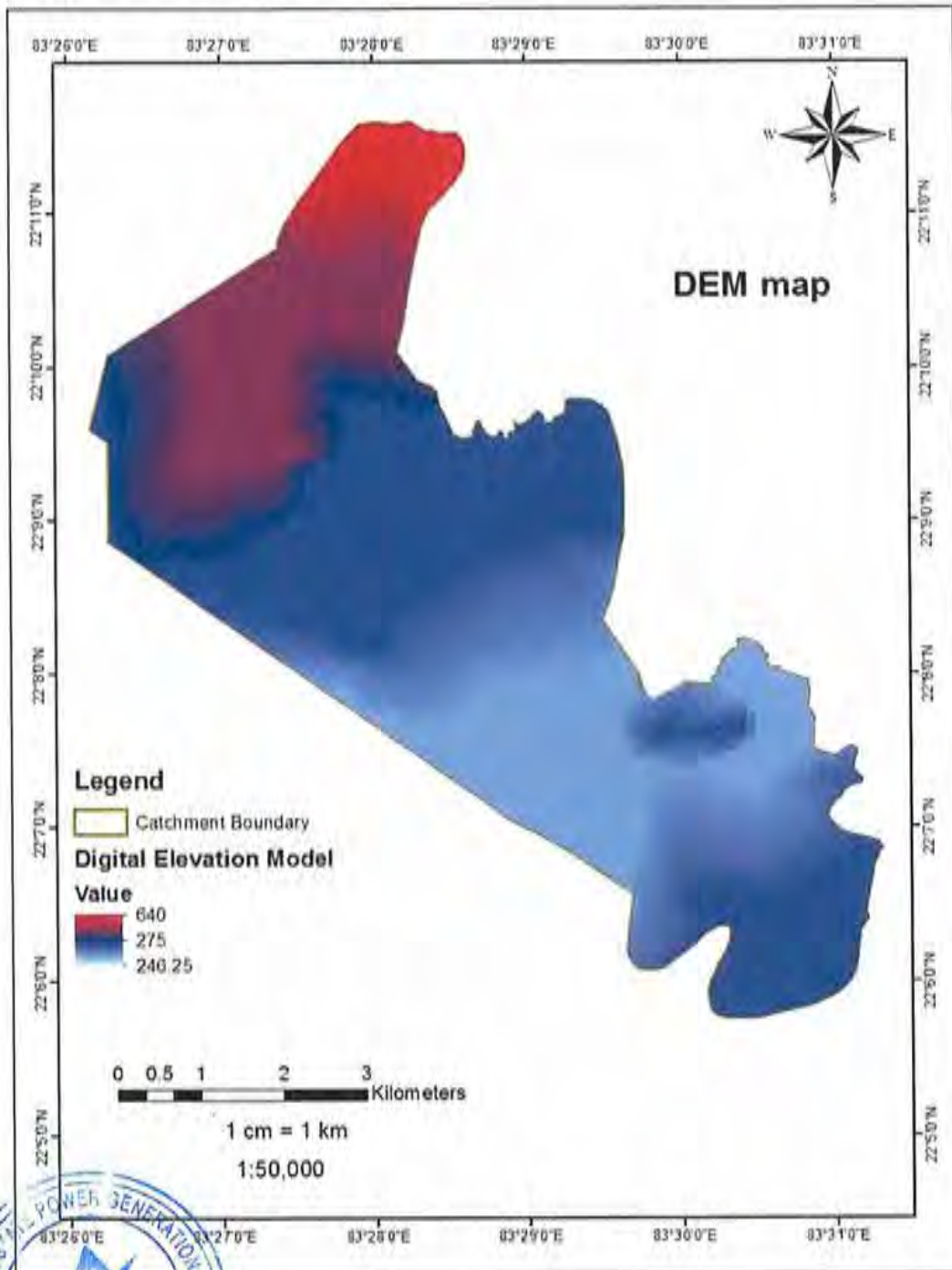


Figure 3.3: Digital Elevation Model (DEM)



3.3 Climatic Water Balance:

The idea of climatic water balance was first put forth by Thornthwaite in 1944. Subsequently he developed water balance technique. Elements of climatic water balance for watershed located in and near the project area is computed.

3.3.1 Water Balance Techniques: It is a climatic balance obtained by comparing the match of precipitation with evapotranspiration, yielding a number of moisture parameters like water surplus, water deficiency, soil moisture change and runoff. The basic relation governing the water balance concept is;

$$P = AE + RO \pm \Delta S.$$

$$1321 = 811 + 707 - 197$$

Where,

P = Precipitation in mm	Accumulated potential water loss (accumulated negative value of P-PE) = ACC (P-PE)
AE = Actual Evaporation in mm	Storage (S)
ΔS = change of soil moisture in mm	Water surplus (WS) Water deficit (WD)
Ro = Runoff in mm	ACC = 200 mm

An important feature of the water balance concept is the recognition of the part played by soil in the exchange of moisture between the earth's surface and the atmosphere. Soil-acts as a medium for storing water (up to a limit) in times of excessive rainfall and releasing the same (in a restricted manner) at other times for purposes of evaporation and transpiration.

3.3.2 Water Balance Table: Using the method described in the above paragraph, the climatic water balance has been computed with the following information for the normal rainfall and placed in Table 3.1 and graphically depicted in Figure 3.4.

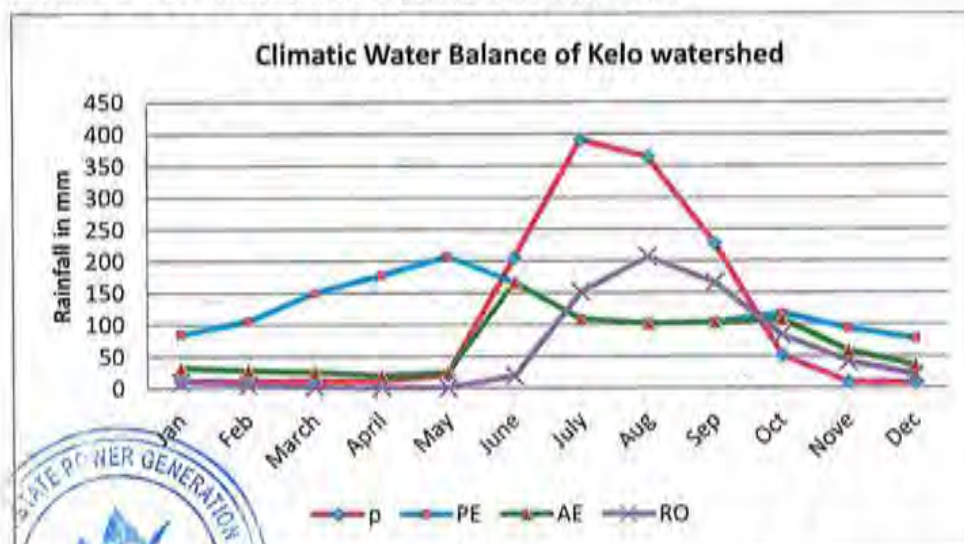


Figure 3.4: Climatic Water Balance of Kelo watershed

Table 3.1: Climatic Water Balance of Kelo watershed

Parameter	Jan	Feb	Mar	April	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Total
PE	85	105.3	149.7	178	207	166	108.6	101.5	103.4	117.1	93	77.3	1492.4
P	11.6	10.8	11.6	11.7	21.3	205	390.8	363.7	227.5	50.8	8.7	7.7	1321.2
P-PE	-73.4	-94.5	-138.1	-166.3	-185.7	39	282.2	262.2	124.1	-66.3	-84.3	-69.6	-171.2
ACCP-PE	-293.6	-388.1	-526.2	-692.5	-878.2	0	0	0	0	-66.3	-150.6	-220.2	-3215.7
S	46.077	28.726	14.401	6.270	2.477	200	200	200	200	143.569	94.190	66.507	1202.217
ΔS	-20.430	-17.351	-14.325	-8.125	-3.793	197.523	0	0	0	-56.431	-49.379	-27.683	±197.53
AE	32.03	28.151	25.925	19.835	25.093	166	108	101.5	103.4	107.231	58.079	35.363	810.607
WD	52.97	77.149	123.775	158.175	181.907	0	0	0	0	9.869	34.921	41.917	680.683
WS	0	0	0	0	0	39	282.2	262.2	124.1	0	0	0	707.5
Ro	10.332	5.166	2.583	1.295	0.645	19.500	150.85	206.52	165.31	82.65	41.328	20.664	706.843

Climatic Water Balance :-

P = AE + RO ± ΔS.

1321 = 811 + 707 - 197

3.4 Intensity of Rainfall:

The rainfall intensity corresponding to a duration and desired probability of exceedance i.e. return period. This is rainfall-frequency duration relationship for the given catchment area. I.M.D. has prepared isopluvial maps for the different return period for given catchment area. C.W.C. has also adopted the same for their publication of February 1997 in respect of flood estimation report for Mahanadi sub zone-3. The isopluvial maps for 25 year return period, 50 year return period and 100 year return period are taken from CWC publication.

The rainfall intensity for different return period for one hour is estimated by multiplying conversion ratio with 24 hrs maximum rainfall of mine. The intensity of rainfall for 1 hour have been estimated and given in **Table 3.2**

Table 3.2: Intensity of Rainfall for 1 hrs

Sr. No.	Return Period	24 hrs maximum rainfall	Conversion factor for 1 hr	Intensity of rainfall in 1 hr	Remark
	Year	Mm/24hrs	Coefficient	Mm/hr	-
1	25	230	0.390	89.7	-
2	50	290	0.390	113.1	-
3	100	320	0.390	124.8	Use for Mine

The intensity of rainfall for catchment treatment plan has been estimated based on 100 year return period which is 124.8 mm/hr (12.5 cm/hr)

Intensity of Rainfall – 12.5 cm/hr

3.5 Runoff Coefficient:

The runoff coefficient is a dimensionless coefficient relating to amount of runoff to the amount of precipitation received. It is larger value for area with low infiltration and high runoff and lower for permeable well vegetated area (forest, flat land). The runoff coefficient has been considered is 25% as per Central Ground Water Board Report on Mahanadi Basin.

Runoff Co-efficient – 25 % of Monsoon rainfall

3.6 Infiltration Test:

Infiltration is the flow of water into the ground through the soil surface. Since infiltrated water may contribute to the ground water discharge in addition to soil moisture, the process can be schematically modeled. The infiltration characteristics of a soil at a given location has been estimated by using flooding infiltrometer. Highest infiltration of 0.85 cm/hr have been recorded near Nala. The infiltration test data of different locations were processed and summarized in **Table-3.3**. Location of Infiltration site is given in **Figure 3.5**.



Table 3.3: Infiltration Test Data

Time since start		Infiltration rate (cm/hr)			
Minutes	Hour	Site I-1 Saraitola Nala	Site I-2 Dholnara Incline	Site I-3 Mudagaon Forest	Site I-4 podopali pond
10	0.16	18.28	14.02	12.65	10.10
20	0.33	7.24	5.98	3.80	4.15
30	0.50	4.82	3.05	3.10	3.74
45	0.75	3.98	2.10	2.05	2.82
60	1.00	2.30	1.50	1.02	1.40
90	1.50	2.00	0.98	0.72	0.64
120	2.00	1.70	0.81	0.54	0.52
150	2.50	0.85	0.54	0.42	0.30
180	3.00	0.85	0.54	0.42	0.30
210	3.50	0.85	0.54 <td 0.42	0.30	
Constant Infiltration rate cm/hr		0.85	0.54	0.42	0.30
Infiltration zone		High	Moderate	Moderate Low	Low
Recharge/Discharge		Recharge	Transit	Discharge	Discharge



Figure 3.5: Location of Infiltration Test Point

3.7 Water table:

Based on data of observation wells a water table map has been prepared for the pre-monsoon and post-monsoon period. The pre-monsoon and post-monsoon water table maps are depicted at **Figure 3.6 and 3.7** respectively. The study of map reveals that the water table is following topography of the area. The movement of groundwater flow is towards Kelo River from both West & East sides. The groundwater is contributing into Kelo River.



Thus, the Kelo River is gaining river and the post-monsoon water available in Kelo River is strictly groundwater runoff.

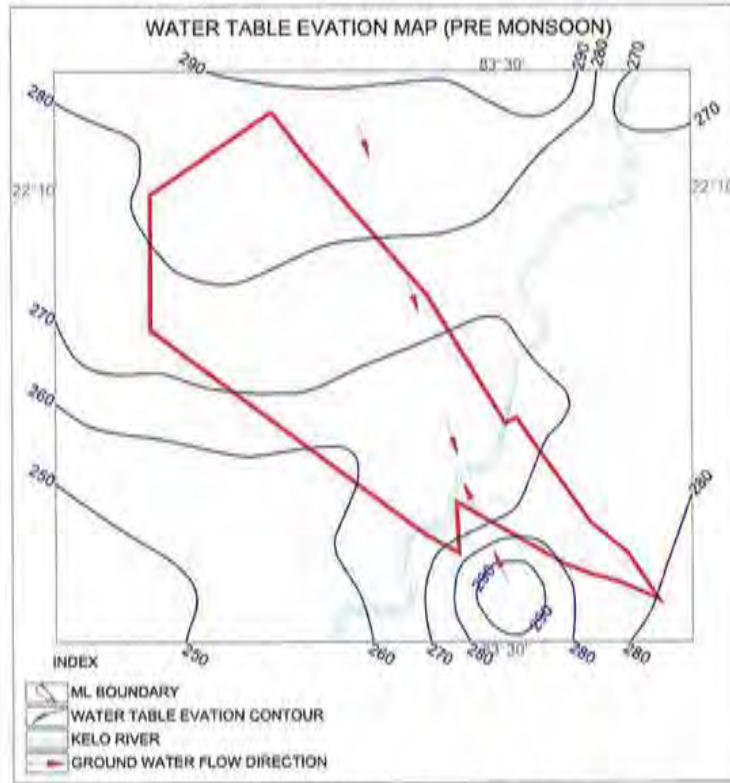


Figure 3.6: Pre-monsoon water table map

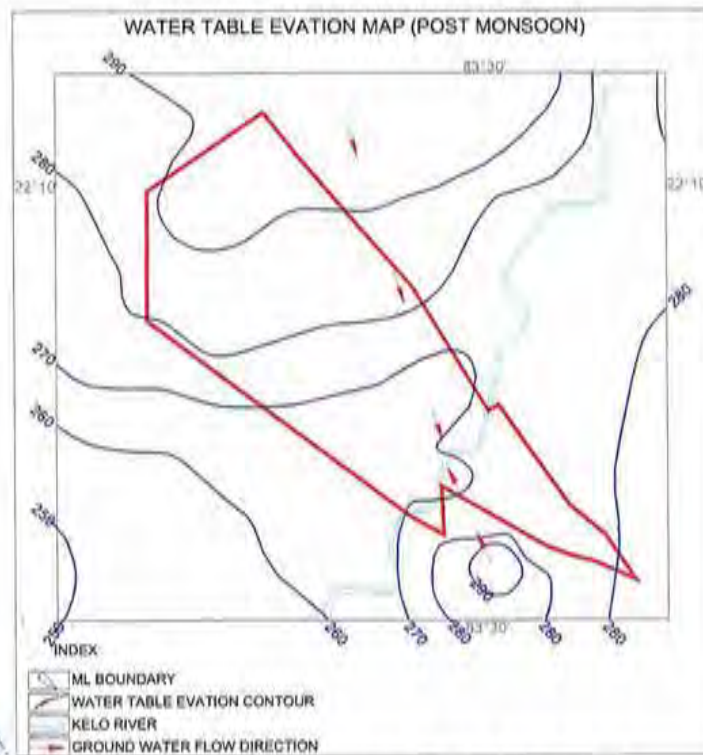


Figure 3.7: post-monsoon water table map



3.8 Rainfall –Runoff – Infiltration Relation:

Based on UNDP study, carried out in Indian Coalfield, for Hydrological consequences in respect of pre & post mining in study area, the relationship between Rainfall –Runoff – Infiltration has been studied and result given in **Table 3.4**

Table 3.4: Rainfall –Runoff – Infiltration Relation

Phase/Condition	Area of CAT Km ²	Normal rainfall in monsoon m	Surface Water		Ground water	
			Runoff Coefficients	Runoff	Infiltration coefficient	Groundwater Recharge
			%	MCM	%	MCM
Pre mining	38.50	1.187	25	11.42	10	4.57
Post Opencast mining	38.50	1.187	15	6.87	21	9.60

The study reveals that due to mining operation and backfilling there is reduction of surface runoff to the tune off 4.55 MCM whereas, due to high rate of infiltration there is increase in groundwater recharge to the tune of 5.03 MCM. Change in Runoff and Recharge is given in **Figure 3.8 and 3.9.**

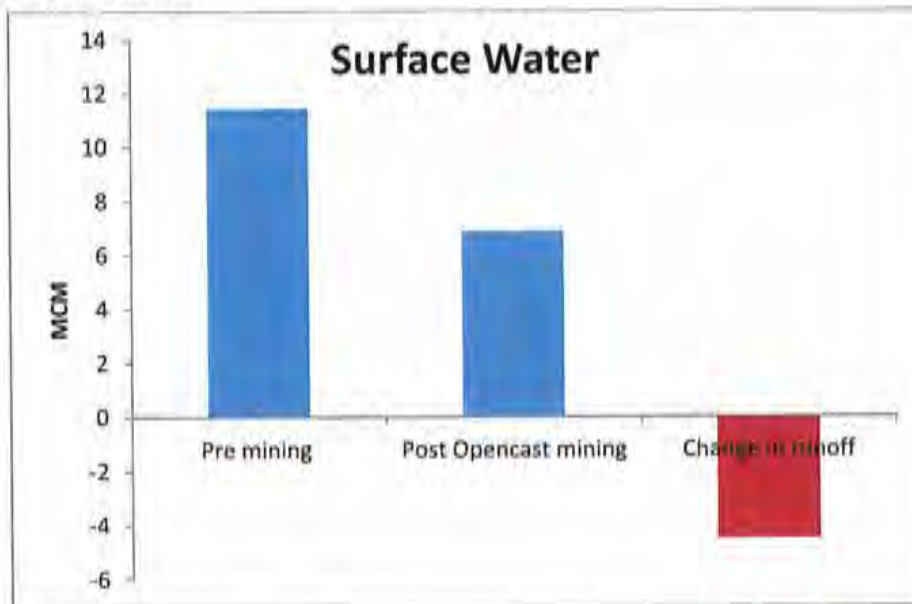


Figure 3.8: Change in Runoff



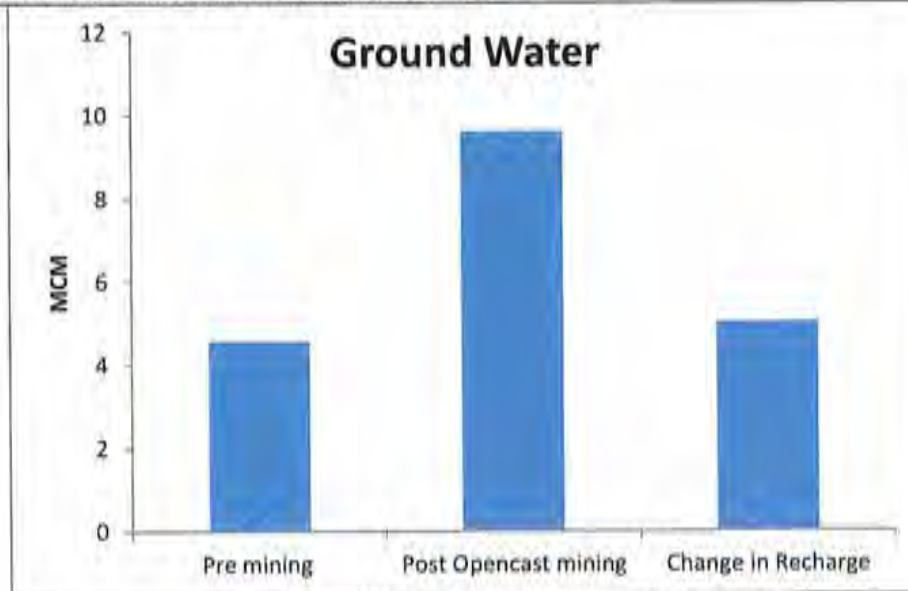


Figure 3.9: Change in Recharge

3.9 Soil Erosion:

Soil erosion may be defined as the defacement and transportation of soil. Water is the major agent responsible for this erosion.

The Soil Erosion highlights the management technique to control erosion in the catchment area. The Soil Conservation Plan involves the following parameters.

1. Understanding the erosion characteristics
2. Suggesting remedial measures to reduce the erosion rate
3. Detain the Silt/Charged particles in the runoff in nala on the way and prevent/reduce the transportation of soil to streams/reservoirs.

The result of the modeling was interpreted to identify the areas with high soil erosion rates. The primary and secondary data collected as a part of the field studies have used as an input for the model.

- 3.9.1 Grain size analysis of soil:** The grain size analysis of the soil in respect of area In and around of study area is given in **Table 3.5**. The data obtain from EIA of GP-III is adopted for the study area as it has similar soil condition.



Table 3.5: Grain size Analysis in %

Type of Grain	Notation	Bajaramunda	Mallupara	Khamariya	Karuwahi	Bhalumuda	Average %
		S1	S2	S3	S4	S5	
Sand	(SAN)	54.49	57.32	30.79	15.42	15.42	34.688
Silt	(SIL)	23	27.88	46.73	59.73	59.73	43.414
Clay	(CLN)	8.08	7.88	16.41	23.22	23.22	15.762
Organic	(C)	14.43	6.92	6.07	1.63	1.63	6.136
	%	100	100	100	100	100	100

(Source: EIA of GP-III)

3.9.2 Silt Yield Index:

The Silt Yield Index (SYI) is defined as the Yield per unit area and SYI value for hydrologic unit is obtained by taking the weighted arithmetic mean over the entire area of the hydrologic unit by using suitable empirical equation.

The Silt Yield Index (SYI) in respect of micro watershed has been estimated and given in Table 3.6.

Table 3.6: Silt Yield Index (SYI)

Sr. No.	Nomenclature of Watershed	W1	Area in Hectar A1	Silt Yield Index
1	W-01	30	1946	1516
2	W-02	30	289	225
3	W-03	30	82	64
4	W-04	30	138	108
5	W-05	30	199	155
6	W-06	30	1072	835
7	W-07	30	125	97
8	Total		3851	3000

3.9.3 Slop of Tract: The slop map area distribution in furnished in Table 3.7. The slop map of the area has been prepared and placed at Figure 3.10.

Table 3.7: Slope of the Tract

Sr. No.	Slope class (Gradient in %)	Area in Ha	Percentage	Remark
1	0-0.5%	5066	51.74%	Low soil loss
2	0.5 – 10%	2294	45.19%	Medium
3	>10-%	6.00	3.07%	High
	Total	3850	100	



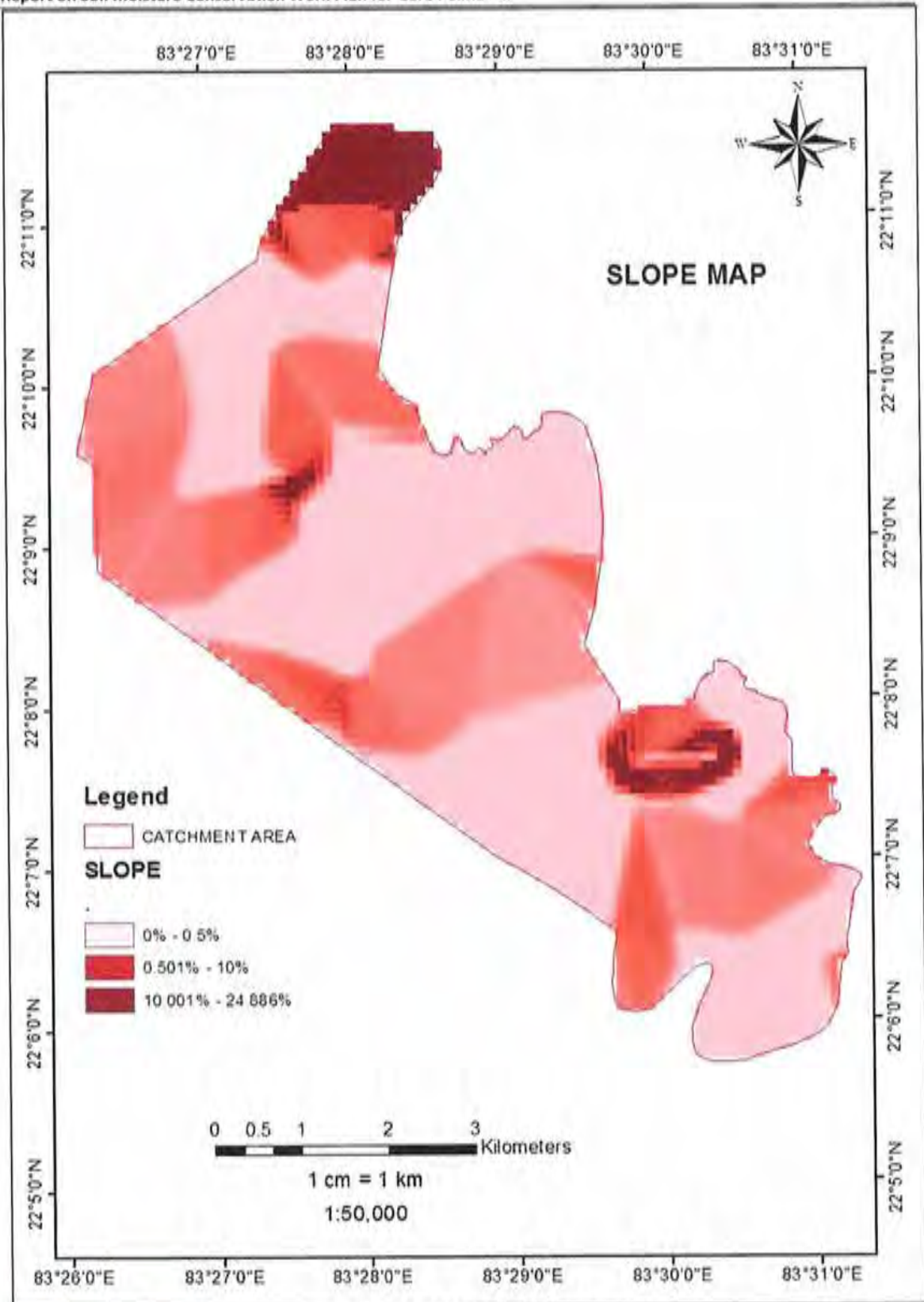


Figure 3.10: Slope of the tract



3.10 Soil Loss and Sediment yield:

Annual soil loss and sediment yield due to water erosion has been evaluated for Soil Conservation Plan.

3.10.1 Equation for Soil loss:

The most commonly used model for predicting soil loss from water erosion is the *Universal Soil Loss Equation (USLE)*. It estimates the average annual soil loss *A* in area as

$$A = RKLSCP$$

Where *R* is the rainfall erosivity factor, *K* is the soil erodibility factor, *L* and *S* are topographic factors representing length and slope, *C* is the cover and management factor and *P* is the support practices factor.

Despite the USLE's plot-scale spatial focus, the model has often been used to estimate soil erosion on much larger areas, such as watersheds or even whole continents.

The relation between gradient (in %) to Soil loss per ha is represented below in **Figure 3.11**.

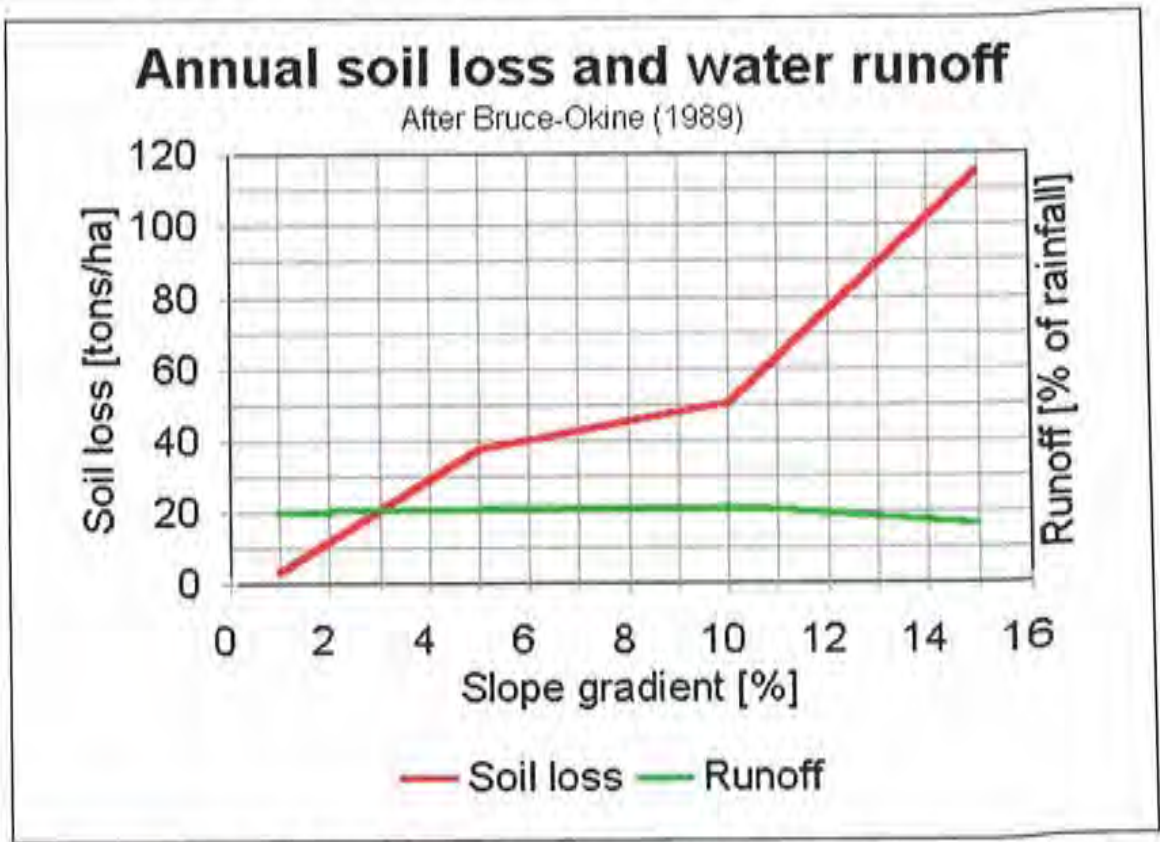


Figure 3.11: Theoretical Annual Loss and Water Runoff



3.10.2 Analytical modeling for potential Gross Erosion: During course of operation of open cast mining and backfilling, witness different topographic conditions like, slop length, slop and canopy cover like bare soil, ground cover etc. The sediment yield as gross erosion will depend on combination of above condition. In order to have most operative plan for Soil Conservation it is imperative to prepare analytical model for this mine. The result has been tabulated for day today execution of Soil Conservation Plan.

The model has been developed with assumption of factors given in above **Table 3.9**. All values are relative to a grassed area with a ground cover 0% and an erodibility factor (K) of 0.1 with slop length 100 m. The erosion for this condition is derived above to the tune of 8 tone/ ha/year. The concept of model is derived by Andy ward et. Al. (1984). The area under study is similar to study area case of Andy Wood Model hence; same is adopted for this mine.

Table 3.9 Analytical modeling for potential gross Erosion

Erodibility Factor(K)	Slope Length 100m Slope:			Slope Length 50m Slope:			Slope Length 25m Slope:		
	1:30:	1:10	1:3	1:30	1:10	1:3	1:30	1:10	1:3
BARE SOIL									
0.1	1.11	5.23	17.76	0.89	1.89	13.32	0.36	1.33	8.88
0.2	2.22	10.66	35.52	1.78	3.77	26.64	0.71	2.66	17.76
0.3	3.33	15.99	53.28	2.67	5.66	39.96	1.07	3.99	26.64
0.4	4.44	21.32	71.04	3.56	7.54	53.28	1.42	5.32	35.52
GROUND COVER 0%*									
0.1	0.50	2.40	8.00	0.40	0.85	6.00	0.16	0.60	4.00
0.2	1.00	4.80	16.00	0.80	1.70	12.00	0.32	1.20	8.00
0.3	1.50	7.20	24.00	1.20	2.55	18.00	0.48	1.80	12.00
0.4	2.00	9.60	32.00	1.60	3.40	24.00	0.64	2.40	16.00
GROUND COVER 20%									
0.1	0.22	1.06	3.52	0.18	0.39	2.64	0.07	0.27	1.76
0.2	0.44	2.11	7.04	0.35	0.75	5.28	0.14	0.53	3.52
0.3	0.66	3.17	10.56	0.53	1.14	7.92	0.21	0.80	5.28
0.4	0.88	4.22	14.04	0.7	1.50	10.56	0.28	1.06	7.04

Source: Andy Wood et. Al. (1984)

Model can now be used as a basis for developing a sediment control strategy. It can be seen that if highly erodible soil (K of 0.4) is placed on steep out slopes, soil erosion could be over 70 times greater than during pre-mining conditions. If, however, the same material is placed on flatter areas, and terraces or diversion ditches are provided every 25-50m, erosion will be very similar to that from undisturbed areas. Model also illustrates the importance of rapid rehabilitation. Erosion from a bare soil condition is 5 time that from a well-established grassed area. The particle size distribution of waste dump and topsoil materials indicated

a high silt content and it was established that sediment ponds with a detention time of 2-6 h



would be required. Based on the single event hydrological analysis it was established that it would be impractical to design ponds for events larger than a 10 year return period of 24 hr. flood and that the ponds would need to be cleaned out several times.

3.11 Discussion – Database Generation:

The database exhibit that the all areas with a slope of less than 5% will achieve the arable land standard. Less than 10% of the rehabilitated area will not satisfy the arable land standard. These areas will, however, provide good grazing land but will need careful management as they are susceptible to severe erosion.

Consideration was primarily given to diversion ditches, terracing and sediment ponds.




4.0 PROBABLE SOURCE OF SOIL EROSION:

4.1 General:

In course of mining excavation activity will be taken up over an area of 2440 ha during complete Mining Operation. The location of excavation, dump, backfilling and uncut area within Mine lease boundary for different stages of mining area given in Figure 4.1 to 4.6. In the first five year there will be two dumps i.e., External dump for waste rock and Topsoil. The external dump will be over an area of 300 ha with a height of 90 m in three tires of 30 m each with over all slope angles of 28°. Adequate management strategy has been prescribed in the mining plan to check soil, erosion from dumps. The management practices are prescribed hereafter.

4.2 Top Soil Management:

Top soil will be properly stacked at earmarked dump site with adequate measures. It will be used for growing plants along the fringes of the site roads and reclamation of external dump and backfilled area. The top soil stockpiles will be low height and will be grassed to retain fertility. Besides this topsoil stacks there will be temporary stacks near the excavation area and area to be reclaimed which will be made use of for concurrent laying without bringing the topsoil to the soil stack near the OB dump.

4.3 Overburden Dump.

The Over Burden likely to be generated during life of the mine is 2746.46 M Cum . The year wise position is furnished below.

Table 4.1: Dump Schedule

YEAR	Excavation Area	OB + TS Removal	Topsoil Generated from Excavation	Pure OB From Excavation M cum.
	Progressive	Progressive	Progressive	Progressive
Const. (0)	0.00	0.00	0.00	0.00
1 st	26.16	5.00	0.16	4.84
2 nd – 3 rd	103.81	129.97	0.62	43.48
4 th – 5 th	25.73	152.60	1.50	123.50
6 th – 10 th	718.67	675.00	4.31	670.69
11 th – 15 th	647.69	624.00	3.88	620.11
16 th – 20 th	202.79	495.00	1.22	493.78
21 st – 25 th	322.57	495.00	1.94	493.06
26 th – 29 th end of the mine	168.13	298.00	1.01	296.99
Closure plan 30 th – 32 th	0.00	0.00	0.00	0.00
Total	2440.55	2761.10	14.64	2746.46

(Source : Mining Plan)



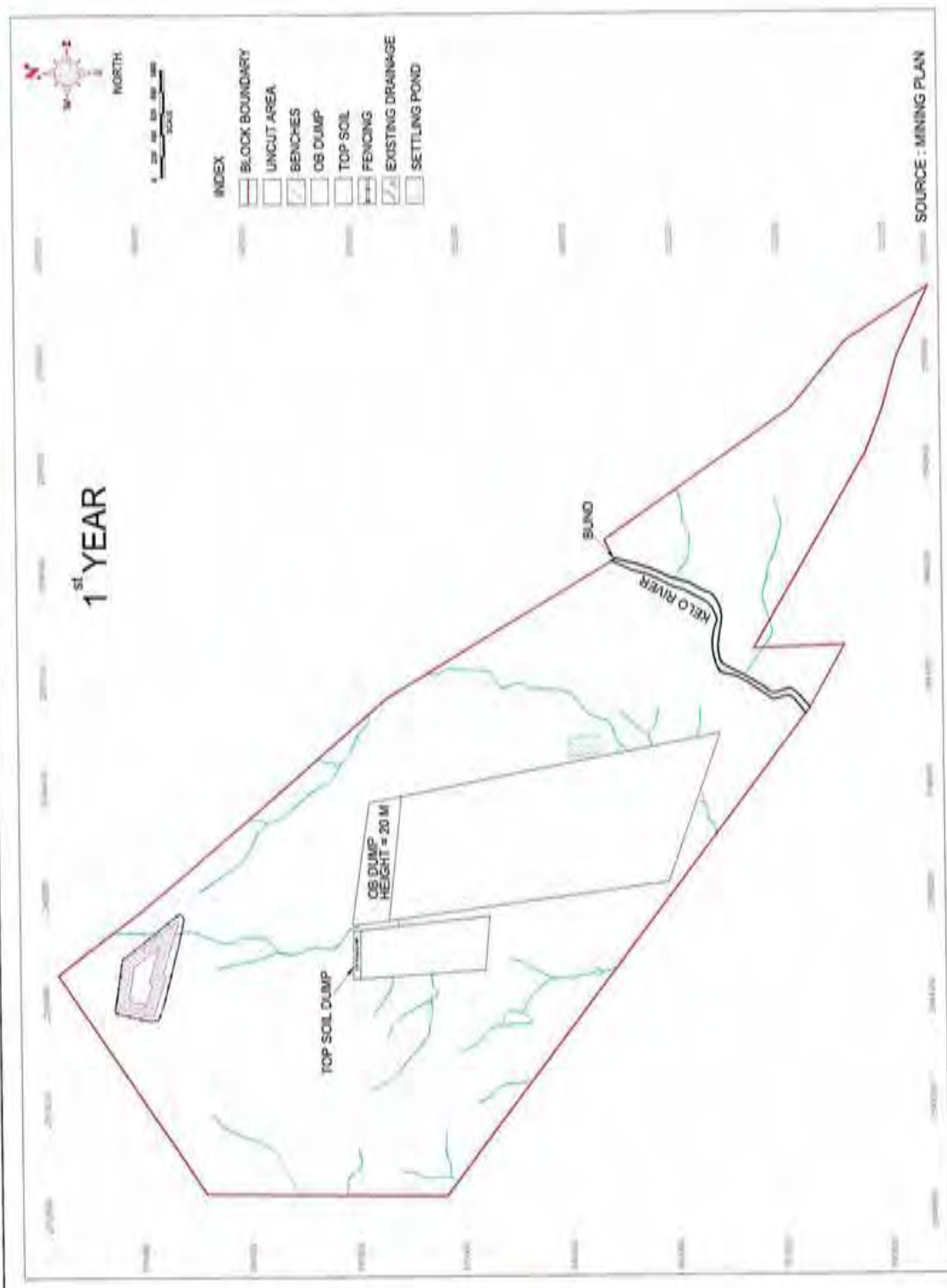


Figure 4.1: Mine Plan for the 1st Year



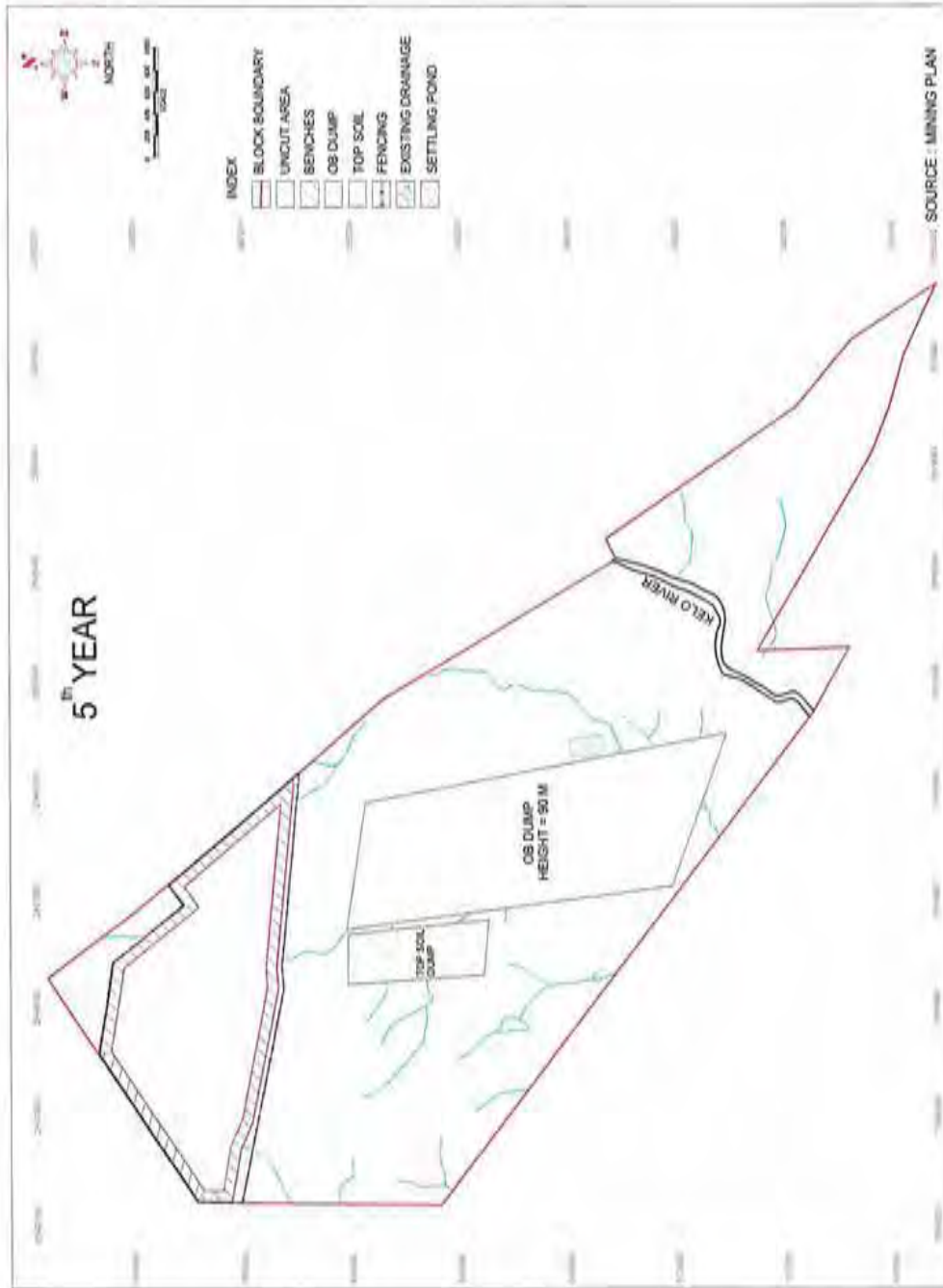
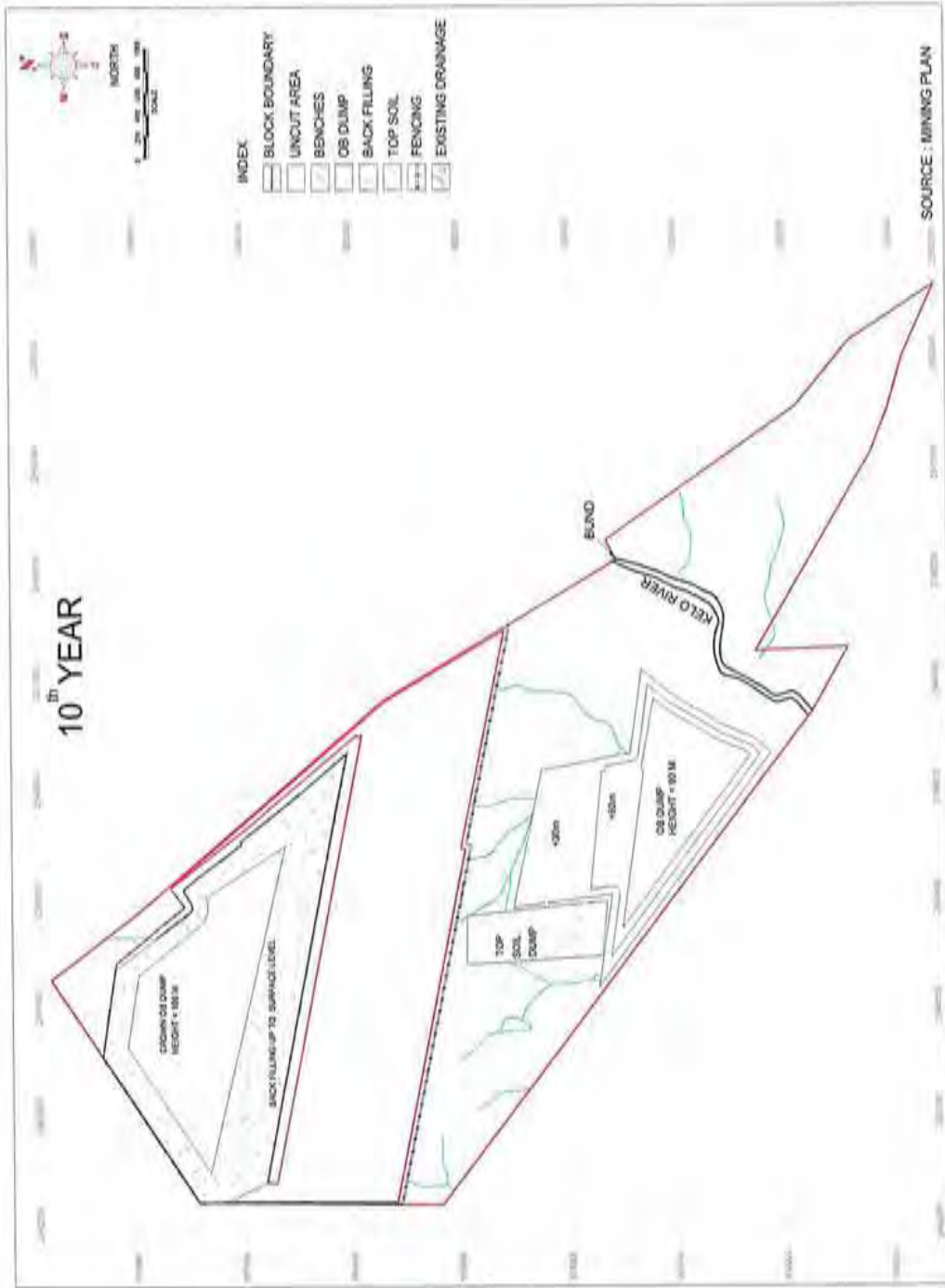


Figure 4.2: Mine Plan for the 5th Year

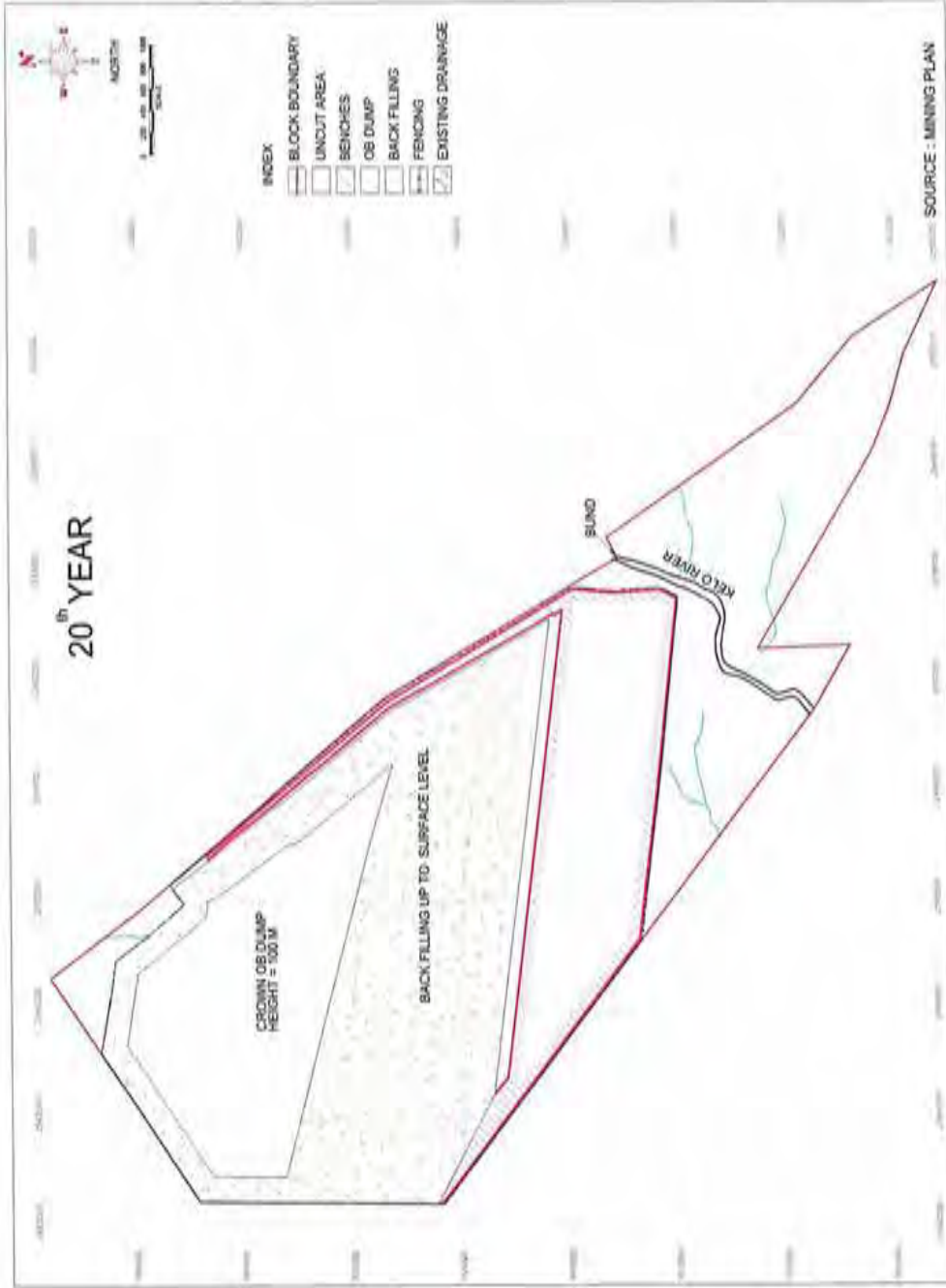




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Figure 4.3: Mine Plan for the 10th Year



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Figure 4.4: Mine Plan for the 20th Year

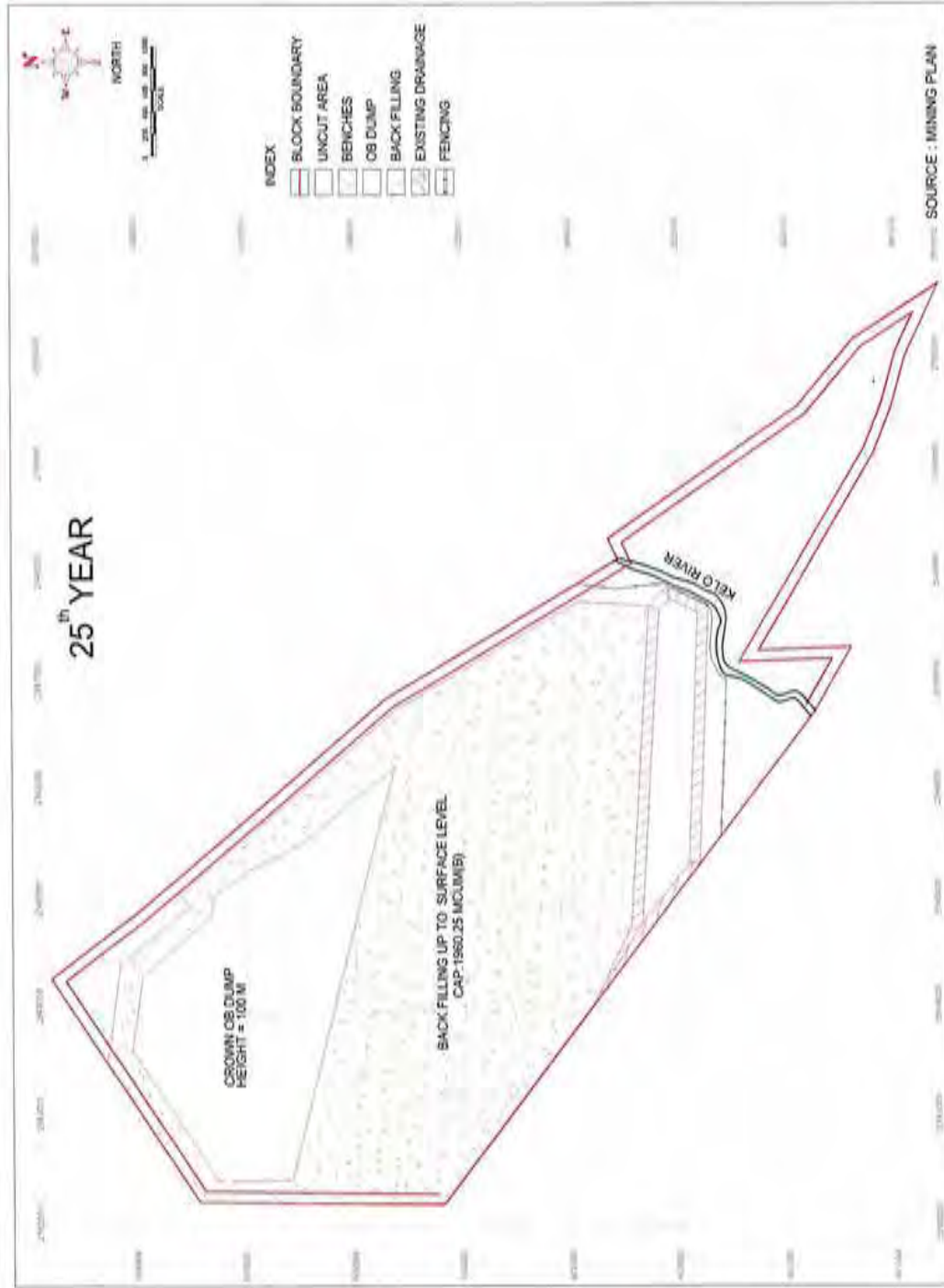


Figure 4.5: Mine Plan for the 25th Year

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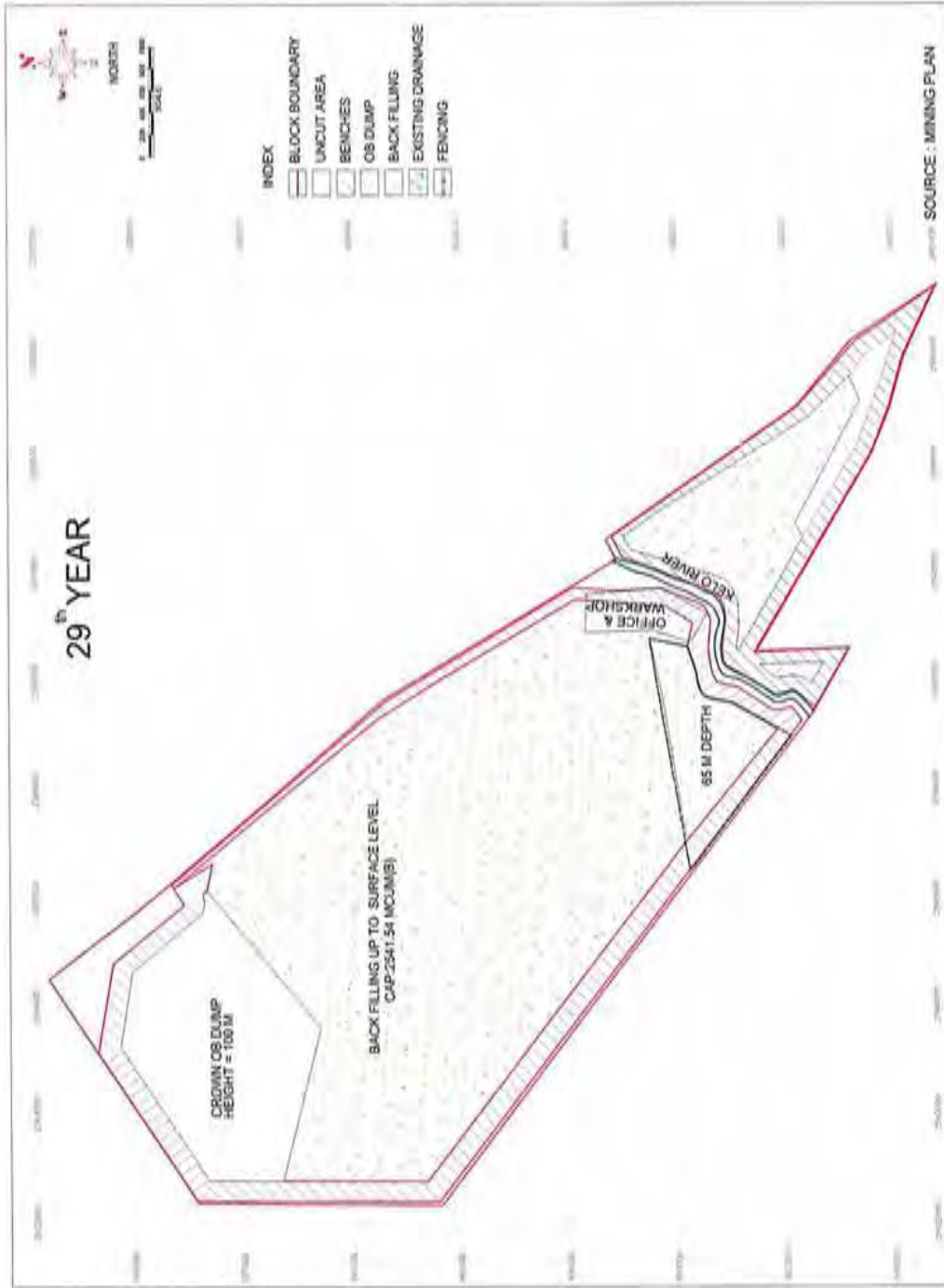


Figure 4.6: Mine Plan for the 29th Year



Discussion: The main source of soil erosion and top soil stack and overburden dumps. It is expected that 2440.55 Ha area will be excavated. The probable soil eroded will be in the tune of 19524 tones during the period of 29th year of mining. Thus the average soil erosion may be 673 tones per year.

4.4 Stabilization of Over Burden Dump

4.4.1 Steps to be taken to avoid Dump Slides

- Dumping of top soil will be avoided at the bottom of the cut as it leads to in stability. Dumping of soil and clayey material will be done away from the working area, that is on farther end of the dump so that formation of weak planes is avoided.
- Afforestation by planting trees will helped a lot in improving stability of dumps by preventing erosion.

4.4.2 Reclamation of overburden dumps:

Following activities shall be taken up for reclamation of Overburden dumps.

- Stabilization of overburden dumps
- Construction of retaining walls
- Construction of drain for drainage
- Provision of jute mesh for facilitating grass or vegetative growth on slopes
- Provision of good soil mixed with manure and subsequent irrigation for growth of grass for anchorage on slopes. Plantation mixed with indogenous and fast-growing plant species
- The degraded area will be reclaimed and rehabilitated with local species of plantation in a phased manner;
- Plantation will be carried out on waste dumps;
- The haulage roads will be flanked by trees on either side; and
- A belt of trees with thick canopy will be created along the mine boundary to intercept dust, gaseous pollutants and noise.

During quarry operations, it is necessary to adopt suggested mining parameters for the stability of benches, high-walls and spoil dumps. It is also mandatory to examine systematically the fencing of mine working, landslides and cracks between benches. It is required to maintain well graded and wide roads on benches keeping the width of working areas sufficient for spreading of blasted rock and movement of the mining and transport equipment.



5.0 SOIL MOISTURE CONSERVATION WORK PLAN

It is estimated that during mining 19524 tons of soil will be eroded during 29 years of mining. This demands a robust soil moisture conservation plan as mitigative measure.

Mitigative Measures:

Mitigative measures to minimize soil erosion will be undertaken by two plan –

- 1) Biological Conservation Plan,
- 2) Engineering Conservation Plan

5.1 Biological Conservation Plan:

5.1.1. Approach Plan

The following biological conservation plan will be adopted to mitigate soil erosion.

- Dumping of top soil will be avoided at the bottom of the cut as it leads to in stability. Dumping of soil and clayey material will be done away from the working area that is on farther end of the dump so that formation of weak planes is avoided.
- Afforestation by planting trees will helped a lot in improving stability of dumps by preventing erosion.
- Stabilization of overburden dumps
- Provision of jute mesh for facilitating grass or vegetative growth on slopes
- Provision of good soil mixed with manure and subsequent irrigation for growth of grass for anchorage on slopes. Plantation mixed with indigenous and fast growing plant species
- The degraded area will be reclaimed and rehabilitated with local species of plantation in a phased manner;
- Plantation will be carried out on waste dumps;
- The haulage roads will be flanked by trees on either side; and
- A belt of trees with thick canopy will be created along the mine boundary to intercept dust, gaseous pollutants and noise.

A thick green belt, 7.5 m wide will be developed along the three sides of mine boundary (leaving one side open for access roads & infrastructure) by planting hardy plant species. The Afforestation Program is given in **Table 5.1**




Table 5.1: Afforestation Program

Afforestation Programme					
Period	Greenbelt on Safety Area and ML Boundary		Reclaimed Area O/B Dump		Total Saplings
	Ha	No. Saplings	Ha	No of Saplings	
1st year	7.21	18025	0.0		18025
2 nd -3 rd year	14.43	36075	0.0		36075
4 th -5 th year	14.43	36075	0.0		36075
6 th -10 th year			198.97	984325	984325
11 th -15 th year			281.30	703250	703250
16 th -20 th year			514.51	1286275	1286275
20 th -25 th year			418.95	1057375	1057375
OCP-closure Stage			612.04	1530100	1530100
Total	31.25	90175	22 20 .53	5551325	5651500

Planning for plantation is done keeping the following objectives in mind:

- Compensate the damage to vegetation due to setting up and operation of the mine.
- Prevent the spread of fugitive dust generated due to mining and allied activities.
- Attenuate noise generated by the mine.
- Reduce soil erosion.
- Help stabilize the slope of external overburden dumps.
- Increases green cover and improve aesthetics.

Green belt development and afforestation will be carried inside the mining lease area to restore and increase the green cover of the region. Progressive Green Belt development and plantation in and around the mining area to control soil erosion. Progressive green belt development and plantation in the available areas will be carried out in a phase-wise manner till end of the mine life. Saplings will be planted at the rate of 1500 trees/ha in external/internal dumps and in other areas. Stretches of un-worked areas in the mining lease, which will not be covered by any activity, will also be selected for afforestation. Plantation will commence there from the initial years of excavation and plantation will be expanded in such areas in progressive stages.

5.1.2. Post plantation care:

Prescribed post plantation care shall be adopted to ensure maximum survival of the plants. Funds for maintenance of the plants for the first five years after the plantation shall be kept. Immediately after planting the seedlings, watering will be done. Further watering



will depend on the rainfall. In the dry seasons, watering will be regularly done especially during March to June. Watering in one year planted saplings will be more frequent (thrice a week). Manuring will be done using organic manure (animal dung,). Diseased and dead plants will be uprooted and destroyed and replaced by fresh saplings. Growth / health and survival rate of saplings will be regularly monitored and remedial actions will be undertaken as required.

5.1.3. Fencing:

As some part of area is nearer to the habitation and lies adjacent to the agricultural land there is every chances of biotic interference to the plantation area. Therefore it has been proposed to provide fencing towards habitation area.

5.1.4. Executing Agency:

In all cases, the works shall be executed by the User Agency having specialized departments headed by qualified persons with outsourced man and machinery as and where required. To facilitate this, the User agency shall establish its own executing and supervision cells along with required infrastructural facilities. In order to maintain the quality of work, in house supervision through competent personnel shall be provided. The entire work shall be carried out through close coordination with the Forest Department.

5.2 Engineering Conservation Plan:

5.2.1 Approach Plan: In this Plan, considering the topography and contours of the lease area, emphasis has been given to arrest sliding down of excavated materials along the contour by constructing check dams and retention walls at specified locations in the mining lease. Locations are judiciously selected within the leasehold and plans are prepared.

The salient features of the drainage management plan are as follows:

- Check dams across the drain will check water current and arrest solids. These need to be cleaned periodically.
- Stone pitching will be made at suitable places as per requirement to regulate water flow. Some of the drains which will serve for a long time shall be made pucca.

5.2.2 Engineering Construction: Retaining walls/Toe walls and garland drains shall serve the purpose of protection against rolling boulders on the slopes and drainage respectively. The drains will be provided with settling pits at regular intervals as required. Outside of the garland drains on the drainage lines shall be reinforced with green cover.



- Check dams will be constructed at identified locations to prevent the rainwater run-offs from adjoining high-lying areas to enter the OB area. After physical reclamation, top soil shall be spread on the dumped material and water sprinkling on the soil will be carried out.
- 5.2.3 Construction of retaining walls/Toe walls:** Retaining walls is a structure which aims at resisting the lateral pressure of soil when there is a change in ground elevation that exceeds the angle of repose of soil. Such retaining walls will be constructed around the OB dump to arrest sliding down of the excavated material.
- 5.2.4 Construction of Catch pits:** The run-off / storm water flowing through the network of garland drains around quarries and dumps will be led through siltation pits to settle out suspended solids. The clear water will be discharged to the nearby seasonal streams / nala. Coagulant, if necessary, will be added in the settling pits in monsoon season. Siltation settling pits will be constructed along the garland drains. It is expected that 4 numbers of settling tanks are required. The structure would be checked against overturning and sliding etc. Proper abutment at both sides should be made with earth filling so that excess run-offs would pass through only the catch pits/siltation pits without any breach elsewhere.
- 5.2.5 Inspection, Monitoring And Evaluation:** For successful implementation of the above proposed program, intensive inspection and technical guidance from the concerned technical wing to be set up by the user agency is required. Infrastructure, conveyance and all other required facilities will be provided by the User agency for proper implementation of the program.



5.2.6 Executing Agency:

In all the cases, the works shall be executed by the User agency having specialized departments headed by qualified persons with outsourced manpower and machinery as and where required. To facilitate this, the user agency shall establish its own executing and supervision cells along with required infrastructural facilities. In order to maintain the quality of work, in house supervision through competent personnel shall be provided.



Photograph showing width measurement of Nala in Mine Lease area for SC plan



Photographs showing temporary SC Plan for OB dump of Gare- IV/VII at the north boundary of GP-II



6.0 COST ESTIMATE OF SOIL MOISTURE CONSERVATION PLAN

Cost of Mitigative Measures for soil moisture conservation work plan in respect of both Biological and Engineering plans are proposed. The detail cost estimate is given in subsequent paragraphs.

6.1 Cost estimate for Biological Plan:

This plan include cost for greenbelt and showing of seeds activities the cost estimate is given in **Table 6.1**

Table 6.1: Cost estimate for Biological Conservation Plan

	S N o	Activity	Amount	Exp for first	Exp for 5-	Exp for 10-	Exp beyond
				5 years	10 years	15 years	15 th years
(A) Green Belt	1	Cleaning of the area (6.64 Ha) x 12 Mondays x Rs. 130.90/mondays	10430	2945.25	2356.2	2474.01	2654.54
	2	Demarcation of the area (15200 m x 0.7 mondays x Rs. 130.90 per mondays	14950	4230	3370	3550	3800
		Barbed wire fencing with RCC pole					
		a) RCC Pole 1.6 m @ 4 m distance (no. of poles =17715 running m/4 x Rs. 113.0	500000	141250	113000	118650	127100
		b) Cost of Barbed Wire (17715 running m x 5 rows/6.5 Kg x Rs 42.50	580000	163461.5	130769.2	137307.7	148461.5
		c) Fixing of RCC Poles and Barbed Wire (17715 m x 0.25 Mondays x Rs.130.90	580000	163461.5	130769.2	137307.7	148461.5
	4	Pit digging in size (45 x 45 x 45 cm) (4450 x 4.5 Mondays/100 Nos x 130.90	26500	7363.125	5890.5	6185.025	7061.35
	5	Mixing of cow dung Manure with soil (6.64 Ha x 3.5 Monday x 130.9)	3050	859.0313	687.225	721.5863	782.1575
	6	Cost of sapling @Rs.8/Sapling (4450 x8)	35600	10000	8000	8400	9200
	7	Planting Charges of Sapling (4450 x 2.5 Mondays/100 Nos x 130.9)	14600	4090.625	3272.5	3436.125	3800.75
8	Hoeing and weeding First year first (4450 samplings x 1.20 Mondays/100 Nos x 130.9)	6990	1975	1566	1643	1806	
9	Hoeing and weeding First year second (4450 samplings x 1.25 Mondays/100 Nos x 130.9)	7282	2045	1636	1718	1882	
10	Hoeing and weeding First year third (4450 samplings x 1.30 Mondays/100 Nos x 130.9)	7575	2127.125	1701.7	1786.785	1959.39	



Report on Soil moisture Conservation Work Plan for Gare Pelma – II

S N o	Activity	Amount	Exp for first	Exp for 5-	Exp for 10-	Exp beyond	
			5 years	10 years	15 years	15 th years	
11	Hoeing and weeding second year first (4450 samplings x 1.20 Mondays/100 Nos x 130.9)	6990	1963.5	1570.8	1649.34	1806.36	
12	Hoeing and weeding second year second (4450 samplings x 1.25 Mondays/100 Nos x 130.9)	7282	2045.313	1636.25	1718.063	1882.375	
13	Hoeing and weeding Third year first (4450 samplings x 1.20 Mondays/100 Nos x 130.9)	6990	1963.5	1570.8	1649.34	1806.36	
14	Watch & Ward (365 days x 4-year x 4 Mondays x Rs 130.90)	764456	764456	0	0	0	
Subtotal A		2572695	1274236	407796	428196	462464	
Percentage		100	49.00	16.00	17.00	18.00	
(B) Sowing of Seeds	15	Sowing of seeds – Topsoil dump area (60000 m ² @ Rs. 16.15/m ²)	969000	164730 (17%)	164730 (17%)	484500 (50%)	155040 (16%)
	Subtotal B		969000	164730	164730	484500	155040
TOTAL		3541695	1438966	572526	912696	617507	

6.2 Cost estimate for Engineering Plan:

This plan include cost for catch pit, check dam and toe wall activities the cost estimate is given in Table 6.2.

6.2.1 Catch Pits:

Catch pits will be provided all along the garland drain at an interval of 1 km, to allow the site & sedimentation to settle down.

Table 6.2: Catch Pits

Total Number of Catch Pits	Dimension Volume	Man days @ 0.67 /m ³	Total Expenditure @ Rs.130.90 per man day	Exp for first 5 years	Exp for 5-10 years	Exp for 10-15 years	Exp beyond 15 th year
9 Nos	8m(l)x5m(w)x2.5m(d) =100 m ³ x 9=900 m ³	603	78932	26310	26310	17540.6	8772

6.2.2 Check dam/ Toe walls will be provided to arrest sediment flow into stream. This will prevent choking of stream. The cost estimate for check dam and toe wall are given in Table 6.3.



Table 6.3: Cost estimation for Check dam/ Toe walls

Sr. No	Places	Dimension/ Volume	Exp @ Rs.300.00 per Cum.	Exp for first 5years	Exp for 5-10 years	Exp for 10-15 years	Exp beyond 15th year
01	(i) where the garland drain around the 0/13 dump discharges in to the main drain.	10 m X 2 m X 2 m=40 m ³	12000	12000	0	0	0
	(i) where the drain around the top soil dump discharges in to the main drain	10 m X 2 m X 2 m=40 m ³	12000	12000	0	0	0
02	(i) A toe wall (coupled with the Garland drain) all around the top soil dump	2.5(h) X 2 m (top width) X 3 m (bottom width) X 300 m= 6.25 X 300=1875 m ³	562500	562500	0	0	0
Total			5,86,500	5,86,500			




6.3 Total cost of Mitigative Measures for Soil Conservation:

The total expenditure proposed for taking up the works connected to "Mitigative Measures for soil Erosion, choking of streams and following top soil Management Plan": Total cost of Mitigative measure is given in **Table 6.4**.

Table 6.4: Total cost of Mitigative Measures

SI No	Activity	Location	Total Exp (Rs)	Exp for first 5 years	Exp for 5-10 years	Exp for 10-15 years	Exp beyond 15th years
A. Biological Plan							
01	Green Belt development	Along the three sides of the block	2572695	1274236	407796	428197	462464
02	Sowing of seeds	Top soil dump area (60000 Sq m x 16.15 per Sq m)	969000	164730	164730	484500	155040
Total			3541695	1438966	572526	912696	617507
B. Engineering Plan							
03	Catch Pits	In the garland drain at an interval of	78932	26310	26310	17540.6	8772
04	Check Dams/ Toe Walls	(i) SW-OB dump garland	12000	12000	0	0	0
		(ii) SE — OB dump garland drain	12000	12000	0	0	0
		(iii) Around top soil	562500	562500	0	0	0
Total of catch pits and check dams/toe			6,65,432	612810	26310	17540	8772
GRAND TOTAL (A + B)			4207127	2051776	598836	930236	626279

Cost of Soil Conservation Plan - Rs. 42,07,127 in four stages




7.0 CONCLUSION:

- The Gare Pelma-II Coal Block comprising total lease area of 25.83 km² has been allotted to Maharashtra State Power Generation Company Limited (MAHAGENCO) in the district of Raigarh of Chhattisgarh state.
- The area is covered in the Survey of India Toposheet No. 64 N/8 & 12 (R.F.1:50,000) and is bound by

Latitude: 22° 06' 22.33" to 22° 10' 48" N

Longitude: 83° 26' 21.85" to 83° 31' 19.1" E

- Pre-mining Land use of mining area is 2583.487 ha. The Soil Moisture Conservation Plan (SMC Plan) is being prepared inclusive forest area of 76 km².
- The Kelo dam is present in the southern portion of the mine site. RL of Kelo bed start of Coal Mine is 260 RL of Kelo bed and at end of Coal Mine it is 240 RL. The area of Kelo watershed is 1348.38 km²
- The basic relation governing the climatic water balance concept is;

$$P = AE + RO \pm \Delta S.$$

$$1321 = 811 + 707 - 197$$
- The intensity of Rainfall is 12.5 cm/ hour.
- Highest infiltration of 0.85 cm/hr has been recorded near Nala and lowest near Pondipali Pond to the tune of 0.30 cm/hr.
- The lowest water table contour is 250 m masl and highest is 290 m amsl during both pre and post monsoon.
- The erosion or soil loss for this condition is derived above to the tune of 8 tone/ ha/year.
- The main source of soil erosion and top soil stack and overburden dumps. It is expected that 2440.55 Ha area will be excavated. The probable soil eroded will be in the tune of 19524 tones during the period of 29th year of mining. Thus the average soil erosion may be 673 tones per year.
- In mitigative measures, Biological conservation plan and Engineering conservation plan will be adopted.
- Cost estimate for Biological Conservation Plan which include green belt and Sowing of seeds will cost around Rs. 35, 41, 695.
- Cost estimate for Engineering Conservation Plan which include Catch pits and Check dams or toe walls will cost around Rs. 6, 65, 432.

The Total Cost of Soil Conservation Plan is Rs. 42, 07, 127 in four stages




8.0 References


- 1) N. K. Prasad et. al. UNDP Final Technical Report on modeling and control of Water System In Coal Mining Environment, Chandrapur Project Area, Maharashtra, (1999).
- 2) N. K. Prasad, Catchment Area Treatment Plan & Soil Conservation Plan for Paras Coal Block District Surajapur Chhattisgarh of M/s RUVNL, (2019) (Srushti Seva Private Limited, Nagpur).
- 3) N.K. Prasad, HG Report, GP-III for M/s GIDC, Goa, District Raigarh, Chhattisgarh (2011) (Srushti Sewa, Nagpur).
- 4) Shantanu Puranik, EIA, GP-III for M/s GIDC, Goa, District Raigarh, Chhattisgarh (2011) (Srushti Sewa, Nagpur).
- 5) "Environmental Impact Assessment of Proposed Gare Pelma Sector II Coal Mine Project of 23.60 MTPA (OC 22.0 MTPA + UIG-1.6 MTPA) of M/s Maharashtra State Power Generation Company Ltd in area of 2583.48 ha at Raigarh District, Chhattisgarh "of MAGENCO (2019)
- 6) "Hydrogeological Study report of Gare Pelma Sector-II Coal Block District Raigarh, Chhattisgarh" of MAGENCO (2017)
- 7) Mining Plan and Mine Closure Plan for Gare Pelma Sector-II Coal Mine of MAGENCO (2015)
- 8) Prof. R. Suresh, "Soil and Water Conservation Engineering", Standard Publishers Distributors, Nai Sarak Delhi, (1993).
- 9) Ven Te Chow, "Hand Book of Applied Hydrology", (1964).
- 10) K Subramanya, "Engineering Hydrology", (2008)
- 11) Santosh Kumar Garg, "Irrigation Engineering and Hydraulic Structures"
- 12) "Predicting Rainfall Erosion Losses" A Guide to Conservation Planning, United States Department of Agriculture, (1978).
- 13) Gaurav Kant Nigam. M. Tech. Thesis on "Assessment of soil Erosion, Runoff, Sediment Yield, Water Quality and Preventive measures in overburden dumps of Opencase Mines in Chirimiri", (2014)
- 14) Hasan Raja Naqvi, A.S. Mohammed Abdul Athik, Hilal Ahmad Ganaie, Masood Ahsan Siddiqui et. al. Soil erosion planning using sediment yield index method in the Nun Nadi watershed, India. Elsevier Publication (2015) P-86-96
- 15) Flood estimation Report for Mahanadi Sub zone-3 by Central Water Commission, Govt. of India, (1997).
- 16) Aquifer system of Chhattisgarh by Central Groundwater Board (2012).
- 17) Andy Ward, Adrian Smith & Jack Caldwell, Surface Erosion and sediment control at Open Cast Mine in South Africa, (1984) IAHS publication no. 144.
- 18) Soil analysis Report of Gare Pelma – II Coal Mine area by Bio Laboratory Exhibition and Training Center, Ambikapur, Chhattisgarh, (2020).
- 19) Source-UNEP-DHI Partnership- [Soil moisture conservation techniques](#)



45 PM

NEFT RTGS CHALLAN

AGENCY COPY

यूनियन बँक ऑफ इंडिया  Union Bank of India

NEFT/RTGS CHALLAN for CAMPA Funds
Date: 17-10-2022

Agency Name.	MAHARASHTRA STATE POWER GENERATION CORPORATION LTD.
Application No.	5820495978
MoEF/SG File No.	8-06/2022-FC
Location.	CHATTISGARH
Address.	MSPGCL, 2ND FLOOR, PRAKASHGAD BUILDING, G-9, PROF. ANANT KANEKAR MARG, BANDRA (E) MUMBAI Mumbai City
Amount (in Rs)	40067127/-


Amount In Words : Four Crore Sixty Seven Thousand One Hundred and Twenty Seven Rupees. Only

NEFT/RTGS to be made as per following details;

Beneficiary Name:	CHATTISGARH CAMPA
IFSC Code:	UBIN0996335
Pay to Account No.	150645820495978 Valid only for this challan amount.
Bank Name & Address:	Union Bank Of India FCS Centre, 21/1, 11 th Floor, Jellita Towers, Mission Road, Bengaluru-560027

* This Challan is strictly to be used for making payment to CAMPA by NEFT/RTGS only

BANK COPY

यूनियन बँक ऑफ इंडिया  Union Bank of India

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* This Challan is strictly to be used for making payment to CAMPA by NEFT/RTGS only

Note: After making the required payment through challan, if the payment status has not been updated even after 7 working days, then kindly mail a copy of your challan with transaction date and reference id to Email: fcsblr@unionbankofindia.bank, epurse@unionbankofindia.bank, ubin0903710@unionbankofindia.bank

BOI MLCB has transferred the above funds vide UTR NO BKIDA22291932229 dated 18/10/22.



Santosh B. Bavdekar
SANTOSH B. BAVDEKAR
CHIEF MANAGER
P.F. NO. 170256

Dr. Nitin S. Wagh
Executive Director (E&S)



Ref: ED(E&S and GP)/GPII/Mine Plan/ 258

Date: 27 JUN 2022

To,
Coal Controllers Organisation,
1, Council House Street,
Lal Dighi, BBD Bagh,
Kolkata,
West Bengal 700001

Subject: Intimation regarding minor change in land type within the leased area in the approved Mining Plan and Mine Closure Plan of Gare Palma Sector II Coal Mine, District Raigarh, Chhattisgarh, allotted to M/s Maharashtra State Power Generation Company Limited

Reference:

1. Letter of Allotment from Nominated Authority Ministry of Coal, Government of India vide letter no. 103/30/2015/NA, dated: 31.08.2015.
2. Approval of Mining Plan from Ministry of Coal, Government of India letter no. 34011/16/2016-CPAM dated 12th August 2016
3. Letter from Mineral Resources Department, Raipur Government of Chhattisgarh intimating previous approval for Mining Lease u/s 5(1) of MMDR Act 1957 dated 24.02.2018.
4. Ministry of Coal, Government of India, Office Memorandum F.No. 34011/28/2019-CPAM dated 29th May 2020
5. MoEF & CC vide letter no. 8-06/2022-FC dated 2nd June 2022- reg Grant of Forest Stage I clearance.
6. Mahagenco Board Resolution No. 2022/3598 dated 23.06.2022.

Respected Sir,

Ministry of Coal, Government of India has allocated Gare Palma Sector II Coal Block in the State of Chhattisgarh to Maharashtra State Power Generation Company Limited (MAHAGENCO) vide Allotment Order referred at Serial no.1.

At first Gare Palma Sector II Coal block spread in land area of 2583.487 ha in which 211.319 Ha area covered under forest land comprising 135.374 Ha of revenue forest land (CBJ) and 75.945 Ha of protected forest land. Accordingly, Mahagenco had submitted Mining Plan and Mine Closure Plan to Ministry of Coal (MoC) on 29.02.2016. Ministry of Coal conveyed the approval of Mining Plan and Mine Closure Plan of Gare Palma Sector II on 12.08.2016. Nominated Authority, MoC vide letter no. 103/30/2015/NA dated 17.02.2017 modified the bounding co-ordinate of the coal block.

Office of the Coal Controller
1, Council House Street, Kolkata-1

After DGPS survey, Mahagenco then applied for Forest Clearance revised application on 28.12.2017 for diversion of forest land for an area 214.869 Ha comprising of 115.134 Ha of revenue forest land (CBJ) and 99.735 Ha of protected forest land.

The Forest Diversion Proposal of the project was deliberated in Forest Advisory committee meeting held on 11.05.2022. MoEF&CC vide letter dated 02.06.2022 (Copy enclosed as Annexure-I), accorded the In-principal (Stage- I) approval for non-forestry use of 214.869 Ha of forest land in favor of Mahagenco subject to fulfilment of various conditions as cited therein.

In Part A, Point no.7 of the letter state that "*Final Mining Plan, after rectifying the detail of forest area involved in the mining leases and being approved under the Forest (Conservation) Act, 1980, shall be submitted to the Ministry before Stage-II approval*".

The clause no. 1.3 (B) of the revised guidelines vide the OM referred at sl. No. 4, states that "*.....For minor changes, the project proponent is empowered to make modification with the approval of the respective company board. These minor changes shall cover a. changes in land type within the leased area. b. changes in MEMM deployment plan; and c. Changes in location of infrastructure within the leased area; The project proponent shall submit specific report of such minor changes to Coal Controller, CCO, Kolkata with copy of the same to administrative section dealing with allocation/allotment of the block and section dealing with approval of mining plan at MoC/CCO, for information*".

In view of the above guidelines, Mahagenco hereby submits revised mine plan with minor modification in the land type within the leased area which was approved in the company board meeting held on 13.06.2022. The copy of Board resolution no. 2022/3598 dt. 23.06.2022 along with relevant amendment of the mine plan is enclosed with this letter.

Therefore, it is requested to kindly take note of the above changes and acknowledge the same.

Thanking You,



Yours Sincerely,

Executive Director (E&S and GP)

Copy s.w.r.to:

1. The Coal Controller, Coal Controller's Organisation, Ministry of Coal, SCOPE Minar, 5th floor, Core-II, Laxmi Nagar, New Delhi- 110092
2. The Nominated Authority, Ministry of Coal, F-Wing, Room No-120, Shastri Bhavan, New Delhi- 110001.
3. The Under Secretary, Ministry of Coal, Shastri Bhavan, New Delhi- 110001.





CIN U40100MH2005SGC153648

Maharashtra State Power Generation Co.Ltd.
Prakashgad, Prof.Anant Kanekar Marg,
Bandra(East), Mumbai-400 051.
Tel.Nos.022-26472131/ 4211

Ref.No.:- MSPGCL/CS/BM-211/211.28

Date: 23.06.2022

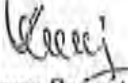
Copy of Resolution passed by Board of Directors of MSPGCL in the BM held on 13.06.2022

Item no 211.28: Board approval regarding rectifying the detail of forest area in the Mining Plan as per the compliance stipulated in the Forest Stage I clearance letter issued by MoEF & CC (Forest Diversion) on 02.06.2022.

Resolution no. 2022/3598: The Board considered the Board Note no. CE (Coal)/GP-II/FC I/Mine Plan/ Rectification/241 dated 09.06.2022 submitted by Chief Engineer (Coal) regarding, rectifying the detail of forest area in the Mining Plan and Mine Closure Plan (earlier approved by MoC on 12.08.2016) for Gare Palma Sector-II Coal Mine as a compliance to point no.7 of part A of Forest Stage-I clearance letter/File No. 8-06/2022-FC dtd. 02.06.2022 issued by MoEF & CC (Forest Diversion).

The Board Noted the MoEF & CC letter dtd 02.06.2022, MoC Office Memorandum dtd 29.05.2020 (empowering company board for Minor changes to Mining Plan and Mine Closure Plan) & presentation given on the subject matter. After deliberation Board resolved and accorded approval as below,

1. To rectify the minor changes in the land type within the leased area of the Mining Plan and Mine Closure Plan of Gare Palma Sector-II Coal Mine.
2. To write a letter to Competent Authority to intimate the same.


Company Secretary
MSPGCL



AMENDMENT NO.1 IN THE MINING PLAN AND MINE CLOSURE PLAN OF GARE PALMA SECTOR II COAL BLOCK, LOCATED IN DISTRICT RAIGARH, CHHATTISGARH.

PREAMBLE:

Nominated Authority, Ministry of Coal, Government of India has allocated Gare Palma Sector II Coal Block in the State of Chhattisgarh to Maharashtra State Power Generation Company Limited (MAHAGENCO) vide Allotment Order no. 103/30/2015/NA, dated: 31.08.2015.

Ministry of Coal has conveyed the approval of Mining Plan and Mine Closure Plan of Gare Palma Sector II vide letter no. 34011/16/2016-CPAM dated 12th August 2016

As per the Approved Mining Plan showing the Land use details the forest area has been shown as 211.319 Ha comprising of 135.374 Ha of revenue forest land (CBJ) and 75.945 Ha of protected forest land. After carrying out the DGPS survey of the coal block, the forest area of 211.319 Ha has been revised to 214.869 Ha which has been validated by the Forest Department of Chhattisgarh. Accordingly, Mahagenco has applied for diversion of forest land for an area 214.869 Ha comprising of 115.134 Ha of revenue forest land (CBJ) and 99.735 Ha of protected forest land.

As per point no 7 of the FC Stage-I recommendation vide letter no. 8-06/2022-FC dated 2nd June 2022, the change in forest area vis-à-vis the application for forest diversion is to be rectified before grant of FC Stage-II.

The tables showing the land breakup in the approved Mining Plan and revised land as per the FC applied are given below.

A. As per approved Mining plan

**TABLE 14.2
EXISTING LAND USE DETAILS OF TOTAL AND APPLIED MINING LEASE AREA (HA)**

Sl. No.	Village	Private Land			Govt. Land				Total Area (Private + Govt. Land)	
		Agriculture	Non Agriculture	Total Area	Populated	Water body	Other	CBJ**		Total Area
A. As per Revenue Departments Records										
1	Tihlirampur	97.902	62.805	160.657	0.03	21.225	30.001	0	67.148	227.736
2	Dholnara	39.04		69.04	6.833	0.375	3.317	2.788	13.314	72.854
3	Murogaon	302.393		302.393	8.256	1.303	4.29	23.904	37.363	330.740
4	Libra	121.416	7.621	129.037	2.097	0.430	4.601	15.043	23.973	153.01
5	Kunjemura	109.715		109.715	14.271	13.596	0.308	30.17	66.295	205.01
6	Jhinkabahal	3.844		3.844	0	0	0	0	0	3.844
7	Radopali	351.876		351.876	8.330	5.895	18.955	0.126	34.311	385.987
8	Dolesara	20.748		20.748	0	0	1.242	0	1.242	21.99
9	Bhatumura	16.297		16.297	0	0	0.704	0.822	1.328	17.623
10	Sarasmal	66.869	9.158	88.027	0	1.332	3.593	16.236	20.131	86.158
11	Pata	316.004	13.166	329.23	13.314	5.529	14.47	15.328	48.639	377.869
12	Chilwahi	142.461		142.461	0.252	0.867	8.193	0	0.272	161.733
13	Gare	157.224		157.224	10.402	4.241	11.606	1.057	28.276	185.5
14	Saraitola	166.220	13.722	169.95	8.385	1.364	7.969	29.703	47.431	217.381
Total of A.		2002.477	106.352	2108.829	79.816	56.167	127.359	135.374	398.712	2507.541
B. As per Forest Departments Record										
Government Forest Land					135.374					75.945
Grand Total										2583.486

Note: 75.945 Ha of Protected Forest land and 135.374 Ha of Revenue Forest land is present within the mine lease area, which needs to be diverted for mining purpose after obtaining forestry clearance from the Ministry of Environment and Forest, Govt. of India under the Forest (Conservation) Act 1980.
* Small big trees forest



Handwritten signature in blue ink.



B. As per revised land use (Ha)

Sl. No.	Village	Private land			Govt. Land				Total Area (Private + Govt. Land)	Forest Land	Total Area
		Agriculture	Non Agriculture	Total Area	Populated	Water body + Other	CBJ**	Total area			
A. As per Revenue Department Records											
1	Tihlirampur	85.965	62.685	148.65	1.17	75.027	0	76.197	224.847	0	224.847
2	Dholnara	52.538		52.538	5.908	10.219	8.139	24.266	76.804	2.183	78.987
3	Murogaon	302.868		302.868	8.256	7.277	8.216	23.749	326.617	48.515	375.132
4	Libra	121.625	7.621	129.246	3.006	1.657	13.216	17.879	147.125	0	147.125
5	Kunjemura	197.535		197.535	14.432	16.537	30.19	61.159	258.694	0	258.694
6	Jhinkabahal	1.435		1.435	0	0.026	0	0.026	1.461	7.612	9.073
7	Radopali	342.873		342.873	17.632	32.017	0.125	49.774	392.647	0	392.647
8	Dolesara	14.023		14.023	0	7.138	0	7.138	21.161	0	21.161
9	Bhalumura	20.369		20.369	0	2.075	1.214	3.289	23.658	0	23.658
10	Sarasmal	66.791	9.158	75.949	0	3.706	15.887	19.593	95.542	0	95.542
11	Pata	312.387	13.166	325.553	12.909	16.328	17.259	46.496	372.049	29.892	401.941
12	Chitwahi	143.574		143.574	7.944	8.739	0	16.683	160.257	0	160.257
13	Gare	164.277		164.277	10.474	11.087	2.159	23.72	187.997	0	187.997
14	Saraitola	145.006	13.722	158.728	8.597	8.839	18.729	36.165	194.893	11.533	206.426
Total of A		1971.266	106.352	2077.618	90.328	200.672	115.134	406.134	2483.752	99.735	2583.487
B. As per Forest Departments Record											
Government Forest land *										99.735	
										Grand Total	2583.487

Note: * 99.735 Ha of protected forest land and 115.134 Ha of revenue forest land is present within the mine lease area, which needs to be diverted for mining purpose after obtaining forestry clearance from the Ministry of Environment and Forest, Govt. of India under the Forest (Conservation) Act 1980. ** Small/Big tree Forest

As per the clause no. 1.3 (B) of the revised guidelines vide the OM F.No. 34011/28/2019-CPAM dated 29th May 2020, the project proponent is empowered to make modification for minor changes which covers changes in land type within the leased area, with prior approval of the Board of the company and the project proponent shall submit such minor changes to Coal controller, CCO, Kolkata with a copy of the same to Administrative Section dealing with the allocation/allotment of the block and section dealing with the approval of mining plan at MoC/CCO, for information.

Accordingly, this amendment no. 1 shall be read with the Mining Plan approved by Ministry of Coal's letter no. 34011/16/2016-CPAM dated 12th August 2016 and shall supersede the details mentioned in table no 14.2 of Page no. 14-3.

Amendment:

The following details mentioned under relevant paras as stated below shall stand amended as follows:

1. At Page ES-6 point no. (m)- Type of land involved in Hectares shall be read as follows:

Sl. No.	Village	Private land	Govt. Land	Forest Land	Total Area
A. As per Revenue Department Records					
1	Tihlirampur	148.65	76.197	0	224.847
2	Dholnara	52.538	24.266	2.183	78.987
3	Murogaon	302.868	23.749	48.515	375.132
4	Libra	129.246	17.879	0	147.125
5	Kunjemura	197.535	61.159	0	258.694
6	Jhinkabahal	1.435	0.026	7.612	9.073
7	Radopali	342.873	49.774	0	392.647



8	Dolesara	14.023	7.138	0	21.161
9	Bhalumura	20.369	3.289	0	23.658
10	Sarasmal	75.949	19.593	0	95.542
11	Pata	325.553	46.496	29.892	401.941
12	Chitwahi	143.574	16.683	0	160.257
13	Gare	164.277	23.72	0	187.997
14	Saraitola	158.728	36.165	11.533	206.426
Total of A		2077.618	406.134	99.735	2583.487
B. As per Forest Departments Record					
Government Forest land *					99,735
				Grand Total	2583.487

2. Table of Land details shall be read as follows:
- At Page ES 7, point no. (n)- Broad Land Use Pattern (Forest, Township, Industrial, Agricultural, Grazing, Barren etc.,
 - At Page 3-5, Point no. 3.6, Table no. 3.2, Present (Pre-Mining) Land use of the ML area Gare Palma sector-II (HA),
 - At Page no. 13-1, Table no 13.1- PRESENT/PRE MINING LAND USE OF THE ML AREA GARE PALMA SECTOR II,
 - At Page no. 14-3, Table no.14.2- EXISTING LAND USE DETAILS PF TOTAL AND APPLIED MINING LEASE AREA(Ha),
 - At Page no. 15-6, Table 15.5-Present Land use of the area required for the project

Sl. No.	Village	Private land			Govt. Land				Total Area (Private + Govt. Land)	Forest Land	Total Area
		Agriculture	Non Agriculture	Total Area	Populated	Water body + Other	CBJ**	Total area			
A. As per Revenue Department Records											
1	Tihirampur	85.965	62.685	148.65	1.17	75.027	0	76.197	224.847	0	224.847
2	Dholnara	52.538		52.538	5.908	10.219	8.139	24.266	76.804	2.183	78.987
3	Murogaon	302.868		302.868	8.256	7.277	8.216	23.749	326.617	48.515	375.132
4	Libra	121.625	7.621	129.246	3.006	1.657	13.216	17.879	147.125	0	147.125
5	Kunjemura	197.535		197.535	14.432	16.537	30.19	61.159	258.694	0	258.694
6	Jhinkabahal	1.435		1.435	0	0.026	0	0.026	1.461	7.612	9.073
7	Radopali	342.873		342.873	17.632	32.017	0.125	49.774	392.647	0	392.647
8	Dolesara	14.023		14.023	0	7.138	0	7.138	21.161	0	21.161
9	Bhalumura	20.369		20.369	0	2.075	1.214	3.289	23.658	0	23.658
10	Sarasmal	66.791	9.158	75.949	0	3.706	15.887	19.593	95.542	0	95.542
11	Pata	312.387	13.166	325.553	12.909	16.328	17.259	46.496	372.049	29.892	401.941
12	Chitwahi	143.574		143.574	7.944	8.739	0	16.683	160.257	0	160.257
13	Gare	164.277		164.277	10.474	11.087	2.159	23.72	187.997	0	187.997
14	Saraitola	145.006	13.722	158.728	8.597	8.839	18.729	36.165	194.893	11.533	206.426
Total of A		1971.266	106.352	2077.618	90.328	200.672	115.134	406.134	2483.752	99.735	2583.487
B. As per Forest Departments Record											
Government Forest land *											99,735
										Grand Total	2583.487

Note: * 99,735 Ha of protected forest land and 115.134 Ha of revenue forest land is present within the mine lease area, which needs to be diverted for mining purpose after obtaining forestry clearance from the Ministry of Environment and Forest, Govt. of India under the Forest (Conservation) Act 1980. ** Small/Big tree Forest

3. At Page ES-18, Point no. c, Para shall be read as follows-99.735 Ha of protected forest land and 115.134 Ha of revenue forest land is present within the mine lease area

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4. At Page 3-7, Point no. 3.7.1, sub-point no. (iv)- Forest within Block, shall be read as follows-
99.735 Ha of Protected Forest land and 115.134 Ha of Revenue Forest land is present within the mine lease area.
5. At Page 3-7, point 3.7.2- Surface reorganization required (Plate IV), sub-point no. (c). shall be read as follows- 99.735 Ha of Protected Forest land and 115.134 Ha of Revenue Forest land is present within the mine lease area, which needs to be diverted for mining purpose after obtaining forestry clearance from the Ministry of Environment and Forest, Govt. of India under the Forest (Conservation) Act 1980.
6. At Page 13-3, point 13.3- Forest Land, shall be read as follows-
Approval of Govt of India, MoEF will be obtained for diversion of 214.869 Ha (99.735 Ha of Protected Forest land and 115.134 Ha of Revenue Forest land) of Forest land for mining under the Forest (Conservation) Act 1980.
7. At Page 14-5, Point no. 14.2.4, shall be read as follows-
Ecology- The leasehold area can be demarcated under two major groups of vegetation structure i.e. Forest land and non-forest land. The non-forest land under Government ownership is barren land while under private ownership it is agriculture and nonagricultural land. The area of protected forest is 99.735 Ha and that of revenue Forest is 115.134 Ha. The forest area will be diverted after obtaining Forest Clearance from MoEF, Govt. of India.
8. At Page 14-19, Table-14.15, shall be read as follows-
Note## During post mine closure plan period, agriculture is proposed instead of plantation over the rehandled crown dump area as well as over the backfilled area obtained as a result of reducing the void except over 214.869 ha including the crown dump of 138 ha which will be left for forest use as in pre-mining scenario.
9. At Page 15-33, Point 15.4.7, Para-(iv) , shall be read as follows –
99.735 Ha of protected forest land and 115.134 Ha of revenue forest land is present within the mine lease area
10. At Page 15-33, Point 15.4.7, Para-(A), Sub Para-(c), shall be read as follows-
99.735 Ha of protected forest land and 115.134 Ha of revenue forest land is present within the mine lease area, which needs to be diverted for mining purpose after obtaining forestry clearance from the Ministry of Environment and Forest, Govt. of India under the Forest (Conservation) Act 1980.
11. At Page no. 14-21 (Table-14.16) and Page no. 15-18 (Table-15.11) shall be read as follows-

Year	Backfilled Reclam. Area	Dump Reclam. Area	Green belt area	Total Plantation area	Backfilled area for agriculture without plantation	Disembled area for Agriculture without plantation	Sedling pond area filled for agriculture without plantation	Made Fit for agriculture in post mine closure after cutting trees	Total fit for Agriculture	Fit for forest in Post Mine Closure
1st year	0		7.21	7.21					0	
3rd year	0		14.43	14.43					0	
5th year	0		14.43	14.43					0	
10th year	198.97	194.76		393.73					0	
15th year	281.3			281.3					0	
20th year	514.51			514.51					0	
25th year	418.95			418.95					0	
End of mine 29th Year	612.04			612.04					0	
Closure plan 32nd year				0	414.78	45.94	5	1846.971	2312.691	214.869
Total	2025.77	194.76	36.07	2256.6	414.78	45.94	5	1846.971	2312.691	214.869



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12. At Page no. 14-21 and Page no. 15-18 para shall be read as follows-
Out of 2583.48 Ha ML area, 2440.55 Ha will be backfilled. Out of backfilled area of 2440.55 Ha, 214.869 Ha (during pre-mining 99.735 Ha of Protected Forest land and 115.134 Ha of Revenue Forest land) will be converted into forest use while the rest 2261.75 Ha will be usable as agricultural land whereas in facilities area 45.94 Ha and in backfilled settling pond 5 Ha will also be usable as agricultural land. Hence the total land usable as agriculture land will be 2261.75+ 45.94 +5.0 = 2312.69 Ha.
13. At Page no. 15-16, shall be read as follows-
Total (OC+UG) Mine closure land use (Ha), Pre Mining Land use (Ha) Total forest Land 214.869 Ha Ha (99.735 Ha of Protected Forest land and 115.134 Ha of Revenue Forest land). Detail mentioned in Point no 16.
14. At Page no. 15-40, Table-15.19: AREAS WHICH COULD BE USED FOR AGRICULTURE, FOREST AND OTHER USES IN POST MINE CLOSURE STAGE, shall be read as follows

Sl. No.	Particulars	Area (Ha)	Agriculture (Ha)	Forest (Ha)	Other
i	Surface level area over the backfill dump and the area made level after removing the crown dump	2440.55	2261.751	178.799	0
ii	Facilities area including set. pond	55.94	Facilities area 45.94 ha and backfilled settling pond 5 ha.	0	5 Ha Facilities for public use
iii	Undisturbed / indirectly affected	86.99		36.07 Green Belt	50.92 others (30.3 road+5.2ha bund+5 ha facilities for public use+15.42 ha under Kelo river).
Total		2583.48	2312.691	214.869*	55.92

Note: *During pre-mining 99.735 Ha of Protected Forest land and 115.134 Ha of Revenue Forest land= Total 214.869 ha

15. At Page no. 15-40, Point 15.5 para shall be read as follows:
A perusal of above table shows that the total land useable as agriculture 2312.691 ha, forest 214.869 ha while the rest will be under other land uses as explained under the last column above.

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16. At Page no. 15-16, Table-15.10: Total (OC+UG) Mine closure land use (Ha) (End of 80th Year), shall be read as follows:
 (The Pre-Mining, During Mining and Post closure (OC And UG) land use and Post closure Management)

Pre Mining Land use "ha"	Land use "Ha"					Land use "ha"					Total			
	Type	During mining 35th year Stage	End of Life (OC 28th Year)	Agricultural Land	Water Plantation	Public Use/ Company use	Forest Land (Re-tamed)	Undisturbed	Total	Agriculture Land		Water Plantation	Public Use (Re-tamed)	Undisturbed
Tenary	i	Excavation Area	1747.06	2440.55										
	ii	Backfilled Area	673.05	2105.49	2261.751			178.799		2440.55	2261.751		178.799	3440.55
	iii	Excavated Void	1074.01	331.06						0				0
	iv	Top Soil Dump												0
	v	Water Body	5.2	5.2			5.2			5.2		5.2		5.2
	vi	Road								0				0
Govt non Forest		External Dump	150.5						0					0
		Safety Zone 7.5m (Green Belt)							0					0
		Hoal Road							0					0
		Between Quarries							0					0
Govt non Forest		Road Diversion							0					0
		kelo River	15.42	15.42					15.42			15.42		15.42
		Approach Road and diversion	30.3	30.3					30.3			30.3		30.3
		Settling Pond	5	5					5			5		5
		Infrastructure area	50.94	50.94	9				50.94	45.94		5		50.94
		Office and workshop	68.54											0
		Reforestation Area							0					0
		Garland Drain							0					0
		Embankment							36.07					36.07
		Water Reservoir	36.07	36.07						0				0
Forest		UG Entry							0					0
		Undisturbed / mining right for UG	629.45	0					0					0
			2583.48	2583.48	2266.751		15.42	36.44	214.869	0	2583.48	15.42	40.5	214.869
Free Hold														0
Total														2583.48



Note: * Top soil dump of 60 Ha. was over the coal bearing area before 10th year after which it reduced to zero by 15th year as area under it was excavated, the topsoil in subsequent years was stacked over the backfilled area
** Surface water reservoir in facilities area measuring 5.0 Ha will be backfilled in the post mine closure stage (OC+UG combined)
*** Surface dump will be rehandled from 7th year to 20th year and area below it excavated
#. Green Belt of 36.07 ha = 23.63 ha along Kelo river 45 m west side and 15 m east side + 12.44 ha over 7.5 m along ML boundary
During post mine closure plan period, agriculture is proposed instead of plantation over the rehandled crown dump area as well as over the backfilled area obtained as a result of reducing the void except over 214.869 ha including the crown dump of 138 ha which will be left for forest use as in pre-mining scenario.

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Maharashtra State Power Generation Co.Ltd.
Prakashgad, Prof.Anant Kanekar Marg,
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Tel.Nos.022-26472131/ 4211

CIN U40100MH2005SGC153648

Ref.No.:- MSPGCL/CS/BM-204/204.11

Date: 03.08.2021

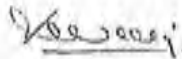
Copy of Resolution passed by Board of Directors of MSPGCL in the BM held on 23.07.2021

Item no 204.11: Approval for authorization of Executive Director (Garepalma) as Authorized Person /Authorized Signatory for Gare Palma Sector II coal Block Mahaganwadi coal Block, Chendipada I& II (CUM) and Bhivkund Coal Block

Resolution no. 2021/3413: The Board considered the note submitted by CE (coal) on the subject. After deliberation, the Board approved as under

The Board authorized Executive Director (Gare Palma) as authorized person/ authorized signatory for:

1. Signing & submission of all applications, affidavits and to do all such acts, deeds and things as are necessary or required in connection with or related to Gare Palma Sector II Coal Block, Mahaganwadi Coal Block, Chendipada I & II (UCM) and Bhivkund Coal Block
2. Matters related to MDO Gare Palma Sector II Coal Mine viz. Coal Mine Agreement and its amendment, etc.



Company Secretary
MSPGCL







F. No. 34011/23/2019-CPAM
Government of India
Ministry of Coal

Shastri Bhawan, New Delhi
The 16th May 2020

Office Memorandum

Subject: Guidelines for Preparation, Formulation, Submission, Processing, Scrutiny, Approval and Revision of Mining plan for the coal and lignite blocks.

Undersigned is directed to state that the guidelines for formulation of Mining plan and Mine Closure Plan has been amended. It has been decided by the Government that all coal (including lignite) mining operations in India shall henceforth be governed as per modified guidelines enumerated below:

1. Mining Plan: All coal (including Lignite) mining operation in India shall henceforth be governed as per these modified guidelines listed below and henceforth, the Mine Closure Plan and Final Mine Closure Plan shall be integral part of Mining Plan. Separate approval of Mine Closure Plan/ Final Closure Plan has been done away with. The Guideline/formal for formulation of Mining plan is enumerated at Appendix - I.
- 1.1. Implementation of the approved Mining Plans shall be sole responsibility of the mine owner. Mining operations shall be undertaken in accordance with the duly approved mining plan. The mining plan once approved shall be valid for the balance life of the Mine, provided that any modification(s) of the mining plan is approved by the competent authority and such approval of the modified mining plan shall remain valid for the estimate balance life of the mining plan. Modification of the approved mining plan during the operation of a mining lease also requires prior approval.
- 1.2. The mining plan shall cover prescription for different phases of life of the mine as stage plan. The Stage plan for 1st year, 3rd year, 5th year, year of achieving rated capacity of the mine, Final year (i.e. at the end of mine life) and post closure shall be submitted at the time of initial submission of mining plan. The project proponent shall submit a report/information consisting a. compliance status with respect to approval condition of mining plan and grounds specified at para 1.3A; b. stage plan for next five years; c. revised balance life of the mine; and d. revised calculation of ESCROW amount with respect to revised balance life, to Coal Controller, CCO, Kolkata with a copy of the same to Administrative Section dealing with the allocation/allotment of the block and section dealing with approval of mining plan at MoC/CCO, for information. Such report/information must be submitted at least 180(one hundred eighty) days before the expiry of 5 (five) year, starting from the commencement of the Mineral Concession (Amendment) Rules, 2020 or the date of execution of the duly executed mining lease deed, whichever is later. Information desired above must bear certificate of Qualified Person/Accredited Mining Plan preparing Agency and have approval of the respective company board. Non submission of such information during the stipulated time may result in withdrawal of mine opening permission or cancellation of the approved mining plan, as may be decided by CCO.
The Mining Plan approved prior to issue of this Guideline will qualify for submission of such report/information at least 180(one hundred eighty) days prior to expiry of 5 (five) year from the date of notification of the Mineral Concession Amendment Rules 2020.
- 1.3.(A) The mining plan may be modified for a. for change in method of mining; b. for facilitating increase in sanctioned peak capacity that is in excess of one hundred and fifty per cent of the



sanctioned rated capacity; e. change in leased area; d. in the interest of safe and scientific mining; e. conservation of minerals; f. for the protection of environment; g. addition of reserve by way of proving of reserve in the existing lease area; h. for changes in final mine closure conditions; or i. and such other change that may be determined by the Central Government. While submission of revision/ modification of mining plan the reason for revision/ modification shall be specified in writing by the lessee.

- (B) Notwithstanding anything contained in clause (A) above, for other minor changes, the project proponent is empowered to make modification with the approval of the respective company board. These minor changes shall cover a. changes in land type within the leased area; b. changes in HEMM deployment plan; and c. changes in location of infrastructure within the leased area. The project proponent shall submit specific report of such minor changes to Coal Controller, CCO, Kolkata with a copy of the same to Administrative Section dealing with the allocation/allotment of the block and section dealing with approval of mining plan at MoC/CCO, for information.
- 1.4. The Mining Plan submitted for approval shall have prior approval of the concerned Board of the Company.
- 1.5. The base date of the Mining Plan should be taken as cut-off date on which the extractable reserve, balance life etc. has been quantified.
- 1.6. The proposed leased area in the Mining Plan shall include the area specified in the mining lease within which mining operations can be undertaken and includes the non-mineralized area required and approved for the activities falling under the definition of mine as referred in The Mines Act 1952. Evacuation route, R&R and Employee Township area outside the block will not be part of the Mining plan.
- 1.7. Pre-mining land ownership/land type furnished in the mining plan will be of indicative in nature along with data source at its footnote (viz. from topo sheet, cadastral plan etc.).
- 1.8. The excavation/ mining area envisages in the mining plan must be restricted within the allotted/vested geological block boundary/existing mining lease and if the project area is confined within the allotted block boundary/existing mining lease, a certificate to this effect is to be provided by the Qualified Person/ Accredited Mining Plan preparing Agency preparing the mining plan. The certificate must be made on the Conceptual Plan depicting Cardinal Point Co-ordinates (shape co-ordinates) of the project boundary, Lease boundary and Geological Block boundary (binding co-ordinates given in the vesting order).
- 1.9. Under provisions of Rule 16 of MCR 1960, State Government is custodian of the exploration data. As such in the cases, where the project area extends beyond the block boundary/existing mining lease the Mines and Geology Department of the concerned State Government shall issue a certificate specifying (a) intent of the State Government for grant of lease beyond the vested geological boundary; (b) non-existence of coal/ lignite in the area beyond the vested/allotted geological block boundary/existing mining lease to rule out the issue of encroachment. The application for issue of certificate from the Mines and Geology Department of the State Government must be supported with proof of the non-existence of coal/lignite in the area under reference (along with their Cardinal Point coordinates) duly certified by custodian agency viz. CMPDIL/ SCCI, in case of coal and NLCIL, in case of lignite.
- Where the project area extends beyond the block boundary/existing mining lease, the certificate issued by the Mines and Geology Department of the concerned State Government must be attached in the Mining Plan.
- 1.10. In case of allotted/auctioned coal/lignite blocks, the mining plan may be revised for extraction of more coal on year to year basis.
- Provided that the mining plan shall be revised for extraction of less coal on year on year basis only under following circumstances: a. If the remaining extractable reserve of the coal mine is less than



3(three) times of the rated Capacity of the current Approved Mining Plan; b. Change in method of mining from Opencast to Underground necessitated due to change in geo-mining conditions. However, revision of Mining Plan for extraction of less coal would be subject to prior approval of the Nominated Authority.

- 1.11 The approval of the revised Mining Plan shall not result in changes in the terms and conditions or efficiency parameters mentioned in the CMDPA Allotment Agreement signed at the time of allotment/vesting for the auctioned/allotted blocks without prior approval of the nominated authority or Central Government, as the case may be. However, efficiency parameters mentioned in the CMDPA/Allotment Agreement shall be linked to the rated capacity of the mine.
- 1.12 The project proponent shall envisage the action plan for exploration and liquidation of the balance reserve yet to be projectised.
- 1.13 The project proponent shall take all necessary precautions regarding safety of mine workings and persons deployed therein and shall adhere to all the statutory clearances with regards to safety.
- 1.14 Proposed project area envisaged in the mining plan shall not encroach into any other adjacent coal block unless permitted to do so by the Ministry of Coal in writing.
- 1.15 The approval of the Mining Plan is without prejudice to the requirement of approvals from competent /prescribed authority under the relevant rules/ regulations etc.
- 1.16 The project proponent shall submit an undertaking that the mine shall be operated as per the Environment Clearance (EC) & Forestry Clearance (FC) for the project.
- 1.17 **Statutory Obligation:** The legal obligations, if any, which the lessee is bound to implement, like special conditions imposed while execution of lease deed, approval of Mining Plan, conditions imposed by the Ministry of Environment, Forest and Climate Change (MoEF&CC), Central Pollution Control Board (CPCB), State Pollution Control Board (SPCB), Directorate General of Mines Safety (DGMS) or any other organizations describing the nature of conditions and compliance positions thereof, should be indicated in the Mining Plan.
2. **Mine closure Plans:** Mine Closure Plans will have two components viz. i) Progressive or Concurrent Mine Closure Plan, and ii) Final Mine Closure Plan. Progressive Mine Closure Plan would include various land use activities to be done continuously and sequentially during the entire period of the mining operations, whereas the Final Mine Closure activities would start towards the end of mine life, and may continue even after the reserves are exhausted and/or mining is discontinued till the mining area is restored to an acceptable level. The Mine closure details of the Mining Plan should be oriented towards the restoration of land back to its original as far as practicable or further improved condition.
- 2.1 Mining is to be carried out in a phased manner along with reclamation and afforestation work in the mined-out area.
- 2.2 Progressive mine closure plan shall be prepared for a period of every five years from the beginning of the mining operations. These plans would be examined periodically in every five years period and to be subjected to third party monitoring by the agencies approved by the Central Government, like Central Mine Planning and Design Institute Ltd. (CMPDIL), National Environmental Engineering Research Institute (NEERI), Indian Institute of Technology (IIT-ISM) or any other institutes/ organizations/ agencies specified from time to time for the purpose.
- 2.5 Various project specific activities viz. mined-out land details & their technical and biological restoration plan, water quality management, infrastructure to be retained and demolished, disposal of mining machinery, etc. shall be furnished in the relevant paras. Where the backfilling of the mine void is being carried out as part of regular mining operation, it shall not be included in the list of progressive mine closure activities. However, in case, where the backfilling of mine void is to be carried out specifically for closure of the mine, quantum of such overburden and the mine closure fund earmarked for the purpose must be included in the list of activities to be taken up for mine closure in the mining plan at the time of submission itself.



- 2.4. The Government may at any time before the closure of mine require certain activities to be included in the mine closure plans, which it may consider necessary for the safety and conservation of environment, or in compliance with any modification/ amendment in the relevant legislation.
- 2.5. **Abandonment cost:** The total cost for carrying out such activities shall be estimated for assessment of abandonment cost of the mine involving progressive and final mine closure activities such as barbed wire fencing all around the working area, dismantling of structures/demolition and cleaning of sites, rehabilitation of mining machinery, plantation, physical/biological reclamation, landscaping, biological reclamation of left-out overburden dump, filling up of de-coated void, post environmental monitoring, supervision charges, power cost, protective and rehabilitation measures including their maintenance and monitoring, miscellaneous charges etc. for the specified post closure period.
- 2.6. **Escrow Account Calculation:** In August 2009 it was estimated that typically closure cost for an opencast mine was around rupees six lakhs per hectare of the total project area and rupees one lakh per hectare for underground project area at the-then price level. Accordingly vide letter dated 7th January 2013 a guideline for mine closure was issued which needed modification in these rates based on the wholesale price index (WPI) as notified by Government of India from time to time while preparing the Mining plan and Mine Closure Plan. The escalated rate (based on the current base year i.e. 01.04.2019) is Rupees Nine Lakh per hectare in opencast and Rupees one lakh fifty thousand per hectare for underground Mine. These rates will be considered as Base Rate to be applicable from 01.04.2019, which may change as specified from time to time by the Government of India.
- [Exemplary Calculation: (Rs 6 lakhs x 1.561 linking factor for base year 2004-05 x WPI 121.1 as on April 2019) / (WPI as on August 2009)] = Rupees 8.75 lakh, rounded to Rupees 9 (nine) lakhs per hectare in case of Opencast project.*
- Henceforth, these rates will stand modified based on the wholesale price index (WPI) as notified by Government of India from time to time. Annual closure cost is to be computed considering the total project area of the mine multiplied by escalated rate (at the above mentioned rates) and dividing the same by the balance life of the mine in years. An amount equal to the annual cost is to be deposited each year throughout the mine life compounded @5% annually.
- [For example if the annual cost works out to Rs 100, then in the first year the amount to be deposited will be Rs 100, in the second year $100 \times (1 + 5\%)^1$, in the third year $100 \times (1 + 5\%)^2$ and so on.]*
- Further, in case of the mine, where escrow account is already open, the annual closure cost is to be computed considering the total project area at the above mentioned rates minus the amount already deposited and dividing the same by the balance life of the mine in years and annual cost as arrived should be compounded @5% annually.
- 2.7. **Financial Assurance:** The Mining Company/ Mine Owner as a part of Financial Assurance will open a Fixed Deposit Escrow account, with the Coal Controller Organization (on behalf of the Central Government) as exclusive beneficiary prior to commencement of any activities on the land/project area of the mine and shall submit the same to Coal Controller Organization (CCO) before the permission is given for opening the mine. The mining company shall cause the payment to be deposited at the rate computed as indicated at Para 2.6. The owner of the company may select the Schedule Bank where the Escrow account is to be opened and inform the same to the Coal Controller, CCO, Kolkata.
- 2.8. Coal Controller, Kolkata shall get the WPI (used for escalation of closure cost at the time of formulation of Mining plan) updated, at the time of opening of Escrow account. The mine owner/ company including all public/ private sector companies shall deposit the yearly amount in a Schedule Bank in accordance with Para 2.6. Coal Controller, Kolkata shall also get the



information, submitted under to para 1.2, verified and get the yearly closure cost modified with respect to the latest WPI in accordance with para 2.6.

- 2.9. Final Mine Closure: The details of the Mining Plan (covering Final Mine Closure Plan envisaging the details of the updated cost estimates for various mine closure activities and the Escrow Account already set up, shall be submitted in the approving authority for approval at least five years before the intended final closure of the mine.
- 2.10. Final Mine Closure would be considered to be completed only after acceptance of the third-party audit report by the Coal Controller on the compliance of all provisions of Mine Closure Plan. Any Institute/Organization/Agency as may be specified by the Government for this purpose may be engaged for Third Party audit to create a self-sustained ecosystem. Failure of restoration within the specified period may result in forfeiture of Escrow Account created as per Para 2.6 & 2.7. The details of the Final Mine Closure Plan along with the details of the updated cost estimate for various mine closure activities and escrow account already set up shall be submitted at the time of approval of final mine closure plan.
- 2.11. Time Scheduling for abandonment: The Action plan for carrying out all abandonment operations (progressive and final mine closure) should be furnished in the form of bar chart for a period of life of the mine plus post closure period. Post closure period shall be taken as 3 (three) years for Underground mines and Opencast mines having stripping ratio lesser than 6(six) MM³/Tc & 5 (five) years for mines having stripping ratio more than 6(six) MM³/Tc.
- 2.12. Implementation of the approved Mine Closure Plan shall be sole responsibility of the mine owner. Mining is to be carried out in a phased manner i.e. continuation of mining activities from one phase to other indicating the sequence of operations depending on the geo-mining conditions of the mine. Up to 50% of the total deposited amount including interest accrued in the ESCROW account may be released after every five years in line with the periodic examination of the Closure Plan as per Para 2.2. The amount released should be equal to expenditure incurred on the progressive mine closure in past five years or 50% whichever is less. The balance amount shall be released to mine owner/leaseholder at the end of the final Mine Closure on compliance of all provisions of Closure Plan. This compliance report should be duly signed by the lessee and certify that said closure of mine complied all statutory rules, regulations, orders made by the Central or State Government, statutory organisations, court etc. and certified by the Coal Controller.
- 2.13. Responsibility of the mine owner: It is the responsibility of the mine owner to ensure that the protective measures contained in the mine closure plan including reclamation and rehabilitation works have been carried out in accordance with the approved mine closure plan and final mine closure plan.
- 2.14. The owner shall submit to the Coal Controller a yearly report before 1st July of every year setting forth the extent of protective and rehabilitative works carried out as envisaged in the approved mine closure plans (Progressive and Final Closure Plans).
- 2.15. The money to be provided per hectare of total Project Area for the purpose is to be deposited every year on commencement of any development activity on the land for the mine after opening a Fixed Deposit Escrow Account prior to obtaining mine opening permission from Coal Controller. Mining company/owners including all Public Sector Undertakings shall deposit the yearly amount in a Scheduled Bank. If the Mine owners fail to deposit the required annual amount in accordance with Para 2.6, 2.7 & 2.8, the Government can withdraw the mining permission.
- 2.16. The funds so generated are towards the security to cover the cost of closure in case the mine owner fails to complete the relevant closure activities. The prime responsibility of mine closure shall always lie with the mine owner, and in case these funds are found to be insufficient to cover the cost of final mine closure including the areas covered in Para 2.3 2.6, 2.7, 2.8 & 2.9 above. The mine owner shall undertake to provide the additional fund equivalent to the gap in



funding before five years of Mine Closure falling which it may be recovered by such other methods as the competent authority may deem fit in this regard.

- 2.17. **Final Closure Certificate:** The Mine owner shall be required to obtain a mine closure certificate from Coal Controller to the effect the protective, reclamation, and rehabilitation work in accordance with the approved Mining plan covering final mine closure provisions/activities have been carried out by the mine owner for surrendering the reclaimed land to the State Government.
- 2.18. The balance amount at the end of the final Mine Closure shall be released to mine owner on compliance of all provisions of Closure Plan duly signed by the mine owner to the effect that said closure of mine complied with all statutory rules, regulations, orders made by the Central or State Government, statutory organizations, court etc. and duly certified by the Coal Controller. This should also indicate the estimated extractable coal reserves and coal actually mined out.
- 2.19. If the Coal Controller has reasonable grounds for believing that the protective, reclamation and rehabilitation measures as envisaged in the approved mine closure plan in respect of which financial assurance was given has not been or will not be carried out in accordance with mine closure plan, either fully or partially, the Coal controller shall give the mine owner a written notice of his intention to issue the orders for forfeiting the sum assured at least thirty days prior to the date of the order to be issued after giving an opportunity to be heard.

3. **Formulation of Mining Plan by Qualified Person (QP) or Accredited Mining Plan Preparing Agency (MPPA):**

- 3.1. System of granting Recognition in a person for preparation of mining plan u/s 22C of MCR 1960 & preparation of mining plan only by RQP u/s 22B of MCR 1960 shall be done away with, after commencement of the Mineral Concessions (Amendment) Rules, 2020.
- 3.2. After commencement of Mineral Concession (Amendment) Rule 2020, no mining plan shall be accepted unless it is prepared by Qualified Person (QP) or Accredited Mining Plan Preparing Agency (MPPA).
- 3.3. Quality Council of India (QCI) or National Accreditation Board for Education and Training (NABET) shall be engaged for accrediting following entities:
- (i) Accredited Prospecting Agency (APA) for undertaking prospecting operations and preparation of geological reports for Coal and Lignite Mines, and
 - (ii) Mining Plan Preparing Agency (MPPA) for preparation of mining plan (for Coal, Lignite Mines and Sand for Stowing)
- 3.4. The Quality Council of India (QCI) or National Accreditation Board for Education and Training (NABET) shall grant accreditation in accordance with such standards and procedures as specified in schedule VI of Mineral Concession (Amendment) Rule 2020.
- 3.5. Qualified Agency (QP) or Mining Plan Preparing Agency (MPPA) who prepares mining plan for a block/mine, shall have recognition from the concerned company board that the qualification of the QP or accreditation of the MPPA has been duly verified and is in line with the relevant provision of the MCR 1960.

4 **Submission, Processing and Scrutiny of Mining Plan**

- 4.1 On and from the date of publication of order and upto the expiry of period of nine months from the commencement of the Mineral Concession (Amendment) Rules, 2020, every mining plan submitted for approval/modification shall be accompanied with a non-refundable application fee specified from time to time in this regard, for the project area specified in the mining plan.
- 4.2 On and from the expiry of period of nine months from the commencement of the Mineral Concession (Amendment) Rules, 2020, every mining plan submitted for approval/modification



shall be accompanied with a non-refundable application fee specified from time to time in this regard, for the project area specified in the mining plan and peer expert review done by any accredited mining plan preparing or reviewing agency at their (applicant's) own cost. During examination of the Mining Plan by the internal committee of MoC, if it is felt that a review by expert or by specialized agency is required, the committee may recommend referring the mining plan to such expert/agency with the approval of the MP approving authority. Charges for the expert review shall be borne by the applicant.

- 4.3 All pages (including cover page, plates and Annexures) shall bear the signature & stamp furnishing details of the QP/Accredited Mining Plan preparing Agency (MPPA) in physical mode of submission and e-signature/digital signature during the online system of submission.
- 4.4 Ministry of Coal is in process of development of on-line portal for submission and approval of mining plan, system of acceptance of Physical copy shall be continued till the development/operationalization of online portal for submission and approval of mining plan.
- 4.4.1 **Submission to Physical Copy Mining Plan to Ministry of Coal:**
- 4.4.1.1 The project proponent shall submit one soft copy and four hard copies of Mining Plan (draft)- one each to the concerned Administrative Section of the Ministry of Coal for the concerned block, Section of MoC/CCO dealing with approval of Mining plan, Coal Controller, CMPDIL/ Extended office of CCO & the dispatch receipt of the speed post (confirming that the draft Mining Plan has been sent). The contact details and correspondence address of the section dealing with the approval of Mining plan, administrative section for the mine, members of the committee etc, shall be updated time to time, on the website of the Ministry of Coal/Coal Controller Organisation.
- 4.4.1.2 The project proponent shall incorporate the observation (if any) and submit the mining plan (after incorporating the compliance to the observation) to section of MoC/CCO dealing with approval of Mining plan, concerned administrative section of the Ministry of Coal, Coal Controller and CMPDIL/ Extended office of CCO.
- 4.4.1.3 **Submission of Mining Plan (after incorporating compliance) to Ministry of Coal:** The project proponent shall submit 04 (four) hard copies & 01 (one) soft copy of modified Mining Plan and the compliance to the observations along with copy of the dispatch receipt of the Speed Post (confirming that the modified Mining Plan has been sent to section of MoC/ CCO dealing with approval of Mining Plan, concerned administrative section of the Ministry of Coal, Coal Controller, and CMPDIL/ Extended office of CCO).
- 4.4.1.4 The procedure of submission at Para 4.3.1 will be replaced by process of submission at para 4.3.2 on development of portal for online submission and approval of Mining Plan.
- 4.4.2 **Online System of Submission of Mining Plan for Approval:**
- 4.4.2.1 Project proponent shall register online, using registered official mail ID.
- 4.4.2.2 For the purpose of preparation of Mining plan through a QP or MPPA, project proponent shall share a temporary login with QP/MPPA. This temporary login shall be valid till the preparation and approval of mining plan only.
- 4.4.2.3 The QP/MPPA shall upload the Mining plan through the temporary login and submit it to the project proponent; QP/MPPA once submits the mining plan to the project proponent, he shall not be able to modify.
- 4.4.2.4 The Project Proponent shall make payment of processing charges/fees online as specified from time to time by Ministry of Coal.
- 4.4.2.5 The Project Proponent shall after incorporating relevant company board approvals submit the mining plan to the Approving Authority; The mining plan submitted to approving authority shall become visible to Administrative Section for the respective block, section of MoC/CCO dealing



with approval of Mining plan, members of the Internal Committee, Coal Controller, CMPDIL, Extended office of CCO, simultaneously. System of SMS alerts shall be available at all stages:

- 4.4.2.6 Observations of the Committee Members shall be uploaded online and the project proponent shall also submit Mining Plan, after incorporating compliance, online

5 Scrutiny & Processing of Mining Plan

- 5.1.1 The current system of getting the mining plan scrutinized through CMPDIL, Ranchi shall continue. Ministry of Coal is in process of creating an extended office of Coal Controller Organization at Delhi which shall be delegated with the work of processing and scrutiny of mining Plan. A letter to this effect shall be issued separately.
- 5.1.2 CMPDIL/Extended office of CCO at Delhi shall scrutinize the mining plan and submit comments to section of MoC/CCO dealing with approval of Mining plan within Fifteen (15) days of receipt of the Mining Plan. Non-submission of comments within the stipulated time may be presumed as "no comment" from CMPDIL/Extended office of CCO; CMPDIL/ Extended office of CCO at Delhi, if consider necessary to make a physical verification of the site/site visit for scrutiny of the mining plan, may make such site visit/physical verification of the site, however, no relaxation in the time line as specified above may be given.
- 5.1.3 Administrative Section of the Ministry of Coal (dealing with the block) shall scrutinize the mining plan with respect to Vesting order/ allotment order and CMPDPA signed with allottee at the time of allotment and submit observations to section of MoC/CCO dealing with approval of Mining plan (till the development of portal for Mining plan approval) within Fifteen (15) days of receipt of the Mining Plan. Non-submission of comments within the stipulated time may be presumed as "no comment" from the administrative section:
- 5.1.4 Members of the Internal Committee shall examine the mining plan from Technical and administrative angle based on the observations of the Administrative Section (dealing with the respective block) and CMPDIL/Extended office of CCO and the peer/expert review report submitted with the mining plan and submit observations to section of MoC/CCO dealing with approval of Mining plan (till the development of portal for Mining plan approval) within Fifteen (15) days of receipt of the Mining Plan. Non-submission of comments within the stipulated time may be presumed as "no comment" from the administrative section. Members of the internal committee, CMPDIL/Extended office of CCO may raise observation twice only. The observation raised shall be communicated directly to the project proponent for incorporating the same in the mining plan. The project proponent shall make presentation in the meeting of the internal committee for scrutiny.
- 5.1.5 Section of MoC/CCO dealing with approval of Mining plan shall communicate the observation (if any) to the project proponent for compliance till the development of online system for submission, processing, and approval of mining plan.
- 5.1.6 Subsequent to development of online portal for submission, processing, and approval the observations of the internal committee members shall be uploaded directly on the portal, which will be visible to the project proponent. A timeline of 15 days shall be available for the internal committee members to upload the comments. Non-submission of comments within the stipulated time may be presumed as "no comment".

6 Timeline for submission of Compliance:

Once the observation of the Scrutiny of the mining plan is communicated either in hard copy, mail or online, the Project Proponent is required to submit the mining plan after incorporating the compliance to the observation within a period of 15 days of the communication, failing which the mining plan submitted for approval shall be rejected.

Provided that any such application may be entertained after the said period of 15 Days, if the applicant satisfies the approving authority that he had sufficient cause for non-submission of mining plan (after incorporating the compliance) in time. However, in any case this period may not be extended beyond 30 days from the date of receipt of communication of the observation.



7 Approving Authority:

- 7.1 On and from the date of publication of order and up to the expiry of period of nine months from the commencement of the Mineral Concession (Amendment) Rules, 2020, the powers to approve mining plan for all categories of coal and lignite mines and sand for stowing shall be exercisable by Project Adviser, Ministry of Coal.
- 7.2 On and from the expiry of period of nine months from the commencement of the Mineral Concession (Amendment) Rules, 2020, the power to approve mining plan for all categories of coal and lignite mines including sand for stowing shall be exercisable by the Coal Controller, CCO, Kolkata, a subordinate office of Government of India in the Ministry of Coal.
- 7.3 The person delegated to approval of Mining Plan under sub-section (1) of section 26 read with clause (b) of sub-section (2) of section 5 of the Mines and Minerals (Development and Regulation) Act, 1957 (67 of 1957) (hereinafter, the 'Act') may seek help of an internal committee constituted for the purpose.
- 7.4 The approving authority shall dispose of the application for approval of the Mining Plans within a period of 30 days from the date of receiving of such application (The Mining Plan received on or before 30th of Current Month will be considered in the ensuing meeting). Provided that the aforesaid period of 30 days shall be applicable only if the Mining Plan is complete in all respect, and in case of any modifications subsequently suggested after the initial submission of the Mining Plan for approval, the said period shall be applicable from the date on which modified mining plan is re-submitted.

8 Internal Committee for Scrutiny of Mining Plan:

- 8.1 Members of the Internal Committee shall examine the mining plan from Technical and administrative angle based on the observations of the Administrative Section dealing with the respective block & CMPDIL/ Extended office of CCO.
- 8.2 The internal committee shall recommend the mining plan for "Approval" or "Rejection". In case of recommendation for Rejection, the committee shall record the reason for Rejection.
- 8.3 Till the opening of CCO office at Delhi, the internal committee shall consist of:
1. Director (Technical), MoC, Member Secretary
 2. Director/ Deputy Secretary, MoC of the section dealing with the allocation/allotment of the respective block, Member
 3. Coal Controller or his representative, Member
 4. Director level officer of CMPDIL, Member
 5. Director/Deputy Secretary, Nominated Authority, Member
- 8.4 After opening of CCO office at Delhi, the internal committee shall consist of:
1. Director level officer of CCO having relevant working experience., Member
 2. Director/ Deputy Secretary of the section dealing with the respective block, Member
 3. Head of Regional Coal Controller Office (having relevant working experience in mine planning), CCO Regional Office New Delhi, Member Secretary
 4. Any other technical person having working experience of not less than 15 (fifteen) years in mine planning, Member

9 Communication of Approval:

- 9.1 In case of allotted/auctioned mine, section dealing with approval of Mining Plan shall communicate the decision of the approving authority within a period of 5 (five) working days in form of a letter confirming "in-principle approval" of the Mining Plan to the project proponent



with a copy of the same to the Nominated Authority, Govt. of India. Final approval of the Mining Plan in such cases shall be communicated by the section dealing with approval of Mining Plan, only on receipt of applicable payments and its confirmation from the Nominated Authority, Govt. of India.

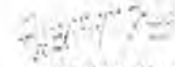
9.2 While for mines other than auctioned/allotted mines, section dealing with approval of Mining Plan shall communicate the decision of the approving authority within a period of 5 working days.

10 Revision:

10.1 Any person aggrieved by any order made or direction issued in respect of mining plan by an officer competent to approval mining plans shall within 30 days of the communication of such order or direction, apply to the Secretary (Coal), Ministry of Coal for a revision of such order or direction thereon.

10.2 On receipt of any application for revision the authority shall give the aggrieved person a reasonable opportunity of being heard and may within 30 days confirm, modify or set aside the order or direction and his decision thereon shall be final.

11 This Guideline supersedes the previous orders and are without any prejudice to any other relevant rules and regulations, such as those issued by the State Governments, Ministry of Environment, Forest and Climate Change, Ministry of Labour and Employment, etc.



(Hitar Singh)

Under Secretary to the Government of India

To,

All the existing Coal and Lignite block allocates

Copy to: -

1. All Joint Secretaries, MoC.
2. Coal Controller, Coal Controller's Office, 1- Council House Street, Kolkata.
3. CMD, CIL, Newtown, Rajarhat, Kolkata-700156, W.B
4. CMD, NLCIL, Cuddalore, Dist. Neyveli-607801 (Tamil Nadu).
5. CMD, Singareni Collieries Company Limited (SCCL), Kothagudem Collieries, Khammam Dist (A.P).
6. Tech. Director (NIC) - with the request to place it to Website of the Ministry of Coal.



File No. 8-06/2022-FC
Government of India
Ministry of Environment, Forest and Climate Change
(Forest Conservation Division)

Indira Paryavaran Bhawan,
Jorbagh Road, Aliganj,
New Delhi - 110003.
Dated: 2nd June, 2022

To
The Principal Secretary (Forests),
Government of Chhattisgarh,
Mahanadi Bhavan,
New Raipur (CG).

Sub: Proposal for non-forestry use of 214.869 ha of forest land in favour of M/s Maharashtra State Power Generation Company Limited (MAHAGENCO) for Gare Pelma Sector -II Opencast Coal Mining Project in the Mand Raigarh Coalfield, in District Raigarh (Chhattisgarh) – reg.

Sir,

I am directed to refer to the Government of Chhattisgarh's letter no. F-5-26/2021/10-2 dated 19.04.2022 on the above subject seeking prior approval of the Central Government under Section 2 of the Forest (Conservation) Act, 1980 and letter no. Bhu-Praband/Khanij/331-245/1025 dated 10.05.2022 forwarding additional information as sought by the Ministry vide its letter of even number dated 22.04.2022 and to say that the proposal has been examined by the Forest Advisory Committee constituted by the Central Government under Section - 3 of the aforesaid Act.

After careful examination of the proposal of the State Government and on the basis of the recommendations of the Forest Advisory Committee, and approval of the same by the competent authority of the MoEF&CC, New Delhi, the Central Government hereby accords approval for non-forestry use of 214.869 ha of forest land in favour of M/s Maharashtra State Power Generation Company Limited (MAHAGENCO) for Gare Pelma Sector -II Opencast Coal Mining Project in the Mand Raigarh Coalfield, in District Raigarh (Chhattisgarh) subject to fulfilment of the following conditions:

A. Conditions which need to be complied prior to handing over of forest land by the State Forest Department and compliance is to be submitted prior to Stage-II approval

1. Compensatory Afforestation:

- i. The Compensatory afforestation over equivalent non-forest land, shall be raised by the State Forest Department at the project cost. At least 1000 saplings per ha shall be planted over admissible CA land. If this not possible to plant these many seedlings in the identified NFL, the balance seedlings will be planted in degraded forest land as per the prescription of the Working Plan at the cost of the User Agency. Detail of such degraded forest land proposed for afforestation of surplus trees shall be submitted to the Ministry before Stage-II approval along with afforestation scheme, suitability



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- certificate, KML files, etc. In such cases CA cost will be revised and duly approved by the competent authority and deposited online in the CAF managed by the CAMPA;
- ii. 25% of the CA cost additionally will be spent towards soil and moisture conservation activities in the proposed CA area as per site requirement and deposited in CAF;
 - iii. The cost of compensatory afforestation at the prevailing wage rates as per compensatory afforestation scheme and the cost of survey, demarcation and erection of permanent pillars, if required on the CA land, shall be deposited in advance with the Forest Department by the user agency. The CA will be maintained for 10 years. The scheme may include afforestation of indigenous species with appropriate provision for anticipated cost increase for works scheduled for subsequent years;
 - iv. The non-forest land identified for CA shall be transferred and mutated in favour of the State Forest Department and subsequently notified by the State Government as RF under Section - 4 or PF under Section-29 of the Indian Forest Act, 1927 or under the relevant Section(s) of the local Forest Act before Stage-II approval. A copy of the final Notification shall be submitted along with the compliance of Stage-I approval;
2. The KML files of diverted area, the CA areas, the proposed SMC treatment area and the WLMP area shall be uploaded on the e-Green watch portal with all requisite details prior to Stage II approval;
 3. The User Agency shall transfer online, the Net Present Value (NPV) of the forest land being diverted under this proposal, as per the guidelines issued by this Ministry vide its letters No. 5-3/2011-FC (Vol.) dated 06.01.2022 read with letter dated 22.03.2022. The requisite funds shall be transferred through online portal into National Authority (CAMPA) account of the State Concerned; new NPV guidelines;
 4. Compensatory levies to be realized from the User Agency under the project shall be transferred/ deposited, through e-challan, in to the account of CAMPA pertaining to the State concerned through e-portal (<https://parivesh.nic.in/>);
 5. *Mine is located close to Kelo River flowing in the area. Numbers of mines are operational in the area which may cause threat to hydrological regime viz. Kelo river and its rivulet, therefore, a study to assess the hydrological regimes and cumulative impact of mining and industrial activities being undertaken in the GarePelma area, on the hydrological regimes of area shall be undertaken in consultation with the Water Resource Department and the same shall be submitted along with considered opinion of Water Resource Department of the State before Stage-II approval. Recommendation to be made in the study shall be implemented by the State from the funds to be realized from the agencies, on pro rata basis, working in the area. The user agency shall also keep adequate area, as per the guidelines of DGMS (Director General of Mine Safety), along the bank of River Kelo as intact and no mining should be carried out in this area. Embankment should be constructed to ensure protection of river and its hydrology from the mining.*
 6. *A Soil and Moisture Conservation (SMC) work plan to mitigate the impact of the proposed mining activity on the local rivulets (nallah) shall be prepared by the user agency in consultation with the State Forest Department and the same shall be submitted along with Stage-I compliance. Cost of implementation of the provisions of the said Plan will be deposited into the*



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CAMPA and the same shall be intimated to the Ministry before Stage-II approval.

7. Final Mining Plan, after rectifying the detail of forest area involved in the mining leases and being approved under the Forest (Conservation) Act, 1980, shall be submitted to the Ministry before Stage-II approval.
8. Area of green belt proposed by the user agency should be increased to cover maximum possible area under the green belt in the lease area of the agency and a report containing the detail of areas proposed to be kept as green belt should be submitted before Stage-II approval.
9. Following activities, as per approved plan / schemes, shall be undertaken in the lease area by the User Agency under the supervision of the State Forest Department. Approved scheme/plan shall be submitted to the Ministry along with compliance of Stage-I approval:
 - i. Mitigative measures to minimize soil erosion and choking of stream shall be implemented within a period of three year with effect from the issue of Stage-II clearance in accordance with the approved Plan in consultation with the State Forest Department.
 - ii. Planting of adequate drought hardy plant species and sowing of seeds, in the appropriate area within the mining lease to arrest soil erosion in accordance with the approved scheme;
 - iii. Construction of check dams, retention /toe walls to arrest sliding down of the excavated material along the contour in accordance with the approved scheme;
 - iv. Stabilize the overburden dumps by appropriate grading/benching, in accordance with the approved scheme, so as to ensure that angles of repose at any given place is less than 28°; and
 - v. No damage shall be caused to the top-soil and the user agency will follow the top soil management plan.
10. User agency either himself or through the State Forest Department shall undertake gap planting and soil & moisture conservation activities to restock and rejuvenate the degraded open forests (having crown density less than 0.40), if any, located in the area within 100 meter from outer perimeter of the mining lease. The plan for plantation and SMC activities will be prepared and submitted to MoEF &CC before Stage-II Clearance;
11. The User Agency shall prepare a list of existing village tanks and other water bodies with GPS co-ordinates located within five km from the mine lease boundary. This list is to be duly verified by the concerned Divisional Forest Officer. The User Agency shall regularly undertake desilting of these village tanks and other water bodies so as to mitigate the impact of siltation of such tanks/water bodies. A detailed approved plan for desilting of identified ponds and water bodies to be prepared in consultation with forest department and shall be submitted to MoEF & CC before Stage-II approval;
12. **Safety Zone Management:** Following activities, at project cost, shall be undertaken by the user agency for the management of safety zone as per relevant guidelines issued by the Ministry's guidelines:
 - i. User agency shall ensure demarcation of safety zone (7.5 meter strip all along the inner boundary of the mining lease area), and its fencing, protection and regeneration by erecting adequate number of 6 feet high RCC boundary pillars



- inscribed with DGPS coordinates with barbed wire fencing and deploying adequate number of watchers under the supervision of the State Forest Department;
- ii. Boundary of the safety zone of the mining lease, adjacent to habitation/roads, should be properly fenced by the user agency;
 - iii. Safety zone shall be maintained as green belt around mining lease and to ensure dense canopy in the area, regeneration shall be taken up in this area by the user agency at project cost under the supervision of the State Forest Department;
 - iv. Afforestation on degraded forest land to be selected elsewhere, measuring one and a half times the area under safety zone, shall also be done at the project cost under the supervisions of the State Forest Department. The degraded forest land (DFL) so selected will be informed to the MoEF & CC with shape files before Stage-II approval and afforestation will be done within three years from the date of Stage-II clearance and maintained thereafter in accordance with the approved Plan in consultation with the State Forest Department; and
 - v. The State Government and the user agency shall ensure that safety zone is maintained as per the prescribed norms;
13. The cost of felling of trees shall be deposited by the User Agency with the State Forest Department;
14. *Elephant/Wildlife Management Plans should be revised and prepared keeping in view the locality factors, occurrence of wildlife, management interventions required for areas. State Government may also get the revised Plan verified by an institute of repute. Cost of implementation of the Plan so finalized shall be deposited into State CAMPA and detail of the same along with approved Plan shall be submitted to the Ministry before Stage-II approval.*
15. State Government shall complete settlement of rights, in term of the Scheduled Tribes and Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, if any, on the forest land to be diverted and submit the documentary evidence, along with compliance of Stage-I approval, as prescribed by this Ministry's letter No. 11-9/1998-FC (Pl.) dated 03.08.2009 read with 05.07.2013, in support thereof;
16. *Proposal involves displacement from non-forest land. A copy of approved R&R plan, prepared in consonance with the R&R policy of the State, shall be submitted along with the compliance of Stage-I approval. It shall be ensured that no rehabilitation is proposed on the forest land; and*
17. The compliance report shall be uploaded on e-portal (<https://parivesh.nic.in/>).
- B. Conditions which need to be complied on field after handing over of forest land to the user agency by the State Forest Department but the compliance in form of undertaking shall be submitted prior to Stage-II approval:**
1. Legal status of the diverted forest land shall remain unchanged;



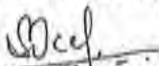
2. At the time of payment of the Net Present Value (NPV) at the present rate, the user agency shall furnish an undertaking to pay the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India;
3. Trees should be felled in phased manner as per the requirement in the approved Mining Plan with prior permission of concerned DFO;
4. The user agency shall explore the possibility of translocation of maximum number of trees identified to be felled and shall ensure that any tree felling shall be done only when it is unavoidable and that too under strict supervision of the State Forest Department;
5. The User Agency shall comply with the Hon'ble Supreme Court order on re-grassing, and re-grass the mining area and any other areas which may have been disturbed due to mining to restore them to a condition which is fit for growth of fodder, flora, fauna, etc. in a timely manner;
6. The User Agency shall undertake mining in a phased manner after taking due care for reclamation of the mined over area. The concurrent reclamation plan as per the approved mining plan shall be executed by the User Agency from the very first year, and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, in the concerned State Government and the concerned Regional Office of the Ministry. If it is found from the annual report that the activities indicated in the concurrent reclamation plan are not being executed by the User Agency, the Nodal Officer or the concern Addl. Principle Chief Conservator of Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities area satisfactorily executed.
7. Period of diversion of the said forest land under this approval shall be for a period co-terminus with the period of the mining lease proposed to be granted under the Mines and Minerals (Development and Regulation) Act, 1957, as amended and the Rules framed there-under;
8. The User Agency shall obtain the Environment Clearance as per the provisions of the Environmental (Protection) Act, 1986, if required;
9. No labour camp shall be established on the forest land and the User Agency shall provide fuels preferably alternate fuels to the labourers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas;
10. The boundary of the diverted forest land, mining lease and safety zone, as applicable, shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, distance from pillar to pillar and GPS coordinates;
11. The layout plan of the mining plan/ proposal shall not be changed without the prior approval of the Central Government and the forest land shall not be used for any purpose other than that specified in the proposal;
12. The forest land proposed to be diverted shall under no circumstances be transferred to any other agency, department or person without prior approval of the Central Government;
13. No damage to the flora and fauna of the adjoining area shall be caused;
14. The User Agency shall submit the annual self-compliance report in respect of the above stated conditions to the State Government, concerned Regional Office and to this Ministry by the end of March every year regularly;
15. Any other condition that the concerned Regional Office of this Ministry may stipulate with the approval of competent authority in the interest of conservation, protection and development of forests & wildlife; and



16. The user agency shall comply all the provisions of the all Acts, Rules, Regulations, Guidelines, Hon'ble Court Order (s) and NGT Order (s) pertaining to this project, if any, for the time being in force, as applicable to the project.
17. Violation of any of these conditions will amount to violation of Forest (Conservation) Act, 1980 and action would be taken as prescribed in para 1.21 of Chapter 1 of the Handbook of comprehensive guidelines of Forest (Conservation) Act, 1980 as issued by this Ministry's letter No. 5-2/2017-FC dated 28.03.2019.

After receipt of compliance report on fulfilment of the conditions mentioned above, the proposal shall be considered for final approval under Section-2 of the Forest (Conservation) Act, 1980. Transfer of forest land shall not be affected till final approval is granted by the Central Government in this regard.

Yours faithfully,


(Sandeep Sharma)

Assistant Inspector General of Forests

Copy to:

1. Principal Chief Conservator of Forest (PCCF) Aranya Bhavan, Sector 19, North Block, New Raipur- 492002 Chhattisgarh.
2. Regional Officer, Integrated Regional Office, MoEF&CC, Naya Raipur
3. The Addl. PCCF & Nodal Officer (FCA), Jail Road, Aranya Bhavan, Raipur.
4. User Agency
5. Monitoring Cell, Forest Conservation Division, MoEF&CC
6. Guard file.



Dr. Nitin S. Wagh
Executive Director (E&S)



Annexure-V-B



Ref: ED(E&S and GP)/GP-II/Revised Mining Plan/ **000348** Date: **11 AUG 2022**

To,
The Divisional Forest Officer (DFO),
Raigarh Forest Division,
Chandra Nagar Colony, Kelo Vihar,
Raigarh (C.G.)- 496001.

Sub: Diversion of Forest land for non-Forest purpose under Forest conservation Act, 1980 proposed for the Gare Palma Sector II coal block allocated to Maharashtra State Power Generation Company limited (Mahagenco) Coal Block is located in Mand Raigarh Coal field of Raigarh District, Chattisgarh- 214.869 ha – Reg. intimation of **submission of Revised Mining Plan after rectifying the Forest Area involve in the mining lease area submitted to CCO-Kolkata/ Delhi & Nominated Authority (MoC).**

- Ref: 1. FC Stage-I recommendation from MoEF & CC vide letter no. 8 -06/2022-FC dated 2nd June 2022.
2. Letter no. तक्र. अधि. / 3551/ 2022/ रायगढ़ Dt. 20.06.2022 from the DFO, Raigarh.
3. Mahagenco letter No ED (E&S andGP)/GPII/Mine Plan/258 dated 27.06.2022.

Dear Sir,

With reference to letter dtd. 02.06.2022 at (1) above, Ministry of Environment, Forest and Climate Change (MoEF &CC) has granted Forest Stage I clearance to Gare Palma Sector II Coal Mine subjected to the condition need to be complied before and after Forest Stage II approvals. The Conditions are segregated into two part – **Part A** condition are required to be complied prior to Forest Stage II approval, while **Part B** condition are required to be complied after FC Stage II approval. Accordingly, as per condition stipulated under Part A Point 7 of the letter dated 02.06.2022:

“Final Mining Plan, after rectifying the detail of forest area involved in the mining leases and being approved under the Forest (Conservation) Act, 1980, shall be submitted to the Ministry before Stage-II approval.”

In view of compliance to aforesaid condition, Mahagenco, vide letter dtd. 27.06.2022 under ref. (3) above, had submitted revised mine plan to CCO Kolkata/Delhi and Nominated Authority (MoC) which is acknowledged on 30.06.2022 and 01.07.2022 by CCO, Kolkata and CCO, Delhi respectively.

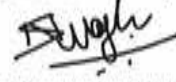
Further, in compliance to point no. 5 of the DFO, Raigarh letter dtd. 20.06.2022 under ref. (2), Mahagenco hereby submits the acknowledgment copy of the letter along with amended mine plan after rectifying the forest area involved in the mining lease, submitted to the Coal Controller-Kolkata, New Delhi and Ministry of coal, acknowledged on 30.06.2022 & 01.07.2022 respectively.



Therefore, it is requested to kindly acknowledge the fulfilment of Part A point no 7 of the FC Stage I letter. Mahagenco solicits your support in this matter and shall remain highly obliged.

With Regards,

Yours Sincerely



Executive Director (E&S and GP)

Encl: -

1. Letter of Amended Mine Plan dated 26.07.2022 with details on rectifying para in Approved Mine Plan, acknowledged by CCO, Kolkata and CCO, Delhi.

Copy s.w.r. to:

The Director (Mining), Mahagenco, Mumbai.

Copy to: -

1. M/s Gare Palma II Collieries Private Limited, 11th floor, Adani Corporate House- 1, Near Vaishnodevi Circle, S.G Highway, Ahmedabad 382421, Email:- gare.palmatwo@adani.com



Dr. Nitin S. Wagh
Executive Director (E&S)



Annexure-VI



Ref: ED(E&S and GP)/GP-II/Green Belt/ **00346**

Date: **11 AUG 2022**

To,
The Divisional Forest Officer (DFO),
Raigarh Forest Division,
Chandra Nagar Colony, Kelo Vihar,
Raigarh (C.G.)- 496001.

Sub: Diversion of Forest land for non-Forest purpose under Forest conservation Act, 1980 proposed for the Gare Palma Sector II coal block allocated to Maharashtra State Power Generation Company limited (Mahagenco) Coal Block is located in Mand Raigarh Coal field of Raigarh District, Chattisgarh- 214.869 ha – Reg. **Area of Green Belt should be increased in the leased area and details report to be submitted before Forest Stage II clearance.**

Ref: 1. FC Stage-I recommendation from MoEF & CC vide letter no. 8 -06/2022-FC dated 2nd June 2022.
2. Letter no. तक. अधि. / 3551/ 2022/ रायगढ़ Dt. 20.06.2022 from the DFO, Raigarh.

Dear Sir,

With reference to letter dtd. 02.06.2022 at (1) above, Ministry of Environment, Forest and Climate Change (MoEF &CC) has granted Forest Stage I clearance to Gare Palma Sector II Coal Mine subjected to the condition need to be complied before and after Forest Stage II approvals. The Conditions are segregated into two part – **Part A** condition are required to be complied prior to Forest Stage II approval, while **Part B** condition are required to be complied after FC Stage II approval. Accordingly, as per condition stipulated under Part A Point 8 of the letter dated 02.06.2022: -

“Area of green belt proposed by the user agency should be increased to cover maximum possible area under the green belt in the lease area of the agency and a report containing the detail of areas proposed to be kept as green belt should be submitted before stage II approval.”

In view of compliance to the aforesaid condition, Mahagenco hereby submits the details of area proposed to increase the maximum possible area under green belt in the lease area.

Detail deliberation on the green belt area within the lease area is as follows: -

Green belt will be developed along the mining lease boundary on 19.7 Ha of land on the safety zone. On 16.37 Ha. of land of Safety zone along embankment on both sides of Kelo river will be used to develop green belt. Total Green belt on 36.07 Ha land will be developed in initial 5 years of mine operation.

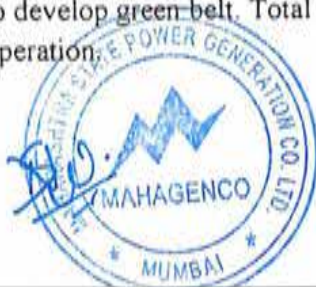


Table showing Plantation Area

Particulars	Area in ha
Along the lease boundary	19.7
Along the embankment of Kelo river	16.37
Back fill Dump area Reclamation	2025.77
Dump area Reclamation	194.76
Total Green Belt area	2256.6

In backfilled reclaimed waste dump, Green belt will be developed year wise on dump maturity which is part of progressive mining closure plan.

Year/stage wise and location wise green belt development along with bifurcation

Year	Backfilled Reclam. Area	Dump Reclam. Area	Green belt area	Total Plantation area	Backfilled area for agriculture without plantation	Dismantled area for Agriculture without plantation	Settling pond area filled for agriculture without plantation	Made Fit for agriculture in post mine closure after cutting trees	Total fit for Agriculture	Fit for forest in Post Mine Closure
1st year	0		7.21	7.21					0	
3rd year	0		14.43	14.43					0	
5th year	0		14.43	14.43					0	
10th year	198.97	194.76		393.73					0	
15th year	281.3			281.3					0	
20th year	514.51			514.51					0	
25th year	418.95			418.95					0	
End of mine									0	
29th Year	612.04			612.04					0	
Closure plan				0	414.78	45.94	5	1846.971	2312.691	214.869
32nd year										
Total	2025.77	194.76	36.07	2256.6	414.78	45.94	5	1846.971	2312.691	214.869

Source: Approved Mining Plan Table no. 14.16

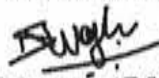
Additional green belt areas will also be developed in and around the infrastructure areas as and when developed for maximizing the green belt cover in the entire coal block area. The Area of Green Belt within the lease area is depicted in the Map enclosed along with this letter for your kind perusal and approval thereof.

It is requested to kindly acknowledge the fulfilment of Part A point no 8 of the Forest Stage I Clearance letter cited as reference I.

Mahagenco solicits your support in this matter and shall remain highly obliged.

With Regards,

Yours Sincerely

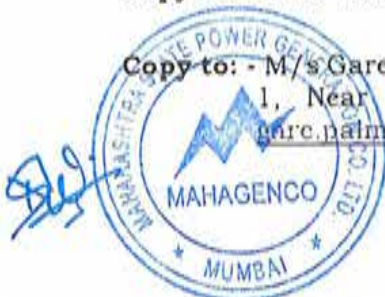

Executive Director (E&S and GP)

Encl: -

1. Map of the area depicting the green belt area in the leased area of GP II coal mine.

Copy s.w.r. to: The Director (Mining), Mahagenco, Mumbai.

Copy to: - M/s Gare Palma II Collieries Private Limited, 11th floor, Adani Corporate House-1, Near Vaishnodevi Circle, S.G Highway, Ahmedabad 382421, Email:- gare.palmatwo@adani.com



Dr. Nitin S. Wagh
Executive Director (E&S)



CERTIFICATE OF UNDERTAKING

In compliance to condition no. 9 of Part-A of Ministry of Environment, Forest and Climate change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake to complete the following activities:

- i. Mitigative measures to minimize soil erosion and choking of stream shall be implemented within a period of three year with effect from the issue of Stage-II clearance in accordance with the approved Plan in consultation with the State Forest Department.
- ii. Planting of adequate drought hardy plant species and sowing of seeds, in the appropriate area within the mining lease to arrest soil erosion in accordance with the approved scheme.
- iii. Construction of check dams, retention /toe walls to arrest sliding down of the excavated material along the contour in accordance with the approved scheme.
- iv. Stabilize the overburden dumps by appropriate grading/benching, in accordance with the approved scheme, so as to ensure that angles of repose at any given place is less than 28°; and
- v. No damage shall be caused to the top-soil and the user agency will follow the top-soil management plan.


Executive Director (E&S and GP)



Annexure-VIII- Findings regarding gap plantation & SMC

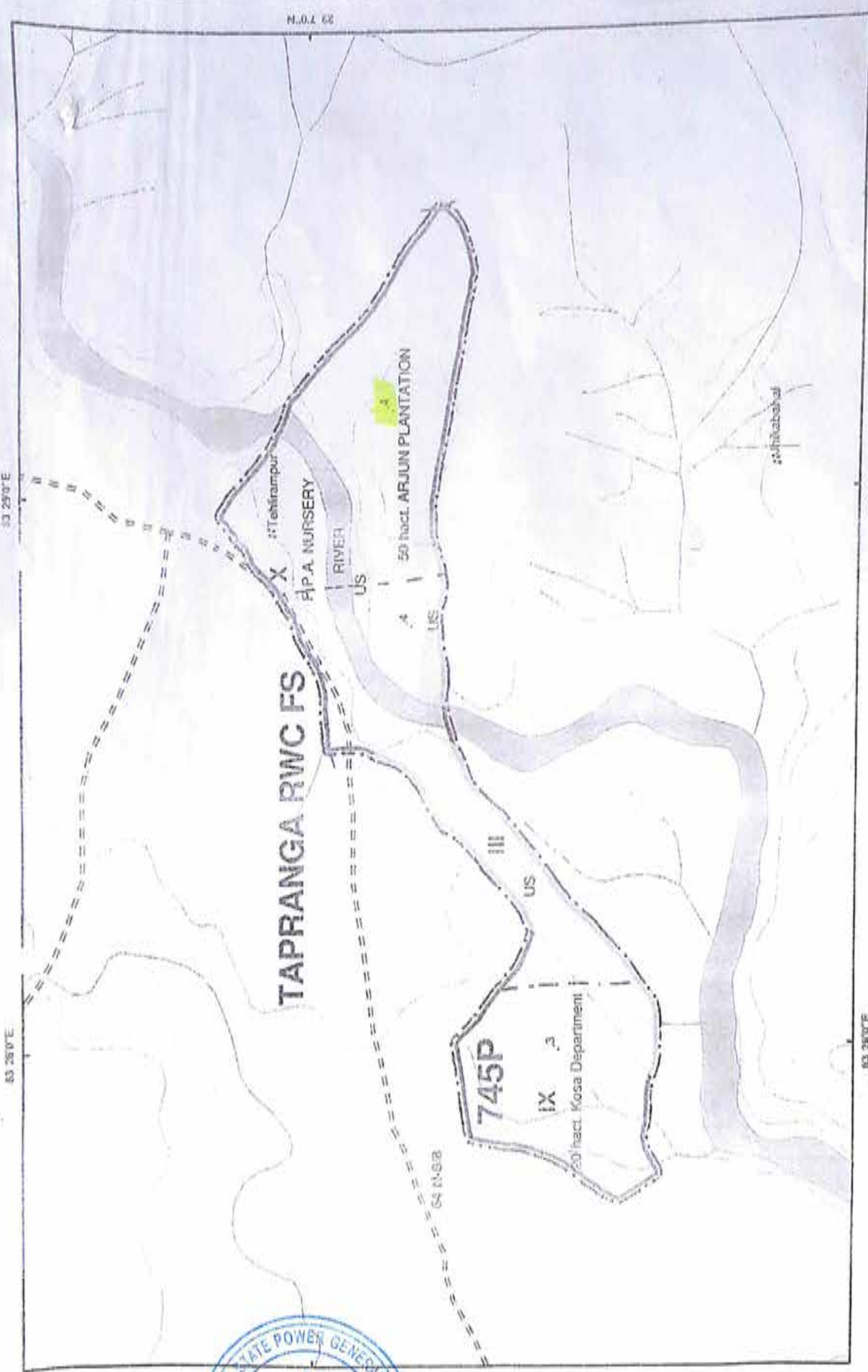
गारे पेलमा सेक्टर-2 कोल ब्लॉक के 100 मीटर परीधि की सीमा में आने वाले 0.4 डेंसिटी से कम के कक्ष का विवरण

उत्तर परीधि					
सरल क्रमांक	कक्ष क्रमांक	क्राउन डेंसिटी	रकबा - हेक्टेयर में	परियोजना की प्रस्तावित लागत	टीप
1	744 P 732P,740P,741P	> 0.5		लागू नहीं।	चूंकि कक्ष क्रमांक 732P, 740P, 741P, 744P की क्राउन डेंसिटी 0.4 से ज्यादा है, तथा शेष भाग गारे पेलमा सेक्टर के अन्य कोल ब्लॉक के अंतर्गत स्थित है। गैप वृक्षारोपण की आवश्यकता नहीं है।

दक्षिण परीधि					
सरल क्रमांक	कक्ष क्रमांक	क्राउन डेंसिटी	रकबा - हेक्टेयर में	परियोजना की प्रस्तावित लागत	टीप
2	745 P	0.4		लागू नहीं।	चूंकि कक्ष क्रमांक 745P की क्राउन डेंसिटी 0.4 है, परंतु शेष भाग गारे पेलमा सेक्टर के अन्य कोल ब्लॉक के अंतर्गत स्थित है। गैप वृक्षारोपण की आवश्यकता नहीं है।


परिक्षेत्र अधिकारी
तमनार
तमनार





Stock Map by
Comp. No. : 0745P

Division : Raigerh
Range : Tamnar
Scale : 1 : 15,000



03 29'0"E

03 20'0"E

22 11'0"N

Bajarmura

TAMNAR IWC FS
BAJIKHOL PWC FS
721
732P
XIV P

64 N-8/7

Dholnara

739P
XIV P

22 10'0"N

Redopali

XIV P
740

22 10'0"N

64 N-8/8

Mudagaon

741P

DANGDANI RWC FS

Saraitola

22 9'0"N

Division : Raigarh
Range : Tamnar
Scale : 1 : 15,000



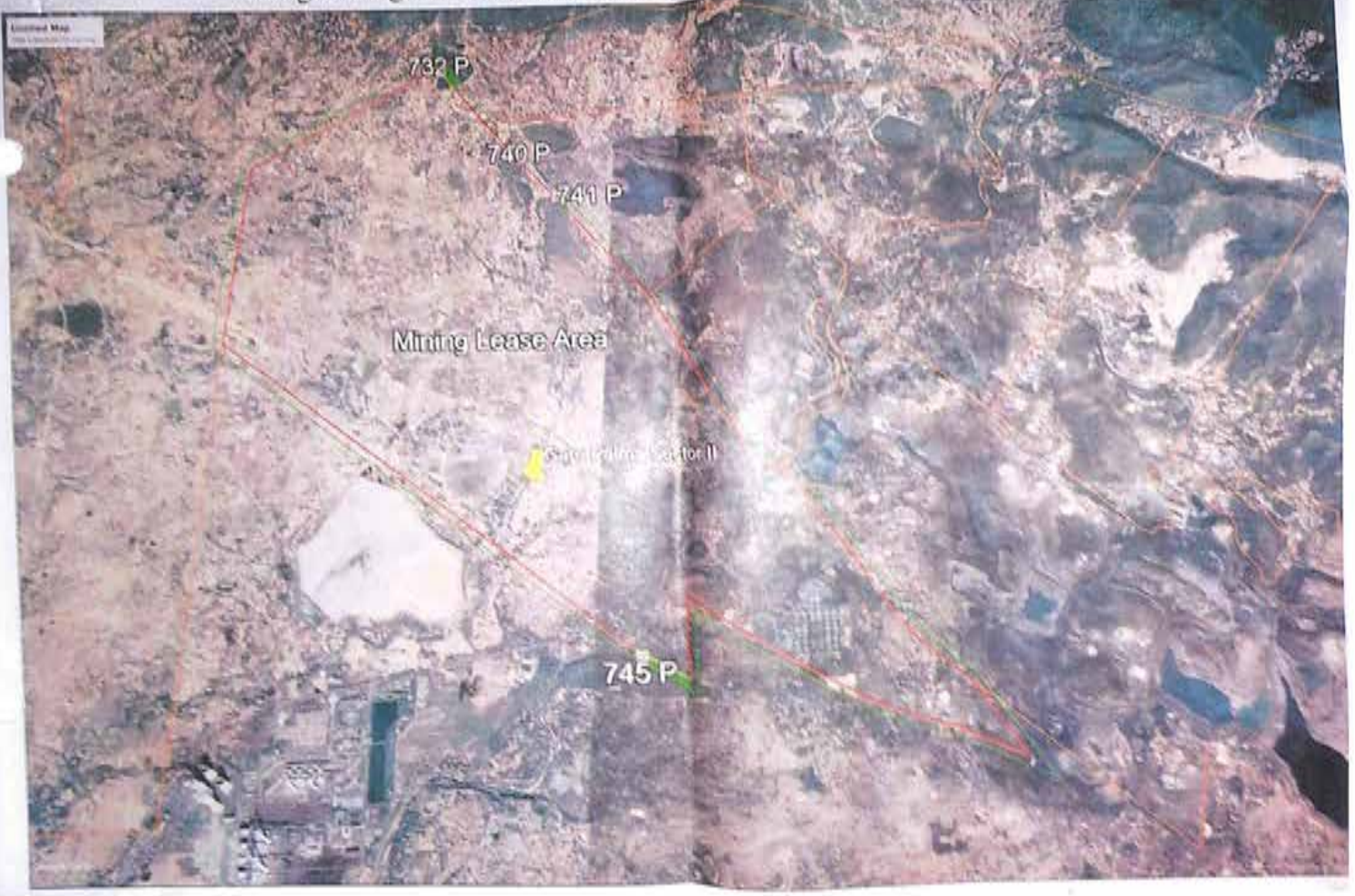
Stock Map by
Comp. No. : 740

GARE PALMA SECTOR II COAL BLOCK
 MAHARASTRA STATE POWER GENERATION COMPANY LTD.



(Signature)
 11-11-11

Google Image of Proposed Gap Plantation Scheme Gare Palma Sector III Coal Mine



Dr. Nitin S. Wagh

Executive Director (E&S)



Azadi Ka Amrit Mahotsav

Annexure-IX



MAHAGENCO

Maharashtra State Power Generation Co. Ltd.

Ref: ED(E&S and GP)/GP-II/Desilting Report/ **000347**

Date: **11 AUG 2022**

To,
The Divisional Forest Officer (DFO),
Raigarh Forest Division,
Chandra Nagar Colony, Kelo Vihar,
Raigarh (C.G.)- 496001.

Sub: Diversion of Forest land for non-Forest purpose under Forest conservation Act, 1980 proposed for the Gare Palma Sector II coal block allocated to Maharashtra State Power Generation Company limited (Mahagenco) Coal Block is located in Mand Raigarh Coal field of Raigarh District, Chattisgarh- 214.869 ha – Reg. **submission of Desilting Report on Village tank and other Water Bodies within 5 kms radius of GPII Coal Mine Area.**

Ref: 1. FC Stage-I recommendation from MoEF & CC vide letter no. 8 -06/2022-FC dated 2nd June 2022.
2. Letter no. तक. अथि / 3551/ 2022/ रायगढ़ Dt. 20.06.2022 from the DFO, Raigarh.

Dear Sir,

With reference to letter dtd. 02.06.2022 at (1) above, Ministry of Environment, Forest and Climate Change (MoEF &CC) has granted Forest Stage I clearance to Gare Palma Sector II Coal Mine subjected to the condition need to be complied before and after Forest Stage II approvals. The Conditions are segregated into two part – **Part A** condition are required to be complied prior to Forest Stage II approval, while **Part B** condition are required to be complied after FC Stage II approval. Accordingly, as per condition stipulated under Part A Point 11 of the letter dated 02.06.2022 -

“The User Agency shall prepare a list of existing village tanks and other water bodies with GPS co-ordinates located within five km from the mine lease boundary. This list is to be duly verified by the concerned Divisional Forest Officer. The User Agency shall regularly undertake desilting of these village tanks and other water bodies so as to mitigate the impact of siltation of such tanks water bodies. A detailed approved plan for desilting of identified ponds and water bodies to be prepared in consultation with forest department and shall be submitted to MoEF &CC before Stage-II approval.

In view of compliance to aforesaid condition, Mahagenco hereby submits the Report on Scheme for De-siltation of Village tanks and other Water Bodies within 5 kms radius in GPII Coal Mine along with KML file of individual pond and combine KML of all pond Area prepared by domain consultant – M/s Srushti Seva Private Limited submitted. The said report and KML files are enclosed herewith this letter.

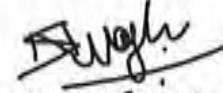


It is requested to kindly review and acknowledge the report as a fulfilment of compliance no. 11 of the Forest stage I Clearance. Mahagenco solicits your support in this matter and shall remain highly obliged.

With Regards,

Yours Sincerely

Encl: As above



Executive Director (E&S and GP)

Copy s.w.r. to:

The Director (Mining), Mahagenco, Mumbai.

Copy to: -

1. M/s Gare Palma II Collieries Private Limited, 11th floor, Adani Corporate House- 1, Near Vaishnodevi Circle, S.G Highway, Ahmedabad 382421, Email:- gare.palmatwo@adani.com
2. Mr N.K Prasad, Srushti Seva Private Limited, "Bilvadal" 8 Janta layout, Deendayal Nagar, Nagpur (Maharashtra)-440022, Email: - srspl15@gmail.com



REPORT ON
Scheme for De-siltation of Village tank and other Water Bodies in 5 kms radius

OF

GARE PALMA SECTOR -II COAL MINE,

VILLAGE GARE & TEHSIL TAMNAR,
DISTRICT RAIGARH, CHHATTISGARH

In compliance to condition no 6 of FC stage- I point no. A-11- The User Agency shall prepare a list of existing village tanks and other water bodies with GPS co-ordinates located within five km from the mine lease boundary. This list is to be duly verified by the concerned Divisional Forest Officer. The User Agency shall regularly undertake desilting of these village tanks and other water bodies so as to mitigate the impact of siltation of such tanks/water bodies. A detailed approved plan for desilting of identified ponds and water bodies to be prepared in consultation with forest department and shall be submitted to MoEF &CC before Stage-II approval “

PROPONENT

MAHARASHTRA STATE POWER GENERATION COMPANY LTD.

Prakashgad, Plot No. G-9 Anant Kanerkar Marg, Bandra (E), Mumbai-400051 (MS)

PREPARED BY

Nawal Kishore Prasad
(Accredited ground water professional)

On behalf of

SRUSHTI SEVA PRIVATE LIMITED

(NABET/GWCO/IA/GW017 dated 23 Sept 2021)

"Bilvadal" 8 Janta Layout, Deendayal Nagar,
Nagpur (Maharashtra) - 440022
Landline: 0712 2971968

Email: srspl15@gmail.com, srushtisewa@yahoo.com



JULY - 2022



CONTENTS

1.0	INTRODUCTION:	1
1.1	General:	1
1.2	Location of the Project:	2
1.3	Introduction of natural Ponds/water bodies, threats and requirement of de-siltation:	3
1.4	Factors responsible for Siltation:.....	4
1.5	Scope of Work:.....	5
1.6	Objective is as follows:	5
2.0	TOPOGRAPHY, SLOPE ANALYSIS AND DRAINAGE:	6
2.1	Topography/DEM:	6
2.2	Slope analysis:.....	6
2.3	Drainage:	6
3.0	DE-SILTATION	10
3.1	Principle of de-siltation:	10
3.2	List of ponds/ water bodies and area of ponds available within 5 km of the project: 10	
3.3	Method of de-siltation:	12
3.4	Depth of De-silting Requirement:	12
3.5	Volume of De-silting Requirement:.....	13
3.6	Rate for De-silting:.....	14
4.0	Estimation of work and financial provision:	15
5.0	EXECUTION OF SCHEME:	17
5.1	Planting of Saplings:	17
5.2	Execution of work:	17
5.3	Inspection, Monitoring and Evaluation:.....	17
5.4	Total Project Cost:.....	18
6.0	CONCLUSION:	18
7.0	Scheme for de-silting of village tank, pond and other water bodies located within 5 km radius from Gare Pelma II opencast mine lease area has been prepared by M/s. Srushti Seva Private Limited, Nagpur (NABET Accreditation No. NABET/GWCO/IA/GW017 dated 23 Sept 2021) in compliance of work order.....	19
8.0	REFERENCES:	23

TABLES

Table 2.1: Watershed details (Total Study Area of 250 km ²)	6
Table 3.1: Location details of selected ponds for de-siltation and area	10
Table 3.2: Volume for De-siltation for 1 st Cycle	13
Table 3.3: Volume for De-siltation for 2 nd cycle	14
Table 4.1: Estimation of work for 1st Cycle	15
Table 4.2: Estimation of work for 2 nd Cycle	16
Table 5.1: Execution of scheme	17
Table 5.2: Total Cost Estimation of Work	18

FIGURES

Figure 1.1: Location Map	1
Figure 1.2: Location of GP II on Toposheet	2
Figure 1.3: Key Map of 5 km Radius	3
Figure 2.1: Digital Elevation Model (DEM)	7
Figure 2.2: Slope Analysis Map	8
Figure 2.3: Drainage Map 5 km Buffer Zone	9
Figure 3.1: Location details of selected ponds for de-siltation	11



1.0 INTRODUCTION:

1.1 General:

The Gare Pelma-II Coal Block comprising total lease area of 25.83 km² has been allotted to Maharashtra State Power Generation Company Limited (MAHAGENCO) in the district of Raigarh of Chhattisgarh state. The location map is given in **Figure 1.1**.

M/s Maharashtra State Power Generation Company Limited (MAHAGENCO) is in process of obtaining Forest Clearance stage II for Gare Pelma-II Coal Block which requires scheme for de-silting of Villages tank and other water bodies (ponds) in five km radius of mine. Accordingly, M/s Srushti Seva Private Limited, Nagpur have been entrusted the Job vide LOA no. GP II/ESH/Desilting/July 2022 dated 11.07.2022.



Figure 1.1: Location Map

1.2 Location of the Project:

The Gare Pelma Sector-II Coal Block lies in Mand Raigarh Coalfield in Raighr district of Chhattisgarh State. The mine site is located at Tilhi Rampur, Kunjemura, Gare, Saraitola, Murogaon, Radopali, Pata, chitwahi, Dholnara, Jhinka Bahal, Dolesara, Bhalumura, Sarasmal and Libra village. The area is covered in the Survey of India Toposheet No. 64 N/8 & 12 (R.F.1:50,000) and is bound by

Latitude: 22° 06' 22.33" to 22° 10' 48" N

Longitude: 83° 26' 21.85" to 83° 31' 19.1" E

The Gare Pelma is situated around 35 km towards north from Raigarh Township, which is also the nearest railway station on Mumbai-Howrah main line of SE Railway. The location of study area on toposheet showing Mine Lease area is given in **Figure 1.2**. Key map of 5 km radius is given in **Figure 1.3**.



Figure 1.2: Location of GP II on Toposheet

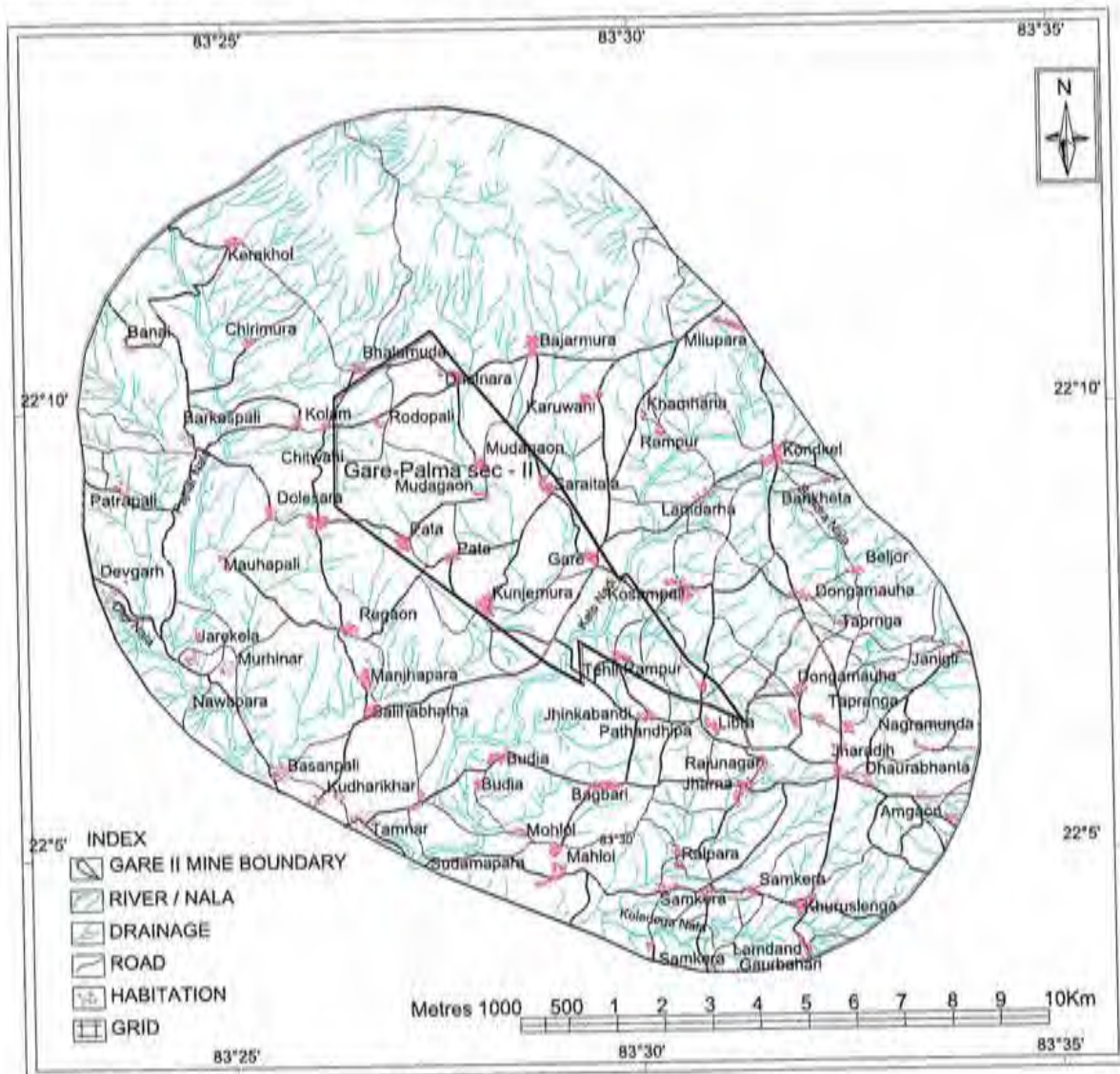


Figure 1.3: Key Map of 5 km Radius

1.3 Introduction of natural Ponds/water bodies, threats and requirement of de-siltation:

Major threat to local water bodies is through lack of management, causing these valuable habitats to become over grown with invasive species, or be filled with silt causing the pond to dry up. All types of aquatic habitats, with the correct management and construction, can be extremely beneficial. This is the reason why de-siltation study is required.

A pond is all area filled with water, either natural or artificial, that is smaller than lake. Defining them to be less than 5 Hector in area, less than 5 meters deep and with less than 30% emergent vegetation helps in distinguishing their ecology from that of lakes and wetlands.



The ponds can be filled up by runoff, ground water or precipitation or all of three this. They can be further divided into four zones.

1. Vegetation Zone
2. Open water
3. Surface films
4. Bottom mud

The bottom mud is silt deposited over the years at the bottom and need to be de-silted frequently. The size and depth of ponds often varies greatly with time of years. The sizes of ponds in the present care are ranging between 991 m² to 23728 m².

The depth of ponds is in the range of 1.5 m to 5 m. The average depth may be 2 m below ground level. Ponds in this area are of fresh water from precipitation /runoff. Ponds are usually by definition quite shallow water bodies with varying abundance of aquatic plants .

There is usually adverse array of aquatic life, with a few examples including algae, snails, fish, beetles, water bugs, frogs and turtle.

Since, fish are a water predator upon amphibian larvae ponds that dry up each year thereby killing resident fish. The pond that dry up completely each year are often known as Vernal ponds.

Ponds are frequently man made or expanded beyond. Their original depth and bounds by anthropogenic causes. Apart from their role as highly bio diverse, fundamentally natural, freshwater ecosystems ponds have had and still have many uses including providing

- Water for Agriculture
- Live stocks
- Communities for domestic uses
- Aiding in habitat restoration.

1.4 Factors responsible for Siltation:

- a) Normally the ponds, water bodies do suffer from siltation due to sedimentation of soil/clay carried in to the water bodies due to inflow of water during rains.
- b) Soil erosion may also be attributed as a primary factor responsible for siltation in ponds.
- c) Rainfall with high intensity at higher altitude is the most common reasons for soil erosion & hence causes siltation in nearby ponds/water bodies,
- d) Soil erosion also occurs from waste dumps, excavated areas & naturally denuded ground surface.

- e) There are habitations/agricultural lands within the mining lease area and Government waste land. Soil erosion is mainly taking place from open places / industrial areas coming within the zone of consideration i.e. 5 km around the Lease boundary.
- f) Further siltation of ponds also takes place due to air borne sand and dust with other vegetative materials falling into the ponds. This adds to the process of siltation, Hence by this phenomenon with passage of time, new layers of silt accumulate over the older layer of silt & become thicker ultimately the depth of the water source decreases & capacity of water storage reduces. De-silting becomes inevitable to ensure availability of more water in the pond/water bodies for day to day requirement of the villages.
- g) The area is mostly comes under mining activities. When dust particles settle on water bodies due to pluming effect, it also adds to sediment in water bodies.

1.5 Scope of Work:

1. Preparation a list of existing village tanks and other water bodies with GPS co-ordinates located within five km from the mine lease boundary.
2. Scheme for de-silting of Village to mitigate the impact of siltation of such tanks/ water bodies.
3. Preparation of Estimation of de-silting of identified ponds and water bodies.
4. Preparation of KML file of identified Tanks/Water bodies.
5. Providing Hard and Soft copy of Reports/ Scheme along with KML file

1.6 Objective is as follows:

Scheme for de-silting aims that the following aspects with respect to the project i.e. Gare Pelma Sector-II Coal Block in Raigarh district. This study is require to pave way of removal of siltation in various water bodies around the project to ensure availability of water in village tanks and other water bodies within 5 km from the boundary. Following are the main objectives.

1. De-silting of village tanks and other water bodies located within 5 km from the mining lease area.
2. De-silting will increase ground water recharge.
3. To ensure availability of water in the said village tanks / water bodies to facilitate the villages for their requirement of water including that of livestock, animals and birds.
4. To ensure a congenial livelihood to the local people.
5. In Chhattisgarh village pond is life line of rural people.



2.0 TOPOGRAPHY, SLOPE ANALYSIS AND DRAINAGE:

The factors which controls silt accumulation in ponds are topography, slope and drainage of the area.

2.1 Topography/DEM:

The area under study is plain having rolling topography with occasional undulating feature, except a hillock in the northern outside of Mine Lease area. In mine lease area the highest elevation is 320 m amsl in the North while lowest 246 m amsl around Kelo River. In 5 km buffer zone highest elevation is 630 m amsl and lowest elevation is 236 m amsl. The Digital Elevation Model (DEM) is prepared by GIS tool and the same is reproduced below as **Figure 2.1**.

2.2 Slope analysis:

The slope analysis map of 5 km radius has been prepared by using ArcGIS tool. The map shows that slope in 5 km buffer zone ranges between 0 to 113 %. Area covered by slope under 20% is plain area (210 km²) whereas slope above 20 % is hilly area (40 km²). The area below 20% is more suitable for ground water recharge around ponds. The slope analysis map is given in **Figure 2.2**.

2.3 Drainage:

The drainage of the area is controlled by Kelo River flowing north to south direction. The drainage system in western part of the study area is controlled by Pajhar Nala, Dighi Nala and Tedipara Nala. The eastern part of the study area is controlled by Kelo Nadi, Bendra nala and Koledega nala. Kelo River is finally discharged into Mahanadi River. The area of micro-watershed of each nala is given in **Table 2.1** and the Drainage map with micro-watershed is given in **Figure 2.3**.

Table 2.1: Watershed details (Total Study Area of 250 km²)

Sr no.	Western part of Study area		Eastern part of Study Area	
	Name	Area	Name	Area
1	Pajhar Nala	100.06	Kelo Nadi	67.11
2	Dighi Nala	14.40	Bendra Nala	30.39
3	Tedipara Nala	11.80	Koledega Nala	26.24



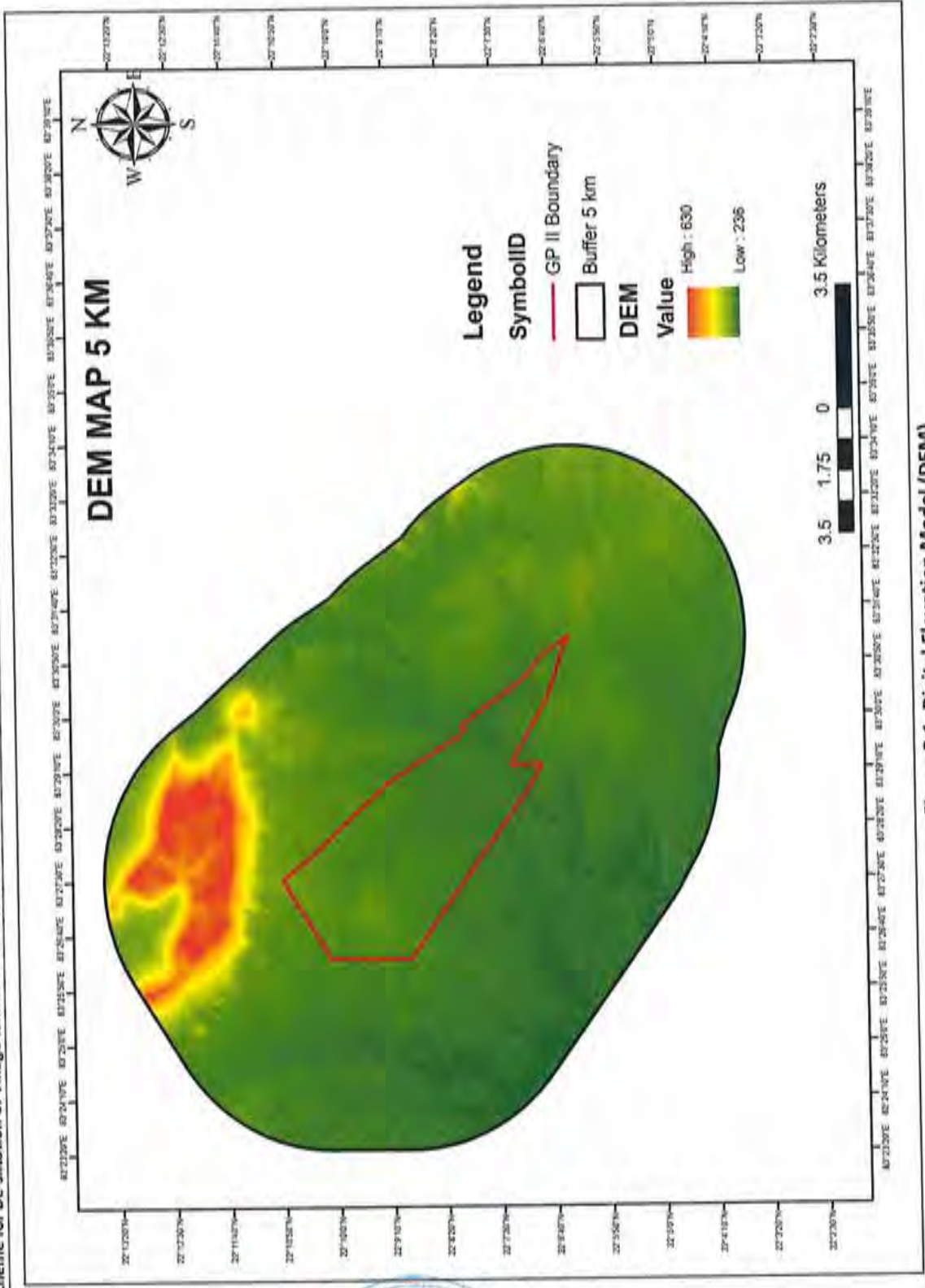


Figure 2.1: Digital Elevation Model (DEM)



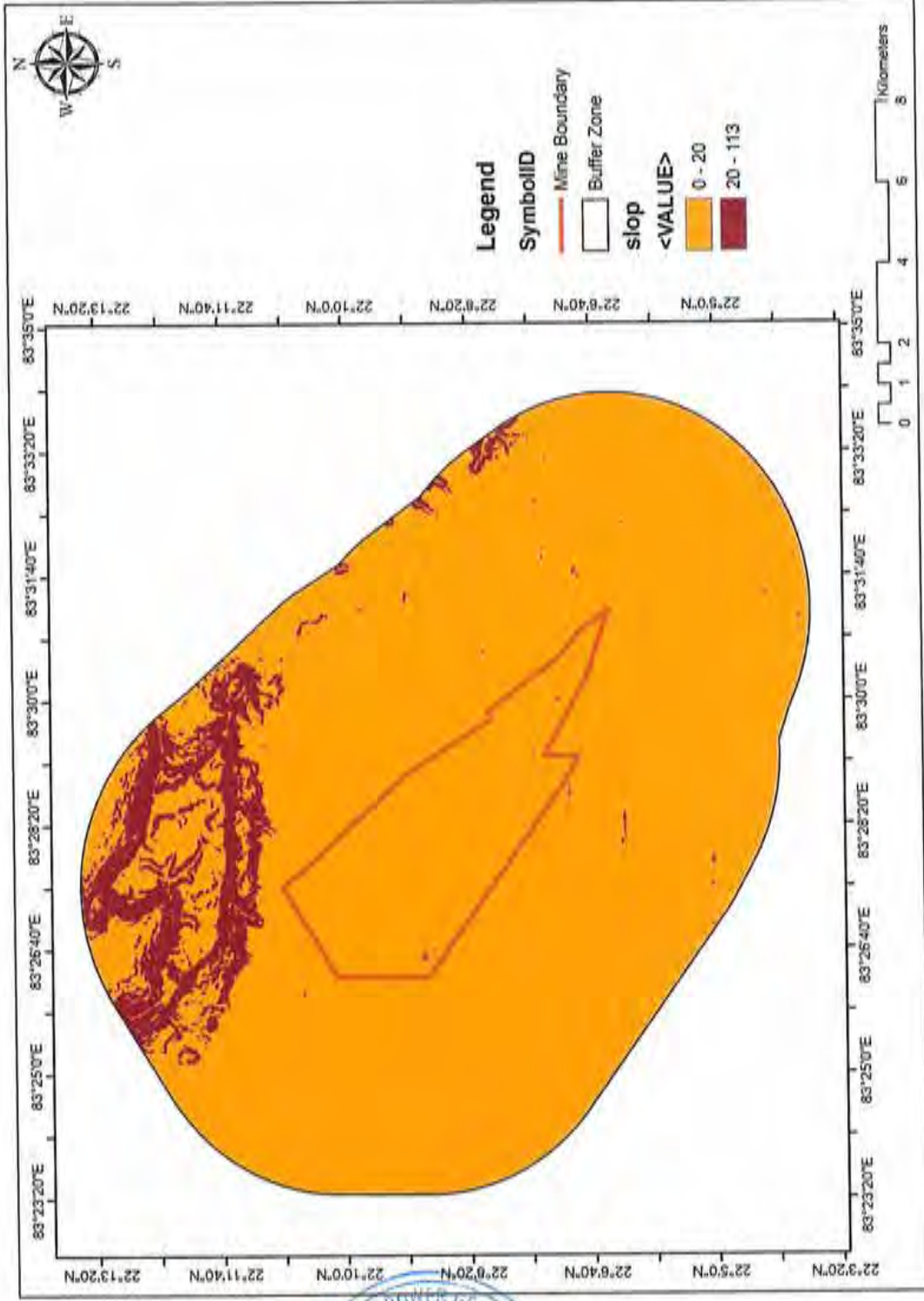


Figure 2.2: Slope Analysis Map



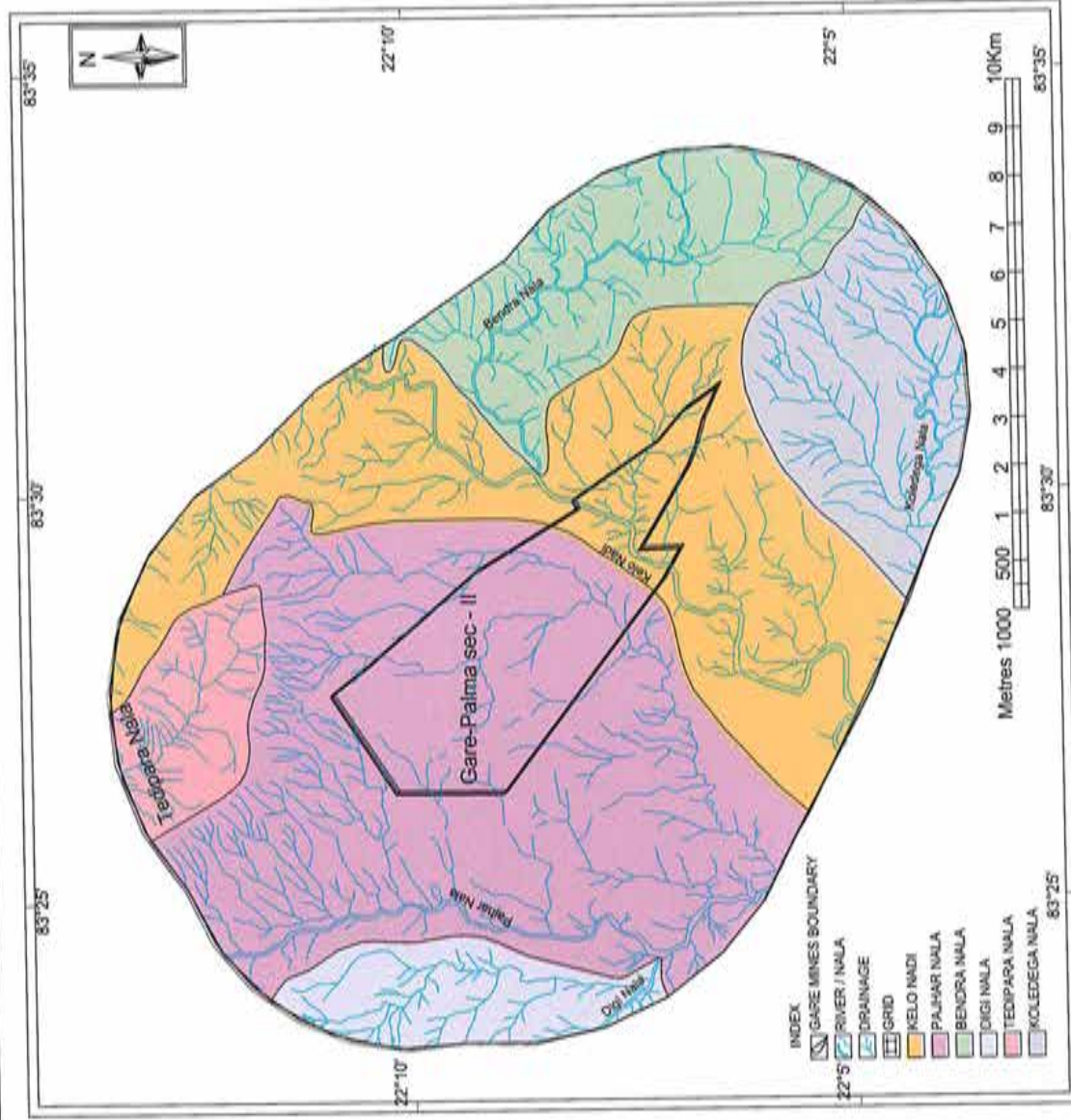


Figure 2.3: Drainage Map 5 km Buffer Zone



3.0 DE-SILTATION

3.1 Principle of de-siltation:

In order to achieve the objectives mentioned in the previous section, the best way is to practice de-siltation of ponds/water bodies at regular intervals. The removed silt should be used in enforcement of embankment and planting of trees on it for stabilization of the same.

The removed materials have to be taken away from the ponds and not spread over the dike /bunds so that they are not washed back into the pond during rain.

3.2 List of ponds/ water bodies and area of ponds available within 5 km of the project:

A field investigation had been carried out in 5 km radius of GP II mine and suitable ponds are selected. The location details of all ponds are given in **Table 3.1** and location on map is given in **Figure 3.1**.

Table 3.1: Location details of selected ponds for de-siltation and area

Sr.No	District	Village Name	Latitude	Longitude	Length m	Width m	Area in sq m m ²
1	Raigarh	Kolam	22°09'56.18"	83°25'46.44"	84.73	60.73	5146
2		Chitwahi	22°09'56.19"	83°25'46.31"	100.92	141.38	14268
3		Dolesara	22°08'53.05"	83°26'07.71"	205	58.84	12062
4		Delesara	22°08'28.06"	83°26'00.57"	176.48	150.58	26574
5		Murhinar	22°07'04.09"	83°24'46.11"	92.86	74.92	6957
6		Regaon	22°07'41.61"	83°26'24.41"	62.22	58	3609
7		Regaon	22°07'27.30"	83°26'48.58"	231.17	94.11	21755
8		Majharpara	22°07'20.63"	83°26'22.60"	128.18	51.74	6632
9		Basan	22°06'10.20"	83°25'44.50"	88.24	85.39	7535
10		Budia	22°05'38.91"	83°27'47.00"	103.04	75.62	7792
11		Budia	22°06'01.85"	83°28'10.23"	57.64	52	2997
12		Jharna	22°05'46.84"	83°31'27.94"	266.16	89.15	23728
13		Libra	22°06'18.12"	83°30'59.82"	147.8	117.11	17309
14		Jhinkabahal	22°06'19.60"	83°29'55.70"	208	115	23920
15		Samkera	22°04'38.3"	83°30'35.4"	65.15	80	5212
16		Bhalumuda	22°10'34.70"	83°26'41.5"	33.45	29.62	991
Total					2151	1429	195973



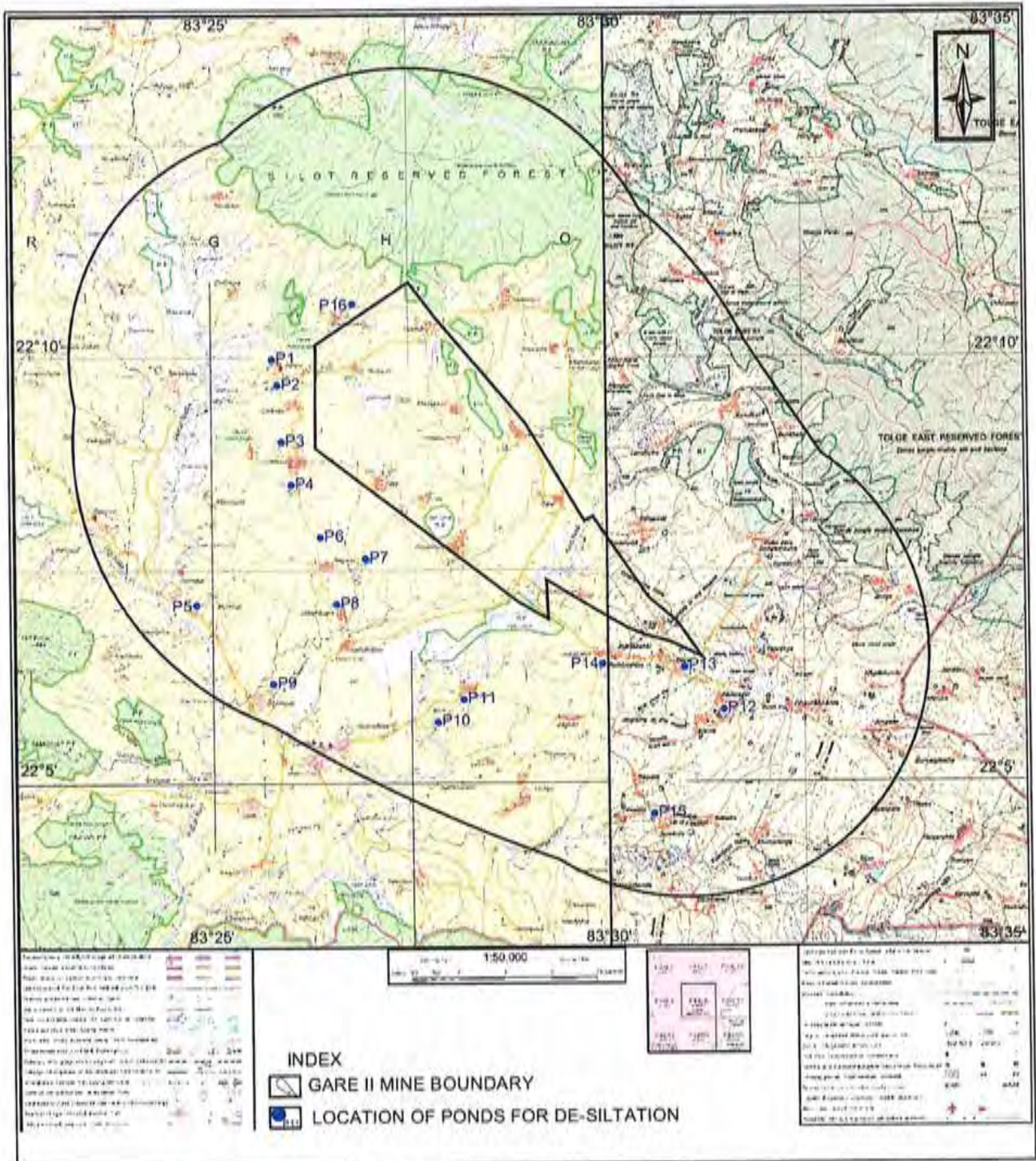


Figure 3.1: Location details of selected ponds for de-siltation



3.3 Method of de-siltation:

- a) De-siltation to be taken up at regular intervals in dry months of the summer season to get best result & depth required to be maintained.
- b) The dried silts to be removed manually or mechanically basing on the site condition/quantity of silt accumulated.
- c) Silt accumulation is mainly found in basal area of the pond which is about 30% less that the size of the pond mentioned.
- d) Silting to a depth of 0.123 m is to be carried out manually in the 2nd round de-silting to a depth of 0.025 m will be taken up.
- e) De-siltation may be taken up at 2 cycle by manually.
- f) The silts so excavated will be placed around the pond in an embankment design at about width of 2.5 m and height of 1 m simultaneously and compacting the soil.
- g) Grass tufting on both the side of the bond will be done. Water inlet PVC pipe of 6" diameter two numbers are to be provided.
- h) Similarly to drain out the excess water PVC pipe of 6" diameter two numbers are also to be fixed.
- i) A bathing ghats of 3 m wide with steps (step height of 25 cm) to be provided.
- j) On the embankment, 50 plants will be planned with gabion facilities. Ficus sp. Aegle marmelos, Amla & Jamun are favored species.
- k) For Bathing Ghat, fixing of pipe and planting of trees a sum of Rs 100,000/- on an average to be provide on LS.

3.4 Depth of De-silting Requirement:

An experiment was conducted to assess the silt load distribution in a recharge pond by Chendil Verma et al (Feb 2019). It is noted that the moment high velocity runoff or flood water enters the pond, the velocity of flow gate drastically reduced causing speedy settlement of silt and other heavier particles to the bottom of pond. The average silt deposition rate in recharge pond was calculated as 12.3 mm/annum. Considering 10 years of silt accumulation will be 123 mm thickness of silt.

Thus, the depth of de-siltation requirement for the first cycle will be 0.123 m

Depth of de-siltation for first Cycle= 0.123 m

Accordingly, depth for de-silting for second cycle may be consider for 2 years thus the depth will

be $12.3 \times 2 = 24.6$ mm say 25 mm equivalent to 0.025 m.

Depth of de-siltation for second Cycle= 0.025 m

3.5 Volume of De-silting Requirement:

The total volume of de-silting of each pond is estimated based on the area of pond and depth of de-silting. The estimated volume silt to be de-silted in each pond is given in Table 3.2 and Table 3.3 for 1st cycle and 2nd cycle respectively.

Table 3.2: Volume for De-siltation for 1st Cycle

Sr No.	Village Name	Length m	Width m	Area in sq m m ²	Depth of silt to be removed m	Volume for de- silting m ³
1st Cycle for 10 years						
1	Kolam	84.73	60.73	5146	0.123	633
2	Chitwahi	100.92	141.38	14268	0.123	1755
3	Dolesara	205	58.84	12062	0.123	1484
4	Delesara	176.48	150.58	26574	0.123	3269
5	Murhinar	92.86	74.92	6957	0.123	856
6	Regaon	62.22	58	3609	0.123	444
7	Regaon	231.17	94.11	21755	0.123	2676
8	Majharpara	128.18	51.74	6632	0.123	816
9	Basan	88.24	85.39	7535	0.123	927
10	Budia	103.04	75.62	7792	0.123	958
11	Budia	57.64	52	2997	0.123	369
12	Jharna	266.16	89.15	23728	0.123	2919
13	Libra	147.8	117.11	17309	0.123	2129
14	Jhinkabahal	208	115	23920	0.123	2942
15	Samkera	65.15	80	5212	0.123	641
16	Bhalumuda	33.45	29.62	991	0.123	122
Total		2151	1429	195973	0.123	22938



Table 3.3: Volume for De-siltation for 2nd cycle

2nd Cycle for 2 years						
1	Kolam	84.73	60.73	5146	0.025	129
2	Chitwahi	100.92	141.38	14268	0.025	357
3	Dolesara	205	58.84	12062	0.025	302
4	Delesara	176.48	150.58	26574	0.025	664
5	Murhinar	92.86	74.92	6957	0.025	174
6	Regaon	62.22	58	3609	0.025	90
7	Regaon	231.17	94.11	21755	0.025	544
8	Majharpara	128.18	51.74	6632	0.025	166
9	Basan	88.24	85.39	7535	0.025	188
10	Budia	103.04	75.62	7792	0.025	195
11	Budia	57.64	52	2997	0.025	75
12	Jharna	266.16	89.15	23728	0.025	593
13	Libra	147.8	117.11	17309	0.025	433
14	Jhinkabahal	208	115	23920	0.025	598
15	Samkera	65.15	80	5212	0.025	130
16	Bhalumuda	33.45	29.62	991	0.025	25
Total		2151	1429	195973	0.025	4662

3.6 Rate for De-silting:

The rate of de-silting has been taken from the SOR – 2021 of Government of Chhattisgarh item no. 3.7, page 12 under SOR for Road and Bridge work. Excavation in marshy soil rate – Rs. 113 per cubic meter.

Rate of Excavation= Rs. 113/ m³



4.0 Estimation of work and financial provision:

Based on the parameters stated above the cost estimate is given below. Estimation of work has been done in cycles. The details of 1st cycle are given in Table 4.1 and form 2nd cycle is given in Table 4.2.

Table 4.1: Estimation of work for 1st Cycle

Sr. No	Village Name	Area in sq m	Depth of silt to be removed	Quantum of Earth work	Rate per cu.m	Amount required for de-siltation	Funds for other general facilities	Total cost Requirement
		m ²	m	m ³	Rs	Rs	Rs	Rs.
1	Kolam	5146	0.123	633	113	71519	100000	171519
2	Chitwahi	14268	0.123	1755	113	198312	100000	298312
3	Dolesara	12062	0.123	1484	113	167653	100000	267653
4	Delesara	26574	0.123	3269	113	369357	100000	469357
5	Murhinar	6957	0.123	856	113	96696	100000	196696
6	Regaon	3609	0.123	444	113	50158	100000	150158
7	Regaon	21755	0.123	2676	113	302378	100000	402378
8	Majharpara	6632	0.123	816	113	92179	100000	192179
9	Basan	7535	0.123	927	113	104726	100000	204726
10	Budia	7792	0.123	958	113	108299	100000	208299
11	Budia	2997	0.123	369	113	41659	100000	141659
12	Jharna	23728	0.123	2919	113	329798	100000	429798
13	Libra	17309	0.123	2129	113	240576	100000	340576
14	Jhinkabahal	23920	0.123	2942	113	332464	100000	432464
15	Samkera	5212	0.123	641	113	72442	100000	172442
16	Bhalumuda	991	0.123	122	113	13771	100000	113771
Total 1st cycle		186487	0.123	22938	113	2591988	1600000	4191988

Cost for de-silting in First Cycle= Rs. 4191988/-



Table 4.2: Estimation of work for 2nd Cycle

Sr. No	Village Name	Area in sq m	Depth of silt to be removed	Quantum of Earth work	Rate per cu.m	Amount required for de-siltation	Funds for other general facilities	Total cost Requirement
		m ²	m	m ³	Rs	Rs	Rs	Rs.
1	Kolam	5146	0.025	129	113	14536	0	14536
2	Chitwahi	14268	0.025	357	113	40307	0	40307
3	Dolesara	12062	0.025	302	113	34076	0	34076
4	Delesara	26574	0.025	664	113	75073	0	75073
5	Murhinar	6957	0.025	174	113	19654	0	19654
6	Regaon	3609	0.025	90	113	10195	0	10195
7	Regaon	21755	0.025	544	113	61459	0	61459
8	Majharpara	6632	0.025	166	113	18735	0	18735
9	Basan	7535	0.025	188	113	21286	0	21286
10	Budia	7792	0.025	195	113	22012	0	22012
11	Budia	2997	0.025	75	113	8467	0	8467
12	Jharna	23728	0.025	593	113	67032	0	67032
13	Libra	17309	0.025	433	113	48898	0	48898
14	Jhinkabahal	23920	0.025	598	113	67574	0	67574
15	Samkera	5212	0.025	130	113	14724	0	14724
16	Bhalumuda	991	0.025	25	113	2799	0	2799
Total 2nd cycle		186487	0.025	4662	113	526827	0	526827

Cost for de-silting in Second Cycle= Rs. 526827/-



5.0 EXECUTION OF SCHEME:

The Plan Period of the scheme is 12 years. De-siltation is to be carried out in two cycles. All the ponds will be de-silted twice in the plan period of twelve years. For first cycle year wise execution for 10 years and for second cycle followed by next two years program is given in **Table 5.1.**

Table 5.1: Execution of scheme

Sr no.	Name of Village	Year of execution											
		2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34	2034-35
1	Kolam	Blue			Red								
2	Chitwahi		Blue			Red							
3	Dolesara			Blue			Red						
4	Delesara				Blue			Red					
5	Murhinar					Blue			Red				
6	Regaon						Blue			Red			
7	Regaon							Blue			Red		
8	Majharpara								Blue			Red	
9	Basan									Blue			Red
10	Budia	Blue			Red								
11	Budia		Blue			Red							
12	Jharna			Blue			Red						
13	Ubra				Blue			Red					
14	Jhinkabahal					Blue			Red				
15	Samkera						Blue			Red			
16	Bhalumuda							Blue			Red		
1st Cycle													
2nd Cycle													

In case any Village pond could not be carried out in the assigned year, it may be taken up in the next year along with the assigned pond.

5.1 Planting of Saplings:

- a) It is suggested to select saplings of 2 year old promising seedlings (mainly local species, mango trees, dhaan etc)
- b) Pits of 45 cm x 45 cm x 45 cm to be dug out for tree planting
- c) Bamboo gabions/ other type of tree guard to be provided to prevent damage by cattle's
- d) The required fertilizers / insecticides to be provided.

5.2 Execution of work:

The scheme will be executed by the user agency as per this approved scheme.

5.3 Inspection, Monitoring and Evaluation:

For successful implementation of this scheme, the user agency is to execute and review the work periodically: Its effectiveness to be reported to Forest Department annually.



5.4 Total Project Cost:

The total project cost for this scheme is Rs. 47.19 Lakhs and total cost estimate for cycle is given in Table 5.2.

Table 5.2: Total Cost Estimation of Work

Details	Cost estimate
Total 1st cycle	4191988
Total 2nd cycle	526827
Total Cost	4718815

Total Cost: Forty Seven lakhs eighteen thousand eight hundred fifteen only.

Total estimated Cost for de-silting of 16 ponds in Two Cycles = Rs. 4718815/-

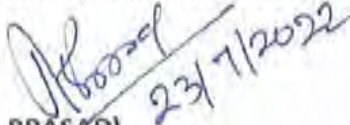
6.0 CONCLUSION:

With the above provisions, it is expected that local villagers will be benefited in shape of wage earning, bathing facilities. The water percolation to recharge ground water will also be enhancing in due course. The local animals/ birds also be getting water in hard summer.



7.0 Scheme for de-silting of village tank, pond and other water bodies located within 5 km radius from Gare Pelma II opencast mine lease area has been prepared by M/s. Srushti Seva Private Limited, Nagpur (NABET Accreditation No. NABET/GWCO/IA/GW017 dated 23 Sept 2021) in compliance of work order.

For
M/S. SRUSHTI SEVA PRIVATE LIMITED


(N. K. PRASAD) 23/7/2022
Functional Area Expert (Ground water and Hydrology)



For
MAHARASHTRA STATE POWER GENERATION COMPANY LTD.

Signature of project Proponent

Divisional Forest Officer,
Raigarh Forest Division



PHOTOGRAPHS:



Report on Scheme for De-siltation of Village tank and other Water Bodies in 5 km radius



Report on Scheme for De-siltation of Village tank and other Water Bodies in 5 km radius



8.0 REFERENCES:

- 1) "Hydrogeological Study report of Gare Pelma Sector-II Coal Block District Raigarh, Chhattisgarh" of MAHAGENCO (2017)
- 2) Mining Plan and Mine Closure Plan for Gare Pelma Sector-II Coal Mine of MAGENCO (2015)
- 3) Aquifer system of Chhattisgarh by Central Groundwater Board (2012).
- 4) Verma, Chhedi & Mishra, Vinay & Jha, Sunil & Sharma, Navneet & Pavelic, Paul. (2019). Estimation of Silt Distribution Pattern in UTFI Pond for De-Silting Guidelines.
- 5) "Chandanam" a Forest & Wild life consulting society, report on ' scheme for de-siltation of village tanks and other water bodies coming within 5 km radius of Talabira II & III OCP of M/s. Neyveli Lignite Corporation India Limited, at Talabira, district Jharsaguda and Sambalpur.



Dr. Nitin S. Wagh
Executive Director (E&S)



Annexure-X



CERTIFICATE OF UNDERTAKING

In compliance to condition no. 12 (i, ii, iii & v) of Part-A of Ministry of Environment, Forest and Climate change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake that following safety zone management measures around lease area would be implemented as per relevant guidelines issued by the Ministry:

- i. Demarcation of safety zone (7.5 meter strip all along the inner boundary of the mining lease area), and its fencing, protection and regeneration by erecting adequate number of 6 feet high RCC boundary pillars inscribed with DGPS coordinates with barbed wire fencing and deploying adequate number of watchers under the supervision of the State Forest Department;
- ii. Boundary of the safety zone of the mining lease, adjacent to habitation/roads, shall be properly fenced;
- iii. Safety zone shall be maintained as green belt around mining lease and to ensure dense canopy in the area, regeneration shall be taken up in this area at project cost under the supervision of the State Forest Department;
- v. Safety zone shall be maintained as per the prescribed norms.


Executive Director (E&S and GP)



Dr. Nitin S. Wagh
Executive Director (E&S)



CERTIFICATE OF UNDERTAKING

In compliance to condition no. 13 of Part-A of Ministry of Environment, Forest and Climate change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake that the cost of felling of trees shall be deposited with the State Forest Department as and when demanded.


Executive Director (E&S and GP)





Annexure-XII-A

**भारतीय वन प्रबंध संस्थान
INDIAN INSTITUTE OF
FOREST MANAGEMENT**

(An Autonomous Institute of the Ministry of Environment,
Forest & Climate Change, Government of India)

IIFM/MAHAGENCO/Gare-Palma/WLP/Vetting/2022-01
11.08.22

To,

Dr. Nitin S. Wagh
Executive Director (E&S)
Maharashtra State power Generation Co. Ltd.
HDIL Tower, 'A' Wing, 4th Floor
Prof. A.K Marg
Bandra (E), Mumbai 400 051
Maharashtra

Sub: Vetting report of approved wildlife conservation plan of Gare Palma sector II coal Block II,
Tamnar, Raigarh, C.G


Dear Sir,

This has reference to your letter dated 24.06.2022 Vide No. ED (E&S and GP)/GP-II/Wildlife
conservation plan/vetting/566 dated 24th June 2022 regarding "Vetting of approved wildlife
conservation plan of Gare Palma sector II coal mine of MAHAGENCO in state of Chhattisgarh".

Please find attached the duly vetted report of the same enclosed with this letter.

Please do conform the receipt of the report. A soft copy of the same is also sent by the email.

Kind Regards


Dr. Yogesh Kumar Dubey
Professor & Area Chairperson
Faculty of Ecosystem & Environment Management



नेहरू नगर, पोस्ट बाक्स नं. 357, भोपाल म.प्र.-462003, भारत
NEHRU NAGAR, POST BOX No. 357, BHOPAL M.P., 462 003 (M.P.) INDIA-PBX : 2775716, 2773799, 2767851
Fax: 91-755 - 2772878, Website : www.iifm.ac.in

इस कार्यालय में हिन्दी पत्रों का स्वागत है

VETTING OF APPROVED WILDLIFE CONSERVATION PLAN OF
GARE PALMA SECTOR II COAL BLOCK II, TAMNAR, RAIGHARH
C.G.

Vetting Report

Submitted to

MAHARASHTRA STATE POWER GENERATION CO. LTD.

August 2022



INDIAN INSTITUTE OF FOREST MANAGEMENT
P.B. No. 357, Nehru Nagar, Bhopal, India
Web: www.iifm.ac.in

eg
11/8/22



Indian Institute of Forest Management, Bhopal

Maharashtra State power Generating Co. Ltd (MAHAGENCO) vide its letter dated 24th June 2022 vide No RD(E&S and GP)/GO-II/Wildlife Conservation plan/vetting/566 had requested Indian Institute of Forest Management, Bhopal regarding vetting of the approved wildlife conservation plan of proposed Gare Palma Sector II Coal mine located in Tamnar area of Raigarh District.

The technical scope of work as stated by MAHAGENCO is given below

1. Vetting of approved wildlife conservation plan of Gare Palma Sector II Coal mine.

Vetting has been done based on the copy of the approved Forest Conservation Actin plan for Wildlife for the plan period of 2020-21 to 2025-26 prepared by Learn Nature Consultants (LNC). The Copy of the approved plan was provided by MAHAGENCO. A two-day site visit was also be carried out between 22-24 July 2022 for authentication and verification of areas where the interventions are prescribed in the Conservation plan.

The Comments on the above said plan are as follows

1. Chapter One: Project Introduction

The chapter 1 gives a description of the proposed study area. A google earth image on page 8 of the report depicts the location of demarcated proposed mine block with 10 km radius marked around it. On page 9, a map marked on survey of India topo sheet depicts the location of the GPS survey points. Subsequently the chapter presents metrological data on climate, rainfall, temperature, wind speed etc. in detail for the period between 2013 – 2017. The Geology and rock formations in the area are also described elaborately. In the end the chapter gives a summary of land use in the Core zone i.e the mine block.

Comments: The plate on page 8 does not carry a heading. It is not clear as to how the detailed description of meteorological and geological information has been subsequently used in the wildlife conservation planning. There is no description of the land use in ten km buffer zone.



2. Chapter Two: Objectives & Methodology

Chapter 2 describes the objectives and methodology. It provides details of the sampling plan and layout for trees, shrubs, herbs and describes the analysis used for the same.

Comments: The methodology for sampling the flora has been in described in sufficient depth. However, there is no mention of the methodology for sampling the faunal species.

3. Chapter Three: Status of Flora & Fauna

Chapter 3 describes the flora and fauna found in the area. There is a brief description of the ecology of the area. Subsequently detailed analysis of phytosociological data is presented for trees and shrubs. The list of floral species belonging to herb, grasses & sedges, climbers & creepers is given in table 3.2.3, 3.2.4, and 3.2.5 for the buffer zone.

The chapter also provide the list of faunal species in categories of mammals, Birds, reptiles, amphibian and fishes. Three species namely monitor lizard (*Varanus benghalensis*), Peafowl (*Pavo Cristatus*) and sloth bear (*Melursus ursinus*).

Comments: The analysis of the vegetation has been given in sufficient detail in terms of IVI, Frequency, Density, Basal Area, relative frequency, relative density, relative basal area etc. However, this data has not been presented separately for core and buffer areas respectively. The list of herbs, grasses & sedges and climber has been presented for the buffer zone. The list of herbs, grasses & sedges and climbers has not been presented for the Core zone. It would have been desirable to present a comparative analysis of the Flora in core and buffer zone separately also to get a clear information on the phytosociology in these two zones.

The list of faunal species presented in the plan does not indicate the methodology used for collecting the information. It does not indicate as, how many were seen through direct sightings and how may were confirmed through



secondary and indirect sightings/evidences. The plan also does not present the presence absence data on faunal species in core and buffer zone and does not provide information on extant of distribution of these species in core and buffer zone. The list of birds have many repetitions like spotted dove, parakeet, House crow, Bater (Grey Quail). The standard common name nomenclature has not being followed on the scientific lines. The list of birds should be arranged and presented family wise.

Butterfly list has not been presented in the chapter. It is highly unlikely that the proposed project area would not be home to large number of butterfly species. Butterflies are a very important indicator of the quality of ecosystem and also plays a significant role in the process of pollination.

It would be desirable to include the presence absence data of the faunal species for core and buffer zone separately to get clear understanding on the extant of distribution and need for specific conservation strategies.

Green belt description on page 53 appears out of context in this chapter, as it would be most suited as a mitigation or avoidance strategy in the chapter providing the details of the conservation plan.

4. Chapter Four: Conservation Action plan for Wildlife

This Chapter present the specific strategies for addressing specific impacts of the project.

Comments: The conservation plan somewhat makes an abrupt beginning by presenting the list of plant species for planation. The chapter very generically highlights the issues of conservation concern for the area and is not substantiated by any data either primary or secondary. Man- Animal conflict problem (page 59) has not been identified with reference to species and nature/type of conflict. It would be prudent to map the species-specific Conflict prone zones in both core and buffer.

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Prescriptions have been given for fire management (page 60) but it does not specify the areas for implementation of the plan. It would be desirable to map the fire prone areas based on the secondary data on forest fires.

The page 61 talks about prevention of poaching in the area but there is no mention about the species that are reported to be under pressure of poaching in the area.

The plan (page 62) suggests creation of multiple water sources in the buffer zone but the prospective sites for such activities have not been stated. Similarly, on page 62 a concern on transmission of diseases from cattle to wildlife has been mentioned but there is no mention of the type of diseases that are commonly transmitted to the wildlife from the domestic livestock and what is the proposed action plan for it.

The Conservation strategies for Sloth bear as listed on page 72 especially the point No 4, 6, 7, 9 & 10 appear to be generic and unrealistic. There is no detailing concerning implementation of these strategies. There is no mention of the agency that shall be responsible for developing and implementing these.

Section 4.3 describes the conservation plan for species belonging to Schedule I of Wildlife protection Act 1972. Section 4.5 details the conservation plan for 12 medicinal plants species but does not detail any specific conservation action for them.

Plantation has been proposed in the buffer zone (page 75) with some species indicated for the same purpose. However, plan does not highlight the areas in buffer zone where such an activity can be carried out.

5. Chapter Five - Avifauna (Vulture & peafowl) Alternate Habitat Plan.

Chapter 5 presents strategies for the conservation and management of Vultures and Peafowl in the area.

The plan very broadly describes the white backed vulture characteristics, its habitat requirement, diet, behavior, reproduction and its status as defined by IUCN.



Subsequently a list of 23 species of vultures is provided on page 85.

Comments: It is not made clear as to which species of Vulture are found in the study area. The list given on page 85 is perhaps the list of vulture species found in the world.

The plan does not identify the potential vulture nesting and resting sites as well as the areas where vultures were sighted in core and buffer zone of the proposed project area. The Threat to the vulture population has also not been appropriately described

The peafowl Conservation plan has been repeated as it had been already addressed in the Chapter 4. This section also only generically talks about the peafowl diet, habitat requirement, mating, reproduction and its status as per IUCN.

6. Chapter Six: Conservation plan for Elephants

This chapter presents specific strategies for Elephant conservation in the area.

Comments: The plan lacks specific information/data on the established elephant corridors/movement in the core and buffer zone with the information on current movement pattern. A map to that effect would be desirable. Information on the population estimates, herd sizes etc. has also not been provided in the plan. Elephant is also not listed in the faunal species list as has been provided in the chapter 3 of the plan.

There is no specific information on elephant human conflict in the core and buffer area of the project. Ideally, the areas having significant man-elephant conflict should be mapped to identify the severity of the problem. The location of susceptible villages should also have been mapped.

The plan describes a large number of methods to escape the damage caused by the elephants but does not specify the specific methods that should be used in the proposed area.

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Forest Management, Bhopal

7. Chapter Seven: Financial projection

This chapter presents the budgetary details for different components of the wildlife conservation.

Comments: Detailed costing has been provided for Soil and Water conservation on page 98 of the plan. It is however not very clearly linked with specific aspects of wildlife conservation that would be addressed by allocating 133.00 lacs on Soil and water conservation. The cost of Soil and water conservation as a part of the wildlife conservation plan is almost one third of the total budget proposed.

On page 61 it is stated in the report that to prevent poaching two ex-army Jawan will be employed to assist the forest officers. The budgetary provision for the same is missing in the financial projections.

On page 64 it is proposed that a photovoltaic barbed wire fencing of 5 strands of wire will be erected around the mining lease area outside the green belt. The cost for the same is not reflected in the financial projections.

Reclamation of backfilled areas is described in detail on page 76. However, the budget estimates for the same are not presented in the financial projections.

There is mention of development of green belt along the boundary of the open cast mining area. The same is not reflected in the financial projections.

Similarly the themes like 4.2.5 Reducing stake holders dependence on forest, 4.2.6 Creating awareness amongst forest stake holders, C training and awareness programme, D. Encourage local villagers to grow trees on their filed bunds/court yard etc, E. Creation of conservation awareness, F. Signboard etc, do not get reflected in the financial projections. These activities cannot be carried out without proper earmarked funds in the conservation plan.

Page 99 (Table 7.2.2) gives details of expenditure for wildlife conservation. There are five separate category under the head Improvement of cover (Escape cover, Ambush cover, Reproductive cover, Special Refuges, Shade and Resting places) for which the financial projections are provided. It is however

Indian Institute of Forest Management, Bhopal



not explained anywhere in the plan as to what these specific category of covers mean and what specific action is proposed to develop these category of cover and the spatial extent and location of the same.

Funds have been provisioned for development of cattle sheds without giving any details of numbers and location. The same holds true for provision of salt licks.

There is no fund allocation for the conservation of sloth bears and Bengal monitor lizards. Both are listed as Schedule I species of Wildlife Protection Act.

Table 7.3.1 on page 100 gives details of fund allocation for Vulture habitat plan. S.N 2.1 provisions construction of 200 artificial nests for vulture. The scientific plan for the same has not been mentioned in the vulture conservation plan in terms of where and how these nests will be constructed. Design of such artificial nests is also not suggested in the plan. There has been no estimate of the vulture population provided in the plan.

Table 7.3.2 provides the details of fund allocation for Peafowl & Peacock habitat plan.

Section 2.1 here also provisions funds for 200 artificial nests for peafowls. It may be noted that, peafowls are ground nesters and very rarely nest on trees. The plan does not indicate the design and location of such artificial nests for peafowl. It is also observed that the budget and fund allocation for vulture and peafowl conservation plan are same and have been replicated. The two species are very different in terms of their habitat and ecological needs.

Table 7.3.4 presents the fund allocation for elephant conservation. The items listed in the table are not reflected in the conservation plan for elephants. It will be useful if these are described with location details in the conservation plan and subsequent inclusion in the expenditure table. Items 7, 8, 9 are very generic in nature.

The guidance on the implementation of the conservation plan is missing. The plan should specify the agency that will execute the recommended actions and

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- the agency that will monitor the compliance and determine the efficacy and success of the outcome of the conservation planning.

8. Chapter Eight – Conclusion and Recommendation

Comments: The chapter makes a declaration that there are no endangered species in and around the mining lease area and the mining lease area does not fall in the migratory route of any species. It is however not clear how the term "endangered species" is defined for this purpose. As per the plan there are three species reported from the area that are listed as Schedule I species in the Wildlife Protection Act 1972.

It is suggested that during the implementation of the wildlife conservation plan the observations/comments made above are included and considered by the concerned agency entrusted with the task of execution of the plan. The fund allocations may also be adjusted/appropriated accordingly to address all attendant aspects of wildlife conservation as stated in the vetting report so that the overarching aims and objectives of wildlife conservation are achieved in the study area.

***** END OF REPORT *****

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Director, Institute of Forest Management, Bhopal

Dr. Nitin S. Wagh

Executive Director (E&S)



Azadi Ka Amrit Mahotsav

Annexure-XII-B



MAHAGENCO

Maharashtra State Power Generation Co. Ltd.

No:-ED(E&S and GP)/GPII/DFO/Wildlife report/ **M 0 0 3 5 9** Date: **2 2 AUG 2022**

To,

Divisional Forest Officer,
Chandra Nagar Colony,
Kelo Vihar Colony,
Raigarh,

Subject: Submission of Approved Wildlife Conservation Plan and report vetted by reputed institute, in compliance to Forest Stage- I conditions and request for approval thereof.

Ref:

1. FC Stage-I recommendation from MoEF & CC vide letter no. 8 -06/2022-FC dated 2nd June 2022.

Dear Sir,

Ministry of Coal (MoC), GoI has allotted the Gare Palma Sector-II Coal Mine to Mahagenco for captive use in Thermal Power Plants. The Gare Palma Sector II coal mine spread in a land area of 2583.487 ha, which includes 14 no. of Villages in District Raigarh of Chhattisgarh State.

As of date, Mahagenco is under process of procuring necessary clearances required towards development & operationalization of the Coal Block. Among various other clearances, the Forest Stage- I clearance has been accorded by the Central Government for non-forestry use of 214.869 Hectares of forest land in favor of Mahagenco vide letter under reference (1). The copy of above letter has been uploaded on Parivesh portal whose copy is enclosed herewith for reference.

As per condition no. 16 stipulated under Part A of the letter dated 02.06.2022, *"Elephant/ Wildlife Management Plans should be revised and prepared keeping in view the locality factors, occurrence of wildlife, management interventions required for areas. State Government may also get the revised Plan verified by an institute of repute. Cost of implementation of the Plan so finalized shall be deposited into State*



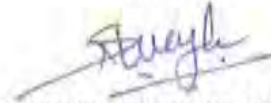
CAMPA and detail of the same along with approved Plan shall be submitted to the Ministry before Stage-II approval."

In view of compliance to aforesaid condition, Mahagenco hereby submits the Approved Wildlife Conservation Plan along with report vetted by Indian Institute of Forest Management, Bhopal, for your review and approval please, as per the part of compliance to Forest Stage- I clearance.

Mahagenco solicits your support in this matter and shall remain highly obliged.

Thanking You,

Sincerely,



Executive Director (E&S and GP)

Enclosure:-

1. Approved Wildlife conservation plan
2. Vetted report of approved Wildlife conservation action plan



**आदेश द्वारा पी.व्ही. नरसिंग राव, भा.व.से. प्रधान मुख्य वन संरक्षक,
(वन्यप्राणी एवं जैव विविधता संरक्षण) सह मुख्य वन्यप्राणी
अभिरक्षक, छत्तीसगढ़, नवा रायपुर**

सेक्टर 19, नार्थ ब्लॉक, अरण्य भवन, प्रथम तल (एफ.आर.) अटल नगर, नवा रायपुर

ewlwcg@gmail.com

(0771-2512880, 0771-2513881)

// आदेश //

आदेश क्रमांक/व.प्रा./प्रबंध-494/12

नवा रायपुर, दिनांक 20.01.2021

मुख्य वन संरक्षक (वन्यप्राणी) एवं क्षेत्र सवालक, अवानकगार टायगर रिजर्व, बिलासपुर का पत्र क्रमांक/व.प्रा./मा.वि./2020/534 दिनांक 20.02.2020 द्वारा मेसर्स महाराष्ट्र स्टेट पावर जनरेशन कंपनी लिमिटेड द्वारा तमनार परिक्षेत्र में रायगढ़ वनमंडल अंतर्गत गारे पेल्गा सेक्टर-2 कोल ब्लॉक कुल रकबा 214.869 हे. के वनभूमि व्यववर्तन हेतु भारत सरकार द्वारा जारी पत्र दिनांक 08.08.2016 के शर्त क्रमांक 4(iii) में अधिसूचित शर्त के पालनार्थ वन्यप्राणी संरक्षण योजना तैयार कर इस कार्यालय को प्रस्तुत किया गया है। मुख्य वन संरक्षक, बिलासपुर वृत्त, बिलासपुर के पत्र क्रमांक/19 दिनांक 07.01.2021 द्वारा प्रस्तावित वन्यप्राणी संरक्षण एवं संवर्धन योजना पर अनुशंसा व्यक्त की गई है।

प्रस्तुत वन्यप्राणी संरक्षण योजना का गहन परीक्षण किया गया। परीक्षण करने पर कुछ कमियां पायी गयी, जिसके पूर्ति हेतु इस कार्यालय के पत्र क्रमांक/व.प्रा./प्रबंध-494/2466 दिनांक 30.06.2020 प्रेषित करते हुये प्रस्ताव में आवश्यक संशोधन समाविष्ट करने हेतु आवेदक संस्था को लेख किया गया था। आवेदक संस्था द्वारा उक्त कमियों को दूर कर पुनरीक्षित वन्यप्राणी संरक्षण योजना मुख्य वन संरक्षक (वन्यप्राणी) एवं क्षेत्र सवालक, अवानकगार टायगर रिजर्व, बिलासपुर का पत्र क्रमांक/व.प्रा./मा.वि./2020/2348 दिनांक 21.09.2020 द्वारा इस कार्यालय को प्रस्तुत किया गया है।

आवेदक संस्थान द्वारा प्रस्तुत वन्यप्राणी संरक्षण योजना का अनुमोदन करते हुये योजना में प्रावधानित राशि का कुल 03 वर्षों में उपयोग करते हुये परिशिष्ट में वर्षवार आबंटन किया जाता है। अनुमोदित योजना में वन्यजीव रहवारा सुधार, वन्यजीव संरक्षण, मृदा एवं जल संरक्षण कार्य, बारागाह विकास, तथा जन जागरूकता आदि से संबंधित राशि का विवरण परिशिष्ट-1 में दर्शित है (संलग्न)।

उक्त वन्यप्राणी संरक्षण योजना की लागत राशि रुपये 358.60 लाख वर्तमान दरों पर है। परियोजना में देरी होने से समय लागत बढ़ेगी, जिसमें प्राईस इन्डेक्स के हिसाब से वृद्धि होगी। परियोजना के क्रियान्वयन के समय जो भी लागत आयेगी वह प्रस्तावकों को वन विभाग में एकमुश्त जमा करानी होगी, जिससे मूल्य वृद्धि के प्रभाव को समाप्त किया जा सके। वन विभाग इस प्रकार जमा की गई राशि से वन्यप्राणी संरक्षण योजना में दर्शाये समय सारणी के अनुसार क्रियान्वित करेगा।

अनुमोदित वन्यप्राणी योजना में दर्शाये गये उपरोक्त घटकों के संगत फील्ड में किये जाने वाले कार्यों का कार्यवार/स्थलवार प्रोजेक्ट संबंधित कामण्डलाधिकारी के द्वारा तत्समय प्रचलित मार्गदर्शी सिद्धांतों (व्यय नार्गस, कार्य की प्रकृति, वन्यप्राणी प्रबंधन के संबंध में लागू होने वाले अन्य तकनीकी तथ्यों व निर्देशों) के अनुरूप तैयार कर राक्षमता-नुसार तकनीकी स्वीकृति/अनुमोदन हेतु अनुशंसा सहित संबंधित मुख्य वन संरक्षक को प्रेषित किया जावेगा। संबंधित मुख्य वन संरक्षक द्वारा प्रोजेक्ट की तकनीकी स्वीकृति/अनुमोदन की साथ मुख्य वन्यप्राणी अभिरक्षक छत्तीसगढ़ को प्रेषित किया जावेगा। प्रोजेक्ट की परीक्षण वन्यप्राणी प्रबंधन की उपयुक्तता की दृष्टि से किया जाकर मुख्य



वन्यप्राणी अभिरक्षक के द्वारा कार्य हेतु प्रशासकीय स्वीकृति जारी किये जाने की अनुशंसा के साथ प्रोजेक्ट, प्रशासकीय स्वीकृति/बजट आबंटन करने हेतु सक्षम अधिकारी को प्रेषित किया जावेगा। प्रशासकीय स्वीकृति आदेश जारी किये जाने के पश्चात ही कार्यों का क्रियान्वयन व.म.अ. द्वारा किया जावेगा।

वन्यप्राणी प्रबंधन योजना के कार्यों की मॉनिटरिंग का कार्य संबंधित मुख्य वन संरक्षक व मुख्य वन्यप्राणी अभिरक्षक छ.ग. द्वारा किया जावेगा। किये जा रहे कार्यों की भौतिक व आर्थिक प्रगति से मुख्य वन्यप्राणी अभिरक्षक को प्रतिमाह व.म.अ. द्वारा अवगत कराया जावेगा।

अनुमोदित वन्यप्राणी संरक्षण योजना की एक प्रति संलग्न प्रेषित है। कृपया वन्यप्राणी संरक्षण योजना में प्रावधानित राशि रुपये 358.60 लाख एकमुश्त जमा करने हेतु परियोजना प्रस्तावकों को आदेशित करें।

संलग्न- परिशिष्ट एवं प्रस्ताव की 01 प्रति।

प्रधान मुख्य वन संरक्षक (व.प्रा.) सह मुख्य वन्यप्राणी
अभिरक्षक, छ.ग., अटल नगर, रायपुर

पृ.क्रमांक/व.प्रा./प्रबंध 494/246

नवा रायपुर, दिनांक 10.01.2021

प्रतिलिपि सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित :

1. अपर प्रधान मुख्य वन संरक्षक (गू. प्रबंध) नवा रायपुर।
2. मुख्य वन संरक्षक बिलासपुर वृत्त बिलासपुर।
3. मुख्य वन संरक्षक वन्यजीवन और क्षेत्रीय निदेशक, अवानकगार टायगर रिजर्व बिलासपुर।
4. वनमंडलाधिकारी रायगढ़ वनमंडल रायगढ़।
5. मुख्य अभियंता मेसर्स महाराष्ट्र स्टेट पावर जनरेशन कंपनी लिमिटेड।

प्रधान मुख्य वन संरक्षक (व.प्रा.) सह मुख्य वन्यप्राणी
अभिरक्षक, अटल नगर, रायपुर, छ.ग.



Table No.-1**Expenditure on Soil and Water Conservation work**

S.No.	Name of Nala	Catchment Area (Ha.)	Forest Area (Ha.)	Work Name	Quantity				Unit	Rate (in Lakh)	Amount in (in Lakh)
					Total	Y (1)	Y (2)	Y (3)			
1	GerwaniNala	2804	1357	BWCD	39	15	15	9	No.	0.040	1.56
2	GerwaniNala			LBCD	14	5	5	4	No.	0.100	1.40
3	GerwaniNala			GS	6	3	2	1	No.	1.250	7.50
	Total	2804.00	1357.00		59	23	22	14			10.46
4	BanjariNala	2556	1760	BWCD	132	50	50	32	No.	0.040	5.28
5	BanjariNala			LBCD	23	10	8	5	No.	0.100	2.30
6	BanjariNala			GS	7	3	2	2	No.	1.250	8.75
7	BanjariNala			TALAB	1	1	-	-	No.	25.000	25.00
8	BanjariNala			SCT	10000	4000	4000	2000	No.	0.003	30.00
	Total	0.00	0.00		10163	4064	4060	2039			71.33
9	GardharasiNala	859	378	BWCD	14	6	5	3	No.	0.040	0.56
10	GardharasiNala			LBCD	4	2	1	1	No.	0.100	0.40
11	GardharasiNala			GS	1	1	-	-	No.	1.250	1.25
12	GardharasiNala			SD	1	1	-	-	No.	35.000	35.00
	Total	0.00	0.00		20	10	6	4			37.21
13	JanjgirNala	1389	609	BWCD	15	7	5	3	No.	0.040	0.60
14	JanjgirNala			LBCD	10	5	3	2	No.	0.100	1.00
	Total	1389.00	609.00		25	12	8	5			1.60
15	ChirwaniNala	1113	862	LBCD	49	20	20	9	No.	0.100	4.90
16	ChirwaniNala			GS	6	3	2	1	No.	1.250	7.50
	Total	2502.00	1471.00		55	23	22	10			12.40
	Grand Total	6695.00	3437.00	Total	10322	4132	4118	2072			133.00

Table No.-2**EXPENDITURE ON WILDLIFE CONSERVATION**

S. No.	ITEM	Year (1)	Year (2)	Year (3)	TOTAL AMOUNT IN INR (LUMP SUM)
IMPROVEMENT OF FOOD					
1	Pasture Development including uprooting of lantana and other unwanted weeds	15,00,000	10,00,000	10,00,000	35,00,000
2	Control of Grazing	5,00,000	2,00,000	2,00,000	9,00,000
3	Weed Control	1,00,000	1,00,000	1,00,000	3,00,000
4	Burning regime, seeding and grass cutting.	1,00,000	1,00,000	1,00,000	3,00,000



5	Development of brows; fruit, seeds & mast.	4,00,000	4,00,000	4,00,000	12,00,000
IMPROVEMENT OF COVER					
1	Escape Cover	5,00,000	3,00,000	-	8,00,000
2	Ambush Cover	3,00,000	1,00,000	1,00,000	5,00,000
3	Reproductive Cover	3,00,000	1,00,000	1,00,000	5,00,000
4	Special Refuges	3,00,000	1,00,000	1,00,000	5,00,000
5	Shade and resting places	10,00,000	2,50,000	2,50,000	15,00,000
CREATION OF CONSERVATION AWARENESS					
1	Provision of salt licks	3,00,000	1,00,000	1,00,000	5,00,000
2	Development of cattle sheds	10,00,000	5,00,000	5,00,000	20,00,000
TOTAL					1,25,00,000

Table No.-3

Proposed Budget for "VULTURE" Habitat Plan

S. N.	Components & Subcomponents	Discription	Execution periods (in Year)	Unit	Quantity	Cost per Unit (in Lac)	Year wise cost estimate (in lac)			
							Y-1	Y-2	Y-3	Total
1	2	3	4	5	6	7	8	9	10	11
1.	Project Construction	DPR by Doing field Survey to Prepare	1	Forest Division	1	0.30	0.30	0.00	0.00	0.30
TOTAL:-			1		1	0.30	0.30	0.00	0.00	0.30
2. Avifauna (Vulture) Alternate Habitate Plan: -										
2.1	Artificial Nesting	Artificial Nest Construction	2	No. of Nest	200	0.01	2.00	0.00	0.00	2.00
TOTAL:-			2		200	0.01	2.00	0.00	0.00	2.00
3. Area Conservation and Promotion through Forest management committee: -										
3.1	Capacity Development of joint Forest management committee members	To increase Awareness of committee members regarding bird enhance.	3	No. of Financial year	3	0.30	0.30	0.30	0.30	0.90
S.N Components & Sub Components Discription Execution periods (in Year) Unit Quantity Cost per Unit (in Lac) Year wise cost estimate (in lac) Y-1 Y-2 Y-3 Total										
1	2	3	4	5	6	7	8	9	10	11
3.2	Field Protection and Promotion work	2 Area Conservation and augmentation through Vulture protectors	3	No. of Financial year	2	1.20	0.80	0.80	0.80	2.40
TOTAL:-					5	1.50	1.10	1.10	1.10	3.30



4.	Bird Survey and Project impact Study: -									
4.1	Project co-ordinator Appointment and establishment Exp.	Project co-ordinator Post creation	3	No. of Staff	1	1.50	0.50	0.50	0.50	1.50
4.2	Tranning of Project co-ordinator and Staff etc.	Staff tranning and Field trip	1	No. of Financial year	1	0.30	0.50	0.00	0.00	0.50
4.3	Survey, Study work and report prepration	Establishment and Execution	3	No. of Financial year	3	0.25	0.25	0.25	0.25	0.75
		TOTAL: -	7		5	2.25	1.25	0.75	0.75	2.75
5	Research & Specialist services	Research, Field trip & Specialist services	1	No. of Financial year	3	0.35	0.25	0.50	0.30	1.05
6	Evaluation and Monitoring	-	3	No. of Financial year	3	0.15	0.15	0.15	0.15	0.45
7	Administrative Expense	Others Expense	3	No. of Financial year	3	0.15	0.15	0.15	0.15	0.45
		TOTAL: -	7		9	0.65	0.55	0.80	0.60	1.95
		Grand TOTAL: -	23	-	22	4.71	5.20	2.65	2.45	10.30

Proposed Budget for "PEAFOWL & PEACOCK" Habitat Plan

S.N	Components & Subcomponents	Discription	Executi on periods (in Year)	Unit	Qua ntity	Cost per Unit (in Lac)	Year wise cost estimate (in lac)			
							Y-1	Y-2	Y-3	Total
1	2	3	4	5	6	7	8	9	10	11
1.	Project Construction	DPR by Doing field Survey to Prepare	1	Forest Division	1	0.30	0.30	0.00	0.00	0.30
		TOTAL: -	1		1	0.30	0.30	0.00	0.00	0.30
2.	Avifauna (Vulture) Alternate Habitate Plan: -									
2.1	Artificial Nesting	Artificial Nest Construction	2	No. of Nest	200	0.01	2.00	0.00	0.00	2.00
		TOTAL: -	2		200	0.01	2.00	0.00	0.00	2.00



3. Area Conservation and Promotion through Forest management committee: -										
S.N	Components & Subcomponents	Discription	Executi on periods (in Year)	Unit	Qua ntity	Cost per Unit (in Lac)	Year wise cost estimate (in lac)			
							Y-1	Y-2	Y-3	Total
1	2	3	4	5	6	7	8	9	10	11
3.1	Capacity Development of joint Forest management committee members	To increase Awareness of committee members regarding bird enhance.	3	No. of Financial year	3	0.30	0.30	0.30	0.30	0.90
3.2	Field Protection and Promotion work	2 Area Conservati on and augmentati on through Peafowl protectors	3	No. of Financial year	2	1.20	0.80	0.80	0.80	2.40
		TOTAL: -	6		5	1.50	1.10	1.10	1.10	3.30
4. Bird Survey and Project impact Study: -										
4.1	Project co-ordi nator Appoint- ment and esta- blishment Exp.	Project co- ordi nator Post creation	3	No. of Staff	1	1.50	0.50	0.50	0.50	1.50
4.2	Tranning of Project co-ordi nator and Staff etc.	Staff tranning and Field trip	1	No. of Financial year	1	0.50	0.50	0.00	0.00	0.50
4.3	Survey, Study work and report prepration	Establishm ent and Execution	3	No. of Financial year	3	0.25	0.25	0.25	0.25	0.75
		TOTAL: -	7		5	2.25	1.25	0.75	0.75	2.75
5	Research & Specialist services	Research, Field trip & Specialist services	1	No. of Financial year	3	0.35	0.25	0.50	0.30	1.05
6	Evaluation and Monitoring	-	3	No. of Financial year	3	0.15	0.15	0.15	0.15	0.45
7	Administrative Expense	Others Expense	3	No. of Financial year	3	0.15	0.15	0.15	0.15	0.45
		TOTAL: -			9	0.65	0.55	0.80	0.60	
		Grand TOTAL			220	4.71	5.20	2.65	2.45	10.30




Table No.-4

PROPOSED EXPENDITURE ON ELEPHANT CONSERVATION

S. No.	Item	Year (1)	Year (2)	Year (3)	Total Amount (Lakh Rs.)
1	Vehicle for movement of monitoring of Elephant's movement	15.00	-	-	15.00
2	Installation of Elephant Tracking System	5.00	-	-	5.00
3	Operation of Elephant Tracking System	4.00	3.00	3.00	10.00
4	Fodder Plantation	10.00	2.50	2.50	15.00
5	Bamboo Brakes	3.00	1.00	1.00	5.00
6	Plantation of Fruit Trees	6.00	2.00	2.00	10.00
7	Construction of Series of Tanks	5.00	-	-	5.00
8	Biodiversity Conservation	3.00	1.00	1.00	5.00
9	Maintenance of Biodiversity Records	4.00	3.00	3.00	10.00
	Total	55.00	12.50	12.50	80.00

Summary of Expenditure on Wildlife Conservation Plan

S.No.	Expenditure	Amount (in lakhs)
1	Soil and water conservation work	133.00
2	Forest conservation for wildlife	125.00
3	Vulture Habitate Plan	20.60
4	Elephant conservation	80.00
	Grand Total	358.60


**Principal Chief Conservator of Forest, Cum
Chief Wildlife Warden
Chhattisgarh, Naya Raipur**



OKM

MAHARASHTRA STATE POWER GENERATION COMPANY LIMITED
2nd Floor Prakashgad Building, G-9
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FOREST CONSERVATION ACTION PLAN FOR WILD LIFE FOR GARE PELMA SECTOR-2, COAL BLOCK -II, TAMNAR, RAIGARH C.G.



Conservation Cost **Rs. 358.60 LAKHS**

Plan Period **2020-21 to 2025-26**



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INDEX

S.N.	PARTICULARS	P.NO.
1.	TEAM OF EXPERTS	I
2.	ACKNOWLEDGEMENTS	II
3.	Chapter I : PROJECT INTRODUCTION	5-25
4.	Chapter II: OBJECTIVES & METHODOLOGY	26-28
5.	Chapter III : STATUS OF FLORA AND FAUNA	29-54
6.	Chapter IV : CONSERVATION ACTION PLAN FOR WILD LIFE	55-79
7.	Chapter V : AVIFAUNA (VALTURE & PEA FOWL & PEACOCK) ALTERNATIVE HABITATE PLAN)	80-88
8.	Chapter VI : CONSERVATION PLAN FOR ELEPHANT	89-97
9.	CHAPTER VII : FINANCIAL PROJECTION	98-106
10.	CHAPTER VIII : CONCLUSION AND RECOMMENDATION	107-108
11.	ANNEXURES	109-114



TEAM OF EXPERTS

FOR

FOREST CONSERVATION ACTION PLAN FOR WILDLIFE

FOR

G a r e P a l m a S e c t o r I I C o a l B l o c k

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LNC team has contributed their best of effort to meet all the expectations; M/s MAHAGENCO has had from us. We are confident that sustained partnership with MSPGCL, MUMBAI would continue to take up new dimensions in future.

LNC looks forward to receive the same level of generosity, support in the forth- coming times also. Last but not the least; we extend our whole hearted thanks to all those, who have directly or indirectly helped us to complete our task.



AN INTRODUCTION

FOREST CONSERVATION ACTION PLAN FOR WILDLIFE

Fauna Conservation: Also known as Conservation zoology is the scientific study of the nature and status of earth biodiversity with the aim of protecting wildlife by their natural habit, habitats and ecosystem from excessive rates of extinction. It is an interdisciplinary subject drawing on Biological Sciences, Geography, Geology, Economics, and the practice of Natural Resources Management. The Forest Conservation is the integral part of it.

Goals at global level are based on protecting the living organisms on the planet (biosphere) and Earth's many cultures and people (ethnosphere). Both the biosphere and ethnosphere are made up of interacting communities of organisms and the environments in which they live, called ecosystems. This conservation plan is an effort in protecting ecosystems and to support sustainable communities and economies.

The goal at local level, is to protect the natural ecosystems around the Gare Palma Sector-II, Coal Block II by creating Forest Conservation Action Plan that enable local stakeholders on natural resources to mitigate changes in ecosystems, conditions of Flora, Fauna & biodiversity, caused or to be caused by their activities for human communities.

Geographical Information Systems (GIS) are one of our key conservation planning tools through which we laid sample plots at pre-designed location and intervals. It delivers uniformly representative sampling area. This technology also makes a permanent database of the locations of sample plots and the primary data collected for future reference.



CHAPTER – I PROJECT INTRODUCTION

M/s Maharashtra State Power Generation Company Limited (MSPGCL, also known as MAHAGENCO) has been allotted Gare Palma Sector-II Coal Mine (GP- II Coal Mine) vide Ministry of Coal (MoC) Corrigendum No. 1 (Dated 17 Feb 2017) to the Allotment order no.103/30/2015/NA, dated 31 - 08-2015 under clause (c) of sub-rule (2) of Rule 13. MSPGCL will develop the GP-II Coal mine and supply the coal to their thermal power plants

1.1 EXTENSION

The "Gare Palma Sector – II Coal Block area lies in Mand Raigarh Coalfield in Raigarh district of Chhattisgarh state. The mine site is located in Tihli Rampur, Kunjemura, Gare, Saraitola, Murogaon, Radopali, Pata, Chitwahi, Dholnara, Jhinka Bahal, Dolesara, Bhalumura, Sarasma and Libra villages.

The Government of India Ministry of Coal O/o the nominated Authority vide Letter no.F.No.103/30/2015/NA dated 17.02.2017, corrigendum no.1 issued in the annexure-1 of the original allotment order, Part-A is modified as given below.

Annexure-1: Particulars of the mine.

Part-A Description of the mine

Name of Coal Mine	Gare Palma Sector-II
Latitude	22°6'24.215"N to 22°10'49.391" N
Longitude	83°26'15.433" E to 83°31'12.632" E
Coalfield	Mand Raigarh
Name of Coal Mine	Gare Palma Sector-II
Villages	Bhalmura, Chitwahi, Dolnara, Dholesara, Gare, Jhinkabahal, Kunjemura, Libra, Muragaon, Pata, Radopalli, Saraitola, Sarasma, Thlirampur.
District	Raigarh
State	Chhattisgarh



The same CMPDI demarcation the area according to the new latitude and longitude as given above and conform the demarcation vide letter no. CMPDI/BD/C(900)/23 dated 13.01.2017 along with the Report on Marking on Ground & Map Preparation of Coal Block Boundary of Gare Palma Sector-II of M/S Mahagenco in Raigarh District, Chhattisgarh (Revised).

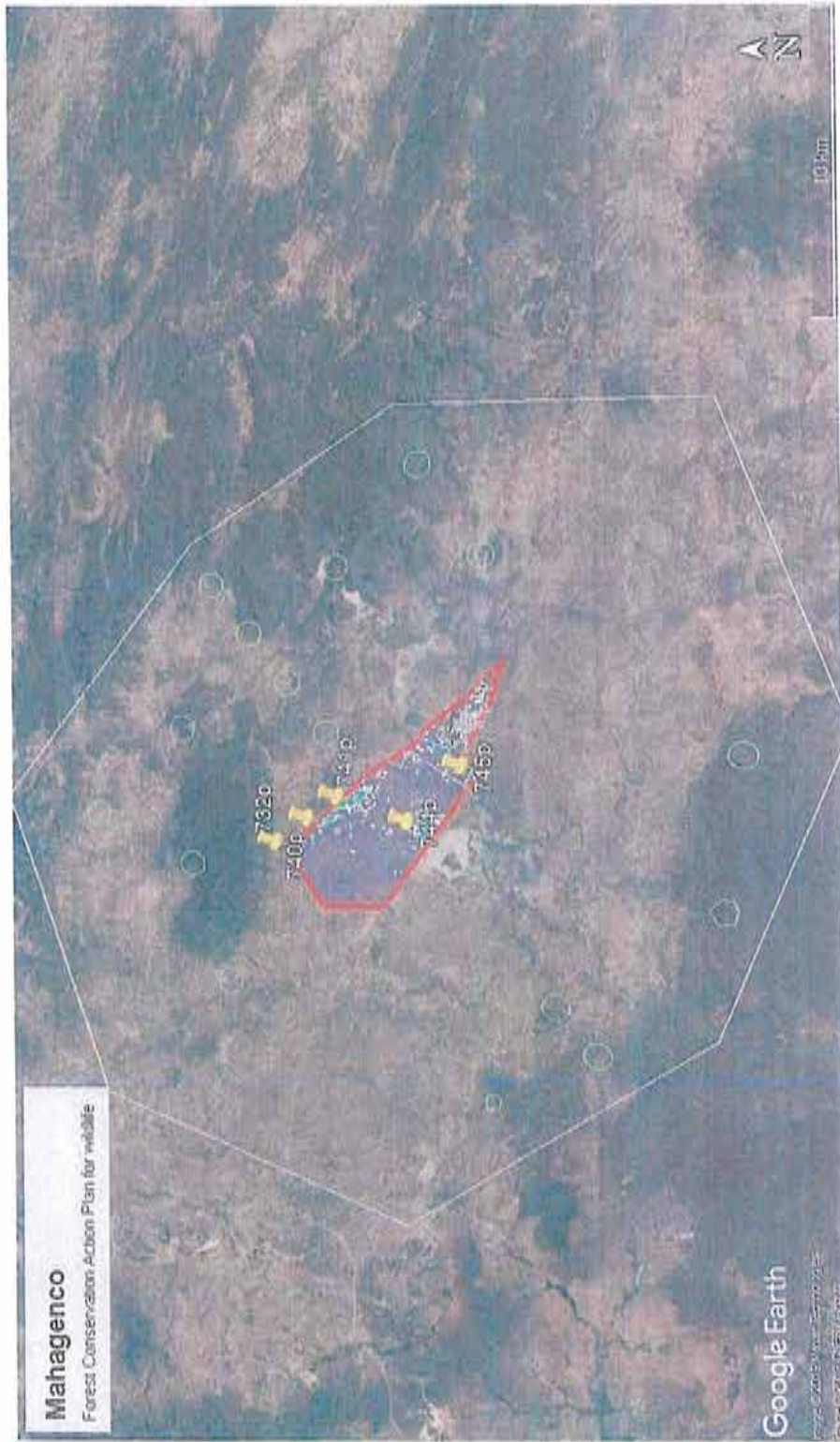
Details of the Boundary Line Coordinates is given in the following Table:

CARDINAL POINT	LATITUDE (DMS)	LONGITUDE (DMS)
A	22°08'51.495N	83°26'15.580E
B	22°10'05.178N	83°26'15.433E
C	22°10'49.891N	83°27'26.624E
D	22°09'09.892N	83°28'57.871E
E	22°08'03.774N	83°29'49.271E
F	22°06'24.215N	83°31'12.632E
G	22°07'18.066N	83°29'13.857E
H	22°06'50.059N	83°29'15.318E

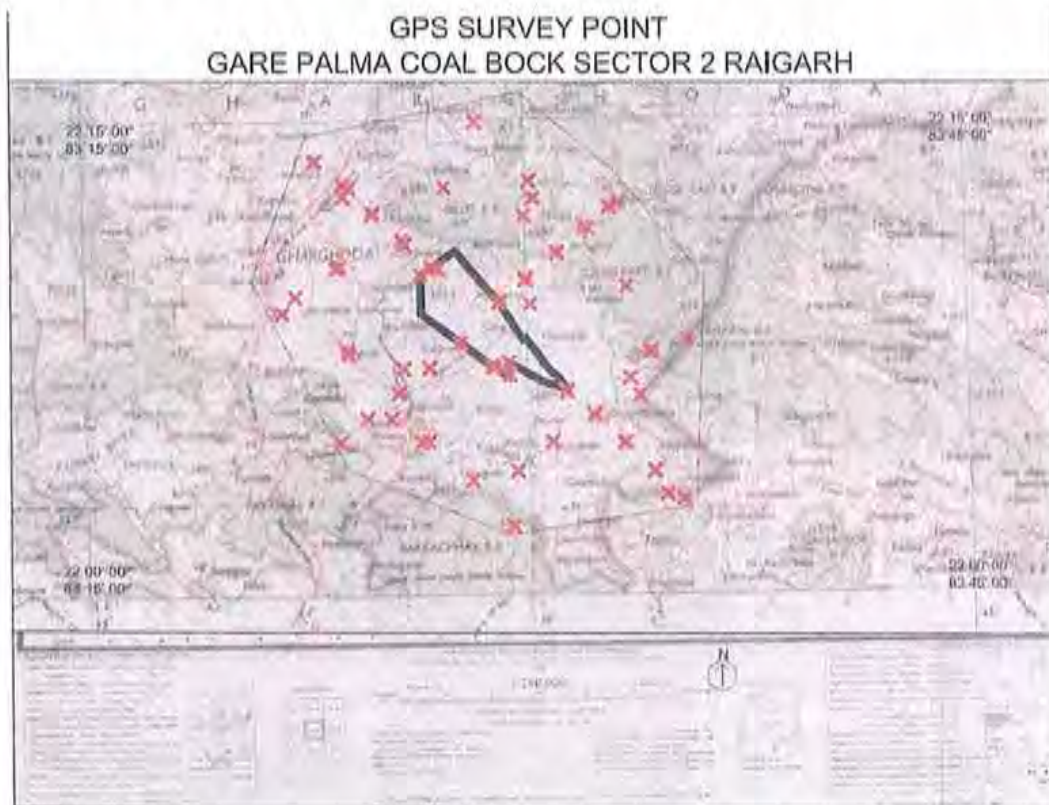
1.2 AREA

Project boundary, Block boundary and ML boundary are the same (2583.486Ha). The block boundary of Gare Sector-II area forms a zigzag line especially at its southern limit. The study area is superimposed on the google earth for planning of sample plots, finding the coordinates and locating the same points on the ground with the help of handheld GPS and according to the Plan the sample plots are laid. The Locations are depicted on the following Google Earth Map.





The study area is also depicted in the following Topo-sheet, The black thick line denotes the actual boundary line while thin line all around this denotes the 10 km off-set from the boundary line which encompasses the study area. The red cross denotes the center of sample plots for the collection of primary data.



1.3 ACCESSIBILITY

The Gare Palma area is situated around 35 km towards north from Raigarh Township, which is also the nearest railway station on Mumbai-Howrah main line of SE Railway. Raigarh is a station on the Tatanagar-Bilaspur section of Howrah-Nagpur-Mumbai line the broad gauge line. It is well connected with many major cities like New Delhi, Mumbai, Kolkata, Kota, Patna, Ahmedabad, Jaipur, Bhubaneswar, Nagpur, Vishakhapatnam etc., while for other destinations it has to depend upon Bilaspur railway station, which is a regional rail hub connected to every part of country and 132 km from Raigarh district headquarter.



The block is connected by road from Raigarh via Punjipathara by State Highway. Punjipathara village is situated on Raigarh-Ghargoda main road. The distance from Raigarh to Ghargoda is around 40 Km. The road distance between Raigarh to Punjipathara is about 20 Km and Punjipathara to Ghargoda is 20 Km towards north. From Punjipathara the road leads to the Gare Palma area via Tamnar TPP area situated at a distance of 10 Km on Punjipathara- Milupara road which passes through the block. Tamnar is situated in the south-western part of the Gare Palma Sector-I area in the sub block „F“. A network of roads is present within the block.

Airport: As of now, Raigarh has an air strip, which is primarily used for small aircraft and choppers. Raigarh Airport near Kondatarai is 9 kilometres (5.6 mi) from the city center. A Four Lane road is proposed on NH 216 which will connect the airport to the city more efficiently. A private airport owned by the Jindal Steel and Power Limited is located 10 kilometers (6.2 mi) north-west of the city.

1.4 PHYSIOGRAPHY

The coalfield is characterized by undulating and rolling topography, consisting of hills interspersed with broad valleys. The general elevation in the block area ranges from 242 m to 303 m above MSL and the surrounding area (upto 10 km) varies from 240 m to 640 m above MSL. The slope is towards south. The hills are relict type and rise about 450m above MSL. The southerly flowing perennial Mand River with its tributaries constitute the main drainage of the area. The Kelo River, a tributary of Mahanadi, drains the eastern part of the coalfield.

The topography of Gare-Palma Area is mostly covered by softer horizon and in general represents an undulating terrain, more resistant sedimentary rocks stand out as ridges, rising as high as 580m above MSL (Silot Pahar) in the north west and 600m above MSL (Morga Pahar) in the north east.

The block exhibits undulating topography. Kelo Nadi flows from north to south through the South-Eastern part of the block. A few ponds are present within the block.



1.5 CLIMATE

The climate of the study area is of subtropical type, and is characterized by an oppressive hot summer, a mild winter and well distributed rainfall during the south western monsoon season. The year may be divided into four seasons. The summer season lasts from March to the middle of June, and the period from June to September is the southwest monsoon season. October and November constitute the post monsoon season and the cold season is from December to February. The nearest meteorological station of IMD is at Raigarh.

1.5.1 Temperature

As per the monthly average of daily maximum and minimum temperatures collected from IMD Station, Raigarh, the monthly mean of minimum temperatures ranges from 9.32°C in January to 22.97°C in May. The monthly mean of maximum temperature ranges from 31.40°C in January to 44.62°C in May.

Summer is very hot & oppressive. The average rainfall of the district ranges from 1200 mm to 1300 mm. July being the rainiest month & may the driest. Dec. and Jan. are the coldest month with the minimum s. May the hottest month with 44.62°C maximum temperature. The summer season starts from middle of the march to the middle of June to September. Winter rain is scanty and only 91.56 mm rain is recorded in the area with average 6 rainy days in the season Winter season start from October to February. Winters are not very long. Difference in minimum temperature is high between Nov. to Feb. and difference is lowest in rainy season. The details of temperature are shown in the Table No. 1.3.

Table No. 1.3 Month wise Average Maximum and Maximum Temperatures (°C)

Table No. 1.3

Particular	Jan	Feb.	Marc h	April	May	June	July	Aug.	Sep.	Oct.	Nov	Dec	Avg.
Av.Max.	27.78	30.09	34.40	39.78	40.86	36.63	31.95	31.03	31.78	31.97	29.39	27.06	32.72
Av. Min.	12.22	16.15	20.66	25.00	27.27	26.20	24.07	24.60	24.42	21.94	17.23	13.05	21.06
Maximum	31.40	34.67	39.92	43.05	44.62	43.11	36.12	32.81	35.52	34.66	32.95	30.36	36.58
Minimum	9.32	11.92	16.06	20.60	22.97	23.13	22.58	23.09	22.43	18.45	13.44	8.86	17.73



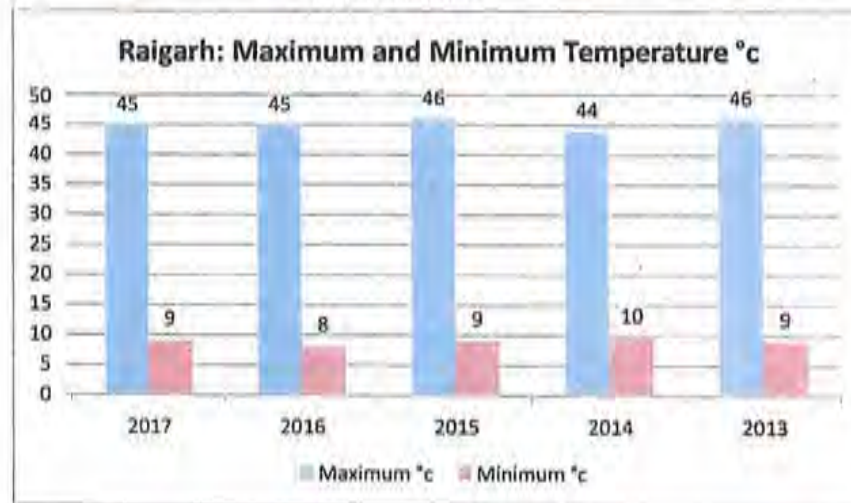
Details of year Wise Temperature for the last five years is given in the Table no.1.4

Table No. 1.4

Year	Maximum °c	Minimum °c
2017	45	9
2016	45	8
2015	46	9
2014	44	10
2013	46	9

The Comparative Status on the Last Five Years Temperature can be adjudged through Chart No. 1.1

Chart No.1.1



1.5.2 Rainfall

The rainfall does not show any cyclic occurrences and shows wide and erratic variations, ranging from as low as 0 mm in 2015 to 339.7 mm. The monsoon season is spread over the months from June to September.

The average rainfall of the district varies from 1200 mm to 1300 mm and the area fall in tropical / subtropical region and observes maximum rain from south west monsoon. In winter season then north-east monsoon is also effective to some extent and gives very

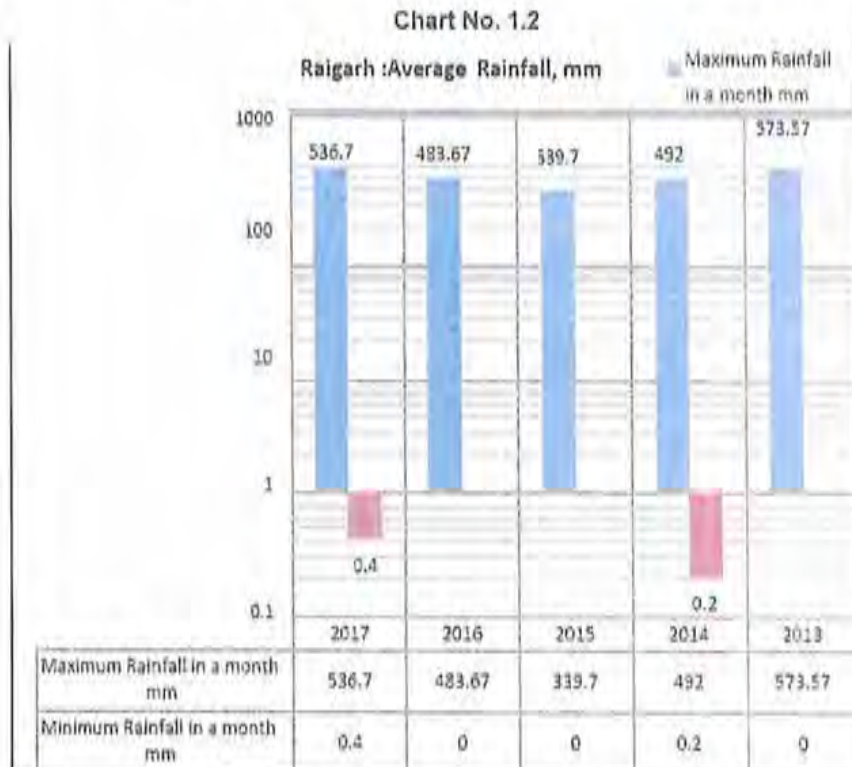


small quantity of has been observed that the month of Feb., March, April, May & October, Nov., Dec. and Jan. are mainly dry months with scanty or on rains relative humidity is least in April and May. The details of rainfall for the Last Five Years are shown in Table No.1.5.

**Details of year Wise Rainfall for the last five years is given in the Table no.1.5
Table No.1.5**

Year	Average Rainfall	
	Maximum Rainfall in a month mm	Minimum Rainfall in a month mm
2017	536.7	0.4
2016	483.67	0
2015	339.7	0
2014	492	0.2
2013	573.57	0

The Comparative Status on the Last Five Years Rainfall can be adjudged through Chart No. 1.2



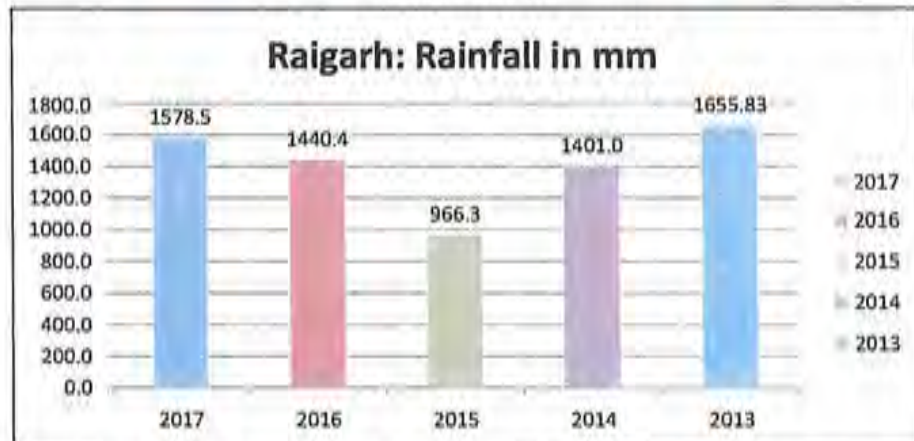
Details of year Wise Rainfall for the last five years is given in the Table no. 1.6.

Table No.1.6

Year	Total Rainfall in mm.
2017	1578.5
2016	1440.4
2015	966.3
2014	1401.0
2013	1655.83

The Comparative Status on the Last Five Years Rainfall can be adjudged through Chart No. 1.3

Chart No. 1.3



Month Wise Average Rainfall for the last five years is given in the Table no.

1.7 Table no. 1.7

Average Rains				
S.no.	Month	Rainfall (mm)	Avg. Rainfall Days	Percentage of Total Rainfall
1	January	17.41	1.09	1.27
2	February	14.01	0.71	1.02
3	March	17.94	1.00	1.31
4	April	12.34	0.91	0.90
5	May	30.02	1.27	2.19
6	June	170.87	6.27	12.46
7	July	378.96	10.63	27.63
8	August	409.55	12.52	29.86
9	September	260.31	9.27	18.98



10	October	48.40	2.45	3.53
11	November	9.35	0.55	0.68
12	December	2.39	0.36	0.17
Total		1371.56	47.04	100.00

1.5.3 Temperature Effects on Avifauna and Flora

Table no. 1.8

S.no.	Temperature Variation	Effects	Months
1.	More than 47°C	Highly Adverse	May, June
2.	Less than 8° C	Highly Adverse	Dec, Jan,
3.	From 9° C to 20°C	Average Suitable effects	Feb, March, Oct, Nov.
4.	From 20° C to 35° C	Best Suitable	March, July, Aug, Sep, Feb

1.5.4 Wind speed and winddirection

The wind speed and direction for long term period from 1976-1991 have been studied through the Windrose diagrams supplied by IMD, Raigarh, for 8.30 hrs and 17.30 hrs respectively. An observation of the morning Windrose shows that the predominant wind direction is from NE during winter season (October to March) and SW during summer and monsoon seasons.

As per the evening Windrose, the predominant wind direction is from NE between October and January, NW between February and May and SW between June and September. The general wind speed ranges form 1 to 5 km/hr throughout the year. However winds in the speed ranging from 6-11 kmph and 12-19 kmph also occur.

Relative humidity

The relative humidity varies from 27% in (May) to 82% (August) during evening and 42% (May) to 86 % (August) during morning.

Month wise Maximum Wind Speed (mph) in Table No. 1.9

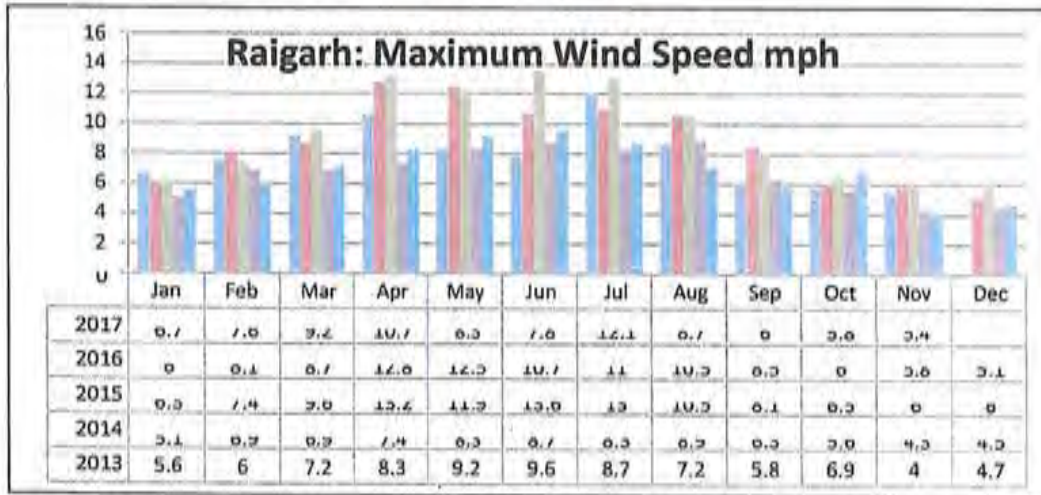
Table No. 1.9

Year	Maximum Wind Speed mph											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017	6.7	7.6	9.2	10.7	8.3	7.8	12.1	8.7	6	5.8	5.4	
2016	6	8.1	8.7	12.8	12.5	10.7	11	10.5	8.5	6	5.8	5.1
2015	6.3	7.4	9.6	13.2	11.9	13.6	13	10.5	8.1	6.5	6	6
2014	5.1	6.9	6.9	7.4	8.3	8.7	8.3	8.9	6.3	5.6	4.3	4.5
2013	5.6	6	7.2	8.3	9.2	9.6	8.7	7.2	5.8	6.9	4	4.7
	5.94	7.2	8.32	10.48	10.04	10.08	10.62	9.16	6.94	6.16	5.1	5.075



The Comparative Status on the Last Five Years Wind Speed can be adjudged through Chart No. 1.4

Chart No. 1.4



The Comparative Status on the Last Five Years Average Maximum Wind Speed can be adjudged through Chart No. 1.5

Chart No. 1.5

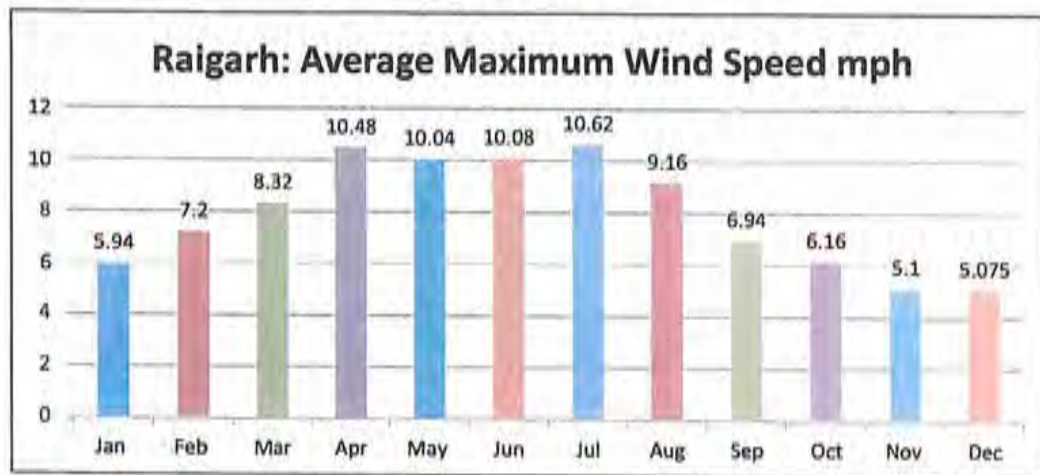


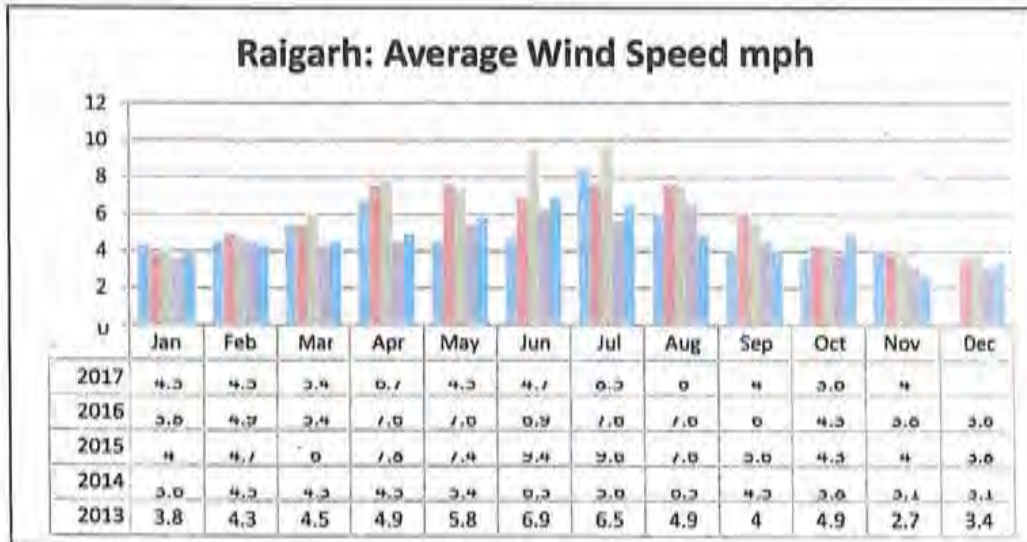
Table No. 1.9 Month wise Average Wind Speed (mph)

Table No. 1.10

Year	Average Wind Speed in mph											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017	4.3	4.5	5.4	6.7	4.5	4.7	8.5	6	4	3.6	4	
2016	3.8	4.9	5.4	7.6	7.6	6.9	7.6	7.6	6	4.3	3.8	3.6
2015	4	4.7	6	7.8	7.4	9.4	9.6	7.6	5.6	4.3	4	3.8
2014	3.6	4.5	4.3	4.5	5.4	6.3	5.6	6.5	4.5	3.8	3.1	3.1
2013	3.8	4.3	4.5	4.9	5.8	6.9	6.5	4.9	4	4.9	2.7	3.4
	3.9	4.58	5.12	6.3	6.14	6.84	7.56	6.52	4.82	4.18	3.52	3.475

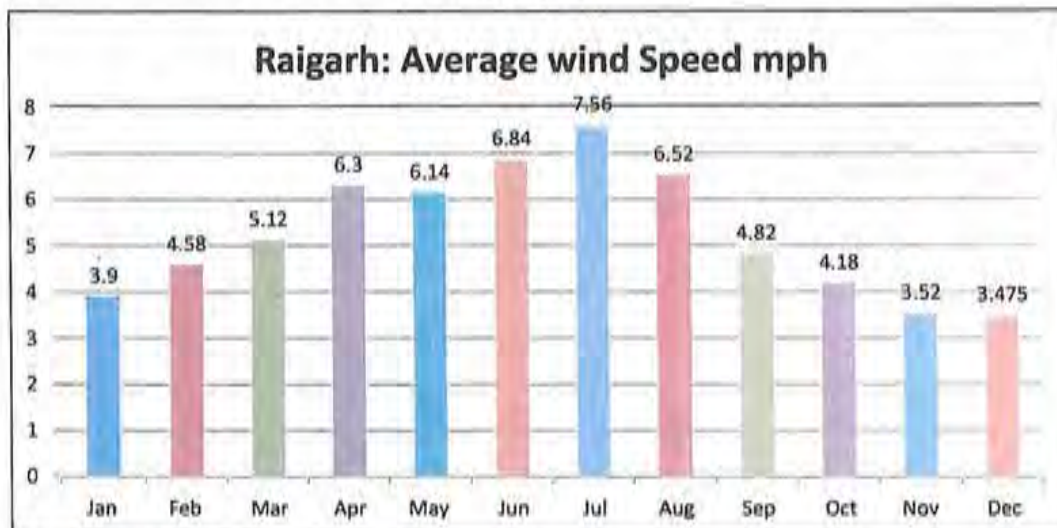
The Comparative Status on the Last Five Years Wind Speed can be adjudged through Chart No. 1.6

Chart No. 1.6



The Comparative Status on the Last Five Years Wind Speed can be adjudged through Chart No. 1.7

Chart No. 1.7



Details of year Wise Humidity for the last five years is given in the Table no.

1.8 Table no. 1.11 Humidity

Year	Maximum %	Minimum %
2017	100%	5%
2016	100%	8%
2015	99%	10%
2014	100%	9%
2013	100%	6%



The Comparative Status on the Last Five Years Humidity can be adjudged through
Chart No. 1.8

Chart No. 1.8



1.6 GEOLOGY & ROCK FORMATIONS

1.6.1 General

Mand-Raigarh coalfield forms the southern part of Mahanadi valley and it is situated mostly in Raigarh district and a smaller part lying in Korba district of Chattisgarh state. Exploration in this vast coalfield is continuing since long and may continue in future also mainly by MECL, G.S.I. and C.M.P.D.I.L.

1.6.2 Geology of Mand-Raigarh Coalfield

The extensive occurrences of Barakar and Supra-Barakar rocks amidst isolated Talchir outcrops spanned between latitudes N 21°45" to 22°42" and longitudes E 83°01" to 83°44", constitutes Mand-Raigarh Coalfield. It is situated between Ib-River Coalfield in the southeast and Korba Coalfield in the west with more or less similar stratigraphic and tectonic setting. The coal measures in the Mand-Raigarh basin are exposed in three well defined patches due to erosion of the overlying Kamthi rocks along the drainage of the prominent rivers.



The generalized stratigraphy of Mand-Raigarh Coalfield is enumerated below in Table 1.12.

TABLE 1.12
GENERALISED STRATIGRAPHIC SUCCESSION

Age	Formation	Thickness (m)	Lithology
Recent	Soil Alluvium	3 m	Alluvial soil pebbly to bouldery bed with silty clay band, laterite etc.
Cretaceous to Eocene	Deccan Traps	-	Basalt flows & dolerite dykes.
Lower to Middle Triassic	Kamthi	2851	Poorly sorted, frequently ferruginous, coarse to very coarse grained, locally graded to pebbly, mega cross bedded sandstone containing brownish grey to buff coloured clay clasts. A fossiliferous red claystone to siltstone bed occurs at the base.
Upper Permian to Lower Permian	Raniganj	180	Mostly fine to medium grained, grayish white, micaceous sandstone and siltstone with claystone, shale, minor coarse grained sandstone and two coal seams of inferior grade.
	Barren Measure	300	Dominantly grey claystone/grey shale with siltstone and iron stone bands; interbanded sequence of fine to medium grained sandstone and shale.
	Barakar	425 - 800	Medium to coarse and very coarse grained even gritty, sandstone at the lower part followed upward by fine to medium grained assemblage with grey claystone/shale which become predominant towards the upper part, number of coal seams and carbonaceous shale.
	Karharbari	23	Mottled at places carbonaceous



Age	Formation	Thickness (m)	Lithology
	(?)		sandstone, frequently associated with pebbles of quartzite granite etc. of various shapes and sizes.
Upper Carboniferous to Lower Permian	Talchir	150+	Very fine to fine grained sandstone with siltstone and shale, occasionally greenish in nature, at places with matrix based variegated polymictic conglomerate.
Precambrian			Granitic gneisses, mica-schists quartzites, intruded by pegmatites and quartz veins.

The geological formations of Mand-Raigarh Coalfield are briefly described below: (Bull. GSI, Ser-A, No.45, Vol.-III, 1983).

1.6.3 Precambrian: The Precambrian rocks comprising Granite Gneiss, mica schist, Phyllites and Quartzites along with Quartz veins & Pegmatites occur along the northern, northeastern periphery. The strike of the foliation varies from E-W to N70oW – S70oE with 50o to 70o dip towards west.

1.6.4 Talchir formation: The Talchir sequence begins with tillite at the base and overlies the basement unconformably. It occurs as a continuous strip along the northern periphery of the basin. Along the southern boundary, Talchirs crop out as narrow, elongated discontinuous strips disrupted by faults. The Mand-Raigarh basin shows widespread development of basal tillite pointing to advancement of ice from the surrounding Precambrian uplands.

1.6.5 Karharbari Formation: Karharbari formation is developed in a limited area. It consists of mottled, at places carbonaceous sandstone, frequently associated with pebbles of quartzite, granite etc. of various shapes and sizes.

1.6.6 Barakar Formation: The Barakar formation conformably overlies the Talchir sediments over the major part of coalfield and covers a large tract within the coalfield. It is represented predominantly by multistoried cross-bedded feldspathic sandstones



which are highly kaolinised and friable with subordinate shales, carbonaceous shales and coal seams. The sandstones are mostly medium to very coarse grained and milky white to greyish white in color. The sandstones are arkosic in nature and often shows pronounced kaolinization. Exposures of fine-grained sandstone and grey to greyish black shale are very limited.

1.6.7 Barren Measure Formation: Barren Measure formation overlies conformably over Barakar formation. Barren Measure formation can be traced in the south eastern part between Gharghoda and Gare, besides sporadic occurrence in vicinity of Chhal and Kuremkela. This formation comprises of predominantly grey claystone/grey shale with siltstone and iron stone bands and interbanded occurrence of fine to medium grained sandstone & shale.

1.6.8 Raniganj Formation: Raniganj formation has been demarcated in south-eastern and south-western part, besides patchy occurrence in north-western part. It is represented by mostly fine to medium grained sandstone, siltstone with clay stone, shale, fine to coarse grained sandstone and coal seams / bands of inferior grade.

1.6.9 Kamthi Formation: The rocks of Kamthi formation are well exposed at higher contours of the flat topped hills. They not only occur in the intervening area between Mand Valley and Hasdo-Arand on the one side and the Raigarh Coalfield on the other, but also occur as irregular patches along the axial region of the Mand Valley. It is represented dominantly by coarse, friable, porous, brownish to red cross bedded sandstone and argillaceous beds. The nature of the contact between Kamthis & Barakars is variable and is somewhat discordant and at places the Kamthi strata overlap the older units.

1.6.10 Intrusive / Deccan Trap: A number of basic dykes, sills and flows have been observed in the Uprora-Porea area in the northern part of the coalfield. The basic rock comprises fine-grained Basalts to coarse-grained Gabbroid type. The flows at places have been altered to laterite. A dyke exposed north of Amaldih has been traced over a distance of 26.5 Km. in an east-west direction and another dyke exposed 0.8 Km. south of Porea is over 6 km length.



1.6.11 Coal seams

The regional exploration so far conducted & continuing till date in Mand-Raigarh Coalfield especially in the western part along the eastern bank of Mand river and northern part of Dharamjaygarh-Khargaon, Ongana - Potia as well as Chhal area, has revealed the presence of a number of coal seams.

Coal of this coalfield is generally banded in nature and it is not devolatilized. In general coal is low in rank, high in volatile matter and non-coking type.

1.6.12 Regional structure

The Mand-Raigarh Coalfield is an asymmetrical basin with an approximately NW-SE axis. It is a part of Ib-Mand-Korba master basin lying within the Mahanadi Graben. It displays a typical half-graben configuration, with the southern boundary marked by a major NW-SE zone of faulting coinciding with the trend of the Mahanadi Graben and the northern boundary not faulted over the major part. In the Mand Valley proper, the coal measures lying between Kharsia & Dharamjaygarh display a broad synclinal structure with its axis running just south of Sithra. The northern limb of the Mand river basin is exposed to the north of the Sithra-Dharamjaygarh area where the Barakar beds are found to strike broadly in NW-SE direction. The beds dip at low angle of 5° to 7° towards south-west. In the southern limb, the strike is approximately NW-SE with minor variations and the beds dip towards north-east.

The other structural element in this basin belt comprises normal Gravity faults. The available surface and sub-surface data indicate that the area lying on both sides of Mand river is traversed by number of sub-parallel faults of considerable linear extent, though the surface expressions of faults are very limited or entirely lacking. Two sets of faults trending WNW-ESE to NW-SE and N-S occur. The former generally has down throws against the dip i.e, towards north while the latter has easterly throw. The amount of throw varies from 10m to 150m.

1.7 Geology of Gare-Palma Sector- II block

Gare Palma Sector- II Coal Block is located in the south-eastern part of Mand-Raigarh



Coalfield. The Geology of the block is in conformity with the regional set up. Major part of Gare Palma Sector-II Coal Block is covered by Barakar Formation.

1.7.1 Geological succession in Gare Palma Sector-II coalblock

The geological succession evolved on the basis of exploration data generated in the block is given in the Table 4.2 below. While calculating the thickness of different stratigraphic formations, all the data generated by the boreholes in the block are considered.

TABLE 1.13
GEOLOGICAL SUCCESSION IN GARE PALMA SECTOR-II COAL BLOCK

Age	Formation	Thickness (m)	Lithology
Recent	Recent	0.50 to 15.00	Soil, alluvium
Lower Permian	Barakar	203.00 to 477.20	Fine, medium and coarse grained felspathic, grey sandstone, micaceous and laminated at places. Grey shale, fire clay, intercalation of shale and sandstone and carbonaceous shales with Coal Seams
Upper carboniferous to Permian	Talchir	0.30 to 45.90	Boulder bed, rhythmite, fine grained greenish sandstone, greenish to purple shales, Khaker coloured siltstones
----- Unconformity -----			
Archaeans	Pre-cambrian	0.10 to 12.50	Mica-schists, gneisses and quartzite.

Note: Thickness as intersected in boreholes.

1.7.1.1 Soil & Alluvium: A major part of the block is covered by a thin layer of soil and alluvium horizon. The weathering has affected all the strata below soil to a varying extent. The thickness of soil ranges from 0.50m (MMT-20) to 15.00 m (MMT-166). The depth of weathered zone varies from 0.50 m (MMT-124 & MMT-176) to 30.32 m (MMT-33).



1.7.1.2 **Intrusive:** The block is free from any intrusive.

1.7.2 Structure of the block

1. The structural interpretation is mainly based on the sub-surface data obtained during the course of exploratory drilling.
2. The general strike of coal horizons is NW-SE in the major part of the block with minor swings. The dip of beds varies from 2o to 4o towards south-west.
3. The block does not show major tectonic disturbances.

1.8 CORE ZONE

a) Core zone

The total area of 2583.486 Ha, covering part of the 14 villages is mostly in the form of private, government and forest land. Summary of the land details as per revenue and forest department records are given in Table 1.14

TABLE 1.14
EXISTING LAND DETAILS OF TOTAL AND APPLIED mining lease AREA (HA)

SN	Village	Revenue Forest area (Ha)	Forest area (Ha)	Total Area of the Village (Ha)
1	Bhalumura	1.214	0	23.658
2	Chitwahi	0	0	160.257
3	Dolesara	0	0	21.161
4	Dholnara	8.139	2.183	78.987
5	Gare	2.159	0	187.997
6	Jhinkabahal	0	7.612	9.073
7	Libra	13.216	0	147.125
8	Radopali	0.125	0	392.647
9	Tihlirampur	0	0	224.847
10	Sarasmal	15.887	0	95.542
11	Murogaon	8.216	48.515	375.132
12	Saraitola	18.729	11.533	206.426
13	Pata	17.259	29.892	401.941
14	Kunjemura	30.19	0	258.694
	Total	115.134	99.735	2583.48



CHAPTER II OBJECTIVES & METHODOLOGY

2.1 OBJECTIVES

The objectives for this study and plan are;

- ❖ To prepare list of plants and animals of the core and buffer zone along with classification as per Schedule given in the Wildlife (Protection) Act, 1972 (for fauna) and in the Red Data Book (for flora).
- ❖ To evaluate ecological sensitivity of the area.
- ❖ To explore whether the area forms a corridor for any endangered wildlife.
- ❖ Prepare a comprehensive Forest Conservation Action Plan for Wildlife ,including endangered/ endemic/ economically important biotic species found in the study area and
- ❖ Mitigation of any probable impact of mining on the movement of any endangered species using the area as corridor.

2.2 DATA COLLECTION

The data collection is done in pre-designed format especially for this specific purpose. In data collection the support and help of local forest officials are taken. Local senior citizens were employed for this specific project to help in identification of fauna and flora by direct and indirect method both.

Information on animals is collected through interviews from the villagers of the core and buffer zones.

2.3 LAYING OF SAMPLE PLOTS:

Sample plots are laid in core as well as in the buffer area adjoining to the boundary representing up to 10 km. Selection of center of the plot of 1 ha. i.e. the point of inter-section of two diagonals i.e. NE to SW and NW to SE of the plot is done. The length of each diagonal measures 141.42 m. After reaching the plot centrestout peg, fixed firmly on the ground in the center.



After fixing the plot centre fix the NE at 45^o, SE at 135^o, SW at 225^o, NW at 315^o corners of the plot by measuring 70.71 m. horizontal distance i.e. half of the diagonal by Steel tape in all four directions. These four corners is marked by thin poles / pegs.

Dimensions of the plot i.e. all sides measure 100 meters horizontal distance.

2.4 SAMPLING FOR TREE LAYER

Saplings and trees with a girth of 20cm or more were taken as trees. The core zone was divided on the map in to 100 x 100m squares. At the intersection of the lines one ha (100 x 100m sq) plots were taken. In total 14, such 1 ha sample plots were marked. The marked sample plots were reached with the help of GPS. Circumference of all the trees at the breast height is recorded species wise.

2.5 COLLECTION OF SECONDARY DATA

Secondary data is collected i.e., Compartment History prepared by the Forest Department, Working Plan of the Area other relevant records such as plantation journals and records of wild life / forest offence cases.

2.6 REVIEW / REFERENCE OF RELEVANT LITERATURE/BOOKS

To complete this study the information from published books, materials and scientific literature is relied upon.

The Team Leader Dr. M.L. Naik and Team Members having extensive previous experience in forestry, bio-technology and environmental assessments have supplemented this.

2.7 SAMPLING FOR SHRUB LAYER

Seedlings and saplings of trees and other woody shrubs were included in this category. Shrub layer was sampled with the help of 10 x 10m square quadrats, 14 within each 1 ha sample plot. Only the number of shrubs, species wise, was recorded.

2.8 SAMPLING FOR HERB LAYER



Small, non-woody plants were included in this category. The herb layer was sampled with the help of 1 x 1m quadrants. Like the shrub layer only the number of herbaceous plants, species wise, were counted.

2.9 DATA ANALYSIS

Frequency and density of all the species, in all the categories viz: tree, shrub and herb layer are calculated while for the tree layer density, frequency and basal area is calculated from these values relative frequency, relative density and relative basal area and then **Importance Value Index (IVI)** is calculated for trees using following formulae:

$$\text{No. of sampling plots in which the species is present Frequency (\%)} = \frac{\text{No. of plots in which the species is present}}{\text{Total No. of plots sampled}} \times 100$$

$$\text{Density} = \frac{\text{No. of plants of the species}}{\text{Total area sampled}}$$

$$\text{Frequency of the species Relative frequency} = \frac{\text{Frequency of the species}}{\text{Frequency of all the species}} \times 100$$

$$\text{Relative density} = \frac{\text{Density of the species}}{\text{Density of all species}} \times 100$$

$$\text{Relative basal area} = \frac{\text{Basal area of the species}}{\text{Basal area of all the species}} \times 100$$

IVI of a species = Rel. Frequency + Rel. Density + Rel. Dominance of the species

2.10 DIVERSITY INDICES

Shannon index of diversity (H) = $-\sum p_i \times \ln p_i$

Where $P_i = n_i/N$

n_i = Importance value of a species

N = Importance value of all the

species \ln = Natural logarithm

Simpson index (D) = $\sum p_i^2$

Simpson index of diversity –

1-D Simpson reciprocal

index = $1/D$



CHAPTER –III STATUS OF FLORA AND FAUNA

The leasehold area can be demarcated under two major groups of vegetation structure i.e. Forest land and non forest land. The non forest land under Government ownership is barren land while under private ownership it is agriculture and non agricultural land. The area of protected forest is 75.945 Ha and that of revenue Forest is 135.374 Ha. The forest area will be diverted after obtaining Forest Clearance from MoEF, Govt. of India.

a) Flora

The forest of the study area as per revised classification of Indian Forest types belongs to sub group 5B/C1 (Northern Tropical dry deciduous Sal Bearing Forest) and sub group 5B/C2 (Northern Tropical dry Mixed deciduous Forest). Common plant species found in the forest are Sal (*Shorea robusta*), Mahua (*Madhuca latipolia*), Tendu (*Diospyros melanozylon*), Palas (*Butea monosperma*), Neem (*Azadiracta indica*) etc. and the crops grown in the area are gram, maize and paddy.

b) Fauna

Due to biotic pressure, forest fire and overgrazing, the type and density of fauna seen in the study area is limited. During survey of the study area and interview from local old age persons at site, it is observed that most of the species which were common in the area in the past are seen rarely nowadays. Animals found in the core zone include rabbit, mongoose, house rat etc. The animals found in study area are rabbit, Jackal, Fox, Monkey, Langur, Jungle myna, Grey heron, Owl, House crow, Common quail etc.

3.1 ECOLOGY OF THE AREA

The area comes under broad category of sub-humid to dry deciduous, mixed and sal forests. Sal forest is considered to be the sub-climax leading to mixed forest as the climax formation. Natural vegetation of the area is a forest. Due to anthropogenic



factors, including the cattle grazing, savanna like structures have developed. These factors are causing rapid degradation of forest both in the plains and more importantly in the hills as well. First to disappear from the forests of the area are the timber trees like Bija (*Pterocarpus marsupium*) and Sal (*Shorea robusta*). This is then followed by the extraction of fuel wood, leading to the conversion of forests to scrub land and then to a grazing (grass) land. Soil in the area is mostly sandy loam locally called as "matasi". The area is on the border of tropical to subtropical, dry to humid climate. Winter is mild to cool with lowest temperature occasionally going down below 10°C in winter while the peak summer temperature may cross 47°C. Although occasional rains are received, nevertheless most testing to the life is the, post monsoon, long dry spell of about eight months. The dryness becomes more testing during the dry summer months, particularly the months of March to mid June, with scorching sun. Relative humidity may go as low as 20% during this period. Typical climax vegetation of the area is sal forest. According to Champion and Seth two types of forests are visible in the area 1. 3C/C_{2e}. The Moist Peninsular sal forest and 2. The 3C/C₃ Moist mixed deciduous Forest.

The mining lease area is almost plain with slight undulations. Basically the area comes under sal forest region with interspersed mixed forests. There are patches of teak (*Tectona grandis*), kaju (*Anacardium occidentale*) and sisal (*Agave americana*) plantations within the lease area. Sal, under best protection and lesser disturbance grows to a height of 15 to 20 m. Forests in the area range from heavily degraded condition to relatively in good condition. The ground is covered during the rainy months up to about middle of the winter months (January). Leaf fall start from late winter (February) which continues to about early summer (March). Actually some plants start shedding their leaves as early as in the month of November while some species may continue shedding leaves till the Month of April. However new leaves start appearing from the early dates of April and is almost complete till about the middle of the month of June. April and up to about middle of the month of May are the months when the forest is almost totally leafless, increasing the visibility to long distances. These are the best months to observe the wildlife making them vulnerable also to the poachers, also. To take a better view of the wild life, it is best to seat near a water hole, which remain very few during these months. Dominant tree sal is



leafless for a shorter time ranging from a few days to about a month, depending upon the sites. At moist places leafless condition of the species is for a very short time. April is the month when the maximum thickness of leaf litter is observed which continues up to the rainfall, when the disappearance of the litter starts. However, fire may cause burning of the litter from a small to large areas. The fire, however, does not cause much damage. Herbaceous plants have already shed their seeds, most of which survive the light surface fire. Similarly the tubers are already buried deep in the soil going unhurt due to surface fire. Trees are leafless hence there is no damage to the foliage, but for some of the trees which have already sprouted their leaves, most commonly is the sal tree.

Disappearance of the litter, with the onset of rains, is very fast, due to hot and humid condition. Almost all the litter has disappeared till about the month of October. Teak litter is first to disappear while the sal litter may persist up to the month of December and even later. Tuberos, corm and rhizomatous forms like the members of Liliaceae and Araceae are first to appear immediately after the onset of rains, followed by the growth of other herbaceous species. Surface of the forest gets clothed well with herbaceous vegetation within only 15-20 days. Insects, mollusks and reptiles are at their peak in the area during this time. Mushroom start growing after about a month with the onset of rains. However, *Astreus* species is special to be mentioned. This is believed to have mycorrhizal association with the sal. It starts coming up within about a week of the rainfall in the area. The mushroom is a delicacy in the area, also sold in the market. However, only trained persons are able to locate the mushroom because its fruiting body remains below the soil, coming up only after the fruiting body has developed to non-edible stage. Forest floor is replete with a large variety of other edible and non-edible, mycorrhizal, saprophytic, parasitic and termitomycetes fungi, more prominently the mushrooms.

The core and buffer zones include the village settlements with their cultivated fields, forest areas as well as vast areas reduced to grasslands due to heavy, anthropogenic disturbances. The disturbance includes cattle grazing and other illegal operations including collection of fire wood. The flora and fauna are similar both in core and buffer zones. The protected and reserve forest areas range from heavily disturbed to much disturbed. Chhote Jhad ka Jungle support shrubby growth of



mostly the species with good coppicing ability (*Lagerstroemia parviflora*, *Shorea robusta*) or less important species (*Chloroxylon swietenia*). In more disturbed and open forest land *Holarrhaena antidysenterica* dominates with its coppices. Some open places are dominated by the small, shrub stage plants of *Diospyros melanoxylon* and *Butea monosperma*. Teak (*Tectona grandis*) is not a natural species of the area but has been planted at a few patches. Eucalyptus plantation is not much common in the area. Village areas are heavily infested with weeds like *Hyptis suaveolens*, *Xanthium strumarium*, *Calatropis gigantea*, *Pennisetum pedicellatum* and *Ageratum conyzoides*, but the notorious weed *Parthenium hysterophorus* has not become much problematic and has, so far not invaded the forest areas. Cultivated field bunds support good growth of *Hyptis suaveolens*, *Themeda quadrivalvis*, *Iselema laxum*, *Heteropogon contortus*, *Bothriochloa pertusa* and *Pennisetum pedicellatum*. Forest openings have grasses like *Andropogon aciculatus*, *Andropogon fulvus*, *Eragrostis tenella*, *Aristida setacea* and herbs like *Hemigraphis indica*. The shade support the growth of psycophyte, *Oplismenus burmannii*. The forests lack the Aonla (*Emblca officinalis*) trees mainly due to lopping and cutting of the tree for fruit collection. Village outskirts are identifiable from a distance due to presence of large Mahua (*Madhuca latifolia*) trees in abundance. Also common are the mango (*Mangifera indica*) groves near to the villages. Timber trees of larger girth, particularly Bija and Sal are almost absent. Sal being a good coppicer is able to maintain its density but the Bija is progressing rapidly towards disappearance from the forests.

The cultivated fields are generally plain areas under single crop cultivation, lying fallow for almost eight months in a year. Rice is the major crop raised in the area as kharif crop during the rainy season. The area has no irrigation facility hence Rabi crop during dry season is not possible. The waste lands are used mostly as grazing grounds. Some important features observed on these wastelands are that *Aristida adscencionis* is the most common species, growing abundantly on the wastelands. The species is not grazed by the cattle. At some other places coppicing of senha (*Lagerstroemia parviflora*) with multiple shoots is observed. At some other places wastelands are covered by the scattered, bushy growth of tendu (*Diospyros melanoxylon*) and Palas (*Butea monosperma*). These two plant species have proved to be the only plant species able to survive in these highly disturbed areas. The



remaining soil surface, not covered by these bushes, are covered by the annual and perennial grasses, sedges and forbs. The village settlements are small villages. Outside the village houses, Palas (*Butea monosperma*) and Mahua (*Madhuca latifolia*) are seen commonly growing outside the village areas. These are the trees which have been left un-cut during the clearing of the forest for settlement. These trees have very little fuel or timber values and are useful only when they are standing. Leaves of both the trees are used for the preparation of "Dona" and "Pattal". The *Butea* tree is used for Lac cultivation also. Mahua tree is the source of mahua flower used in the preparation of local alcoholic drink the "Daru or the Tharra" while its fruit yields an oil. Some mango trees are also observed outside the village areas, but are not so common in the presently applied mining lease area, as could be observed outside the village areas in other parts of Chhattisgarh.

Table No.3.1

SN	Local name	Scientific Name	F	D	DO	RF	RD	RDO	IVI
1.	Sal	<i>Shorea robusta</i>	95	18.05	945.41	5.47	21.78	29.53	56.78
2.	Char	<i>Buchanania lanzan</i>	78	7.59	315.93	4.49	9.16	9.87	23.52
3.	Bhelwa	<i>Semecarpus anacardium</i>	46	1.37	38.88	2.64	1.65	1.21	5.5
4.	Tendu	<i>Diospyros melanoxylon</i>	73	4.86	165.90	4.20	5.86	5.18	15.24
5.	Dhaora	<i>Anogeisus Latifolia</i>	38	3.81	112.26	2.18	4.6	3.51	10.29
6.	Khambar	<i>Gmelina arborea</i>	01	0.04	2.34	0.05	0.05	0.07	0.17
7.	Kurchi	<i>Halarrhena antidyenterica</i>	69	1.82	41.28	3.97	2.2	1.29	7.46
8.	Bahera	<i>Terminalia bellirica</i>	12	0.18	9.72	0.69	0.22	0.3	1.21
9.	Saja	<i>Terminalia tomentosa</i>	68	3.10	125.05	3.91	3.74	3.91	11.56
10.	Kara	<i>Cleistanthus collinus</i>	44	3.18	28.17	2.53	3.84	0.88	7.25
11.	Beeja	<i>Pterocarpus marsipium</i>	39	1.42	58.91	2.24	1.71	1.84	5.79
12.	Kasai	<i>Bridelia retusa</i>	33	0.59	19.69	1.90	0.71	0.61	3.22
13.	Mahua	<i>Madhuca indica</i>	74	4.16	299.26	4.26	5.02	9.35	18.63
14.	Janua	<i>Syzyium cumini</i>	30	0.91	40.51	1.72	1.1	1.27	4.09
15.	Chihur	-	37	1.45	42.76	2.13	1.75	1.34	5.22
16.	Necin	<i>Azadirachta indica</i>	01	0.01	0.20	0.05	0.01	0.01	0.07
17.	Senha	<i>Lagerstromia parviflora</i>	53	1.76	57.42	3.05	2.12	1.79	6.96
18.	Bargad	<i>Ficus benghalensis</i>	27	0.40	78.35	1.55	0.48	2.45	4.48
19.	Phaphen	<i>Oroxylum indicum</i>	07	0.13	1.25	0.40	0.16	0.04	0.6
20.	Kekad	<i>Flacourtia ranonchhi</i>	54	1.09	40.92	3.11	1.32	1.28	5.71
21.	Hara	<i>Terminalia chebula</i>	20	0.28	12.41	1.15	0.34	0.39	1.88
22.	Kumbhi	<i>Careya arborea</i>	46	1.17	29.04	2.64	1.41	0.91	4.96
23.	Dhobin	<i>Dalbergia paniculata</i>	33	1.04	69.85	1.90	1.25	2.18	5.33



SN	Local name	Scientific Name	F	D	DO	RF	RD	RDO	IVI
24.	Rohina	<i>Soyida febrifuga</i>	26	1.50	36.01	1.49	1.81	1.12	4.42
25.	Salai	<i>Boswellia serrata</i>	20	0.39	29.26	1.15	0.47	0.91	2.53
26.	Kosam	<i>Schleichera oleosa</i>	21	0.40	36.33	1.20	0.48	1.13	2.81
27.	Riyan	<i>Acacia leucophloea</i>	04	0.50	1.20	0.23	0.6	0.04	0.87
28.	Bel	<i>Aegle marmelos</i>	02	0.30	3.10	0.11	0.36	0.1	0.57
29.	Kari	-	38	0.56	15.36	0.28	0.68	0.48	1.44
30.	Mundi	<i>Mitragyna parviflora</i>	05	0.11	1.55	1.61	0.13	0.05	1.79
31.	Semal	<i>Salmaal malabarica</i>	03	0.07	5.97	0.17	0.08	0.19	0.44
32.	Peepal	<i>Ficus religiosa</i>	04	0.05	1.95	0.23	0.06	0.06	0.35
33.	Ankot	<i>Alangium salvifolium</i>	10	0.24	7.65	0.57	0.29	0.24	1.1
34.	Chilhar like	-	34	1.41	42.76	1.95	1.7	1.34	4.99
35.	Palas	<i>Butea monosperma</i>	02	0.07	2.10	0.11	0.08	0.07	0.26
36.	Arjun	<i>Ternstroemia arjuna</i>	34	0.81	50.70	1.95	0.98	1.58	4.51
37.	Dhanbahar	<i>Cassia fistula</i>	28	0.41	7.85	1.61	0.49	0.25	2.35
38.	Garur like	-	03	0.07	1.05	0.16	0.08	0.03	0.27
39.	Kari like	-	21	0.40	6.85	1.20	0.48	0.21	1.89
40.	Korkot	-	10	0.13	1.80	0.57	0.16	0.06	0.79
41.	Garud	-	07	0.10	3.15	0.40	0.12	0.1	0.62
42.	Ladu bahoria	<i>Ixora parviflora</i>	43	1.30	26.40	2.47	1.57	0.82	4.86
43.	Patala	<i>Stereospermum suaveolens</i>	02	0.02	1.06	0.11	0.02	0.03	0.16
44.	Hadmanjani	-	36	1.23	20.86	2.07	1.48	0.65	4.2
45.	Aonla	<i>Emblica officinalis</i>	20	0.42	12.04	0.01	0.51	0.38	0.9
46.	Aam	<i>Mangifera indica</i>	16	0.72	36.55	0.92	0.87	1.14	2.93
47.	Dharwai	<i>Woodfordia fruticosa</i>	28	0.80	25.59	1.61	0.97	0.8	3.36
48.	Magardanti	<i>Acacia sps.</i>	15	0.31	5.90	0.86	0.37	0.18	1.41
49.	Kheensali	<i>Nyctanthus arbar-trisita</i>	14	0.84	3.41	0.80	1.01	0.11	1.92
50.	Patwa	-	08	0.12	1.40	0.46	0.14	0.04	0.64
51.	Kanko	-	11	0.15	1.75	0.63	0.18	0.05	0.86
52.	Kuru	<i>Dillenia pentagyna</i>	51	2.42	48.85	2.93	2.92	1.53	7.38
53.	Khair	<i>Acacia catechu</i>	16	0.72	21.95	0.92	0.87	0.69	2.48
54.	Bhirha	<i>Chloroxylon zivietentia</i>	27	2.36	77.61	1.55	2.85	2.42	6.82
55.	Amrud	<i>Psidium guajava</i>	01	0.01	0.65	0.05	0.01	0.02	0.08
56.	Kachnar	<i>Bauhinia variegata</i>	03	0.04	2.55	0.17	0.05	0.08	0.3
57.	Dankuru	<i>Dillenia sps.</i>	28	1.53	36.35	1.61	1.85	1.14	4.6
58.	Kharahar	-	07	0.11	3.45	0.40	0.13	0.11	0.64
59.	Vatasani	-	18	1.03	19.40	1.03	1.24	0.61	2.88
60.	Antan/ Ainhi	<i>Helicteres isora</i>	18	0.07	1.00	1.03	0.08	0.03	1.14
61.	Padari	-	22	0.50	9.50	1.26	0.61	0.3	2.17



SN	Local name	Scientific Name	F	D	DO	RF	RD	RDO	IVI
62.	Kalami	<i>Adina cordifolia</i>	04	0.06	1.35	0.23	0.07	0.04	0.34
63.	Thelco	<i>Gardenia turgida</i>	08	0.09	1.85	0.46	0.11	0.06	0.63
64.	Qirbul	<i>Sesbania sps.</i>	04	0.05	0.75	0.23	0.06	0.02	0.31
65.	Titai	-	04	0.08	2.55	1.23	0.1	0.08	1.41
66.	Mainhal	<i>Randia dumetorum</i>	05	0.07	2.35	0.28	0.08	0.07	0.43
67.	Khol Khandiar	-	04	0.09	0.35	0.23	0.11	0.01	0.35
68.	Bakuli	-	21	0.44	16.45	1.20	0.53	0.51	2.24
69.	Palasbal	<i>Butea superba</i>	04	0.04	0.40	0.23	0.05	0.01	0.29
70.	Katai	-	04	0.06	0.15	0.23	0.07	0.01	0.31
71.	Geigala	-	18	0.32	8.20	1.03	0.38	0.26	1.67
72.	Sheshapoda	<i>Embilia ribes</i>	03	0.06	1.30	0.17	0.07	0.04	0.28
73.	Bar	<i>Ziziphus jujuba</i>	02	0.07	1.75	0.11	0.08	0.05	0.24
74.	Lodli	<i>Symplocos racemosa</i>	22	0.55	15.72	1.26	0.66	0.48	2.4
75.	Ghont	<i>Ziziphus xylopara</i>	09	0.27	2.37	0.51	0.33	0.07	0.91
			1736	82.88	3201.96	100	100	100	300

Abbreviations:

F – Frequency RF = Relative

frequency D = Density RD = Relative
density

DO = Dominance RDO = Relative

dominance IVI = Importance Value

Index

The data given in the Table NO. 3.1 is analysed to find out suitable species proposed to be planted in the study area so that no. of important species can be increased in terms of value. The species given in the following table is proposed for the plantation in terms of percentage of the total no. of plants. This activity will enhance the density of the forest indirectly leading to forest conservation and wild life protection.



TABLE NO. 3.1.1 TOP 20 IVI SPECIES

SN	Species	Fre	Den	BA	RF	RD	RBA	IVI	percentage of plants to be planted
1	<i>Shorea robusta</i>	100.00	302.86	9.63	7.95	39.92	49.96	97.83	37
2	<i>Buchanania lanzan</i>	100.00	96.19	1.28	7.95	12.68	6.66	27.29	10
3	<i>Madhuca latifolia</i>	74.29	33.02	2.08	5.91	4.35	10.79	21.06	8
4	<i>Terminalia tomentosa</i>	85.71	45.71	0.82	6.82	6.03	4.26	17.10	6
5	<i>Goruga pinnata</i>	74.29	31.43	0.50	5.91	4.14	2.61	12.66	5
6	<i>Careya arborea</i>	68.57	17.78	0.23	5.45	2.34	1.19	8.98	3
7	<i>Diospyros melanoxylon</i>	51.43	20.95	0.29	4.09	2.76	1.50	8.35	3
8	<i>Anogeissus latifolia</i>	45.71	20.00	0.39	3.64	2.64	2.02	8.30	3
9	<i>Syzigium cumini</i>	51.43	15.56	0.36	4.09	2.05	1.88	8.02	3
10	<i>Pterocarpus marsupium</i>	2.86	30.48	0.61	0.23	4.02	3.19	7.43	3
11	<i>Semecarpus anacardium</i>	54.29	13.33	0.19	4.32	1.76	0.97	7.05	3
12	<i>Chloroxylon swietenia</i>	17.14	21.90	0.39	1.36	2.89	2.02	6.27	2
13	<i>Terminalia bellerica</i>	37.14	8.25	0.25	2.95	1.09	1.31	5.35	2
14	<i>Kako</i>	25.71	9.84	0.37	2.05	1.30	1.91	5.25	2
15	<i>Casaeria graveolens</i>	40.00	6.35	0.11	3.18	0.84	0.57	4.59	2
16	<i>Lagerstroemia parviflora</i>	28.57	10.16	0.15	2.27	1.34	0.75	4.37	2
17	<i>Terminalia chebula</i>	28.57	5.08	0.15	2.27	0.67	0.78	3.72	1
18	<i>Milusa tomentosa</i>	31.43	5.71	0.07	2.50	0.75	0.35	3.60	1
19	<i>Cleistanthus collinus</i>	17.14	6.35	0.27	1.36	0.84	1.38	3.58	1
20	<i>Bridelia retusa</i>	34.29	4.13	0.06	2.73	0.54	0.29	3.56	1
								264.36	100.00

The data given in the Table NO. 3.1 is analyzed to find out suitable species proposed to be planted in the study area so that frequency of the species should be increased. The species given in the following table is proposed for the plantation in terms of percentage of the total no. of plants. This activity will enhance the density of the forest indirectly leading to forest conservation and wild life protection.



Table no. 3.1.2 TOP 20 FREQUENCY SPECIES

SN	Species	Fre	Den	BA	RF	RD	RBA	IVI	percentage of plants to be planted
1	<i>Pterocarpus marsupium</i>	2.86	30.48	0.6141	0.23	4.02	3.19	7.43	3
2	<i>Ficus benghalensis</i>	2.86	0.32	0.2275	0.23	0.04	1.18	1.45	3
3	<i>Terminalia arjuna</i>	2.86	0.63	0.0099	0.23	0.08	0.05	0.36	3
4	<i>Albizia lebbek</i>	2.86	0.32	0.0066	0.23	0.04	0.03	0.3	3
5	<i>Xeromorphis spinosa</i>	2.86	0.32	0.0061	0.23	0.04	0.03	0.3	3
6	<i>Salmalia malabarica</i>	2.86	0.32	0.0037	0.23	0.04	0.02	0.29	3
7	<i>Acacia plinnata</i>	2.86	0.32	0.002	0.23	0.04	0.01	0.28	3
8	<i>Amtari</i>	2.86	0.32	0.002	0.23	0.04	0.01	0.28	3
9	<i>Domni</i>	2.86	0.32	0.0018	0.23	0.04	0.01	0.28	3
10	<i>Ficus glomerata</i>	2.86	0.32	0.0016	0.23	0.04	0.01	0.28	3
11	<i>Ghotia</i>	2.86	0.32	0.0017	0.23	0.04	0.01	0.28	3
12	<i>Dillenia pentagyna</i>	5.71	0.95	0.0203	0.45	0.13	0.11	0.69	6
13	<i>Soymida febrifuga</i>	5.71	0.63	0.0196	0.45	0.08	0.1	0.64	6
14	<i>Ventilago calyculata</i>	5.71	0.95	0.0091	0.45	0.13	0.05	0.63	6
15	<i>Bowsellia serrata</i>	5.71	0.95	0.0063	0.45	0.13	0.03	0.61	6
16	<i>Gardenia turgida</i>	5.71	0.95	0.0054	0.45	0.13	0.03	0.61	6
17	<i>Xylosma longifolium</i>	5.71	0.63	0.0096	0.45	0.08	0.05	0.59	6
18	<i>Gmelina arborea</i>	8.57	5.08	0.0591	0.68	0.67	0.31	1.66	9
19	<i>Dhendheni</i>	8.57	0.95	0.0093	0.68	0.13	0.05	0.86	9
20	<i>Mangifera indica</i>	11.43	1.27	0.1427	0.91	0.17	0.74	1.82	12
		94.29							100

3.2 PHYTOSOCIOLOGY OF VEGETATION:

It is difficult to prepare an exhaustive list of all the species of plants, particularly the herbs, from any sizable area. The list of plants may run in to at least 200 to 300 species. However, attempts have been made to determine as many species of plants as possible along with the phytosociology of trees and shrubs around the dam in 10 km radius area



3.2.1 Phytosociology of trees

All the plants having a circumference at breast height (CBH) of 20 cm or more have been taken as trees.

Table: 3.2 Phytosociology of trees:

S N	Species	Fre	Den	BA	RF	RD	RBA	IVI
1.	<i>Acacia pinnata</i>	2.86	0.32	0.0020	0.23	0.04	0.01	0.28
2.	<i>Albizia lebbek</i>	2.86	0.32	0.0066	0.23	0.04	0.03	0.30
3.	<i>Amtari</i>	2.86	0.32	0.0020	0.23	0.04	0.01	0.28
4.	<i>Anogeissus latifolia</i>	45.71	20.00	0.3898	3.64	2.64	2.02	8.30
5.	<i>Bhaluhara</i>	20.00	2.22	0.0209	1.59	0.29	0.11	1.99
6.	<i>Bowsellia serrata</i>	5.71	0.95	0.0063	0.45	0.13	0.03	0.61
7.	<i>Bridelia retusa</i>	34.29	4.13	0.0551	2.73	0.54	0.29	3.56
8.	<i>Buchanania lanzan</i>	100.00	96.19	1.2823	7.95	12.68	6.66	27.29
9.	<i>Careya arborea</i>	68.57	17.78	0.2286	5.45	2.34	1.19	8.98
10.	<i>Cassia fistula</i>	22.86	4.13	0.0318	1.82	0.54	0.17	2.53
11.	<i>Casaeria graveolens</i>	40.00	6.35	0.1098	3.18	0.84	0.57	4.59
12.	<i>Chloroxylon swietenia</i>	17.14	21.90	0.3883	1.36	2.89	2.02	6.27
13.	<i>Cleistanthus collinus</i>	17.14	6.35	0.2659	1.36	0.84	1.38	3.58
14.	<i>Dalbergia paniculata</i>	14.29	2.54	0.2022	1.14	0.33	1.05	2.52
15.	<i>Dhendheni</i>	8.57	0.95	0.0093	0.68	0.13	0.05	0.86
16.	<i>Dillenia pentagyna</i>	5.71	0.95	0.0203	0.45	0.13	0.11	0.69
17.	<i>Diospyros melanoxylon</i>	51.43	20.95	0.2885	4.09	2.76	1.50	8.35
18.	<i>Domri</i>	2.86	0.32	0.0018	0.23	0.04	0.01	0.28
19.	<i>Emblica officinalis</i>	11.43	1.59	0.0091	0.91	0.21	0.05	1.17
20.	<i>Ficus benghalensis</i>	2.86	0.32	0.2275	0.23	0.04	1.18	1.45
21.	<i>Ficus glomerata</i>	2.86	0.32	0.0016	0.23	0.04	0.01	0.28
22.	<i>Gardenia gummifera</i>	22.86	8.57	0.0694	1.82	1.13	0.36	3.31
23.	<i>Gardenia latifolia</i>	20.00	4.44	0.0464	1.59	0.59	0.24	2.42
24.	<i>Gardenia turgida</i>	5.71	0.95	0.0054	0.45	0.13	0.03	0.61
25.	<i>Gataran</i>	11.43	2.86	0.0346	0.91	0.38	0.18	1.47
26.	<i>Ghotia</i>	2.86	0.32	0.0017	0.23	0.04	0.01	0.28
27.	<i>Gmelina arborea</i>	8.57	5.08	0.0591	0.68	0.87	0.31	1.66
28.	<i>Goruga pinnata</i>	74.29	31.43	0.5026	5.91	4.14	2.61	12.66



29.	<i>Ixora parviflora</i>	22.86	2.54	0.0625	1.82	0.33	0.32	2.48
30.	<i>Kako</i>	25.71	9.84	0.3672	2.05	1.30	1.91	5.25
31.	<i>Lagerstroemia parviflora</i>	28.57	10.16	0.1453	2.27	1.34	0.75	4.37
32.	<i>Madhuca latifolia</i>	74.29	33.02	2.0799	5.91	4.35	10.79	21.06
33.	<i>Mangifera indica</i>	11.43	1.27	0.1427	0.91	0.17	0.74	1.82
34.	<i>Milium tomentosum</i>	31.43	5.71	0.0674	2.50	0.75	0.35	3.60
35.	<i>Pterocarpus marsupium</i>	2.86	30.48	0.6141	0.23	4.02	3.19	7.43
36.	<i>Salmalia malabarica</i>	2.86	0.32	0.0037	0.23	0.04	0.02	0.29
37.	<i>Schleichera oleosa</i>	14.29	1.27	0.0154	1.14	0.17	0.08	1.38
38.	<i>Semecarpus anacardium</i>	54.29	13.33	0.1870	4.32	1.76	0.97	7.05
39.	<i>Shorea robusta</i>	100.00	302.86	9.6266	7.95	39.92	49.96	97.83
40.	<i>Soymida febrifuga</i>	5.71	0.63	0.0196	0.45	0.08	0.10	0.64
41.	<i>Syzygium cumini</i>	51.43	15.56	0.3621	4.09	2.05	1.88	8.02
42.	<i>Terminalia arjuna</i>	2.86	0.63	0.0099	0.23	0.08	0.05	0.36
43.	<i>Terminalia bellerica</i>	37.14	8.25	0.2517	2.95	1.09	1.31	5.35
44.	<i>Terminalia chebula</i>	28.57	5.08	0.1499	2.27	0.67	0.78	3.72
45.	<i>Terminalia tomentosa</i>	85.71	45.71	0.8204	6.82	6.03	4.26	17.10
46.	<i>Ventilago calyculata</i>	5.71	0.95	0.0091	0.45	0.13	0.05	0.63
47.	<i>Woodfordia fruticosa</i>	20.00	4.13	0.0235	1.59	0.54	0.12	2.26
48.	<i>Wrightia tinctoria</i>	17.14	3.49	0.0251	1.36	0.46	0.13	1.95
49.	<i>Xeromorphis spinosa</i>	2.86	0.32	0.0061	0.23	0.04	0.03	0.30
50.	<i>Xylocarpus longifolium</i>	5.71	0.63	0.0096	0.45	0.08	0.05	0.59
	Total	1257.14	758.73	19.2675	100.00	100.00	100.00	300.00

Abbreviations: Fre = Frequency; Den = Density; BA = Basal area;
RF = Relative frequency; RD = Relative density; RBA = Relative Basal Area
IVI = Importance Value Index (RF + RD + RBA)

On the basis of IVI *Shorea robusta* has emerged as the most dominant tree species followed by *Char (Buchanania lanzan)* as the second most dominant species



of the area. At the time of base line data collection the situation was the same but after 10 years of the construction of the dam IVI value of Sal has increased, indicating that the growth conditions for the most dominant tree species has improved.

The data given in the Table NO. 3.2 is analyzed to find out suitable species proposed to be planted in the study area so that no. of important species can be increased in terms of value. The species given in the following table is proposed for the plantation in terms of percentage of the total no. of plants. This activity will enhance the density of the forest indirectly leading to forest conservation and wild life protection.

TABLE NO. 3.2.1 Top 20 IVI SPECIES OF TRESS

SN	Species	Fre	Den	BA	RF	RD	RBA	IVI	percentage of plants to be plan
1	<i>Shorea robusta</i>	100	302.86	9.6266	7.95	39.92	49.96	97.83	37
2	<i>Buchananja lanzan</i>	100	96.19	1.2823	7.95	12.68	6.66	27.29	10
3	<i>Madhuca latifolia</i>	74.29	33.02	2.0799	5.91	4.36	10.79	21.06	8
4	<i>Terminalia tomentosa</i>	85.71	45.71	0.8204	6.82	6.03	4.26	17.1	6
5	<i>Goruga pinnata</i>	74.29	31.43	0.5026	5.91	4.14	2.61	12.66	5
6	<i>Careya arborea</i>	68.57	17.78	0.2286	5.45	2.34	1.19	8.98	3
7	<i>Diospyros melanoxyton</i>	51.43	20.95	0.2885	4.09	2.76	1.5	8.35	3
8	<i>Anogeissus latifolia</i>	45.71	20	0.3898	3.64	2.64	2.02	8.3	3
9	<i>Syzgium cumini</i>	51.43	15.56	0.3621	4.09	2.05	1.88	8.02	3
10	<i>Pterocarpus marsupium</i>	2.86	30.48	0.6141	0.23	4.02	3.19	7.43	3
11	<i>Semecarpus anacardium</i>	54.29	13.33	0.187	4.32	1.76	0.97	7.05	3
12	<i>Chloroxylon swietenia</i>	17.14	21.9	0.3883	1.36	2.89	2.02	6.27	2
13	<i>Terminalia bellerica</i>	37.14	8.25	0.2517	2.95	1.09	1.31	5.35	2



14	<i>Kako</i>	25.71	9.84	0.3672	2.05	1.3	1.91	5.25	2
15	<i>Casaeria graveolens</i>	40	6.35	0.1098	3.18	0.84	0.57	4.59	2
16	<i>Lagerstroemia parviflora</i>	28.57	10.16	0.1453	2.27	1.34	0.75	4.37	2
17	<i>Terminalia chebula</i>	28.57	5.08	0.1499	2.27	0.67	0.78	3.72	1
18	<i>Millettia tomentosa</i>	31.43	5.71	0.0674	2.5	0.75	0.35	3.6	1
19	<i>Cleistanthus collinus</i>	17.14	6.35	0.2659	1.36	0.84	1.38	3.58	1
20	<i>Bridelia retusa</i>	34.29	4.13	0.0551	2.73	0.54	0.29	3.56	1
								264.36	100

The data given in the Table NO. 3.2 is analyzed to find out suitable species proposed to be planted in the study area so that frequency of the species should be increased. The species given in the following table is proposed for the plantation in terms of percentage of the total no. of plants. This activity will enhance the density of the forest indirectly leading to forest conservation and wild life protection.

TABLE NO. 3.2.2 Top 20 FREQUENCY SPECIES OF TREES

SN	Species	Fre	Den	BA	RF	RD	RBA	IVI	percentage of plants to be planted
1	<i>Pterocarpus marsupium</i>	2.86	30.48	0.6141	0.23	4.02	3.19	7.43	3
2	<i>Ficus benghalensis</i>	2.86	0.32	0.2275	0.23	0.04	1.18	1.45	3
3	<i>Terminalia arjuna</i>	2.86	0.63	0.0099	0.23	0.08	0.05	0.36	3
4	<i>Albizia lebbeck</i>	2.86	0.32	0.0066	0.23	0.04	0.03	0.3	3
5	<i>Xeromorphis spinosa</i>	2.86	0.32	0.0061	0.23	0.04	0.03	0.3	3
6	<i>Salmalia malabarica</i>	2.86	0.32	0.0037	0.23	0.04	0.02	0.29	3
7	<i>Acacia pinnata</i>	2.86	0.32	0.002	0.23	0.04	0.01	0.28	3
8	<i>Amtarri</i>	2.86	0.32	0.002	0.23	0.04	0.01	0.28	3
9	<i>Domni</i>	2.86	0.32	0.0018	0.23	0.04	0.01	0.28	3



10	<i>Ficus glomerata</i>	2.86	0.32	0.0016	0.23	0.04	0.01	0.28	3
11	<i>Gholia</i>	2.86	0.32	0.0017	0.23	0.04	0.01	0.28	3
12	<i>Dillenia pentagyna</i>	5.71	0.95	0.0203	0.45	0.13	0.11	0.69	6
13	<i>Soymida febrifuga</i>	5.71	0.63	0.0196	0.45	0.08	0.1	0.64	6
14	<i>Ventilago calyculata</i>	5.71	0.95	0.0091	0.45	0.13	0.05	0.63	6
15	<i>Bowsellia serrata</i>	5.71	0.95	0.0083	0.45	0.13	0.03	0.61	6
16	<i>Gardenia turgida</i>	5.71	0.95	0.0054	0.45	0.13	0.03	0.61	6
17	<i>Xylosma longifolium</i>	5.71	0.63	0.0096	0.45	0.08	0.05	0.59	6
18	<i>Gmelina arborea</i>	8.57	5.08	0.0591	0.68	0.67	0.31	1.66	9
19	<i>Dhendheni</i>	8.57	0.95	0.0093	0.68	0.13	0.05	0.86	9
20	<i>Mangifera indica</i>	11.43	1.27	0.1427	0.91	0.17	0.74	1.82	12
		94.29							100

3.2.1.1 Diversity indices for trees:

Diversity indices values were found to be as

follows: Shannon index of diversity 2.75

Simpson index 0.059

Simpson index of diversity

0.941 Simpson reciprocal

index 16.953

3.2.2 PHYTOSOCIOLOGY OF SHRUBS

Phytosociology of shrubs is given in the following table: Some more species of shrubs, nor recorded in the quadrats but recorded outside the quadrats are given below the phytosociology table:



Table – 3.3 IVI of shrub species

SN	Species	Fre	Den	Abu	RF	RD	RAb	IVI
1.	<i>Abrus precatorius</i>	3.33	0.74	2	0.27	0.08	0.72	1.07
2.	<i>Aegle marmelos</i>	3.33	0.74	2	0.27	0.08	0.72	1.07
3.	<i>Anogeissus latifolia</i>	46.67	22.96	4.43	3.84	2.45	1.60	7.88
4.	<i>Antidesma ghaesembilla</i>	6.67	1.48	2	0.55	0.16	0.72	1.43
5.	<i>Azadirachta indica</i>	3.33	0.74	2	0.27	0.08	0.72	1.07
6.	<i>Bhaluhara</i>	3.33	9.26	25	0.27	0.99	9.02	10.28
7.	<i>Borga</i>	3.33	1.48	4	0.27	0.16	1.44	1.88
8.	<i>Bowsellia serrata</i>	6.67	3.70	5	0.55	0.39	1.80	2.75
9.	<i>Bridelia retusa</i>	3.33	1.11	3	0.27	0.12	1.08	1.48
10.	<i>Buchanania lanzan</i>	70.00	56.30	7.24	5.75	6.00	2.61	14.37
11.	<i>Butea monosperma</i>	6.67	1.85	2.5	0.55	0.20	0.90	1.65
12.	<i>Careya arborea</i>	30.00	9.63	2.89	2.47	1.03	1.04	4.54
13.	<i>Cassia fistula</i>	23.33	6.30	2.43	1.92	0.67	0.88	3.47
14.	<i>Cassine glauca</i>	80.00	51.11	5.75	6.58	5.45	2.07	14.10
15.	<i>Chloroxylon swietenia</i>	20.00	37.04	16.67	1.64	3.95	6.02	11.61
16.	<i>Cleistanthus collinus</i>	13.33	5.93	4	1.10	0.63	1.44	3.17
17.	<i>Dalbergia paniculata</i>	3.33	0.74	2	0.27	0.08	0.72	1.07
18.	<i>Dendrocalamus strictus</i>	16.67	9.63	5.2	1.37	1.03	1.88	4.27
19.	<i>Dhendheni</i>	3.33	0.74	2	0.27	0.08	0.72	1.07
20.	<i>Diospyros melanoxylon</i>	76.67	62.59	7.35	6.30	6.67	2.65	15.63
21.	<i>Emblica officinalis</i>	6.67	1.85	2.5	0.55	0.20	0.90	1.65
22.	<i>Ficus benghalensis</i>	3.33	0.74	2	0.27	0.08	0.72	1.07
23.	<i>Ficus glomerata</i>	3.33	0.37	1	0.27	0.04	0.36	0.67
24.	<i>Gardenia gummifera</i>	20.00	16.67	7.5	1.64	1.78	2.71	6.13
25.	<i>Gardenia latifolia</i>	33.33	13.33	3.6	2.74	1.42	1.30	5.46
26.	<i>Gardenia turgida</i>	33.33	5.56	1.5	2.74	0.59	0.54	3.87
27.	<i>Gataran</i>	23.33	18.15	7	1.92	1.93	2.53	6.38
28.	<i>Ghotia</i>	3.33	0.37	1	0.27	0.04	0.36	0.67
29.	<i>Goruga pinnata</i>	26.67	17.04	5.75	2.19	1.82	2.07	6.08
30.	<i>Kako</i>	20.00	5.56	2.5	1.64	0.59	0.90	3.14
31.	<i>Katai</i>	10.00	2.59	2.33	0.82	0.28	0.84	1.94
32.	<i>Khisora</i>	3.33	1.11	3	0.27	0.12	1.08	1.48
33.	<i>Ixora parviflora</i>	23.33	6.30	2.43	1.92	0.67	0.88	3.47



SN	Species	Fre	Den	Abu	RF	RD	RAb	IVI
34	<i>Lagerstroemia parviflora</i>	40.00	31.85	7.17	3.29	3.40	2.59	9.27
35	<i>Madhuca latifolia</i>	56.67	28.89	4.59	4.66	3.08	1.66	9.39
36	<i>Acacia pinnata</i>	6.67	2.96	4	0.55	0.32	1.44	2.31
37	<i>Mangifera indica</i>	3.33	0.74	2	0.27	0.08	0.72	1.07
38	Manj	3.33	2.22	6	0.27	0.24	2.17	2.68
39	<i>Miliusa tomentosa</i>	13.33	5.19	3.5	1.10	0.55	1.26	2.91
40	Nagar Kena	3.33	3.70	10	0.27	0.39	3.61	4.28
41	Parri	3.33	0.74	2	0.27	0.08	0.72	1.07
42	<i>Phoenix sylvestris</i>	10.00	1.11	1	0.82	0.12	0.36	1.30
43	<i>Pterocarpus marsupium</i>	20.00	8.52	3.83	1.64	0.91	1.38	3.93
44	<i>Rademachera xylocarpa</i>	3.33	0.37	1	0.27	0.04	0.36	0.67
45	<i>Schleichera oleosa</i>	3.33	0.74	2	0.27	0.08	0.72	1.07
46	<i>Semecarpus anacardium</i>	30.00	17.04	5.11	2.47	1.82	1.84	6.13
47	<i>Shorea robusta</i>	96.67	228.15	21.24	7.95	24.32	7.66	39.93
48	<i>Smilax zeylanica</i>	3.33	0.37	1	0.27	0.04	0.36	0.67
49	<i>Syzigium cumini</i>	43.33	20.00	4.15	3.56	2.13	1.50	7.19
50	<i>Terminalia bellerica</i>	20.00	5.56	2.5	1.64	0.59	0.90	3.14
51	<i>Terminalia chebula</i>	10.00	6.67	6	0.82	0.71	2.17	3.70
52	<i>Terminalia tomentosa</i>	56.67	32.59	5.18	4.66	3.47	1.87	10.00
53	<i>Ventilago calyculata</i>	6.67	8.52	11.5	0.55	0.91	4.15	5.61
54	<i>Woodfordia fruticosa</i>	40.00	33.33	7.5	3.29	3.55	2.71	9.55
55	<i>Wrightia tinctoria</i>	86.67	118.15	12.27	7.12	12.59	4.43	24.14
56	<i>Xeromorphis spinosa</i>	3.33	0.37	1	0.27	0.04	0.36	0.67
57	<i>Zyziphus oenoplea</i>	20.00	6.67	3	1.64	0.71	1.08	3.44
Total		1216.67	938.15	277.11	100.0	100.0	100.0	300.00

Abbreviations: Fre = Frequency; Den = Density; Abu = Abundance;
RF = Relative frequency; RD = Relative density; RAb = Relative
Abundance IVI = Importance Value Index (RF + RD + RAb)



The data given in the Table NO. 3.3 is analyzed to find out suitable species proposed to be planted in the study area so that no. of important species can be increased in terms of value. The species given in the following table is proposed for the plantation in terms of percentage of the total no. of plants. This activity will enhance the density of the forest indirectly leading to forest conservation and wild life protection.

TABLE NO. 3.3.1 TOP 20 IVI SPECIES OF SHRUBS

SN	Species	Fre	Den	Abu	RF	RD	RAb	IVI	percentage of plants to be planted
1	<i>Shorea robusta</i>	96.67	228.15	21.24	7.95	24.32	7.66	39.93	18
2	<i>Wrightia tinctoria</i>	86.67	118.15	12.27	7.12	12.59	4.43	24.14	11
3	<i>Diospyros melanoxylon</i>	76.67	62.59	7.35	6.3	6.67	2.65	15.63	7
4	<i>Buchanania lanzan</i>	70	56.3	7.24	5.75	6	2.61	14.37	6
5	<i>Cassine glauca</i>	80	51.11	5.75	6.58	5.45	2.07	14.1	8
6	<i>Chloroxylon swietenia</i>	20	37.04	16.67	1.64	3.95	6.02	11.61	5
7	<i>Bhaluhara</i>	3.33	9.26	25	0.27	0.99	9.02	10.28	5
8	<i>Terminalia tomentosa</i>	56.67	32.59	5.18	4.66	3.47	1.87	10	4
9	<i>Woodfordia fruticosa</i>	40	33.33	7.5	3.29	3.55	2.71	9.55	4
10	<i>Madhuca latifolia</i>	56.67	28.89	4.59	4.66	3.08	1.66	9.39	4
11	<i>Lagerstroemia parviflora</i>	40	31.85	7.17	3.29	3.4	2.59	9.27	4
12	<i>Anogeissus latifolia</i>	46.67	22.96	4.43	3.84	2.45	1.6	7.88	4
13	<i>Syzigium cumini</i>	43.33	20	4.15	3.56	2.13	1.5	7.19	3
14	<i>Gataran</i>	23.33	18.15	7	1.92	1.93	2.53	6.38	3
15	<i>Gardenia gummifera</i>	20	16.67	7.5	1.64	1.78	2.71	6.13	3
16	<i>Semecarpus anacardium</i>	30	17.04	5.11	2.47	1.82	1.84	6.13	3
17	<i>Goruga pinnata</i>	26.67	17.04	5.75	2.19	1.82	2.07	6.08	3
18	<i>Ventilago calyculata</i>	6.67	8.52	11.5	0.55	0.91	4.15	5.61	3
19	<i>Gardenia latifolia</i>	33.33	13.33	3.6	2.74	1.42	1.3	5.46	2
20	<i>Careya arborea</i>	30	9.63	2.89	2.47	1.03	1.04	4.54	2
								223.67	100



The data given in the Table NO. 3.3 is analyzed to find out suitable species proposed to be planted in the study area so that frequency of the species should be increased. The species given in the following table is proposed for the plantation in terms of percentage of the total no. of plants. This activity will enhance the density of the forest indirectly leading to forest conservation and wild life protection.

TABLE NO. 3.3.2 TOP 20 FREQUENCY SPECIES OF SHRUBS

SN	Species	Fre	Den	Abu	RF	RD	RAb	IVI	percentage of plants to be planted
1	<i>Bhaluhara</i>	3.33	9.26	25	0.27	0.99	9.02	10.28	5
2	<i>Nagar Kena</i>	3.33	3.7	10	0.27	0.39	3.61	4.28	5
3	<i>Manj</i>	3.33	2.22	6	0.27	0.24	2.17	2.68	5
4	<i>Borga</i>	3.33	1.48	4	0.27	0.16	1.44	1.88	5
5	<i>Bridelia retusa</i>	3.33	1.11	3	0.27	0.12	1.08	1.48	5
6	<i>Khisora</i>	3.33	1.11	3	0.27	0.12	1.08	1.48	5
7	<i>Abrus precatorius</i>	3.33	0.74	2	0.27	0.08	0.72	1.07	5
8	<i>Aegle marmelos</i>	3.33	0.74	2	0.27	0.08	0.72	1.07	5
9	<i>Azadirachta indica</i>	3.33	0.74	2	0.27	0.08	0.72	1.07	5
10	<i>Dalbergia paniculata</i>	3.33	0.74	2	0.27	0.08	0.72	1.07	5
11	<i>Dhendheni</i>	3.33	0.74	2	0.27	0.08	0.72	1.07	5
12	<i>Ficus benghalensis</i>	3.33	0.74	2	0.27	0.08	0.72	1.07	5
13	<i>Mangifera indica</i>	3.33	0.74	2	0.27	0.08	0.72	1.07	5
14	<i>Parri</i>	3.33	0.74	2	0.27	0.08	0.72	1.07	5
15	<i>Schleichera oleosa</i>	3.33	0.74	2	0.27	0.08	0.72	1.07	5
16	<i>Ficus glomerata</i>	3.33	0.37	1	0.27	0.04	0.36	0.67	5
17	<i>Ghotia</i>	3.33	0.37	1	0.27	0.04	0.36	0.67	5
18	<i>Rademachere xylocarpa</i>	3.33	0.37	1	0.27	0.04	0.36	0.67	5
19	<i>Smilax zeylanica</i>	3.33	0.37	1	0.27	0.04	0.36	0.67	5
20	<i>Xeromorphis spinosa</i>	3.33	0.37	1	0.27	0.04	0.36	0.67	5
		66.6							100



3.2.3 Herbs

Table – 3.2.3: Herbs recorded from the buffer zone

SN	Botanical Name	Common name	Family
1.	<i>Cassia tora</i>	Charota	Caesalpinaceae
2.	<i>Chlorophytum tuberosum</i>	Safed musli	Liliaceae
3.	<i>Curculigo orchioides</i>	Kali musli	Amaryllidaceae
4.	<i>Solanum nigrum</i>	Jangli bhata	Solanaceae
5.	<i>Vandella cristata</i>		
6.	<i>Vandella sp</i>		
7.	<i>Oldenlandia corymbosa</i>		
8.	<i>Borreria hispida</i>		
9.	<i>Borreria stricta</i>		
10.	<i>Phyllanthus amarus</i>	Bhul neem	Euphorbiaceae
11.	<i>Scoparia dulce</i>	Hazardana	Scrophulariaceae
12.	<i>Elephantopus scabre</i>		
13.	<i>Evolvulus alsinoides</i>		
14.	<i>Convolvulus nummularius</i>		
15.	<i>Hemigraphis indica</i>		

3.2.4 Grasses and sedges

Table – 3.2.4: Grasses and sedges recorded from the buffer zone

SN	Botanical Name	Common Name
1.	<i>Dicanthium annulatum</i>	Kail
2.	<i>Andropogon aciculatus</i>	Mothi marvel
3.	<i>Heteropogon contrtus</i>	Kusal, Sukal, Lampa
4.	<i>Themeda quadrivalvis</i>	Gunner
5.	<i>Apluda varia</i>	Phuli
6.	<i>Apluda mutica</i>	Kunda-phuli



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7.	<i>Thysanolaena maxima</i>	Phool bahari
8.	<i>Cynodon dactylon</i>	Doob
9.	<i>Eragrostis tenella</i>	Bhurburi
10.	<i>Eulaliopsis binata</i>	Sabai, Bhabhar
11.	<i>Iseilema laxum</i>	Mushan
12.	<i>Oplismenus burmanii</i>	
13.	<i>Fibristylis podocarpa</i>	
14.	<i>Cyperus iria</i>	
15.	<i>Cyperus pygmaea</i>	
16.	<i>Cyperus rotundus</i>	

3.2.5 Climbers and creepers

Table – 3.2.5: Climbers and creepers in the buffer zone

SN	Botanical Name	Common Name	Family
1.	<i>Abrus precatorius</i>	Ghumchi	Fabaceae
2.	<i>Acacia pinnata</i>	Raona, Chotichilati	Mimosaceae
3.	<i>Asparagus racemosus</i>	Shataori	Liliaceae
4.	<i>Bauhinia vahlii</i>	Mahul	Caesalpinaceae
5.	<i>Celastrus peniculata</i>	Malkangni	Celastreaceae
6.	<i>Cryptolepis buchanani</i>	Nagbel	Asclepiadaceae
SN	Botanical Name	Common Name	Family
7.	<i>Dioscorea hispida</i>	Blachandi	Dioscoreaceae
8.	<i>Gymnema sylvestre</i>	Phulcat	Rhamnaceae
9.	<i>Ichnocarpus frutescens</i>	Dhimarbel	Apocynaceae
10.	<i>Marsdenia tenacissdima</i>	Dudhibel	Asclepiadaceae
11.	<i>Mucuna pruriens</i>	Kewanch	Fabaceae
12.	<i>Smilax macrophylla</i>	Ramdaton	Liliaceae
13.	<i>Spatholobus roxburghi</i>	Palasbel	Fabaceae
14.	<i>Vallis heynei</i>	Keoti	Apocynaceae
15.	<i>Ventilago calyculata</i>	Pararbel	Rhamnaceae
16.	<i>Ziziphus oenoplia</i>	Makor	Rhamnaceae



3.2.6 Epiphytes

Table – 3.2.6: Epiphytes in the buffer zone

1. *Vanda tasellata*
-

3.2.7 Parasites

Table – 3.2.7: Parasites in the buffer zone

1. *Dendrophthoe falcata*
2. *Viscum orientale*
3. *Cuscuta reflexa*

3.3 FAUNA IN THE STUDY AREA

Wild faunal species like Bear, Fox and Jackal were reported to be more common than other animal species in the area. The major aquatic fauna are fishes, amphibians and water snakes. The list of faunal species is given below:

3.3.1 Mammals

S.N.	Local Name	English Name	Zoological Name	Status WL(Protection Act, 1972)	Part
				Schedule	Part
1.	Siyar	Jackal	<i>Canis aureus</i>	II	II
2.	Bhalu	Sloth bear	<i>Melursus ursinus</i>	I	I
3.	Kharaha	Indian hare	<i>Lepus ruficaudatus</i>	IV	-
4.	Gilhari	Squirrel	<i>Funambulus pennanti</i>	IV	-
5.	Chamgadam	Fruit bat	<i>Cynopterus sphinx</i>	V	-
6.	Choocha	Field rat	<i>Bandicota benghalensis</i>	V	-
7.	Lomadi	Indian fox	<i>Vulpus benghalensis</i>	II	II
8.	Bandar	Monkey	<i>Macaca mulatta</i>	III	-
9.	Hurra	Hyaena	<i>Hyaena hyaena</i>	III	-
10.	Langoor	Common langur	<i>Semnopithecus entellus</i>	II	I
11.	Jangali billi	Jungle cat	<i>Felis chaus</i>	II	II



12. Jangalisuar	Wid boar	<i>Sus scrofa</i>	III	-
13. Choocha	Common house	<i>Rattus rattus</i>	V	-

3.3.2 Birds

1. House crow	<i>Corvus splendens</i>	V
2. Common myna	<i>Acridotheris tristis</i>	IV
3. Brahminy myna	<i>Sturnus pagodarum</i>	IV
4. Pied myna	<i>Sturnus contra</i>	IV
5. Black drongo	<i>Dicrurus paradiseus</i>	IV
6. Spotted dove	<i>Streptopelia chinensis</i>	IV
7. Blue jay	<i>Coracias benghalensis</i>	IV
8. Parakeet	<i>Psittacula krameri</i>	IV
9. Little Green Bee-Eater	<i>Merops orientalis</i>	IV
10. Koel, Cuckoo	<i>Eudynamys scolopacea</i>	IV
11. Phakhta	<i>Streptopelia chinensis</i>	IV
12. Jangali Kua	<i>Corvus macrorhynchos</i>	V
13. Jangali Tota	<i>Taccocua leschenaultia</i>	IV
14. Tania Tota	<i>Psittacula cyanocephala</i>	IV
15. Tota	<i>Psittacula krameri</i>	IV
16. Neelkanth	<i>Coracias benghalensis</i>	IV
17. Bate (Grey Quail)	<i>Coturnix coturnix</i>	IV
18. Basanti (Indian cuckoo)	<i>Cuculus micropterus</i>	IV
19. Kite	<i>Milvus migrans</i>	IV
20. Peafowl	<i>Pavo cristatus</i>	I
21. Redwhiskered bulbul	<i>Pycnonotus cafer</i>	IV
22. Bate (Grey Quail)	<i>Coturnix coturnix</i>	IV
23. Red jungle fowl	<i>Gallus gallus</i>	IV
24. Grey jungle fowl	<i>Gallus sonneratii</i>	IV
25. Jungle myna	<i>Acridotheres fuscus</i>	IV
26. Grey heron	<i>Ardea cineria</i>	IV
27. Golden backed woodpecker	<i>Brachypternus benghalensis</i>	IV
28. Owl	<i>Bubo bubo</i>	IV
29. Cattle egret	<i>Bubucus ibis</i>	IV
30. Blue rock pigeon	<i>Columba livia</i>	IV
31. House crow	<i>Corvus splendens</i>	V



32. Common Hawk-cuckoo	<i>Cuculus varius</i>	IV
33. Gray partridge	<i>Francolinus pondicerianus</i>	IV
34. Grey waig tail	<i>Motacilla cinerea</i>	IV
35. House sparrow	<i>Passer domesticus</i>	V
36. Grey quail	<i>Perdica asiatica</i>	IV
37. Roseringed parakeet	<i>Psittacula krameri</i>	IV
38. Spotted dove	<i>Pycnonotus luteolus</i>	IV
39. Common kingfisher	<i>Alcedo atthis</i>	IV
40. Pond heron	<i>Ardeola grayii</i>	IV
41. Large cormorant	<i>Phalacrocorax carbo</i>	IV
42. Little cormorant	<i>Phalacrocorax niger</i>	IV
43. Little green heron	<i>Ardeola striatus</i>	IV
44. Little egret	<i>Egretta garzetta</i>	IV
45. Phakta	<i>Streptopelia senegalensis</i>	IV
46. Asian openbill	<i>Anastomus oscitans</i>	IV
47. Black ibis	<i>Pseudibis papillosa</i>	IV
48. Greater caucal	<i>Centropus sinensis</i>	IV
49. Indian Robin	<i>Saxicoloides fulicata</i>	IV
50. Oriental Magpie Robin	<i>Copsychus saularis</i>	IV

3.3.3 Reptiles

1. Dhaman/Indian Rat snake	<i>Ptyas mucosus</i>	II	II
2. Dhondwa/Water sanke	<i>Enhydryis enhydryis</i>	IV	
3. Nag/Cobra	<i>Naja naja</i>	II	II
4. Common Karait	<i>Bungarus caeruleus</i>	IV	
5. Banded Krait	<i>Bungarus fasciatus</i>	IV	
6. Russel viper	<i>Vipera russelli</i>	II	II
7. Sita Ki Lath	<i>Amphiesma stolata</i>	-	-
8. Gohi, Monitor lizard	<i>Varanus benghalensis</i>	I	II
9. Garden lizard	<i>Calotes versicolor</i>	-	-

3.3.4 Amphibia

1. Mendhak	Bull frog	<i>Hoplobatrachus tigerinus</i>	IV	-
2. Mendhak	Common toads	<i>Duttaphrynus melanostictus</i>		IV
3. Mendhak	Skipper frog	<i>Euphlyctis cyanophlyctis</i>	IV	-



4. Mendkak	Small frog	<i>Microhyla ornata</i>	IV	-
5. Mendhak	Tree frog	<i>Polypedates maculatus</i>	IV	-

3.3.5 Fishes

1.	Kotri/Karwadi	<i>Puntius sophora</i>
2.	Karwadi	<i>Puntius ticto</i>
3.	Tengna	<i>Mystus cavasium</i>
4.	Bam	<i>Mastocembelus armatus</i>
5.	Padhan	<i>Wallago attu</i>
6.	Magur	<i>Clarius batrachus</i>
7.	Singi	<i>Heteropneustes fossilis</i>
8.	Maral	<i>Chana marulius</i>
9.	Bhunda	<i>Ophiocephalus striatus</i>
10.	Bhanga	<i>Labeo bata</i>
11.	Dandai	<i>Rasbora daniconius</i>
12.	Karwadi	<i>Barbus ticto</i>
13.	Catla	<i>Catla catla</i>
14.	Mrigal	<i>Cirrhina mrigala</i>
15.	Mongri rou	<i>Labeo fimbriatus</i>
16.	Dingra	<i>Mystus aor</i>
17.	Fresh water cat fish	<i>Mystus seenghala</i>
18.	Singhara	<i>Mystus vittatus</i>

3.3.6 SCHEDULE I SPECIES RECORDED FROM THE STUDY AREA.

1. Monitor lizard (*Varanus benghalensis*)
2. Peafowl (*Pavo cristatus*)
3. Sloth bear (*Melursus ursinus*)

3.3.7 ENDEMIC ANIMAL SPECIES: NIL

3.3.8 MIGRATORY ANIMAL SPECIES: NIL

3.3.9 ROUTE OF MIGRATORY ANIMAL SPECIES: NIL

3.4 GREEN BELT



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Green belt of sufficient width will be developed along the boundary of the open cast mining area. The area for green belt plantation consists of undisturbed soil, hence, plantation could be made like gap filling in a forest area. Green belt is erected not from biodiversity conservation point of view but is basically developed as a screen to check the spread of fugitive dust.

1. A green belt of sufficient width will be developed around the open cast mining area.
2. Green belt plantation will be started with the beginning of the mining and will be completed within five years from the beginning.
3. To raise seedlings for plantation in the green belt a nursery will be developed. Seedlings of only local species, suitable for green belt plantation will be raised in this nursery.
4. Green belt plantation will be protected properly. If need arises then the saplings will be protected with tree guards. Together with the trees green belt plantation will include shrubs, climbers and some herbaceous species also. However, only local species will be used in the plantation.
5. Green belt will help in reducing the spread of fugitive dust and noise from the mining area.
6. Selection of plants for green belt plantation will be made on following criteria:
 - Having tolerance to dust pollution.
 - Should maintain leaves for as longer a time as possible.
 - Combination of plants should be such so that almost a screen of plants is formed to check the dust from escaping the area. Thus the green belt plants will consist of mainly the trees and shrubs with some herbs also.
 - The trees should provide shade.
 - Plants possessing economic and/or aesthetic value should be given preference.
 - Trees less affected due to pruning should be given preference because pruning will yield fuel wood.
 - Every plant species to be planted in the green belt should have some basis for its selection to be planted in the green belt.
 - Only local species will be taken for plantation.



Green belt will be developed with the aim to form a curtain to check the spread of fugitive dust. Hence, the belt will consist of trees, shrubs and lianas and climbers. With these above considerations following, local plant species will be taken for green belt plantation.

3.4.1 Trees

1. Imli (*Tamarindus indica* – seed)
2. Mahua (*Madhuca latifolia*– seed)
3. Saja (*Terminalia tomentosa* - seed)
4. Aam (*Mangifera indica* – seed, seedling transplantation)
5. Kumhi (*Careya arborea* – seed)
6. Rohan (*Soymida febrifuga* - seed)
7. Sidha (*Lagerstroemia parviflora* - seed)
8. Bargad (*Ficus benghalensis* - Transplantation)
9. Pipal (*Ficus religiosa* - Transplantation)
10. Umar (*Ficus racemosa* - Transplantation)
11. Pakar (*Ficus infectoria* - Transplantation)
12. Neem (*Azadirachta indica*- seed)
13. Sal (*Shorea robusta*- seed)
14. Karanj (*Pongamia pinnata* - seed)
15. Haldu (*Adina cordifolia* – seed)
16. Bel (*Aegle marmelos* - Seed)
17. Maharukh (*Ailanthus excelsa* - Seed)
18. Kala sisris (*Albizzia lebbek* - seed)
19. Chichwa (*Albizzia odoratissima* - seed)
20. Asta (*Bauhinia racemosa* – seed)
21. Kasai (*Bridelia retusa* - seed)
22. Amaltas (*Cassia fistula* - seed)
23. Mainphal (*Catunaregam spinosa* - seed)
24. Lasora (*Cordia myxa* - seed)
25. Jamrashi (*Elaeodendron glaucum* - seed)
26. Bhonrsal (*Hymenodictyon excelsum* - seed)
27. Baranga (*Kydia calycina* - seed)
28. Kari (*Milusa tomentosa* - seed)



29. Kusum (*Schleichera oleosa* - seed)

30. Jamun (*Syzygium cumini* - seed)

3.4.2 Shrubs

1. Chilhi (*Casearia tomentosa* – seed)
2. Dikamali (*Gardenia gummifera* – seed)
3. Adusa (*Adhatoda vasica* – seed)
4. Akol (*Alangium salvifolium* - seed)
5. Karonda (*Carissa spinarum* – seed)
6. Chipti (*Desmodium pulchellum* - seed)
7. Chapar (*Moghamia chapar* – seed)
8. Baibirang (*Embelia ribes* – seed)
9. Marodphali (*Helecteres Isora* – seed)
10. Dudhi (*Holarrhena antidysenterica* – seed, transplantation)

3.4.3 Climbers and Lianas

1. Satawar (*Asparagus racemosus* – seed, tuber)
 2. Mahul (*Bauhinia vahlii* – seed)
 3. Palasbel (*Spatholobus roxburghii* – seed)
 4. Malkangni (*Celestrus peniculata* - seed)
 5. Baichandi (*Dioscorea hispida* – tuber, bulbil)
 6. Dangkanda (*Dioscorea bulbifera* – seed, tuber, bulbil)
 7. Gudmar (*Gymnema sylvestre* – cutting, seed)
 8. Dhimarbel (*Ichnocarpus frutescens* – seed)
 9. Ramdaton (*Smilax zeylanica* – seed)
 10. Guruch (*Tinospora cordifolia* – cutting, seed)
 11. Keoti (*Vallis heynei* – seed)
 12. Keoti (*Ventilago calyculata* – seed)
-



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CHAPTER- IV
CONSERVATION ACTION PLAN FOR WILD LIFE

Conservation of flora and to increase its density plantation and conservation in- situ is proposed. The rest of the species derived for increasing their frequency and no. of plants in relation to the species specific important value index, is given in the following table.

S.NO.	SPECIES	S.NO.	SPECIES	S.NO.	SPECIES
1	<i>Abrus precatorius</i>	21	<i>Diospyros melanoxylon</i>	41	<i>Pterocarpus marsupium</i>
2	<i>Acacia pinnata</i>	22	<i>Domni</i>	42	<i>Rademachera xylocarpa</i>
3	<i>Aegle marmelos</i>	23	<i>Ficus benghalensis</i>	43	<i>Salmalia malabarica</i>
4	<i>Albizia lebbeck</i>	24	<i>Ficus glomerata</i>	44	<i>Schleichera oleosa</i>
5	<i>Amtarri</i>	25	<i>Gardenia guminifera</i>	45	<i>Semecarpus anacardium</i>
6	<i>Anogeissus latifolia</i>	26	<i>Gardenia latifolia</i>	46	<i>Shorea robusta</i>
7	<i>Azadirachta indica</i>	27	<i>Gardenia turgida</i>	47	<i>Smilax zeylanica</i>
8	<i>Bhaluhara</i>	28	<i>Gataran</i>	48	<i>Soymida febrifuga</i>
9	<i>Borga</i>	29	<i>Gholia</i>	49	<i>Syzigium cumini</i>
10	<i>Bowsellia serrata</i>	30	<i>Gmelina arborea</i>	50	<i>Terminalia arjuna</i>
11	<i>Bridelia retusa</i>	31	<i>Goruga pinnata</i>	51	<i>Terminalia bellerica</i>
12	<i>Buchanania lanzan</i>	32	<i>Kako</i>	52	<i>Terminalia chebula</i>
13	<i>Careya arborea</i>	33	<i>Khisora</i>	53	<i>Terminalia tomentosa</i>
14	<i>Casaeria graveolens</i>	34	<i>Lagerstroemia parviflora</i>	54	<i>Ventilago calyculata</i>
15	<i>Cassine glauca</i>	35	<i>Madhuca latifolia</i>	55	<i>Woodfordia fruticosa</i>
16	<i>Chloroxylon swietenia</i>	36	<i>Mangifera indica</i>	56	<i>Wrightia tinctoria</i>
17	<i>Cleistanthus collinus</i>	37	<i>Manj</i>	57	<i>Xeromorphis spinosa</i>
18	<i>Delbergia paniculata</i>	38	<i>Millusa tomentosa</i>	58	<i>Xylosma longifolium</i>
19	<i>Dhendheni</i>	39	<i>Nagar Kena</i>		
20	<i>Dillenia pentagyna</i>	40	<i>Parri</i>		

The preference would be given to above species given in the table for plantation within the study area in the form of gap planting or regular unirrigated plantation. The planting of these species being naturally available in the area will enrich the habitat of local fauna without any adverse impact on the micro climate of



the area and existing species. The area available for the plantation and depth planting is derived from the google imagery, toposheet and reconnaissance survey done during the field visit for study of the area.

Table no. 4.1 Plantable Area

S.NO.	Land used	AREA	Plantable/ workable area	UNIT
1.	Agricultural area	28963.00	289.63	hectares
2.	Forest area	11540.70	1154.07	hectares
3.	Forest blank area	1671.98	1253.98	hectares
4.	Area under abadi water streams and other infrastructures/ unworkable area.	19431.01	nil	
	Total	61606.69	2697.68	hectare

Area available for the plantation work is 2698 hectares only.

4.1 Conservation Plan for fauna is based on:

1. Home range of the animal
2. Territorial area requirement of the animal
3. Deciding the number of animals to be conserved and accordingly evaluating the carrying capacity of the habitat
4. Conservation is aimed at multiple species
5. Conservation is proposed in a managed ecosystem or an un-managed, natural ecosystem.

However, very little knowledge exists on the above parameters for most of the animals.



4.2 Primary data used for conservation Plan

The proposed conservation plan has been prepared on the basis of the following:

- a. Field & Desk Study
- b. Inputs from The Mine Plan
- c. Working Plan of Raigarh Forest division

Several reasons for the decline of wild life and methods for their conservation are proposed. However the best method for the conservation of wild life is to maintain ecosystems in their natural condition, allowing their natural development, thus protecting the habitat of the wildlife. Both these phenomena (ecosystem development and habitat protection) are related to anthropogenic factors. Some of the important anthropogenic factors are listed below:

1. Habitat fragmentation and destruction
2. Man-animal conflict
3. Forest fire
4. Poaching
5. Stake holders dependence on forest resources
6. Creating awareness amongst forest stake holders
7. Water scarcity

The plan for wild life conservation with respect to above situations is detailed as under:

4.2.1 Habitat improvement: Sal (*Shorea robusta*) is the most dominant tree species of the area. This should be one of the important species to be used in gap filling of the adjoining (degraded) forest area. Sal is a semi-evergreen tree species, providing shade to the wild life as well as to the ground flora, particularly during intense radiation and scorching summer months. There had been some debate over the regeneration of sal through natural regeneration as well as *dona* transplantation. However, I had observed successful natural regeneration as well as *dona* transplantation, provided it is done with care. Together with sal other local species, particularly some fruit yielding species should also be planted eg: Mango, Tendu and Gular etc. To this it is important to add the plantation of aonla, which has almost disappeared from the area. The area vegetated with the local species will provide



natural environment, food and shelter to the wild life attracting them more to the area. Some hideouts, suitable to different species, should also be created at suitable places.

4.2.2 Elimination of man-Animal conflict and protection: Man-animal conflict is a difficult problem to be eliminated. The conflict is both deliberate as well as inadvertent. Bear-human conflicts is one of the most common phenomenon in the area, of which most common conflicts are during mahua flower collection season. Bears have a special liking for the flower and the flower collectors approach the mahua tree early in the morning when the visibility is low. Recently, due to strictness on wildlife protection and conservation, at any places improvement in wildlife is being observed of which most significant is the increase in the population of bear, rhesus monkey and hanuman Bandar. Bear is generally aggressive, attacking humans, particularly when a person is alone. However, conflict can be minimized through employing local persons to form anti-depredation team. The conflict can be minimized also through protecting the area, preventing the entry of human beings or the cattle in the area. First aid facilities should be provided in the villages to meet exigencies in case of any conflict.

Project proponent would complement the forest department in the protection of forests from anthropogenic, harmful activities. Project proponent employees would keep watch over wildlife offences, illicit felling, animals in distress and forest fire etc. Land line phone line should be established to disseminate information on above mentioned offences. Project employees/guards would:

- ◆ Keep watch over wandering animals near the project site.
- ◆ Be trained on identifying the movement of wildlife through indirect evidences like droppings, hoof marks, scat etc.
- ◆ Keep constant vigil on animal traps including the nets and electrical lines etc.

Loss of crop, properties, injuries and lives by the wildlife would be compensated as early as possible by the forest department. In order to prevent backlash by the people, due to delay in the payment of compensation, a **corpus fund of about Rs. 20 lakhs**, by the project proponent, would be made available to the DFO. Compensation would be made immediately and would be replenished from the Govt. fund, received for the purpose.

4.2.3 Prevention of forest fire: Forest fire is caused both naturally as well as by the



human beings. Forest fire in late winter and early summer is a major threat to the wildlife. Severity, frequency and expanse of the fire affect the wildlife, ground and shrub flora, small animals, soil erosion and regeneration of the vegetation. Most of the animals hiding in the litter are burnt to death, causing great loss to the biodiversity. Burnig of the litter exposes the soil surface to the totrrential monssonic rains causing significant erosion of the soil, making it thin and thinner and exposing the bed rock, which is unable to support a good growth of vegetation. Most common reason of forest fire is setting fire to the litter for the collection of N.T.F.P. like Mahua flower and fruit, sal seed, seeds of achar, kusum, harra, behead, bhilwa etc. Anthropogenic causes will be minimized through forming a fire line around the forest area. To add to the prevention of fire local persons will be employed as fire guards, during the fire prone season. The team will be instructed to fight the fire as soon as it is detected. Watch towers will also be constructed to detect forest fire. Awareness program against forest fire will also be run in adjoining vllages.

4.2.3.1 Management prescriptions for fire protection

The forest fires along-with unregulated grazing have been acknowledged as the main causes of degradations of forest eco-systems and wildlife habitat. It directly affects the fodder availability and also kills the helpless wild animals especially the micro- fauna, reptiles, etc. It also exposes the soil to erosion and, hence, causes habitat degradation in the process. Due to deciduous nature of the forests, the grasses, weeds and falling leaves and twigs forms a thick layer of undergrowth which is highly inflammable in nature. The availability of water also becomes scarce during summers causing further hardships in its timely check and control.

The Fire lines are classified into, the following, categories in order of priority.

a) **A -Class Fire lines:** These Fire lines comprise of the external boundary. These are the prominent Fire lines, which should be prescribed for clearing, burning and maintenance every year on priority basls.

b) **B -Class Fire lines:** These Fire lines includes internal boundaries and roads. These Fire lines should also be prescribed for clearing, burning and maintenance, every year.



c) **C-Class Fire lines:** It includes the remaining Fire lines including the internal boundaries of compartments and coupe lines.

4.2.4 Prevention of poaching: Poaching is undoubtedly a serious problem in the conservation of wild life. Poaching is premediated, an organized crime. Poaching starts from the local people and may end at an international level. Poaching can not be operated without the help of local people most of which are the tribes, because they only have the knowledge about the location of the animals. Several methods are employed by the poachers, to kill or trap the wild life, of which poisoning and traps of different types are more common. Traps are often home made eluding the forest officers detection. Poachers can apply even electrocution by using connection from the power line passing from the area. Poaching links sometimes are extended to international level. A proper vigilance will be maintained to check such menace. Poaching menace will be eliminated seriously neither all the efforts to promote wild life survival in the area will go in to waste. This will be achieved through employing, properly equipped like with Walkie-talkie, two ex-army jawans to assist the forest officers.

4.2.5 Reducing stake holder's dependence on forest produce: People from adjoining villages have already exploited the forest to the extent that the forests have become a grazing land or a source of fuel wood. Timber and medicinal species have either disappeared or have become scarce. However, regenerating the forest will again attract the villagers towards the forest. To keep the people away from the forest their economic condition will be improved. This will be achieved through financial and technical help to develop Dairy, Poultry, Vegetable cultivation, Horticulture and Agro-forestry. Promotion of agro-forestry, in particular, will reduce their dependence on forests for timber as well as for fuel wood.



4.2.6 Creating awareness amongst forest stake holders: Awareness about the environment and wild life will be created amongst the adjoining villages. They will be informed about the importance of a good environment, a healthy ecosystem and more importantly about the wild life. Through slide and film shows they will be convinced about the sustenance of natural ecosystems. They will be convinced that their own survival depends upon the survival of a healthy ecosystem, to which a wide variety of wild life is an essential component. To develop affection of the people towards the wild life some of them will be taken to some zoos and wild life sanctuaries. Awareness programmes will be run with the help of Forest Officers and more importantly some national experts will be invited to deliver talks awareness, related to wildlife conservation.

4.2.7 Water availability: Rainfall in the area is about 1300 mm, sufficiently to be categorized as a wet zone. However, due to lack of proper storage, severe water scarcity develops during the summer months. To make the water available throughout the year it is essential to create water storage facility. Multiple water storage places will be created in the Buffer zone through improving the existing ponds, constructing stop dams in the water channels and through creating water holes. Also, camouflage and hiding places should be created. Some wildlife species fulfill their salt requirement through licking the soil. Salt deposits will be arranged for such species adjacent to the water holes. These water holes will also be helpful in recharging the ground water and thus will be supporting good growth of the vegetation.

In addition to above following additional measures is proposed to be adopted for flora and fauna conservation.

A. Restriction of grazing and creation of waterholes: Illegal grazing is a serious problem in the area. There is a large population of cattle of local breed, mostly the cows. These cows of very small size are of little use either in agriculture or milk production. They are all driven to the forests in the morning and gathered back in the evening. These are serious threats to the forests, causing degradation of forests through trampling and browsing away the newly sprouting saplings. Trampling not only results in killing the saplings but also causes compaction of the soil, reducing water infiltration, increasing surface run off and consequently the erosion of soil.



Transmission of diseases from cattle to wildlife can cause depletion of wiping out the wildlife of the area. Waterholes will be constructed outside the plain area for exclusive use of wildlife. This will reduce direct conflict between the wild animals and cattle. Patrolling parties will check and stop the entry and illegal grazing of cattle in the area. Heavy grazing not only reduces the herbaceous cover but brings about compaction of the soil also. It also favours the growth of non-palatable, unwanted weeds like *Lantana camara*, *Hyptis suaveolens*, *Plectranthus incanus*, *ageratum conyzoides* and so on. Such weeds will be uprooted and eradicated, preferably before their flowering and fruiting, to promote the growth of fodder grasses.

B. Providing salt licks: Compensation of salt requirement is essential from other than the salt obtained from the food. This is met by the wild life through licks i.e. licking the soil rich in salt. However, providing artificial salt lick has proved to be a good alternative to provide the salt to the wild life because these artificial salt licks have far higher concentration of salt as compared to the concentration of salt in natural soil. Therefore artificial salt licks will be provided to the wildlife of the area near the waterholes.

C. Training and awareness programme: This is the most important aspect of wild life conservation. People will be educated regarding the importance of wild life conservation through mass publicity by installing sign-boards, conducting audio visual classes and distributing literature in respective villages in the buffer zone. **Experts in the field** of wild life conservation will also be invited to deliver talks through slides.

D. Encourage local villagers to grow trees on their own on field bunds/court yards etc.: In consultation with Forest Department the company will provide some finance, to grow saplings of tree species, having importance for wood, small timber and fuel wood to distribute to the villagers. Bamboo will be another important species with a lot of environmental and economic value. This will, no doubt, will help reduce dependence of people on RF forest; as a result the ecological condition of the area will improve so the wild life will be attracted to this area.

E. Creation of conservation awareness: What if a few species of wildlife become endangered or extinct? How are we concerned if the Indian Cheetah has been lost forever or the Asiatic lion is precariously perched on the verge of extinction?



Why should we spend crores of rupees to protect the tiger? The answers to these questions of "what", "how" and "why" should form the basis for creating conservation awareness among the public- an understanding of the importance of biological diversity of inter- relationships in nature, of the sustenance and stability of ecosystems and of man's impact on the natural world.

F. Sign boards: Wild life protection will be most effective if the young once like the school children are taught and involved in it. To begin with sign boards with images of wildlife will be placed near the village schools as well as at places of more occurrence or more conflicts of any particular species of the wildlife.

G. Fencing and lighting: A photovoltaic, barbed wire fencing of 5 strands of wire will be erected around the mining lease area, outside the green belt. Lighting will also be fixed around the mining lease area. Lights will be focused towards the inside, so that the animals outside the lease area will be disturbed least due to light.

Protected areas and threatened species could most effectively be safeguarded if local people considered it in their own interest to do so. Working with rather than against local people has become a major working principle for IUCN.

H. Working Plan Prescriptions: Forest working plans, prepared now a days, have more exosystemic approach as compared to earlier reports which had more emphasis on exploitation of the forest products for economic gains. Working plans have several circles but one related to wildlife conservation is the "Wildlife and Biodiversity Conservation Working Circle". Main objectives of the circle are:

- Conservation and Propagation of Biodiversity
- Increase density of forest crop
- Soil & water conservation
- Improve habitat for wildlife
- Conservation and propagation of endangered species
- Provide special protection to plants of medicinal value
- Involve fringe villagers for active co-operation in ecodevelopment.

However, it is worth mentioning that none of the presently proposed impact areas fall under areas marked by the circle for special biodiversity treatment.



For wildlife conservation the areas have been divided in to three zones as follows:

- ❖ P-I High presence of wildlife
- ❖ P-II Medium level presence of wildlife
- ❖ P-III Minimum level presence of wildlife

Presently proposed impact areas fall almost entirely under P-III. General objectives of these areas is to develop them in a way so that they can support wildlife in the future.

I. Providing gas to the project employees: Project employees of all types and grade should be provided gas as cooking fuel. This will prevent illegal collection of fuel wood from the forest. To help villagers in getting gas connection under the UJJWALA YOJANA this will decrease dependency of villagers on the forest for the fuel wood.

J. Cattle feeding stalls: To prevent the cattle to go to the forest for grazing, cattle stalls should be established under the guidance of the forest officers.

K. Labour camp location: No labour camp should be located within 100 meters of a permanent water source.

L. Placement of funds: Funds proposed for wildlife conservation should be made available in advance. The fund should be deposited in a separate account meant exclusively for wildlife conservation of GARE PALMA SECTOR-2 COAL BLOCK-II. The account should be reequipped yearly with the amount marked for the year.

4.3 CONSERVATION PLAN FOR WILDLIFE BELONGING TO SCHEDULE I

4.3.1 *Varanus bengalensis bengalensis* (Bengal monitor lizard)

4.3.1.1 Habit: They are often found in agricultural areas. Bengal monitors shelter in burrows that they dig or crevices in rocks and abandoned termite mounds. It is mostly diurnal in habit.

4.3.1.2 Habitat: It is found in a wide range of habitats, viz. forest, river banks, by the side of nullah, and agricultural land. It occupies burrows, dense vegetation, hollows of trees, rock cracks and crevices.



4.3.1.3 Behavior: Mainly ground dweller, but is a very good climber as well. Bengal Monitors are usually solitary and usually found on the ground although the young are often seen on trees. They shelter and spend nights in burrows or crevices in rocks, make use also of abandoned termite mounds. In the night their body temperature drops below ambient. In the morning they raise their body temperatures by basking before commencing activity and for this reason they are rarely active early in the morning and most active in the afternoons when temperatures are highest.

4.3.1.4 Food: Their normal prey consists of beetles, grubs, orthopterans, scorpions, crabs, snails, ants and other invertebrates. Vertebrate prey is comparatively rare and includes frogs, fish, other lizards, snakes birds and their eggs and rodents. They sometimes capture roosting bats.

4.3.1.5 Threat: Monitor lizards are hunted for skin and their body fat. Its eggs are considered a delicacy and the entire animal is also eaten. Unani, the Greco-Arabian system of medicine, recommends the use of various body parts of monitors to cure numerous ailments. The population of the Common Indian Monitor, *Varanus bengalensis* has alarmingly dwindled throughout the Indian sub-continent mainly due to excessive exploitation of the adults for their commercially valuable skins, as food and in traditional medicines. Habitat loss due to large-scale deforestation, urbanization, dams and hydroelectricity projects and other biotic factors are also responsible for the population decline of the species.

4.3.1.6 Conservation Status: Status: Not Listed (IUCN 2000); Endangered (ESA). Schedule I Indian Wildlife (Conservation) Act, 1972.

4.3.1.7 Conservation measures: There is no scarcity of food or habitat to the animal. Preventing poaching will be the single most important factor in the conservation of the species, for which awareness programmes should be run frequently.

4.3.2 Pavo cristatus (Common Peafowl, Indian Peafowl)

The Indian Peafowl (*Pavo cristatus*), is also known as the Common Peafowl or the Blue Peafowl, The peacock is the **national bird** of India.



4.3.2.1 Habitat: It is found in forests, but can live also in cultivated regions and around human habitations and is usually found where water is available.

4.3.2.2 Food: It is an omnivorous bird. It's diet consists of small mammals like: mice, reptiles like lizards and snakes, amphibians, arthropods like: insects, ticks, termites, ants, locusts and scorpions, seeds, fruit, vegetables, flowers, leaves, and minnows in shallow streams and so on. With its strong bill it is able to kill a snake, even a cobra. Around cultivated areas, peafowl feed on a wide range of crops such as groundnut, tomato, paddy, chilly, and even bananas. Around human habitations, they feed on a variety of food scraps and even human excreta.

4.3.2.3 Threat: Poaching of peacocks for their meat, feathers and accidental poisoning by feeding on pesticide treated seeds are known threats to wild birds. Methods to identify if feathers have been plucked or have been shed naturally have been developed as Indian law allows the collection of feathers that have been shed. However, presently, there is no severe threat to this species, primarily for its status as a National bird and secondarily due to religious belief this species is protected. But its train feathers are in great demand for commercial purposes and are the main threat to its survival. Their loud calls make them easy to detect, and in forest areas, often indicate the presence of a predator such as a tiger.

4.3.2.4 Conservation: They are generally protected by religious sentiment and will forage around villages for scraps. The people living in the surrounding area should be rewarded for timely information about disturbing and/or poaching of the bird. The bird has a wide range of food items, hence, improvement of and protection of the bird in the buffer zone will provide sufficient food to the animal.

4.3.2.5 Conservation Status: IUCN Red List, Least Concern species. Schedule I Indian Wildlife (Conservation) Act, 1972.

4.3.3 Melursus ursinus (Sloth bear) | Vulnerable A2 cd+4cd;C1

Presently applied lease area has both the degraded, protected forest as well as cultivated area. Bear is a nocturnal animal. Generally it remains within the forest area, but occasionally it intrudes within the village area. This is mainly due to the Mahua flower, because Mahua trees are most common around the village areas.



Therefore approach of the bear near to the village area is more during the months of Mahua flowering: the Months of March and April. Approach of the animal near the village areas in other months is extremely rare. Their density is also very low.

4.3.3.1 Habitat: Sloth bears, in the area, occupy a wide range of habitats including forests, scrublands, and grasslands where boulders and scattered shrubs and trees provide shelter. The most common shelter is a den, a cavern like structure generally in rocks.

4.3.3.2 Home range: To date, there is no definitive research detailing the exact nature of the home range of the sloth bear. The size of the home range of an individual sloth bear will vary with the concentration of high energy food sources. Thus, the more concentrated the food sources, the smaller the range necessary to maintain an animal.

4.3.3.3 Habit: The sloth bear is more inclined to attack man unprovoked than almost any other animal. Sloth bears avoid areas where human disturbance is high, however, the bear raid peanut, maize, and fruit crops. Sloth bears like to escape from the heat of the day and forage for food at night. They will start to become active as the sun starts to set. This is also the time when many insects such as termites are more active.

They are generally nocturnal, occasionally approaching near to the village area even during the day time. Locally they prefer isolated shelters below rocks and caverns to spend their day time hours. Occasionally, near to the village area, after consuming large amount of mahua (*Madhuca latifolia*) flower they remain sleeping below the tree late after sun rise.

4.3.3.4 Food: Sloth bears subsist primarily on termites, ants, and fruits. This is the only species of bear adapted specifically for myrmecophagy (ant and termite-eating; The ratio of insects to fruits in the diet varies seasonally and geographically. Most bears are opportunistic omnivores. As such, their activities are governed by the availability of food items and dietary components within their habitat. When trees are in fruit, usually during the monsoon season, sloth bears dine on mango, fig, ebony,



and other fruits, and also on some flowers. However, ground dwelling ants and termites, dug out of their cement- hard nest mounds, are a year-round staple. They have special liking for the honey for which the animal can climb trees and knock down honeycombs, later collecting the sweet bounty on the forest floor. Beetles, grubs, ants, and other insects round out their diet. During food shortages, sloth bears will eat carrion. In March and April, they will eat the fallen petals of mowha trees and are partial to mangoes, sugar cane, the pods of the Amaltas and the fruit of the jack-tree. Sloth bears are extremely fond of honey. Sloth bears will also climb and shake fruit trees to obtain food. They will also eat leafy plants, sugar-rich fruits, nuts, root, tubers, berries, vegetables, honey, eggs and small vertebrates like rodents. They eat virtually any carrion which they may discover. Seasonal availability and geographic location are the biggest factors determining the primary food sources of sloth bears.

Food items of bear are documented with the help of scat analysis and direct observation. However, percent occurrence of a particular food in scats may differ from actual consumption. It is possible that most easily digestible food may be observed less in the scat while less digested food may be more.

Some studies have shown that sloth bears are mainly myrmecophagous but in another study of the scat it has been observed that Ficus species dominated in all seasons. Similarly, a study on sloth bears in central India has found that fruits were eaten year round and were the mainstay of the diet from February to June, whereas termites, ants, and honey were the predominant foods in other months.

A study on the scat of bear, in the central India has revealed following to be present in the scat and hence forming the food item of the bear. Months of their local availability has been added with each of the food item.

1. Black ant and their egg: Available all round the year but more during winter and summer season.
2. Red ant and their eggs: Available all round the year but more during winter and summer season.
3. Termite and their egg: Available all round the year
4. Honey Bees: Available all round the year but more during late winter and summer season
5. Ficus benghalensis (Bargad), Ficus religiosa (Pipal): Summer season



6. *Ficus virens*: Winter, Summer
7. *Ficus racemosa*: Winter summer
8. *Ficus glomerata* (Gular): Summer
9. *Ziziphus mauritiana* (Ber), *Ziziphus oenoplia* (Makoy) and *Ziziphus nummularia* (Jharberi): Winter
10. *Aegle marmelos* (Bel): summer
11. *Briedelia squamosa* (Kasihi): Late winter to early summer
12. *Diospyros melanoxylon* (tendu): Summer
13. *Buchanania lanzan* (Achar): Summer
14. *Schleichera oleosa* (Kusum): Summer
15. *Syzygium cumini* (Jamun): Summer
16. *Cassia fistula* (Amaltas) fruit: Rainy
17. *Madhuca indica* (Mahua) (flower): March-April
18. *Madhuca indica* (fruit): June-July
19. *Arachis hypogeal* (Groundnut): Late rainy season
20. *Zea mays* (Corn): rainy
21. Amrood (*Psidium guajava*): Winter
22. Aam (*Mangifera Indica*): Summer
23. Kathal (*Artocarpus heterophyllus*): Summer
24. Bones, hair and animal tissue

Many of the non-timber forest produce, forming the food of the bear are collected like flowers and fruits of mahuwa (*Madhuca indica*) and fruits of bel (*Aegle marmelos*), char (*Buchanania lanzan*), jamun (*Syzygium cumini*), and tendu (*Diospyros melanoxylon*). Such collection may limit their availability for bears. *Ficus* spp. are not used by local people, so are readily available to the bears. Thus *Ficus* spp. play important roles by providing supply of food for most of the part of the year. This is particularly important during summer when there are no crops in fields to raid and fewer fruiting species, and bears find it difficult to dig for termite and ants.

4.3.3.5 Threat: Major threats to this species are habitat loss, poaching and conflict killings. Habitat loss is mainly due to overharvest of forest products, monoculture plantations (e.g., teak, eucalyptus), expansion of agricultural areas, human



settlements, and roads. Poaching is mainly for the commercial trade in bear parts. Encounters resulting in conflicts between people and sloth bears occur mainly where the habitat has become severely degraded but still being used by both. The only natural threats to sloth bears are tigers (*Panthera tigris*) and possibly leopards (*P. pardus*). Asian elephants are reported not to tolerate sloth bears in their vicinity. The reason for this is unknown. Bear parts are valuable commodities in the trade for Asian medicines. Incentives for killing bears are therefore high. Although, bear is protected to varying degrees by national laws, however, they can be killed to protect life or property.

4.3.3.6 Conflicts: The sloth bear is more inclined to attack man unprovoked than almost any other animal. Major man-bear conflicts result during the mahua flowering season. Persons going early to collect the flower encounter the animal, frequently, sometimes the bear remain sleeping below the tree after consuming large amount of mahua flower and is one of the major causes of man-bear conflicts. Persons going to the forest for the collection of wood or other forest produce encounter the bear, inadvertently resulting in conflicts.

4.3.3.7 Conservation Status: CITES APPENDIX I: *Indian Wildlife (Protection) Act (1972) (As amended up to 2002)*; Scheduled I; Part I; *Indian Red Data Book (IUCN 1994)*: Not Listed; *IUCN (1998)* (Proposed); Vulnerable (National) and Data Deficient (Global); *IUCN (2002)* (Proposed): Vulnerable (Global) based on Version 2.3 1994 (IUCN, 2003). According to Alfred et al considering the nature and degree of threats and trends reported, it is strongly recommended to include sloth bear in one of the endangered categories of IUCN. They are particularly vulnerable to loss of habitat because of their reliance on lowland areas, which tend to be the places most readily used by people. Poaching and trade in sloth bears or their parts is also common in many parts of their range.

4.3.3.8 Conservation Measures

1. Education will help to reduce bear-human conflicts and enhance a conservation ethic among locals,
2. Habitat improvements (government or community-based reforestation) would be helpful in alleviating conflicts.
3. Planting of fruit trees more particularly the spp. of *Ficus*, because *Ficus* spp. are not collected by man but form an important diet to the animal.



4. Promoting honey bee in the area will not only serve as food to the bear but will help also in warding off the elephant.
5. Red ant (*Oecophylla smaragdina*) can be promoted easily to form colonies in the trees. This will serve as important source of insect diet and may compensate for the termite.
6. Artificial method to promote termite colonies should be developed.
7. Den like structures should be developed in the area if such structures are lacking or less in number in the area.
8. It is unfortunate that the conservation of Elephant and Bear go contradictory to each other.
9. Villagers should avoid growing crops of liking to bear like ground nut and corn etc. particularly near their den sites.
10. Translocation of bears from isolated habitat patches to more suitable areas should be carried out.

4.4 Conservation Plan for additional Schedule I species not present earlier but enter the area later.

It is possible that some Schedule I species, not present presently in the core or the buffer zone of the presently applied mining lease area, may enter the buffer zone on some later date. Conservation plan will be submitted for such *Schedule I* species not mentioned earlier, but are found to have entered and becomes a part of the buffer zone, on any later date. The conservation plan will be prepared and then will be sent for approval by the Chief Wildlife Warden.

4.5 CONSERVATION PLAN FOR MEDICINAL PLANTS

Types and number of plant species, to be named as medicinal plants are rare in the core and buffer zone. However, conservation of medicinal plants will be done in the area proposed for afforestation. Medicinal plants recorded in the core and buffer zone, all of them are common plants of the area. Endangered species like *Rauwolfia serpentina* or as common a species of the area as *Andrographis paniculata* have not been recorded from the area. The medicinal plants recorded from the core and buffer zone are not difficult to be regenerated, however, they will be regenerated as follows:



- A. ***Achyranthes aspera***: This annual plant grows abundantly on waste grounds but sporadically in forest areas. The plant can be propagated through seeds.
- B. ***Andrographis paniculata***: This herbaceous plant of much medicinal value grows extensively in the area. The plant can be propagated easily through seeds collected in the months of October-November.
- C. ***Asparagus racemosus***: The plant grows much abundantly in the forests of the area. It is used also as a substitute to Safed Musli (*Chlorophytum* sp.) This is a perennial plant with a bunch of white, tuberous roots. The aboveground part of the plant dies every year at the end of growing season (March-April), new plant emerges from the underground stem, surviving with the tuberous root. The plant will be propagated through the tuber. Tubers will be collected at the end of growing season of the plant in the month on March. Tubers will be stored in some cool place in soil and will be planted in the afforestation area in the first week of June.
- D. ***Curculigo orchioides***: The plant called *Kali Musali* is a much valued medicinal plant, but it grows abundantly in the region. This perennial plant grows naturally with a vertical, very deep rhizome. Aboveground part of the plant consists of only one or two leaves which dies away every year, regenerating again from the underground rhizome. Generally it grows gregariously near to the base of tree trunks of many tree species like the *Shorea robusta* and *Madhuca latifolia* trees. It will be regenerated in the afforestation zone from the rhizome and seeds.
- E. ***Dioscorea bulbifera***: This twining plant is also a perennial plant, perennating through the underground rhizome. Like the earlier plant aboveground part of this plant also dies away every year. The plant is cultivated also as the bulbil and tuber of the plant are consumed as vegetable. Bulbils are produced in good numbers on the aboveground parts, in the axils of the leaves. Regeneration of the plant can be made easily by sowing the bulbils in the month of June or July. The bulbils will be placed below the soil, below some tree or shrub.
- F. ***Diplocyclos palmatus***: This cucurbitaceous annual climber grows extensively around villages, climbing on hedges. It flowers and fruits extensively. It can be propagated easily through seeds.



- G. *Elephantopus scaber*:** Generally, it grows gregariously near to the base of tree trunks of many tree species like the *Shorea robusta* and *Madhuca latifolia* trees. The plant has a perennial rhizome. The plant can be propagated either through the seed or by transplantation.
- H. *Evolvulus alsinoides*:** The plant grows abundantly in the area. The plant grows normally outside the forest area in open places, generally the grasslands. It was recorded presently in the grazed area of the forest. The plant species will not be included to be grown in the presently proposed afforestation zone.
- I. *Hemidesmus indicus*:** This twiner species is a perennial plant with a very deep root system, signifying the name "*Anantmool*" given to the plant. It is a very common plant of the forests as well as undisturbed, open places. The plant flowers sporadically, hence, could be propagated mainly through cuttings and transplantation.
- J. *Holarrhaena antidysenterica*:** This small tree often becomes a problem after openings are formed due to cutting of the trees. It is not browsed by the cattle and is able to regenerate fast through coppicing as well as from abundant seeds. It can be propagated easily through seeds and does not require any special care for cultivation.
- K. *Sphaeranthus indicus*:** This annual medicinal plant grows as a weed in drying, pulse stable, water bodies. It starts growth from late winter and reaches full growth in the months of April-May. It can be grown easily through seeds.
- L. *Tephrosia purpurea*:** This perennial plant grows almost like a weed on open, wastelands. It is a very hardy species tolerating dryness to a good extent. The plant can be easily propagated through seeds, which are produced abundantly by the plant. It is not a typical forest species, hence, will not be included in the list of plants to be grown in the afforestation zone.

4.6 OVERBURDEN DUMP MANAGEMENT

The overburden of opencast mine mainly consists of following:

- a) The Top soil which is rich in nutrients and suitable for plant growth.
- b) The lower soil, which in true sense is not a soil but is earth, because in this soil



organic matter is totally absent and is generally poor in nutrients required for plant growth.

Hence Top soil are being preserved separately and preserved for future spreading over back filled over dump for plantation.

Initially overburden has to be dumped externally for a short period of 3 months till void is created in the mine by decoaling the area. Then backfilling started with OB Dump in the void.

4.7 Plantation in the buffer zone:

- Trees will be planted in the buffer zone also. This plantation will be done at selected places only and only local species will be used in the plantation. Some of the tree species included will be: Saja (*Terminalia tomentosa*), Baheda (*Terminalia bellerica*) Bija (*Pterocarpus masupium*), Bargad (*Ficus benghalensis*), Peepal (*Ficus religiosa*), Mahua (*Madhuca latifolia*), Sal (*Shorea robusta*), Dhawda (*Anogeissus latifolia*) Tendu (*Diospyros melanoxylon*), Char (*Buchanania lanzan*), Khair (*Acacia catechu*), Lodh (*Symplocos racemosa*) etc.
- Care will be taken to include some fruit bearing trees like Gular (*Ficus glomerata*), Achar (*Buchanania lanzan*), Aonla (*Emblica officinalis*) Am (*Mangifera indica*) and such trees to provide food to the herbivores which in turn will be the food source of the carnivores.
- Water, particularly during drier seasons, becomes the most important factor to all types of wild animals including the mammals, birds and reptiles. If water is available safely, then all other factors become secondary for the presence and survival of the wild life in any forested area.
- Places suitable for mini watersheds will be identified in the core as well as in the buffer zone to store rainwater. Further, to make water available at all the times, throughout the year, some of these water holes will be recharged through artificial means. Proper slope will be given to approach these water sources so that the wild animals will be able to drink water without any difficulty. For this PIL has engaged one reputed Consultant to study & suggest means of water shedding arrangement in & around Gare P a l m a S e c t o r i I C o a I B I o c k project so that depletion of water level can be arrested.



- Proper cover through vegetation or any other type of even artificial cover will be developed near to these water sources so that the prey species will be able to hide themselves from the predators, at the time of approaching the water sources.
- To attract the birds, plants yielding food to the birds will be planted on priority basis. If water and food are available to the birds without any anthropogenic disturbances the area can become an ideal place for bird watching.

4.8 RECLAMATION OF BACKFILLED AREA

The soil used for backfilling is better soil than the original soil as compost are being used. However, additional amount of compost will be added to the soil, at the time of plantation in the backfilled area.

4.8.1 Bio- Reclamation

Biological reclamation will be done to transform the degraded land and waste dump into a self - sustaining ecologically bio- diverse stable land. This will prevent soil erosion, dust pollution and recreate the aesthetic beauty of the environment. Re-vegetation of waste dump through systematic means, increase the slope stability, enhance the infiltration rate of rain water and its availability, increases the soil fertility and promotes natural regeneration of native plant species.

4.8.2 Species Selection for Reclamation of the Area

Successful bio- reclamation would largely depend on the selection of appropriate species for re- vegetation. While selecting plant species following parameters will be considered.

- Local and native to the soil
- Nitrogen fixing leguminous species
- Shrubs, herbs and grasses for nutrient retention and recycling

Apart from above Top Soil Management will be done to ensure the inoculation of Micro-organism, seed, organic matter etc.

4.8.3 The Planting of Plants

Criteria for the selection of plants:

Plant species selected for plantation in the backfilled, overburden soil should possess any or more of the following properties. It should

- a. Have soil binding property.



- b. Be a nitrogen fixer.
- c. Be able to tolerate, at least to some extent, the crack formation in the soil.
- d. Have drought tolerance ability.
- e.
- f. Be able to grow in a slope.
- g. Be able to grow in nutrient and organic matter poor soil.
- h. Be a local species.

Plantation of the overburden soil will be taken up in two phases.

4.8.3.1 Phase: I

The first phase will be aimed to establish plants, which will make the overburden soil suitable for plantation and/or natural growth of the local species.

4.8.3.2 Phase: II

Second phase will then to vegetate the area, introducing as much local biodiversity as possible with the aim to develop a natural ecosystem, prevalent in the area. The first phase of stabilization of the overburden soil is expected to take 3-4 years. After that, in the overburden soil reclamation area, the local tree, shrub, herb, grasses and hedges and climber species, inhabiting the nearby forest area, will be introduced. This will lead, gradually, to the development of a natural forest and thus the natural ecosystem, in the area.

4.9 Participation of Local Institution in conservation

As per the definition of wild life given in Wild Life (Protection) 1972, under section 2 (37) "Wild Life includes any animal, aquatic or Land vegetation which forms part of any habitat". This is a very broad definition of the wild life which covers all living creatures of the earth. It is collectively known as biodiversity.

To conserve and protect biodiversity the local institution i.e. Panchayat/Gram Sabha has been entrusted by the Govt. of India for recording of biodiversity present in and around their village / locality and prepare a register incorporating all details of the biodiversity.

4.10 Non-formal Education:

Conservation education and awareness will be imparted both at the formal and non-formal levels. At the formal level, it will be given at school, colleges and university levels. Formal education, in spite of all the curriculum development and introduction



of the study of ecology, wildlife and conservation at the school and college levels, however, largely remains text book and examination oriented. Because of the situation, non-formal education becomes all the more necessary for creating the right kind of awareness and attitude among people at all levels- children, teenagers, adults, family groups, teachers, administrators, politicians and policy- makers. To achieve this some local tours of school and college students will be arranged to nearby Pench, Pachmarhi or Satpura National Parks.

4.11 Institutional Infrastructure

The prime requisite for building up an understanding and awareness about wildlife and conservation is to develop an appreciation, respect and love for nature. Most people lack the curiosity to know even the names of animals and plants they come across in their day-to-day life. Development of an inquisitive mind, a keen sense of observation and curiosity about the fauna and flora are, therefore, very important. Concern for conservation can only emanate from a love for nature and awareness about the interdependence of all species of animals and plants, including the man. To arouse curiosity about the wildlife in the young mind some quiz and essay competitions will be arranged in the schools and colleges of the buffer zone and some nearby areas.

4.12 The Indian Tradition of Conservation:

The theme of conservation, wildlife and reverence for life is reflected in some of the exquisite images in Indian art paintings, sculpture, architecture and decorative art. The most wide-ranging wild life imagery is found in Indian miniature paintings. Early literatures like the *Panchatantra* and *Hitopadesha* contain animal fables that have been used to preach both wisdom and morals. The long term tradition and abiding faith in conservation of nature is vividly seen in recent times also like the "Chlpko" and "Appiko" movements. These conservation themes will be popularized through pamphlets and posters.

4.13 Role of the Individual:

Each individual should develop a personal ethic towards nature and wildlife which could pave the way for commitment and conviction not to destroy wildlife particularly that of not considering hunting as a sport, nor to use products made out



of skins or other parts of endangered animals. Unless these products are boycotted by their users, the clandestine killing and poaching of wildlife at the hands of unscrupulous people will continue. Everyone can play important role in spreading the message of conservation among their friends, family and community at the large. In our country there is strong Governmental commitment for the conservation of wildlife and protection of the environment. We also have voluntary agencies and action groups to mobilize public opinion for conservation. Yet we have a long way to go.

David A. Munro, a former Director-General of IUCN made the following remark in 1979: "Conservation is on the brink of massive failure. Paradoxically it also faces opportunities for success that it has never had before."

Our success in the future depends upon seizing these opportunities and making conservation a people's movement. If the efforts made in India for conserving our wildlife in the last few decades provide any indication of the future, there is enough scope for optimism. Awareness programs will be organized to make the wildlife conservation plan as popular as possible among the local people.

4.14 Requirement of plants year wise and location wise:

Action plan for the plantation in near future will be planned. Every year about 40000 to 50000 saplings will be planted at the rate of about 2000 saplings per Hectare.

To fulfill the requirement of nursery plants, a nursery will be established at the site. During peak requirements, additional plants will be procured from Govt./Forest nurseries, located nearby. Species selected for plantation will be local with emphasis on the species recorded in the area during the sampling. Care will be taken also to maintain the proportion of the species as recorded during the sampling of the area.



CHAPTER V

AVIFAUNA (VALTURE AND PEA FOWL & PEACOCK) ALTERNATE HABITATE PALN

5.1 PROJECT BACKGROUND: -

Preparation of Eco-friendly AVIFAUNA (VALTURE AND PEA FOWL & PEACOCK) ALTERNATE HABITATE PALN of the affected Avifauna due to the diversion of 214.869 ha. Forest land in favour of Gare pelma Sector-II Coal Block has been allotted to Maharastra State Power Generation Company Limited (MAHAGENCO) Coal block is located in the mand Raigarh Coalfield of Raigarh District, Chhattisgarh.

Details of Diverted forest land

S.No.	Villages	Forest and Revenue Land Details		
		Compartment No. or village name	Protected Area (ha.)	Revenue Area (ha.)
1	Pata	744 P	29.891	
2	Dholnara	732 P	2.183	
3	Saraitola/Muragaon	741 P	45.151	
4	Muragaon	740 P	14.896	
5	Jhinkibahal	745 P	7.612	
6	Bhalumuda	Bhalumuda	0.000	1.214
7	Dholnara	Dholnara	0.000	8.139
8	Gare	Gare	0.000	2.159
9	Libra	Libra	0.000	13.216
10	Rodopali	Rodopali	0.000	0.125
11	Saarasmaal	Saarasmaal	0.000	15.887
12	Mudagaon	Mudagaon	0.000	8.216
13	Saraitola	Saraitola	0.000	18.729
14	Pata	Pata	0.000	17.259
15	Kunjemura	Kunjemura	0.000	30.190
		Total:-	99.735	115.134

5.2 CLIMATE: -

The area is characterized by tropical climate with well defined summer from April to mid June, rainy season from mid June to mid September and winter from November to February. May to mid June is the hottest month when the temperature rise to maximum of 44°C to 46°C December is the coldest month and the temperature falls to a minimum of 7°C.



Vulture

Vultures are medium to large sized Raptors or birds of prey. There are two types of Vultures, The old world Vultures who belong to the Accipitridae family along with *Buzzards*, Kites and Eagles who are found in Africa, Asia and Europe, and New World Vultures who belong to the *Cathartidae* family which also includes Condors who are found in the Americas.



There are around 30 different species of Vulture throughout the world except the continents of Antarctica and Oceania. There are 8 species of Vultures in Africa including the Hooded Vulture, Lappet-faced Vulture, White headed Vulture, Egyptian Vulture, Palmnut Vulture, Cape Griffon, Ruppel's Griffon and White-backed Vulture.

Africa's White-backed Vulture (*Gyps africanus*) is an old world Vulture who is closely related to the European Griffon (*Gyps fulvus*). It ranges from Mauritania, east to Ethiopia and south through East Africa to South Africa.

Old World and New World Vultures are not related. They are collectively called Vultures because they are similar in appearance and they are believed to be connected through evolutionary status rather than DNA.

A group of Vultures is known as a 'venue' and when the group is seen in the air, circling together, it is called a 'kettle'.

5.3 WHITE-BACKED VULTURE CHARACTERISTICS: -

The White-backed Vulture is a medium sized bird which measures around 94 centimetres (37 inches) in length and weighs between 4 and 7 kilograms (9 – 16 pounds). It has a



wingspan of 4 – 5.5 feet (1.2 – 1.7 metres), Its wings are very broad and its tail feathers are short. Down feathers are present on its head and neck and it has a white neck ruff.

As its name suggests, the back of this Vulture is white in colour which contrasts with its dark plumage. As these Vultures age, their plumage becomes paler and plainer, especially the females.

Vultures have muscular legs, sharp talons and sharp bills. The African White-backed Vulture lacks neck feathers which prevents it from becoming soiled when dipping into a carcass.

Ticks and Mites and other parasites will not stay on the neck of the Vulture for too long as the neck is exposed to the sun ultra violet rays to kill bacteria. The vulture also loves to rub its neck on rocks to clean.

Vultures have incredible eyesight during the day which enables them to spot their prey while soaring through the sky, a Vulture can spot a large animal carcass from around 4 miles away on open grassland or savanna plains. Their vision is not so good at night. Vultures also have a very well developed sense of smell which also helps them to find their food.

5.4 WHITE-BACKED VULTURE HABITAT: -

The preferred habitats of the Vulture are deserts, savannas and grassland near a water source. It also inhabits wooded country with game animals and livestock, up to 3,000 metres above sea level.

5.5 WHITE-BACKED VULTURE DIET, HUNTING AND FEEDING: -

Vultures are carnivores and scavengers and feed mainly on carrion of freshly killed animals. Flocks of Vultures can be observed soaring over the Savannas, searching for carcasses and sometimes following ungulates as they undertake their regular migrations. Vultures will also eat scraps from human habitats.

Most birds of prey will feed on live prey, however, Vultures are specialized 'eaters of the dead'. It is not an uncommon sight to see a group of different species of Vulture feeding on a dead animal at the same time.

On a huge carcass, such as a dead elephant, hundreds, sometimes a thousand Vultures can be seen squabbling over the kill, making grunts and goose-like hisses and cackles. The scrum of vultures can be seen dipping their long, bare necks under the skin of the carcass or crawling into the ribcage as they feed on the dead remains.



After gorging themselves, the vultures may bathe together with other species at a favourite site, or rest with their wings spread and backs to the sun. Despite their ghastly habits, vultures are one of the fussiest birds when it comes to cleanliness.

Vultures can eat as well as digest meat, in any stage of decay and can even endure diseases that would kill any other animal. Vulture stomach acid is exceptionally corrosive, allowing them to safely digest putrid carcasses infected with Botulinum toxin, hog cholera, and anthrax bacteria that would be lethal to other scavengers. This also enables them to use their reeking, corrosive vomit as a defence when threatened.

If a dead animal has a very thick hide which the vulture cannot get into, it waits for a larger scavenger to eat first. Vultures are known to strip meat, skin and even feathers, leaving only the skeleton of the animal remaining, however, some vultures will also eat bones, along with the other parts of an animal.

Vultures seldom attack healthy animals; however, they may kill a wounded or sick animal.

5.6 WHITE-BACKED VULTURE BEHAVIOUR: -

Vultures are generally solitary animals although they will fly in flocks when circling prey. Vultures can fly at speeds of 48 kilometres per hour (30 miles per hour).

Vultures are high flying birds with the Ruppel's Vulture being the world's highest flyer with a record of 37,000 feet. Vultures can fly for a very long time, without becoming tired, as they glide on the thermal updrafts which gives them a 'free lift'. They fly in circular motions in order to gain height.

Vultures have a unique way of cooling themselves in the African heat by urinating. This not only cools them, but disinfects their legs which kills any germs they may have picked up walking through the carcasses.

The main predators of the Vultures are Hawks, Snakes and Wild cats. To get away from any danger the vulture will bring up what it has just eaten, or some projectile vomit that will smell awful for a few days if it touches you.

5.7 WHITE-BACKED VULTURE REPRODUCTION: -

The White-backed Vulture breed at the beginning of the dry season. They breed in savanna trees in west and east Africa, nesting in loose colonies of between 2 – 13 birds.

Vultures tend to have just one mate per year. Female Vultures lay one egg at a time in a platform nest made from leaves and sticks built in trees or cliffs. The same nest might be used for a number of years.



Eggs are incubated for around 50 days. Young Vultures are dark in colour with light brown streaks on their feathers.

Young Vultures are fed by both parents until they fledge at around 120 – 130 days. Vultures mature at around 5 – 7 years old.

The life span of a Vulture can be up to 30 years in captivity, 15 – 20 years in the wild.

5.8 WHITE-BACKED VULTURE CONSERVATION STATUS: -

The White-backed Vulture is classed as 'Least Concern' to 'Near Threatened' on the IUCN Red List (2007). However, conservationists in South Africa are warning that vultures are endangered and could soon become extinct because they are being hunted down for use by traditional healers.

Other factors of their decline include habitat loss due to agriculture, declines in wild ungulate populations which reduces the availability of carrion on which to feed, drowning in farm reservoirs, persecution and poisoning.

A number of protected areas in Africa hold populations of white-backed vultures, including Serengeti National Park in Tanzania, a World Heritage Site. Recommended measures include establishing legal protection for the species in all range countries, establishing a vulture monitoring network, and determining the most significant threats and seeking solutions.

5.10 MORE VULTURE FUN FACTS: -

There is a belief that the Vultures have the power to predict everything from winning lottery numbers to football scores.

New World Vultures hunt by smell and detect the carcass starting to decay by the gas Mercaptan given off at the start of the decaying period.

Old World Vultures are in the same family as the Hawks and Eagles these cannot smell their food, they hunt by sight only.

You cannot see a Vultures ear because a fine skin covers the ear to stop blood and other bits getting in when they are feasting on the carcass of a dead animal.

Vultures have the same ancestor as storks.



5.12 LIST OF VULTURES: -

- Cape Griffon, *Gyps coprotheres*
 - Egyptian Vulture, *Neophron percnopterus*
 - Eurasian Black Vulture or Monk Vulture, *Aegypius monachus*
 - Griffon vulture, *Gyps fulvus*
 - Himalayan Griffon Vulture, *Gyps himalayensis*
 - Hooded Vulture, *Necrosyrtes monachus*
 - Indian White-Rumped vulture, *Gyps bengalensis*
 - Lammergeier or Bearded Vulture, *Gypaetus barbatus*
 - Lappet-faced Vulture, *Torgos tracheliotus*
 - Long-billed Vulture or Indian Vulture, *Gyps indicus*
 - Palm-nut vulture, *Gypohierax angolensi*
 - Red-headed Vulture, *Sarcogyps calvus*
 - Rüppell's vulture or Rüppell's griffon vulture, *Gyps rueppelli*
 - Slender-billed Vulture, *Gyps tenuirostris*
 - White-backed Vulture, *Gyps africanus*
 - White-headed Vulture, *Trigonoceps occipitalis*
-
- American Black Vulture, *Coragyps atratus*
 - Andean Condor, *Vultur gryphus*
 - California Condor, *Gymnogyps californianus*
 - Turkey Vulture, *Cathartes aura*
 - Greater Yellow-headed Vulture, *Cathartes melambrotus*
 - King Vulture, *Sarcorhamphus papa*
 - Lesser Yellow-headed Vulture, *Cathartes burrovianu*

Peafowl Peacock

Peafowl is the term given to 2 species of bird which are members of the pheasant family. The Indian Peafowl (*Pavo cristatus*) is a native bird to the Indian subcontinent and the Green Peafowl (*Pavo muticus*) breeds from east Burma to Java. Males are known as 'Peacocks' and females as 'Peahens'. The Peacock is the national bird of India. Peacocks are well known for their magnificent, beautiful tail feather displays during courtship.

PEAFOWL DESCRIPTION

The Peacocks brilliant 'train' contains over 200 shimmering feathers, each one decorated with eyespots. The male Indian Peacock has iridescent colouring of blue and green on its head, neck and breast. Their long 'trains' are not the tail quill feathers but elongated upper



tail feather coverts. The train is bronze and green and has a series of 'eyes' which are more prominent when the tail is fanned.



The male Indian Peafowls actual tail feathers are short and grey in colour and can only be seen from behind when the tail is extended and fully fanned. The males display their beautiful fanned trains as part of their courtship behaviour to the Peahens. During molting season, the males shed their train feathers and their grey quill feathers are more obvious.

Female Peafowl lack the bright colours of the male and have a duller appearance which is common in many other bird species. Peahens are generally brown in colour with lighter underparts. They also lack the long upper tail coverts. They may have some iridescent green colouring on their neck

Both male and female Peafowl have crests on top of their heads which are also present on the Green Peafowl species. Green Peafowl differ in appearance to the Indian Peafowl in that the male has a green and gold plumage and their wings are black with a sheen of blue. Unlike the Indian Peafowl, Green Peahens are similar to the Green Peacocks only having shorter upper tail feather coverts and slightly less iridescent in some parts. In the months where the male has no train, it is difficult to tell females and males apart.



Peafowl are large birds with males measuring up to 2.3 metres (7.5 feet) in length and females being smaller at 86 centimetres (34 inches) in length. The tail length of the male Peafowl can be 4 – 5 feet. Peacocks weigh 9 – 13 pounds and Peahens weigh 6 – 9 pounds. Like other members of Galliformes, both male and female Peafowl have sharp, powerful metatarsal spurs also known as 'kicking thorns' which they use to defend themselves against predators. Their legs are strong and they have 3 strong toes facing forward and one facing backwards. Because their wing surface to bodyweight ratio is not large, most species of Peafowl are incapable of long flights

Apart from the Indian Peafowl and the Green Peafowl, 1 or 2 mutations have been developed by those kept in captivity. One of them is a white Peafowl species called the Indian White Peafowl. Another species found in the rainforests of Central Africa is the Congo Peafowl.

PEAFOWL HABITAT

Peafowl are mainly ground-dwelling birds preferring forests and farmland. They can also be found in bushlands and rainforests. Many will nest on the ground while some will roost in trees.

PEAFOWL DIET

Peafowl are omnivores and their diet consist of plants and flower petals, seeds, ants, termites, ticks and locust. They will also eat small reptiles such as young Cobra snakes, arthropods and amphibians.

PEAFOWL MATING BEHAVIOUR AND PEA FOWL REPRODUCTION

The Peacock is a classic example of 'sexual selection' influencing evolution. Studies prove that Peahens prefer to mate with the most impressive males displaying the largest number of eyespots in their tails. Studies have shown that the males with the largest eyespots tend to father bigger, healthier and fitter young that are more likely to survive, proving that the beauty of the Peacock is more than skin deep. Peacocks molt their tail feathers around August time and begin to regrow them

During courtship, the male spreads his train of feathers and makes it shiver to attract the female. The male will often back towards the receptive female, swinging around to confront her with the magnificence of his display before taking several steps back and bowing. The display is followed by the male vocalising very loud calls known as 'crows' that are even louder than a Roosters crow. If the Peahen is impressed, she will join his harem of females, for like most male birds with a highly ornamented plumage, the Peacock is polygamous.



Females are well equipped for their maternal roles with their discreet, cryptic colouration. Males play no part in rearing the young and being so conspicuous, would probably be a liability in the way of camouflage.

Peahens generally reach breeding age at around 2 years, Peacocks at around 3 years. Peahens lay 6 – 12 brownish, buff coloured eggs from April to September. They are laid in a nest which has been scratched out in the ground and lined with grass. The Peahen will sit upon the eggs and incubate them for 28 days.

Peachicks are born weighing 3.6 ounces (103 grams), fully feathered and can fly within a couple of weeks. They must learn to fly quite soon in order to stay with their mothers when roosting in trees to ensure survival from predators. Peachicks are taught how to eat and how to make a variety of sounds by the Peahen. Under the age of 1-year, young Peafowl are called 'Peachicks'. A male's train of feathers will not be present for 3 years and will develop over this time. The life span of a healthy Peafowl can be 40 – 50 years

PEAFOWL CONSERVATION STATUS

The IUCN lists the Green Peafowl as vulnerable to extinction due to hunting and a reduction in extent and quality of habitat.



CHAPTER- VI

CONSERVATION PLAN FOR ELEPHANT

Elephants are major agents of change and are often indicated as those to use large herbivores possessing the ability of changing entire ecosystems in terms vegetation structure and composition, thereby affecting a whole series of other ecosystem components as well. The exclusive role of elephants as agents of change could thus far not be completely isolated from the multitude of factors involved in ecosystem dynamics.

Globally, wild elephants are present in 50 countries, 13 of which are in Asia and 37 in Africa. At present the number of wild Asian elephants (*Elephas maximus*) is between 35,000 and 50,000 (www.elephantcare.org), while the number in captivity is around 16,000. The trend in almost all Asian range states has been a drastic decline in wild elephant numbers, due to a range of anthropogenic factors related to increasing human population, loss and degradation of forest habitat, fragmentation of breeding population and increasing human-elephant conflict (HEC).

The Asian elephant is categorized as an 'endangered' species in the Red List of the World Conservation Union (www.iucnredlist.org) and is classified with the Convention for International Trade of Endangered Species (www.cites.org). They have declined from over 5 million animals located throughout the continent 100 years ago, to the current number confined to fragmented habitats in sub-Saharan regions. Whereas poaching for ivory and meat was a major reason for the decline in the past, loss of habitat is the biggest threat to their continued survival at present. Paradoxically, though, elephant numbers are increasing in some countries and may need to be controlled in order to prevent degradation of their habitats.

India holds by far the largest number of wild Asian elephants, estimated at about 26,000 to 28,000 or nearly 60% of the population of the species (Bist 2002).

Elephas maximus is placed in Schedule I and Part I of Indian Wildlife Protection Act (1972) conferring it the highest level of protection. Wild elephants are presently distributed over an area of about 109,500 km² (Santiapillai and Sukumar 2006); this is approximately 3% of India's geographical area. Adjacent to some of these areas, a segment of the elephant population killed an average of 350 people annually over the last five years (2005-2006 to 2009-2010) (Project Elephant), and damaged an average of 330 km of crops every year for the last three years (2007 2008 to 2009-2010) (Project Elephant).

Northern Chhattisgarh in Central India has been home of Asian elephants since historical times. However, in the early part of the 20th century they became locally extinct (Singh, 2002). In 1988 elephants migrated from the prime elephant habitat of Jharkhand into Chhattisgarh and caused extensive damage to life and property. Since then, HEC cases have been increasing due to straying of migratory elephants in the state (Singh, 2002). The number



of wild elephants in the year 2007-08 in the state estimated to be 122 (MoEF, 2008). Major reason for prolonged stay of elephants in the state could be better forest cover (44%), heavy mining, habitat degradation and deforestation in the states of Jharkhand and Orissa (Singh, 2002, Earth Matters Foundation, 2008). Even the state of Chhattisgarh is primarily inhabited by tribal communities dependent largely on agriculture and minor forest produce. Increasing human pressure on forested areas is resulting in increased incidences of human-elephant conflict. This necessitated a detailed assessment of habitat suitability and dispersal corridor for elephant in the area.

6.1 Records of the Elephant's movement in Raigarh District: -

During 19th century and earlier elephants were, recorded only from the northern part (Raigarh district) of the state but for unknown reasons the species left the area in the beginning of the 20th century. During this time the species was recorded from Raigarh District. However, the species re-entered the area Chhattisgarh state, in 1980s, around the year 1986. The elephants then entered the area of Raigarh district, from Orissa state. In the beginning their entry was occasional, coming and going in to and out of the area. However, in later year their entry as well as their residence time, within the area of the state, has increased.

6.2 At present, the study area of Gharghoda Range under Raigarh Forest Division has been observed the elephant movement.

1. Important points in the conservation of elephants: Following are some key points in the conservation of elephants:

- * Require 150-250 kg of plant food every day, with preference for grasses.
- * Evolved to a large size, with black color. The black color absorbs more heat.
- * Lack sweat gland to dissipate the body heat, hence, require a shade in sunny days, or require frequent cooling through wallowing or spreading water over the body.
- * Have very poor visibility particularly during night. Their eyes do not shine in the night, because of reduced number of cones, unlike the canines like tiger, leopard and even bovid like the cow.
- * A good source of water is required also for drinking.
- * Frequent dusting of the body or mud cover over the body is required to protect the body from the biting insects.
- * Change in cropping pattern by introducing crops disliked by elephant or the plant which act as elephant repellent (eg. Patchouli, (Pachouli) Helianthus annus (Sunflower) Capsicum annum (Chilli) Sesamum indicum (Til) and Citrus should be promoted.

2. HABITAT

Elephants are generalists, but use mainly scrub forest. They can be found the jungle, but generally on the edge where open, grassy areas are accessible. They prefer areas that



combine grass, low woody plants, and forest. Elephants rarely forage in one area for more than a few days in a row. In general, food, water and shade are the three basic resources that can be expected to influence the movement of the elephants (Sukumar *et al.*, 2003). Their Home range ranges from 30-600 km²

3. FOOD

Elephants eat a wide variety of species of vegetation. They are herbivore, folivore and lignivore. More than 100-130 different species of plants may be eaten They prefer grasses, but they also consume bark, roots, leaves, wood, stems and leaves of trees, vines, shrubs, tubers, bamboo and barn. An average day's intake is 150-200 kg of wet vegetation. The proportions of the different plant types in their diet vary depending upon the habitat and season. Annual diet has been found to be dominated by grass. Maximum straving distance covered by the raiding elephant has been recorded up to 5.5km

4. Time-activity budget of elephants.

Generally they are active almost throughout the day during rainy and winter months, but during summer months they are active only in the morning and evening hours. They become active well before dawn and start their morning activities in the vicinity of the area where they spent night. Evening hour is the time for drinking and bathing especially during summers. In summer season percentage of movement is more due to lack of fodder species and shrinkage of natural water sources.

5. FOOD PLANTS

Following is a list of plants reported as food by different workers. However, only the names of plants, local to the area, have been taken and the local name have been changed. Part of the plant eaten may be different for the different species.

SN	Local Name	Botanical Name
1.	Khair	Acacia catechu
2.	Babool	Acacia nilotica
3.	Bel	Aegle marmelos
4.	Kala siris	Albizia lebbek
5.	Bans	Bambusa arundinacea
6.	Safed siris	Albizia procera
7.	Kachnar	Bauhinia variegata
8.	Mahul	Bauhinia vahlii
9.	Khatua	Bauhinia malabarica
10.	Semal	Bombax celba
11.	Ghas	Brachlaria sp.
12.	Kasai	Bridella retusa
13.	Kumhi	Careya arborea
14.	Lassora	Cordia myxa
15.	Ghas	Cymbopogan flexuosus
16.	Grass	Cynodon dactylon Doob



17.	Shisham	Dalbergia sissoo
18.	Bans/Bamboo	Dendrocalamus strictus
19.	Urai/Khus	Desmostachya bipinnata
20.	Ghas	Eleusine sp.
21.	Amla	Emblica officinalis
22.	Nilgiri	Eucalyptus spp
23.	Bagal Ghas	Eulaliopsis binate
24.	Kaith	Feronia elephantum
25.	Bargad/Bar	Ficus bangalensis
26.	Dumar/Gular	Ficus glomerata
27.	Pipal	Ficus religiosa
28.	Duranga-hesa	Ficus rumphii
29.	Pakar	Ficus infectoria
30.	Kandai	Flacourtia indica
31.	Kekad	Garuga pinnata
32.	Dhaman	Grewia elastic
33.	Ainhi	Helicteres isora
34.	Korea	Holarrhena antidysenterica
35.	Karnata	Ipomoea spp
36.	Ulu	Imperata arundinacea
37.	Baranga/Pula	Kydia calycina
38.	Senha/Sidha	Lagerstroemia parviflora
39.	Kaith	Limonia acidissima
40.	Sinduri/Rohini	Mallotus philippinensis
41.	Lajwanti	Mimosa pudica
42.	Mudhi	Mitragyna parvifolia
43.	Banana	Musa paradisiaca
44.	Bichhloo	Neyraudia arundinacea
45.	Dhan	Oryza sativa
46.	Tinsa	Ougeinia cojeinensis
47.	Buta Chhind	Phoenix humilis
48.	Jangal Jalebi	Pithecellobium dulce
49.	Mainphal	Randia dumetorium
50.	Kandi-khar	Saccharum munja
51.	Ganna	Saccharum officinarum
52.	Kans	Saccharum spontaneum
53.	Sisal	Sansevieria sp.
54.	Kosam/Kusum	Schleichera oleosa
55.	Sarai/Sal	Shorea robusta
56.	Jamun	Syzygium cumini
57.	Amlil/Imli	Tamarindus indica
58.	Saja	Terminalia tomentosa
59.	Sagaun/Teak	Tectona grandis
60.	Giloe/Gurch	Tinospora cordifolia
61.	Hathi ghas/Pirlu	Thysanolaena agrostis
62.	Bhander	Zizyphus mauritiana
63.	Ghont	Zizyphus xylopyra

The most commonly consumed species belong to family Poaceae and Fabaceae (17.65%) followed by Moraceae (14.71%). Elephants extensively feed on *Artocarpus heterophyllus*, *Syzygium cumini*, *Acacia nilotica*, *A. catechu*, *Dalbergia sissoo*, *Zizyphus mauritiana*, *Aegle marmelos* and *Ficus species*, besides various and shrubs (Bhagat et al. 2017). *Saccharum spontaneum*, *Thysanolaena maxima* and fruit parts of *Dillenia indica*, are



some of the other species recorded to be preferred by elephants. Some other food plants have been reported by the villagers of elephant moving areas of Chhattisgarh state. The list includes:

Musa paradisiaca	Kela	All the parts are edible
Oryza sativa	Rice	Eat very cleverly the fruiting part only, in the barn yard they dismantle the heap of gathered rice
Saccharum officinarum	Ganna	One of the most preferred food item
Dendrocalamus strictus	Bamboo	All the parts are edible
Ficus benghalensis	Bargad	Leaves and barks were eaten mostly
Ficus religiosa	Peepal	Leaves and barks were eaten mostly
Artocarpus heterophyllus	Kathal	Fruits, leaves and barks were eaten mostly
Milium velutinum	Bhilwa	Leaves and barks were eaten mostly
Pterocarpus marsupium	Bija	Barks were eaten mostly
Zea mays	Makka	Whole plant's parts are eaten
Phoenix sylvestris	Chhind	Rhizomes are edible
Phoenix acaulis	Buta chhind	Rhizomes are edible
Buchanania lanzan	Char	The saplings are up-rooted; the root is thrashed clean of soil and is then eaten
Goruga pinnata	Kekad	Barks were eaten mostly
Carica papaya	Papita	Whole plant's parts are eaten

Some of the elephants develop fascination for country made alcoholic drinks called "Handia"

6. THREATS

The pre-eminent threats to the Asian elephant today is habitat loss, degradation, agriculture and farming, grazing, mining, human interference, trade, pollution, hunting for ivory, insurgency, corridor loss, anthropogenic pressures on the habitat, man-elephant conflict, forest fires, illegal captures of live animals etc, Poisoning and disease are some other threats to the animal.

7. SOLUTION

Habitat destruction by man has threatened the survival of the Asian Elephant Therefore; maintenance of the habitat is the first requirement in the conservation of the elephants. If proper habitat is absent or is below the desirable standard then it may be developed Elephants require, simultaneously, two types of habitats:

a. Dense forest with all trees and



b. Scrub jungle and grasslands dense forest is required as refuge and protection from intense sun rays.

While scrub and grasslands are required as a better feeding area. Tall trees are not a good source of food because their foliage and tender twigs are beyond the reach of elephant's trunk. It is only the fallen fruit and bark of such trees which can be eaten. It is generally difficult to peel off the bark from trees. In a scrub or grassland, it is easy to feed. The food item may be foliage, tender shoot, entire plant or even the root, all are within their easy reach with respect to the area, there are two options for the conservation of the elephants:

- **Restrict the elephants in a defined area**
- **Develop a corridor for long, may be interstate, migration route.**

Development of a corridor far beyond the OCP Chhal Dharamjaigarh mining lease area will be the best choice for the conservation of the species. The corridor, to be developed, must have both the dense forest with tall trees as well as shrubby areas. Now it depends upon the condition of the area to decide that the shrubby areas should be forming outer fringe to the tall tree area or should be in the middle or should be in patches in between the tall trees. The corridor belt should be of sufficient width and should be planned either away from the village settlements or the isolated houses near to their path should be shifted. Elephants require 150-200 kg of food per head, per day. Habitat planning should include provisions to yield sufficient food. It is important now to decide about the plant species. The food plants should be of more liking type to the elephants. To keep the food plants within easy reach of the elephants, regular planting of new plants or pruning to stimulate coppicing, should be made. Some of the food plant species suggested to be planted in the area are:

Dendrocalamus strictus, (Bans) D. Dhedhi (Bans), Bambusa arundinacea (Bans), Ficus benghalensis (Bargad), E. religiosa (peepal), F glomerula (Gular) Fremisil (Bangali Bargad), E infectoria (Pakar), Artocarpus heterophyllus (Kathal), Semecarpus anacardium (Bhilawa), Pterocarpus marsupium (Bija), Phoenix sylvestris (Chhind), Phoenix acaulis (Buta chhind), Buchanania lanzan (Char), Feronia elephantum (Kaith), Goruga pinnata (Kekat), Thysanolaena agrostis (Hathi ghas), Cymbopogon flexuosus (ghas), Themeda quadrivalvis (Ghas), Iscilema laxum (Grass), Bothriochloa pertusa (Ghas), Apluda mutica (Ghos) etc. Bamboos (Dendrocalamus strictus, Bambusa arundinacea) are one group of fast growing plants which can form a good proportion of diet to the elephants. Another bamboo species Dendrocalamus redit will be an exotic species to the area but is common in Western Ghats. It has a thin stem. Elephants have special liking for the bamboo plant and it is easy to grow the plant in sufficient quantity in short time. However, it is not a species which can create any problem. The villagers in OCP Chhal area have informed that the elephants have special liking for Buchanania lanzan. The saplings of the plant are uprooted and the root thrashed clean and eaten. With the vegetation it is essential to develop perennial sources of water with some salt ponds, within the conservation area.



6.3 ELEPHANT CORRIDOR

There is a need to establish an elephant reserve, combining the Tumor Pingla and Semarsot wildlife Sanctuaries in Surguja district and Badalkhol wildlife Sanctuary in Jashpur district. Corridor will be developed to join these three wildlife sanctuaries. However, still no notification has been issued.

6.5.4 SOME SUGGESTIONS TO ESCAPE ELEPHANT DAMAGE

Methods adopted to escape elephant damage may be categorized as

1. Active and Passive methods

- Noise-making like shouting, drum beating, bursting fire crackers, firing gun shots into the air (by forest officials only),
- Using elephant torch light.
- Pelting stones and lighted fuel-woods.
- Loudspeaker broadcasting of tiger roaring sound However, the major drawback of using all these methods is that these may provoke the raiding elephants increasing the possibility of more damage to the crops and other properties as well as higher risk to the farmer's life. Further, if the active methods fail to be effective, singly, then combined effort should be made.

2. Passive methods

- Change in cropping pattern by introducing some elephant repellent alternative cash crops (eg. Patchouli, Helianthus annus, Capsicum annum and Citrus).
- Digging trenches around village area.
- Planting sisal (Agave Americana) around village boundary.
- Solar fencing.
- Improvement of water sources.
- Raise improve fodder resources.
- Fencing houses with GI wires.



Elephants avoid shining objects. GI wires are cheapest, shining objects to distract the elephants. Barbed wire fencing is gradually proving ineffective in preventing the movement of elephants. In the buffer zone of the presently applied mining lease area also the elephant have broken barbed wire fencing and entered a nursery. Crops of elephant liking should be avoided, as far as possible. Some of the crops, listed above, should be used to replace the more traditional crops like the sugarcane and rice. In Karnataka elephant proof trenches are being dig around the village area, but I have observed in Raigarh district in Chhattisgarh state that the elephants can move down and up in trenches of good depth. Sisals been found to be good to prevent the elephants to cross the sisal plant area. The plant yields A good quality fiber. Electric fencing has also been suggested as one of the methods but in Assam it has been found to be a failure as the elephant have discovered techniques to break such fences, safely. In areas like kamakhya nagar in Dhenkanal division in Orissa improvement of fodder resources in the forest has shown promising result of restricting the elephants more in the forest area. Passive methods are always better to avoid man-elephant conflicts. More important are the selection of plants as alternative crop as well as plants to check the entry of elephants in to the settlement areas, A good amount of researches and suggestions on the conservation and reducing its conflicts with human being is going on, resulting in suggestions coming frequently on these aspects. With the above, some more, methods are being suggested for affected region

- **Two doors in a house:** Most of the houses in villages have only one door or exit. In case the elephant enters the house through the door the occupants can escape through another door
- **Timely information:** Timely information to the helping person about the approach of elephants can reduce the conflicts as well as loss of human life. For this a network should be formed with the villages and the forest officers.
- **Elephant torch:** The elephant torch should be provided to each of the vulnerable villages. Presently the torch is only with the forest officer one torch for several villages.

Some more suggestions to avoid conflicts:

- Do not make crowd near elephant.
- Maintain at least 300 meter distance from the elephant.
- Do not wear red, white or colorful clothes.
- Day time is their resting time: do not disturb them during day time.
- Do not injure them neither they become more violent.
- Do not allow children, ladies and aged persons to go near the elephants.



- Do not prepare liquor or hand in" (country liquor) in the elephant movement area, because elephants like it and can smell it from distance. Do not go near the elephant after taking alcoholic drink.
- Elephants have good smelling power so keep in mind the direction of the wind.
- Elephant can run at a speed of 30-40km per hour, so do not run straight instead make zig-zag running.
- While running throw towel, handkerchief, cap or any other cloth so that they will get attracted to that and will get engaged with that.
- In a hilly terrain run towards the slope.
- While running away from an elephant do not hide behind a tree nor climb up a tree in the evening.
- To prevent the entry of elephants in n village bum wood and "Masal". Collect in a group and make noise by beating drum, tin etc. Try to drive them towards non in habituated area.
- Make the payment for compensation of elephant loss, early.
- Inform loss of human life or property, within 24 hours to the Patwari or the nearest forest employee.

Steps taken in Africa, to escape elephant damage

- Elephant area is fenced with ropes. Fencing ropes are smeared with a mixture of chilli + tobacco powder in engine oil. Disagreeable smell of the mixture helps to some extent, to ward off the elephants.
- Honey bee combs are promoted on the elephant corridor boundary Honey bees ward off the elephants.
- Electronic tracking devices are attached to the elephants to track their movements. This helps in timely information to the villagers.

CHAPTER VII FINANCIAL PROJECTION



CHAPTER VII FINANCIAL PROJECTION

Minimum disturbance approach; area specific vs. species-specific management; Improve Interspersion (uniform distribution off water, food, cover & edges over the area) and juxtaposition (location of welfare factors with respect to each other within home ranges) will be adopted.

To implement the conservation plan following works are proposed within the core zone, buffer zone and adjoining forest and revenue area. More emphasis will be given to soil and water conservation structures and creation of water holes along with the habitat development works. To improve the habitat and conserve the flora and fauna following items of works are proposed and tentative financial allocation for the same is given in front of them.

7.2 ACTION PLAN

7.2.1 CONSERVATION OF SOIL AND WATER.

7.2.1.1 Watershed Improvement

Table No. 7.1
Expenditure on Soil and Water Conservation work

S.No.	Name of Nala	Catchment Area (Ha.)	Forest Area (Ha.)	Work Name	Quantity				Unit	Rate (In Lakh)	Amount in (In Lakh)
					Total	Y (1)	Y (2)	Y (3)			
1	Gerwani Nala	2804	1357	BWCD	39	15	15	9	No.	0.040	1.56
2	Gerwani Nala			LBCD	14	5	5	4	No.	0.100	1.40
3	Gerwani Nala			GS	6	3	2	1	No.	1.250	7.50
	Total	2804.00	1357.00		59	23	22	14			10.46
4	Banjari Nala	2556	1760	BWCD	132	50	50	32	No.	0.040	5.28
5	Banjari Nala			LBCD	23	10	8	5	No.	0.100	2.30
6	Banjari Nala			GS	7	3	2	2	No.	1.250	8.75
7	Banjari Nala			TALAB	1	1	-	-	No.	25.000	25.00
8	Banjari Nala			SCT	10000	4000	4000	2000	No.	0.003	30.00
	Total	0.00	0.00		10163	4064	4060	2039			71.33
9	Gardharasi Nala	859	378	BWCD	14	6	5	3	No.	0.040	0.56
10	Gardharasi Nala			LBCD	4	2	1	1	No.	0.100	0.40
11	Gardharasi Nala			GS	1	1	-	-	No.	1.250	1.25
12	Gardharasi Nala			SD	1	1	-	-	No.	35.000	35.00
	Total	0.00	0.00		20	10	6	4			37.21
13	Janjgir Nala	1389	609	BWCD	15	7	5	3	No.	0.040	0.60
14	Janjgir Nala			LBCD	10	5	3	2	No.	0.100	1.00
	Total	1389.00	609.00		25	12	8	5			1.60
15	Chirwani Nala	1113	862	LBCD	49	20	20	9	No.	0.100	4.90
16	Chirwani Nala			GS	1	1	-	-	No.	1.250	7.50
	Total	2502.00	1471.00		55	23	22	10			12.40
	Grand Total	6695.00	3437.00	Total	10322	4132	4118	2072			133.00



7.2.2 EXPENDITURE ON WILDLIFE CONSERVATION

Table No. 7.2

S. No.	ITEM	Year (1)	Year (2)	Year (3)	TOTAL AMOUNT IN INR (LUMP SUM)
IMPROVEMENT OF FOOD					
1	Pasture Development including uprooting of lantana and other unwanted weeds	15,00,000	10,00,000	10,00,000	35,00,000
2	Control of Grazing	5,00,000	2,00,000	2,00,000	9,00,000
3	Weed Control	1,00,000	1,00,000	1,00,000	3,00,000
4	Burning regime, seeding and grass cutting.	1,00,000	1,00,000	1,00,000	3,00,000
5	Development of brows; fruit, seeds & mast.	4,00,000	4,00,000	4,00,000	12,00,000
IMPROVEMENT OF COVER					
1	Escape Cover	5,00,000	3,00,000	-	8,00,000
2	Ambush Cover	3,00,000	1,00,000	1,00,000	5,00,000
3	Reproductive Cover	3,00,000	1,00,000	1,00,000	5,00,000
4	Special Refuges	3,00,000	1,00,000	1,00,000	5,00,000
5	Shade and resting places	10,00,000	2,50,000	2,50,000	15,00,000
CREATION OF CONSERVATION AWARENESS					
1	Provision of salt licks	3,00,000	1,00,000	1,00,000	5,00,000
2	Development of cattle sheds	10,00,000	5,00,000	5,00,000	20,00,000
TOTAL					1,25,00,000



7.3 PROPOSED BUDGET FOR AVIFAUNA (VALTURE AND PEAFOWL & PEACOCK) ALTERNATE HABITATE PALN:-

PROJECT:- Diversion of 214.869 ha. Forest land in favour of Gare pelma Sector-II Coal Block has been allotted to Maharashtra State Power Generation Company Limited (MAHAGENCO) Coal block is located in the Mand Raigarh Coalfield of Raigarh District, Chhattisgarh.

Proposed Budget for "VALTURE" (Bijon Pk.M)

TABLE 7.3.1

S.N.	Components & Sub Components	Discription	Execution periods (in Year)	Unit	Quantity	Cost per Unit (in Lac)	Year wise cost estimate (in lac)				Remarks
							Y-1	Y-2	Y-3	Total	
1	2	3	4	5	6	7	8	9	10	11	12
1.	Project Construction	DPR by Doing field Survey to Prepare	1	Forest Division	1	0.30	0.30	0.00	0.00	0.30	
		TOTAL:-	1		1	0.30	0.30	0.00	0.00	0.30	
2.	Avifauna (Vulture) Alternate Habitate Plan:-										
2.1	Artificial Nesting	Artificial Nest Construction	2	No. of Nest	200	0.01	2.00	0.00	0.00	2.00	
		TOTAL:-	2		200	0.01	2.00	0.00	0.00	2.00	
3.	Area Conservation and Promotion through Forest management committee:-										
3.1	Capacity Development of joint Forest management committee members	To increase Awareness of committee members regarding bird enhance.	3	No. of Financial year	3	0.30	0.30	0.30	0.30	0.90	



S.N.	Components & Sub Components	Discription	Execution periods (in Year)	Unit	Quantity	Cost per Unit (in Lac)	Year wise cost estimate (in lac)				Remarks
							Y-1	Y-2	Y-3	Total	
1	2	3	4	5	6	7	8	9	10	11	12
3.2	Field Protection and Promotion work	2 Area Conservation and augmentation through Vulture protectors	3	No. of Financial year	2	1.20	0.80	0.80	0.80	2.40	
		TOTAL:-	6		5	1.50	1.10	1.10	1.10	3.30	
4.	Bird Survey and Project impact Study:-										
4.1	Project co-ordinator Appointment and establishment Exp.	Project co-ordinator Post creation	3	No. of Staff	1	1.50	0.50	0.50	0.50	1.50	
4.2	Training of Project co-ordinator and Staff etc.	Staff training and Field trip	1	No. of Financial year	1	0.50	0.50	0.00	0.00	0.50	
4.3	Survey, Study work and report preparation	Establishment and Execution	3	No. of Financial year	3	0.25	0.25	0.25	0.25	0.75	
		TOTAL:-	7		5	2.25	1.25	0.75	0.75	2.75	



5	Research & Specialist services	Research, Field trip & Specialist services	1	No. of Financial year	3	0.35	0.25	0.50	0.30	1.05
6	Evaluation and Monitoring	-	3	No. of Financial year	3	0.15	0.15	0.15	0.15	0.45
7	Administrative Expense	Others Expense	3	No. of Financial year	3	0.15	0.15	0.15	0.15	0.45
		TOTAL:-	7		9	0.65	0.55	0.80	0.60	1.95
		Grand TOTAL:-	23		220	4.71	5.20	2.65	2.45	10.30

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**7.3.2 PROPOSED BUDGET FOR AVIFAUNA (VULTURE AND PEAFOWL & PEACOCK)
ALTERNATE HABITATE PALN:-**

Proposed Budget for "PEAFOWL & PEACOCK" Habitat Plan

TABLE 7.3.2

S.N.	Components & Sub Components	Discription	Execution periods (in Year)	Unit	Quantity	Cost per Unit (in Lac)	Year wise cost estimate (in lac)			Remarks	
							Y-1	Y-2	Y-3		Total
1	2	3	4	5	6	7	8	9	10	11	12
1.	Project Construction	DPR by Doing field Survey to Prepare	1	Forest Division	1	0.30	0.30	0.00	0.00	0.30	
		TOTAL:-	1		1	0.30	0.30	0.00	0.00	0.30	
2.	Avifauna (Vulture) Alternate Habitate Plan:-										
2.1	Artificial Nesting	Artificial Nest Construction	2	No. of Nest	200	0.01	2.00	0.00	0.00	2.00	
		TOTAL:-	2		200	0.01	2.00	0.00	0.00	2.00	
3.	Area Conservation and Promotion through Forest management committee:-										
3.1	Capacity Development of joint Forest management committee members	To increase Awareness of committee members regarding bird enhance.	3	No. of Financial year	3	0.30	0.30	0.30	0.30	0.90	



S.N.	Components & Sub Components	Discription	Execution periods (in Year)	Unit	Quantity	Cost per Unit (in Lac)	Year wise cost estimate (in lac)				Remarks
							Y-1	Y-2	Y-3	Total	
1	2	3	4	5	6	7	8	9	10	11	12
3.2	Field Protection and Promotion work	2 Area Conservation and augmentation through Peafowl protectors	3	No. of Financial year	2	1.20	0.80	0.80	0.80	2.40	
		TOTAL:-	6		5	1.50	1.10	1.10	1.10	3.30	
4.	BIRD Survey and Project impact Study:-										
4.1	Project co-ordinator Appointment and establishment Exp.	Project co-ordinator Post creation	3	No. of Staff	1	1.50	0.50	0.50	0.50	1.50	
4.2	Tranning of Project co-ordinator and Staff etc.	Staff tranning and Field trip	1	No. of Financial year	1	0.50	0.50	0.00	0.00	0.50	
4.3	Survey, Study work and report preparation	Establishment and Execution	3	No. of Financial year	3	0.25	0.25	0.25	0.25	0.75	
		TOTAL:-	7		5	2.25	1.25	0.75	0.75	2.75	



5	Research & Specialist services	Research, Field trip & Specialist services	1	No. of Financial year	3	0.35	0.25	0.50	0.30	1.05
6	Evaluation and Monitoring	-	3	No. of Financial year	3	0.15	0.15	0.15	0.15	0.45
7	Administrative Expense	Others Expense	3	No. of Financial year	3	0.15	0.15	0.15	0.15	0.45
		TOTAL:-	7		9	0.65	0.55	0.80	0.60	1.95
		Grand TOTAL:-	23		220	4.71	5.20	2.65	2.45	10.30



PROPOSED EXPENDITURE ON ELEPHANT CONSERVATION

Table No. 7.3.4

S. No.	Item	Year (1)	Year (2)	Year (3)	Total Amount (Lakh Rs.)
1	Vehicle for movement of monitoring of Elephant's movement	15.00	-	-	15.00
2	Installation of Elephant Tracking System	5.00	-	-	5.00
3	Operation of Elephant Tracking System	4.00	3.00	3.00	10.00
4	Fodder Plantation	10.00	2.50	2.50	15.00
5	Bamboo Brakes	3.00	1.00	1.00	5.00
6	Plantation of Fruit Trees	6.00	2.00	2.00	10.00
7	Construction of Series of Tanks	5.00	-	-	5.00
8	Biodiversity Conservation	3.00	1.00	1.00	5.00
9	Maintenance of Biodiversity Records	4.00	3.00	3.00	10.00
	Total	55.00	12.50	12.50	80.00

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7.4 SUMMARY OF EXPENDITURE ON ACTION PLAN (In Lakhs)

1. Expenditure on soil and water conservation work	= 133.00
2. Expenditure on forest conservation for wildlife	= 125.00
3. Expenditure Vulture Habitat Plan	= 20.60
4. Expenditure on Elephant conservation	= 80.00

TOTAL (IN LAKHS) = 358.60

**TOTAL EXPENDITURE ON IMPLEMENTATION OF
FOREST CONSERVATION FOR WILDLIFE**

Rs. 358.60 LAKHS

Rs. Three Crores Fifty-Eight Lakhs and Sixty Thousand only



CHAPTER – VIII

CONCLUSION AND RECOMMENDATION

8.1 ECOLOGICAL SENSITIVITY

The whole study area is screened through the parameters for ecological sensitivity. There are no areas that can be defined as being ecologically insensitive; "ecologically particularly sensitive areas" fulfil specific criteria. The technical and political discussion around the concept "ecologically particularly sensitive areas" can be reduced to three criteria (EPSA criteria): Value, Fragility and Potential.

The **Value** criterion serves, for example, to describe virgin areas, rare landscapes and habitats or ancient rural landscapes. The assessment includes both ecological and cultural values. The **Fragility** criterion identifies the sensitive (unstable) state and, thus, the special fragility of a habitat. Fragile are, for example, areas with little buffer capacity, areas with critically impacted assets to be protected or areas with conditions that intensify the effect of stress on them. The **Potential** criterion is used for areas with scope for sustainable development, for example areas that show no dominant or irreversible utilization, areas with planning "culture (tradition/structure)" or areas with reserves.

The presently investigated Gare Pelma Sector II Coal Block does not fall under any of the above mentioned criteria, hence the coal block area applied for lease does not fall under any sensitive area.

8.1.1 MIGRATORY ROUTE OF ENDANGERED SPECIES

There is no endangered species in and around the mining lease area allotted for the Gare Pelma Sector II Coal Block. Further the area of Mining Lease does not fall in the migratory route of any species. During the study it is found that through this area there is no movement of any endangered/threatened species.



ANNEXURES

S. NO.	COMPONENT	PAGE NO.
1.	LOCATION OF RECHARGE STRUCTURES	110
2.	GOOGLE IMAGE DENOTING AREA	111
3.	MAP DENOTING LOCATION OF SAMPLE PLOTS	112
4.	TYPICAL DIAGRAM AND SECTIONAL VIEW OF CHECK DAM	112
5.	TYPICAL AND SECTIONAL VIEW OF CONTOUR TRENCH/ CONTOUR BUND	113
6.	TYPICAL DIAGRAM AND SECTIONAL VIEW OF ROCK BOULDER DAM	113
7.	Site photographs	113-114



Fig. 2 GOOGLE IMAGE DENOTING AREA

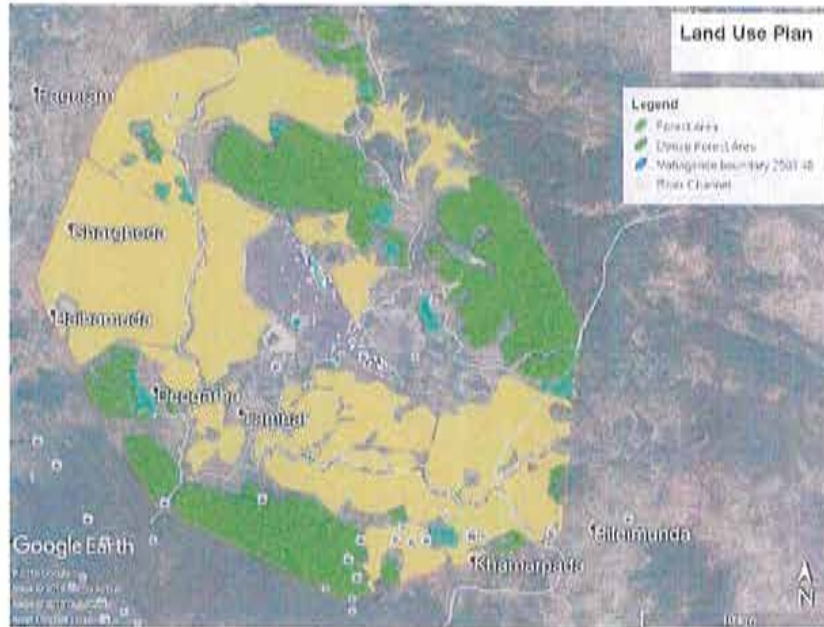


Fig. 3 MAP DENOTING LOCATION OF SAMPLE PLOTS



Fig. 4 Typical diagram and sectional view of check dam

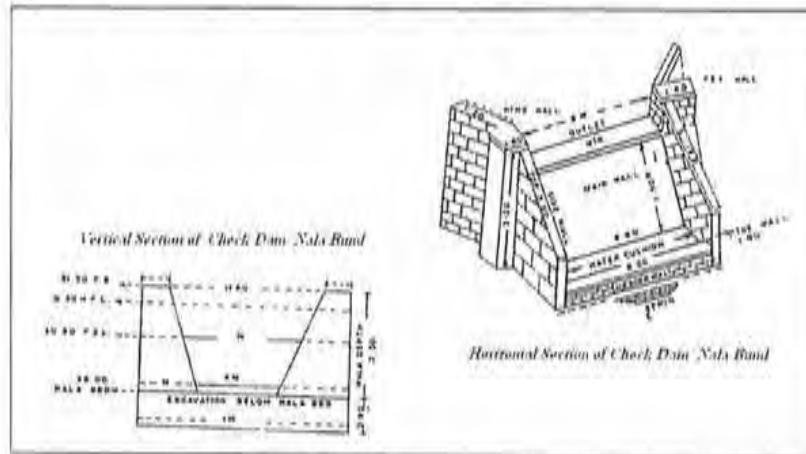


Fig. 5 Typical diagram and sectional view of CONTOUR TRENCH/ CONTOUR BUND

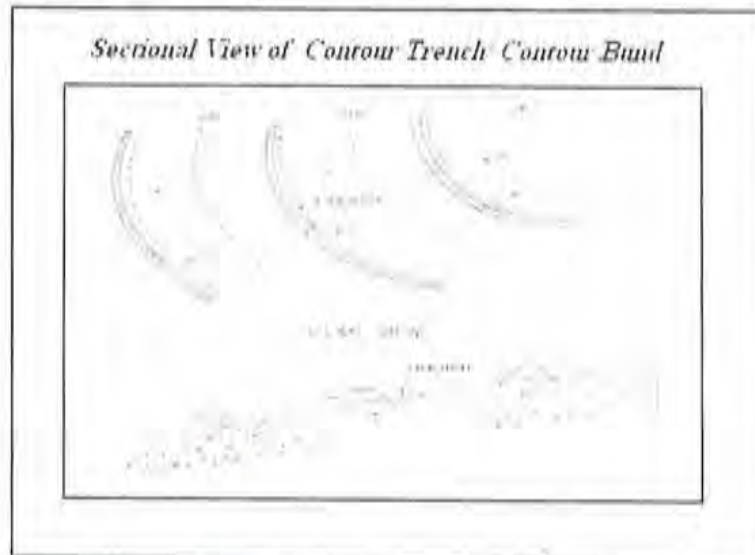
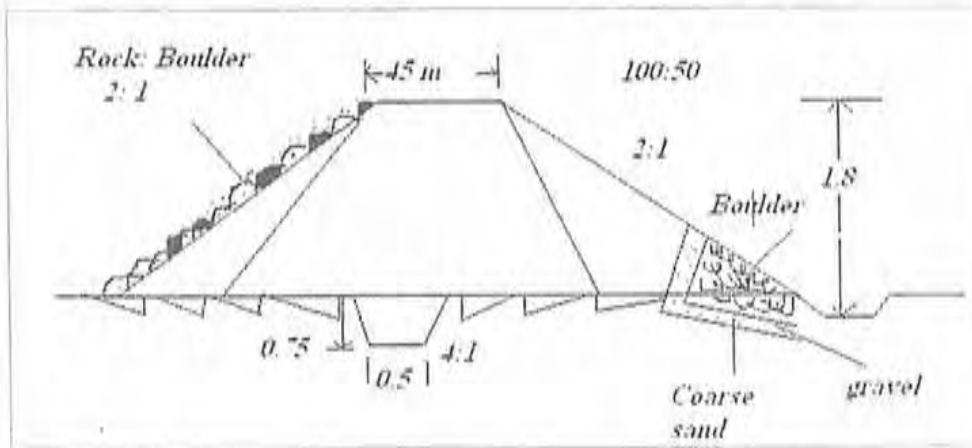


Fig. 6 Typical diagram and sectional view of ROCK BOULDER DAM



Site photographs :





चेक लिस्ट क्रमांक- 34

वन अधिकार मान्यता पत्र वितरण की
सूची एवं कलेक्टर का अनापत्ति प्रमाण
पत्र



Forest Clearance under section 2 of FCA 1980 for coal mining within GARE PALMA SECTOR-II Allotted to M/s MSPGCL wide order NO. 103/30/2015/NA, Date 31.08.2015 REVENUE FOREST= 115.134 Ha. Forest land = 99.735 ha. Total Forest area= 214.869 ha.

CHIEF ENGINEER (COAL)
MSPGCL MUMBAI,
MAHARASHTRA

वन अधिकार मान्यता पत्र वितरण की सूची एवं कलेक्टर का अनापत्ति प्रमाण पत्र

महाराष्ट्रा स्टेट पावर जनरेशन कंपनी लिमि. (महाजेनको) द्वारा रायगढ़ जिले के रायगढ़ वनमण्डल अंतर्गत गारे पेलमा सेक्टर-2 कोल ब्लॉक में कोयला खनन कार्य हेतु रायगढ़ जिले के रायगढ़ वनमण्डल अंतर्गत व्यपवर्तन हेतु आवेदित क्षेत्र रकबा 214.869 हे. वनभूमि में कोयला खनन कार्य के लिए वन अधिकार मान्यता पत्र वितरण की सूची एवं कलेक्टर का अनापत्ति प्रमाण पत्र संलग्न है।



वनमण्डलाधिकारी
रायगढ़ वनमण्डल रायगढ़





कार्यालय कलेक्टर भू-अभिलेख शाखा रायगढ (छ.ग.)

क्रमांक/
प्रति.

161)

/स.अ.भू.अ./ 2019

रायगढ दिनांक २/ 12 /2019

अपर प्रधान मुख्य वन संरक्षक
(भू-प्रबंध/व.रा.अ.)
अरण्य भवन मेडिकल कॉलेज रोड
रायपुर (छ.ग.)

विषय:-

वन संरक्षण अधिनियम 1980 के अंतर्गत व्यपवर्तन हेतु वन अधिकार अधिनियम 2006 के तहत मेसर्स महाराष्ट्र स्टेट पावर जनरेशन कंपनी लिमिटेड के कोल ब्लॉक गारे पेलमा सेक्टर-2 रायगढ क्षेत्र के तहसील तमनार स्थित ग्राम डोलनारा, भालमुडा, रोडोपाली, मुडागांव, पाता, कुंजेपुरा, गारे, सराईटोला, झिकावहाल, लिबरा, सारसमाल कुल रकबा 214.869 हे. राजस्व वन भूमि एवं संरक्षित वन भूमि के लिये प्रदर्श 'स' एवं नान लिनियर प्रकरण हेतु फार्म-2 में जानकारी वेजने बाबत।

संदर्भ:-

मेसर्स महाराष्ट्र स्टेट पावर जनरेशन कंपनी लिमिटेड, का पत्र क्रमांक CE(COAL)/GAREPALMA/03222 दिनांक 25.09.2017।

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विषयांतर्गत संदर्भित पत्र का कृपया अवलोकन करने का कष्ट करें। मेसर्स महाराष्ट्र स्टेट पावर जनरेशन कंपनी लिमिटेड डोलनारा, भालमुडा, रोडोपाली, मुडागांव, पाता, कुंजेपुरा, गारे, सराईटोला, झिकावहाल, लिबरा, सारसमाल रायगढ क्षेत्र के तहसील तमनार स्थित कोल ब्लॉक गारे पेलमा सेक्टर-2 में आने वाली राजस्व वन भूमि 115.134 हे. एवं संरक्षित वन भूमि 99.735 हे. कुल वन भूमि 214.869 हे. राजस्व वन भूमि के वन संरक्षण अधिनियम 1980 के अंतर्गत व्यपवर्तन हेतु वन अधिकार अधिनियम 2006 के तहत (FRA) प्रमाण पत्र चाही गई है। उक्त संघ में अनुविभागीय अधिकारी(रा0) धरघोडा से प्राप्त जानकारी के अनुसार निम्न व्यक्तियों को वन अधिकार अधिनियम के तहत हक पत्र प्रदान किया गया है जो निम्नानुसार है:-

क्रमांक	ग्राम का नाम	वन अधिकार मान्यता पत्र धारक का नाम	खसरा नं.	रकबा हेक्टे. में
1	लिबरा	निरक	निरक	निरक
2	कुंजेपुरा	निरक	निरक	निरक
3	पाता	प्रेमसिंह पिता ठपाशम उराव	628/1	1.214 हे.
4	गारे	निरक	निरक	निरक
5	डोलनारा	निरक	निरक	निरक
6	सारसमाल	निरक	निरक	निरक
7	सराईटोला	लक्ष्मीप्रसाद पिता लछन कंवर गणेशराम पिता भागीरथी कंवर आशाराम पिता इन्दरसिंह कंवर बुधराम पिता घनसिंह अग्रिया हीराबाई पति बंशीधर कंवर विद्याधर पिता धरमसिंह कंवर	18/1 स 18/1 से 10/1 से 10/1क 133/1 10/1 रो	0.194 0.360 0.162 0.453 0.324 0.310
8	मुडागाव	महेशराम पिता बोधराम गोंड प्रेनसागर पिता बोधन मांडी गोहन सिंह पिता भोगसिंह गोंड हरीराम पिता बोरी गोंड घांसीराम पिता मनिहार गोंड गानसिंह पिता मनिहार जगन्नाथ पिता चत्तार सिंह मांडी	103 73/5 103 49 173/5 173/5 168	0.202 0.202 0.125 0.364 0.809 0.809 0.405
9	झिकावहाल	निरक	निरक	निरक
10	भालमुडा	रघुसिंग पिता दयाराम कंवर	155/5	0.405
11	रोडोपाली	निरक	निरक	निरक



अतः उपरोक्तानुसार अनुविगगीय अधिकारी(शो) घरघोडा से प्राप्त जानकारी के आधार पर मेसर्स महाराष्ट्र पावर जनरेशन कंपनी लिमिटेड के पक्ष में आबंटित कोल ब्लॉक गारे पेलगा सेक्टर-2 रायगढ़ क्षेत्र के तहसील तामदार शिथत गांव दोहनारा, भालुमुडा, रोडोपाली, मुड़ागांव, पाता, कुजेभुरा, गारे, सराईटोला, झिकावहाल, लिबरा, सारलमाल कुल रकबा 214.869 हे. राजस्व वन भूमि व्यपवर्तन हेतु निर्धारित प्रारूप प्रदर्श 'स' प्रमाण पत्र एवं नान लिमिगर प्राकरण हेतु फार्म-2 में जानकारी संलग्न कर आपकी ओर भेजी जा रही है।
संलग्न:- उपरोक्तानुसार।

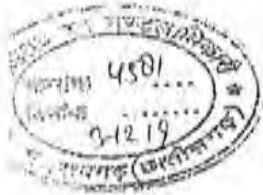
पृ. क्रमांक/ प्रतिलिपि- 1611/स.अ.गू.अ./2019

रायगढ़ दिनांक 9/12/2019

1. लघिन, छ.ग. शासन राजस्व एवं आपदा प्रबन्धन विभाग मंत्रालय महानदी भवन नवा रायपुर को सादर सूचनार्थ।
2. वन मडलधिकारी वन गडल रायगढ़ को सूचनार्थ एवं आवश्यक कार्यवाही हेतु।
3. मेसर्स महाराष्ट्र स्टेट पावर जनरेशन कंपनी लिमिटेड गारे पेलगा सेक्टर-2 रायगढ़ को सूचनार्थ।

तक, श्री/ राजस्व
वन मडलधिकारी
वन मडल, पुनमण्डल
9/12/19

कलेक्टर
रायगढ़(छ.ग.)



कार्नाल कलेक्टर भू-अभिलेख शाखा रायगढ़ (छ.ग.)

प्रमाण पत्र

प्रदर्श 'स'

गैस महाराष्ट्र स्टेट पावर जनरेशन कंपनी लिमिटेड रायगढ़ द्वारा कोलमाईन्स खनन हेतु रायगढ़ जिला में रायगढ़ वनमण्डल के ग्राम ढोलनारा, मालमुड़ा, रोडोपाली, मुड़ागाँव पाता, कुजेपुरा, गारे, सराईटोला, झिकावहाल, लिवरा एवं सारसमाल के वन भूमि व्यपवर्तन हेतु 214.869 हे. वनभूमि के प्रकरण में अनुसूचित जनजाति एवं अन्य परंपरागत वननिवासी (वन अधिकारों की मान्यता) अधिनियम 2006 का पालन प्रतिवेदन।

अनुविभागीय अधिकारी (रा.) धरघोड़ा के प्रमाण-पत्र के आधार पर प्रमाणित किया जाता है कि :-

1. अनुसूचित जनजाति एवं अन्य परंपरागत वननिवासी (वन अधिकारों की मान्यता) अधिनियम 2006 में नियत संपूर्ण प्रक्रिया का पालन कर अधिकारों को स्थापित किया गया है, तथा संपूर्ण प्रस्तावित क्षेत्र की वनभूमि कुल रकबा 214.869 हे. जो इस कार्य हेतु व्यपवर्तित किया जाना है। तथा ग्राम ढोलनारा, मालमुड़ा, रोडोपाली, मुड़ागाँव पाता, कुजेपुरा, गारे, सराईटोला, झिकावहाल, लिवरा एवं सारसमाल तहसील तमनार में स्थित है, में तदनुसार यह भूअर्थवार्ति पूर्ण की गई है।

ग्राम सभा की बैठक एवं उसमें पारित प्रस्ताव दिनांक 02.10.2016, 20.11.206, 21.11.2016 एवं 30.11.2016 (प्रदर्श 'अ') एवं वन तथा राजस्व विभाग का संयुक्त जाँच प्रतिवेदन (प्रदर्श 'ब') दर्शित है।

2. उक्त प्रकरण का प्रस्ताव ढोलनारा, मालमुड़ा, रोडोपाली, मुड़ागाँव, पाता, कुजेपुरा, गारे, सराईटोला, झिकावहाल, लिवरा एवं सारसमाल ग्राम के श्री उल्लन सिंह, मिलूशंकर, लकेश्वर सिदार, कृतलाल राठिया, बोधनराम मांडी, धनीराम एवं श्रीमती कमला राठिया की अध्यक्षता में हुई ग्राम सभा की बैठक दिनांक 02.10.2016, 20.11.206, 21.11.2016 एवं 30.11.2016 रखा गया था एवं इसमें 50 प्रतिशत ग्राम सभा के तथा ग्राम वन समिति के सदस्य उपस्थित थे, जिनको परियोजना क्रियान्वयन एवं प्रकरण के पूर्ण विवरण तथा प्रभाव से अवगत करा कर विस्तार से समझाईस हिन्दी एवं स्थानीय भाषा में दी गई।

प्रस्तावित वन क्षेत्र में प्रदत्त वन अधिकार मान्यता पत्र धारकों की संख्या ग्रामवार निम्नानुसार है :-

क्रमांक	ग्राम वन नाम	वन अधिकार मान्यता पत्र धारक का नाम	खसरा नं.	रकबा हेक्टे. में
1	लिवरा	निरंक	निरंक	निरंक
2	कुजेपुरा	निरंक	निरंक	निरंक
3	पाता	प्रेमसिंह पिता ठपाराम उराव	628/1	1.214 हे.
4	गारे	निरंक	निरंक	निरंक
5	ढोलनारा	निरंक	निरंक	निरंक
6	सारसमाल	निरंक	निरंक	निरंक
7	सराईटोला	लक्ष्मीप्रसाद पिता लछन कंवर	18/1 से	0.194
		गणेशराम पिता भागीरथी कंवर	18/1 से	0.360
		आशाराम पिता इन्दरसिंह कंवर	10/1 से	0.162
		बुधराम पिता धनसिंह अगरिया	10/1क	0.453
		हीराबाई पति बंशीधर कंवर	133/1	0.324
		विद्याधर पिता धरमसिंह कंवर	10/1 से	0.310
8	मुड़ागाव	महेशराम पिता बोधराम गोंड	103	0.202
		प्रेमसागर पिता बोधन र डी	73/5	0.202
		मोहन सिंह पिता भोगसिंह गोंड	103	0.125
		हरीराम पिता बोरी गोंड	49	0.364
		घांसीराम पिता मनिहार गोंड	173/5	0.809
		मानसिंह पिता मनिहार	173/5	0.809
	जगन्नाथ पिता चमार सिंह मांडी	168	0.405	



	शिकायत	निरंक	निरंक	निरंक
10	भातूमुडा	रत्नूराम पिता दयाराम कवर	155/5	0.405
11	रोडोपाती	निरंक	निरंक	निरंक

- जो भी घर्षा एवं निर्णय लिये गये उसमें ग्राम सभा के न्यूनतम 50 प्रतिशत सदस्यों की उपस्थिति का कोरम पूर्ण था।
- संयुक्त सत्यापन प्रतिवेदन एवं ग्रामसभा के ठहराव प्रस्ताव दिनांक 02.10.2016, 20.11.2016, 21.11.2016 एवं 30.11.2016 के अनुसार ऐसे विलुप्त प्राय जनजाति समूह (पी.पी.जी.) के सदस्य व्यपवर्तन हेतु प्रश्नाधीन भूमि परनिवासरत नहीं हैं। जिनका वन अधिग्रहण अनुसूचित जनजाति एवं अन्य परंपरागत वननिवासी (वनअधिकारों की मान्यता) अधिनियम 2006 की धारा 3(1) (c) अंतर्गत विशेष रूप से संरक्षित रखना है।
- संयुक्त सत्यापन प्रतिवेदन एवं ग्रामसभा के दिनांक 02.10.2016, 20.11.2016, 21.11.2016 एवं 30.11.2016 के सकल्यों के आधार पर यह प्रमाणित किया जाता है कि व्यपवर्तन क लिए प्रस्तावित वनभूमि पर अनुसूचित जनजाति एवं अन्य परंपरागत वननिवासी (वन अधिकारों की मान्यता) अधिनियम 2006 की मान्यता 3(2) अंतर्गत शासन द्वारा संचालित कोई सुविधा विद्यमान नहीं है।

संलग्न-उपरोक्तानुसार।

(श्री यशवन्त कुमार)
कलेक्टर
एवं

अध्यक्ष-जिला वन अधिकार समिति
जिला रायगढ़ (छ.ग.)



FORM-II
(for Project other than linear projects)
Government of Chhattisgarh
Officer of the District Collector Raigarh

No.

Dated 28.11.2019

TO WHICHEVER IT MAY CONCERN

In compliance of the Ministry of Environment and Forests (MoEF), Government of India's letter No. 11-9/98-FR(pt.) dated 3rd August 2002 wherein the MoEF issued guidelines on submission of evidences for having initiated and completed the process of settlement of rights under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 ("FRA", for short) on the forest land proposed to be diverted in for non-forest purposes, it is certified that 214.869 hectares of Revenue forest land and forest land proposed to be diverted in favour of M/s Maharashtra State Power Generation Company Limited for COAL BLOCK Core Pelma Block-2 in Raigarh District falls within jurisdiction of Dholnara, Bhalumuda, Rodopali, Mudagaon, Pata, Kunjemura, Gare, Saraitola, Jhinkabahal, Libra and Sarasmal village(s) in Tamner Tehsil.

It is further certified that:

- (a) The complete process for identification and settlement of rights under the FRA has been carried out for the entire 214.869 hectares of Revenue forest land and forest land proposed for diversion. A copy of records of all consultation and meetings of the Forest Rights Committees, Gram Sabha, Sub-Division Level Committee and the District Level Committee are enclosed as annexure.....01..... to01..... annexure
- (b) The proposal for such diversion (with full details of the project and its-implications, in vernacular/local language) have been placed before each concerned Gram Sabha of forest-dwellers, who are eligible under the FRA.
- (c) The each of concerned Gram Sabha, has certified that all formalities/processes under the FRA have been carried out, and that they have given their consent to the proposed diversion and the compensation and ameliorative measures, if any, having understood the purpose and details of proposed diversion. A copy of certificate issued by the Gram sabha of Dholnara, Bhalumuda, Rodopali, Mudagaon, Pata, Kunjemura, Gare, Saraitola, Jhinkabahal, Libra and Sarasmal village(s) is enclosed as annexure.....01..... to annexure01.....
- (d) The discussion and decision on such proposals had taken pace only when there was a quorum of minimum 50% of the members of Gram sabha present.
- (e) The diversion of forest land for facilities managed by the Government as required under section 3(2) of the FRA have been completed and the Gram Sabhas have given their consent to it.
- (f) The rights of Primitive Tribal Groups and Pre-Agricultural Communities, where applicable have been specifically safeguarded as per section 3(1) (e) of the FRA.

Encl.: As above.



(Yashwanth Kumar)
District Collector Raigarh
COLLECTOR
RAIGARH (C.G.)

कार्यालय: अनुमितीय अधिकारी (राजस्व) जिला रायगढ़ (छ.ग.)

क्रमांक / वन अधि. / 2019

घरघोड़ा दिनांक 13/11/2019

प्रति,

कलेक्टर,

(शु.स.मिलेख शाखा)

जिला रायगढ़ (छ.ग.)

विषय :- मेन्सरी फ्लॉयड स्टेट पॉवर जनरेशन कंपनी लिमिटेड के पक्ष में आबंटित कोल ब्लॉक गारे पेलमा सेक्टर-2 में आने वाली राजस्व वन भूमि 115.134 हे० एवं संरक्षित वन 99.735 हे० कुल 214.869 हे० को वन संरक्षण अधिनियम 1980 के अंतर्गत व्यपवर्तन प्रस्ताव हेतु अनापत्ति प्रमाण पत्र बाबत।

संदर्भ :- आपका पत्र क्रमांक 1163/मू.अ.लि./2018/दिनांक 08/06/2018।

विषयांतर्गत लेख है कि संदर्भित के माध्यम से महाराष्ट्र स्टेट पॉवर जनरेशन कंपनी लिमिटेड के पक्ष में आबंटित कोल ब्लॉक गारे पेलमा सेक्टर-2 जो तहसील दमनगर जिला रायगढ़ में स्थित है, में आने वाली राजस्व वन भूमि 115.134 हे० एवं संरक्षित वन 99.735 हे० कुल 214.869 हे० को वन संरक्षण अधिनियम 1980 के अंतर्गत वन व्यपवर्तन प्रस्ताव प्रेषित करने हेतु अनापत्ति प्रमाण पत्र बांटी गई थी, उक्त संबंध में तहसीलदार तमनार एवं पटवारियों से ग्रामधार भाम लिवरा, कुंजेमुच, पाता, गारे, बोलनारा, सारसगल, सराईटोला, मुड़ागांव, झिकावहाल, भालूमुड़ा, रोडीपाली, गितवाही, डोलेसरा, एवं टिहलीरामपुर के हल्का पटवारियों से जांच प्रतिवेदन लिया गया जिसके अनुसार प्रेषित रूपि में वन अधिकार पत्र प्रदाय किया गया है जो निम्नानुसार है :-

क्र.	ग्राम पंचायत का नाम	ग्राम का नाम	खसरा नं.	रकबा	नाम / पिता का नाम	मद
1	कुंजेमुरा प.ह.नं. 12	कुंजेमुरा	71	0.113	बाबूलाल पिता भिचवा उरांव	छोटे/बड़े जंगल
			110	0.101	जयकुमार पिता मंगलराम उरांव	छोटे/बड़े जंगल
			84/2क	0.080	छबील पिता झगरु उरांव	छोटे/बड़े जंगल
			84/2क	0.040	चैतराम पिता गूलचू उरांव	छोटे/बड़े जंगल
			84/2क	0.030	मालिकराम पिता बंधन उरांव	छोटे/बड़े जंगल
			84/2क	0.030	जुनकू पिता गुलचू उरांव	छोटे/बड़े जंगल
			486/1	0.809	मिलन पिता मछिन्दर गौड़	छोटे/बड़े जंगल
			490/1ख	0.202	खगेश्वर पिता खेमसिंह गौड़	छोटे/बड़े जंगल
2	बजरमुड़ा प.ह.नं. 14	बोलनारा	3/1 से	0.607	रत्थोराम पिता मारवाड़ी कंवर	छोटे झाड़ के जंगल
3	रोडीपाली प.ह.नं. 14	भालूमुड़ा	155/5से	0.405	रत्थूराम पिता दयाराम कंवर	छोटे झाड़ के जंगल
4	पाता प.ह.नं. 13	पाता	628/1	1.214	प्रेमसिंह पिता दुपाराम उरांव	छोटे झाड़ के जंगल



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5	सराईटोला प.ह.नं. 13	मुड़गाँव	4/1	0.607	गोकूल पिता राजाराम गोंड	छोटे झाड़ के जंगल
			4/1	0.101	बुडूराम पिता हीराराम उरांव	छोटे झाड़ के जंगल
			49/1	0.465	परभरसिंह पिता धोवराम गोंड	बड़े झाड़ के जंगल
			173/6	0.101	जबूलास पिता बालकराम उरांव	छोटे झाड़ के जंगल
			173/5	0.405	लालसाय पिता बालकराम उरांव	छोटे झाड़ के जंगल
			49/1	1.103	कृष्णलाल पिता गोकूलप्रसाद	बड़े झाड़ के जंगल
			173/5	0.405	गान्हीराम पिता मनियार गोंड	छोटे झाड़ के जंगल
			205	0.910	बोवन पिता गंगल मांडी	छोटे झाड़ के जंगल
			49	0.364	हरीराम पिता बोरी गोंड	बड़े झाड़ के जंगल
			173/5	0.809	घोरीराम पिता मनियार गोंड	छोटे झाड़ के जंगल
			173/5	0.809	भानसिंह पिता मनियार गोंड	छोटे झाड़ के जंगल
			10/1	0.346	सोहित पिता भोगसिंह गोंड	छोटे झाड़ के जंगल
			168	0.405	जगरनाथ पिता चमारसिंह मांडी	छोटे झाड़ के जंगल
			10/1	1.174	जहाजराम पिता साहेबराम उरांव	छोटे झाड़ के जंगल
			23/2	1.911	शनिर्ष पिता शनिराम मांडी	छोटे झाड़ के जंगल
103	0.125	गोहनसिंह पिता भोगसिंह गोंड	छोटे झाड़ के जंगल			
205/173/5	1.202	प्रेमसागर पिता बोवन मांडी	छोटे झाड़ के जंगल			
6	सराईटोला प.ह.नं. 13	सराईटोला	10/1	0.310	विद्याधर पिता धरमसिंह कंवर	छोटे झाड़ के जंगल
			18/1	0.194	लक्ष्मीप्रसाद पिता लछन कंवर	छोटे झाड़ के जंगल
			18/1	0.360	गणेशराम पिता भागीरथी कंवर	छोटे झाड़ के जंगल
			10/1	0.162	आशाराम पिता इंदरसिंह कंवर	छोटे झाड़ के जंगल
			133/1	0.324	हीराबाई / बशीधर कंवर	छोटे झाड़ के जंगल
7	सारसमाल प.ह.नं. 20	सारसमाल	39/1ख	0.202	अजीतसिंह पिता डोकरी कंवर	छोटे झाड़ के जंगल
			39/1ख	0.202	धरिया पिता घुसाई कंवर	छोटे झाड़ के जंगल
8	लिबरा प.ह.नं. 26	लिबरा	10	0.229	बाबूलाल पिता बुंदेराम कंवर	छोटे झाड़ के जंगल
			139	0.081	जनकराम पिता पालूराम कंवर	छोटे झाड़ के जंगल
			191/6	0.121	रायमती / पनिकराम कंवर	छोटे झाड़ के जंगल
			245	0.405	जुझारसिंह पिता पीलसाय गोंड	छोटे झाड़ के जंगल

अतः शेष ग्राम क्रमशः गारे, झेलसरा, चित्तवारी, रोडोपाली टिहलीरामपुर एवं अंकाबहाल में प्रभावित होने वाले राजस्व वन भूमि/छोटे बड़े झाड़ का जंगल मद की भूमि वन अधिकार पट्टा प्रदाय किया जाना नहीं पाया गया है।

- प्रभावित क्षेत्र में कोई भी विशेष पिछड़ी जनजाति के लोग निवास नहीं करते हैं।
- वन संरक्षण अधिनियम 2006 की धारा 3(2) के तहत किसी भी प्रकार के शासकीय पाठशाला, आंगनवाड़ी, अस्पताल आदि कोई शासकीय सेवा विद्यमान नहीं है।
- प्रभावित क्षेत्र में धार्मिक एवं ऐतिहासिक महत्व का कोई भी स्थल नहीं है।
- प्रभावित क्षेत्र में से कोई हाईटेंशन लाईन नहीं गुजरी है।

उपरोक्तानुसार पटवारी एवं तहसीलदार का प्रतिवेदन अनुशंसा सहित अनापत्ति प्रमाण पत्र सहित सादर सम्प्रेषित है।



अनुविभागीय अधिकारी (रा0)
घरघोड़ा, रायगढ़ (छ.ग.)

कार्यालय तहसीलदार, तमनार जिला रायगढ़ (छ0ग0)

क्रमांक 1025/आर-1/2019

तमनार दिनांक 05.11.2019

प्रति

अनुविभागीय अधिकारी,

(राजस्व) घरघोड़ा

- विषय:- महाराष्ट्र स्टेट पॉवर जनरेशन कंपनी के पक्ष में आबंटित कोल ब्लॉक गारे पेलमा रोक्टर -2 में आने वाली राजस्व वन भूमि 115.134 हे0 को वन संरक्षण अधिनियम 1980 के अंतर्गत प्रत्यावर्तन प्रस्ताव हेतु अनापत्ति प्रमाण पत्र हेतु जांच रिपोर्ट प्रस्तुत करने का बत।
- संदर्भ:- आपका पत्र क्र. 1176/वन अधि./2019 घरघोड़ा दिनांक 05.11.19

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विषयांतर्गत लेख है कि संबंधित पत्र के माध्यम से महाराष्ट्र पावर जनरेशन कंपनी के पक्ष में आबंटित कोल ब्लॉक गारे पेलमा रोक्टर - 2 पर्यावरण तहसील तमनार में स्थित क्रमशः ग्राम भालुमूडा, रोडोपाली मुडागांव, सराईटोला, चितवाही, पाता, डोलेसरा, कुजेमुरा, गारे, झिकावहाल, लिबरा, टिहलीरामपुर, सारसमाल, एवं डोलनारा तहसील तमनार में आने वाली राजस्व वन भूमि का वन संरक्षण अधिनियम 1980 के अन्तर्गत प्रत्यावर्तन के संबंध में राजस्व वन भूमि/छोटे बड़े झाड़ मट की भूमि का अनापत्ति प्रमाण पत्र प्रदाय किये जाने के संबंध में जांच रिपोर्ट चाहा गया है।

उक्त संबंध में संबंधित हल्का पटवारी से जांच रिपोर्ट प्राप्त किया गया। जिसमें क्रमशः ग्राम कुजेमुरा, डोलनारा, भालुमूडा, पाता, मुडागांव, सराईटोला सारसमाल एवं लिबरा में वन अधिकार प्रमाण पत्र प्रदाय किया गया है जिसका सूची परिशिष्ट "अ" में पृथक से संलग्न है।

शेष ग्राम क्रमशः चितवाही, डोलेसरा, रोडोपाली, टिहलीरामपुर, झिकावहाल, एवं गारे में स्थित प्रभावित होने वाले राजस्व वन भूमि/ छोटे बड़े झाड़ मट की भूमि वन अधिकार पट्टा प्रदाय किया जाना नहीं पाया गया।

उपरोक्तानुसार जांच प्रतिवेदन मय पटवारी रिपोर्ट पृथक से संलग्न किया जाकर सादर सम्प्रेषित।

सहपत्र:- उपरोक्तानुसार।


तहसीलदार
तमनार



तहसील नमनार अन्तर्गत गन अधिकार पट्टाधारियों की सूची

अनुक्र.सं.	ग्राम पंचायत का नाम	गण का नाम	खण्ड	रकबा	माला	पिता का नाम	जाति
1	2	3	4	5	6	7	8
1	कुंजेपुरा	कुंजेपुरा	71	0.113	अबुलाल	गिंध्या	उरांव
2	कुंजेपुरा	कुंजेपुरा	110	0.101	जयशुभार	मंगलराम	उरांव
3	कुंजेपुरा	कुंजेपुरा	१४/२क	0.080	छभील	झगरू	उरांव
4	कुंजेपुरा	कुंजेपुरा	३१/२क	0.040	चैतराम	दुलवू	उरांव
5	कुंजेपुरा	कुंजेपुरा	४१/२क	0.030	गलिक्रशम	बंधन	उरांव
6	कुंजेपुरा	कुंजेपुरा	४१/२क	0.030	सुनकु	बुतचु	उरांव
7	कुंजेपुरा	कुंजेपुरा	488/1	0.809	गिलन	मछिन्दर	गोंड
8	कुंजेपुरा	कुंजेपुरा	490/१ख	0.202	खगेश्वर	खेमसिंह	गोंड
9	गणरगुडा	बोलनारा	3/1 से	0.607	रत्थेराम	मारवाडी	कंवर
10	रोडोपाली	भाळूमूडा	155/5 से	0.405	रत्नराम	दयाराम	कंवर
11	पाता	पाता	628/1	1.214	प्रेमसिंह	तुपाराग	उरांव
12	सराईटोला	मुडगांव	4/1	0.607	गोकुल प्रसाद	सजादान	गोंड
13	सराईटोला	मुडगांव	4/1	0.101	दुडराग	हीराराम	उरांव
14	सराईटोला	मुडगांव	49/1	0.485	करमसिंह	धीवाराम	गोंड
15	सराईटोला	मुडगांव	173/6	0.101	तादुलाल	बालक राम	उरांव
16	सराईटोला	मुडगांव	173/5	0.405	लालसाय	बाबकराम	उरांव
17	सराईटोला	मुडगांव	49/1	1.103	कृष्णा लाल	गोकुल प्रसाद	गोंड
18	सराईटोला	मुडगांव	173/5	0.405	नान्हीराम	मनियार	गोंड
19	सराईटोला	मुडगांव	205	0.910	गोधन	मंगल	मांडी
20	सराईटोला	मुडगांव	49	0.364	हरिशम	बोरी	गोंड
21	सराईटोला	मुडगांव	173/5	0.809	घांसीराम	मनियार	गोंड
22	सराईटोला	मुडगांव	173/5	0.609	मानसिंह	मनियार	गोंड
23	सराईटोला	मुडगांव	10/1	0.346	सोहित	भोगसिंह	गोंड
24	सराईटोला	मुडगांव	168	0.405	जनरनाथ	बमारसिंह	मांडी
25	सराईटोला	मुडगांव	10/1	1.174	जहाजराम	साहेगराम	उरांव
26	सराईटोला	मुडगांव	23/2	1.011	शनिरो	शनीराम	मांडी
27	सराईटोला	मुडगांव	103	0.125	मोहन सिंह	भोगसिंह	गोंड
28	सराईटोला	मुडगांव	205, 173/5	1.202	प्रेमसागर	बोधन	मांडी
29	सराईटोला	सराईटोला	10/1	0.310	विद्याधर	धरमसिंह	कंवर
30	सराईटोला	सराईटोला	18/1	0.194	लक्ष्मी प्रसाद	लछन	कंवर
31	सराईटोला	सराईटोला	18/1	0.360	गणेशराम	भागीरथी	कंवर
32	सराईटोला	सराईटोला	10/1	0.162	आशाराम	इन्दर सिंह	कंवर
33	सराईटोला	सराईटोला	133/1	0.324	हिराबाई	बंशीधर	कंवर
34	सारसमाल	सारसमाल	39/१ख	0.702	अजीत सिंह	डाकरी	कंवर
35	सारसमाल	सारसमाल	39/१ख	0.202	घसिया	धुराई	कंवर
36	लिवरा	लिवरा	10	0.229	बाबूलाल	सुन्दराम	कंवर
37	लिवरा	लिवरा	139	0.081	जनकराम	पालुराम	कंवर
38	लिवरा	लिवरा	191/6	0.121	शयमती	पनिकराम	कंवर
39	लिवरा	लिवरा	245	0.405	जुझारसिंह	पी न्साय	गोंड



सहस्रीलदास
नमनार

प्रति
 श्रीमान् तहसीलदार महोदय
 तमनार

विषय:- महाराष्ट्र स्टेट पावर जनरेशन कम्पनी के पक्ष में आर्बिट्रल कोल एकाडि गारे चेलमा सेक्टर-2 में आने वाली राजस्व वन भूमि 115.134 हे. बी वन सरसभ अधिनियम 1980 के अन्तर्गत प्रत्यावर्तन प्रस्ताव हेतु अनापत्ति प्रमाण पत्र हेतु आंच प्रतिवेदन प्राप्त करने का कार्य।

महोदय,

उपर्युक्त विषयान्तर्गत के लक्ष्य में ग्राम कुंजेपुरा प.ह.नं. 12 व.नि.प्र. तमनार तहसील तमनार जिला रायगढ़ में महाराष्ट्र पावर जनरेशन कम्पनी के पक्ष आर्बिट्रल कोल एकाडि गारे चेलमा सेक्टर-2 के अन्तर्गत तमनार तहसील के ग्राम कुंजेपुरा में आने वाली राजस्व वन भूमि व वन संरक्षण अधिनियम 1980 के अन्तर्गत प्रत्यावर्तन के लक्ष्य में राजस्व वन भूमि। येरे गड वडे गड वड की भूमि का अनापत्ति प्रमाण पत्र प्रदत्त किये जाने के लक्ष्य में आंच रिपोर्ट माहौल गण है।

उक्त संवंध में ग्राम कुंजेपुरा प.ह.नं. 12 व.नि.प्र. तमनार तहसील तमनार जिला रायगढ़ के राजस्व अभिलेख एवं वन अधिकार प्रदाय की व प्रकृतिक विज्ञान गण अनापत्ति में ग्राम कुंजेपुरा में स्थित ख.नं. 71 क्षेत्रका 0.113 हे.भूमि वाबुलाल वि. मिचवा डायंक, ख.नं. 110 से रकबा 0.101 हे.भूमि जयकुमार वि. मंगलराम डायंक ख.नं. 84/25 से रकबा 0.080 हे.भूमि इ.बील वि. मंगलराम डायंक 0.040 हे.भूमि चेंतराज वि. कुलथु डायंक, ख.नं. 84/25 से रकबा 0.030 हे.भूमि सुनडू वड कुलथु डायंक ख.नं. 486/1 से रकबा 0.809 हे.भूमि मिलन सिंह वि. मंदिंदर गोड ख.नं. 490/1 से रकबा 0.202 हे.भूमि स्वगेडवट वि. स्वगेडवट के सरत पट्टा गावे कियत है।

क्र.	ख.नं.	रकबा	वन अधिकार परेदायी व नाम/पिता वनांक	जाति	ग्रामबंधन
(1)	71	0.113	वाबुलाल/ मिचवा	डायंक	कुंजेपुरा
(2)	110	0.101	जयकुमार/ मंगलराम	डायंक	—
(3)	84/25	0.080	इ.बील/ मंगलराम	डायंक	—
(4)	84/25	0.040	चेंतराज/ कुलथु	डायंक	—
(5)	84/25	0.030	मालिकराम/ वंधन	डायंक	—
(6)	84/25	0.030	सुनडू/ कुलथु	डायंक	—
(7)	486/1	0.809	मिलन सिंह/ मंदिंदर	गोड	—
(8)	490/1	0.202	स्वगेडवट/ स्वगेडवट	डायंक	—

अतः प्रतिवेदन उपर्युक्त अधिकायी हेतु जारी प्रस्तुत है।



सा.स.स.
 प्र.स.स.
 पट्टावर्तन
 संतोष कुमार साहू
 12/11/2019

जाति

श्रीमान तंत्रशास्त्र महोदय
लमनार

विषय - महाराष्ट्र स्टेट पावर जनरेशन कंपनी के पत्र में एम्बेटिल डोल व लॉड गारे पेलमा सेक्टर-2 में छाने वाली राजस्व वन भूमि 115.134 हे.अ. व वन संरक्षण अधिनियम 1980 के अन्तर्गत प्रत्यावर्तन प्रस्ताव हेतु दानापति प्रमाण पत्र हेतु जांच रिपोर्ट प्रस्तुत करने बाबत

महोदय

विषयान्तर्गत लेखा है कि महाराष्ट्र पावर जनरेशन कंपनी के पत्र में एम्बेटिल डोल व लॉड गारे पेलमा सेक्टर-2 पर्यावरण लक्ष्य लमनार में स्थित ग्राम भालूमुडा, रौद्रोपाली एवं दौलनारा लक्ष्य लमनार में छाने वाली राजस्व वन भूमि या वन संरक्षण अधिनियम 1980 के अन्तर्गत प्रत्यावर्तन के संबंध में राजस्व वन भूमि/बड़े/बोटे आदि मद की भूमि या दानापति प्रमाण पत्र लदा कि जाते के संबंध में आपसे आयालय से जांच अतिवेदन प्राप्त हुआ था।

उक्त संबंध में ग्राम भालूमुडा, रौद्रोपाली तथा दौलनारा के राजस्व अभिलेख एवं वन अधिदार लदाय फीजी या डावलौउन दिया गया। डावलौउन में ग्राम भालूमुडा में स्थित भूमि रज.नं. 1537/5 सै रकबा 0.405 हे. रत्नुराम फि. दयाराम कुंवर तथा ग्राम रौद्रोपाली में निरंठ एवं ग्राम दौलनारा में रत्नुराम भूमि रज.नं. 8/ सै रकबा 0.607 हे. बंथो क. परपाटी कुंवर या पहा वन अधिदार आधिमिषम के लक्ष्य बहा करी दिया गया है।

क्र. नं.	रकबा	भूमि अधिकार प्रदेहारी व नाम	जाति	ग्राम का नाम
1.	155/5 सै 0.405	रत्नुराम फि. दयाराम	कुंवर	भालूमुडा
2.	निरंठ	निरंठ	-	रौद्रोपाली
3.	3/ सै 0.607	रत्नुराम फि. परपाटी	कुंवर	दौलनारा



आपसे अतिवेदन सादर प्रस्तुत है

श्रीमान तंत्रशास्त्र महोदय
लमनार

प्रति,

श्रीमान महेशीवदास
महेशीव - तपनार

विषय:- महाराष्ट्र स्टेट पावर जनरेशन कंपनी के पक्ष में प्रीबंदिन कोल ब्लाक चारे पेलम सेक्टर-2 में आने वाली राजस्व वन सूचि 115.134 ए० को वन संरक्षण अधिनियम 1980 के अन्तर्गत प्रस्तावित प्रस्ताव हेतु अनापत्ति प्रमाण पत्र हेतु आंच प्रोटेक्ट करने कायें।

दर्शन:- क्रमांक 1014/आ.स.1/2019 तपनार दिनांक 7/11/2019

महेश्वर,

उपरोक्त विषय-संबंध आपके आदेश के परिपालन में महाराष्ट्र स्टेट पावर जनरेशन कंपनी के पक्ष में आंचंदिनकोल ब्लाक चारे पेलम सेक्टर-2 में आने वाली राजस्व वन सूचि कोटे भांड के गंजल/बड़ेभांड के गंजल गड में समाविष्ट ग्रामी में अंचत सूचिका आंच किया गया। जिसकी सूची अचक से संलग्न है।

अतः श्रीमान की आंच अनिवार्य अनुष्ठान है।

श्री आर. सिद्ध
प.सं.- 13/15
म. - तपनार



प्रति

श्री मान तहशीलदार
तहशील - तपनार

विषय:- महाराष्ट्र स्टेट पावर जनरेशन कंपनी के पक्ष में आवंटित कोल ब्लॉक चारे पेलाम ब्लॉक-2 में आने वाली रागस वन सुवि 115.13.4 हे० की वन वंशुण नवधिनियम 1980 के अन्तर्गत प्रचारित प्रस्ताव हेतु अनापत्ति पत्र हेतु आंश प्रोटे करतु करमे बाधत।

संदर्भ:- आंक 1014/आर-1/2019 तपनार दिने 7/11/2019

महाराष्ट्र
उपरोक्त विषया-तर्जद आपके आदेश के परिपालन में महाराष्ट्र स्टेट पावर जनरेशन कंपनी के पक्ष में आवंटित कोल ब्लॉक चारे पेलाम ब्लॉक-2 में आने वाली रागस वन सुवि छोटे भाड के गंगल/ बडे भांड के गंगल गड में प्रचारित ग्रामी में स्थित सुवि का आंश दिथा गया। जिसकी सूची एथक को संलग्न है।

अतः श्री मान की ओर अनिवेदन उपरतुत है।

11/11/19
श्री. सार सिद्ध
प.ह.न. 13/15
तपनार



क्रमांक	ग्राम का नाम	प. ह. न.	ख. न.	रकबा	वन अधिकारी/पट्टेदार का नाम	पिता का नाम
1	2	3	4	5	6	7
1	पाता	13	628/1 ✓	1.214	प्रभासिह	दुपाराम उराव
2	भुजागाव	14	4/1 ✓	0.607	गोकुलमहाद	बनाराम गेड
			4/1 ✓	0.101	बुडुसम	सुनाराम उराव
			49/1	0.485	करमसिह	बोकाराम गेड
			173/6 ✓	0.101	बाबुलाल	बाबुलाल उराव
			173/5	0.405	लालसाधु	मनिसाह गेड
			49/1	1.103	रुठ्ठालाल	गोकुलमहाद गेड
			173/5 ✓	0.405	मन्नीराम	मनिसाह गेड
			205 ✓	0.910	कोपस	भंगल भोन्डी
			49 ✓	0.364	हरीराम	कोसी गेड
			173/5 ✓	0.809	बाबुराम	मनिसाह गेड
			✓ 173/5	0.809	मानसिह	मनिसाह गेड
			10/1 ✓	0.346	सोसिह	मोगसिह गेड
			168	0.405	जगदनाथ	प्रभासिह भाकी
			10/1	1.174	जगजराज	बाहेरराम उराव
			23/2	1.011	शरिफ	शहीराम भोन्डी
			103	0.125	मोहनसिह	मोगसिह गेड
			205]	1.202	प्रेमसागर	कोपस भाकी
			173/5]			
	साईदोली	13	10/1	0.310	विदयाधर	धरमसिह कुंवर
			18/1	0.194	लक्ष्मीमहाद	लक्ष्मी कुंवर
			18/1	0.360	जोगेशराम	मन्नीराम कुंवर
			10/1	0.182	अनाराम	उदरसिह कुंवर
			133/1	0.324	वीरबाई	के.पी.सिंह कुंवर
	गाडे	15			निरक	

१



श्री. आर. सिद्धा 11/11/019
 प.ह.न. 13
 तह. - तयनन

पति

14

श्रीमान तहसीलदार महोदय
तमनार

विषय:- महाराष्ट्र स्टेट पावर जनरेशन कर्पोरेशन के प्लान में आबंटील कोलकांडा जारे पेलमा सेक्टर-2 में आगे वाली राजख वन 2002 के अन्तर्गत प्रयावर्तन पटलान हेतु को वन संरक्षण अधिनियम 1980 के अन्तर्गत प्रयावर्तन पटलान हेतु अगपसी प्रमाण पत्र हेतु जाना रिपोर्ट पटलान करने का वन पत्रिका संदर्भ क्रमांक 1014/आर-1/2019 तमनार दिनांक 7.11.2019 संदर्भित पत्र के माध्यम से महाराष्ट्र पावर जनरेशन कर्पोरेशन के प्लान में आबंटील कोलकांडा जारे पेलमा सेक्टर 02 पर्यावरण तहसील तमनार में स्थित ग्राम शिवावरल, लिखरा - टील्लोरामपुर सारसभाल तहसील तमनार में आने वाली राजख धरति का वन संरक्षण अधिनियम 1980 के अन्तर्गत प्रयावर्तन के संबंध से राजख वन 2002/ छोटे बड़े झाड़ मरुती 20 मि का अगपसी प्रमाण पत्र प्रदाय किये जाने के संबंध में।
सूची निचे लिखे इस प्रकार है।

क्र	ग्राम का नाम	प.ह. नं.	ख.न	इ.कुवा	वन अधिकार पहेली का नाम	विना अनाम	क्ष.
1	2	3	4	5	6	7	8
1	सारसभाल	20	39/1अ	0.202	अर्जुन सिंह	जे.डी. कुंवर	
2	—	—	39/1अ	0.202	काशिका	धुमई कुंवर	
3	लिखरा	20	10	0.229	बालू लाल	बुंदेराम कुंवर	
4	—	—	139	0.081	पानडराम	पानडराम कुंवर	
5	—	—	191/5	0.121	श्यामवती पति	पानडराम कुंवर	
6	—	—	245	0.405	धुमई सिंह	पील लाल गोंड	
7	टी ल्लोरामपुर	20	—	—	—	—	
8	शिवावरल	20	—	—	—	—	

उपरोक्त वन अधिकार निचराहीने स्थल जांच किया गया।

प्रतिवेशम अधिनियम कार्रवाई हेतु प्रेषित।



(Signature)
11.11.2019
20126

मुख्यालय पं. ०२ आ. वि. मं. व तह. लमनार जिला रायगड (छ.गं.)

प्रति,

श्रीमान लहरीलाल साहव
लहरीलाल लमनार जिला रायगड (छ.गं.)

विषय - महाराष्ट्र स्टेट पावर जनरेशन कंपनी के पक्ष में आंबंलित कोल ब्लॉक गारे पैलमा सेक्टर - २ में आने वाली राजस्व वन अधि 115.134 हे. को वन संरक्षण अधिनियम 1980 के अंतर्गत प्रत्यावर्तन प्रस्ताव हेतु अनापत्ति प्रमाण पत्र हेतु जांच रिपोर्ट प्रस्तुत करने का कार.

संदर्भ - अं. वि. प्र. (य) धरघोडा का पत्र क्रमांक 1176/ वन अधि. / 2019 धरघोडा दिनांक 05 नवम्बर 2019

विषयान्तर्गत कोल ब्लॉक डि. संदर्भित पत्र में महाराष्ट्र पावर जनरेशन कंपनी के पक्ष में आंबंलित कोल ब्लॉक गारे पैलमा सेक्टर - 2 पर्यावरण लहरीलाल लमनार में स्थित भूमि ग्राह. चितवाही डोलेसरा में स्थित प्रभावित होने वाले राजस्व वन भूमि / ब्लॉक को संरक्षण मं. को भूमि निरंकु है।

अतः श्रीमान डि. ओर उचित कार्यवाही हेतु सादर अनुरोध प्रस्तुत है।



Raj
11/11/2019
मौजराग राठिया
प.स. नं 02
तह. लमनार

अनुभाग स्तरीय वन अधिकार सगिति घरघोडा जिला रायगढ़

// बैठक की कार्यवाही विवरण //

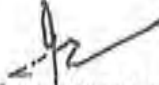
अनुसूचित जनजाति एवं अन्य परम्परागत वन निवासी (वन अधिकारों की मान्यता) अधिनियम 2006-07 तथा संशोधित नियम 2012 के तहत ग्राम - ग्राम लिबरा, कुंजेपुरा, पाता, गारे, डोलनारा, सारसमल, सराईटोला, मुड़ागोव, झिकाबहाल, भालूमुड़ा, रोडोपाली रायगढ़ क्षेत्र के रायगढ़ वन गंडणल के अंतर्गत आने वाले आरक्षित संरक्षित एवं राजस्व वन भूमि का कुल रकबा 214.869 हे० जहसील तमनार के अन्तर्गत मेसर्स महाराष्ट्र स्टेट पॉवर जनरेशन कंपनी लिमिटेड के पक्ष में आवंटित कोल ब्लॉक गारे पेलमा सेक्टर-2 में आने वाले ग्राम लिबरा, कुंजेपुरा, पाता, गारे, डोलनारा, सारसमल, सराईटोला, मुड़ागोव, झिकाबहाल, भालूमुड़ा, रोडोपाली का कुल रकबा 214.869 हेक्टेयर सन्दर्भ वन भूमि रकबा 115.124 हे० एवं संरक्षित वन भूमि रकबा 99.735 हेक्टेयर भूमि है। इस व्यपवर्तन के परिपेक्ष में अनुसूचित जनजाति एवं अन्य परम्परागत वन निवासी (वन अधिकार मान्यता) अधिनियम 2006 नियम 2007 तथा संशोधित नियम 2012 के नियम एवं प्रावधानों पर वना की गई जो राजस्व वन भूमि एवं संरक्षित वन भूमि ग्राम लिबरा, कुंजेपुरा, पाता, गारे, डोलनारा, सारसमल, सराईटोला, मुड़ागोव, झिकाबहाल, भालूमुड़ा, रोडोपाली का व्यपवर्तन के लिए प्रस्तावित है, में निम्नानुसार हितग्राहियों को वन अधिकार पत्र प्रदाय किया गया है:-


क्रमांक	तहसील का नाम	ग्राम	वन अधिकार मान्यता पत्र धारक का नाम	खसरा नंबर	रकबा (हे०मी०)
1	2	3	4	5	6
1	तमनार	लिबरा	निरंक	निरंक	निरंक
2	तमनार	कुंजेपुरा	निरंक	निरंक	निरंक
3	तमनार	पाता	प्रेमसिंह पिता उपाराम	628/1	1.214 हे.
4	तमनार	गारे	निरंक	निरंक	निरंक
5	तमनार	डोलनारा	निरंक	निरंक	निरंक
6	तमनार	सारसमल	निरंक	निरंक	निरंक
7	तमनार	सराईटोला	1. लक्ष्मीप्रसाद पिता लछन कंवर 2. गणेशराम पिता भागीरथी कंवर 3. आशाराम पिता इंदरसिंह कंवर 4. बुधराम पिता धनसिंह अगरिया 5. हीराबाई पति बंशीधर कंवर 6. विद्याधर पिता धरमसिंह कंवर	18/1 18/1 10/1 10/1क 133/1 10/1	0.194 0.360 0.162 0.453 0.324 0.310
8	तमनार	मुड़ागोव	1. भदेशराम पिता बोधराग गोंड 2. प्रेमसागर पिता बोधन मांझी 3. मोहनसिंह पिता भोगसिंह गोंड 4. हरीराम पिता बोरी गोंड 5. घांसीराम पिता मनिहार गोंड 6. मानसिंह पिता मनिहार गोंड 7. जगन्नाथ पिता चमारसिंह मांझी	103 73/5 103 49 173/5 173/5 168	0.202 0.202 0.125 0.364 0.809 0.809 0.405
9	तमनार	झिकाबहाल	निरंक	निरंक	निरंक
10	तमनार	भालूमुड़ा	रत्थूराम पिता दयाराम कंवर	155/5	0.405
11	तमनार	रोडोपाली	निरंक	निरंक	निरंक



प्रस्तावित वन भूमि/राजराज भूमि पर विचार करने हेतु आज दिनांक 15.11.19 को अनुविभाग स्तरीय वन अधिकार समिति की बैठक आयोजित की गई जिसमें परीक्षण उपरान्त यह पाया गया कि प्रस्तावित भूमि में वन अधिकार अधिनियम के तहत उपरोक्तानुसार लोगों को वन अधिकार पत्र वितरण किया गया है।


अतः उपरोक्तानुसार उपरोक्त स्तरीय वनअधिकार समिति घरघोडा द्वारा अनापत्त प्रमाण पत्र द्वारा सर्वसम्मति से प्रस्ताव पारित किया जा कर अनावृत्ति प्रमाण पत्र जारी किया गया।



अनुविभाग अधिकारी (वा.)
अध्यक्ष अनुविभाग स्तरीय
वन अधिकार समिति घरघोडा (रायगढ़)


अनुविभागीय अधिकारी (वन)
सदस्य अनुविभाग स्तरीय
वन अधिकार समिति घरघोडा (रायगढ़)


श्रीमती नुमावती किरा
अध्यक्ष ज.पं. घरघोडा
सदस्य अनुविभाग स्तरीय
वन अधिकार समिति घरघोडा (रायगढ़)


श्री जयराम राठिया
सदस्य ज.पं. तमनार
सदस्य अनुविभाग स्तरीय
वन अधिकार समिति घरघोडा (रायगढ़)


ज०पं० घरघोडा
सदस्य अनुविभाग स्तरीय
वन समिति घरघोडा (रायगढ़)


ज०पं० तमनार
सदस्य अनुविभाग स्तरीय
वन समिति घरघोडा (रायगढ़)



Annexure-XIV-A

कार्यालय अनुविभागीय अधिकारी (रा0) घरघोड़ा जिला रायगढ़ (छ0ग0)

क्रमांक क/वाचक-1/2020

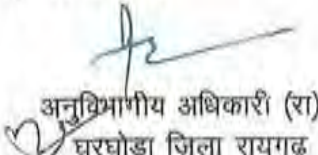
घरघोड़ा दिनांक 6 मार्च, 2020

प्रति,

मे0महाराष्ट्र स्टेट पावर जनरेशन कंपनी लिमिटेड
रायगढ़

विषय- मे0 मे0महाराष्ट्र स्टेट पावर जनरेशन कंपनी लिमिटेड द्वारा गारे-पेलमा सेक्टर-2 कोल
ब्लाक के भू-प्रभावितों के लिये तैयार की गई पुनर्वास एवं पुनर्व्यवस्थापन योजना एवं
पात्रता की रूपरेखा के अनुमोदन बाबत।

उपरोक्त विषयान्तर्गत कलेक्टर (खनिज शाखा) रायगढ़ का पत्र क्रमांक 2684/ख0लि0-1/
2020 दिनांक 19.02.2020 एवं आयुक्त महोदय, बिलासपुर संभाग बिलासपुर का पत्र क्रमांक 365/
राजस्व शाखा/2020 दिनांक 04.02.2020 की प्रति संलग्न कर भेजा जा रहा है।
2- उपर्युक्त पत्रों में दिये गये निर्देशानुसार कार्यवाही किया जाना सुनिश्चित करें।


अनुविभागीय अधिकारी (रा0)
घरघोड़ा जिला रायगढ़





कार्यालय आयुक्त विलासपुर संभाग, विलासपुर (छ.वा.)

//ज्ञापन//

क्रमांक 365 / राजस्व शाखा / 2020
प्रति,

विलासपुर, दिनांक 04/02/2020

कलेक्टर,
जिला-रायगढ़ (छ0ग0)

विषय :- मेसर्स महाराष्ट्र स्टेट पॉवर जनरेशन कंपनी लिमिटेड द्वारा गारे पेलमा सेक्टर-2 कोल ब्लॉक के भू-प्राप्तियों के लिये तैयार की गई पुनर्वास एवं पुनर्व्यवस्थापन योजना एवं पात्रता की रूपरेखा के अनुमोदन वावत् ।

संदर्भ :- आपका कार्यालयीन पत्र क्रमांक 2497/ख.लि.-1/2020, रायगढ़, दिनांक 22.01.2020 ।

—00—

विषयांतर्गत मेसर्स महाराष्ट्र स्टेट पॉवर जनरेशन कंपनी लिमिटेड द्वारा गारे पेलमा सेक्टर-2 कोल ब्लॉक कुल रकबा 2583.487 हे. क्षेत्रफल खनिज कोयला का स्वीकृत खनिज पददा क्षेत्र में ग्रामों को छ.ग. भू राजस्व संहिता में वर्णित प्रावधानों के तहत अधिग्रहण किये जाने पर कोयला परियोजना से प्रभावित भू स्वामियों को एवं प्रभावित सभी कुटुम्ब पुनर्वास का लाभ दिये जाने हेतु भूमि अर्जन पुनर्वासन और पुनर्व्यवस्थापन में उचित प्रतिकर और पारदर्शिता का अधिकार अधिनियम 2013 के अंतर्गत प्रस्तावित पुनर्वास कार्य योजना का अनुमोदन निम्नानुसार शर्तों के अधीन किया जाता है :-

1. कलेक्टर, रायगढ़ द्वारा मुआवजा का निर्धारण पुनर्वासन और पुनर्व्यवस्थापन में उचित प्रतिकर और पारदर्शिता का अधिकार अधिनियम 2013 के प्रावधानों एवं राज्य शासन के द्वारा समय समय पर दिये निर्देशों के तहत किया जायेगा ।
2. प्रभावित कृषक की भूमि, भू-अर्जन के बाद स्थल में कम बचती है जिसमें कृषि कार्य संभव नहीं है उस भूमि का भी अधिग्रहण किया जायेगा ।
3. पर्यावरण संतुलन को बनाये रखने के लिये वृक्षारोपण किया जायेगा ।
4. अवैध अतिक्रमणकारियों के लिये पुनर्वास:- उन अतिक्रमणकारियों को राजस्व वन अथवा राजस्व भूमि के अलावा शासकीय भूमि/आवादी भूमि पर काबिज हो पुनर्वासार्ह के लिये पात्रता की शर्त छत्तीसगढ़ शासन के दिशा निर्देशों के अनुसार तय किया जायेगा ।
5. पुनर्वास पैकेज एवं प्रतिकर का पूर्ण भुगतान किया जाना सुनिश्चित किया जाये ।

Amir



Scanned with
CamScanner

6. मेसर्स महाराष्ट्र स्टेट पॉवर जनरेशन कंपनी लिमिटेड द्वारा गारे पेलमा सेक्टर-2 कोल ब्लॉक द्वारा कोयला उत्खनन के लिये निजी भूमि सारंगरा राईट के तहत आवेदित भूमि से प्रभावित परिवारों के लिये प्रति 2 एकड़ का एक सदस्य को नौकरी/रोजगार परियोजना के अंतर्गत अवसर दिया जायेगा तथा प्रभावित कुटुंब के लिये नौकरी/रोजगार का प्रावधान रखा जायेगा। (Descending order अनुपालन किया जायेगा)
7. क. जिन विस्थापितों को परियोजना में नियमित रोजगार दिया जाना संभव न हो तो उन्हें मुआवजा के अतिरिक्त प्रति प्रभावित कुटुंब पांच लाख रुपये का एक ही चार में संदाय किया जाये या
- ख. प्रतिवर्ष 20,000/- रुपये प्रति एकड़ आगामी बीस वर्ष वार्षिकी दी जावे। इसमें प्रति दो वर्ष में 500/- रु. प्रति एकड़ वृद्धि की जावे।
8. प्रभावित कुटुंबों को रोजगार सुनिश्चित करने की दृष्टि से आजीविका ट्रेड में प्रशिक्षण व्यवस्था कर उन्हें प्रत्यक्ष/अप्रत्यक्ष रूप से रोजगार/जीविका उपलब्ध कराना सुनिश्चित किया जायेगा तथा समय समय पर रोजगार के जो भी अवसर उपलब्ध होंगे उनमें यथासंभव भूमि विस्थापितों को रोजगार का अवसर प्राथमिकता से दिया जायेगा।
9. कलेक्टर रायगढ़ भू अर्जन का पर्यवेक्षण करेंगे एवं प्रत्येक तीन माह में अपना प्रगति प्रतिवेदन राज्य शासन को एवं इस कार्यालय को भेजना सुनिश्चित करेंगे।
10. प्रभावित कुटुंबों को रोजगार सुनिश्चित करने की दृष्टि से आजीविका ट्रेड में प्रशिक्षण व्यवस्था मेसर्स महाराष्ट्र स्टेट पॉवर जनरेशन कंपनी लिमिटेड द्वारा गारे पेलमा सेक्टर-2 कोल ब्लॉक द्वारा किया जायेगा। पश्चात् सफल प्रशिक्षणार्थियों को प्राथमिकता से प्रत्यक्ष/अप्रत्यक्ष रूप से स्वरोजगार/जीविका उपलब्ध कराने की व्यवस्था करेगा।
11. प्रभावित क्षेत्र नि:शक्तजनों के लिये आजीविका प्रशिक्षण एवं स्वरोजगार हेतु मेसर्स महाराष्ट्र स्टेट पॉवर जनरेशन कंपनी लिमिटेड द्वारा गारे पेलमा सेक्टर-2 कोल ब्लॉक को विशेष प्रयास करना होगा।
12. अधिग्रहित भूमि में वृक्ष लगे हों तो उसका आंकलन राजस्व वन विभाग के अधिकारियों द्वारा निर्धारित की गई मूल्य अनुसार मुआवजा राशि का वितरण किया जायेगा।

संलग्न :- उपरोक्तानुसार (मूल प्रकरण/प्रस्ताव)



28.01.20
 अधिकृत
 विलासपुर संगम विलासपुर

पुनर्वास एवं पुनर्स्थापन योजना
एवं पात्रता रूपरेखा

गारे पालमा सेक्टर - II कोल ब्लॉक
तहसील तमनार, जिला रायगढ़, छत्तीसगढ़
जनवरी-2019



महाराष्ट्र स्टेट पावर जनरेशन कंपनी लिमिटेड
(MSPGCL)

अनुमोदित
28.01.20
बिलासपुर संभाग बिलासपुर (छ.ग.)
4/2/2020



Seen & verified
Executive Engineer (Civil)
M.S.P.G.C.L., Nagpur

अनुक्रमणिका

क्रमांक	पुनर्वास योजना के विवरण विन्दुओं की सूची	पृष्ठ क्रमांक
1	पृष्ठ भूमि	2
2	परियोजना क्षेत्र का रेखांकन और उसके प्रभाव का विवरण	3-4
3	परिभाषाएं	5-6
4	सामाजिक आर्थिक सर्वेक्षण	7-18
5	व्यापक पुनर्वास एवं पुनर्व्यस्थापन एवं पात्रता रूपरेखा	19-24
6	प्रस्तावित सीएसआर गतिविधियां	25-26
7	परिशिष्ट – I Vesting Order की प्रति मय संशोधन पत्र परिशिष्ट – II Forest Clearance हेतु आन लाईन आवेदन की प्रतिलिपि परिशिष्ट – III Environmental Clearance स्वीकृति हेतु जारी ToR की प्रतिलिपि एवं सहपत्र परिशिष्ट – IV Previous Approval for Mining lease परिशिष्ट – V भू-सतही अधिकार प्राप्त करने हेतु प्रस्तावित भूमि का नक्शा। परिशिष्ट – VI अधिग्रहण की जाने वाली भूमि की ग्रामवार सूची। परिशिष्ट – VII आर्थिक समाजिक सर्वेक्षण एवं अधिग्रहण से प्रभावित/विस्थापितों की विस्तृत जानकारी।	



पुनर्वास एवं पुनर्स्थापन योजना एवं पात्रता रूपरेखा

गारे पालमा सेक्टर – II कोल ब्लॉक
तहसील तमनार, जिला रायगढ़, छत्तीसगढ़
जनवरी-2019



महाराष्ट्र स्टेट पावर जनरेशन कंपनी लिमिटेड
(MSPGCL)



Seen & verified
Executive Engineer (Civil)
M.S.P.G.C.L., Nagpur

पुनर्वासि एवं पुनर्स्थापन एवं पात्रता रूपरेखा
गारे पेलमा सेक्टर-II कोल ब्लॉक
तहसील-तमनार, जिला रायगढ़, छत्तीसगढ़



1 प्रस्तावना

1.1 पृष्ठभूमि

महाराष्ट्र स्टेट पावर जनरेशन कंपनी लिमिटेड (आगे इसे महाजेनको के रूप में संदर्भित किया गया है) महाराष्ट्र सरकार की राज्य के स्वामित्व वाली सार्वजनिक क्षेत्र की इकाई है जो कि बिजली उत्पादन में संलग्न है जिसका पंजीकृत कार्यालय प्लाट नं अनंत कनेकर मार्ग बांद्रा (पूर्व), मुंबई में स्थित है। महाराष्ट्र सरकार के निर्णय के अनुसार, महाराष्ट्र राज्य विद्युत उत्पादन कंपनी को भारतीय कंपनी अधिनियम 1956 के तहत शामिल किया गया है जिसमें भूतपूर्व, 'महाराष्ट्र राज्य विद्युत बोर्ड' (आगे इसे "एमएसईवी" के रूप में संदर्भित किया गया है) को पुनर्गठित किया गया है।

एमएसईवी का उक्त पुनर्गठन, विद्युत अधिनियम 2003 की धारा 131 के साथ महाराष्ट्र सरकार द्वारा भाग XIII के लिए किया गया है। महाजेनको को दिनांक 31.5.2005 के दिन रजिस्ट्रार ऑफ कंपनीज, महाराष्ट्र, मुंबई में शामिल किया गया है और महाजेनको ने दिनांक 15.09.2005 को व्यवसाय का प्रमाण पत्र प्राप्त किया है। महाजेनको बिजली के उत्पादन और आपूर्ति के व्यवसाय में संलग्न है और इसे जनरेशन असेट्स, इंटररेस्ट इन प्रोपर्टी, एमएसईवी के अधिकार और दायित्व के साथ शामिल किया गया है।

भारत के सभी राजकीय बिजली उत्पादन यूटिलिटीज की तुलना में महाजेनको के पास अधिकतम कुल उत्पादन क्षमता है और उच्चतम थर्मल इन्स्टाल्ड कैपेसिटी है। क्षमता के संस्थापन के संदर्भ में देखा जाए तो, एनटीपीसी के बाद यह दूसरी सबसे अधिक बिजली उत्पादन की कंपनी है। कंपनी की कुल उत्पादन क्षमता 13606 मेगावाट है, जिसमें थर्मल पावर प्लांट से 10170 मेगावाट, हाइडल पावर प्लांट से 2580 मेगावाट, गैस टर्बाइन से 672 मेगावाट और सौर उर्जा से 184 मेगावाट शामिल हैं।

तालिका 1 : महाजेनकोसंयंत्रों की स्थापित क्षमता

क्र. सं.	पावर स्टेशन	इकाइयां एवं आकार (मेगावाट)	स्थापित क्षमता (मेगावाट)
A. थर्मल पावर स्टेशन			
1	कोराडा इकाइयां 6 से 10	2 x 210 + 3 x 660	2400
2	नासिक इकाइयां 3 से 5	3x210	630
3	भूसावल इकाइयां 3 से 5	1x210 + 2x500	1210
4	पारस इकाइयां 3 और 4	2x250	500
5	पर्ली इकाइयां 4 से 8	2x210+ 3x250	1170
6	खापरखेडा इकाइयां 1 से 5	4x210 + 1x500	1340
7	चंद्रापुर इकाइयां 3 से 9	2x210 + 5x500	2920
टीपीपी की कुल स्थापित क्षमता			10170
B. गैस टरबाइन पावर स्टेशन			
	युरन गैस टरबाइन	4x108	432
	इकाइयां 1 और 2	2x120	240
गैस आधारित संयंत्रों की कुल स्थापित क्षमता			672
C. हाइड्रो पावर स्टेशन			
	कोयना हाइड्रो	St I&II- 4x70 + 4x80, St III- 4x80, St. IV-4x250 & Koyna Dam Foot- 2x18	1956



Seen & verified

(Signature)

Executive Engineer (Civil)
M.S.P.G.C.L., Nagpur

पुनर्वास एवं पुनर्स्थापन एवं पात्रता रूपरेखा
गारे पेलमा सेक्टर-II कोल ब्लॉक
तहसील-तमनार, जिला रायगढ़, छत्तीसगढ़



	छोटी हाइड्रोपावर परियोजनाएं		374
	घाटघर पम्प भण्डारण	2x125	250
हाइडल संयंत्रों की कुल स्थापित क्षमता			2580
D	सौर		184
कुल स्थापित क्षमता (A+B+C+D)			13606

स्रोत: MAHAGENCO

1.2 परियोजना:

गारे पालमा सेक्टर-II कोयला ब्लॉक को महाराष्ट्र राज्य विद्युत उत्पादन कंपनी लिमिटेड (महाजेनको) को भारत सरकार के कोयला मंत्रालय द्वारा महाराष्ट्र स्थित अपने संयंत्र में अंतिम उपयोग के लिए आवंटित किया गया है। 25.83 वर्ग किमी (2583.486 हक्टेयर) क्षेत्र में फैला गारे पेलमा सेक्टर-II कोयला ब्लॉक छत्तीसगढ़ राज्य के रायगढ़ जिले के तमनार तहसील में मंड रायगढ़ कोलफील्ड का अंग है। खनन पट्टे का क्षेत्र भालुमुड़ा, धितवाही, ढोलनारा, डोलेसरा, गारे, झिकाबहाल, कुंजेमुरा, लिबरा, मुडागांव, पाता, रोडोपाली, सराईटोला, सारसमल और टिहलीरामपुर के गांवों में स्थित है। खुली खदान (22.0 एमटीपीए) और भूमिगत (1.6 एमटीपीए) परिचालन दोनों के 69 वर्षों के खनन अचल जीवन के साथ, खदानों की शिखर क्षमता 23.6 एमटीपीए होगी।

यह क्षेत्र सर्वे ऑफ इण्डिया टॉपोसैट संख्या 64 एन/8 और 12 (आर, एफ. 1:50,000) में कवर किया गया है और नीचे दी गयी तालिका में दिखाए गये निर्देशांक से घिरा हुआ है।

तालिका 2 : साइट समन्वय

सीमा बिंदु	अक्षांश	देशांतर
A	22° 08' 51.495" N	83° 26' 15.580" E
B	22° 10' 05.178" N	83° 26' 15.433" E
C	22° 10' 49.891" N	83° 27' 26.624" E
D	22° 09' 09.892" N	83° 28' 57.871" E
E	22° 08' 03.774" N	83° 29' 49.271" E
F	22° 06' 24.215" N	83° 31' 12.632" E
G	22° 07' 18.066" N	83° 29' 13.857" E
H	22° 06' 50.059" N	83° 29' 15.318" E

स्रोत : EIA रिपोर्ट और GCPL

रायगढ़ - सुंदरगढ़ मार्ग गारे पेलमा सेक्टर-II साइट से दक्षिण पूर्व दिशा में 9 किमी तथा अम्बिकापुर राजमार्ग (एसएच-1) 6 किमी दूर है। जिला मुख्यालय रायगढ़ है जो साइट से लगभग 35 किमी दूर है और निकटतम शहर तमनार है जिसकी दूरी दक्षिण से करीबन 10 किमी है। निकटतम रेलवे स्टेशन रायगढ़ में भी है जबकि निकटतम हवाई अड्डा रायपुर है जोकि दक्षिण पश्चिम दिशा में 290 किमी की दूरी पर है। उड़ीसा के साथ अंतर-राज्य सीमा पूर्व से 10 किमी लगभग पूर्व की ओर ब्लॉक से सटी है। परियोजना स्थल का विवरण तालिका 3 में दिया गया है।



पुनर्वास एवं पुनर्स्थापन एवं पात्रता रूपरेखा
गारे पेलमा सेक्टर-II कोल ब्लॉक
तहसील-तमनार, जिला रायगढ़, छत्तीसगढ़



तालिका 3 : परियोजना स्थल का विवरण

क्र.सं.	अवधारणा	विवरण
1.	परियोजना	MAHAGENCO की 23.80 एमटीपीए क्षमता वाली 2,583.486 हेक्टेयर से अधिक भूमि में फैली गारे पालमा सेक्टर-II कोयला खनन परियोजना, जिला रायगढ़, छत्तीसगढ़
2.	जगह	
(i)	राज्य	छत्तीसगढ़
(ii)	जिला	रायगढ़
(iii)	तहसील	तमनार
(iv)	गांव	भालुमुडा, चितवाही, डोलनारा, डोलेसरा, गारे, झिकाबहाल, कुजेमुरा, लिबरा, मुडागाव, पाता, रोडोपाली, सराईटोला, सारसमल और टिहलीरामपुर
(vi)	अक्षांश :	22° 6' 24.215" N to 22° 10' 49.891" N
(vii)	देशांतर :	83° 26' 15.433" E to 83° 31' 12.632" E
3.	दूरी	
(i)	निकटतम नगर	तमनार, 10 किमी, दक्षिण
(ii)	जिला मुख्यालय	रायगढ़, 35 किमी, दक्षिण
(iii)	मुख्य मार्ग	रायगढ़ - अम्बिकापुर राजमार्ग (SH-1) 6 किमी, पश्चिम रायगढ़ - घरघोडा मार्ग वाया तमनार
(iv)	रेलवे स्टेशन	रायगढ़, 35 किमी, दक्षिण
(v)	हवाई अड्डा	रायपुर, 290 किमी, दक्षिण-पश्चिम

1.2 अध्ययन:

राजस्व के मामले में परियोजना के कार्यान्वयन से परियोजना क्षेत्र, राज्य और केंद्र को लाभ होगा। परियोजना प्रभावित परिवारों/विस्थापित परिवारों को परियोजना क्षेत्र के निकट या यदि आशिक रूप से प्रभावित होने पर उसी गांव में भूमि अधिग्रहण, पुनर्वास और पुनर्वास अधिनियम, 2013 (आरएफसीटीएलआरआर अधिनियम, 2013) में उचित मुआवजा और पारदर्शिता के अधिकार के प्रावधान और साथ ही आदर्श पुनर्वास नीति छत्तीसगढ़ राज्य के अनुसार पुनर्वास करने की आवश्यकता है।

इसलिए प्रभावित घरों के पुनर्स्थापना और पुनर्वास के लिए पात्रता प्राप्त घरों की उक्त अधिनियम/नीति के अनुसार विस्तृत सामाजिक-आर्थिक सर्वेक्षण की आवश्यकता है जिससे परियोजना से प्रभावित परिवारों के लिए विस्तृत पुनर्स्थापना और कार्य योजना तैयार की जा सके।

वर्तमान रिपोर्ट आर एण्ड आर योजना एवं पात्रता रूपरेखा के बारे में विस्तृत जानकारी देती है, जिसके आधार पर आर एण्ड आर लागत तैयार की गई है।

इस बारे में ग्रीनसी इण्डिया कंसल्टिंग प्राइवेट लिमिटेड, गाजियाबाद द्वारा प्रभावित गांवों में एक विस्तृत सामाजिक-आर्थिक/घरेलु सर्वेक्षण किया गया है।



1.3 परिभाषायें

परियोजना प्रभावित परिवारों के लिए आर एण्ड आर योजना तैयार करने के लिए भूमि अधिग्रहण, पुनर्वास और पुनर्वास अधिनियम, 2013 (आरएफसीटीएलआरआर अधिनियम, 2013) में उचित मुआवजा और पारदर्शिता का अधिकार के अनुसार सम्बंधित परिभाषाएं नीचे दी गई हैं।

प्रभावित क्षेत्र: ऐसे क्षेत्र जिन्हें भूमि अधिग्रहण के उद्देश्य के लिए उपयुक्त सरकार द्वारा अधिसूचित किया जाता है। इस विशेष परियोजना के लिए, या तो पूर्ण रूप से अथवा आंशिक रूप से प्रभावित गांवों की कल संख्या 14 है।

परियोजना प्रभावित परिवार (पीएएफएस): परियोजना प्रभावित परिवारों में वे लोग शामिल हैं, जो निम्नलिखित के कारण प्रभावित होते हैं:

- अधिग्रहण के कारण भूमि या अन्य अचल संपत्तियों की हानि होती है;
- वह परिवार जो किसी जमीन का मालिक नहीं है, परंतु उस परिवार के सदस्य कृषि मजदूर, जोतदार, फसलों को साझेदारी पर उगाते हैं, कारीगर हैं और 3 से अधिक वर्षों से अधिक समय से इस क्षेत्र में काम कर रहे हैं और अधिग्रहण के कारण उनकी प्राथमिक आजीविका का साधन प्रभावित होती है;
- अनुसूचित जनजाति / अन्य पारंपरिक वनवासी जिन्होंने अधिग्रहण के कारण एफआरए 2006 के अधीन अपने वन अधिकार को गंवा दिया है;
- कोई भी परिवार जिसके प्राथमिक आजीविका के साधन के समाप्त होने का खतरा होता है, जैसे कि वन उत्पाद के संग्राहक, शिकारी, मछुआरे, नावी, आदि और जो 3 वर्ष से अधिक समय से इसी क्षेत्र में आजीविका के लिए स्रोतों पर निर्भर रहे हैं; तथा
- परिवार के सदस्य जिसे राज्य और केंद्र सरकार दोनों में से किसी भी सरकारी योजना के अधीन भूमि सौंपी गयी है।

परिवार: ऐसा व्यक्ति, उसकी पत्नी, अवयरक भाई और बहन जो कि उस पर निर्भर हैं, शामिल हैं। विस्थापित परिवार के प्रत्येक व्यस्क बेटे/बेटी, जो अधिसूचना की तारीख में व्यस्क हो चुके हैं, को एक अलग परिवार माना जाएगा। एक अविवाहित बेटी जिसकी उम्र 18 वर्ष से अधिक है और एक परित्यक्त महिला/विधवा को भी अलग परिवार माना जाएगा।

पुनःस्थापन: नए स्थान पर न्यूनतम बुनियादी सुविधाएं जैसे स्वास्थ्य, शिक्षा, परिवहन, संचार, बिजली, आदि के प्रावधान के साथ भूमि के आवंटन और गृह-निर्माण में सहायता के प्रावधान को पुनःस्थापन कहा जाता है।

पुनर्वास: पर्याप्त आय का सृजन करने के लिए या तो व्यक्तिगत रूप से या सामूहिक गतिविधियों के लिए आर्थिक सहायता कार्यक्रमों के प्रावधान को पुनर्वास कहा जाता है।

परियोजना विस्थापित परिवार: कोई भी ऐसा परिवार जो भूमि अधिग्रहण के कारण प्रभावित क्षेत्र से हटाकर पुनर्वास क्षेत्र में बसाया जाना है।



पुनर्वास एंव पुनर्स्थापन एंव पात्रता रूपरेखा
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भूमि पर कब्जा करने का अर्थ है: किसी व्यक्ति द्वारा, एक मालिक, हकदार या किरायेदार या अन्यथा के रूप में रखी गई कुल भूमि।

भूमि मालिक में वह व्यक्ति शामिल है जिसका नाम सम्बन्धित प्राधिकरण के अभिलेखों में भूमि या इमारत उसके हिरसे के मालिक के रूप में दर्ज है, या कोई ऐसा व्यक्ति जिसे अनुसूचित जनजाति और अन्य पारम्परिक वन निवासी (वन अधिकार अधिनियम 2006 की मान्यता) के तहत वन अधिकार दिया गया हो या जो राज्य के किसी भी कानून के तहत जमीन पर पट्टा अधिकार दिये जाने का हकदार रखता हो या ऐसा कोई व्यक्ति जिस न्यायालय या प्राधिकरण के आदेश से मालिक घोषित किया गया हो।

सीमांत किसान से तात्पर्य एक ऐसे किसान से है जिसके पास एक हेक्टेयर तक गैर-सिंचित भूमि या आधे हेक्टेयर तक सिंचित भूमि हो।

छोटा किसान का अर्थ एक ऐसा किसान है जिसके पास दो हेक्टेयर तक गैर-सिंचित भूमि या एक हेक्टेयर तक सिंचित भूमि हो लेकिन जो सीमांत किसान से बड़ा हो।

बाजार मूल्य का अर्थ है कि जहां भूमि स्थित है वहां विक्री अभिलेख के पंजीकरण के लिए भारतीय स्टाम्प अधिनियम 1899 में निर्धारित बाजार मूल्य के अनुसार कलेक्टर द्वारा निर्धारित भूमि का मूल्य या पड़ोसी गांवों में भूमि का औसत मूल्य या निजी कम्पनियों या सार्वजनिक-निजी साझेदारी हेतु सहमति की सहमत राशि।

Seen over seal

M. S. P. G. C. L.
Executive Engineer (Civil)
M.S.P.G.C.L., Nagpur



पुनर्वास एवं पुनर्स्थापन एवं पात्रता रूपरेखा
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2. सामाजिक-आर्थिक सर्वेक्षण

सामाजिक-आर्थिक सर्वेक्षण संकेत करता है कि प्रस्तावित गारे पाल्ना सेक्टर -2 कोयला खान परियोजना के निर्माण के कारण बेदखल/विस्थापित/प्रभावित हुए लोगों को निम्नलिखित चार श्रेणियों में वर्गीकृत किया जा सकता है, जिनका संक्षिप्त विवरण नीचे दिया गया है :

- 1) भूमि अधिग्रहण के कारण घर और घर की जमीन खोने वाले परिवार;
- 2) भूमि और घर की जमीन दोनों खोने वाले परिवार;
- 3) परियोजना के अधीन केवल भूमि खोने वाले परिवार;
- 4) अपने आय के स्रोत को खोने वाला परिवार, क्योंकि वे प्रभावित परिवारों पर निर्भर हैं, वे जा आजीविका के लिए अधिग्रहित की जाने वाली भूमि पर निर्भर हैं या छत्तीसगढ़ सरकार के राजस्व विभाग द्वारा पट्टे पर दी गई भूमि पर निवास कर रहे हैं।

प्रभावित गांवों में किए गए सामाजिक-आर्थिक सर्वेक्षण के आधार पर, एक विस्तृत पुनर्वास और पुनःस्थापन योजना तैयार की गई थी, जिसमें पुनर्वास और पुनःस्थापन कार्यक्रम के कार्यान्वयन, निगरानी और मूल्यांकन के लिए कार्यों की रूप-रेखा का सुझाव दिया गया।

2.1 लक्ष्य और उद्देश्य

गांव और घर दोनों ही स्तरों पर एक सामाजिक-आर्थिक सर्वेक्षण निम्नलिखित उद्देश्यों के साथ निष्पादित किया गया है ताकि उनके अध्ययन के लिए निर्धारित लक्ष्यों को पूरा किया जा सके,

(क) प्रस्तावित कोयला ब्लॉक के अंतर्गत आने वाले घर की भूमि सहित गृह-भूमि घरों के विवरण प्राप्त करना,

(ख) प्रभावित व्यक्तियों के विभिन्न सामाजिक-आर्थिक विवरणों को प्राप्त करना जैसे जनसांख्यिकीय विवरण, घर सहित संसाधन आधार, अन्य अचल और चल संपत्ति, देनदारियों और अन्य स्रोतों द्वारा उत्पन्न आय का विवरण प्राप्त करना।

(ग) विस्थापित व्यक्तियों द्वारा सामना की जाने वाली समस्याओं - उनकी सामाजिक-आर्थिक समस्याओं सहित, उनकी उत्पादन प्रणालियों, सांस्कृतिक विरासत आदि के टूटने/नुकसान होने से सम्बंधित समस्याओं की प्रकृति का निर्धारण करना।

(घ) ऐसे प्रभावित व्यक्तियों के विस्थापन के लिए स्थान और मूलभूत सुविधाओं और बुनियादी ढांचे के निर्माण का संकेत देते हुए ऐसे विस्थापित लोगों के लिए नई कॉलोनी की स्थापना का आकलन करना और विस्तृत योजना तैयार करना, और

(ङ) पुनर्वास के लिए सरकारी भूमि की उपलब्धता, परियोजना के निष्पादन के कारण कृषि, व्यापार, औद्योगिक या सेवा क्षेत्रों या अन्य क्षेत्रों में उपलब्ध होने वाले आर्थिक अवसरों सहित परियोजना के कारण प्रभावित गांवों के संसाधनों के आधार का आकलन करना।

2.2 प्रभावित गाँवों की सूची

तमनार तहसील में अलग-अलग टोलों (पोडों) के साथ 14 गांव परियोजना के अंतर्गत आ रहे हैं। गाँवों की सूची तालिका 4 में दी गई है।



Seen & Verified
[Signature]
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पुनर्वास एवं पुनर्स्थापन एवं पात्रता रूपरेखा
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तालिका 4 : परियोजना प्रभावित गाँवों की सूची

क्र. सं.	ग्राम पंचायत	गांव	छोटा गांव	टिप्पणी
1	रोडोपाली	भालूमुडा	मांझी पारा	प्रस्तावित परियोजना द्वारा आंशिक भूमि प्रभावित/ कोई घर/ गांव विस्थापित नहीं
			कंवर पारा	
			बड़े सिदार पारा	
			राठिया बस्ती	
2	चितवाही	चितवाही	स्कूल पारा	प्रस्तावित परियोजना द्वारा आंशिकतौर पर भूमि प्रभावित/ कोई घर/ गांव विस्थापित नहीं
			चौहान पारा	
			साव पारा	
			सिदार पारा	
			सिदार पारा पूर्व	
			सिदार पारा पश्चिम	
			सिदार पारा दक्षिण चौक पारा	
3	बजरमुडा	ढोलनारा	आवास पारा	प्रस्तावित परियोजना द्वारा पूरा गांव विस्थापित, आंशिक भूमि प्रभावित
			दक्षिण पारा	
			पूर्व पारा	
			बरकीपा	
4	डोलेसेरा	डोलेसेरा	पनिका पारा पश्चिम	प्रस्तावित परियोजना द्वारा आंशिकतौर पर भूमि प्रभावित/ कोई घर/ छोटा गांव विस्थापित नहीं
			पनिका पारा पूर्व	
			चौहान पारा पूर्व	
			सतनामी पारा	
			पटेल पारा पूर्व	
			पटेल पारा पश्चिम	
			कुम्हार पारा	
			उराव पारा	
			चौहान पारा पश्चिम	
			कोलता पारा	
पैकरा पारा मध्य				
5	गारे	गारे	कलार पारा	प्रस्तावित परियोजना द्वारा पूरा गांव विस्थापित, आंशिक भूमि प्रभावित
			सिदार पारा	
			कंवर पारा	
			सडक पारा	
			अधरिया पारा पूर्व	
अधरिया पारा पूर्व				



पुनर्वास एवं पुनर्स्थापन एवं पात्रता रूपरेखा
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तालिका 4 : परियोजना प्रभावित गाँवों की सूची

क्र. सं.	ग्राम पंचायत	गांव	छोटा गांव	टिप्पणी
			डारी पारा पूर्व डारी पारा पश्चिम	
6	झिकावहाल	झिकावहाल	अधरिया पारा मांझा पारा स्कूल पारा सोढी पारा आवास पारा ढीपा पारा	प्रस्तावित परियोजना द्वारा आंशिक भूमि प्रभावित / कोई घर / गांव विस्थापित नहीं
7	कुजेमुरा	कुजेमुरा	आवास पारा उरांव पारा पश्चिम उरांव पारा दक्षिण घसिया पारा निशाद पारा सिदार पारा उत्तर सिदार पारा दक्षिण निशाद पारा पश्चिम बेहरा पारा हुंकरा ढीपा पश्चिम हुंकरा ढीपा पूव	प्रस्तावित परियोजना द्वारा पूरा गांव विस्थापित, आंशिक भूमि प्रभावित
8	लिबरा	लिबरा	पठान ढीपा उत्तर पठान ढीपा दक्षिण कुदरी पारा कंवर पारा दक्षिण कंवर पारा उत्तर रावत पारा सिदार पारा उत्तर चौहान पारा चीधरी पारा धोबी पारा सोढी पारा सिदार पारा दक्षिण	प्रस्तावित परियोजना द्वारा कुदरी पारा विस्थापित, आंशिक भूमि प्रभावित
9	सराईटोला	मुडागांव	फिटिंग पारा सिदार पारा अधरिया पारा मांझी पारा	प्रस्तावित परियोजना द्वारा पूरा गांव



पुनर्वास एवं पुनर्स्थापन एवं पात्रता रूपरेखा
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तालिका 4 : परियोजना प्रभावित गाँवों की सूची

क्र. सं.	ग्राम पंचायत	गाँव	छोटा गाँव	टिप्पणी
			आवास मुहल्ला	विस्थापित, समस्त भूमि प्रभावित
10	पाता	पाता	बांधापाली उत्तर बांधापाली पूर्व गोटिया पारा कंवर पारा बांधापाली पश्चिम कोटवार मुहल्ला आवास पारा सिदार पारा कंबट पारा गांदा पारा तेली पारा आवास मुहल्ला	प्रस्तावित परियोजना द्वारा पूरा गाँव विस्थापित, आंशिक भूमि प्रभावित
11	रोडोपाली	रोडोपाली	चौहान पारा दक्षिण रठिया पारा पश्चिम रठिया पारा पूर्व बड़े सिदार पारा रठिया बस्ती देहरी बस्ती	प्रस्तावित परियोजना द्वारा पूरा गाँव विस्थापित, समस्त भूमि प्रभावित
12	सराईटोला	सराईटोला	इंदिरा आवास पश्चिम इंदिरा. आवास पूर्व कंवर पारा पूर्व गांडा पारा कंवर पारा पश्चिम मांझी पारा	प्रस्तावित परियोजना द्वारा पूरा गाँव विस्थापित, समस्त भूमि प्रभावित
13	सारसमल	सारसमल	मांझा पारा पश्चिम मांझा पारा पूर्व खाले पारा मांझा पारा कंवर पारा पूर्व उपर पारा	प्रस्तावित परियोजना द्वारा आंशिक भूमि प्रभावित / कोई घर / गाँव विस्थापित नहीं
14	टिहलीरामपुर	टिहलीरामपुर	टिहलीरामपुर उत्तर टिहलीरामपुर पूर्व	प्रस्तावित



पुनर्वास एवं पुनर्स्थापन एवं पात्रता रूपरेखा
गारे पेलमा सेक्टर-II कोल ब्लॉक
तहसील-तमनार, जिला रायगढ़, छत्तीसगढ़



तालिका 4 : परियोजना प्रभावित गाँवों की सूची

क्र. सं.	ग्राम पंचायत	गांव	छोटा गांव	टिप्पणी
			टिहलीरामपुर माधी	परियोजना द्वारा पूरा गांव विस्थापित, आंशिक भूमि प्रभावित
			ऊर्जा नगर	
			उराव पारा	

स्रोत : ग्रीनसीइण्डिया कंसल्टिंग प्राइवेट लिमिटेड द्वारा पीआरए तकनीक का इस्तेमाल कर प्राथमिक सर्वेक्षण एवं परामर्श, 2017

2.3 भूमि वितरण

रायगढ़ जिले के 14 गावों में प्रस्तावित परियोजना के लिए करीबन 2583.487 हेक्टेयर भूमि की जरूरत है। विभिन्न क्षेत्रों के तहत अधिग्रहित भूमि का आकलन किया गया और राजस्व भूमि में वर्गीकृत किया गया जिसमें निजी भूमि (आदिवासी और गैर-आदिवासी) और सरकारी एवं राजस्व वन भूमि शामिल हैं। वन भूमि (संरक्षित वन) की भी पहचान की गई है। अधिग्रहित की जाने वाली भूमि का मुआवजा एलएआरआर अधिनियम 2013 के अनुसार प्रदान किया जायेगा।

तालिका 5: गांव वार भूमि वर्गीकरण(हेक्टेयर में)

क्र.	गांव	निजी (हेक्टेयर)		राजस्व भूमि हेक्ट			कुल सरकारी भूमि	वन भूमि (RF/PF/OF)	कुल भूमि
		गैर आदिवासी भूमि	आदिवासी भूमि	राजस्व वन	बस्ती/आबादी	अन्य सरकारी भूमि			
1	भालुमुड़ा	4.496	15.873	1.214	0.000	2.075	3.289	0.000	23.658
2	धितवाही	54.839	88.735	0.000	7.944	8.739	16.683	0.000	160.257
3	डोलेसेरा	10.634	3.389	0.000	0.000	7.138	7.138	0.000	21.161
4	कालनारा	27.140	25.398	8.139	5.908	10.219	24.266	2.183	78.987
5	गारे	47.738	116.539	2.159	10.474	11.087	23.72	0.000	187.997
6	क्षिकावहाल	0.322	1.113	0.000	0.000	0.026	0.026	7.612	9.073
7	विचरा	65.801	63.445	13.216	3.006	1.657	17.879	0.000	147.125
8	साडोपाली	150.308	192.565	0.125	17.632	32.017	49.774	0.000	392.647
9	टिहलीरामपुर	106.733	41.917	0.000	1.170	75.027	76.197	0.000	224.847
10	सरसमल	33.141	42.808	15.887	0.000	3.706	19.593	0.000	95.542
11	मुडागांव	121.220	181.648	8.216	8.256	7.277	23.749	48.515	375.132
12	सराईटोला	40.433	118.295	18.729	8.597	8.839	36.165	11.533	206.426
13	पाता	220.507	105.046	17.259	12.909	16.328	46.496	29.892	401.941
14	कुजेमुरा	104.193	93.342	30.190	14.432	16.537	61.159	0.000	258.694
	कुल	987.505	1090.113	115.134	90.328	200.672	406.134	99.735	2583.487

स्रोत : राजस्व विभाग, तमनार तहसील, रायगढ़ जिला, छत्तीसगढ़ के अधिलेख के अनुसार



पुनर्वास एवं पुनर्स्थापन एवं पात्रता रूपरेखा
गारे पेलमा सेक्टर-II कोल ब्लॉक
तहसील-तमनार, जिला रायगढ़, छत्तीसगढ़



2.4. विस्थापित और प्रभावित आबादी का विवरण

परियोजना द्वारा विस्थापित परिवार-

• भूमि और घर से विस्थापित: ये परिवार जो परियोजना के लिए भूमि के साथ साथ अपना घर खोते हैं उनके परिवार की आजीविका भी खो जाती है। इसलिए उन्हें परियोजना द्वारा विस्थापित परिवारों के रूप में वर्गीकृत किया गया है। घर और भूमि खोनेवाले परिवारों की कुल संख्या 1159 हैं।

- घरों से विस्थापित लोग: ये परिवार परियोजना के लिए अपना घर खो रहे हैं, उन्हें परियोजना द्वारा विस्थापित परिवारों के रूप में वर्गीकृत किया गया है। यह अनुमान लगाया गया है कि लगभग 1086 घर केवल अपनी गृहस्थी खो रहे हैं और उनके पास कोई भूमि नहीं है।

परियोजना द्वारा प्रभावित परिवार -

• भूमि से विस्थापित: वे परिवार जो परियोजना की वजह से केवल अपनी भूमि खो रहे हैं लेकिन उनपर परियोजना का किसी भी प्रकार से प्रभाव/असर नहीं पड़ा है। इसलिए, उनके घरों को स्थानांतरित नहीं किया गया है। इन परिवारों को परियोजना द्वारा प्रभावित परिवारों के रूप में वर्गीकृत किया गया है। लगभग 674 परिवार केवल अपनी भूमि खो रहे हैं, इस बात की गणना की गई है।

तालिका 6: परियोजना विस्थापित एवं प्रभावित घर (HHs)

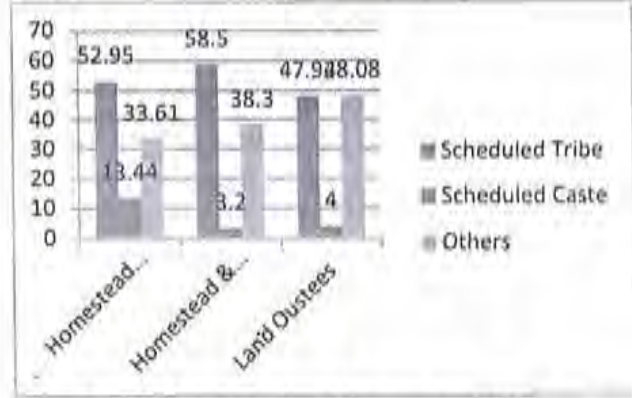
क्रम संख्या	गांव का नाम	विस्थापित घर (HHs)			प्रभावित घर (HHs)
		घर विस्थापित	घर एवं भूमि विस्थापित	कुल	भूमि विस्थापित
		कुल	कुल		कुल
1	सराईटोला	56	124	180	11
2	मुंडामांघ	52	109	161	26
3	बालनारा	66	80	146	15
4	रोडीपाली	66	127	193	38
5	लिबरा	40	34	74	87
6	टिहलीरामपुर	38	100	138	9
7	गारे	217	111	328	12
8	कुजेमुसा	249	203	452	43
9	पाता	302	271	573	34
10	ब्रितवाही	0	0	0	214
11	सरसमल	0	0	0	39
12	भालूगुडा	0	0	0	64
13	झिकाबहाल	0	0	0	18
14	खोलेसरा	0	0	0	64
कुल		1086	1159	2245	674

स्रोत : प्राथमिक सर्वेक्षण, योनिनी इण्डिया कंसल्टिंग प्राइवेट लिमिटेड, 2017



2.5. विस्थापित आबादी का सामाजिक वितरण

कुल परियोजना द्वारा विस्थापित और प्रभावित घरों की संख्या क्रमशः 2245 और 674 हैं जिनकी कुल आबादी क्रमशः 7063 और 2574 हैं। इसमें से, यह पाया गया कि 55.81 प्रतिशत विस्थापित परिवार और 47.92 प्रतिशत प्रभावित परिवार अनुसूचित जनजाति के हैं। इस क्षेत्र में अनुसूचित जातियों का अनुपात कम पाया गया। जातिगत आधार पर वर्गीकरण का विस्तृत विवरण नीचे तालिका 7, 8 और 9 में वर्णित किया गया है और उसके साथ दिए गए आंकड़ों में दर्शाया गया है।



प्रभावित/विस्थापित आबादी का सामाजिक समूह

नीचे दी गई तालिका 4 में सामाजिक समूह विखराय के साथ विस्थापित घरों व परिवारों का गांव आधारित वितरण प्रदान किया गया है।

तालिका 7: परियोजना विस्थापित घरों का जातिवार वितरण

क्रम संख्या	गांव का नाम	घर विस्थापित				घर और भूमि विस्थापित				कुल
		अनुसूचित जनजाति	अनुसूचित जाति	अन्य	कुल	अनुसूचित जनजाति	अनुसूचित जाति	अन्य	कुल	
1	सराईटोला	47	5	4	56	94	7	23	124	180
2	मुडागाव	38	1	13	52	72	3	34	109	161
3	दोलनाश	43	8	15	66	57	0	23	80	146
4	रोडोपाली	41	5	20	66	101	1	25	127	193
5	लिवरा	26	0	14	40	31	0	3	34	74
6	टिहलीरामपुर	22	0	16	38	48	0	52	100	138
7	गारे	140	17	60	217	76	6	29	111	328
8	कुजेगुरा	98	47	104	249	95	16	92	203	452
9	पाहा	120	63	119	302	104	4	163	271	573
	कुल	575	146	365	1086	678	37	444	1159	2245

स्रोत : प्राथमिक सर्वेक्षण, यौगिक इन्फ्रिया कंसल्टिंग प्राइवेट लिमिटेड, 2017



पुनर्वास एवं पुनर्स्थापन एवं पात्रता रूपरेखा
गारे पेलमा सेक्टर-II कोल ब्लॉक
तहसील-तमनार, जिला रायगढ़, छत्तीसगढ़



तालिका 8: परियोजना विस्थापित घरों का जातिवार वितरण

क्रम संख्या	गांव का नाम	प्रभावित घर			
		अनुसूचित जनजाति	अनुसूचित जाति	अन्य	कुल
1	शराईटोला	1	1	9	11
2	मुडागांव	22	2	2	26
3	ढोलनारा	3	2	10	15
4	रोडोपाली	12	2	24	38
5	लिबरा	47	0	40	87
6	टिहलीरामपुर	5	0	4	9
7	गारे	2	2	8	12
8	कुजेमुरा	8	3	32	43
9	पाता	11	0	23	34
10	चितवाही	114	3	97	214
11	सरसमल	30	2	7	39
12	भालुमुडा	55	2	7	64
13	झिकावहाल	4	3	11	18
14	डोलेसरा	9	5	50	64
कुल		323	27	324	674

स्रोत : प्राथमिक सर्वेक्षण, यूनिसी इण्डिया कंसल्टिंग प्राइवेट लिमिटेड, 2017

तालिका 9: परियोजना विस्थापित एवं प्रभावित घरों का जातिवार वितरण (%)

क्रम संख्या	गांव का नाम	विस्थापित घर				प्रभावित घर	
		घर विस्थापित		घर और भूमि विस्थापित		भूमि विस्थापित	
		अनुसूचित जनजाति	अनुसूचित जाति	अनुसूचित जनजाति	अनुसूचित जाति	अनुसूचित जनजाति	अनुसूचित जाति
1	शराईटोला	83.93	8.93	75.81	5.65	9.09	9.09
2	मुडागांव	73.08	1.92	66.06	2.75	84.62	7.69
3	ढोलनारा	65.15	12.12	71.25	0.00	20.00	13.33
4	रोडोपाली	62.12	7.58	79.53	0.79	31.58	5.26
5	लिबरा	65.00	0.00	91.18	0.00	54.02	0.00
6	टिहलीरामपुर	57.89	0.00	48.00	0.00	55.56	0.00
7	गारे	64.52	7.83	68.47	5.41	16.67	16.67
8	कुजेमुरा	39.36	18.88	46.80	7.88	18.60	6.98
9	पाता	39.74	20.86	38.38	1.48	32.35	0.00
10	चितवाही	0.00	0.00	0.00	0.00	53.27	1.40
11	सरसमल	0.00	0.00	0.00	0.00	76.92	5.13
12	भालुमुडा	0.00	0.00	0.00	0.00	85.94	3.13
13	झिकावहाल	0.00	0.00	0.00	0.00	22.22	16.67
14	डोलेसरा	0.00	0.00	0.00	0.00	14.06	7.81
कुल		52.95	13.44	58.50	3.19	47.92	4.01

स्रोत : प्राथमिक सर्वेक्षण, यूनिसी इण्डिया कंसल्टिंग प्राइवेट लिमिटेड, 2017



पुनर्वास एवं पुनर्स्थापन एवं पात्रता रूपरेखा
गारे पेलमा सेक्टर-II कोल ब्लॉक
तहसील-तमनार, जिला रायगढ़, छत्तीसगढ़



2.6 आम संसाधनों की क्षति

1.6.1 जल स्रोत

तालिका 10 परियोजना से प्रभावित जल संसाधनों की संख्या को दर्शाती है। निजी जल स्रोतों में सबसे अधिक प्रभाव, ट्यूबवेल - कुआं पर पड़ा है, जबकि सरकारी संपत्तियों पर ग्राम पंचायत द्वारा निर्मित पानी की टंकिया है जिनपर अधिक प्रभाव पड़ा है।

तालिका 10: परियोजना द्वारा प्रभावित जल संसाधनों की संख्या

क्र. सं.	गांव का नाम	कुआं	हैंडपम्प	तालाब	ट्यूब वेल	पंचायत वाटक टैंक
1	झिकाबहाल	5	6	7	0	6
2	लिवरा	8	4	10	0	12
3	डोलेसेरा	0	4	7	0	5
4	टिहली रामपुर	0	4	1	0	8
5	भालमुडा	1	0	3	0	3
6	रोडोपाली	1	2	5	7	8
7	धितवाही	25	6	4	0	7
8	ढोलनारा	12	0	1	20	8
9	मुडागांव	2	5	5	10	5
10	सराईटोला	25	3	3	10	4
11	पाता	1	30	2	0	8
12	कुजेमुरा	1	35	4	0	5
13	गारे	2	4	6	0	4
14	सारसनाल	1	5	2	0	5
		84	108	60	47	88

स्रोत : प्राथमिक सर्वेक्षण, यीनसी इण्डिया कंसल्टिंग प्राइवेट लिमिटेड, 2017

1.5.1 सार्वजनिक संपत्ति संसाधन

निजी संपत्तियों/संरचनाओं और भूमि के अतिरिक्त, कुछ ऐसी सरकारी संपत्ति/संरचनाएं भी हैं जो कि परियोजना के कारण प्रभावित हो रही हैं। ऐसे संसाधन जैसे - चराई का मैदान, पूजास्थल, दफनाने का मैदान, श्मशान, आदि सभी सार्वजनिक संपत्ति संसाधनों में शामिल होते हैं। इनके अतिरिक्त स्कूल की इमारतें, अस्पताल, कार्यालय भवन आदि सरकारी संरचनाओं में शामिल होते हैं। तालिका 11 परियोजना द्वारा प्रभावित होने वाली संपत्तियों का विवरण देती है।

तालिका 11 परियोजना द्वारा प्रभावित होने वाली संपत्तियों का विवरण

क्रम संख्या	गांव	हरितभूमि	मुक्तिघाम/कब्रिस्तान	धार्मिक स्थल
1	लिवरा	1	0	5
2	कुजेमुरा	0	0	3
3	पाता	1	0	2
4	टिहली रामपुर	0	1	3
5	रोडोपाली	0	0	5
6	ढोलनारा	0	0	3
7	मुडागांव	0	0	2
8	सराईटोला	0	0	3
9	गारे	0	0	3
	कुल	2	1	29

स्रोत : प्राथमिक सर्वेक्षण, यीनसी इण्डिया कंसल्टिंग प्राइवेट लिमिटेड, 2017



पुनर्वास एवं पुनर्स्थापन एवं पात्रता रूपरेखा
गारे पेलमा सेक्टर-II कोल ब्लॉक
तहसील-तमनार, जिला रायगढ़, छत्तीसगढ़



तालिका 12: प्रभावित सरकारी संरचनाओं

क्रम संख्या	गांव का नाम	डाक घर	पंचायत भवन	सामुदायिक हॉल या बारात घर	स्वास्थ्य केन्द्र	विद्यालय	आंगनवाड़ी केन्द्र
1	लिवरा	1	1	1	1	2	2
2	कुजेमुरा	-	1	3	1	3	3
3	पाता	-	1	2	1	2	2
4	टिहली रामपुर	-	1	1	-	1	1
5	शेडोपाली	-	1	2	1	2	2
6	ढोलनारा	-	0	1	-	1	1
7	मुजागाव	-	1	1	1	1	2
8	सराईटोला	1	1	1	1	2	2
9	गारे	1	1	3	1	2	3
	कुल	3	8	15	7	16	18

स्रोत : प्राथमिक सर्वेक्षण, ग्रीनफील्ड इन्फ्रस्ट्रक्चर कंसल्टिंग प्राइवेट लिमिटेड, 2017

यह अनमानित है कि लगभग 16 स्कूल, 18 आंगनवाड़ी केंद्र, 15 सामुदायिक हॉल/बारात घर इस परियोजना के कारण प्रभावित हो रहे हैं और उनका स्थानांतरण आवश्यक है। एक निजी स्कूल के साथ, जिंदल स्टील एंड पावर लिमिटेड की कॉलोनी भी है जिसे विस्थापित करने की आवश्यकता है। सभी प्रभावित सरकारी संरचनाओं का विवरण नीचे तालिका 12 में दिया गया है।

1.5.1 वृक्ष

प्रभावित क्षेत्र में 'लकड़ी' और 'फल' दोनों तरह के पेड़ प्रभावित हो रहे हैं। तालिका 13 उन पेड़ों का विवरण दर्शाती है जो निजी संपत्तियों पर मौजूद हैं। प्रभाव के कारण उन्हें गिराकर उनके मालिकों को उचित मुआवजा देने की आवश्यकता है।

तालिका 13 : प्रभावित वृक्षों का अनुमान

क्रम संख्या	गांव का नाम	फलों से लदे वृक्ष	लकड़ी के पेड़	कुल
1	चितवाही	158	1	159
2	मुजागाव	691	1	692
3	ढोलनारा	1422	71	1493
4	शेडोपाली	533	36	569
5	सरसमल	185	25	210
6	पाता	414	14	428
7	डोलेसरा	61	2	63
8	टिहलीरामपुर	253	1	254
9	भालमुडा	143	3	146
10	सराईटोला	419	1	420
11	लिवरा	240	5	245
12	झिकावहाल	77	0	77
13	गारे	355	8	363
14	कुजेमुरा	438	9	447
	कुल	5389	177	5566

स्रोत : प्राथमिक सर्वेक्षण, ग्रीनफील्ड इन्फ्रस्ट्रक्चर कंसल्टिंग प्राइवेट लिमिटेड, 2017



पुनर्वास एवं पुनर्स्थापन एवं पात्रता रूपरेखा
गारे पेलमा सेक्टर-II कोल ब्लॉक
तहसील-तमनार, जिला रायगढ़, छत्तीसगढ़



1.5.1 घर का प्रकार

परियोजना के कारण विस्थापित होने वाली आवास इकाइयों की संख्या का पता लगाने के लिए सर्वेक्षण भी किया गया था। जिसमें यह पाया गया था कि 1889 कच्चे मकान, 121 पक्के मकान और 235 आधे पक्के मकान परियोजना के कारण विस्थापित हो जाएंगे। नीचे दिए दी गई तालिका 14 में गंव और टाइप के आधार पर विवरण वर्णित हैं।

तालिका 14 : विस्थापित घरों का प्रकार

क्रम संख्या	गांव का नाम	घर का प्रकार (परियोजना विस्थापित घर)			
		पक्का	कच्चा	पक्का और कच्चा	कुल
1	मुडागांव	10	135	16	161
2	डोलनारा	12	119	15	146
3	राडोपाली	11	174	8	193
4	पाता	54	396	123	573
5	टिहलीरागपुर	12	110	16	138
6	सराईटोला	8	162	10	180
7	लिवरा	2	64	8	74
8	गारे	3	308	17	328
9	कुजेमुरा	9	421	22	452
कुल		121	1889	235	2245

स्रोत : प्राथमिक सर्वेक्षण, ग्रामीणोपेडिया कंसल्टिंग प्राइवेट लिमिटेड, 2017

1.6 व्यावसायिक संरचना

कुल परियोजना विस्थापित और प्रभावित परिवारों की रोजी रोटी खाने की संभावना बनी हुई है क्योंकि वे सभी मुख्य रूप से कृषि कार्य कर अपनी आजीविका बलाते हैं। इसकी तुलना में जो लोग भी अपनी रोजी रोटी खो रहे हैं उनमें से अधिकांश किसान हैं। इन क्षेत्रों की प्रमुख फसल 'घावल' थी।

किसान यहां चना, कोदो-कुटकी और गेहू भी उगाते हैं। इन क्षेत्रों में किसानों द्वारा कम अनुपात में 'मक्का, उड़द, नाइजर, सोयाबीन, अरहर, सरसों, कुल्थी, अलसी, मूंगफली, तिल, मसूर, मटर, मूंग, ज्वार और सूरजमुखी' उगाए जाते हैं। आसपास के क्षेत्रों में लोगों का एक बड़ा वर्ग मिला है जो कि गैर-कृषि श्रमिकों के रूप में काम करते हैं। यह तालिका 15 विस्थापित परियोजना की व्यवसायिक संरचना और उसे प्रभावित लोगों को दर्शाती है।

तालिका 15: परियोजना विस्थापित एवं प्रभावित आवादी का व्यावसायिक ढांचा

क्रम संख्या	गांव का नाम	कृषि	खेतीहर मजदूर	गैर-खेतीहर मजदूर	पारम्परिक व्यवसाय/हस्तशिल्प	सरकारी नौकरी	प्रवासी	निजी नौकरी	लगू नहीं	कुल
परियोजना विस्थापित घर										
1	मुडागांव	95	0	61	0	1	0	4	0	161
2	डोलनारा	83	0	51	0	3	0	7	2	146
3	राडोपाली	104	0	72	1	6	0	8	2	193
4	पाता	298	0	264	0	0	0	11	0	573
5	टिहलीरागपुर	46	20	63	1	1	0	0	7	138
6	सराईटोला	80	1	97	0	2	0	0	0	180



पुनर्वास एवं पुनर्स्थापन एवं पात्रता रूपरेखा
गारे पेलमा सेक्टर-II कोल ब्लॉक
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क्रम संख्या	गांव का नाम	कुशि	खेतीहर मजदूर	गैर-खेतीहर मजदूर	पारम्परिक व्यवसाय / हस्तशिल्प	सरकारी नौकरी	प्रवासी	निजी नौकरी	लघु नहीं	कुल
7	लिबरा	27	29	13	1	1	0	3	0	74
8	गारे	234	0	88	0	0	0	6	0	328
9	कुजेमुरा	179	0	264	0	0	0	9	0	452
	कुल	1146	50	973	3	14	0	48	11	2245
परियोजना प्रभावित घर										
1	शराईटोला	5	3	2	0	0	0	1	0	11
2	गुडागांव	12	8	4	0	0	0	2	0	26
3	ढोलनारा	9	4	0	1	0	0	1	0	15
4	रोडोपाली	18	15	1	0	0	1	3	0	38
5	लिबरा	31	0	43	0	5	0	8	0	87
6	टिहलीरामपुर	4	3	1	0	0	0	1	0	9
7	गारे	7	2	1	0	0	1	1	0	12
8	कुजेमुरा	19	14	8	1	0	0	1	0	43
9	पाता	14	11	4	2	0	0	3	0	34
10	चितवाही	131	2	71	0	1	5	0	4	214
11	सरसमल	26	0	12	0	1	0	0	0	39
12	भालूमुडा	46	0	18	0	0	0	0	0	64
13	डिकाबहाल	8	3	3	0	3	0	1	0	18
14	डोलेसरा	59	0	4	0	1	0	0	0	64
	कुल	389	65	172	4	11	7	22	4	674

स्रोत : प्राथमिक सर्वेक्षण, यतीनसी इन्डिया कंसल्टिंग प्राइवेट लिमिटेड, 2017

Seen & verified
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Executive Engineer (Civil)
M.S.P.G.C.L., Nagpur



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3. व्यापक पुनर्वास एवं पुनर्स्थापन एवं पात्रता रूपरेखा

प्रस्तावित परियोजना के लिए, भूमि अधिग्रहण, पुनर्वास और पुनःस्थापन अधिनियम, 2013 में उचित मुआवजा तथा पारदर्शिता के अधिकार के सर्वश्रेष्ठ प्रावधानों और साथ ही साथ छत्तीसगढ़ राज्य की आदर्श पुनर्वास नीति सहित व्यापक पात्रता रूपरेखा गठित की गई है। परियोजना की R&R नीति के प्रावधानों को नीचे दिया जा रहा है।

क प्रथम सिड्यूल : भूमि स्वामियों का मुआवजा

भूमि विस्थापितों, जिनकी भूमि अधिग्रहण या पट्टे पर ली जा रही है, को निम्नलिखित स्वरूप के अनुसार न्यूनतम मुआवजा दिया जायेगा।

तालिका 16: भूमि स्वामियों के लिए मुआवजा

क्र. संख्या	मुआवजा पैकेज का घटक	मूल्य निर्धारण करने का तरीका
1	भूमि का बाजार मूल्य	कलेक्टर द्वारा बाजार मूल्य निर्धारित किया जाएगा यह मूल्य पिछले तीन वर्षों के दौरान गांव या आसपास के गांवों में स्थित समान प्रकार की जमीन की औसत बिक्री मूल्य के आधार पर निर्धारित किया जाएगा। मूल्य निर्धारण की तारीख एलएआरआर 2013 की धारा 11 के तहत अधिसूचना तिथि होगी।
2	बाजार मूल्य पर गुणक कारक	शहरी क्षेत्र से दूरी के आधार पर और उचित प्राधिकारी द्वारा अधिसूचना के अनुसार, ग्रामीण क्षेत्रों में 1 के कारक से अधिकतम होगी। (छत्तीसगढ़ सरकार की राजपत्र अधिसूचना दिनांक 27 फरवरी 2019 के माध्यम से दिए गये दिशानिर्देशों के अनुसार सभी क्षेत्रों के लिए गुणक कारक 2 होगा)
3	भूमि या इमारत से जुड़ी संपत्ति	<ul style="list-style-type: none"> • कलेक्टर के अनुरोध पर भूमि से जुड़ी इमारत की कीमत का निर्धारण किसी योग्य अभियंता/पीडब्ल्यूडी द्वारा किया जाता है • कलेक्टर के अनुरोध पर कृषि, रेशम-उत्पादन, वन या वन विभाग के क्षेत्र में अनुभवी व्यक्तियों द्वारा वृक्षों के मूल्य का निर्धारण किया जाता है • कलेक्टर के अनुरोध पर कृषि क्षेत्र में अनुभवी व्यक्तियों द्वारा स्थायी फसलों का मूल्य निर्धारित किया जाता है
4	क्षतिपूर्ति	कलेक्टर द्वारा निर्धारित 100 प्रतिशत भूमि के बाजार मूल्य (1) और परिसंपत्तियों के मूल्य (2) में कारक के बराबर।
5	ग्रामीण क्षेत्रों में अंतिम पुरस्कार	भूमि का बाजार मूल्य (1)+ परिसंपत्ति का मूल्य (3)+ 100 प्रतिशत की क्षतिपूर्ति (4)



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पुनर्वास एवं पुनर्स्थापन एवं पात्रता रूपरेखा
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परियोजना के लिए भूमि की अनुमानित लागत

तालिका 17 : भूमि की लागत

किरायेदारी भूमि	मात्रा	इकाई दर	लाख में रूपये
निजी भूमि का बाजार मूल्य	2077.62 हेक्ट	रु 25 लाख/हेक्ट	-
ग्रामीण भूमि के लिए घटक	2 बार का बाजार मूल्य	रु 50 लाख/हेक्ट	103881.00
भूमि पर इमारतों का मुआवजा	भूमि मूल्य का 10%		10388.10
कुल भूमि मुआवजा (क)			114269.10
फलदार वृक्षों के लिए मुआवजा	5389	6000	323.340
लकड़ी वाले वृक्षों के लिए मुआवजा	177	4000	7.080
कुओं के लिए मुआवजा	84	40000	33.600
हैपडपम्प/ट्यूबवेल के लिए मुआवजा	155	100000	155.000
भूमि (B) पर परिसम्पत्तियों के लिए मुआवजा			519.020
कुल भूमि मुआवजा (C = A+B)			114788.12
हर्जाना @ 100% (D)			114788.12
कुल किरायेदारी भूमि मुआवजा (E = C+D)			229576.24
सरकारी भूमि (F)	200.672	रु 16.52 लाख/हेक्ट	4807.32
संरक्षित वन भूमि (G)	99.735	रु 24.51 लाख/हेक्ट	2444.50
राजस्व वन (छोटा बड़ा जंगल) (H)	115.134	रु 24.75 लाख/हेक्ट	2849.57
R&R कॉलोनी के लिए भूमि (I)	90.328	रु. 25 लाख/हेक्ट	2258.20
क्षतिपूर्ति वनीकरण के लिए भूमि (J)	214.869	रु. 6.60 लाख/हेक्ट	1418.14
महायोग			243353.97

टीप- 1. इस लागत में FRA के तहत प्रभावित परिवार शामिल नहीं हैं

2. R&R पात्रता और लागत को जिला प्रशासन द्वारा अंतिम रूप दिया जायेगा।

ख. दूसरा सिड्यूल : R&R पात्रता

ये पात्रता सभी प्रभावित परिवारों (विस्थापित और भूमि खोने वालों के लिए) के लिए हैं



पुनर्वास एवं पुनर्स्थापन एवं पात्रता रूपरेखा
गारे पेलमा सेक्टर-II कोल ब्लॉक
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तालिका 18 : R&R मुआवजा लागत

क्र.सं.	व्यौरा	संख्या	रूपये में इकाई दर	राशि रूपये (लाख)
1.	घर निर्माण के लिए एक बार सहयोग	3296	576000	18984.96
2.	वार्षिकी या रोजगार का विकल्प	4277	500000	21385.00
3.	निर्वाह भत्ता @ 12 महीनों/PDF के लिए रु. 3000	3296	36000	1186.56
4.	अनुसूचित जाति/अनुसूचित जनजाति परिवारों के लिए अतिरिक्त एक बारगी सहयोग	2585	50000	1292.50
5.	परिवार के स्थानांतरण के लिए परिवहन लागत	3296	50000	1648.00
6.	एक बारगी पुनर्वास भत्ता	3296	50000	1648.00
7.	पशु छप्पर/छोटी दुकानों के लिए मुआवजा	919	25000	229.75
8.	कारीगर, छोटे व्यापारियों आदि के लिए एक बारगी अनुदान	117	25000	29.25
9.	PAFs की भूमि तथा घरों के लिए स्टाम्प शुल्क @ 7.5% और पंजीकरण शुल्क @1%			142.39
	कुल			46546.41

टीप- R&R पात्रता और लागत को जिला प्रशासन द्वारा अंतिम रूप दिया जायेगा।

ग. तीसरा सिड्यूल : सामुदायिक सुविधाएं और आर एंड आर कॉलोनी की लागत का प्रावधान

अधिग्रहण प्राधिकरण की लागत पर आबादी के पुनर्वास के लिए, निम्नलिखित बुनियादी ढांचागत सुविधाएं और न्यूनतम बुनियादी सुविधाएं प्रदान की जानी चाहिए ताकि यह सुनिश्चित किया जा सके कि नए गांव या कॉलोनी में पुनर्वासित आबादी स्वयं के लिए समुदाय के उचित मानकों के अनुसार जीवन-स्तर को प्राप्त कर सके और विस्थापन के कारण उत्पन्न होने वाले कटु अनुभव को न्यूनतम करने का प्रयास कर सके।

उचित रूप से रहने योग्य और नियोजित नयी बस्ती में, न्यूनतम निम्नलिखित निम्न सुविधाएं और संसाधन उपलब्ध होंगी, जैसा कि उस स्थान के लिए उपयुक्त होगा:

- भूमि के अधिग्रहणकर्ता द्वारा उपलब्ध कराई जाने वाले अवसंरचना सुविधाएं/प्रस्ताव का घटक
- पुनर्वासित गांवों के अंदर की सड़कों और सभी मौसम में कार्यरत रहने वाली सड़क का निकटतम पक्के सड़क के साथ जुड़ाव, सभी पुनर्वासित परिवारों के लिए गलियारा और सुविधाधिकार पर्याप्त रूप से व्यवस्थित किया जाना चाहिए।
- भौतिक पुनर्वास से पहले उचित जल निकासी और साथ ही स्वच्छता योजनाओं को निष्पादित किया जाना चाहिए।
- भारत सरकार द्वारा निर्धारित मानदंडों के अनुसार प्रत्येक परिवार के लिए सुरक्षित पीने के पानी के एक या अधिक सुनिश्चित स्रोत की व्यवस्था की जानी चाहिए।
- पशुओं के लिए पीने के पानी की व्यवस्था की जानी चाहिए।
- राज्य में स्वीकार्य अनुपात में पशुओं के चरने हेतु भूमि की व्यवस्था की जानी चाहिए।
- उचित मूल्य की दुकानों की उचित संख्या में व्यवस्था की जानी चाहिए।
- पंचायत क्षेत्र, जैसा कि उपयुक्त हो



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गारे पेलमा सेक्टर-II कोल ब्लॉक
तहसील-तमनार, जिला रायगढ़, छत्तीसगढ़



- गांव स्तर के डाक खाने, जैसा कि उपयुक्त हो, बचत खाता खालने की सुविधाओं सहित।
- उपयुक्त बीज-सह-खाद भण्डारण सुविधा, यदि जरूरत हो।
- पुनर्वासित परिवारों को आवंटित कृषि भूमि के लिए बुनियादी सिंचाई सुविधाएं प्रदान करने के लिए प्रयास किये जाने चाहिए, यदि सिंचाई परियोजना से नहीं, तो सहकारी विकास या किसी सरकारी योजना या विशेष सहयोग के तहत।
- विस्थापित लोगों के पुनर्वास के लिए स्थापित सभी नये गांवों को उपयुक्त परिवहन सुविधा प्रदान की जायेगी जिसमें आसपास के विकास केंद्रों/शहरी स्थानों के साथ स्थानीय बस सेवाओं के माध्यम से सार्वजनिक परिवहन सुविधाएं शामिल होंगी।
- जाति-समुदायों और उनकी प्रथाओं पर निर्भर कर, साइट पर कब्रिस्तान या शमशान स्थल।
- व्यक्तिगत शौचालय स्थलों सहित स्वच्छता सुविधाएं।
- प्रत्येक परिवार और सार्वजनिक प्रकाश के लिए, व्यक्तिगत एकल विद्युत कनेक्शन (या ऊर्जा के गैर-पारम्परिक स्रोत जैसे सार ऊर्जा के माध्यम से कनेक्शन),
- बच्चे तथा मां को पूरक पोषण सेवाएं प्रदान करती आंगनवाड़ी।
- निशुल्क तथा अनिवार्य शिक्षा अधिनियम, 2009 (2009 का 35) के बच्चों के अधिकार के प्रावधानों के अनुसार विद्यालय
- दो किमी की सीमा में उप-स्वास्थ्य केन्द्र
- भारत सरकार द्वारा निर्धारित प्राथमिक स्वास्थ्य केन्द्र
- बच्चों के लिए खेल का मैदान
- प्रत्येक सौ परिवारों के लिए एक सामुदायिक केन्द्र
- प्रभावित क्षेत्र की संख्या और आयाम के अनुसार सामुदायिक सभा के प्रत्येक पचास परिवारों के लिए पूजा स्थल एवं दीपाल/वृक्ष मंच।
- पारम्परिक आदिवासी संस्थानों के लिए पृथक भूमि निर्धारित की जानी चाहिए।
- जंगलों में रहने वाले परिवारों को जहां संभव हो गैर-लकड़ी वन उत्पादन तथा आम सम्पत्ति संसाधन प्रदान किये जाने चाहिए, यदि संभव हो तो उनके नये प्रवास स्थल के करीब प्रदान किये जायें, और यदि ऐसा कोई परिवार वन या आम सम्पत्ति के खाली स्थान के करीब क्षेत्र में अपनी पहुंच या प्रवेश जारी रखता है, तो उसे आजीविका के ऊपर वर्णित स्रोतों का अधिकार मिलना चाहिए। प्रवास के लिए उपयुक्त सुरक्षा व्यवस्थाएं की जानी चाहिए, यदि जरूरत हो।
- मानदंडों के अनुसार पशुचिकित्सा केन्द्र
- प्रभावित व्यक्तियों/आबादी को जिनकी उम्र 60 वर्ष (पुरुष और महिला) से ऊपर है, को जीएसईसीएल जिला प्रशासन तथा राज्य सरकार नीति योजना के तहत किये गये फैसले के अनुसार पेंशन के तौर पर वित्तीय सहायता प्रदान करेगा।

तालिका 19 : कॉलोनी और आधारभूत ढांचा लागत

व्यौरा	लागत रूपये में (लाख)
[I] R&R कॉलोनी में आवासीय घर	
आवासीय इमारत - भार वहनीय ढांचा घर (50 वर्गमीटर डीयू) - संख्या 3208, प्रत्येक की लागत रु. 5,76,000/-	18984.96
कुल (I)	18984.96
[II] R&R कॉलोनी के लिए आधारभूत ढांचा सुविधाएं	



पुनर्वास एवं पुनर्स्थापन एवं पात्रता रूपरेखा
गारे पेलमा सेक्टर-II कोल ब्लॉक
तहसील-तमनार, जिला रायगढ़, छत्तीसगढ़



व्यौरा	लागत रुपये में (लाख)
प्राथमिक विद्यालय	130.28
मैदान सहित आंगनवाड़ी / नर्सरी	24.62
मार्केट ब्लॉक से आगे पंचायत घर	34.88
मार्केट ब्लॉक -I (बैंक, डाक खाना तथा PDS सहित)	34.88
अस्पताल	148.75
सामुदायिक केन्द्र / आदिवासी केन्द्र / क्लब	111.82
मार्केट ब्लॉक -II (दुकानें)	49.24
पशु चिकित्सा क्लीनिक	12.31
कुल (II)	546.77
(III) विस्तृत सेवाएं	
फाटक सहित 3 मीटर ऊंची टाउनशिप बाड़ें	234.25
गेट सहित 1.5 मीटर की ऊंची कम्पाउंड दीवारें	77.05
RCC सड़कें	1874.99
तूफान जल निकास तंत्र	231.16
UG टैंक (600 Cum)	35.96
OH टैंक (400 Cum)	102.74
मल निपटान संयंत्र 500 cum / दैनिक क्षमता	308.22
स्ट्रीट लाइटिंग सहित बाहरी विद्युत व्यवस्था	0.00
सिविल कार्यों सहित रिचार्ज गियर, केबल और अन्य ऐसेसीरीज के साथ दो 11 KV / 430 Volt, 500 KVA ट्रांसफार्मरों के साथ LT सबस्टेशन उपकरण	41.10
सभी आवासीय एवं सार्वजनिक इमारतों में पंखें	25.68
जल निपटान संयंत्र (900 Cum/d)	36.99
पम्प हाउस के साथ बोरवेल का निर्माण	51.37
भूनिर्माण और बागवानी	25.68
कुल (III)	3045.19
विविध व्यय जोकि ऊपर वर्णित नहीं हैं (IV)	103.00
वृद्धि / आकस्मिकताएं (V)	636.00
कुल R & R आधारभूत ढांचा कालौनी लागत (II + III + IV + V)	4330.96



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गारे पेलगा सेक्टर-II कोल ब्लॉक
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आरएफसीटीएलएआरआर अधिनियम, 2013 के पहले, दूसरे और तीसरे शिड्यूल के अनुसार परियोजना के लिए भूमि तथा आरएंडआर लागत की कुल लागत गणना नीचे दी गई है।

तालिका 20 : कुल आर.एंड आर और भूमि लागत

क्र. सं.	शिड्यूल	लागत रुपये में (लाख)
1	पहला शिड्यूल	243353.97
2	दूसरा शिड्यूल	46546.41
3	तीसरा शिड्यूल	4330.96
	कुल	294231.34

Seen & verified
M. D. J.
Executive Engineer (Civil)
M.S.P.G.C.L., Nagpur



पुनर्वास एवं पुनर्स्थापन एवं पात्रता रूपरेखा
गारे पेलमा सेक्टर-II कोल ब्लॉक
तहसील-तमनार, जिला रायगढ़, छत्तीसगढ़



4 प्रस्तावित सी.एस.आर. गतिविधियां

MAHAGENCO की विशेषकर अंशधारकों एवं समाज के प्रति सामाजिक जिम्मेदारी के भाग के तौर पर, प्रस्तावित परियोजना के आस-पास 10 किमी क्षेत्र के भीतर गांवों में विकास गतिविधियां की जानी है। विकास गतिविधियां विभिन्न अंश-धारकों द्वारा अभिव्यक्त क्षेत्र की जरूरत के अनुसार तैयार की जायेंगी। व्यापक विकास क्षेत्र जिन्हें कवर किया जायेगा में शामिल हैं स्वास्थ्य सेवाएं, शैक्षणिक सुधार, आजीविका विकास, कौशल विकास, सांस्कृतिक वृद्धि और आधारभूत ढांचा विकास। गामवासियों की जरूरत को समझने के लिए, सभी प्रभावित गांवों में एक प्रारंभिक बातचीत शुरू की गई। उसके आधार पर, MAHAGENCO द्वारा किये जाने वाली सी.एस.आर गतिविधियों के निर्धारण के लिए एक बुनियादी गतिविधि चार्ट प्रस्तावित किया गया है।

तालिका 11 : सी.एस.आर गतिविधियां

क्र. सं	व्यापक उद्देश्य	प्रस्तावित गतिविधियां
1	स्वास्थ्य	स्थानीय स्वास्थ्य केन्द्रों का उन्नयन
		मोबाइल स्वास्थ्य इकाई (2)
		स्वास्थ्य जागरूकता शिविर
		विशेष स्वास्थ्य जागरूकता शिविर
		इलाज के लिए गरीब मरीजों को सहयोग
		गर्मियों में पड़ोसी गांवों में साफ पानी की आपूर्ति
		बच्चों तथा गर्भवती महिलाओं के लिए टीकाकरण शिविर
		आंगनवाड़ी केन्द्रों का विकास एवं उनका स्टाफ
2	कौशल एवं उद्यमशीलता विकास	युवाओं को प्रशिक्षण देने के लिए घरघोरा में स्थानीय आईटीआई का उन्नयन तथा नये व्यवसायों की प्रस्तुति
		SHGs के माध्यम से स्थानीय महिलाओं और पारम्परिक शिल्पकारों को प्रशिक्षण
3	आजीविका विकास तथा किसानों के उत्पादन में वृद्धि	हाल की फसल पर किसानों को प्रशिक्षण, खेती, कटाई और विपणन पर विशेष प्रशिक्षण
		जैविक खेती, प्राकृतिक, कीटनाशक, कीटाणुनाशक की तैयारी और इस्तेमाल पर प्रशिक्षण
		सामूहिक खेती, विपणन तथा प्रबंधन के लिए किसान क्लबों तथा उनके संघों का गठन
		पानी तथा मिट्टी के संरक्षण पर किसानों को प्रशिक्षण
		सभी 20 गांवों में महिला स्वयं सहायता समूहों का गठन करना तथा विद्यमान समूहों को मजबूत बनाना।
4	आधारभूत ढांचे में सुधार	पक्का मार्ग का निर्माण
		नालियों का निर्माण, गड्ढे भरना आदि।
		गांवों में सौर रोशनी को प्रोत्साहन तथा स्थापना करना
		ग्राम पुस्तकालय की स्थापना
		लघु जल संचय ढांचों जैसे एनिकट कक्ष का विकास
		तालाबों की खुदाई
		बाजार मंचों का निर्माण
5	शैक्षणिक स्थिति में सुधार	विद्यालयों / सामुदायिक कक्षों में शौचालय का निर्माण
		स्थानीय विद्यालयों का उन्नयन और पुस्तकें तथा स्टेशनरी प्रदान



25
Executive Engineer (Civil)
M.S.P.G.C.L., Nagpur

पुनर्वास एवं पुनर्स्थापन एवं पात्रता रूपरेखा
गारे पेलमा सेक्टर-II कोल ब्लॉक
तहसील-तमनार, जिला रायगढ़, छत्तीसगढ़



क्र. सं	व्यापक उद्देश्य	प्रस्तावित गतिविधियां
		करना
		विद्यालयों में कम्प्यूटर्स का प्रावधान
		जरूरतमंद बच्चों को छात्रवृत्ति
6	खेल प्रचार	विभिन्न खेल गतिविधियों का प्रचार एवं प्रायोजन

Seen & Verified

Dr. J. K. J.
Executive Engineer (Civil)
M.S.P.G.C.L., Nagpur



Dr. Nitin S. Wagh
Executive Director (E&S)



CERTIFICATE OF UNDERTAKING

In compliance to condition no. 16 of Part-A of Ministry of Environment, Forest and Climate change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby confirm that there is no Rehabilitation & Resettlement (R&R) is proposed on forest land of Gare Palma II coal block,


Executive Director (E&S and GP)



Dr. Nitin S. Wagh
Executive Director (E&S)



CERTIFICATE OF UNDERTAKING

In compliance to Condition no. 1 of Part B of Ministry of Environment, Forest and Climate Change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake to confirm that "Legal status of the diverted forest land shall remain unchanged".

DATE: 12 JUL 2022

(Dr. Nitin S. Wagh)

Executive Director (E&S and GP)



Dr. Nitin S. Wagh
Executive Director (E&S)



Annexure-VI

CERTIFICATE OF UNDERTAKING

In compliance to Condition no. 2 of Part B of Ministry of Environment, Forest and Climate Change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP), on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake to confirm "to pay the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India".

DATE: 12 JUL 2022


(Dr. Nitin S. Wagh)

Executive Director (E&S and GP)



Dr. Nitin S. Wagh
Executive Director (E&S)



Annexure-III

CERTIFICATE OF UNDERTAKING

In compliance to Condition no. 3 of Part B of Ministry of Environment, Forest and Climate Change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake to confirm that "Trees shall be felled in phased manner as per the requirement in the approved Mining Plan with prior permission of concerned DFO".

DATE: 12 JUL 2022


(Dr. Nitin S. Wagh)

Executive Director (E&S and GP)



Dr. Nitin S. Wagh
Executive Director (E&S)



Annexure-XVIII



CERTIFICATE OF UNDERTAKING

In compliance to Condition no. 4 of Part B of Ministry of Environment, Forest and Climate Change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake to confirm that *"Mahagenco shall explore the possibility of translocation of maximum number of trees identified to be felled and shall ensure that any tree felling shall be done only when it is unavoidable and that too under strict supervision of the State Forest Department"*.

DATE: 12 JUL 2022


(Dr. Nitin S. Wagh)

Executive Director (E&S and GP)



Dr. Nitin S. Wagh
Executive Director (E&S)



Annexure-XIX



CERTIFICATE OF UNDERTAKING

In compliance to Condition no. 5 of Part B of Ministry of Environment, Forest and Climate Change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake to confirm that *"Mahagenco shall comply with the Hon'ble Supreme Court order on re-grassing, and re-grass the mining area and any other areas which may have been disturbed due to mining to restore them to a condition which is fit for growth of fodder, flora, fauna, etc. in a timely manner"*.

DATE: 12 JUL 2022


(Dr. Nitin S. Wagh)

Executive Director (E&S and GP)



Dr. Nitin S. Wagh
Executive Director (E&S)




Annexure-XX



CERTIFICATE OF UNDERTAKING

In compliance to Condition no. 6 of Part B of Ministry of Environment, Forest and Climate Change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake to confirm that *"Mahagenco shall undertake mining in a phased manner after taking due care for reclamation of the mined over area. The concurrent reclamation plan as per the approved mining plan shall be executed by the Mahagenco from the very first year, and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, in the concerned State Government and the concerned Regional Office of the Ministry. If it is found from the annual report that the activities indicated in the concurrent reclamation plan are not being executed by the Mahagenco, the Nodal Officer or the concern Addl. Principle Chief Conservator of Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities area satisfactorily executed"*.

DATE: 12 JUL 2022


(Dr. Nitin S. Wagh)

Executive Director (E&S and GP)



Dr. Nitin S. Wagh
Executive Director (E&S)



Annexure-XXI



CERTIFICATE OF UNDERTAKING

In compliance to Condition no. 7 of Part B of Ministry of Environment, Forest and Climate Change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake to confirm that *"Period of diversion of the said forest land under this approval shall be for a period co-terminus with the period of the mining lease proposed to be granted under the Mines and Minerals (Development and Regulation) Act, 1957, as amended and the Rules framed there-under"*.

DATE: 12 JUL 2022


(Dr. Nitin S. Wagh)

Executive Director (E&S and GP)



ENVIRONMENTAL
CLEARANCE

PARIVESH

*(Pro-Active and Responsive Facilitation by Interactive,
and Virtuous Environment Single-Window Hub)*



**Government of India
Ministry of Environment, Forest and Climate Change
(Impact Assessment Division)**

To,

The CGM
Maharashtra State Power Generation Company Limited CIN-
U40100MH2005SGC153648
4th floor A-Wing HDIL Tower, Bandra East, Mumbai, Mumbai
City, Maharashtra-400051

Subject: Grant of Environmental Clearance (EC) to the proposed Project Activity under the provision of EIA Notification 2006-regarding

Sir/Madam,

This is in reference to your application for Environmental Clearance (EC) in respect of project submitted to the Ministry vide proposal number IA/CG/CMIN/52019/2016 dated 01 Aug 2020. The particulars of the environmental clearance granted to the project are as below.

- | | |
|--|--|
| 1. EC Identification No. | EC22A042CG183991 |
| 2. File No. | J-11015/72/2016-IA.II(M) |
| 3. Project Type | New |
| 4. Category | A |
| 5. Project/Activity including Schedule No. | 1(a) Mining of minerals |
| 6. Name of Project | Gare Palma Sector -II Coal mine (Block) |
| 7. Name of Company/Organization | Maharashtra State Power Generation Company Limited CIN- U40100MH2005SGC 153648 |
| 8. Location of Project | Chhattisgarh |
| 9. TOR Date | 08 Aug 2016 |

The project details along with terms and conditions are appended herewith from page no 2 onwards.

Date: 11/07/2022

(e-signed)
Lalit Bokolia
Scientist F
IA - (Coal Mining sector)

Note: A valid environmental clearance shall be one that has EC identification number & E-Sign generated from PARIVESH. Please quote identification number in all future correspondence.

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No. J-11015/72/2016-IA.II(M) Pt.
Government of India
Ministry of Environment, Forest and Climate Change
(Impact Assessment Division)

2nd Floor Vayu Wing,
Indira Paryavaran Bhawan,
Jorbagh Road, N Delhi - 3
Email: lk.bokolia@nic.in Tel: 011-20819417

Dated: 11th July, 2022

To

The Chief Engineer (coal),
Maharashtra State Power Generation Co. Ltd. (Mahagenco)
Plot No. G-9, 'Prakashgad', 3rd Floor,
Bandra (E), Mumbai-400051 (Maharashtra)
email-eccoal@mahagenco.in

Sub: Gare Palma Sector II Coal Mine Project of Open Cast 22.0 MTPA + Under Ground-1.6 MTPA capacity in mine lease area of 2583.48 ha of M/s Maharashtra State Power Generation Company Ltd (MSPGCL) located in village-Tihli Rampur, Kunjemura, Gare, Saraitola, Murogaon, Radopali, Pata, Chitwahi, Dholnara, JhinkaBahal, Dolesara, Bhalumura, Sarasmal and Libra, Tehsil-Gharghoda, District- Raigarh, (Chhattisgarh) - For Environmental Clearance - reg.

Sir,

This has reference to your online proposal no. IA/CG/CMIN/52019/2016 dated 1st August, 2020, submitted to this Ministry for grant of Environmental Clearance (EC) in terms of the provisions of the Environment Impact Assessment (EIA) Notification, 2006 under the Environment (Protection) Act, 1986 for Gare Palma Sector -II Coal mine Project of 23.60 MTPA (OC-22.0 MTPA+UG-1.6 MTPA) of M/s Maharashtra State Power Generation Company Limited (MSPGCL) in an area of 2583.48 ha in District Raigarh (Chhattisgarh).

2. The project/activity is covered under category 'A' of item 1(a) 'Mining of Minerals' the Schedule to the EIA Notification, 2006

3. The proposal was considered by the sectoral Expert Appraisal Committee (EAC) in its in its 51st EAC meeting held on 5th December, 2019, 2nd meeting of sectoral EAC (Coal Mining) held on 28-29 September, 2020. The details of the project, as per the documents submitted by the project proponent, and also as informed during the meeting, are reported to be as under: -

- (i) The project area is covered under Survey of India Topo Sheet NoF44L7 F44L8 F44L11 F44L12 and is bounded by the geographical coordinates ranging from latitude 22°06'24.215" N to 22°10'49.891" N and longitudes 83°26'15.433" E to 83°31'12.632" E.
- (ii) Coal linkage of the project is proposed for captive use for various thermal power plants of Mahagenco namely Chandrapur Thermal Power Station Unit 8 & Unit 9 (1000 MW), Koradi

EC Gare Palma Sector II Opencast of M/s Mahagenco

Page 1 of 16

EC Identification No. - EC22A042CG163991 File No. - J-11015/72/2016-IA.II(M) Date of Issue EC - 11/07/2022 Page 2 of 17



Thermal Power Station Unit 8, Unit 9 and Unit 10 (1980 MW), Parli Thermal Power Station Unit 8 (250 MW).

- (iii) Joint venture cartel has been formed –Not applicable.
- (iv) Project does not fall in the Critically Polluted Area (CPA), where the MoEF&CC's vide its OM dated 13th January, 2010 has imposed moratorium on grant of environment clearance.
- (v) Employment generation, direct employment to 3400 persons will be provided from the project.
- (vi) The project is reported to be beneficial in terms of Coal from this project will be used in power generation in Maharashtra, which will help in reducing gap in demand and production of electricity in the State, based on the requirement of the people of the project area, the development activities will be taken up. The basic requirement of the community will be strengthened by extending health care, educational facilities, providing drinking water to the villages affected, building/strengthening of existing roads in the area etc.
- (vii) ToR for the proposal was granted by the Ministry on 8th August, 2016. Extension of validity of ToR was granted on 5th August, 2019 for a period of one year.
- (viii) Total mining lease area as per block allotment is 2583.48 ha. Mining Plan (Including Progressive Mine Closure Plan) has been approved by the Ministry of Coal on 12.08. 2016.
- (ix) The land usage pattern of the project is as follows:

Pre-mining land use details

(Area in Ha)

S. No.	LANDUSE	Within	Outside	TOTAL
		M L Area(ha)	M L Area(ha)	
1.	Agricultural land	2077.618	NIL	2077.618
2.	Forest land	214.869	NIL	214.869
3.	Wasteland	NIL	NIL	NIL
4.	Grazing land	NIL	NIL	NIL
5.	Surface water bodies	56.167	NIL	56.167
6.	Settlements	90.328	NIL	90.328
7.	Others (non- agriculture & Govt. land)	144.505	NIL	144.505
	Total	2583.487	NIL	2583.487

Post Mining Post Opencast Mining land use (upto 32nd year)

Sl No.	Description	Bund/Void	Public Use	Company Use	Undisturbed	Plantation/ Agriculture Green Belt	Total incl.
1	Backfill (Excavation)	-	-	-	-	2440.55	2440.55
2	Void/ water body	-	-	-	-	-	0.00



Sl No.	Description	Bund	Void	Public Use	Company Use	Undisturbed	Plantation/ Agriculture/ Green Belt	Total incl.
3	Surface Dump	-	-	-	-	-	-	0.00
4	Bund	5.2	-	-	-	-	-	5.20
5	Green Belt	-	-	-	-	-	36.07	36.07
6	TS Dump	-	-	-	-	-	-	0.00
7	Settling pond	-	5	-	-	-	-	5.00
8	Road diversion	-	-	30.3	-	-	-	30.30
9	Facilities retained	-	-	-	-	50.94	-	50.94
10	Under Kelo river	-	-	-	-	15.42	-	15.42
11	Undisturbed (others)	-	-	-	-	-	-	0.00
	Total	5.2	5	30.3	-	66.36	2476.62	2583.48

*All values in ha

- (x) Total geological reserve reported in the mine lease area is 1059.29 MT with 781.78 MT mineable reserve. Out of total mineable reserve of 781.78 MT, 655.15 MT are available for extraction. Percent of extraction is 83.8%.
- (xi) I Bottom seam to X Bottom seams (in 18 Horizons) with thickness ranging from 0.5m - 8.39 m are workable. Grade of coal is G1 - G16 (Both OC and UG), stripping ratio 4.99 Cum/t, while gradient is 1 in 20.
- (xii) Method of mining operations envisages by there are two mining methods viz. Opencast (OC) and Underground (UG) method.
- (xiii) Life of mine is total 77 years (Life of OC mine - 29 years and UG mine - 66 years starting from 12th year onwards).
- (xiv) The project has one external OB dumps in an area of 450 ha with 90 m height and 221.17Mm³ of OB. External OB Dumps shall be re-handled and backfilled in 29th to 32nd year. The OB from the current mining operations shall be backfilled from 6th year onwards. Two internal OB in an area of 2440.55 ha with 2761.12 Mm³ of OB is envisaged in the project.
- (xv) Total quarry area is 2440.55ha out of which backfilling will be done in 2440.55 ha while final mine void will be created in an area of 0 ha with a depth of 0 m. Backfilled quarry area



of 2440.55 ha shall be reclaimed with plantation. Final mine void will be converted-No final void, only 5 ha of settling pond will be converted in to water body.

- (xvi) Transportation of coal has been proposed by dumpers in mine pit head, from surface to siding by dumpers and at sidings by appropriate loading system.
- (xvii) Reclamation Plan in an area of 2476.62ha, comprising of 0 ha of external dump, 2440.55 ha of internal dump and 36.07 ha of green belt. In addition to this, an area of 0 ha, included in the safety zone/rationalization area, has also been proposed for green belt development.
- (xviii) 214,869 ha of forest land has been reported to be involved in the project, Ministry (FC Division) vide its letter dated 02.06.2022 has granted forest Stage-I Clearance for non-forestry use of 214,869 ha of forest land in favour of M/s Maharashtra State Power Generation Company Limited
- (xix) No National Parks, Wildlife Sanctuaries and Eco-Sensitive Zones have been reported with 10 km boundary of the project.
- (xx) Wildlife conservation plan submitted to DFO on 14.11.2019, DFO recommended the WCP to CCF on 24.01.2020, CCF recommended the WCP to PCCF on 20.02.2020. The budget of Rs 488.50 Lakhs for conservation of wild life is provided during the period of 5 years (2020-21 to 2025-26).
- (xxi) The ground water level has been reported to be varying between 4.67 to 12.34 m during pre-monsoon. Total water requirement for the project is 2785 KLD. Hydrology study and embankment design was carried out by Min Mec Consultancy Pvt Ltd., New Delhi. Kelo river will not be diverted due to the prevailing topography, shape of the block and presence of other coal blocks all around. Flow in Kelo river, reduction is 0.8%, low impact is envisaged on downstream water balance.
- (xxii) Application for obtaining the approval of the Central Ground Water Authority for 2785 KLD has been submitted on 05th December 2017. NOC for ground water abstraction obtained from CGWA, New Delhi Vide Lr no. CGWA/NOC/MIN/ORIG/2020/7943 dated 03.07.2020. The sanctioned water quantity is 1454 m³/day
- (xxiii) Public hearing for the project of 23.60 MTPA capacity in an area of 2583.48 ha was conducted on 27th September, 2019 at Village-Dolesara, District-Rajgarh, Chhattisgarh. Major issues raised in the public hearing include health, education, employment, compensation to land losers, drinking water etc. Appropriate action to address the issues raised in the Public Hearing have already been taken/proposed in EIA/EMP.
- (xxiv) Kelo River/nalla is flowing north to south through the south eastern part of the boundary of lease. Kelo will remain untouched and hence no river/nalla diversion involved.
- (xxv) One court case filed vide writ petition no. 92 of 2019 by Mr. Chinmay Mohapatra is pending in Hon'ble High Court of Bilaspur.
- (xxvi) The project involves 2245 project affected families. R&R of the PAPs will be done as per LARR 2013.
- (xxvii) Total cost of the project is Rs 764200 lakhs. Cost of production is Rs.930 per tonne., CSR cost is 2% of the average net profit of the company made during three immediately preceding financial years shall be spent on CSR activities. R&R cost is Rs. 2435 crores. Environment Management Cost is Rs. 1484.53 crores has been allocated under EMP budget



in which 1027.66 crores for Progressive Closure and 456.87 Crores for Final Closure of Mine.

4. The proposal was considered by the sectoral Expert Appraisal Committee (EAC) in its 2nd meeting of sectoral EAC (Coal Mining) held on 28-29 September, 2020 and recommended for grant of Environment Clearance. Based on recommendations of the EAC, the Ministry of Environment, Forest and Climate Change hereby accords approval of Environment Clearance to Gare Palma Sector II Coal Mine Project of Open Cast 22.0 MTPA + Under Ground-1.6 MTPA capacity in mine lease area of 2583.48 ha of M/s Maharashtra State Power Generation Company Ltd (MSPGCL) located in village-Tihli Rampur, Kunjemura, Gare, Saraitola, Murogaon, Radopali, Pata, Chitwahi, Dholnara, JhinkaBahal, Dolesara, Bhalumura, Sarasmal and Libra, Tehsil-Gharghoda, District- Raigarh, (Chhattisgarh), under the provisions of Environment Impact Assessment Notification, 2006 and subsequent amendments/circulars thereto subject to the compliance of the following terms & conditions / specific conditions for environmental safeguards as stated below:-

- (i) The project proponent shall obtain Consent to Establish/Operate from the State Pollution Control Boards for the proposed peak capacity of 23.60 MTPA (OC-22.0 MTPA+UG-1.6 MTPA) prior to commencement.
- (ii) As per NGT order dated 15.02. 2022 in Original Application No. 104/2018 in the matter of Shivpal Bhagat & Ors vs UIO, PP to comply with all the recommendation of Carrying Capacity Study being conducted by reputed institute by CPCB & SPCB.
- (iii) As per NGT order dated 15.02. 2022 in Original Application No. 104/2018 in the matter of Shivpal Bhagat & Ors vs UIO, Coal transportation is permitted for only one year through road from date of commissioning and subsequently, transport must be done by rail or closed conveyor belt only.
- (iv) As per NGT order dated 15.02. 2022 in Original Application No. 104/2018 in the matter of Shivpal Bhagat & Ors vs UIO, proper and free health care facilities with multispecialty treatment system shall be provided in coal mine buffer area.
- (v) As per NGT order dated 15.02. 2022 in Original Application No. 104/2018 in the matter of Shivpal Bhagat & Ors vs UIO, PP shall have to comply that when coal is sold to TPP, there is the agreement to sell that at least 25% Fly Ash of the coal sold, should be accepted by the coal company (seller) from TPP(Purchaser) failing which coal company shall be liable for civil action and other legal measures.
- (vi) Third party monitoring (by NEERI/CIMFR/IIT/NITs) for air quality shall be carried out at identified locations, both ambient and the process area, to arrive at impact of the proposed expansion.
- (vii) Top soil should be stored separately at marked area and necessary vegetation shall be maintained to avoid any entrainment of dust.
- (viii) All the recommendation of carrying capacity study shall be completed within stringent timeframe.
- (ix) PP shall construct embankment leaving 100 mtrs away from HFL of kelo river and the same shall be taken prior approval from DGMS
- (x) As proposed fresh water requirement will be 1785 KI-D, which shall be met from Kelo river

EC Gare Palma Sector II Opencast of M/s Mahagenco

EC Identification No. - EC22A042CG183991

File No. - J-11015/72/2016(A.II(M)

Date of Issue EC - 11/07/2022

Page 6 of 17



initially and later by groundwater. The total industrial water demand (peak) in operation phase shall be met by utilizing treated mine discharge water. If require, necessary arrangement shall be made to reuse treated water from STP & ETP to nearby TPP or coal washery /or future coal washery by entering suitable agreement. No wastewater (treated or untreated) shall be discharged into the river or any other water body

- (xi) All the villages coming under the zone of influence as in hydrology study shall be provided with suitable water supply alongwith sanitation facility.
- (xii) All the recommendation in Social Impact Assessment study shall be complied within stringent timeframe. Timeline should be submitted to District Collector for necessary action points.
- (xiii) Commitment made during public consultation process shall be adhere to. As proposed, Rs. 45.35 Crore is earmarked for CER activities, which shall be accomplished within period of 5 years.
- (xiv) Water quality and Bioassay test of kelo shall be monitored quarterly and submitted to State Pollution Control Board. No water shall be discharged in river.
- (xv) Quarterly monitoring of quality of water from bore hole used for drinking purpose shall be conducted and report thereof shall be submitted to SPCB.
- (xvi) Progressive backfilling of mine and progressive reclamation of OB dump shall be done.
- (xvii) To control the production of dust at source, the crusher and in-pit belt conveyors shall be provided with mist type sprinklers.
- (xviii) Mitigating measures shall be undertaken to control dust and other fugitive emissions all along the roads by providing sufficient fixed type water sprinklers. Adequate corrective measures shall be undertaken to control dust emissions, which would include mechanized sweeping, water sprinkling/mist spraying on haul roads and loading sites, long range misting/fogging arrangement, wind barrier wall and vertical greenery system, green belt, dust suppression arrangement at loading and unloading points, etc.
- (xix) Continuous monitoring of occupational safety and other health hazards, and the corrective actions need to be ensured.
- (xx) Permission from State Water Department for diversion of two nalas, one in the west side (Nala A) and one on the East side (Kamara nala) of Kelo river shall be taken before any diversion work. Impact of diversion in terms of availability of water in river shall be studied before diversion and submitted to State Water Department.
- (xxi) PP shall take permission of State Public Works Department before the proposed for diversion Roads from Bajamura to Ghargoda (approx. 11.6 km) and Milupara to Tamnar (app 3 km).
- (xxii) Persons of nearby villages shall be given training on livelihood and skill development to make them employable.
- (xxiii) PP shall submit Mine Closure Plan as per MoC latest 2019 guidelines to this Ministry within one year.
- (xxiv) Mining shall be carried out only by surface miners for the project and silo loading till railway siding through in-pit conveyor should be installed to avoid road transportation in 5 years.



- (xxv) Efforts shall be made for utilizing alternate sources of surface water, abandoned mines or else whatsoever and thus minimizing the dependability on a single source.
- (xxvi) Active OB Dump should not be kept barren/open and should be covered by temporary grass to avoid air born of particles
- (xxvii) PP shall conduct the stability study of OB dump by reputed agencies and necessary approval of DGMS.
- (xxviii) As proposed, total plantation shall be done in 2256.60ha area of land till closure of mine. Project proponent to plant 150,000 nos. of native trees with broad leaves along the transportation route in three years to prevent the effect of air pollution. After completion of tree plantation, number of trees shall be duly endorsed from District Forest Officer.
- (xxix) Project Proponent shall obtain blasting permission from DGMS for conducting mining operation near villages and also explore deployment of rock breakers of suitable capacity in the project to avoid blasting very near to villages. There shall be no damages caused to habitation/structures due to blasting activity.
- (xxx) The Project Proponent shall comply with all the statutory requirements and judgment of Hon'ble Supreme Court dated the 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors. State Government shall ensure that the entire compensation levied, if any, for illegal mining paid by the Project Proponent through their respective Department in strict compliance of judgment of Hon'ble Supreme Court dated the 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors.
- (xxxi) Project Proponent shall obtain the necessary prior permission from the Central Ground Water Authority (CGWA) in case of intersecting the Ground water table.
- (xxxii) Proponent shall appoint an Occupational Health Specialist for Regular and Periodical medical examination of the workers engaged in the Project and maintain records accordingly; also, Occupational health check-ups for workers having some ailments like BP, diabetes, habitual smoking, etc. shall be undertaken once in six months and necessary remedial/preventive measures taken accordingly. The Recommendations of National Institute for ensuring good occupational environment for mine workers shall be implemented; The prevention measure for burns, malaria and provision of anti-snake venom including all other paramedical safeguards may be ensured before initiating the mining activities.
- (xxxiii) Project Proponent shall follow the mitigation measures provided in Office Memorandum No. Z-11013/57/2014-IA.II (M), dated 29th October, 2014, titled "Impact of mining activities on Habitations-Issues related to the mining Projects wherein Habitations and villages are the part of mine lease areas or Habitations and villages are surrounded by the mine lease area".
- (xxxiv) The illumination and sound at night at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right for darkness and minimal noise levels at night, PPs must ensure that the biological clock of the villages is not disturbed; by orienting the floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day-light/night hours.



(xxxv) The project proponent shall take all precautionary measures during mining operation for conservation and protection of endangered fauna, if any, spotted in the study area. Action plan for conservation of flora and fauna shall be implemented in consultation with the State Forest and Wildlife Department. A copy of action plan shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office.

(xxxvi) Hon'ble Supreme Court in an Writ Petition(s) Civil No. 114/2014, Common Cause vs Union of India & Ors vide its judgement dated 8th January, 2020 has directed the Union of India to impose a condition in the mining lease and a similar condition in the environmental clearance and the mining plan to the effect that the mining lease holders shall, after ceasing mining operations, undertake re-grassing the mining area and any other area which may have been disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc. Compliance of this condition after the mining activity is over at the cost of the mining lease holders/Project Proponent". The implementation report of the above said condition shall be sent to the Regional Office of the MoEFCC.

4.1 The grant of environmental clearance is further subject to compliance of the Standard EC conditions as under:

(a) Statutory compliance

(i) The project proponent shall obtain forest clearance under the provisions of Forest (Conservation) Act, 1986, in case of the diversion of forest land for non-forest purpose involved in the project.

(ii) The project proponent shall obtain clearance from the National Board for Wildlife, if applicable.

(iii) The project proponent shall prepare a Site-Specific Conservation Plan / Wildlife Management Plan and approved by the Chief Wildlife Warden. The recommendations of the approved Site-Specific Conservation Plan/Wildlife Management Plan shall be implemented in consultation with the State Forest Department. The implementation report shall be furnished along with the six-monthly compliance report (in case of the presence of Schedule-I species in the study area).

(iv) The project proponent shall obtain Consent to Establish/Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 from the concerned State Pollution Control Board/ Committee.

(v) The project proponent shall obtain the necessary permission from the Central Ground Water Authority.

(vi) Solid/hazardous waste generated in the mines needs to be addressed in accordance to the Solid Waste Management Rules, 2016/Hazardous & Other Waste Management Rules, 2016.

(b) Air quality monitoring and preservation

(i) Continuous ambient air quality monitoring stations as prescribed in the statute be established in the core zone as well as in the buffer zone for monitoring of pollutants, namely PM₁₀, PM_{2.5}, SO₂ and NO_x. Location of the stations shall be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board. Online ambient air quality monitoring stations may also be



installed in addition to the regular monitoring stations as per the requirement and/or in consultation with the SPCB. Monitoring of heavy metals such as Hg, As, Ni, Cd, Cr, etc to be carried out at least once in six months.

(ii) The Ambient Air Quality monitoring in the core zone shall be carried out to ensure the Coal Industry Standards notified vide GSR 742 (E) dated 25th September, 2000 and as amended from time to time by the Central Pollution Control Board. Data on ambient air quality and heavy metals such as Hg, As, Ni, Cd, Cr and other monitoring data shall be regularly reported to the Ministry/Regional Office and to the CPCB/SPCB.

(iii) Transportation of coal, to the extent permitted by road, shall be carried out by covered trucks/conveyors. Effective control measures such as regular water/mist sprinkling/rain gun etc shall be carried out in critical areas prone to air pollution (with higher values of PM₁₀/PM_{2.5}) such as haul road, loading/unloading and transfer points. Fugitive dust emissions from all sources shall be controlled regularly. It shall be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central/State Pollution Control Board.

(iv) The transportation of coal shall be carried out as per the provisions and route envisaged in the approved Mining Plan or environment monitoring plan. Transportation of the coal through the existing road passing through any village shall be avoided. In case, it is proposed to construct a 'bypass' road, it should be so constructed so that the impact of sound, dust and accidents could be appropriately mitigated.

(v) Vehicular emissions shall be kept under control and regularly monitored. All the vehicles engaged in mining and allied activities shall operate only after obtaining 'PUC' certificate from the authorized pollution testing centres.

(vi) Coal stock pile/crusher/feeder and breaker material transfer points shall invariably be provided with dust suppression system. Belt-conveyors shall be fully covered to avoid air borne dust. Side cladding all along the conveyor gantry should be made to avoid air borne dust. Drills shall be wet operated or fitted with dust extractors.

(vii) Coal handling plant shall be operated with effective control measures w.r.t. various environmental parameters. Environmental friendly sustainable technology should be implemented for mitigating such parameters.

(c) Water quality monitoring and preservation

(i) The effluent discharge (mine waste water, workshop effluent) shall be monitored in terms of the parameters notified under the Water Act, 1974 Coal Industry Standards vide GSR 742 (E) dated 25th September, 2000 and as amended from time to time by the Central Pollution Control Board.

(ii) The monitoring data shall be uploaded on the company's website and displayed at the project site at a suitable location. The circular No. J-20012/1/2006-IA.11 (M) dated 27th May, 2009 issued by Ministry of Environment, Forest and Climate Change shall also be referred in this regard for its compliance.



(iii) Regular monitoring of ground water level and quality shall be carried out in and around the mine lease area by establishing a network of existing wells and constructing new piezometers during the mining operations. The monitoring of ground water levels shall be carried out four times a year i.e. pre-monsoon, monsoon, post-monsoon and winter. The ground water quality shall be monitored once a year, and the data thus collected shall be sent regularly to MOEF/CC/RO.

(iv) Monitoring of water quality upstream and downstream of water bodies shall be carried out once in six months and record of monitoring data shall be maintained and submitted to the Ministry of Environment, Forest and Climate Change/Regional Office.

(v) Ground water, excluding mine water, shall not be used for mining operations. Rainwater harvesting shall be implemented for conservation and augmentation of ground water resources.

(vi) Catch and/or garland drains and siltation ponds in adequate numbers and appropriate size shall be constructed around the mine working, coal heaps & OB dumps to prevent run off of water and flow of sediments directly into the river and water bodies. Further, dump material shall be properly consolidated/ compacted and accumulation of water over dumps shall be avoided by providing adequate channels for flow of silt into the drains. The drains/ ponds so constructed shall be regularly de-silted particularly before onset of monsoon and maintained properly. Sump capacity should provide adequate retention period to allow proper settling of silt material. The water so collected in the sump shall be utilised for dust suppression and green belt development and other industrial use. Dimension of the retaining wall constructed, if any, at the toe of the OB dumps within the mine to check run-off and siltation should be based on the rainfall data. The plantation of native species to be made between toe of the dump and adjacent field/habitation/water bodies.

(vii) Adequate groundwater recharge measures shall be taken up for augmentation of ground water. The project authorities shall meet water requirement of nearby village(s) after due treatment conforming to the specific requirement (standards).

(viii) Industrial waste water generated from CHP, workshop and other waste water, shall be properly collected and treated so as to conform to the standards prescribed under the standards prescribed under Water Act 1974 and Environment (Protection) Act, 1986 and the Rules made there under, and as amended from time to time. Adequate ETP /STP needs to be provided.

(ix) The water pumped out from the mine, after siltation, shall be utilized for industrial purpose viz. watering the mine area, roads, green belt development etc. The drains shall be regularly desilted particularly after monsoon and maintained properly.

(x) The surface drainage plan including surface water conservation plan for the area of influence affected by the said mining operations, considering the presence of river/rivulet/pond/lake etc. shall be prepared and implemented by the project proponent. The surface drainage plan and/or any diversion of natural water courses shall be as per the approved Mining Plan/EIA/EMP report and with due approval of the concerned State/Gol Authority. The construction of embankment to prevent any danger against inrush of surface water into the mine should be as per the approved Mining Plan and as per the permission of DGMS or any other authority as prescribed by the law.



(xi) The project proponent shall take all precautionary measures to ensure riverine/riparian ecosystem in and around the coal mine up to a distance of 5 km. A riverine/riparian ecosystem conservation and management plan should be prepared and implemented in consultation with the irrigation / water resource department in the state government.

(d) Noise and Vibration monitoring and prevention

(i) Adequate measures shall be taken for control of noise levels as per Noise Pollution Rules, 2016 in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc shall be provided with personal protective equipments (PPE) like ear plugs/muffs in conformity with the prescribed norms and guidelines in this regard. Adequate awareness programme for users to be conducted. Progress in usage of such accessories to be monitored.

(ii) Controlled blasting techniques shall be practiced in order to mitigate ground vibrations, fly rocks, noise and air blast etc., as per the guidelines prescribed by the DGMS.

(iii) The noise level survey shall be carried out as per the prescribed guidelines to assess noise exposure of the workmen at vulnerable points in the mine premises, and report in this regard shall be submitted to the Ministry/RO on six-monthly basis.

(e) Mining Plan

(i) Mining shall be carried out under strict adherence to provisions of the Mines Act 1952 and subordinate legislations made there-under as applicable.

(ii) Mining shall be carried out as per the approved mining plan (including Mine Closure Plan) abiding by mining laws related to coal mining and the relevant circulars issued by Directorate General Mines Safety (DGMS).

(iii) No mining shall be carried out in forest land without obtaining Forestry Clearance as per Forest (Conservation) Act, 1980.

(iv) Efforts should be made to reduce energy and fuel consumption by conservation, efficiency improvements and use of renewable energy.

(f) Land reclamation

(i) Digital Survey of entire lease hold area/core zone using Satellite Remote Sensing survey shall be carried out at least once in three years for monitoring land use pattern and report in 1:50,000 scale or as notified by Ministry of Environment, Forest and Climate Change(MOEFC) from time to time shall be submitted to MOEFCC/Regional Office (RO).

(ii) The final mine void depth should preferably be as per the approved Mine Closure Plan, and in case it exceeds 40 m, adequate engineering interventions shall be provided for sustenance of aquatic life therein. The remaining area shall be backfilled and covered with thick and alive top soil. Post-mining land be rendered usable for agricultural/forestry purposes and shall be diverted. Further action will be treated as specified in the guidelines for Preparation of Mine Closure Plan issued by the Ministry of Coal dated 27th August, 2009 and subsequent amendments.



(iii) The entire excavated area, backfilling, external OB dumping (including top soil) and afforestation plan shall be in conformity with the "during mining"/"post mining" land-use pattern, which is an integral part of the approved Mining Plan and the EIA/EMP submitted to this Ministry. Progressive compliance status vis-a-vis the post mining land use pattern shall be submitted to the MOEFCC/RO.

(iv) Fly ash shall be used for external dump of overburden, backfilling or stowing of mine as per provisions contained in clause (i) and (ii) of subparagraph (8) of fly ash notification issued vide SO 2804 (E) dated 3rd November, 2009 as amended from time to time. Efforts shall be made to utilize gypsum generated from Flue Gas Desulfurization (FGD) if any, along with fly ash for external dump of overburden, backfilling of mines. Compliance report shall be submitted to Regional Office of MoEF&CC, CPCB and SPCB.

(v) Further, it may be ensured that as per the time schedule specified in mine closure plan it should remain live till the point of utilization. The topsoil shall temporarily be stored at earmarked site(s) only and shall not be kept unutilized. The top soil shall be used for land reclamation and plantation purposes. Active OB dumps shall be stabilised with native grass species to prevent erosion and surface run off. The other overburden dumps shall be vegetated with native flora species. The excavated area shall be backfilled and afforested in line with the approved Mine Closure Plan. Monitoring and management of rehabilitated areas shall continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment, Forest and Climate Change/ Regional Office.

(vi) The project proponent shall make necessary alternative arrangements, if grazing land is involved in core zone, in consultation with the State government to provide alternate areas for livestock grazing, if any. In this context, the project proponent shall implement the directions of Hon'ble Supreme Court with regard to acquiring grazing land.

(g) Green Belt

(i) The project proponent shall take all precautionary measures during mining operation for conservation and protection of endangered/endemic flora/fauna, if any, spotted/reported in the study area. The Action plan in this regard, if any, shall be prepared and implemented in consultation with the State Forest and Wildlife Department.

(ii) Greenbelt consisting of 3-tier plantation of width not less than 7.5 m shall be developed all along the mine lease area as soon as possible. The green belt comprising a mix of native species (endemic species should be given priority) shall be developed all along the major approach/ coal transportation roads.

(h) Public hearing and Human health issues

(i) Adequate illumination shall be ensured in all mine locations (as per DGMS standards) and monitored weekly. The report on the same shall be submitted to this ministry & it's RO on six-monthly basis.

(ii) The project proponent shall undertake occupational health survey for initial and periodical medical examination of the personnel engaged in the project and maintain records accordingly as per the provisions of the Mines Rules, 1955 and DGMS circulars. Besides regular/periodic health



check-up, 20% of the personnel identified from workforce engaged in active mining operations shall be subjected to health check-up for occupational diseases and hearing impairment, if any, as amended time to time

(iii) Personnel (including outsourced employees) working in core zone shall wear protective respiratory devices and shall also be provided with adequate training and information on safety and health aspects.

(iv) Implementation of the action plan on the issues raised during the public hearing shall be ensured. The project proponent shall undertake all the tasks/measures as per the action plan submitted with budgetary provisions during the public hearing. Land oustees shall be compensated as per the norms laid down in the R&R policy of the company/State Government/Central Government, as applicable.

(v) The project proponent shall follow the mitigation measures provided in this Ministry's OM No.Z-11013/5712014-IA.II (M) dated 29th October, 2014, titled 'Impact of mining activities on habitations-issues related to the mining projects wherein habitations and villages are the part of mine lease areas or habitations and villages are surrounded by the mine lease area'.

(i) Corporate Environment Responsibility

(i) The company shall have a well laid down environmental policy duly approve by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental/forest/wildlife norms/conditions. The company shall have defined system of reporting infringements/deviation/violation of the environmental/forest/wildlife norms/conditions and/or shareholders/stake holders.

(ii) A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly to the head of the organization.

(iii) Action plan for implementing EMP and environmental conditions along with responsibility matrix of the company shall be prepared and shall be duly approved by competent authority. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Year wise progress of implementation of action plan shall be reported to the Ministry/Regional Office along with the Six Monthly Compliance Report.

(iv) Self environmental audit shall be conducted annually. Every three years third party environmental audit shall be carried out.

(j) Miscellaneous

(i) The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising it at least in two local newspapers of the District or State, of which one shall be in the vernacular language within seven days and in addition this shall also be displayed in the project proponent's website permanently.



(ii) The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.

(iii) The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.

(iv) The project proponent shall monitor the criteria pollutants level namely: PM₁₀, SO₂, NO_x (ambient levels) or critical sectoral parameters, indicated for the projects and display the same at a convenient location for disclosure to the public and put on the website of the company.

(v) The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on the website of the ministry of Environment, Forest and Climate Change at environment clearance portal.

(vi) The project proponent shall follow the mitigation measures provided in this Ministry's OM No.Z-11013/5712014-IA,II (M) dated 29th October, 2014, titled 'Impact of mining activities on habitations-issues related to the mining projects wherein habitations and villages are the part of mine lease areas or habitations and villages are surrounded by the mine lease area'.

(vii) The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.

(viii) The project authorities shall inform to the Regional Office of the MOEFCC regarding commencement of mining operations.

(ix) The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.

(x) The project proponent shall abide by all the commitments and recommendations made in the EIA/EEMP report, commitment made during Public Hearing and also that during their presentation to the Expert Appraisal Committee.

(xi) No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change.

(xii) Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.

(xiii) The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.

(xiv) The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.



(xv) The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information/monitoring reports.

(xvi) The above conditions shall be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any other orders passed by the Hon'ble Supreme Court of India / High Courts and any other Court of Law relating to the subject matter.

5. The proponent shall abide by all the commitments and recommendations made in the EIA/EMP report and also that during presentation to the EAC. All the commitments made on the issues raised during public hearing shall also be implemented in letter and spirit.

6. The proponent shall obtain all necessary clearances/approvals that may be required before the start of the project. The Ministry or any other competent authority may stipulate any further condition for environmental protection. The Ministry or any other competent authority may stipulate any further condition for environmental protection.

7. Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

8. The coal company/project proponent shall be liable to pay the compensation against the illegal mining, if any, and as raised by the respective State Governments at any point of time, in terms of the orders dated 2nd August, 2017 of Hon'ble Supreme Court in WP (Civil) No. 114/2014 in the matter of 'Common Cause Vs Union of India & others.

9. The concerned State Government shall ensure no mining operations to commence till the entire compensation for illegal mining, if any, is paid by the project proponent through their respective Department of Mining & Geology, in strict compliance of the judgment of Hon'ble Supreme Court.

10. This environmental clearance shall not be operational till such time the project proponent complies with the above said judgment of Hon'ble Supreme Court, as applicable, and other statutory requirements.

This issues with the approval of the competent Authority


(Lalit Bokolia)
Director

Copy to:

1. The Secretary, Ministry of Coal, Shastri Bhawan, New Delhi
2. The Secretary, Department of Environment & Forests, Government of Chattisgarh, Secretariat Raipur

EC Gare Pulma Sector II Opencast of M/s Mahagenco



- (ii) The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.
- (iii) The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.
- (iv) The project proponent shall monitor the criteria pollutants level namely; PM₁₀, SO₂, NO_x (ambient levels) or critical sectoral parameters, indicated for the projects and display the same at a convenient location for disclosure to the public and put on the website of the company.
- (v) The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on the website of the ministry of Environment, Forest and Climate Change at environment clearance portal.
- (vi) The project proponent shall follow the mitigation measures provided in this Ministry's OM No.Z-11013/5712014-IA.II (M) dated 29th October, 2014, titled 'Impact of mining activities on habitations-issues related to the mining projects wherein habitations and villages are the part of mine lease areas or habitations and villages are surrounded by the mine lease area'.
- (vii) The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.
- (viii) The project authorities shall inform to the Regional Office of the MOEFCC regarding commencement of mining operations.
- (ix) The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.
- (x) The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, commitment made during Public Hearing and also that during their presentation to the Expert Appraisal Committee.
- (xi) No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change.
- (xii) Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.
- (xiii) The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.
- (xiv) The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.



3. Deputy Director General of Forests (C), Ministry of Env., Forest and Climate Change, Integrated Regional Office, Aranya Bhawan, North Block, Sector-19 Naya Raipur, Atal Nagar, Chhattisgarh - 492002
4. Chairman, Central Ground Water Authority, Jamnagar House, 18/11, Man Singh Road Area, New Delhi, Delhi 110001
5. Member Secretary, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, Delhi - 32
6. The Chairman, Chhattisgarh State Environment Conservation Board, - -Tilak Nagar, Shiv Mandir Chowk, main Road, Avantī Vihar, Raipur Chhattisgarh 492001
7. The District Collector, Raigarh, Government of Chattisgarh
8. Monitoring File /Record File
9. PARIVESH Portal


(Lalit Bokolia)
Director



Signature Not Verified
Digitally signed by Lalit Bokolia
Scientist F
Date: 7/11/2022 12:05:56 PM

Dr. Nitin S. Wagh
Executive Director (E&S)



Azadi Ka Amrit Mahotsav

Annexure-XXIII




MAHAGENCO
Maharashtra State Power Generation Co. Ltd.

CERTIFICATE OF UNDERTAKING

In compliance to Condition no. 9 of Part B of Ministry of Environment, Forest and Climate Change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake to confirm that *"No labour camp shall be established on the forest land and the Mahagenco shall provide fuels preferably alternate fuels to the labourers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas"*.

DATE: 12 JUL 2022


(Dr. Nitin S. Wagh)

Executive Director (E&S and GP)



Dr. Nitin S. Wagh
Executive Director (E&S)



Annexure-XXIV



CERTIFICATE OF UNDERTAKING

In compliance to Condition no. 10 of Part B of Ministry of Environment, Forest and Climate Change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake to confirm that *"The boundary of the diverted forest land, mining lease and safety zone, as applicable, shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, distance from pillar to pillar and GPS coordinates"*.

DATE: 12 JUL 2022


(Dr. Nitin S. Wagh)

Executive Director (E&S and GP)



Dr. Nitin S. Wagh
Executive Director (E&S)



Annexure-XXV



CERTIFICATE OF UNDERTAKING

In compliance to Condition no. 11 of Part B of Ministry of Environment, Forest and Climate Change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake to confirm that *"The layout plan of the mining plan/proposal shall not be changed without the prior approval of the Central Government and the forest land shall not be used for any purpose other than that specified in the proposal"*.

DATE: '12 JUL 2022


(Dr. Nitin S. Wagh)

Executive Director (E&S and GP)



Dr. Nitin S. Wagh
Executive Director (E&S)



Annexure-XXVI



CERTIFICATE OF UNDERTAKING

In compliance to Condition no. 12 of Part B of Ministry of Environment, Forest and Climate Change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake to confirm that *"The forest land proposed to be diverted shall under no circumstances be transferred to any other agency, department or person without prior approval of the Central Government"*.

DATE: 12 JUL 2022


(Dr. Nitin S. Wagh)

Executive Director (E&S and GP)



Dr. Nitin S. Wagh
Executive Director (E&S)



Annexure-XXVII



CERTIFICATE OF UNDERTAKING

In compliance to Condition no. 13 of Part B of Ministry of Environment, Forest and Climate Change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake to confirm that *"No damage to the flora and fauna of the adjoining area shall be caused"*.

DATE: 12 JUL 2022


(Dr. Nitin S. Wagh)

Executive Director (E&S and GP)



Dr. Nitin S. Wagh
Executive Director (E&S)



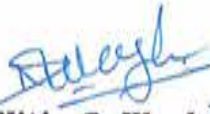
Annexure-XXVIII



CERTIFICATE OF UNDERTAKING

In compliance to Condition no. 14 of Part B of Ministry of Environment, Forest and Climate Change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake to confirm that *"Mahagenco shall submit the annual self-compliance report in respect of the above stated conditions to the State Government, concerned Regional Office and to this Ministry by the end of March every year regularly"*.

DATE: 12 JUL 2022


(Dr. Nitin S. Wagh)
Executive Director (E&S and GP)



Dr. Nitin S. Wagh
Executive Director (E&S)



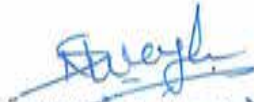
Annexure-XXIX



CERTIFICATE OF UNDERTAKING

In compliance to Condition no. 15 of Part B of Ministry of Environment, Forest and Climate Change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake to confirm that *"Mahagenco shall comply with any other condition that the concerned Regional Office of this Ministry may stipulate with the approval of competent authority in the interest of conservation, protection and development of forests & wildlife"*.

DATE: 12 JUL 2022


(Dr. Nitin S. Wagh)

Executive Director (E&S and GP)



Dr. Nitin S. Wagh
Executive Director (E&S)



Annexure-XXX



CERTIFICATE OF UNDERTAKING

In compliance to Condition no. 16 of Part B of Ministry of Environment, Forest and Climate Change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake to confirm that *"Mahagenco shall comply all the provisions of the all Acts, Rules, Regulations, Guidelines, Hon'ble Court Order (s) and NGT Order (s) pertaining to this project, if any, for the time being in force, as applicable to the project"*.

DATE: 12 JUL 2022


(Dr. Nitin S. Wagh)

Executive Director (E&S and GP)



Dr. Nitin S. Wagh
Executive Director (E&S)




Annexure-XXXI



CERTIFICATE OF UNDERTAKING

In compliance to Condition no. 17 of Part B of Ministry of Environment, Forest and Climate Change, letter no. 8-06/2022-FC dated 2nd June 2022, I Dr. Nitin S. Wagh, Executive Director (E&S and GP) on behalf of Maharashtra State Power Generation Company Limited (Mahagenco), hereby undertake to acknowledge that "Violation of any of these conditions will amount to violation of Forest (Conservation) Act, 1980 and action would be taken as prescribed in para 1.21 of Chapter 1 of the Handbook of comprehensive guidelines of Forest (Conservation) Act, 1980 as issued by this Ministry's letter No. 5-2/2017-FC dated 28.03.2019".

DATE: 12 JUL 2022


(Dr. Nitin S. Wagh)

Executive Director (E&S and GP)

