



File No.: 495357/43-MINB1/09-2024
Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Level Expert Appraisal
Committee(SEAC), ODISHA)



Dated 27/09/2024



To,

KOLA ASHOK
Sai priya nagar 11th lane, Rayagada, ODISHA, Pin - 765001
bahinipatikeredasand@gmail.com

Subject: Grant of Standard Terms of Reference (ToR) to the proposed Project under the EIA Notification 2006 and as amended thereof-regarding.

Sir/Madam,

This is in reference to your application submitted to SEAC vide proposal number SIA/OR/MIN/495357/2024 dated 05/09/2024 for grant of Terms of Reference (ToR) to the project under the provision of the EIA Notification 2006 and as amended thereof.

2. The particulars of the proposal are as below :

(i) ToR Identification No.	TO24B0107OR5550391N
(ii) File No.	495357/43-MINB1/09-2024
(iii) Clearance Type	Fresh ToR
(iv) Category	B1
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals
(vii) Name of Project	PROPOSAL FOR ENVIRONMENT CLEARANCE OF BAHINIPATI KERADA SAND BED OVER AN AREA 18.80 ACRE/ 7.608 HA. LOCATED AT VILLAGE- BAHINIPATI KERADA TAHASIL-RAYAGADA DIST- RAYAGADA, ODISHA.
(viii) Name of Company/Organization	KOLA ASHOK
(ix) Location of Project (District, State)	RAYAGADA, ODISHA
(x) Issuing Authority	SEAC
(xii) Applicability of General Conditions	NO

3. The **SEAC** has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after detailed examination hereby decided to grant Standard Terms of

Reference to the instant proposal of **MR KOLA ASHOK** under the provisions of the aforementioned Notification.

4. The brief about products and by products as submitted by the Project proponent in Form-1 (Part A, B) and Standard Terms of Reference are annexed to this letter as Annexure (1).
5. The Ministry reserves the right to stipulate additional TORs, if found necessary.
6. The Standard Terms of Reference (ToR) to the aforementioned project is under provisions of EIA Notification, 2006 and as amended thereof. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/ Regulations or Statutes, as applicable, to the project.
7. The granted letter, all the documents submitted as a part of application viz. Form-1 Part A and Part B are available on PARIVESH portal which can be accessed by scanning the QR Code above.

Copy To

1. Additional Chief Secretary, Forest, Environment & Climate Change Dept., Government of Odisha for information.
2. Member Secretary, State Pollution Control Board, Odisha, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-8, Bhubaneswar for information.
3. Member Secretary, SEAC, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar for information.
4. Deputy D.G.Forest., Integrated Regional Office (IRO), Ministry of Environment & Forests, A/3, Chandrasekharpur, Bhubaneswar for information.
5. Director of Mines, Steel & Mines Dept., Govt. of Odisha
6. Collector & ADM, Rayagada /Sub Collector, Rayagada /, DFO, Rayagada, Mining Officer, Rayagada for Information and necessary action.
7. Guard file for record/Website/Parivesh Portal.

Annexure 1

Standard Terms of Reference for conducting Environment Impact Assessment Study for Mining of minerals and information to be included in EIA/EMP report

1. Project Details

Sr. No.	Terms of Reference
1.1	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994. The production details need to submit since inception of mine duly authenticated by Department of Mines & Geology, State Government.
1.2	A copy of the document in support of rightful lessee of the mine should be submitted. In case of new mines copy of LoI granted by State Government to be submitted. PP should ensure that LoI is valid at the time of grant of ToR. PP should submit the copy of lease deed/supplementary lease deed/extension letter/transfer deed, from its initial grant to subsequent renewals/ transfer/extension of validity.
1.3	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.

Sr. No.	Terms of Reference
1.4	PP should submit the District Survey Report (DSR) as per S.O. 3611(E) dated 25.07.2018 in case of minor minerals.
1.5	Brief of proposal to be submitted which include total excavation of the material required for the production of certain quantity of the minerals, location of the project, mining lease area, latitude longitude, seismic zone etc. In case of expansion project details of expansion viz. expansion in mining lease area or expansion in production of any particular mineral or expansion in total excavation, latest certified Compliance report (CCR) from IRO of conditions granted in existing EC needs to be submitted.
1.6	The PP should submit the real-time aerial video footage & video of the mining lease area and of the transportation route.
1.7	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
1.8	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
1.9	The PP should collect the Baseline data (BLD) in respect of initial level of the mining lease. For this permanent bench marks (BM) needs to be established at prominent location preferably close to mining leases in question and should have precisely known relationship to the level datum of the area, typically mean sea level.
1.10	In case of sand mining, the entire mining lease area should be divided suitably into grids of 25 m x 25 m with the help of sections across the width of river and along the direction of flow of the river. The levels (MSL & RL) of the corner point of each grid needs to be recorded. Each Grid should be suitably numbered for identification. PP should identify grids which will be worked out and grids which will come under no mining zone i.e. safety barriers from the river bank. PP should comply with the sustainable sand mining management guidelines 2016 and enforcement and monitoring guidelines, 2020 etc.
1.11	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.
1.12	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
1.13	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
1.14	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.

Sr. No.	Terms of Reference
1.15	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
1.16	Compliance of the Ministry's Office Memorandum No. F: 3-50/2017-IA.III (Pt.), dated 30.05.2018 on the 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 needs to be submitted and included in the EIA/EMP Report.

2. Forest

Sr. No.	Terms of Reference
2.1	PP shall submit a certificate from Chief Conservator of Forests regarding involvement of Forest Land in the mining lease area if any. In case forest land is involved i) PP should submit the proof of application made for obtaining forest clearance and ii) a map clearly showing the forest & non-forest area.
2.2	Status of forestry clearance for the broken-up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.
2.3	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.
2.4	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.

3. Court Matters

Sr. No.	Terms of Reference
3.1	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.

4. Land Environment

Sr. No.	Terms of Reference
4.1	PP should submit the details of survey number [viz. survey no, area in hectare, classification of land (government, private, forest, grazing land etc.), villages] duly authenticated by State Government, falling in the mining lease area.
4.2	The study area will comprise of 10km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.
4.3	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.

Sr. No.	Terms of Reference
4.4	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.

5. Wildlife

Sr. No.	Terms of Reference
5.1	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.
5.2	A detailed biological study of the study area [core zone and buffer zone] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. PP shall submit list of Schedule-1 species present in core and buffer zone duly authenticated by CWLW. In case of any Scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest/Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost. Proof of its submission of conservation plan to the CWLW needs to be submitted.
5.3	PP shall submit a certificate from Chief Wildlife Warden regarding distance of mining lease from the protected area falling within 10 KM of the mining lease. In case project requires clearance under Wildlife (Protection) Act, 1972 then copy of application made for the same needs to be submitted.

6. Baseline Environment

Sr. No.	Terms of Reference
6.1	One season (non-monsoon) [i.e. March - May (Summer Season); October - December (post monsoon season); December - February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.
6.2	Air quality modelling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modelling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The windrose showing pre-dominant wind direction may also be indicated on the map.
6.3	The PP should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this, PP should submit the original test reports and certificates of the labs from which samples were analyzed.

7. Water Environment

Sr. No.	Terms of Reference
7.1	The water requirement for the Project, its availability and source should be furnished. Quantity of surface or ground water to be used for the Project should be indicated. A detailed water balance should also be provided. Submit the year wise target for reduction in consumption of the ground/surface water by developing alternative source of water through rain water harvesting measures. Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided. The capital and recurring expenditure to be incurred needs to be submitted.
7.2	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.

8. Hydro Geology

Sr. No.	Terms of Reference
8.1	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be.
8.2	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and BGL. A schematic diagram may also be provided for the same.
8.3	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working bench will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished. In case of surface water is proposed to be utilized then Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.

9. Transportation

Sr. No.	Terms of Reference
9.1	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.

10. Land Acquisition and R&R

Sr. No.	Terms of Reference
10.1	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.
10.2	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While

Sr. No.	Terms of Reference
	preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need-based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.

11. Socio-Economic Environment

Sr. No.	Terms of Reference
11.1	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
11.2	Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
11.3	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
11.4	Activity-wise time-bound action plan on the issues raised and commitment made during public hearing to be submitted as part of the final EMP Report in compliance of the Ministry's OM F.No.22-65/2017-IA.III dated 30th September, 2020.

12. Environmental Monitoring and Management

Sr. No.	Terms of Reference
12.1	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the proposed safeguard measures in each case should also be provided.
12.2	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.

13. Critically Polluted Areas, Aravali & CRZ

Sr. No.	Terms of Reference
13.1	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali

Sr. No.	Terms of Reference
	Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.
13.2	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).

14. Risk Assessment & Disaster Management

Sr. No.	Terms of Reference
14.1	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.
14.2	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
14.3	A Disaster Management Plan shall be prepared and included in the EIA/EMP Report.

15. Miscellaneous

Sr. No.	Terms of Reference
15.1	The general points are also to be followed: - a) All documents to be properly referenced with index and continuous page numbering. b) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated. c) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project. d) Where the documents provided are in a language other than English, an English translation should be provided. e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted. f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed. g) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation. h) As per the circular no. J-11011/618/2010-IA.II (I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable. i) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.

16.

Sr. No.	Terms of Reference
16.1	An EIA-EMP Report would be prepared for a combined peak capacity ofMTPA for OC-cum-UG project which consists of MTPA in an ML/project area of ha for OC and MTPA for UG in an ML/project area of ha based on the generic structure specified in Appendix III of the EIA Notification 2006.
16.2	An EIA-EMP Report would be prepared for MTPA rated capacity to cover the impacts and environment management plan for the project specific activities on the environment of the region, and the environmental quality encompassing air, water, land, biotic community, etc. through collection of data and information, generation of data on impacts including prediction modeling for..... MTPA of coal production based on approved project/Mining Plan for.....MTPA. Baseline data collection can be for any season (three months) except monsoon.
16.3	The ToRs prescribed for both opencast and underground mining are applicable for opencast – cum-underground mining.
16.4	Information on the following aspects of the corporate Environment Responsibility should also be provided for opencast, underground and opencast-cum-underground Min
16.5	Corporate Environment Responsibility:
16.6	The Company must have a well laid down Environment Policy approved by the Board of Directors.
16.7	The Environment Policy must prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the environmental or forest norms/ conditions.
16.8	The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions must be furnished.
16.9	To have proper checks and balances, the company should have a well laid down system of reporting of non-compliances/violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at large
16.10	The condition prescribed in standard ToR separately for opencast and under ground mine to also be followed and also of coal washery if located within lease area or near to the mine lease area
16.11	An EIA-EMP Report shall be prepared for..... MTPA peak capacity in an ML/project area of.....ha based on the generic structure specified in Appendix III of the EIA Notification, 2006.
16.12	An EIA-EMP Report would be prepared for..... MTPA peak capacity to cover the impacts and environment management plan for the project specific activities on the environment of the region, and the environmental quality encompassing air, water, land, biotic community, etc. through collection of data and information, generation of data on impacts including prediction modeling for MTPA of coal production based on approved project/Mining Plan for.....MTPA. Baseline data collection can be for any season (three months) except monsoon.
16.13	If the washery is located within the mine lease or near to the mine lease its location should be cited separately also, providing pillar coordinates and site layout plan. In such cases cumulative impact of mine operation with washery to be assessed and EMP measure to be drawn to the worst scenario
16.14	Plan of mechanized transportation of coal to coal washery also for rejects and washed coal to be drawn

Sr. No.	Terms of Reference
16.15	Propoer KML file with pin drop and coordinate of mine at 500-1000 m interval be provided
16.16	A toposheet specifying locations of the State, District and Project site should be provided.
16.17	A Study area map of the core zone (project area) and 10 km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical features such as the land use, surface drainage pattern including rivers/streams/nullahs/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries, mines, washery and other polluting sources. In case of ecologically sensitive areas such as Biosphere Reserves/National Parks/WL Sanctuaries/ Elephant Reserves, forests (Reserved/Protected), migratory corridors of fauna, and areas where endangered fauna and plants of medicinal and economic importance found in the 15 km study area should be given. The above details to be furnished in tabular form also.
16.18	Land use map (1: 50,000 scale) based on a recent satellite imagery of the study area may also be provided with explanatory note on the land use.
16.19	Map showing the core zone delineating the agricultural land (irrigated and un-irrigated, uncultivable land as defined in the revenue records, forest areas (as per records), along with other physical features such as water bodies, etc should be furnished.
16.20	A contour map showing the area drainage of the core zone and 25 km of the study area (where the water courses of the core zone ultimately join the major rivers/streams outside the lease/project area) should also be clearly indicated in the separate map.
16.21	A detailed Site plan of the mine showing the proposed break-up of the land for mining operations such as the quarry area, OB dumps, green belt, safety zone, buildings, infrastructure, CHP, ETP, Stockyard, township/colony (within and adjacent to the ML), undisturbed area -if any, and landscape features such as existing roads, drains/natural water bodies to be left undisturbed along with any natural drainage adjoining the lease /project areas, and modification of thereof in terms of construction of embankments/bunds, proposed diversion/re-channelling of the water courses, etc., approach roads, major haul roads, etc should be indicated.
16.22	In case of any proposed diversion of nallah/canal/river, the proposed route of diversion/modification of drainage and their realignment, construction of embankment etc. should also be shown on the map as per the approval of Irrigation and flood control Department of the concerned state.
16.23	Catchment area with its drainage map of 25 km area within and outside the mine shall be provided with names, details of rivers/ riverlet system and its respective order. The map should clearly indicate drainage pattern of the catchment area with basin of major rivers. Diversion of drains/ river need eloboration in form of lengthe, quantity and quality of water to be diverted
16.24	Prior in principle approval from the respective state govt shall be required in cases where PP proposes diversion of river/ stream/ nallah/ drains. However, state approval shall not be finally considered before the appraisal by EAC. PP shall have submitted detailed project report in case where diversion is required with emphasis on hydrological study
16.25	Similarly if the project involves diversion of any road/railway line passing through the ML/project area, the proposed route of diversion and its realignment should be shown in the map along with the status of the approval of the competent authority.

Sr. No.	Terms of Reference																																													
16.26	Break up of lease/project area as per different land uses and their stage of acquisition should be provided. LANDUSE DETAILS FOR OPENCAST PROJECT should be given as per the following table: <table><tr><th>Sl. No.</th><th>Landuse</th><th>Within ML area/project area (ha)</th><th>Outside ML area/project area (ha)</th><th>Total</th></tr><tr><td>1</td><td>Agricultural land</td><td></td><td></td><td></td></tr><tr><td>2</td><td>Forest land</td><td></td><td></td><td></td></tr><tr><td>3</td><td>Wasteland</td><td></td><td></td><td></td></tr><tr><td>4</td><td>Grazing land</td><td></td><td></td><td></td></tr><tr><td>5</td><td>Surface water bodies</td><td></td><td></td><td></td></tr><tr><td>6</td><td>Settlements</td><td></td><td></td><td></td></tr><tr><td>7</td><td>Others (specify)</td><td></td><td></td><td></td></tr><tr><td></td><td>Total</td><td></td><td></td><td></td></tr></table>	Sl. No.	Landuse	Within ML area/project area (ha)	Outside ML area/project area (ha)	Total	1	Agricultural land				2	Forest land				3	Wasteland				4	Grazing land				5	Surface water bodies				6	Settlements				7	Others (specify)					Total			
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16.27	Break-up of lease/project area as per mining plan should be provided.																																													
16.28	Impact of changes in the land use due to the project if the land is predominantly agricultural land/forestland/grazing land, should be provided.																																													
16.29	Study on the existing flora and fauna in the study area (10km) should be carried out by an institution of relevant discipline. The list of flora and fauna duly authenticated separately for the core and study area and a statement clearly specifying whether the study area forms a part of the migratory corridor of any endangered fauna should be given. If the study area has endangered flora and fauna, or if the area is occasionally visited or used as a habitat by Schedule-I species, or if the project falls within 15 km of an ecologically sensitive area, or used as a migratory corridor then a Comprehensive Conservation Plan along with the appropriate budgetary provision should be prepared and submitted with EIA-EMP Report; and comments/observation from the CWLW of the State Govt. should also be obtained and furnished.																																													
16.30	One-season (other than monsoon) primary baseline data on environmental quality - air (PM10, PM2.5, SOx, NOx and heavy metals such as Hg, Pb, Cr, As, etc), noise, water (surface and groundwater), soil - along with one-season met data coinciding with the same season for AAQ collection period should be provided. The detail of NABL/ MoEF&CC certification of the respective laboratory and NABET accreditation of the consultant to be provided.																																													
16.31	Map (1: 50, 000 scale) of the study area (core and buffer zone) showing the location of various sampling stations superimposed with location of habitats, other industries/mines, polluting sources, should be provided. The number and location of the sampling stations in both core and buffer zones should be selected on the basis of size of lease/project area, the proposed impacts in the downwind (air)/downstream (surface water)/groundwater regime (based on flow). One station should be in the upwind/upstream/non-impact/non-polluting area as a control station. The monitoring should be as per CPCB guidelines and parameters for water testing for both ground water and surface water as per ISI standards and CPCB classification wherever applicable. Observed values should be provided along with the specified standards.																																													
16.32	For proper baseline air quality assessment, Wind rose pattern in the area should be reviewed and accordingly location of AAMSQ shall be planned by the collection of air quality data by adequate monitoring stations in the downwind areas. Monitoring location for collecting baseline data should cover overall the 10 km buffer zone i.e. dispersed in 10 km buffer area. In case of expansion, the displayed data of CAAQMS and its comparison with the monitoring data to be provided																																													

Sr. No.	Terms of Reference
16.33	A detailed traffic study along with presence of habitation in 100 mts distance from both side of road, the impact on the air quality with its proper measures and plan of action with timeline for widening of road. The project will increase the no. of vehicle along the road which will indirectly contribute to carbon emission so what will be the compensatory action plan should be clearly spell out in EIA/ EMP report.
16.34	The socio-economic study to conducted with actual survey report and a comparative assessment to be provided from the census data should be provided in EIA/ EMP report also occupational status & economic status of the study area and what economically project will contribute should be clearly mention. The study should also include the status of infrastructural facilities and amenities present in the study area and a comparative assessment with census data to be provided and to link it with the initialization and quantification of need based survey for CSR activities to be followed.
16.35	The Ecology and biodiversity study should also indicate the likely impact of change in forest area for surface infrastructural development or mining activity in relation to the climate change of that area and what will be the compensatory measure to be adopted by PP to minimize the impact of forest diversion.
16.36	Impact of proposed project/activity on hydrological regime of the area shall be assessed and report be submitted. Hydrological studies as per GEC 2015 guidelines to be prepared and submitted
16.37	Details of mineral reserves, geological status of the study area and the seams to be worked, ultimate working depth and progressive stage-wise working scheme until the end of mine life should be provided on the basis of the approved rated capacity and calendar plans of production from the approved Mining Plan. Geological maps and sections should be included. The Progressive mine development and Conceptual Final Mine Closure Plan should also be shown in figures. Details of mine plan and mine closure plan approval of Competent Authority should be furnished for green field and expansion projects.
16.38	Details of mining methods, technology, equipment to be used, etc., rationale for selection of specified technology and equipment proposed to be used vis-à-vis the potential impacts should be provided.
16.39	Impact of mining on hydrology, modification of natural drainage, diversion and channeling of the existing rivers/water courses flowing though the ML and adjoining the lease/project and the impact on the existing users and impacts of mining operations thereon.
16.40	Forest diversion shall be only proposed for coal bearing areas. No non-essential infrastructure, office, workshop etc shall be propsed or developed in forest area. No forest area shall be used for OB dump, accordingly Mine plan to be prepared
16.41	Detail of OB recovery for reutilization of minerals from mining shall be explored
16.42	OB dump management from its extraction, transportation to reutilization, disposal / backfilling, to be carry on in a manner to mininmize its impact. A detail to be furnished in EIA/EMP report
16.43	Detailed water balance should be provided. The break-up of water requirement for the various mine operations should be given separately.
16.44	Flow chart of water balance should be provided. Treatment of effluents from workshop, township, domestic wastewater, mine water discharge, etc. should be provided. Details of STP in colony and ETP in mine should be given. Recycling of water to the max. possible extent should be done.
16.45	PP shall submit design details of all Air Pollution control equipment (APCEs) to be implemented as part of

Sr. No.	Terms of Reference
	Environment Management Plan vis-à-vis reduction in concentration of emission for each APCEs
16.46	PP shall propose and explore to use LNG/CNG based mining machineries and trucks for mining operation and transportation of coal. The measures adopted to conserve energy or use of renewable sources shall be submitted.
16.47	PP to evaluate the green house emission gases from the mine operation/ washery plant and corresponding carbon absorption plan.
16.48	Site specific impact assessment with its respective measure to be provided
16.49	Impact of mining and water abstraction from the mine on the hydrogeology and groundwater regime within the core zone and 10 km buffer zone including long-term monitoring measures should be provided. Details of rainwater harvesting and measures for recharge of groundwater should be reflected in case there is a declining trend of groundwater availability and/or if the area falls within dark/grey zone.
16.50	Impact of blasting, noise and vibrations should be given.
16.51	Impacts of mining on the AAQ and predictions based on modeling using the ISCST-3 (Revised) or latest model should be provided.
16.52	Impacts of mineral transportation within the mining area and outside the lease/project along with flow-chart indicating the specific areas generating fugitive emissions should be provided. Impacts of transportation, handling, transfer of mineral and waste on air quality, generation of effluents from workshop etc, management plan for maintenance of HEMM and other machinery/equipment should be given. Details of various facilities such as rest areas and canteen for workers and effluents/pollution load emanating from these activities should also be provided.
16.53	Effort be made to reduce/eliminate road transport of coal inside and outside mine and for mechanized loading of coal through CHP/ Silo into wagons and trucks/tippers.
16.54	Details of waste OB and topsoil generated as per the approved calendar programme, and their management shown in figures as well explanatory notes tables giving progressive development and mine closure plan, green belt development, backfilling programme and conceptual post mining land use should be given. OB dump heights and terracing based on slope stability studies with a max of 28o angle as the ultimate slope should be given. Sections of final dumps (both longitudinal and cross section) with relation to the adjacent area should be shown.
16.55	Efforts be made for maximising progressive internal dumping of O.B., sequential mining, external dump on coal bearing area and later rehandling into the mine void.--to reduce land degradation.
16.56	Impact of change in land use due to mining operations and plan for restoration of the mined area to its original land use should be provided.
16.57	Progressive Green belt and ecological restoration /afforestation plan (both in text, figures and in theAdequate greenbelt nearby areas, coal stock yard and transportaion area of coal shall be provided with details of species selected and survival rate. Adequate greenbelt nearby areas, coal stock yard and transportaion area of coal shall be provided with details of species selected and survival rate Greenbelt development should be undertaken particularly around the transport route and CHP. Table 2 : Stage Wise Cumulative Plantation

Sr. No.	Terms of Reference						
16.58	H341						
	S.N. Land use Category		Present (1st Year)	5th Year	10th Year	20th Year	24th Year (end of mine life)*
	1	Backfilled Area(Reclaimed with plantation)					
	2	Excavated Area (not reclaimed)/void					
	3	External OB dump Reclaimed with plantation)					
	4	Reclaimed Top soil dump					
	5	Green Built Area					
	6	Undisturbed area (brought under plantation)					
	7	Roads (avenue plantation)					
	8	Area around buildings and Infrastructure					
	Total						
	6						
	S. No.	YEAR*	Green Belt	External Dump	Backfilled Area	Others(Undisturbed Area/etc)) TOTAL	
	1	1st year					
	2	3rd year					
	3	5th year					
	4	10th year					
	5	15th year					
	20th year						
	7	25th year					
	8	30th year					
	9	34th year(end of mine life)					
	10	34- 37th Year (Post-mining)					
Conceptual Final Mine Closure Plan and post mining land use and restoration of land/habitat to the pre-mining status should be provided. A Plan for the ecological restoration of the mined out area and post mining land use should be prepared with detailed cost provisions. Impact and management of wastes and issues of re-handling (wherever applicable) and backfilling and progressive mine closure and reclamation should be furnished. Table 3: Post-Mining Landuse Pattern of ML/Project Area (ha)							
S.N. Land use during Mining		Land Use (ha)					
		Plantation	Water Body	Public Use	Undisturbed	Total	
1	External OB Dump						
2	Top soil Dump						
3	Excavation						
4	Roads						
5	Built up area						
6	Green Belt						
7	Undisturbed Area						
Total							

Sr. No.	Terms of Reference
16.59	Occupational health issues. Baseline data on the health of the population in the impact zone and measures for occupational health and safety of the personnel and manpower in the mine should be given.
16.60	Site specific Risk Assessment and Disaster Preparedness and Management Plan should be provided.
16.61	(i) Integration of the Env. Management Plan with measures for minimizing use of natural resources - water, land, energy, etc. should be carried out.
16.62	Cost of EMP (capital and recurring) should be included in the project cost and for progressive and final mine closure plan.
16.63	Details of R&R. Detailed project specific R&R Plan with data on the existing socio- economic status of the population (including tribals, SC/ST, BPL families) found in the study area and broad plan for resettlement of the displaced population, site for the resettlement colony, alternate livelihood concerns/employment for the displaced people, civic and housing amenities being offered, etc and costs along with the schedule of the implementation of the R&R Plan should be given.
16.64	CSR Plan along with details of villages and specific budgetary provisions (capital and recurring) for specific activities over the life of the project should be given.
16.65	a) The Company must have a well laid down Environment Policy approved by the Board of Directors.
16.66	b) The Environment Policy must prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the environmental or forest norms/conditions.
16.67	c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions must be furnished.
16.68	d) To have proper checks and balances, the company should have a well laid down system of reporting of non-compliances/violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at large.
16.69	f) In built mechanism of self-monitoring of compliance of environmental regulations should be indicated.
16.70	Details on Public Hearing should cover the information relating to notices issued in the newspaper, proceedings/minutes of Public Hearing, the points raised by the general public and commitments made by the proponent and the time bound action proposed with budgets in suitable time frame. These details should be presented in a tabular form. If the Public Hearing is in the regional language, an authenticated English Translation of the same should be provided.
16.71	Status of any litigations/ court cases filed/pending on the project should be provided.
16.72	Submission of sample test analysis of Characteristics of coal: This should include details on grade of coal and other characteristics such as ash content, S and heavy metals including levels of Hg, As, Pb, Cr etc.
16.73	Copy of clearances/approvals such as Forestry clearances, Mining Plan Approval, mine closer plan approval. NOC from Flood and Irrigation Dept. (if req.), etc. wherever applicable.
16.74	FOREST CLEARANCE: Details on the Forest Clearance should be given as per the format given:

Sr. No.	Terms of Reference
	TOTAL ML/PROJECT AREA (ha) TOTAL FORESTLAND AND Date of FC (ha) Balance area for Status of appl for. which FC is yet to be diversion of forest land obtained If more than, provide details of each FC
16.75	PP shall submit clarification from PCCF that mine does not falls under corridors of any National Park and Wildlife Sanctuary with certified map showing distance of nearest sanctuary.
16.76	Source of water for use in mine, sanction of the Competent Authority in the State Govt. and impacts vis-à-vis the competing users in the upstream and downstream of the project site. should be given.
16.77	In case of expansion of the proposal, the status of the work done/activities as per mining plan and mine closure plan and progressive reclamation of OB dump shall be detailed in EIA/ EMP report
16.78	A copy of application submitted for 5 star rating system to Ministry of coal for expansion cases may be provided. Certificate /rating given to project shall be provided with EIA-EMP report
16.79	PP shall carry out survey through drone highlighting the ground reality for atleast 10 minutes
16.80	Detailed Chronology of the project starting from the first lease deed allotted/Block allotment/ Land acquired to its No. of renewals, CTO /CTE with details of no. renewals, previous EC(s) granted details and its compliance details, NOC details from various Govt bodies like Forest NOC(s), CGWA permissions, Power permissions, etc as per the requisites respectively to be furnished in tabular form.
16.81	The first page of the EIA/ EMP report must mention the peak capacity production, area, detail of PP, Consultant (NABET accreditation) and Laboratory (NABL / MoEF & CC certification)
16.82	The compliances of ToR must be properly cited with respective chapter section and page no in tabular form and also mention sequence of the respective ToR complied within the EIA-EMP report in all the chapter,s section.
16.83	An EIA-EMP Report shall be prepared for peak capacity (.....MTPA)operation in an ML/project area of.....ha based on the generic structure specified in Appendix III of the EIA Notification, 2006.
16.84	An EIA-EMP Report would be prepared for peak capacity operation to cover the impacts and environment management plan for the project specific activities on the environment of the region, and the environmental quality encompassing air, water, land, biotic community, etc. through collection of data and information, generation of data on impacts including prediction modeling for..... MTPA of coal production based on approved project/Mining Plan for.....MTPA. Baseline data collection can be for any season (three months) except monsoon.
16.85	A Study area map of the core zone (project area) and 10 km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical features such as the land use, surface drainage pattern including rivers/streams/nullahs/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries, mines, coal washery and other polluting sources. In case of

Sr. No.	Terms of Reference																																										
	ecologically sensitive areas such as Biosphere Reserves/National Parks/WL Sanctuaries/ Elephant Reserves, forests (Reserved/Protected), migratory corridors of fauna, and areas where endangered fauna and plants of medicinal and economic importance found in the 15 km study area should be given. The above details to be furnished in tabular form also																																										
16.86	(Details of mineral reserves, geological status of the study area and the seams to be worked, ultimate working depth and progressive stage-wise working scheme until the end of mine life should be provided on the basis of the approved rated capacity and calendar plans of production from the approved Mining Plan. Geological maps and sections should be included. The Progressive mine development and Conceptual Final Mine Closure Plan should also be shown in figures. Details of mine plan and mine closure plan approval of Competent Authority should be furnished for green field and expansion projects.																																										
16.87	Original land use (agricultural land/forestland/grazing land/wasteland/water bodies) of the area should be provided as per the tables given below. Impacts of project, if any on the land use, in particular, agricultural land/forestland/grazing land/water bodies falling within the lease/project and acquired for mining operations should be analyzed. Extent of area under surface rights and under mining rights should be specified. Area under Surface Rights <table><tr><th>S.N ML/Project Land use</th><th>Area under Surface Rights(ha)</th><th>Area Under Mining Rights(ha)</th><th>Area under Both (ha)</th></tr><tr><td>1 Agricultural land</td><td></td><td></td><td></td></tr><tr><td>2 Forest Land</td><td></td><td></td><td></td></tr><tr><td>3 Grazing Land</td><td></td><td></td><td></td></tr><tr><td>4 Settlements</td><td></td><td></td><td></td></tr><tr><td>5 Others (specify)</td><td></td><td></td><td></td></tr></table> <table><tr><th>S.N.</th><th>Details</th><th>Area (ha)</th></tr><tr><td>1</td><td>Buildings</td><td></td></tr><tr><td>2</td><td>Infrastructure</td><td></td></tr><tr><td>3</td><td>Roads</td><td></td></tr><tr><td>4</td><td>Others (specify)</td><td></td></tr><tr><td></td><td>Total</td><td></td></tr></table>	S.N ML/Project Land use	Area under Surface Rights(ha)	Area Under Mining Rights(ha)	Area under Both (ha)	1 Agricultural land				2 Forest Land				3 Grazing Land				4 Settlements				5 Others (specify)				S.N.	Details	Area (ha)	1	Buildings		2	Infrastructure		3	Roads		4	Others (specify)			Total	
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4	Others (specify)																																										
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16.88	One-season (other than monsoon) primary baseline data on environmental quality - air (PM10, PM2.5, SOx, NOx and heavy metals such as Hg, Pb, Cr, As, etc), noise, water (surface and groundwater), soil - along with one-season met data coinciding with the same season for AAQ collection period should be provided. The detail of NABL/ MoEF&CC certification of the respective laboratory and NABET accreditation of the consultant to be provided.																																										
16.89	Baseline data on the health of the population in the impact zone and measures for occupational health and safety of the personnel and manpower for the mine should be submitted.																																										
16.90	Study on land subsidence including modeling for prediction, mitigation/prevention of subsidence, continuous monitoring measures, and safety issues should be carried out.																																										
16.91	Detailed water balance should be provided. The break up of water requirement as per different activities in the mining operations, including use of water for sand stowing should be given separately. Source of water for use in mine, sanction of the Competent Authority in the State Govt. and impacts vis-à-vis the																																										

Sr. No.	Terms of Reference
	competing users should be provided.
16.92	PP shall propose to use LNG/CNG based mining machineries and trucks for mining operation and transportation of coal. The measures adopted to conserve energy or use of renewable sources shall be explored
16.93	PP shall explore the use of vent gases as generated from under ground Mine for use of energy generation/ in house energy consumption
16.94	Site specific Impact assessment with its mitigation measures, Risk Assessment and Disaster Preparedness and Management Plan should be provided.
16.95	Impact of stowing by using coal washery rejects/ flyash/ bottom ash shall be assessed in term of leachate generation and its characteristics
16.96	Impact of choice of mining method, technology, selected use of machinery and impact on air quality, mineral transportation, coal handling & storage/stockyard, etc, Impact of blasting, noise and vibrations should be provided.
16.97	Details of various facilities to be provided to the workers in terms of parking, rest areas and canteen, and effluents/pollution load resulting from these activities should also be given.
16.98	The number and efficiency of mobile/static water jet, Fog cannon sprinkling system along the main mineral transportation road inside the mine, approach roads to the mine/stockyard/siding, and also the frequency of their use in impacting air quality should be provided.
16.99	Impacts of CHP, if any on air and water quality should be given. A flow chart showing water balance along with the details of zero discharge should be provided.
16.100	Conceptual Final Mine Closure Plan and post mining land use and restoration of land/habitat to the pre-mining status should be provided. A Plan for the ecological restoration of the mined out area and post mining land use should be prepared with detailed cost provisions. Impact and management of wastes and issues of re-handling (wherever applicable) and backfilling and progressive mine closure and reclamation should be furnished.
16.101	Adequate greenbelt nearby areas, coal stock yard and transportaion area of coal shall be provided with details of species selected and survival rate Greenbelt development should be undertaken particularly around the transport route and CHP.
16.102	e) Environment Managament Cell and its responsibilities to be clearly spleel out in EIA/ EMP report
16.103	Details on the Forest Clearance should be given as per the format given: Total ML Total Project Area Forest Date of Extent of Balance area for which Status of appl For (ha) land (ha) FC Forest Land FC is yet to be obtained diversion of forest land If more than one provide details of each FC

Sr. No.	Terms of Reference
16.104	In case of expansion of the proposal, the status of the work done as per mining plan and approved mine closure plan shall be detailed in EIA/ EMP report

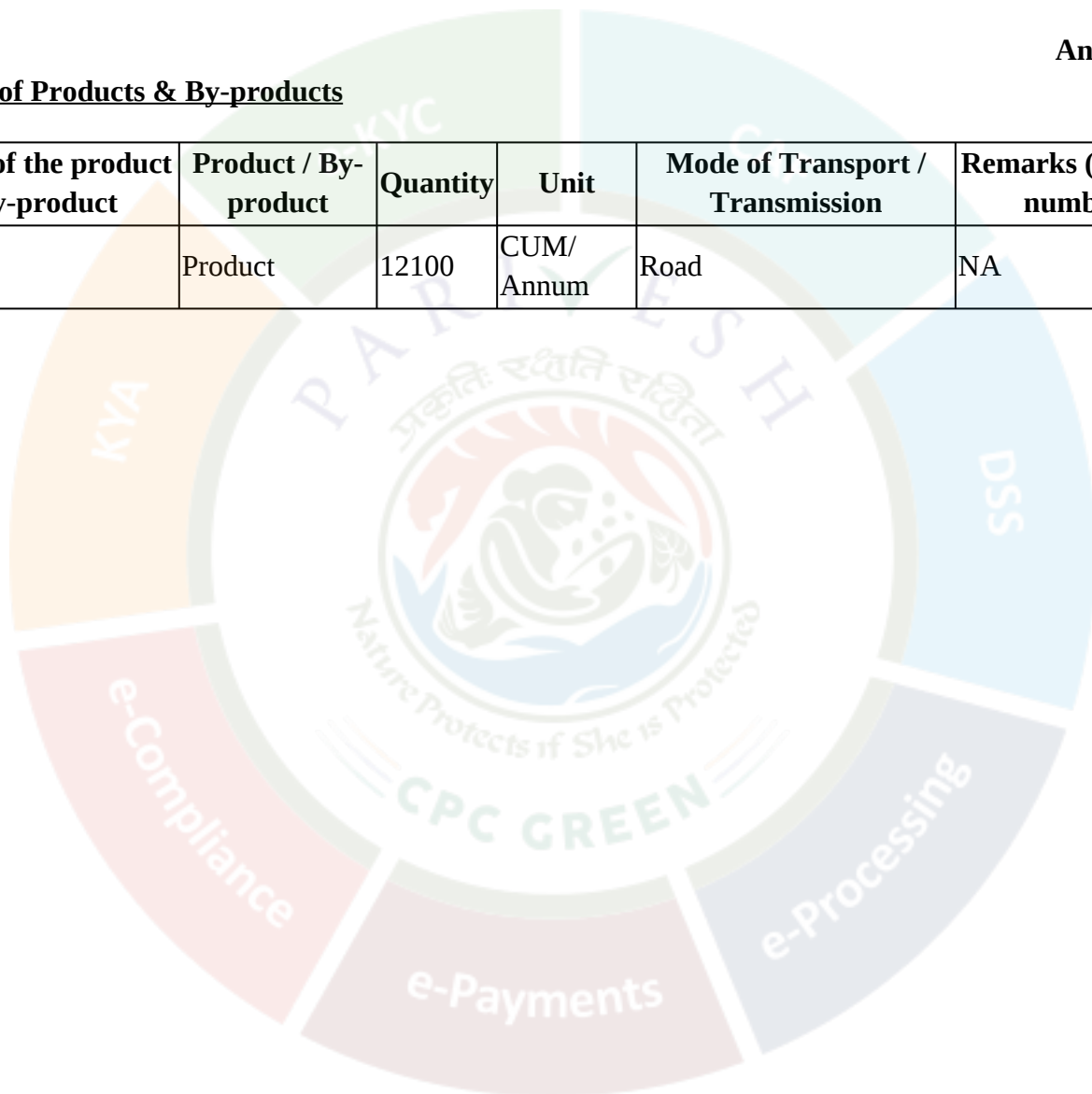
Additional Terms of Reference

Additional Specific TOR has been granted as per SEAC Meeting dated 17-11-2020 which is attached as uploaded document.

Annexure 2

Details of Products & By-products

Name of the product /By-product	Product / By-product	Quantity	Unit	Mode of Transport / Transmission	Remarks (eg. CAS number)
Sand	Product	12100	CUM/ Annum	Road	NA



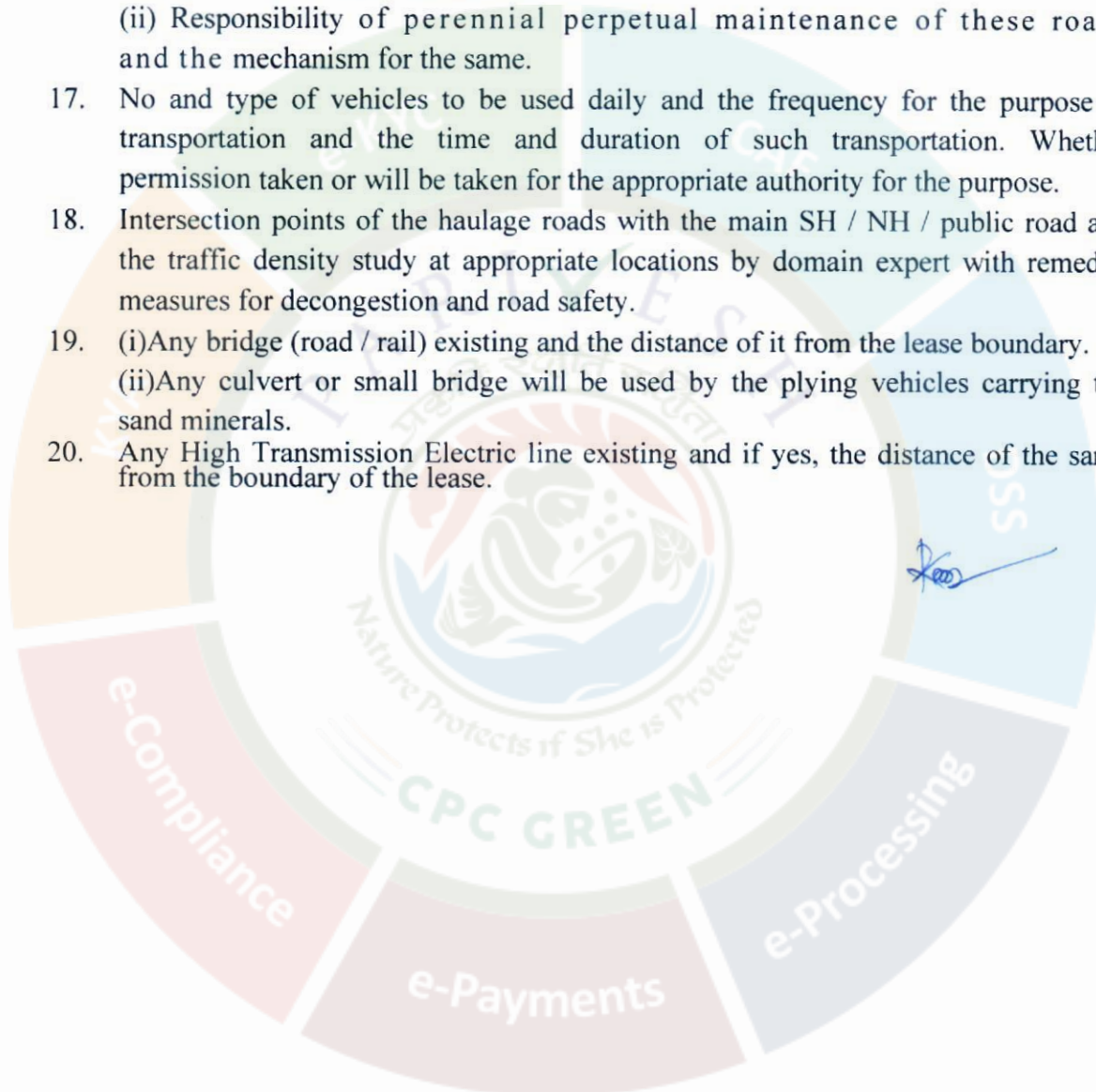
As per Proceedings of State Level Expert Appraisal Committee meeting held on 17.11.2020 following specific TORs has been recommended for sand mining projects having lease area less than 25ha.

Specific ToRs for Sand Mining:

1. 1:50,000 scale topomap with indicating the working area boundaries of the proposed sand bed, transporting route, nearest bridge, water intake point etc.
2. NABET accredited consultant certificate along with consent letter that he has prepared the EIA & EMP report and also replenishment study of the proposed sand bed.
3. The project proponent has to carry out Annual Rate of Replenishment Study (ARRS) by engaging appropriate NABET consultant/ORSAC empanel agency by collecting pre-monsoon & post-monsoon data from the field to know the quantum/volume of sand deposited/replenished & to be extractable from the mining lease area. As per the MoEF & CC, Govt. of India's Enforcement and Monitoring Guideline for Sand Mining, 2020, there are two methods prescribed for the study of rate of replenishment of sand on a stretch of river bed. These are (1) physical survey of the field by the conventional method and (2) use of UAV/Drone and other image data processing techniques. The second method i.e. UAV/Drone method is the one which has been found suitable for the above purpose and recommended by ORSAC, Bhubaneswar and there are some organizations in Odisha state who are empanel by ORSAC to conduct such survey. The details of UAV/Drone method is attached a separate sheet. The finding of the study shall be submitted to SEIAA, Odisha along with the final EIA/EMP report to assess the rate of replenishment of mined out sand in the lease area. The detailed comparison of both pre-monsoon and post-monsoon data and data shall be included in the study report with attaching real-time geo-coordinate photographs of field study in different time period.
4. Whether it is an existing mine? If yes, submit the copy of Environmental Clearance and compliance to EC conditions from the Regional Office, SPCB. The year which last operated.
5. Area of the safety zone with dimensions and geo-co-ordinates w.r.t lease boundary
6. Any approach road existing or will be constructed inside the safety zone?
7. Mitigation measures to be taken to ensure not to disturb free flow of river.
8. Distance of the river bank / embankment from the lease boundary. Is it a river bank or embankment?
9. Any ramp existing or will be constructed on the river bank / embankment for movement of vehicles to reach the nearest road.
10. Distance of the village road / city road / district road / public road from the river bank / embankment. Is this road single road / double road?
11. No. of village (s) and name of village (s) or the city (s) or urban place (s) or semi urban place (s) through which the sand carrying vehicles will ply and the distance of it from the river bank or embankment.
12. Whether schools / colleges / hospitals / health centers / bus stops / religious places existing nearby and if so, the distances of it from the bank or the road through which the vehicle will ply or existing alongside the road?
13. Any plantation done in the safety zone or embankment in case of an existing mines

and if so, the area of plantation, number of species.? If not, the plan for it to arrest bank erosion.

14. Any stone packing in the river bank / embankment existing in case of existing mines and if not, the plan for it.
15. Whether, any alternative mine exists or explored or can be explored if this mine is otherwise found unsuitable? Please furnish details.
16. (i) Whether permission taken or will be taken from Water Resource Authority or the concerned Authority of the roads to be used for plying of vehicles loaded with sand or empty vehicles for the same after the river bank.
(ii) Responsibility of perennial perpetual maintenance of these roads and the mechanism for the same.
17. No and type of vehicles to be used daily and the frequency for the purpose of transportation and the time and duration of such transportation. Whether permission taken or will be taken for the appropriate authority for the purpose.
18. Intersection points of the haulage roads with the main SH / NH / public road and the traffic density study at appropriate locations by domain expert with remedial measures for decongestion and road safety.
19. (i) Any bridge (road / rail) existing and the distance of it from the lease boundary.
(ii) Any culvert or small bridge will be used by the plying vehicles carrying the sand minerals.
20. Any High Transmission Electric line existing and if yes, the distance of the same from the boundary of the lease.



Annexure-1

The replenishment study for river bed sand is very essential in order to have a check on possible over exploitation. It is assumed that the riparian habitat disturbance is minimum if the replenishment is equal to excavation for a given stretch. It is imperative to have a study of replenishment of sand material during a defined period for sustainable sand mining. As per the MOEF&CC, Govt. of India's Enforcement and Monitoring Guideline for Sand Mining, 2020, there are two methods prescribed for the study of rate of replenishment of sand on a stretch of river bed. These are (1) physical survey of the field by the conventional method and (2) use of UAV / Drone and other image data processing techniques. The second method UAV/ Drone method is the one which has been found suitable for the above purpose, and recommended by the ORSAC, Bhubaneswar.

The UAV / Drone method briefly is as follows:

The Drone /UAV is fitted with the advanced camera used for survey purposes. The survey is conducted using a set of instruments and compatible software to depict the topography of the study area (the lease area) by utilizing the properly referenced data.

After running the prescribed steps, the software shall automatically generate orthorectified imagery. Ground truthing is done at minimum 5 locations spread evenly across the lease area by using DGPS instruments. The readings from DGPS instruments are compared with the Drone Data for accuracy assessment.

The study shall have the details of establishment of bench mark by putting a number of pillar points and various Ground Control Points (GCP) at the site, observing by DGPS the various GCPs for permanent bench marks and control points. The summary of the elevation data from each session's profile based on the post monsoon survey is mentioned in the tabular form. A detailed comparison sheet of both pre-monsoon and post-monsoon elevation data is prepared. Cross sectional depiction of deposition and erosion for each section in pre and post deposition seasons shall be given.

Drone images are used to recreate highly accurate orthomosaic maps of mining sites and quarries. Each pixel contains 2D geo tagged information (X, Y), and can be used for distance and surface measurements. A densified point cloud can be generated from Drone images and data. Each point contains geospatial (X,Y,Z) information. It provides an accurate model of a site for precise volume measurements and visual insights. The drone data is processed to generate Digital Terrain Model (DTM) and assessment of progressive volumetric change.

Adequate number of geomatic grade ground control bench marks (X,Y,Z), depending on the size of the lease area, are to be maintained permanently around the lease area within a maximum distance of 500 meters from the lease area for the entire study period. There should be pre and post monsoon survey to assess the sand replenishment within the study area.

There are some organizations in Odisha state who are empaneled by ORSAC to conduct such survey.

Dy

Annexure-2

Essential Physical Criteria As Per Enforcement And Monitoring Guidelines For Sand Mining, January 2020 Of MoEF&CC, Govt. Of India

Sl. No.	Essential Criteria	Reference
1.	"No Mining Zone": 1/4th the part of the river width (excluding 3/4th the central part of the river width) on both sides of the river towards the river bank	4.1.1 (Para - e) Page - 16
2.	a) Distance between two clusters: ≥ 2.5 km b) Area of mining lease area is a cluster: ≤ 10 ha. c)	4.1.1 (Para - k) Page - 19
3.	Concave River Bank: No extraction of sand	
4.	No mining if a) Upstream: Lease is 1 km from major Bridge and high ways or 5(x) of the Bridge / public civil structure / water intakes point subject to lease is located at a minimum 250 meters distance. Where x = Span of the bridge. b) Downstream side: Lease is 1 km from the major bridge and Highways Or 10x of the bridge / public civil structure / water intake point Subject to lease is located at a minimum distance of 500 meter where x = span of the bridge	4.3 (Para - h) Page - 23
5.	Mining depth: ≤ 3 meter (maximum 3 meter)	4.3 (Para - m) Page - 24
6.	Mining distance from river bank: 1/4 th of the river width, But subject to not less than 7.5 meter	4.31 (Para - m) Page - 24
7.	Area for removal of minerals: $\leq 60\%$ of mine lease area	4.3 (Para - s) Page - 25
8.	Minable sand per ha. Available for actual mining: $\leq 60,000$ MT/Annum	
9.	Regular replenishment study and replenishment rate	

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