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1 EXECUTIVE SUMMARY

1.1 Introduction and Background

The Arasmeta Limestone Mining Project is located at a distance ~0.800 Km from Arasmeta village. The District Headquarter Bilaspur is ~23.50 km towards North – West direction and is connected by good tar road.

The details of necessary permit and Clearance for applied lease area are given below –

Name	Project details	Annexure No.
Reference of TOR	1418/SEAC/mine/1472 Nawa Raipur Atal Nagar Date- 28/09/2021	Annexure - II
Area	46.292 hect.	Annexure - I
Lease	03	Annexure - I
Applied Capacity	1000358TPY	Annexure - II
Village	Arasmeta	Annexure - I
District	Janjgir Champa	Annexure - I
NOC by Gram Panchayat	Gram Panchayat Arasmeta dated 15/12/2019	Annexure - IV
Approval letter of Mine Plan	JANJGIR/Bhu/KHAU/1243/2020 dated 28/10/2020	Annexure - III
Geological Reserve	8110779.08 MT	Annexure – III
Recoverable Reserve		Annexure – III
Maximum Annual Mining Capacity	1000358TPY	TOR Annexure – II
Cost of Project	25.00 Crore	-

The studies were undertaken by the Consultant namely, Aseries Envirotek India Pvt. Ltd. (AEIPL) Noida. AEIPL is a National Accreditation Board for Education and Training (NABET) Accredited Consultant Organization (ACO) and is qualified to prepare EIA reports for Project / Activity 1(a) (Mining of Minerals), a mandatory requirement for agencies submitting such studies to regulators for the purpose of seeking EC.

The EIA study report has been based upon the following :-

- Field data collection on different aspects of environment including air, soil, water, land, meteorology, noise, flora, fauna, agriculture and socio-economy in the study area of 10 km radius with mine as its center.
- Study of opencast mining methodology, water requirement, source of pollutants and pollution control strategy.
- Ecological Prospective and Green Belt Development.

The EIA study evaluates the impact on the present environmental scenario and check out the environmental management plan incorporating further step to mitigate the adverse impacts of air, noise, water, land pollution on environment.

1.2 Location and Environmental setting

Table 1-1: Location and Environmental setting

S.No.	Particulars	Details		
A.	Nature of the Project	Proposed Arasmeta LimeStone Mining Project of M/s. Nuvoco Vistas Corporation Limited Manoj Kumar Agrawal (Plant Head, Arasmeta Cement Plant),		
B.	Size of the Project			
1.	Mine area	46.292 Ha		
2.	Production Capacity	1000358 TPA		
C.	Location Details			
1.	Village	Arasmeta		
2.	Tehsil	Akaltra		
3.	District	Janjgir Champa		
4.	State	Chhattisgarh		
5.	Toposheet No.	64K/5		
D.	Environmental Settings of the Area			
1.	Ecological Sensitive Areas	No protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration located within the 15 km radius of the mining lease. Forest area is approx 350m from applied area.		
2.	River / water body	River - Lilagar river at 0.075 km, North.,		
3.	Nearest Human Habitation	Arasmeta Village Distance of 800 meter in SE direction		
4.	Nearest Town / City	Bilaspur City at distance of ~23.0 km in North-West direction.		
5.	National Highway	Highway	Distance	Direction
		NH-200	~370 Meter	West
6.	Nearest Railway Station	Bilaspur Railway Station ((~23.0 km in North-West direction)		
7.	Nearest Airport	Bilaspur Airport (~ 23.0 km in North West direction).		
8.	State Boundary	None within study area		
9.	Seismic Zone	Zone – II [as per IS 1893 (Part-I): 2002]		
D.	Cost Details			
1.	Project Cost	25.00 Crore		
E.	Requirements of the Project			
1.	Water Requirement	27.475 KLD		
2.	Man Power Requirement	31		

1.3 Project Chronology till Date

1. The details of online file for the project proposal namely Form-1 (as per the EIA Notification 2006, as amended till date) along with a Pre-feasibility Report, Approved Mining plan and proposed Terms of References (ToR) for carrying out environmental studies to the State Environment Impact Assessment Authority Chhattisgarh for the mine lease are as follows :-

- Previously the lease was allotted to M/s Raymond cement works. Vide order No. F 3-134/95/12/2 dated 27.12.1996 by MP Govt. for 46.292 Ha. Area from 18.06.1997 to 17.06.2017 for the period of 20 years.

- The Mine lease was transferred by Raymond cement works to M/s Lafarge India Pvt Ltd. (presently M/s Nuvoco Vistas Corporation Ltd.) Vide letter No. F 3-110/2000/12-1 dated 08.12.2000
- The Environment clearance was granted to M/s Lafarge India Pvt Ltd. By Ministry of Environment and Forest on 03.04.2002 for 84000 TPA limestone (Copy of EC & Transfer letter are enclosed as Annexure-II).
- As per section 8A of MMDR Amendment Act, 2015, Mining Lease Period has been extended for 50 years. Supplementary lease agreement for extended period has been made on 28/01/2019 Lease was executed for 30 years from 18th June 2017 to 17 June 2047.

Mine Plan and Progressive Mine Closure Plan:

- The mine lease area is non- forest Private land. Earlier the mining Plan was approved under Rule 22 OF MCR,1960; Vide Letter No .BLS/LST/MOLN 475/NPG Nagpur dated 17/05//1996 for the grant of Mining Lease.

Review Mining plan and Progressive Mine Closure Plan:

- Review Mining plan and Progressive Mine Closure Plan of proposed mining lease area has been approved by Regional Controller of Mines IBM Raipur, Chhattisgarh in favor of M/s. Nuvoco Vistas Corporation Limited Copy of Approval letter of Modified Mine Plan enclosed as Annexure-III.

Project Description

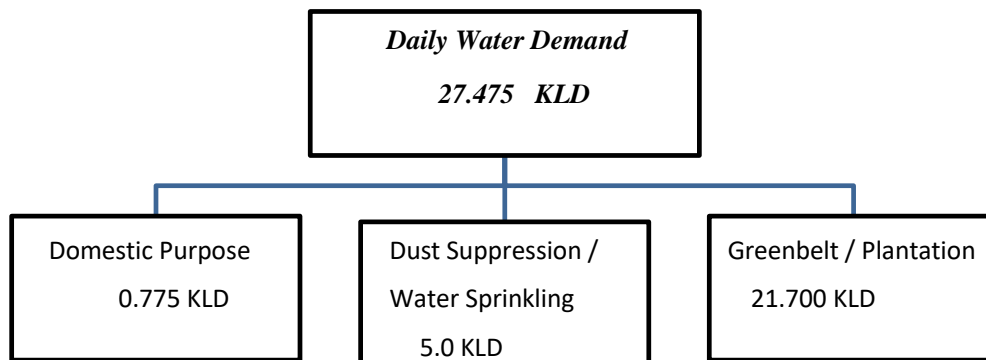
1.3.1 Study Area at a Glance

The study area is taken in accordance with the provisions of sector specific EIA guidance manual for Mining of Minerals manual, published by Ministry of Environment and Forests, during 2010. The study area for the Limestone Mining Project was as follows:

- The proposed project area (M. L. area) is considered as ‘Core Zone’.
- 10 km radius from the boundary limits of the M.L. area is considered as ‘Buffer Zone’.

1.3.2 Utilities

Table 1-2: Water Requirement for the mining



1.3.3 Topography and Drainage

The topography of the area is flat land. Few out crops of stone are shown across the granted area, however in most of the part stone is buried under the soil in the granted area. The general slope is

towards South- west. Maximum Altitude of the applied area is 245 m AMSL at eastern part while lowest side is 219.4 m ASML at western part of granted area. Therefore, granted area has been surveyed in contour interval of 1 meter and shown on plan accordingly. Granted area is devoid of any vegetation. The climate of the area is sub-tropical with hot summer.

At present there is no water source, which is passing through the lease area and its surrounding. Proper care will be taken at the time of mining. The distance of water bodies from applied mines given below :-

Water body	Lilagar river at 75 meter towards North direction from the project site.
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1.3.4 Local Geology

The geological reserve of this area is a part of Raipur shale and limestone series of Chhattisgarh basin which is regarded as equivalent of lower vindhyan of Indian stratigraphy Dolomitic limestone covers small part of ML area on the surface. Out of the 28 boreholes drilled within the area, this litho encountered in BHK-04 from 2.65 to 10.00 meter. The rock is hard and tough, predominantly light grey in colour, massive, medium to fine grained with occasionally brownish tinge and contains shaly patches in places. Shaly Limestone is a fine-grained unit showing all sorts of colour variation from light grey to greenish grey to brown and purple.

Blendable grade Limestone has been encountered in 27 boreholes out of the 28 drilled with the thickness in individual boreholes ranging from 2.75meter to 25 m. In some of the holes where it occurs in association with the cement grade limestone, it occasionally occupies two different positions, one above and the other below the cement grade rock unit.

Cement Grade Limestone has been encountered in 27 out of 28 boreholes drilled ranging in thickness from 4.00m. to 27m. Surface exposures are sparse but they show excellent development of stromatolitic. The rock is fine-grained, massive, predominantly of a light grey colour with occasional greenish grey to brown tinge and patches.

Top Soil / Alluvium major part of the area contains the top soil / alluvial cover over the rock formations and attains a maximum thickness of 10.60 meter in bore hole no BHK 1. Within the ML area (as per drilling data), barring, of course, the agricultural area where the soil thickness may be more. The mainly clay, with a predominant dark grey colour and is characterized as black cotton soil.

1.3.5 Mineable Reserve & Life of Mine

Table 1 3: Reserve Estimation

Sectional Area/Block Area (Sqmtr)	Influence(M)	Depth in mtr	Volume(m ³)	Bulk Density (t/m ³)	Resource Quantity(t)	Level of Exploration	Type of Land	Name of the radical	Grade (%)	Method used for resource estimation	Remarks
10028.96	100	-	923498.3	2.5	2077871.22	G3	Non-Forest	CaO & MgO	CaO: ≥42%, Mgo: ≤5%	Sectional	For more details pls refer below table no. A
3898.25	100	-	333534.8	2.5	750453.3	G3	Non-Forest	CaO & MgO	CaO: ≥39-42%, Mgo: ≤5%	Sectional	For more details pls refer below table no. B
3931	100	-	385060	2.5	866385	G3	Non-Forest	CaO & MgO	CaO: ≥34-39%, Mgo: ≤5%	Sectional	For more details pls refer below table no. C
2477	100	-	247700	2.5	557325	G1	Non-Forest	CaO & MgO	CaO: ≥42%, Mgo: ≤5%	Sectional	For more details pls refer below table no. D
1440	100	-	144000	2.5	324000	G3	Non-Forest	CaO & MgO	CaO: ≥42%, Mgo: ≤5%	Sectional	For more details pls refer below table no. E
2312.44	100	-	231243.5	2.5	520297.88	G3	Non-Forest	CaO & MgO	CaO: ≥42%, Mgo: ≤5%	Sectional	For more details pls refer below table no. F
185	100	-	18500	2.5	41625	G3	Non-Forest	CaO & MgO	CaO: ≥39-42%, Mgo: ≤5%	Sectional	For more details pls refer below table no. G
4202.8	100	-	420280	2.5	901371.6	G1	Non-Forest	CaO & MgO	CaO: ≥34-39%, Mgo: ≤5%	Sectional	For more details pls refer below table no. H
9262.127	100	-	926212.7		2083978.58	G1	Non-Forest	CaO & MgO	CaO: ≥39-42%, Mgo: ≤5%	Sectional	For more details pls refer below table no. I
27571.45	100	-	2678578		6026800.5	G1	Non-Forest	CaO & MgO	CaO: ≥42%, Mgo: ≤5%	Sectional	For more details pls refer below table no. J
Total					14150108.1						

1.3.6 Mining Method

Method of mining will be opencast mining method. Mode of working will be manual. Only Top soil will be removed by excavator and cutting of stone on the stone layer on mine surface will be done by stone cutter rest all the other operations like excavation and sizing etc. will be done manually by local labors by hardened chisels. Loading of sized stone on tractors will be done manually with the help of local labors. Transportation of Limestone will be done manually with the help of local labors. Transportation of Limestone will be done by tractors. Hand Broken stone chip will also be loaded on tractors manually. The gradient of the ramp with benches will be maintained to 1:15 i.e.. Width of ramp will be 6-7 meter.

Width of benches will be maintained similar to height of benches. The quarry will be developed in 6-7 benches width each out of which first bench will be of top soil and third bench will be of Limestone i.e last bench of 6-7 m height only. However during advancement of mining operation the mine will be worked into 1.5 m -1.5 m height of sub-benches. Finally at mine boundary benches will be converted to 6-7 M

Classification	Code	Quantity in Tons			Grade	
		Forest	Non-Forest	Total	Forest	Non-Forest
A. Mineral Reserve			8110779.08			
1. Proved Mineral Reserve (A)	111	0	6026800.50	6026800.50	0	Cement Grade (>42% Cao and 5% MgO)
	111	0	2083978.58	2083978.58	0	Blendable Grade (>42-39% Cao and 5% MgO)
2. Probable Mineral Reserve (A)	121	0			0	0
B. Remaining Resources			6039329.04	6039329.04		
1. Feasibility Mineral Resource (B)	211	0	901371.6	901371.6	0	Sub Grade (>34-39% Cao and 5% MgO)
2. Prefeasibility Mineral Resource (B)	221	0	0	0	0	
3. Prefeasibility Mineral Resource (B)	222	0	0	0	0	
4. Measured Mineral Resource (B)	331	0	557325	557325		
5. Indicated Mineral Resource (B)	332	0	0	0	0	
6. Inferred Mineral Resource (B)	333		4580632.44	4580632.44		
7. Reconnaissance Mineral Resource (B)	334		0	0	0	
Total Mineral Resources (A+B)		0	14150108.12	14150108.12	0	

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Core/Non-core Drilling: -

S.NO.	Year	In forest area				In Non- Forest				Total boreholes	Total Mtr	Attachment
		No. of boreholes	Total Mtr	Type of boreholes	Grid interval	No. of boreholes	Total Mtr	Type of boreholes	Grid interval			
1	2021-22					6	252	Core drilling	100	6	252	Proposal of the current mining plan (Fy 2021-22) which will be completed in march 22) SBH1 to SBH 6
2	2022-23					5	210	Core drilling	100	5	210	(SBH7 to SBH 11)
3	2022-23					3	126	DTH	100	3	126	DTH 1 to DTH 3
Total						14	588			14	588	

DRAFT EIA OF ARASMETA LIMESTONE MINING PROJECT OF M/S. NUVOCO VISTAS CORPORATION LIMITED, DISTRICT JANJGIR CHAMPA, CHHATTISGARH

2.0.1 Drilling

ICM drills will be deployed for drilling of 115 mm dia hole.

		DRILLING MACHINARIES-			
Sl No	Drilling Machines Make	Dia of hole (mm)	Rate of drilling mts / hr	Annual meterage capacity	Nos of machines required.
1	Rock wet drilling machine	110 mm	8	15360	3

2.0.2 Blasting

Average daily production in the quarry is 3,334.53 tons per day. As operation in the quarry is small in scale. Production during subsequent year will also expected at same level.

As the planned operation in the quarry is small in scale, blasting pattern will be kept simple row blasting with simple blasting parameters. Low intensity scientific controlled blasting will be done.

Blasting parameters & blast impact and control measure are discussed below-

2.0.3 Blasting Parameters

Table- 2.1 BlastingParameters

A	BLASTING			
S.No.	Description	Code	Details	Remarks
1	Limestone	A	1000000	
2	Overburden	B	287031	
3	Total material handling	C=A+B	1287031	
4	Drilling pattern		Burden 2 to 3 meters and spacing 4 to 5 meters Depth is 6-9 meter	
5	Yield/Hole in ore/OB Tones/hole =(S*B*Depth*BD)	D	262.5	Av. Depth is 7.0 Meters.
6	Nos of Drill hole req /year =	E=C/D	4902.98	
7	Annual drilling meterage required.(Nos of hole x depth	F=E*7	34320.83	Av. Bench height 7 meters.

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	of hole			
8	Total drilling with 10 % extra	$G=F*1.10$	37752.91	
9	Total nos of working days =300 days	W	300	
10	Nos of working days hours in a day based on nos. of shift	X= two shift working*8 hours daily	16	
11	Actual productive hours in a year considering 80%	$H=W*X*0.8*0.5$	1920	

	availability and 50 % utilization			
12	Rate of drilling R= mts/hr,	R	8	
12	Annual Drilling Output(ADO) of one drill machine in mts= (Productive hours X rate of drilling)	$O=H*R$	15360	
13	No of drilling machine required to meet proposed material handling =TADR/ADO	$N=G/O$	2.46	2.44 or say 3

Blasting & Explosive Requirement in Mineral Ore

Type of Explosive	Type of Explosives used / to be Used			
	Slurry explosives in cartridge form Bulk explosive (SME) Non electric delay detonators (DTH and surface Connectors Electric detonator.			
	Explosive Requirement for over burden removal-			
i)	Frequency of blasting in a week -	F	2	
ii)	Maximum number of holes blasted in a round.	H	40	
iii)	Charge per hole (kg)		43.75	
iv)	Charge per round (Kg)		1750	

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v)	Explosive requirement per month for OB removal		3888.89	Per month 23333 tonne and 6 powderfactor
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B Explosive Requirement for ORE ZONE				
I	Total Limestone proposed to be handled in CUM/annum (x)	1000000		
li	Limestone proposed to be handled in tones / day y =x/300 days	3333.333333		
lii	Drilling pattern in Limestoned zone (Spacing * Burden* depth)	2.8 X 4.8 X 8		
Iv	Yield per holes in Limestone Zone CUM= z	268.8		

V	No of holes required to be blasted per day = y/z	12.40079365		
Vi	Frequency of blasting in a week	2		
Vii	Maximum number of holes blasted in a round.	40		
Viii	Charge per hole (kg)	44.8		
Ix	Charge per round (Kg)	1792		
X	Explosive requirement per month for Limestone zone blasting	13888.88889		25 day working and 6 powder factor
Xi	Total explosive requirement per month (Kg)	17777.78		

2.0.4 Storage of Explosives

The blasting will be conducted on the contract basis through approved blasting contractor, therefore no need to install magazine at quarry site.

7.8	Type of explosives used / to be used	ANFO @ 0.87 g/cc and 3560 kJ/g Slurry Explosives of 83mm dia cartridges Site Mixed Emulsion
7.9	Powder factor in ore and overburden / waste.	4.5 to 5
7.1	Whether secondary blasting is needed, if so describe it briefly	No secondary blasting
7.11	Storage of explosives (like capacity and type of explosive magazine)	Existing magazine at Arasmeta Cement Plant capacity (Explosive 22600 kg, Detonators 44000 Nos, and Fuse 18000 meter)

2.0.5 Loading and Transportation

Wheel loaders/excavators will be used for loading of Ore/ waste material. Dumpers of appropriate capacity will be deployed for hauling ore to the Crushing plant or mineral stock and waste material to dump yard.

DRAFT EIA OF ARASMETA LIMESTONE MINING PROJECT OF M/S. NUVOCO VISTAS CORPORATION LIMITED, DISTRICT JANJGIR CHAMPA, CHHATTISGARH

1. Excavator/Loader

2.	Type of Excavator	Bucket capacity in CUM	Rated output in tonne/ hr	Output per day by Excavator=capacity per hr * nos of hrs in a day)	No of equipments required = Material Handling required per day / Machine output per day
a)	PC 300	3.4	200	200*12=2400	Limestone 3335, OB 1000 and soil 443 total 4778 . Total machine required =4778/2400 = 1.9 or say 2 (considering break down etc)
b)	PC 300	3.4	200	200*12=2400	
c)			Total	4800 tonnes	

Dumper/Tipper

	Dumper/ tipper	Capacity& Make	Rated output per Shift from mines around 4.5 Km	output per day by dumper = Capacity per hr * nos of hrs in a day)	No of dumper required to handle daily production
a)	35 tonner for Limestone)	BEML	7 trip in each shift	14 Trip per day total output per day 490 MT in limestone	Per day handling 3335 MT/490 Tonnes by one dumpers per day=6.8 dumpers or say 7 dumpers
b)	20 tonner (for Soil)	TATA, AMW, Volvo etc	2 trip in each Hrs total trip by each tripper in aday 24	Total soil handling in year 88588 CuM Effective days for soil handling 200 working days i.e per day handling 442 CUM considering 15 CuM per trip 30 trip required per day.	3 tipper considering breakdown etc
C	20 tonner (for waste rock)	TATA, AMW, Volvo etc	2 trip in each Hrs total trip by each tripper in aday 24	Total handling of Waste rock per day 1000 tonnes 50 trips per day required considering 18 Mt per day	4 tipper considering breakdown etc
Total tippers/ dumpers required					7 dumpers & 7 tippers tipper

3. Other Machineries

S. No	Machine	Details	
		Type	No's
		Water Tanker with water sprinkler	2
		Dewatering pumps	02
		Rock breaker	01

1.4 Meteorology Long Term Meteorology (Secondary Data)

Information presented in subsequent paragraphs is from the Indian Meteorological Department (IMD) Raipur, Long Term Climatological Tables, 1971-2000. These tables give useful information about a region's weather, since it was collected over a period of 30 years.

1.4.1 Temperature

The average ambient temperature remains 26.2°C, varies from 15.5°C to 45.7°C. The minimum - maximum temperature range is 29.5 - 49 °C in summer and 8 - 25 °C in winter. The average relative humidity remains around 62.6%, varies from 15.4% to 99.2%. The station pressure varies from 974 hPa to 960 hPa, averaged around 987 hPa..

1.4.2 Wind

Long- term wind direction data indicates that the predominant wind during the study period Post Monsoon i.e from 01/10/2021 to 31/12/2021 is SE and second predominant wind direction is SW

1.4.3 Rainfall

Janjgir Champa is endowed with high rainfall. Areas of chronic shortfall are few and localized. The district receives its rainfall mainly from the south-west monsoon which usually sets in the third/fourth week of June and spread over a period from late June to early October with heaviest shower in the months of July and August. The normal rainfall in the district is 1383 mm and the average is 1322 mm in the year 2014. Janjgir Champa district has a tropical wet and dry climate; temperatures remain moderate throughout the year, except from March to June, which can be extremely hot. The highest temperature goes up to 43°C and observed in the months of May and June. Winters last from November to January and are mild and the lowest falls up to 13 °C and observed in the months of December and January.

1.4.4 Relative Humidity

Most humid conditions were found in the monsoons, followed by post-monsoons, winter and summer in that order. Mornings were more humid than evenings and humidity ranged from a high of 88-82% in monsoon mornings to a low of 53-34% in summer evening

1.4.5 Site Specific Meteorology

Baseline meteorological data representing the Post Monsoon (01/10/2021 to 31/12/2021) was collected near project site

Meteorological data showed that the average wind speed during the study period was observed to be 6.01 m/sec. It was observed that during study period wind blows pre dominantly from South East and Second pre dominant direction is South West. The data obtained during the study period was compiled to obtain average data.

1.5 Existing Environment Scenario

1.5.1 Land Use

Land Use of the Study Area

The land use land cover map of the study area has been prepared using recent Landsat satellite image, area and distance calculations have been carried out using GIS software after geo- referencing and interpretation.

1.5.2 Soil Quality

The soils of study area are predominantly Sandy loam in texture. The pH of the soil is ranges from 7.26 to 8.16. The soil being of friable consistency, the bulk density of the soil is in the range of 1.35 to 1.52 g/cm³. The organic matter content of the soil samples varies from 0.22 to 0.57 %. & Nutrient ration has been satisfactory level.

1.5.3 Ambient Air Quality

The above analysis report shows that since this mine is not operating and traffic on the National Highway is also less, population in the village is not more. The baseline ambient air quality was found to be within the permissible limits of NAAQS.

1.5.4 Noise

The ambient noise level in the study area were Lmin 39.7 / Lmax 43 dBA in the night time. During Day time Lmin is 50.8 dBA and Lmax is 54.4 dBA. The ambient noise level data are within the prescribed limit by MOEF&CC & State PCB. The analytical data shows there is no impact nearby villages/habitant. The noise levels recorded at all locations were within the NAAQS limits

1.5.5 Water Environment

Groundwater Quality

Analysis of results of ground water reveals the following: -

The analysis results shows that the pH for the ground water samples GW1, GW2, GW3, GW4, GW5, GW6, GW7 & GW8 ranged from 7.32 to 7.65 indicating slightly alkaline in nature. The TDS (Total Dissolved Solids) were found to be in the range 524.0 mg/l to 591.0 mg/l which is within the permissible limit of 2000 mg/l.

Total Hardness of Ground water samples in the study area was found to be 256-300 mg/l which is within permissible limit. Alkalinity indicates better buffering capacity of water and ranges between 124.0-208.0 mg/l.

Fluoride content varies from 0.58 mg/l – 0.81 mg/l which is within permissible limit. The overall ground water quality in the study area was found to be mineralized with respect to total dissolved solid, chloride (82.0 mg/l to 100.0 mg/l), sulphate (38.0 mg/l to 52.0mg/l) and hardness.

Surface Water Quality

Surface water samples were collected, and analyzed, pH value was found to be 7.54 to 7.66 mg/l which indicate that surface water is alkaline in nature; TDS was found to be 265 to 271 mg/l. Dissolve oxygen were found about 5.8 and 6.4mg/l. It is seen that the physicochemical analysis of other parameters like chloride, calcium, magnesium, nitrate and fluoride were found within the desirable limit. The overall surface water quality of the available sources within the study area was found to be good physico- chemically with respect to all the parameters. There is no organic load-observed in the sources monitored indicating no pollution load in the source

1.5.6 Impact on Air Environment

- Water sprinkling will be done twice during the day in summer season and once during the day in winter season for settling of dust particles.
- Transportation of mineral will be done on Kaccha road which will generate dust and rest of the distance will be on State Highway will not cause air pollution.
- Regular maintenance of machinery and vehicles will be done to check the excess emissions. A system of regular overhauling of dumpers & excavators, after specified hours of working shall be evolved and observed to avoid generation of obnoxious fumes.
- Green belt with tall trees will be planted. It will restrict the particulates and reduce the concentration of SO₂ and NO₂.
- Plantation along Kaccha road and statutory barrier etc. will also protect the soil from wind erosions.
- All the haulage roads including the main ramp to mine pit will be kept properly maintained and watered regularly during the working shift to prevent generation of dust due to the movement of dumpers, water tankers etc.
- Dust mask shall be provided to the workers engaged at dust generation points like excavations and loading points.

1.5.7 Impact of Traffic Density:

Traffic analysis is carried out by understanding the existing carrying capacity of the roads near to the project site and the connecting main roads in the area. Existing traffic on these roads was compared with the carrying capacity of these roads as per IRC guidelines and it was found that the roads are capable of handling the additional traffic/load.

Table 2.13: Comparison Carrying Capacity of Road in Existing & Proposed PCU

Location	Existing Traffic Load			Total Traffic load including Applied Project		
	No of PCUs	V/C	LoS	No of PCUs	V/C	LoS
Project site to Bilaspur Rd	8282	0.552	C	8339	0.552	C

*LOS- Level of Services

1.5.8 Impact on Noise Environment

The expected noise levels in the working environment are compared with standards prescribed by occupational safety and health administration (OSHA-USA) & CPCB-NEW DELHI, the noise levels are expected to be in the acceptable range.

1.5.9 Impact on Water Environment

Impact on Surface Water Quantity

Surface water will not be utilized and impact on surface water quantity is not anticipated due to the proposed activity.

Impact on Surface Water Quality

The proposed opencast mining operation may cause water pollution. The sources of pollution generally are:

- Wash off from dumps
- Soil Erosion

Mitigation Measures

In open cast mining pits as well as on dumps, it is necessary that the rainwater falling outside the edge limit of the working areas will not be allowed to enter into the pit and working areas. Therefore it is proposed to develop garlands drains around the mining pits and dumps to arrest the surface runoff water and divert it to lower synclines without any contact with the mining operations.

In the lease for proper drainage of water, a set of garland drainages will be made in the mining lease area and the water will be accumulated at the lower most gradient by constructing siltation tanks which will act as water storage in the area as well as collection of silts. Silts will be regularly cleared regularly.

Impact on Groundwater Quantity

As evident from nearby wells, as well as also by villagers during the summer water table goes down below 35.0 meter and in rainy season water table comes up within 32.0 meter.

Since the water table is below the maximum excavation depth (25-26m) of operation in and the flow or extent of nearest hydrology is too far from the proposed lease area thus no impact can be assessed on water table, water flow or hydrology. Moreover no sewage or other effluents will be generated from the mine closure activities which are required to be discharged on water. Hence no water pollution can be assessed

1.5.10 Impact on Flora and Fauna

As the mining activities will be confined to core zone only, no adverse impact is foreseen on the flora & fauna in the core zone. To prevent the entry of wildlife animals from entering the lease area proper fencing will be done all around the lease area.

1.5.11 Impact on Top Soil

During mining of Limestone top soil will be generated and will be used for plantation.

1.5.12 Impact on Socio Economic Status

Socio-economic survey was conducted in villages within the study area located in all directions with reference to the project site.

The respondents were asked for their awareness/opinion about the project and their opinion about the impacts of the project, which is an important aspect of socio-economic environment, viz. job opportunities, education, health care, transportation facility and economic status.

1.6 Environment Monitoring Program

The monitoring of pollutant in mine will be carried out for air, water, soil and noise. It takes care of all monitoring needs of the mine. Additionally ambient air and work zone monitoring in mine will be conducted in every season near mining operation, loading and transportation (haul road) areas by Government approved private agency. The analysis results of air monitoring will be properly recorded and submitted to the statutory authorities from time to time. Noise measurement of mine equipment will be done Twice in a year, ambient air monitoring will be done twice in year. Water quality monitoring will be done once in season at two locations & soil quality monitoring will be done once in a year at locations within the study area. A total of Rs. 1.14 lakhs/- every year will be spent on monitoring of environmental parameters.

1.7 Additional Studies

1.7.1 Risk Assessment and Disaster Management Plan

The following natural /industrial problems may be encountered during the mining operation are:

- Inundation-filling of the mine pit due to excessive rains.
- Slope failures at the mine faces or stacks.

Water table will not be encountered during proposed working. No high risk accidents like landslides, subsidence flood etc. have been apprehended. But possibility of accidental disaster is also not ruled out. Therefore, all the statutory precautions will be taken for quick evacuation as per the Mines Act 1952, the Mines Rules 1955, Rule of MMR- 1961 and the Rules of MCDR-1988.

1.8 Environment Management Plan

The environment management plan is prepared with a view to facilitate effective environmental management of the project. Apart from having an Environmental Management Plan, environment management cell consisting of mines manager, safety officer and environmental officer is constituted. About 13.68 lakh of capital cost and 14.52 lakh per year recurring cost would be spent on environment management activities.

1.9 Project Benefits

The surrounding inhabitants around the mine lease area are mainly agricultural oriented. Opportunities for jobs activities will be created and mining will serve as a source of permanent livelihood. The mine will create employment directly or indirectly. Additional, certain works like transportation will be outsourced on contract. So, overall effect of mining is expected to be positive.

