ENVIRONMENTAL IMPACT ASSESSMENT

Executive Summary
of
Draft Environmental Impact Assessment
for

Proposed Singardip (Rithi) Stone & Murrum Quarry Project having Mine Lease Area: 2.82 Ha.

Proposed Production of Stone & Murrum is 1,94,793 TPA

Project Cost: 85 Lakh

located *at*

Survey/Gut No.: 24/1 (Part), Land type: Private Land, Village: Singardip (Rithi), Tehsil: Hingna, District: Nagpur, Maharashtra.

ToR No.: TO25B0108MH5974300N, Dated: 18/08/2025

Project of Schedule 1 (a), Mining of Minerals, Category B1

Baseline Period: March to May 2025

Monitoring Done By:

Kiwis Eco Laboratories Private Limited

Accredited by NABL vide Certificate No.: TC-15391

Project Proponent:

Shri. Satish Rushiraj Hiranwar & Shri. Tarun Rushiraj Hiranwar

Office Address: "At: Jivanchhaya Nagar, Trimurti Nagar, Nagpur, Maharashtra.

Consultant

Southern Enviro Engineers Pvt. Ltd.
Act Responsible Think Sustainable

(Certificate No. NABET/EIA/23-26/SA 0240, Validity: 29.03.2026)

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Executive Summary

1.0 Introduction

The proposed Stone and Murrum Quarry Project by Shri. Satish Rushiraj Hiranwar & Shri. Tarun Rushiraj Hiranwar over an area of 2.82 Ha. is situated at Survey/Gut No.: 24/1 (Part), Land type: Private Land, Village: Singardip (Rithi), Tehsil: Hingna, District: Nagpur, Maharashtra. Proposed Production of Stone & Murrum is 1,94,793 TPA (Maximum Yearly Production in 5 Years Plan) and Total Production is 5,94,059 Tons in five years. Semi-mechanized open cast method of mining is proposed for the present project.

The proposed Stone and Murrum Quarry Project is part of a cluster formation over an area 55.81 Ha. (> 25 Ha.), as defined under MoEF&CC Notification S.O. 2269(E) dated 1st July 2016. The project is categorized as 1(a) B1 Category as per EIA Notification, 2006 and its subsequent amendments by Ministry of Environment, Forest and Climate Change (MoEF&CC). Therefore, the proposed project requires Environmental Clearance from the State Environment Impact Assessment Authority (SEIAA), MoEF&CC, Maharashtra.Therefore, the proposed project requires Environmental Clearance from the State Environment Impact Assessment Authority (SEIAA), MoEF&CC, Maharashtra.

1.1 Statutory Clearances

The approved list of documents for the project are given below:

S. N.	Document Name	Details of Approval	Receiving Date
1.	Letter of Intent	Approved by District Mining Officer, Nagpur with vide Letter no.: KRAMANK: KHANI-2/KAKSH-21/KAVI-338/2023	10/08/2023
2.	Approved Mining Plan	Approved by Directorate of Geology and Mining, Government of Maharashtra, vide letter No. MLV/Misc./432/Part/2024/93 for a period of 5 financial years from 2024–25 to 2028–29.	14/01/2025
3.	Cluster Certificate	Cluster Area 55.18 Ha. (> 25 Ha.) Approved by Govt. of Maharashtra, Directorate of Geology and Mining, Office of the District Mining Officer Collectorate Nagpur, with Letter No. Min-1/D-21/CLT/292/2024	24/09/2024
4.	Terms of Reference	State Level Environment Impact Assessment Authority (TOR Identification No.: TO25B0108MH5974300N)	18/08/2025

The project is for excavation of stone and murrum from non-agriculture land having private ownership by the project proponent. The Mining Lease area is not reserved for Gayran or other public use. On this land electric poles are not seen.

1.2 Terms of Reference

The Project Applicant has submitted Form 1, Pre-Feasibility Report (PFR) with Environmental Management Plan (EMP), and an Approved Mining Plan for obtaining Terms of Reference (ToR) for the grant of Environmental Clearance (EC) for the proposed Singardip (Rithi) Stone and Murrum Quarry Project. The project was uploaded on the Parivesh portal with Proposal No.: SIA/MH/MIN/524704/2025, dated 19/02/2025. After receiving the Terms of Reference (ToR) the Draft Environmental Impact Assessment (EIA) report is being prepared for the purpose of conducting the Public Hearing.

1.3 Project Proponent

Shri. Satish Rushiraj Hiranwar & Shri. Tarun Rushiraj Hiranwar is supplying mined mineral to infrastructure development projects like roads, bridges, dams, buildings and has experience in the stone quarry projects along with experienced staff and good financial position capable to carry out mining of minor minerals. The applicant is a Private Contractor who supplies material in nearby villages. The excavated stone will be used for the following purposes: 1. In the stockyards of Railway plots as a ballast material, 2. Road metal for road works, 3. In construction of building for filling and flooring, 4. In irrigation department for Dam, Canal, etc. preparation, 5. Other sectors.

Name & Contact Address of Implementing Organization

Shri. Satish Rushiraj Hiranwar & Shri. Tarun Rushiraj Hiranwar

Office Address: At: Jivanchhaya Nagar, Trimurti Nagar, Nagpur, (M.S.)

Site Address: Survey/Gut No.: 24/1 (Part), Village: Singardip (Rithi), Tehsil: Hingna, District: Nagpur, Maharashtra.

1.4 Brief Description of Nature, Size & Location of the Project

The environmental settings of the 10 km study area are given in **Table 1.**

Table 1: Environmental Settings of the Study Area

S. N.	Particulars	Details
1	Project Name	Singardip (Rithi) Stone & Murrum Quarry Project
2	Location	Survey/ Gut No.: 24/1 (Part), Village: Singardip (Rithi), Taluka: Hingna, District: Nagpur, Maharashtra
3	Name of Project Proponent	Shri. Satish Rushiraj Hiranwar

		& Shri. Tarun Rushiraj Hiranwar (Project Proponent) Address: At: Jivanchhaya Nagar, Trimurti Nagar, Nagpur, (M.S.)			
4	Proposed Mining Plan Validity	2024-25 to 2028-29			
5	Area	2.82 Ha.			
6	Life of Mine	16 Years			
7	Ultimate Depth	18 m			
8	Toposheet No.	55K/16, 55L/13			
9	Geographical Co-ordinates	**BP No.**	**Latitude**	**Longitude**	**R. L.(m)**
		BP-1	20°57'20.66" N	78°51'14.61" E	345.92
		BP-2	20°57'20.72" N	78°51'16.65" E	345.61
		BP-3	20°57'19.98" N	78°51'17.56" E	346.35
		BP-4	20°57'19.56" N	78°51'17.95" E	347.13
		BP-5	20°57'18.87" N	78°51'19.55" E	346.04
		BP-6	20°57'18.32" N	78°51'20.32" E	345.58
		BP-7	20°57'18.23" N	78°51'20.56" E	345.79
		BP-8	20°57'18.56" N	78°51'20.94" E	344.52
		BP-9	20°57'18.56" N	78°51'21.39" E	343.76
		BP-10	20°57'18.15" N	78°51'22.29" E	342.34
		BP-11	20°57'18.16" N	78°51'23.12" E	341.08
		BP-12	20°57'17.21" N	78°51'24.49" E	340
		BP-13	20°57'16.92" N	78°51'24.98" E	339.66
		BP-14	20°57'16.24" N	78°51'25.37" E	339.42
		BP-15	20°57'14.73" N	78°51'26.67" E	338.49
		BP-16	20°57'13.42" N	78°51'26.27" E	340.47
		BP-17	20°57'18.83" N	78°51'14.22" E	352.51
		BP-18	20°57'19.13" N	78°51'14.46" E	351.22
		BP-19	20°57'19.45" N	78°51'14.63" E	349.89
		BP-20	20°57'19.48" N	78°51'14.17" E	349.93
10	AMSL	343 m			

11	Topography	Flat deposit with gentle slope
12	Type of Soil	Moderately deep to deep clayey
13	Name of Mineral Mined	Minor Mineral: Basalt stone & Murrum
14	Production capacity of mine	Proposed Production of Stone & Murrum: 1,94,793 TPA Total Production in 5 years: 5,94,059 Tons.
15	Drilling and blasting	At very small scale and Electrical Control Blasting for loosening rock will be done
16	Land Use	Private Land (Non-Forest)
17	Water Requirement & Source	11.5 KLD and private water tanker supply
18	Solid waste	No solid waste is generated
19	No. of working days	250 days
20	Manpower	33 Person
21	Type of land	Rocky, Barren,Non-Agricultural Land.

22 Water Bodies in 10 km Study Area

S. N.	Water Bodies in 10 km Study Area	Distance in km	Direction
1	Kanholibara Dam	1.9	SW
2	Kanholibara River	1.5	W
3	Anjangaon Dam & Reservoir	7.2	S
4	Khadki Dam	0.8	SE
5	Khadki Canal	1.8	SE
6	Salaimendha Dam	8.7	NNE
7	Borgaon Lake	7.1	ENE
8	Vyphadpitesur Dam and Reservoir	7.5	ENE
9	Nanhi Dam, Reservoir and Spillway	2	ENE
10	Shashimar Nala	8.8	NE

23 Forest in 10 km Study Area

S. N.	Forests in 10 km Study Area	Distance in km	Direction
1	Degma Reserve Forest	Adjacent	W

		2	Keljhar Reserve Forest	4.2	W
		3	Junapani Reserve Forest	9.5	SSE
		4	Bid Sukli Reserve Forest	5.3	E
		5	Protected Forest near Itevahi village	3.2	W
		6	Protected Forest near Itevahi village	4.5	W
		7	Protected Forest near Kanholibara Dam	3.5	SW
		8	Protected Forest near Savli village	4.8	SSW
		9	Protected Forest near Ajangaon village	6.5	S
24	Greenbelt Area in Hectare	0.68 Ha.			
25	Greenbelt Area in %	24 %			
26	Total number of saplings	1099 saplings			
27	Greenbelt Cost	Capital Cost: 10.65 Lakh Recurring Cost: 2.00 Lakh			
28	Project Cost	Rs. 85.0 Lakh			
29	EMP Cost	Capital Cost: 25.73 Lakh Recurring Cost: 18.38 Lakh			
30	CER Cost	1.7 Lakh			

Source: AMP, Site Visit, 10 km Toposheet map, kml file (Google Earth)

Map showing general and specific location of proposed mine site, 10 km topo map study area and Google imagery of the proposed project site are given in **Figure 1, Figure 2 and Figure 3.**

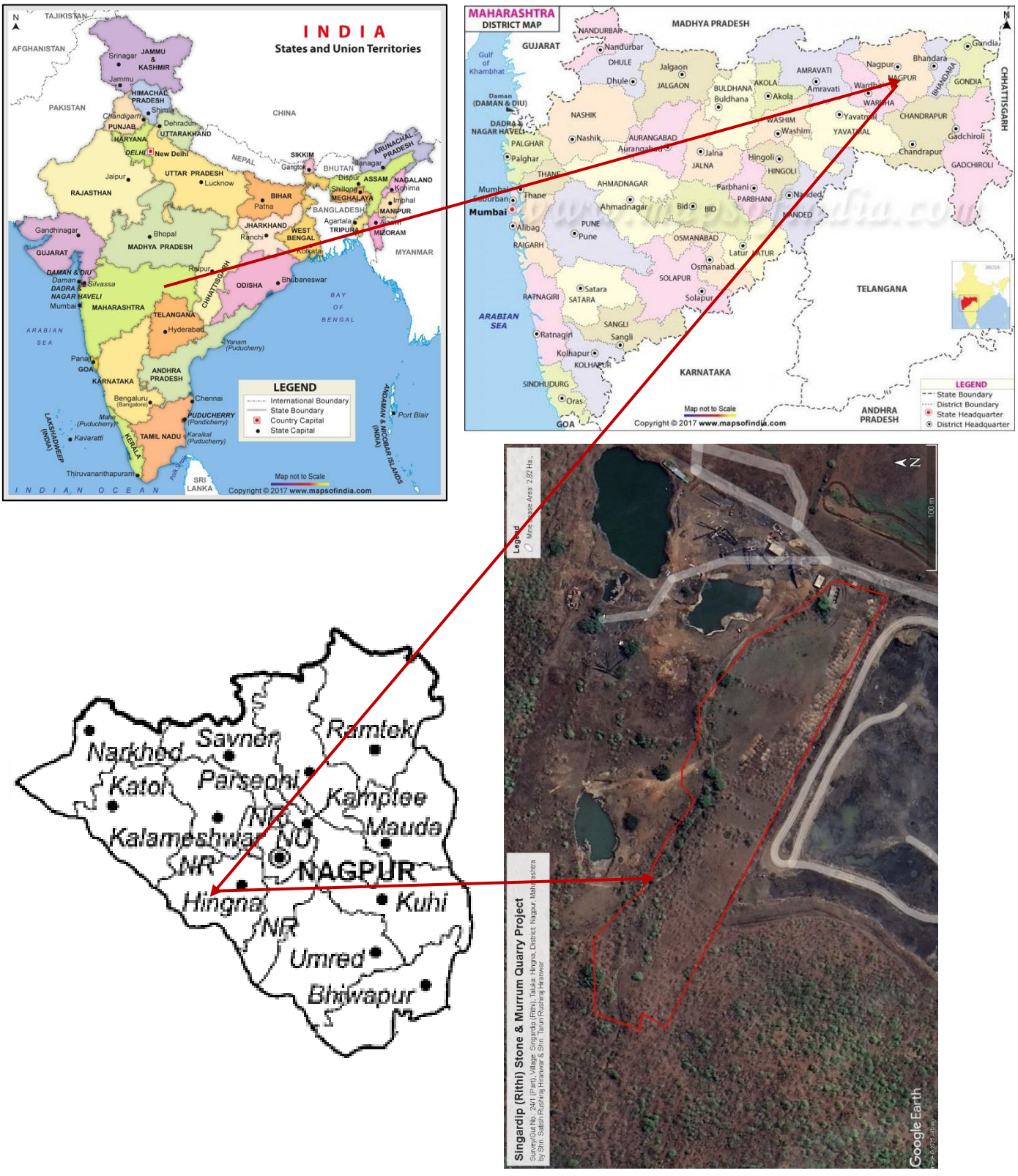


Figure 1: Location Map of the Mine Site

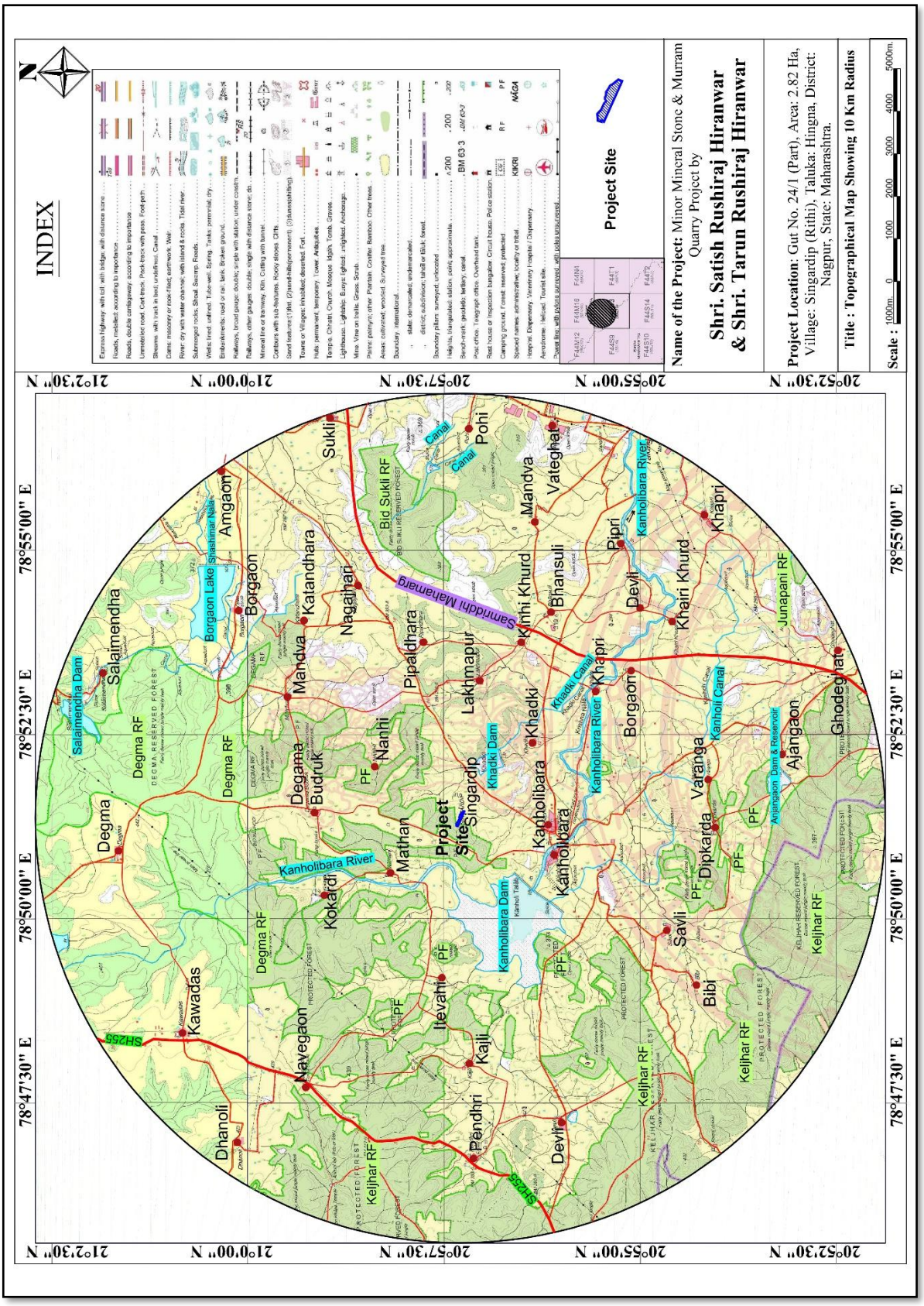


Figure 2: Topographical Map showing 10 km Radius Area around the Mine Site

BP No.	Latitude	Longitude
BP-1	20°57'20.66" N	78°51'14.61" E
BP-2	20°57'20.72" N	78°51'16.65" E
BP-3	20°57'19.98" N	78°51'17.56" E
BP-4	20°57'19.56" N	78°51'17.95" E
BP-5	20°57'18.87" N	78°51'19.55" E
BP-6	20°57'18.32" N	78°51'20.32" E
BP-7	20°57'18.23" N	78°51'20.56" E
BP-8	20°57'18.56" N	78°51'20.94" E
BP-9	20°57'18.56" N	78°51'21.39" E
BP-10	20°57'18.15" N	78°51'22.29" E
BP-11	20°57'18.16" N	78°51'23.12" E
BP-12	20°57'17.21" N	78°51'24.49" E
BP-13	20°57'16.92" N	78°51'24.98" E
BP-14	20°57'16.24" N	78°51'25.37" E
BP-15	20°57'14.73" N	78°51'26.67" E
BP-16	20°57'13.42" N	78°51'26.27" E
BP-17	20°57'18.83" N	78°51'14.22" E
BP-18	20°57'19.13" N	78°51'14.46" E
BP-19	20°57'19.45" N	78°51'14.63" E
BP-20	20°57'19.48" N	78°51'14.17" E

Figure 3: Google Image of Mine Lease Area

1.5 Project Description:

1.5.1 Type of Project Including Interlinked and Interdependent Projects, If Any:

It is a Stone & Murrum Quarry mining project within a mining lease area of 2.82 Ha. Minor mineral namely Stone (Basalt) & Murrum will be mined out from the site. Semi-mechanized opencast mining methodology using drilling and blasting with Excavator – Dumper combinations is proposed for this project. No interlinked projects were associated with this project.

1.5.2 Details of Alternate Sites:

No alternate site was considered as the project is mineral specific and site specific.

1.5.3 Size or Magnitude of Operation:

The mine lease area is of 2.82 Ha. and production Stone, Low Grade Weathered Stone & Murrum is 1,94,793 TPA and Total Production in five years would be 5,94,059 Tons. The mine lease follows Semi Mechanized Open Cast Method of mining

1.5.4 Topography:

The quarry lease area is gently undulating terrain. The area is part of the Deccan Plateau region, characterized by its flat to gently sloping land surface interspersed with basaltic rock outcrops and shallow depressions.

The general ground surface elevation within the lease area ranges between approximately 310 meters to 316 meters above mean sea level (MSL). The highest elevation point is located towards the north-central portion of the lease, while the land gradually slopes towards the southern and southeastern directions, facilitating natural drainage.

The natural drainage is dendritic, with surface runoff occurring mainly during the monsoon season. No perennial water bodies or natural streams pass through the lease area; however, seasonal rainwater accumulation may occur in localized depressions. The area is free from any significant erosion or instability. There are no habitation structures or public infrastructure within the proposed lease boundary. The area is approachable via village roads connecting to the main Hingna–Nagpur Road, allowing ease of access for quarrying operations and material transport.

The 10 km radius is approximate about 20°51'48.87"N to 21° 2'40.38"N latitude and 78°45'29.16"E to 78°57'10.97"E longitude and elevation 265 to 460 meters are used as per the project site confined within that area.

1.5.5 Regional Geology:

The proposed project site lies within the eastern extent of the Deccan Traps; a vast geological formation formed during the Upper Cretaceous to Paleogene period through extensive volcanic

activity. These traps are predominantly composed of multiple horizontal to sub-horizontal basaltic lava flows, often interspersed with red bole horizons and thin intertrappean beds representing periods of volcanic quiescence.

In the Nagpur region, the Deccan Traps exhibit a well-defined sequence of massive, vesicular, and amygdaloidal basalts, often overlain by lateritic soils and murrum due to tropical weathering. These rocks are generally fine-grained, dark-coloured, and hard, making them suitable for use as construction aggregates.

1.5.6 Local Geology:

The applied quarry lease area is geologically part of the Deccan Volcanic Province (DVP) and is primarily underlain by Deccan Trap basaltic flows of Cretaceous to Paleogene age. The lithological sequence observed in the area, as per field observations documented in the Mining Plan, includes:

1. Top Soil / Murrum Layer: This is a thin surface cover of reddish-brown lateritic soil and murrum, typically formed due to prolonged subaerial weathering of the underlying basaltic flows. The murrum is ferruginous, granular to compact, and is widely used in road construction, embankments, and sub-base preparation. Thickness varies from 0.5 m to 2.0 m across the site.
2. Weathered Basalt (Vesicular Zone): Below the murrum layer, weathered vesicular basalt is encountered. This layer shows varying degrees of alteration and may contain filled vesicles with secondary minerals such as zeolites or silica. This zone is moderately compact and partially fractured.
3. Massive Basalt: The lowermost unit exposed is compact, fine-grained massive basalt, dark grey to black in colour. This rock is highly durable and competent, making it suitable for use as construction-grade stone. The massive basalt is the primary target lithology for excavation under this mining project.

1.5.7 Reserves:

The depth of the Stone & Murrum known in the area is about 100 meters or even more, from the data collected from the boreholes drilled around the area. However, only 40 meters depth is considered for the estimation of proved reserves, though the reserves are continuing at depth.

Geological reserves as per UNFC classification are given in below **Table 2**.

Table 2: Geological Reserves as per UNFC Classification

Total Mineral Resources					
Reserve Type	**Area**	**Average**	**Average**	**Total Geological**	**Total Geological**

& Code		Thickness of Deposit	Volume of Deposit	Reserve @ BD 2.4 T/m³	Reserve @ CF = 2.83
U	m^2	m	m^3	Tons	Brass
F	A	T	V = A x T	Rgbt = V x BD	Rgbb = V/2.83
Proved (111)	15,000	35	9,87,000	23,68,800	3,48,763
Probable (121)	15,000	3	8,4,600	2,03,040	29,894
Possible (122)	15,000	2	56,400	1,35,360	19,929
TOTAL	15,000	40	**11,28,000**	**27,07,200**	**3,98,587**

(Source: Approved Mining plan)

1.6 Method of Mining:

1.6.1 Salient description of the Mining Method:

Stone is exposed near to the surface; hence Semi Mechanized Opencast Mining with blasting would be preferred. Due to negligible amount of overburden, development in overburden is not required. The semi mechanized opencast mining methodology using drilling and blasting with Excavator - Dumper combination will be adapted for the extraction of stone.

1.6.2 Proposed Method of Mining:

This is a stone quarry project, so that the opencast mining method shall be adopted for extraction of the stone. Drilling and blasting will be done to produce the required size of crude rock or ROM. This rock will be break manually and by using crusher also.

Production will be done as per the Mining Plan approved by the Directorate of Geology & Mining, Govt. of Maharashtra. In the district and other nearby areas, infrastructural developments are in full swing. So that the proposed rate of production will be maintained.

Each cycle of operation shall consist of the following operations:

i) Removal of soil, murrum & weathered stone.

ii) Mining of Stone by the Opencast Mining Method with Bench Dimensions as follows:

Height of Bench: Not more than 6 m

Width of Bench: Not less than 6 m

There are generally four main operations in a Quarry:

a) Drilling

b) Blasting

c) Loading

d) Hauling

iii) Stacking of ROM to surface yard for proper sizing, sorting and stacking.

iv) Reclamation.

Drilling and Blasting

Stone is hard in nature and cannot be mined without drilling and blasting. These operations will be carried out by licensed blasting agencies under proper regulatory supervision.

1.7 Mining Program for next Five Years:

Production and Development plan for five years Plan Period (2024-25 to 2028-29) is shown below in **Table 3:**

Table 3: Production and Development Plan for Five Years

S. N.	Year	Proposed Excavation	Proposed production of ROM (Stone, Low Grade weathered Stone & Murrum) BD (2.4 T/m^3)	Average Saleable Material @90% recovery	Approximately Mine Loss Material @10%	Proposed Production of ROM (Stone, Low Grade weathered Stone & Murrum) CF = 2.83	Average Saleable Material @90% recovery	Approximately Mine Loss Material @10%
	U	m^3	Tons	Tons	Tons	Brass	Brass	Brass
	F	V	Qt = V×BD	Qst= Qt × 90%	Qlt = Qt×10%	Qb =V/2.83	Qsb=Qb ×90%	Qlb =Qb× 10%
1	2024-2025	18570.0	44568	40111	4457	6562	5906	656
2	2025-2026	36026.70	86464	77818	8646	12730	11457	1273
3	2026-2027	53991.12	129579	116621	12958	19078	17170	1908
4	2027-2028	57773.0	138655	124790	13866	20414	18373	2041
5	2028-2029	81163.68	194793	175314	19479	28680	25812	2868
	Total	**247524.50**	**594059**	**534653**	**59406**	**87464**	**78718**	**8746**

(Source: Approved Mining plan)

1.8 Raw Material Required Along with Estimated Quantity, Likely Source, Marketing Area of Final Product/S, Mode of Transport of Raw Material and Finished Product:

No raw material will be required in the proposed project. The operation involves the extraction of Stone and Murrum and it will be transported to the Local market through tippers. New approach road will be developed for transportation.

1.9 Use of Mineral:

The excavated stone will be used for the following purposes: 1. In the stockyards of Railway plots as a ballast material, 2. Road metal for road works, 3. In construction of building for filling and flooring, 4. In irrigation department for Dam, Canal, etc. preparation, 5. Other sectors.

1.10 Availability of Water, Energy/ Power Requirement and its Sources:

1.10.1 Water Requirement:

Total water requirement of the proposed mining project will be 11.50 KLD which will be met from private tankers. Domestic water requirement will be 1.48 KLD & for greenbelt development will be 6.08 KLD. Wastewater generated is 1.2 KLD (80% of Domestic water). Water requirement details are given in below **Table 4.**

Table 4: Water Requirement Details

S. N.	Details of Usage	Quantity of Water Required (KLD)
1	Dust Suppression (Water Sprinkling)	4.00
2	Domestic Purpose	1.48
3	Greenbelt	5.99
	Total	**11.47**
	Total Water Required (Rounded off)	**11.50**

1.10.2 Power:

Electric power supply will be obtained from MSEDCL (Maharashtra State Electricity Distribution Company Limited) for the proposed project. Solar Panel of 1.0 KVA is used for street lights.

1.11 Quantity of wastes to be generated (liquid and solid) and scheme for their management/ disposal:

1.11.1 Solid Waste Generation& its Disposal:

Nature of Waste: This is Stone Quarry Project so the all-excavated material is saleable. Therefore, the generation of the waste material is negligible. The nature of waste is small quantity of top cover soil and small quantity of Murrum and weathered Stone.

a) The Top Soil: The small quantity of top cover soil if encountered will be handled separately and directly dumped at Green Belt area and used for plantation in Green Belt to generate the greenery.

b) Murrum and weathered Stone: Very small amount of waste material will be generated. The small quantity of Murrum and weathered Stone will be handled separately and used for making the roads, filling wherever required and making safety embankments for ML Boundary and around the proposed mining pits. If such type of any waste balanced on site will be dump separately wherever the space available according to progress of active mining pit and sale out to the market as a filling material.

Drainage and Environmental Protection: No surface water bodies are present within or near the lease area; hence, mining and dumping operations are planned to avoid disturbance of the natural drainage system. Garland drains and retaining walls will be constructed around waste dumps and other disturbed areas to prevent runoff and sedimentation during monsoon.

Preparation of Dumping Sites: Dump sites will be surveyed and clearly demarcated before use. Access roads from quarry to dump sites will be developed with appropriate gradients to ensure safe transport of waste materials. Shrubs and vegetation in dumping areas will be cleared prior to dumping, and any soil stripped will be spread over existing dumps for stabilization.

Protective Measures: Garland drains and retaining walls will be constructed around overburden dumps, topsoil stacks, and ROM yards to control erosion and prevent waterlogging. Regular monitoring will ensure the structural stability and environmental compliance of the dumps.

Liquid Effluent: No liquid effluent will be generated from the mining operations as no wet processing is involved. The only liquid waste will be domestic sewage generated from mine offices and labor camps. Bio Toilets will be proposed to ensure safe disposal and compliance with Zero Discharge norms.

1.12 Site Analysis:

1.12.1 Accessibility:

The site for the proposed mine is located at Survey/Gut No.: 24/1 (Part), Land type: Private Land, Village: Singardip (Rithi), Tehsil: Hingna, District: Nagpur, Maharashtra, over an area of 2.82 Ha.

The Kanholibara–Nagpur Road is located approximately 0.74km (740 meters) SE of the project site. The nearest infrastructure is Kanholibara village situated at an aerial distance of 2.07 km (2070 meters) in the SSW direction. The nearest Railway Station is located at Butibori at an aerial distance of 16.63 km (16630 meters) away from the site towards the ESE direction.

National Highway NH-361 (Nagpur–Tuljapur Highway) lies at an aerial distance of 5.2 km (5200 meters) towards the ESE. State Highway SH-255 (Seloo Road) is located approximately 8.00 km (8000 meters) towards the west. The nearest Major District Road is SH-255 (Nagpur–Wardha Road), at a distance of 8.12 km (8120 meters) in the SSE direction.

1.13 Planning Brief:

1.13.1 Land Use Planning:

The mining lease is located in 2.82 Ha. area which is Private Land (Non-Forests). The vegetation is in the lease area is sparse, mainly consisting of grasses, shrubs, and a few scattered trees, typical of basaltic terrain with thin soil cover. The land was previously unused and falls under the category of private, non-agricultural land. There will be change in land use pattern as Stone and Murrum will be excavated from the mine lease area.

1.13.2 Assessment of Infrastructure Demand (Physical & Social):

On the basis of the preliminary site visit, the infrastructure demand in the villages was assessed on the basis of need and priority.

1.13.3 Amenities/Facilities:

First aid box and drinking water facility will be made available at the project site. Rest shelter will be provided at the project site. Mines office and other statutory constructions like rest shelter, first aid, work shed and drinking water as required in the mine lease area will be provided. Drinking water will be supplied to the workers by the water tankers from the surrounding villages.

1.14 Proposed Infrastructure & Environment Management Plan:

1.14.1 Residential Area (Non-Processing Area):

As the local persons of surrounding villages will be given employment, no residential area/ housing is proposed within the mining lease area.

1.14.2 Water Management:

The total water requirement is 11.5 KLD. There are no chances for changes in quality of surface water or ground water. The mining operations will be carried out on slopes of the rocky terrain. Hence, neither the ground water table nor the general surface drainage pattern will be affected. No water will be discharged from the mine.

Following measures shall be taken:

- PP will ensure that good quality potable water is provided for drinking purposes. A single cabin has been provided for staff use, equipped with a bio toilet system to manage domestic sewage in an eco-friendly manner.

- The spillages from fueling of machinery shall be avoided and in case of any spillage the same shall be handled properly. Likewise, the spent lubricating oils etc., shall be safely collected and properly disposed off.

1.15 Sewerage System:

A single cabin has been provided for staff use, equipped with a bio toilet system to manage domestic sewage in an eco-friendly manner.

1.16 Solid Waste Management:

No waste generation is envisaged from the mine.

1.17 Baseline Environmental Studies:

Baseline environmental studies were conducted in the area within 10 km radius of the proposed project site to assess the existing environmental scenario in the area. Baseline environmental studies were carried out in the months March to May 2025 i.e.; Pre monsoon season. The baseline environmental quality data for various components of environment, viz. Air, Noise, Water, Land were monitored during March to May 2025 in the study area covering 10 km radius around the project site.

1.17.1 Meteorology:

Summary of the Meteorological Data Generated at Site

The site-Specific meteorological data is given in **Table 5** and wind rose diagram is given in **Figure 4.**

Table 5: Site Specific Climatological Data

S. N.	Month	Temperature (°C)		Relative Humidity (%)		Rainfall (mm)
		Max.	Min.	Max.	Min.	
1	March 2025	32.38	23.52	57.6	35.02	0
2	April 2025	38.24	24.33	78.66	32.96	0.58
3	May 2025	34.19	27.89	82.77	47.9	0.73
	Total					**1.31**

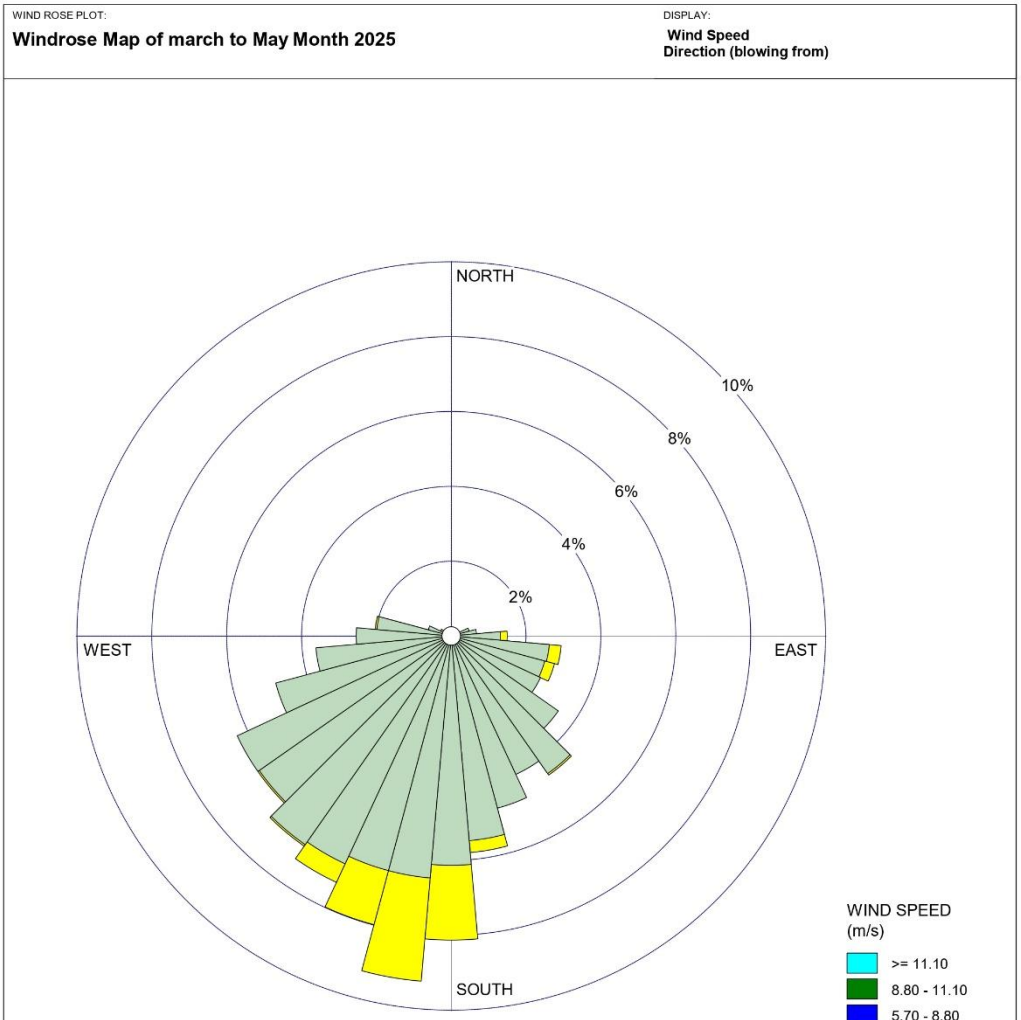


Figure 4: Wind Rose Diagram – March to May - 2025 (Site Specific)

1.17.2 Ambient Air Quality Status:

The status of ambient air quality within the study area was monitored for the period of during March to May 2025 at 8 locations including the project site and in 10 km study area villages. Total 8 sampling locations were selected based on the meteorological conditions considering upwind and downwind directions. The levels of Respirable Particulate Matter (PM_{10}), Fine Particulates ($PM_{2.5}$), Sulphur Dioxide (SO_2,) and Oxides of Nitrogen (NO_X) were monitored. Based on the above, the AAQ stations have been identified and locations of Ambient Air Quality, Noise, Ground and Soil monitoring stations are presented in **Table 6**. The minimum and maximum values of monitoring results are summarized in **Table 7 A, 7 B, 7 C, 7 D & 7E.**

Table 6: Ambient Air Quality, Noise, Ground and Soil Monitoring Stations

Location Code	Location	Distance w.r.t Project Site	Coordinates
A1	Project site	---	20°57'20.66"N,78°51'14.61"E
A2	Kanholibara	2.17 km/S	20°56'8.52"N, 78°51'16.06"E
A3	Mandva	4.7 km/NE	20°59'28.53"N, 78°53'1.79"E
A4	Degama Budruk	3.15 km/N	20°58'51.58"N,78°52'10.11"E
A5	Pipaldhara	4.76 km/NE	20°57'45.60"N, 78°54'3.14"E
A6	Kokardi	3.47 km/NW	20°59'8.13"N, 78°50'48.50"E
A7	Savli	5.50 km/SSW	20°54'40.35"N,78°49'51.02"E
A8	Kajli	5.66 km/WSW	20°57'12.60"N, 78°48'1.17"E

Table 7: Summary of Ambient Air Quality Results

Table 7 A: Particulate Matter – PM_{10}

Location Name	A1	A2	A3	A4	A5	A6	A7	A8
Minimum	68.4	57.0	47.2	47.7	46.0	45.1	48.4	46.2
Maximum	74.9	65.9	55.9	51.4	50.3	50.8	54.9	50.9
Average	71.7	61.3	51.8	49.7	48.7	48.3	51.4	49.0
98th Percentile	74.7	65.8	55.8	51.4	50.3	50.5	54.7	50.8
CPCB Standards	**100**							

All Values are in µg/m^3

Table 7 B: Particulate Matter – $PM_{2.5}$

Location Name	A1	A2	A3	A4	A5	A6	A7	A8
Minimum	25.3	15.6	15.5	15.2	14.4	14.2	13.3	15.2
Maximum	31.6	23.9	22.9	19.9	18.3	19.5	17.2	19.9
Average	28.7	19.6	19.5	17.7	16.8	17.2	15.3	17.4
98th Percentile	31.4	23.5	22.8	19.8	18.3	19.4	17.1	19.8
CPCB Standards	**60**							

All Values are in $\mu g/m^3$

Table 7 C: Sulphur Dioxide - SO_2

Location Name	A1	A2	A3	A4	A5	A6	A7	A8
Minimum	19.6	15.5	13.2	13.6	12.4	13.2	13.1	13.2
Maximum	23.9	19.9	16.6	16.3	15.4	15.8	15.8	16.9
Average	21.3	17.6	14.8	15.0	14.2	14.5	14.7	15.0
98th Percentile	23.6	19.8	16.4	16.2	15.4	15.7	15.8	16.8
CPCB Standards	80							

All Values are in $\mu g/m^3$

Table 7 D: Oxides of Nitrogen – NOx

Location Name	A1	A2	A3	A4	A5	A6	A7	A8
Minimum	21.1	17.5	15.4	15.5	14.4	15.1	15.2	15.4
Maximum	25.9	21.4	18.4	18.6	17.9	17.9	17.9	18.2
Average	23.5	19.7	16.9	17.0	16.3	16.6	16.6	17.0
98th Percentile	25.9	21.3	18.3	18.3	17.9	17.9	17.9	18.1
CPCB Standards	80							

All Values are in $\mu g/m^3$

Table 7 E: Carbon Monoxide – CO

Location Name	A1	A2	A3	A4	A5	A6	A7	A8
Minimum	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Maximum	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Average	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0
98th Percentile	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0

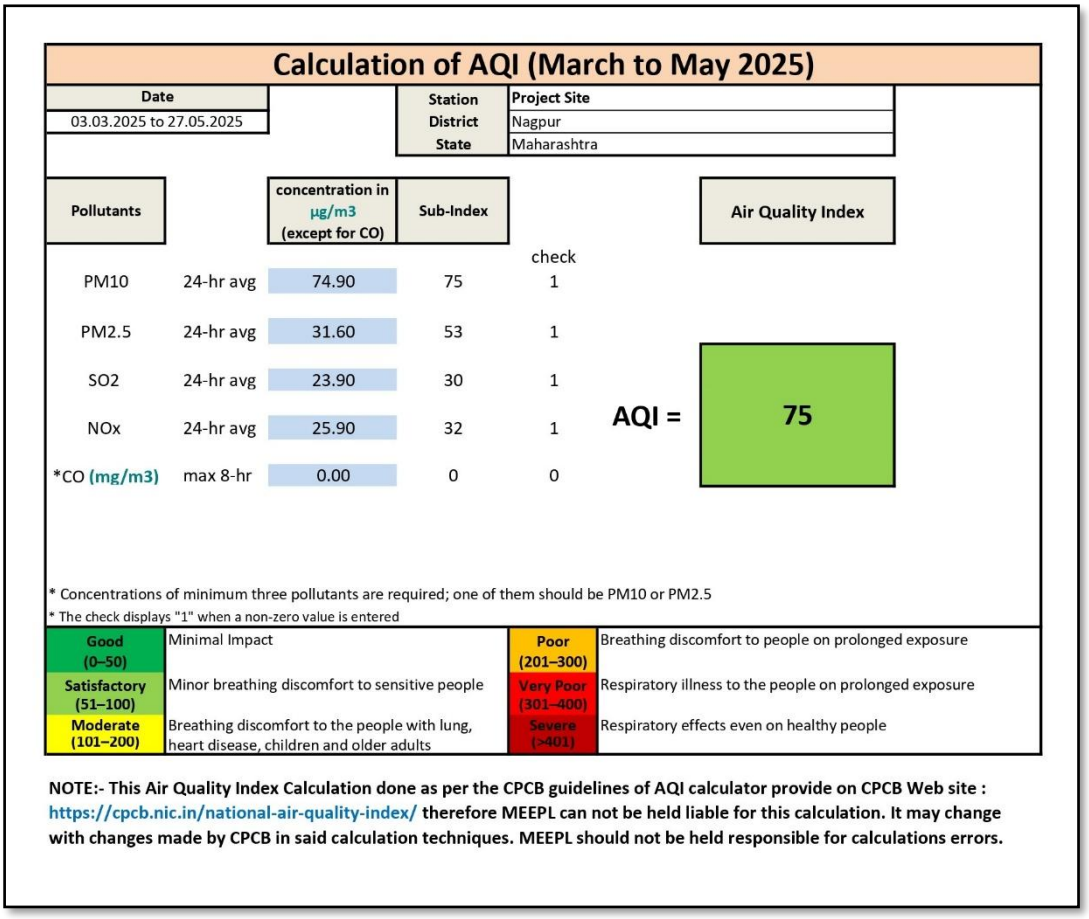
All Values are in $\mu g/m^3$

The analysis of ambient air quality data for three months consequently indicates good ambient air quality conditions at site as well as around the site upwind as well as downwind. Particulate matter PM_{10} as well as $PM_{2.5}$ is within prescribed limits. SO_2 and NOx levels are well below the limits prescribed hence overall picture as far as ambient air quality concerned is positive.

As per the baseline data collection, as per the baseline data collection, the maximum value of PM_{10} was recorded at Project Site – 74.9 µg/m³ and minimum value at Kokardi – 45.1 µg/m³. The maximum value of PM2.5 was recorded at Project Site – 31.6 µg/m³ and minimum value at Savli – 13.3 µg/m³. The maximum value of SO_2 was recorded at Kanholibara – 23.9 µg/m³ and minimum value at Pipaldhara – 12.4 µg/m³. The maximum value of NO_x was recorded at Kanholibara – 25.9 µg/m³ and minimum value at Pipaldhara – 14.4 µg/m³. The maximum value of CO was recorded at Project site and Kanholibara – 0.3 mg/m³ and minimum value at Mandva, Degama Budruk, Kokardi, Savli, and Kajli – 0.0 mg/m³.

Air Quality Index (AQI)

The objective of an AQI is to quickly disseminate air quality information that entails the system to account for pollutants which have short-term impacts. An Air Quality Index (AQI) is a number of related parameters (SO_2, CO, visibility, etc.) used to communicate to the public how polluted the air currently is or how polluted it is forecast to become. As the AQI increases, an increasingly large percentage of the population is likely to experience increasingly severe adverse health effects.



Calculation of AQI (March to May 2025)

Date	Station	Project Site
03.03.2025 to 27.05.2025	District	Nagpur
	State	Maharashtra

Pollutants		concentration in µg/m3 (except for CO)	Sub-Index	check
PM10	24-hr avg	74.90	75	1
PM2.5	24-hr avg	31.60	53	1
SO2	24-hr avg	23.90	30	1
NOx	24-hr avg	25.90	32	1
*CO (mg/m3)	max 8-hr	0.00	0	0

Air Quality Index: AQI = 75

* Concentrations of minimum three pollutants are required; one of them should be PM10 or PM2.5
* The check displays "1" when a non-zero value is entered

Good (0–50)	Minimal Impact	Poor (201–300)	Breathing discomfort to people on prolonged exposure
Satisfactory (51–100)	Minor breathing discomfort to sensitive people	Very Poor (301–400)	Respiratory illness to the people on prolonged exposure
Moderate (101–200)	Breathing discomfort to the people with lung, heart disease, children and older adults	Severe (>401)	Respiratory effects even on healthy people

NOTE:- This Air Quality Index Calculation done as per the CPCB guidelines of AQI calculator provide on CPCB Web site : https://cpcb.nic.in/national-air-quality-index/ therefore MEEPL can not be held liable for this calculation. It may change with changes made by CPCB in said calculation techniques. MEEPL should not be held responsible for calculations errors.

Figure 5: Air Quality Index

Interpretation using AQI

AQI has been calculated for the entire study period and it can be seen that the air quality is satisfactory for the project locations.

1.17.3 Ambient Noise Levels:

Ambient noise level monitoring was carried out at the 8 monitoring locations; those were selected for ambient air quality monitoring. The noise recording stations are shown in **Table 6**. The monitoring results are summarized in **Table 8**.

Table 8: Summary of Ambient Noise Level Monitoring Results

Equivalent Noise Levels	N1	N2	N3	N4	N5	N6	N7	N8
(Day) L_{Max}	71.4	57.5	59.7	55.7	56.3	54.6	56.4	57.4
(Day) L_{Min}	55.8	45.2	46.5	44.5	43.3	42.2	42.6	42.2
(Night) L_{Max}	59.3	47.3	46.2	46.3	46.3	41.5	44.3	42.5
(Night) L_{Min}	55.5	40.9	40.5	40.6	40.8	38.6	38.1	37.3
L_d	**66**	**54.0**	**53.7**	**52.5**	**53.9**	**49.6**	**50.7**	**51.7**

L_n	**57.6**	**43.7**	**42.6**	**42.4**	**43.8**	**39.9**	**41.1**	**40.8**
CPCB Ld	75	55	55	55	55	55	55	55
Ln	70	45	45	45	45	45	45	45

***All values in dB(A)**

L_{min} : Minimum Noise Level Recorded
L_{max} : Maximum Noise Level Recorded
L_d : Day Equivalent
L_n : Night Equivalents
L_{dn} : Day-Night Equivalents

Conclusion

The Maximum Noise (day) value was observed 71.4 dB(A) at Project Site (N1) and the Minimum Noise (day) value was observed 42.2 dB(A) at Kajli (N8) and Kokardi (N6). The Maximum Noise (night) value was observed 59.3 dB(A) at Project Site (N1) and the Minimum Noise (night) value was observed 37.3 dB(A) at Kajli (N8). The maximum and minimum day time equivalent noise levels were found in the range of 49.6 to 66 dB(A). The maximum and minimum night time equivalent noise levels were found in the range of 39.9 to 57.6 dB(A).

1.17.4 Surface and Ground Water Quality:

Ground Water Sampling Locations:

Ground water sampling locations were selected surrounding the mine site within 10 km study area. Total eight ground water samples were collected and analyzed from the 10 km radius of the study area. The locations of ground water sampling with its distance and direction w.r.to the project site are given in **Table 6.**

Conclusion: Ground Water Samples within 10 km Study Area:

The physico-chemical characteristics of groundwater are presented in following table and compared with the IS-10500 standards.

Parameters	Unit	Baseline Monitoring Period (March to May 2025)	Permissible Limit (IS 10500)
pH	-	7.3 – 7.9	No relaxation (6.5 – 8.5)
EC	µS/cm	610 – 796	Not specified
TDS	mg/L	374 – 484	2000
Total Hardness	mg/L	162 – 380	600
Chloride	mg/L	35 – 89	1000
Sulphate	mg/L	16 – 55	400
Nitrate	mg/L	1.8 – 6.5	No relaxation

Surface Water Sampling Locations:

Surface water sampling locations were selected surrounding the mine site within 10 km study area. Three surface water samples were collected from the study area. Two surface water samples were from downstream and one from upstream of the project site. The locations of surface water sampling with its distance and directions w.r.to the project site given in **Table 9.**

Table 9: Surface Water Sampling Locations

S. N.	Location	Distance/Dir. W.r.t. project site	Latitude & Longitude
Surface Water			
SW1	Kanholibara Nadi Upstream near Mathan Village	1.94 km/NW	20°58'10.08"N, 78°50'37.93"E
SW 2	Kanholibara Nadi Downstream near Kanholibara village	2.30 km/S	20°56'4.91"N, 78°51'0.60"E
SW3	Kanholibara Dam	1.92 km/SW	20°56'43.96"N, 78°50'25.30"E

Conclusion:

Surface Water Samples within 10 km Study Area:

Sampling was carried out at 3 locations during the study period. Sampling and analysis were carried out, as per standard methods and frequency of the sampling was thrice/stations. The summary of the results is presented below:

The physico-chemical characteristics of the surface water are presented in following Table and are compared with the IS-2296:1992 standards.

Parameters	Unit	Baseline Monitoring Period (March to May 2025) – Range	IS 2296:1992; Class C (Drinking water source after conventional treatment and disinfection)
pH	-	7.4–7.6	6.0–9.0
EC	µMho/cm	382–716	-
TDS	mg/L	232–410	1500
Total Hardness	mg/L	192–258	300
Chloride	mg/L	22–59	600

1.17.5 Soil Quality:

Location of Soil Sampling Sites:

The soil samples were collected from 8 sampling locations within an area of 10 km radius around

the proposed project for analysis of the physico-chemical characteristics of the soil quality. Soil samples were collected from three different types of land i.e.; agriculture, waste (mine site) and barren land. The locations of soil sampling are given with its distance and direction w.r.to project site in **Table 6.**

Conclusion:

Sampling was carried out at 8 locations during the study period. The summary of the results is presented below:

Physico-Chemical Characteristics of Soil			**Macro and Secondary Nutrient Content in Soil**		
Parameters	**Unit**	**Range (Minimum - Maximum)**	**Parameters**	**Unit**	**Range (Minimum- Maximum)**
pH	-	7.0 – 8	Nitrogen	Kg/hec	105 – 252
EC	µS/cm	360 – 1146	Phosphates	Kg/hec	14.0 – 26
Moisture Content	%	3.0– 4.0	Potassium	Kg/hec	138 – 950
Organic Carbon	%	1.0 – 1.0	Magnesium (as Mg)	mg/kg	798 – 1281

1.17.6 Land Use Land Cover Classification:

The Land Cover classes and their coverage are summarized in **Table 10.**

Table 10: Land Use Pattern of the Study Area

LU/LC Classification System				
S. N	**Level-I**	**Level-II**	**Area (sq. km²)**	**Percentage (%)**
1	Built-up land	Settlement	4.10	1.27
		Industrial Settlement	3.64	1.13
		Road Infrastructure	3.01	0.93
		Railway Line Area	0.85	0.26
2	Agricultural Land/ Crop Land	Single Crop	103.18	31.92
		Double Crop	55.65	17.21
3	Forest	Protected Forest	14.40	4.45
		Reserved Forest	105.36	32.59
		Open Jungle	3.28	1.01
		Open Mixed Jungle	4.79	1.48
4	Scrubs/Wastelands	Open Scrub	10.59	3.28
		Wasteland	2.89	0.89
5	Waterbodies	River/Nala/Stream/Canal	1.85	0.57
		Pond/Lake/Dam/Reservoir	7.28	2.25
6	Mines Area	Stone Quarry	2.42	0.75
		Total	**323.29**	**100.00**

1.17.7 Ecology & Biodiversity in 10 km Study Area:

The 10 km study area consists of a mix of agricultural lands, open scrub and patches of degraded forest vegetation. Common tree species include neem (Azadirachta indica), babool (Acacia nilotica), teak (Tectona grandis), and other dry deciduous varieties. Shrubs and grasses such as Calotropis gigantea and Cynodon dactylon dominate the open spaces. Fauna mainly includes small mammals like hare, mongoose, and rodents, along with domestic cattle and goats. Avifauna is diverse, with common bird species such as Indian Robin, Red Whiskered Bulbul frequently observed. Reptiles like garden lizard, skink, and snakes (rat snake, cobra) are occasionally found in the rocky and scrub areas. Aquatic biodiversity is limited to seasonal streams and ponds, supporting fish, frogs, and aquatic insects. No rare, endangered, or threatened (RET) species have been reported within the proposed study area. The ecology is mainly shaped by human activities such as agriculture, grazing, and minor forest product collection. Overall, the study area represents a typical dry deciduous ecosystem of Nagpur district with moderate floral and faunal diversity.

1.18 Socio-Economic Environment:

Information on socio-demographic status and the trends of the communities in the 10 km radius was collected through primary social survey and secondary data from census 2011 & village directory 2011. Summary of the socio-economic status of the study area is given in **Table 11.**

Table 11: Distribution of Population in the Study Area as per 2011 Census

S.N.	Particulars	0-3 km	3-7 km	7-10 km	0-10 km
1	No. of Households	10943	2252	7783	20978
2	Male Population	24114	4934	16900	45948
3	Female Population	21301	4577	14883	40761
4	Total Population	45415	9511	31783	86709
5	% Of Males to Total Population	53.1	51.88	53.17	52.7
6	% Of Females to Total Population	46.90	48.12	46.83	47.28
7	Average Household Size	4.15	4.2	4.08	4.14
8	Sex Ratio	883	928	881	887

Source: District Primary Census Hand Book, Maharashtra, 2011

1.19 Anticipated Environmental Impacts and Mitigation Measures:

1.19.1 Air Environment:

The air borne particulate matter is the main air pollutant contributed by opencast mining. Predictions have been carried out for the worst-case scenario considering all the operations of the mine will be under simultaneous continuous operation of 12 hours for the proposed emissions.

The air quality modeling has been done and the details of Incremental Emission Load of Area Source due to Mining Activity (Excavation, Drilling, Blasting and Loading), Contributing in Existing Baseline Values is given in **Table 12 A** and Incremental Emission Load of Line Source (Vehicles Movement) due to Mining Activity, Contributing in Existing Baseline Values is given in **Table 12 B.**

Table 12 A: Incremental Emission Load of Area Source due to Mining Activity (Excavation, Drilling, Blasting and Loading), Contributing in Existing Baseline Values

Incremental- Area Source													
S. N.	Sampling Location Code & Name	PM_{10} (ug/m^3)			PM2.5 (mg/m^3)			SO_2 (ug/m^3)			NOx (ug/m^3)		
		BV	IV	RV	BV	IV	RV	BV	IV	RV	BV	IV	RV
1	*A1	74.9	0.30	75.2	31.6	0.25	31.85	23.9	0.17	24.07	25.9	0.34	26.24
2	A2	65.9	-	65.9	23.9	-	23.9	19.9	-	19.9	21.4	-	21.4
3	A3	55.9	0.02	55.92	22.9	0.03	22.93	16.6	-	16.6	18.4	0.03	18.43
4	A4	51.4	0.04	51.14	19.9	0.04	19.94	16.3	0.02	16.32	18.6	0.05	18.65
5	A5	50.3	0.02	50.32	18.3	0.03	18.33	15.4	0.02	15.42	17.9	0.03	17.93
6	A6	50.8	0.04	50.84	19.5	0.03	19.53	15.8	0.02	15.82	17.9	0.03	17.93
7	A7	54.9	-	54.9	17.2	-	17.2	15.8	-	15.8	17.9	-	17.9
8	A8	50.9	-	50.9	19.9	-	19.9	16.9	-	16.9	18.2	-	18.2
NAAQS Standards		100 (24 hourly)			60 (24 hourly)			80 (24 hourly)			80 (24 hourly)		

Note: BV- Baseline Value, IV- Incremental Value, RV- Resultant Value

Table 12 B: Incremental Emission Load of Line Source (Vehicles Movement) due to Mining Activity, Contributing in Existing Baseline Values

S. N.	Sampling Location Code & Name	PM_{10} (ug/m^3)			SO_2 (ug/m^3)			NOx (ug/m^3)			CO (mg/m^3)		
		BV	IV	RV	BV	IV	RV	BV	IV	RV	BV	IV	RV

1	*A1	74.9	0.24	74.24	23.9	0.31	24.21	25.9	0.29	26.19	0.5	0.34	0.84
2	A2	65.9	-	-	19.9	-	19.9	21.4	-	21.4	0.3	-	0.3
3	A3	55.9	-	-	16.6	0.01	16.61	18.4	-	18.4	0.0	0.01	0.01
4	A4	51.4	0.01	51.41	16.3	0.02	16.32	18.6	0.02	18.62	0.0	0.02	0.02
5	A5	50.3	-	-	15.4	0.01	15.41	17.9	0.01	17.91	0.0	0.01	0.01
6	A6	50.8	-	-	15.8	0.01	15.81	17.9	0.01	17.91	0.0	0.01	0.01
7	A7	54.9	-	-	15.8	-	15.8	17.9	-	17.9	0.0	-	0.0
8	A8	50.9	-	-	16.9	-	16.9	18.2	-	18.2	0.0	-	0.0
NAAQS Standards		**100 (24 hourly)**			**80 (24 hourly)**			**80 (24 hourly)**			**4 (1 Hour)**		

Note: BV- Baseline Value, IV- Incremental Value, RV- Resultant Value

1.19.2 Air Pollution Control Measures:

The predicted average concentrations with baseline along with the negligible proposed contribution from the project will be below the standards. Hence considering the present and the future scenario, it can be concluded that there is minimal impact of the project. Whereas construction phase impacts have to be mitigated to the most so as to keep the air quality within prescribed standards. Therefore, following Environment management measures need consideration the prevailing conditions;

1. Wet drilling shall be done to avoid transport of dust emissions
2. Control blasting shall be done as per mining plan
3. Trees with large foliage area and higher APTI index shall be planted around the project boundary.
4. Storage and pillage of excavated material will not be done at project site
5. Mining shall be done as per approved production plan
6. PUC certified vehicles shall be used, EURO 6 engine compatible vehicles are recommended to avoid higher emission level of gases
7. Internal road shall be sprinkled with water, regularly
8. Unnecessary vehicular movement shall be restricted to avoid dust emission.
9. Dedicated water storage vehicle shall be provided for sprinkling activity
10. Excavation, handling and transport of materials will be avoided under high wind conditions or when a visible dust plume is present;

11. During windy conditions, dust suppression measures will be adopted (dampening with water, tire washing facility at the entrance of the project site, etc.;
12. The vehicles hired for transportation of material and labor shall have PUC certificate in order to reduce air emissions;
13. Dust covers will be provided on trucks used for transportation of materials prone to fugitive dust emissions;
14. Traffic Management - vehicular movement to be regulated with proper parking facility and internal road system;

1.19.3 Noise Environment:

Noise from mining activities, including heavy machinery, drilling, blasting, and transportation, significantly impacts the working environment.

1.19.4 Noise Pollution Control Measures:

The following control measures will be adopted to keep the ambient noise levels well below the limits:

1. Drilling will be carried out with the help of sharp drill bits which will help in reducing noise.
2. Controlled blasting will be done to minimize noise, ground vibration, fly rock and air overpressure.
3. Proper maintenance, oiling and greasing of machines at regular intervals will be done to reduce generation of noise.
4. Confining the noise generating sources.
5. In order to reduce the effect of noise pollution, ear plugs /earmuffs will be provided to all employees.
6. Green belt development along the safety barrier would minimize the adverse impacts likely to arise out of mining operations. In the proposed scheduled afforestation programme, adequate plantation will be done along the periphery of the mines area to attenuate noise.
7. Periodical noise level monitoring will be done.

1.19.5 Impact due to Ground Vibrations:

Blasting operations, commonly used in mining, can cause ground vibrations that negatively impact nearby structures and individuals. These vibrations, generated by the explosive shockwaves, can lead to structural damage, annoyance, and even displacement of building components.

1. Structural Damage:

- Superficial Damage: Low-level vibrations can cause cracks in plaster, loose tiles, and other

superficial damage to buildings.

- Structural Damage: Excessive vibrations can lead to more serious structural damage, including cracks in walls, foundation issues, and potential collapse of unstable structures.
- Slope Instability: In mining operations, vibrations can destabilize mine slopes, potentially leading to landslides and endangering personnel and equipment.
- Damage to Underground Structures: Blasting can also affect underground structures like tunnels and mineshafts.

2. Human Impact:

- Annoyance and Discomfort: People can feel vibrations at levels far below those that cause damage, leading to annoyance, sleep disturbance, and general discomfort.
- Psychological Impact: The fear and anxiety associated with blasting vibrations can have a psychological impact on nearby residents.
- Detection at Low Levels: Human perception of vibration is far more sensitive than the levels that cause structural damage.

Vibration Mitigation Measures

By practicing controlled blasting, the problems will be greatly minimized and the impact will also be minimized by using Latest techniques for blasting:

1. Use of NONELs,
2. Optimization of blasting parameters, Face orientation,
3. No secondary blasting is done,
4. Regular monitoring for vibrations during blasting

Blasting in this Stone quarry, does not propagate vibrations as the formation consisting of bedding planes, cavities and murram intrusions. However, to mitigate the ill effects of vibrations if any, the following methods will be followed:

1. Blasting will be performed strictly as per the guidelines specified under blasting technology;
2. Blasting operations will be carried out only during daytime as per mine safety guidelines;
3. Proper warning signals will be used;
4. Adequate safe distance from site of blasting will be maintained;
5. During blasting, other activities in the immediate vicinity will be temporarily stopped;
6. Overcharging will be avoided;
7. Optimization of blasting;
8. Supervision of drilling and blasting operations to ensure designed blast geometry;

9. Sub-drilling will be kept just adequate to tear-off the bench bottom;
10. The charge per delay will be minimized and preferably a greater number of delays will be used per blast;
11. Effective stemming of the explosives will be done in the drill holes; Shorter stemming columns of less than 1/ 3 shall be avoided to reduce overloading of blast holes;
12. Straight row pattern of initiation shall be preferred;
13. Delay interval between rows of blast holes shall be maximized whenever confinement is greater like corner of benches or the portions close to structures of importance;
14. Delay period shall be increased in the last rows;
15. Progress of blast (delay) shall be opposite to the direction of house/ structures of importance;
16. Blasting shall not be carried out in benches covered with the fragmented material produced from previous blast. Face profile shall be checked before charging.

1.19.6 Water Environment:

The total water requirement for the above operations will be 11.5 KLD and domestic water requirement will be met by water tankers at the mine site. Waste water generation from the above consumption is from domestic consumption i.e., 1.2 KLD. Wastewater generated from the Domestic front will be mainly from toilets.

Ground water pollution can take place only if the mining rejects contain chemical substances. However, the deposit does not contain any harmful ingredients. Hence, no impact on groundwater quality is envisaged. The ground water table is about 10 m below the general ground level; mining operations will not intersect the ground water table.

There is no any seasonal nallah inside the mine lease area. During rainy season, water will precipitate within the mine and in the vicinity, for that garland drains all along the quarry edge keeping a barrier from the mine surface will be constructed to arrest incoming water to the mine.

No wastewater generation is envisaged due to the mining operations. No impact of wastewater generation on the surface water is envisaged, as there is no discharge into surface water resources.

1.20 Greenbelt Development:

Greenbelt development programme will be designed within the natural constraints of the site and in particular species selection reflects flora known to be resistant to the local conditions. A Greenbelt development is necessary for:

1. Landscaping and providing shelter

2. Improvement in site conditions
3. Surface air purification by providing oxygen and letting SPM to settle on the leaves.
4. To attenuate noise generation by movement of vehicles and other machinery.

Proponent will provide the plantation all along the 10 m barrier zone, approachable road and in the restricted area under 250 m from forest boundary.

The following characteristics will be taken into consideration while selecting plant species for green belt development and tree plantation.

1. They should be local indigenous and drought resistant species.
2. They should be fast growing and tall trees.
3. They should be perennial and evergreen.
4. They should have thick canopy cover.
5. The planting should be in appropriate alternate rows around the site to prevent lateral pollution dispersion.
6. The trees should maintain regional ecological balance and conform to soil and hydrological conditions. Indigenous species should be preferred.
7. Species will be planted as per SEIAA guidelines.

The plantation work for greenbelt development will be carried in consultation with a horticulturist. Total no. of saplings with consideration of 75% rate of survival to be planted every year and balance assume mortality of 25% will be covered every year with applicable rate of saplings to be planted.

Afforestation will be carried out to increase the green cover and to create harmony with nature. The total mine area developed Greenbelt surrounding 7.5 m ML area and along the permanent roads shall be developed with tree species having broad leaves, with minimum of 2 or 3 rows, keeping 2.5 m interval. Spacing in between the tree saplings shall be used for development of undergrowth. Mostly local varieties of plants are proposed to be planted to improve the soil quality with humus and carbon.

Details of Plantation area are as given below:

Total Area = 28,200 m^2, (2.82 Ha.)

A) Tree plantation in 7.5 m Periphery = Perimeter = 930 m x 2 rows / 2.5 Spacing = 744 No. of saplings - Trees already existed in Greenbelt Area = 744 – 5= 739 saplings will be planted.

B) Tree plantation along the approachable Road = 400 m x 2 row both side / 2.5 spacing

= 320 No. of saplings will be planted

C) New tree plantation for Cutting 2 Tree in Mining Zone = 20 x 2= 40 No. of saplings will be planted.

D) Total Plantation including mine lease area, mine approachable road = 739 + 320 + 40 = 1099 No. of saplings will be planted.

Species recommended for greenbelt development is given in **Table 13.**

Table 13: Plantation program on the Greenbelt Development Area

A) **Plantation program on the Greenbelt Development Area (10 m Periphery of Proposed Quarry Lease Area & along the Approachable Road**		
Year (as per Mining Plan)	**Sapling to be planted**	**Survival Rate Considered**
I (100% sapling of tree plantation)	1099	75 %
Total	**1099**	

Table 14: Species Recommended for Greenbelt Development

Following Plants will be planted on the periphery of Mine lease & along the Approachable Road			
S. N.	**Common Name**	**Botanical Name**	**Importance of Tree**
1	Neem	*Azadirachta indica*	Medicinal value to control soil erosion.
2	Karanj	*Pongamia pinnata*	Karanj is a medium- sized evergreen or briefly deciduous tree, Karanj trees have been used for soil reclamation.
3	Amba	*Mangifera indica*	Edible fruits, varied medicinal properties are attributed to different parts of mango tree.
4	Pimpal	*Ficus religiosa*	The fruits, leaves, bark and even the latex are used to prepare herbal remedies, *Ficus religiosa* is tolerant to various climate zones.
5	Shisam	*Dalbergia sissoo*	Medicinal value, Bird attracting species.
6	Kadamb	*Neolamarckia cadamba*	Evergreen tree has scented orange flowers in dense globe-shaped clusters.
7	Sagvan	*Tectona grandis*	Teak is a large, long, deciduous tree
8	Vad	*Ficus benghalensis*	*Ficus benghalensis* grows best in wet habitats on well-draining sandy loam soils, but it is drought-resistant.
9	Umber	*Ficus racemosa*	Medicinal value, Edible fruits, Bird attracting species.

10	Arjun	*Terminalia arjuna*	Medicinal value, helping to reduce soil erosion
	Total = 1099 No. of saplings		

1.21 Occupational Health & Safety Management:

Occupational Health and Safety Measures result in improving the conditions under which workers are employed and work. It improves not only their physical efficiency, but also provides protection to their life and limb. Management will consider the following safety measures:

- **a)** To depute dedicated safety team
- **b)** Inspection and maintenance of equipment and accessories
- **c)** Pre-placement and periodic health check-up covering chest X-rays, ECG, Spirometry, Vision Test, Audiometry, CBC, Blood Sugar, Urine Test, and Lipid Profile
- **d)** Removal of unsafe conditions and prevention of unsafe acts
- **e)** Detailed analysis of each and every incident
- **f)** To provide standard PPEs and ensure its use
- **g)** Periodic inspection by internal and external safety experts
- **h)** Celebration of various safety events for awareness
- **i)** Medical facilities and first aid boxes will be established in the mine premises

Besides, following points are also taken care of during mine operation for assuring safety of workers:

- **a)** Health awareness programmes and camps will be organized
- **b)** The mine workers will be provided all necessary PPE, especially dust masks, ear plugs/ear muffs, safety boots, helmets etc.
- **c)** Employees will be medically examined at the time of employment and periodically thereafter. Tests include chest X-ray, Spirometry, Audiometry, and others.
- **d)** Under initial vocational training, the workers will be given training related to all safety and health aspects pertaining to their vocation.
- **e)** Special awareness programs will be regularly organized for workers and nearby villagers regarding health effects due to mineral dust exposure.
- **f)** The occupational health surveillance programme will be carried out by a team of qualified doctors and nurses, with records maintained properly.

1.22 Environment Management Plan (EMP):

In order to implement an effective environmental management plan for mitigating the adverse impacts on the environment, regular monitoring of various environmental components is

necessary. Mine manager with the support of Safety and Env. Officer and other workers will monitor the environment management plan of this area.

Budget for Implementation Environment Management Plan:

It is necessary to include the environmental cost as a part of the budgetary cost component. The project authorities propose to undertake the following environmental works to achieve the environmental quality as desired. Total budget of Environment Management Plan (EMP) for the proposed mining project is Rs. 44.11 Lakh which includes capital cost of Rs. 25.73 Lakh and recurring cost of Rs. 18.38 Lakh. Detail budget for Environmental Management Plan is given in below **Table 15.**

Table 15: EMP Budget

S. N.	Particular	Measures	Capital Cost (Rs.)	Recurring Cost/Annum (Rs.)	Time Frame	Date of Start
1	Environmental Monitoring	Monitoring of Air, Water, Noise & Soil	0	1,50,000	Twice in a year report will be submitted to RO of MoEF&CC & SEIAA Maharashtra	w.e.f. after getting EC & Mining Lease
2	Air Pollution Control	Sprinkling of water on haulage road & approachable to control dust	4,00,000	1,00,000	Twice in a day	During operations
		Approachable Road compaction & Maintenance	0	90,000	Twice in a year and as per need	During operations
		Purchase of Gunny bags for blasting	20000	15000	During operations	During operations
3	Water Pollution control	Garland Drain 864 m,	1,72,800	1,38,240	Before start of monsoon season	As per the monitoring season
4	Noise Pollution Control	Appropriate PPE's Earmuffs will be Provide to workers	45,000	22,000	Twice in a year	During operations

5	Green Belt Development (33% of the total area as per the CPCB Guidelines)	Plantation will be developed along the lease area (Safety Zone 7.5m) – 739 Nos.	5,99,500	1,07,910	1099 Saplings within 1 year	w.e.f. monsoon season after getting Environmental Clearance
		Along the Approachable road- Nos. 320				
		Drip Irrigation System shall be installed for regular watering the plantation	4,65,000	93,000	Once in 5 years	w.e.f. after getting Mining Lease
6	Employees Health Check-up and Insurance, etc.	Visit of PHC Doctor	0	16,500	Once a Month	During operations
		First Aid Room & First Aid Stations & Stretcher & Blanket	70,000	10,000	Before execution of Mining Operation	w.e.f. after getting Mining Lease
		Accidental Insurance	0	3,30,000	Once in 5 years	
7	Amenities Provided (Drinking Water, Mobile Toilet, Labour Welfar, Occupational Health and Safety, Healthcare)	Drinking Water facility for workers & purchase of Water Tank	13,000	185625	Before execution of Mining Operation	w.e.f. after getting EC & ML (maintenance will be done during operation)
		Rest Shelter cum Canteen Shade	1,00,000	39,600		
		Mobile Toilet & Cost for Maintenance & Sanitation of Bio Toilets	2,00,000	3,60,000		
		PPE [Personnel Protection Equipment]: (goggles, gloves, helmets, dust mask, safety shoes, Gum Boots)	82,500	--	Twice in a year	During operations

		Safety Training to Workers for health and safety	0	66,000		
8	Safety & Security	Fencing of Barbed Wire	2,23,200	74,400	Before execution of Mining Operation	w.e.f. date of start of mining
		CCTV installation with AMC	50000	30000		
9	Renewable Energy	Solar street lights for Mine Office, Store, toilet Area and mine approach road, Haul Roads and Entry Gate	1,32,000	10,000	Before execution of Mining Operation	w.e.f. date of start of mining
Total			**25,73,000**	**18,38,275**		

1.23 Corporate Environment Responsibility:

CER Budget will be considered as per the guidance of district collector after the Public Hearing.

1.24 Project Benefits:

The proposed Stone and Murrum Quarry Project by Shri. Satish Rushiraj Hiranwar & Shri. Tarun Rushiraj Hiranwar is a low-scale but high-impact development initiative, aligned with the principles of sustainable and inclusive growth. The project not only addresses the demand for essential mineral resources but also brings tangible socio-economic benefits to the surrounding region, particularly the rural and tribal communities. The development initiatives, in line with the Corporate Environment Responsibility (CER) framework, will be focused on long-term community upliftment and inclusive growth.

1. The project will significantly improve the socio-economic environment of the area by generating direct and indirect employment opportunities. Priority will be given to local residents for recruitment, and several indirect livelihood options will be created through transportation, support services, and small-scale local businesses.
2. Many villagers will have the opportunity to engage their own vehicles for the transport of mined material, thereby creating a new and sustainable income stream for families with otherwise limited earning avenues, especially in forest-dominated, agriculture-dependent areas.
3. Given the lack of industrial activity in the vicinity, this project provides a much-needed alternative to traditional occupations such as seasonal farming.

4. The project is also expected to contribute indirectly to the nation's infrastructure development, by supplying Stone and Murrum, a key input in Construction & Infrastructure. This aligns with broader national priorities of resource security and economic development.
5. Furthermore, the mining operations will adhere to environmentally compliant practices, ensuring that ecological disruption is kept to a minimum and that sustainable mining protocols are maintained throughout the life of the project.
6. In conclusion, the extraction of stone and murrum plays a vital role in supporting infrastructure development by providing essential raw materials for roads, buildings, and industrial projects.
7. It promotes local employment, boosts the regional economy, and utilizes otherwise barren land effectively. Overall, it contributes to both economic growth and community development.

1.25 Conclusion:

Based on the Draft EIA study, it is observed that there will be a marginal increase in the dust pollution, which will be controlled by sprinkling of water and transportation of Stone and Murrum in trucks by covering the material with Tarpaulin.

There will be negligible impact on ambient environment & ecology due to mining activities, more over the mining operations will lead to direct and indirect employment generation in the area.

Hence, it can be summarized that the mining of minerals from the proposed Stone and Murrum Quarry mining project by Shri. Satish Rushiraj Hiranwar & Shri. Tarun Rushiraj Hiranwar will have a positive impact on the socio-economic environment of the area.

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