

# EXECUTIVE SUMMARY

## TVL. NAVAMANI MINES PRIVATE LIMITED ROUGH STONE AND GRAVEL QUARRY

S.F. Nos. 15/1 & 15/2, Extent – 2.80.5 Ha  
Sivayam (North) Village, Krishnarayapuram Taluk, Karur District, Tamil Nadu State

“B1” CATEGORY/ MINOR MINERAL /CLUSTER/ NON-FOREST LAND/ PATTALAND

\* **CLUSTER EXTENT = 8.80.0 Ha**

\* Cluster Calculated as per MoEF & CC Notification – S.O. 2269(E) Dated: 01.07.2016

**ToR Obtained vide**

**Lr.No.SEIAA-TN.F.No.6993/SEAC/TOR-761/2020 Dated 24.09.2020**

**Project Proponent**

**Tvl. Navamani Mines Private Limited  
Thiru. Palaniyandi Vimalathithan,  
Director, No.5/898, Alagu Nagar,  
Trichy Main Road,  
Namakkal District – 637 001**

**Environmental Consultant**

**GEO EXPLORATION AND MINING SOLUTIONS** 

Old No. 260-B, New No. 17,  
Advaitha Ashram Road, Alagapuram,  
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Accredited for sector 1 ‘A’, 31 & 38 Category ‘B’  
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**Baseline Monitoring Period – March to May 2021**

**Environmental Lab**

**KGS ENVIRO LABORATORY PVT LTD**

(ISO /IEC 17025:2017 Certified & MoEF Notified Laboratory)

No: 16, F-1, Bharathi Flats, Bharathiyar Street, Cholambedu Main Road,  
Thirumullaivoyal, Chennai – 600 062.

**APRIL 2023**

## 1. INTRODUCTION

Rough Stone is the major requirement for construction industry. This EIA Report is prepared by considering Cumulative load of proposed & existing quarries within 500m radius from the proposal of Tvl. Navamani Mines Private Limited Rough Stone and Gravel Quarry. Total extent of Cluster of 8.80.0 Ha at Sivayam (North) village, Krishnarayapuram taluk, Karur District and Tamil Nadu State, cluster area is calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016.

The proponent has obtained necessary statutory clearances from the Department of Geology and Mining, Karur District, Tamil Nadu (Statutory Clearance Documents are enclosed along with Mining plan as Annexure No III). The total Extent of the quarries within the radius of 500m from this proposal is > 5Ha, hence the proposal falls under “B1” Category project as per the EIA notification, 2006 (As amended timely).

Proponent applied for Environmental Clearance to SEIAA, Tamil Nadu and obtained ToR vide Lr.No.SEIAA-TN.F.No.6993/SEAC/TOR-761/2020 Dated 24.09.2020 for carrying out EIA and EMP studies for the Rough stone and Gravel quarry.

To carry out the EIA studies and to prepare EIA and EMP studies the proponent Tvl. Navamani Mines Private Limited have engaged a consultant M/s. Geo Exploration and Mining Solutions, Salem, Tamil Nadu. The Baseline Monitoring study has been carried out during pre monsoon season (March to May 2021) considering the provisions of MoEF & CC Office Memorandum Dated: 29.08.2017 and MoEF & CC Notification S.O. 996 (E) Dated: 10.04.2015.

**“Draft EIA report prepared on the basis of ToR Issued for carrying out public hearing for the grant of Environmental Clearance from SEIAA, Tamil Nadu”**

### 1.1 DETAILS OF PROJECT PROPONENT –

<b>Name of the Project Proponent</b>	Tvl. Navamani Mines and Minerals Rough Stone and Gravel Quarry
<b>Address</b>	No.5/898, Alagu Nagar, Trichy Main Road, Namakkal District – 637 001
<b>Mobile No</b>	+91 94433 44331
<b>E-Mail</b>	<a href="mailto:navamanimines@gmail.com">navamanimines@gmail.com</a>

The project proponent is an individual.

**1.2 QUARRY DETAILS WITHIN 500 M RADIUS**

<b>CLUSTER QUARRIES</b>				
<b>PROPOSED QUARRY</b>				
<b>CODE</b>	<b>Name of the Owner</b>	<b>S.F.Nos &amp; Village</b>	<b>Extent (ha)</b>	<b>Remarks</b>
P1	<b>Tvl. Navamani Mines Private Limited</b> Thiru. Palaniyandi Vimalathithan, Director, No.5/898, Alagu Nagar, Trichy Main Road, Namakkal District – 637 001	15/1 & 15/2 Sivayam (North) Village	2.80.5 ha	ToR obtained vide Lr.No. SEIAA- TN.F.No.6993/SEA C/TOR-761/2020 Dated 24.09.2020
<b>TOTAL</b>			<b>2.80.5 ha</b>	
<b>EXISTING QUARRIES</b>				
<b>CODE</b>	<b>Name of the Owner</b>	<b>S.F.Nos &amp; Village</b>	<b>Extent ( ha)</b>	<b>Lease period</b>
E1	<b>Thiru. A.Shanmugaraj</b> S/o. Appavu, No 219, Manapparai Main Road, Iyyar Malai, Sivayam Post, Karur District	13/1, 14/2 and 14/3 Sivayam (North) Village	2.49.5 ha	07.02.2018 to 06.02.2023
E2	<b>Thiru. D. Rathinam</b> S/o. Duraisamy, 153/A, Kampan Street, Kavery Nagar, Kulithalai Taluk, Karur District	30/1A, 30/1B Sivayam (North) Village	2.46.0 ha	07.02.2018 to 06.02.2023
E3	<b>Tmt. M.Jayamani,</b> W/o. Manoharan Ponniyagoundanpudhur, Punnamchathiram, Aravakurichi Taluk, Karur District	30/4, 31/1 Sivayam (North) Village	1.04.0 ha	06.12.2018 to 05.12.2023
E4	<b>Thiru. M.Palaniyandi,</b> S/o, Mottiyandi, 2/34, Ambalakkara street, Somarasampettai, Srisangam Taluk, Trichy District.	2/2 Sivayam (North) Village	2.34.5 ha	10.07.2014 to 09.07.2019
<b>Total Extent</b>			<b>5.99.50</b>	
<b>Total Cluster Extent</b>			<b>8.80.0</b>	

**TABLE 1.3 SALIENT FEATURES OF THE PROPOSAL**

<b>SALIENT FEATURES OF PROJECT</b>				
Name of the Quarry	Tvl. Navamani Mines and Minerals Rough Stone and Gravel Quarry			
Mining Plan Period / Lease Period	5 Years			
	Pit	Length in m	Width in m	Depth in m
Existing Pit dimension	I	25	15	3
	II	37	18	3
Ultimate Pit dimension	I	208	103	38
Toposheet No	58 J/05			
Latitude between	10°52'19.57"N to 10°52'25.68"N			
Longitude between	78°22'26.70"E to 78°22'34.23"E			
Highest Elevation	124 m AMSL			
Geological Resources	Rough Stone in m <sup>3</sup>		Gravel m <sup>3</sup>	
	9,80,455		84,039	

Mineable Reserves	Rough Stone in m3	Gravel m3
	3,95,935	49,332
Water Level in the surrounds area	The Water table is found at a depth of 50m in summer and at 45m in rainy seasons.	
Method of Mining	Opencast Mechanized Mining Method involving drilling and blasting	
Machinery proposed	Jack Hammer	10 Nos
	Compressor	2 Nos
	Hydraulic Excavator	2 Nos
	Tippers	5 Nos
Blasting Method	Usage of Slurry Explosive with MSD detonators	
Proposed Manpower Deployment	36 Nos	
Project Cost	Project Cost	Rs 65, 68,505/-
	EMP Cost	Rs 3, 80,000/-
	Total	Rs 69, 48,505/-
Cer Cost	Rs.5,00,000/-	

### 1.3 STATUTORY DETAILS

- The proponent applied for Rough Stone and Gravel Quarry Lease, Dated: 24.04.2019
- Precise Area Communication Letter was issued by the District Collector, Karur, vide Rc.No 256/Kanimam/2019 Dated 19.06.2019
- The Mining Plan was prepared by Recognized Qualified Person and got approved by by Assistant Director, Geology and Mining, Tiruvannamalai District, vide Rc.No 256/Kanimam/2019 Dated 24.06.2019
- Proponent applied for ToR to get Environmental Clearance vide online Proposal No. SIA/TN/MIN/38701/2019 Dated: 05.07.2019
- Proponent submitted application Hard copy for Terms of Reference Dated 01.08.2019  
The proposal was placed in 166th SEAC meeting held on 30.07.2020 and the committee recommended for issue of ToR.  
The proposal was considered in 397th SEIAA meeting held on 21.09.2020 and issued ToR vide Letter No SEIAA-TN/F.No. 6993/SEAC/ToR-761/2020 Dated 24.09.2020

### 2.0 PROJECT DESCRIPTION

The proposed project is site specific and there is no additional area required for this project. There is no effluent generation/discharge from the proposed quarries. Rough Stone is proposed to be excavated by opencast mechanized method involving splitting of rock mass of considerable volume from the parent rock mass by jackhammer drilling and blasting, hydraulic excavators are used for loading the Rough Stone from pithead to the needy crushers and rock breakers to avoid secondary blasting.

## 2.1 SITE CONNECTIVITY TO THE PROJECT AREA

<b>Nearest Roadway</b>	Cart Track – 150m – South (Connecting – Ayyarmalai – Kuzhanthai patti Village) Village Road – 400m North West (Kuzhanthai patti Village) (NH 67) Karur – Trichy – 9.0 km North (SH 71) Kulithalai – Manapparai - 1.3 km East side
<b>Nearest Village</b>	Kuzhanthai patti Village – 1.0 km- South West (Population – 1,360)
<b>Nearest Town</b>	Kulithalai – 9.0 km - NW
<b>Nearest Railway Station &amp; Railway Line</b>	Kulithalai – 9.0 km - NE
<b>Nearest Airport</b>	Tiruchirapalli Airport – 37 km – South East
<b>Seaport</b>	Thoothukudi 235 km South side

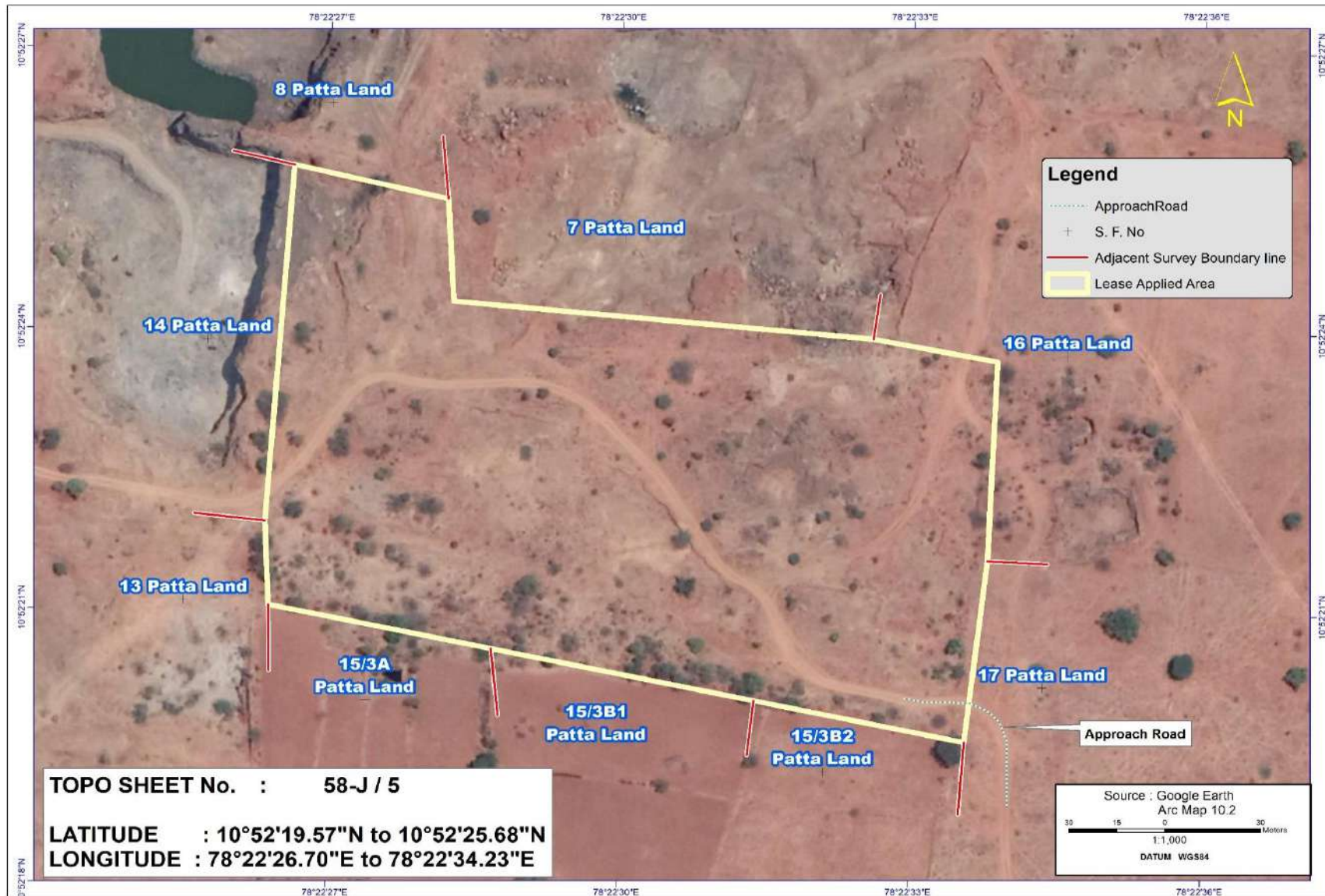
## 2.2 LAND USE PATTERN OF THE PROPOSED PROJECT

DESCRIPTION	PRESENT AREA IN (HA)	AREA AT THE END OF LIFE OF QUARRY (HA)
Area under quarry	0.10.0	2.25.3
Infrastructure	Nil	0.01.0
Roads	Nil	0.02.0
Green Belt	Nil	0.28.6
Un – utilized area	2.70.5	0.23.6
<b>TOTAL</b>	<b>2.80.5</b>	<b>2.80.5</b>

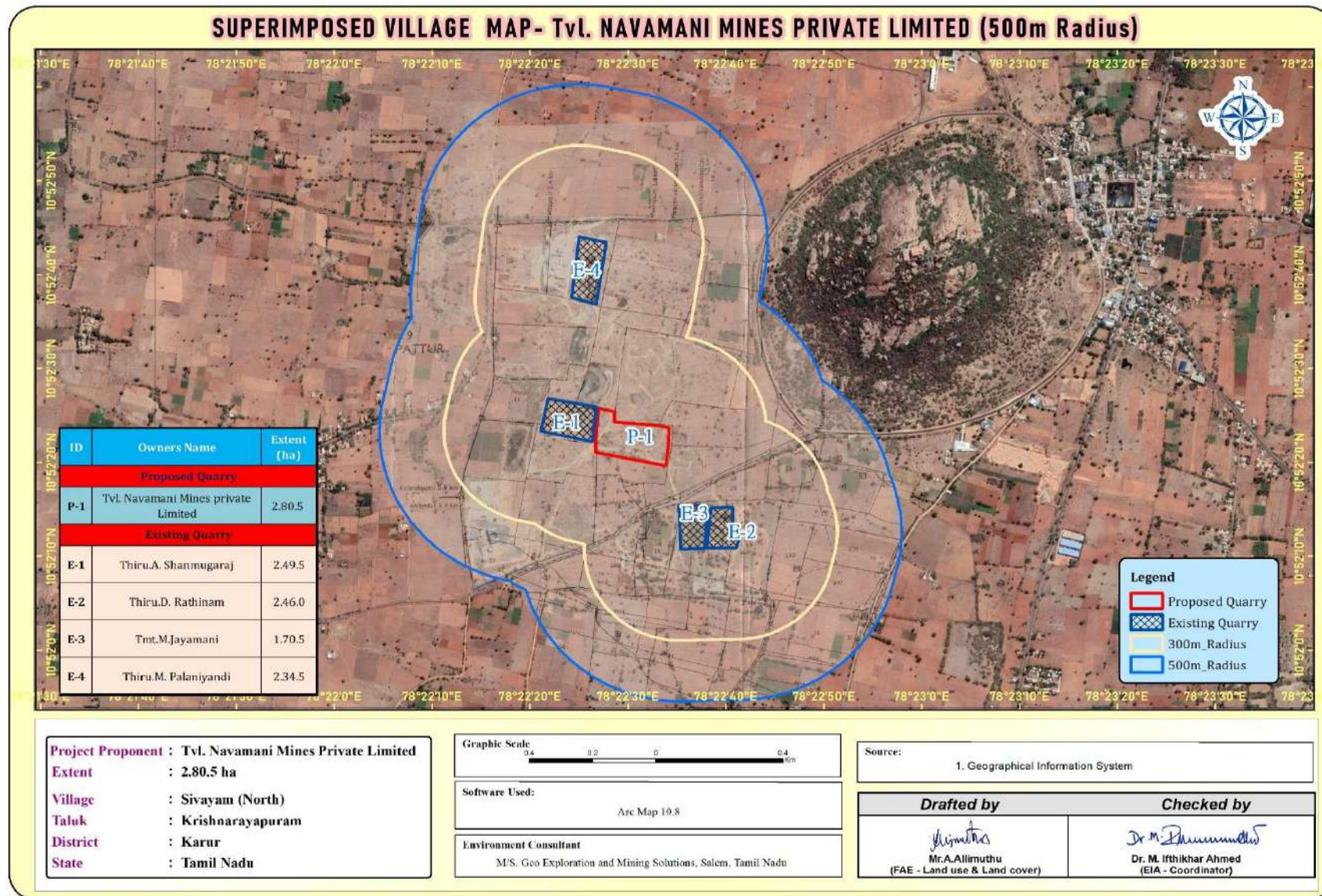
## 2.3 OPERATIONAL DETAILS OF LEASE APPLIED AREA

PARTICULARS	DETAILS	
	Rough Stone (5Year Plan period)	Gravel (3 Years Plan period)
Geological Resources	9,80,455 m <sup>3</sup>	84,039 m <sup>3</sup>
Mineable Reserves	3,95,935 m <sup>3</sup>	49,332 m <sup>3</sup>
Yearwise production	3,95,935 m <sup>3</sup>	49,332 m <sup>3</sup>
Mining Plan Period / Lease Applied Period	5 Years	
Number of Working Days	300 Days	
Production per day	264 m <sup>3</sup>	55 m <sup>3</sup>
No of Lorry loads (6m <sup>3</sup> per load)	44 Nos	9 Nos
Proposed Depth for Mining Plan Period	35 m	3 m
Total Depth of Mining	38 m	

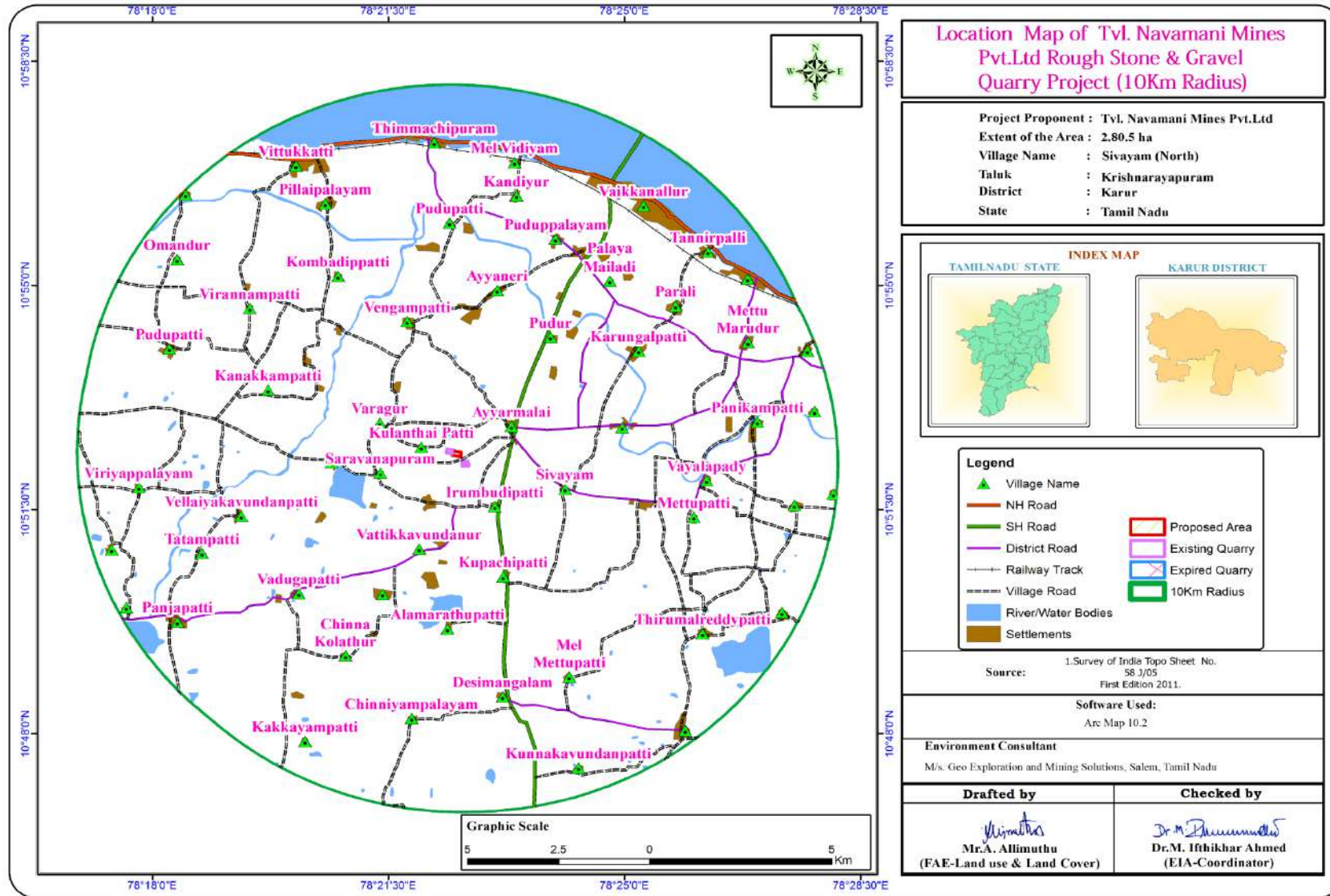
**FIGURE – 1: GOOGLE IMAGE SHOWING PROJECT AREA**



**FIGURE – 2: GOOGLE IMAGE SHOWING CLUSTER (500 m QUARRIES)**

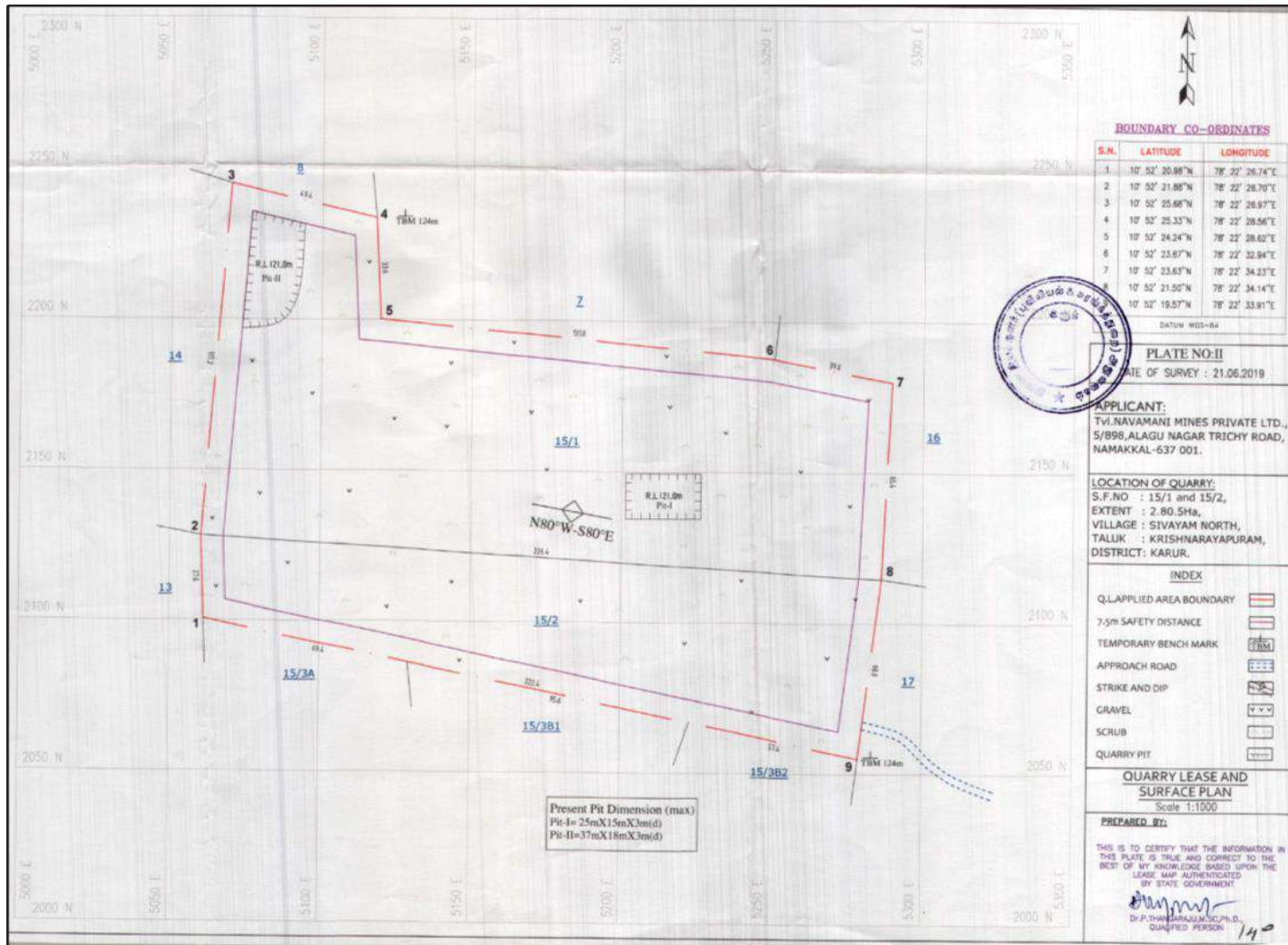


**FIGURE – 3: TOPOSHEET MAP COVERING 10 KM RADIUS**





**FIGURE – 4: QUARRY LEASE PLAN & SURFACE PLAN**



## 2.4 METHOD OF MINING

Opencast Mechanized Mining Method is being proposed by formation of 5.0 meter height bench with a bench width not less than the bench height. However, as far as the quarrying of Rough Stone is concerned, observance of the provisions of Regulation 106 (2) (b) as above is seldom possible due to various inherent petro genetic factors coupled with mining difficulties. Hence it is proposed to obtain relaxation to the provisions of the above regulation from the Director of Mines Safety for which necessary provision is available with the Regulation 106 (2) (b) of MMR-1961, under Mine Act – 1952.

The top layer of Topsoil will be Excavate directly by Hydraulic Excavators and preserved all along the safety barrier to facilitate greenbelt development during Mine Closure Stage. The Rough Stone is a batholith formation and the splitting of rock mass of considerable volume from the parent rock mass will be carried out by deploying jackhammer drilling and Slurry Explosives will be used for blasting. Hydraulic Excavators attached with Rock Breakers unit will be deployed for breaking large boulders to required fragmented sizes to avoid secondary blasting and hydraulic excavators attached with bucket unit will be deployed for loading the Rough Stone into the tippers and then the stone is transported from pithead to the nearby crushers.

## 2.5 PROPOSED MACHINERY DEPLOYMENT

S.NO.	TYPE	NOS	SIZE/CAPACITY	MOTIVE POWER
1	Jack hammers	10	1.2m to 2.0m	Compressed air
2	Compressor	2	50 HP	Diesel Drive
3	Excavator with Bucket / Rock Breaker Unit	2	150-200 HP	Diesel Drive
4	Tippers	5	20 Tonnes	Diesel Drive

## 2.6 CONCEPTUAL MINING PLAN/ FINAL MINE CLOSURE PLAN

The ultimate pit size is designed based on certain practical parameters such as economical depth of mining, safety zones, permissible area, etc.,

## 2.7 ULTIMATE PIT DIMENSION

Pit	Length (Max) (m)	Width (Max) (m)	Depth (Max) (m)
I	208	103	38m below ground level

### 3.0 DESCRIPTION OF THE ENVIRONMENT

The baseline status of the project environment is described section wise for better understanding of the broad spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as Land, Water, Air, Noise, Biological and Socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering March to May 2021 as per CPCB & MoEF & CC guidelines.

### 3.1 ENVIRONMENT MONITORING ATTRIBUTES

Attribute	Parameters	Frequency of Monitoring	No. of Locations	Protocol
Land-use Land cover	Land-use Pattern within 10 km radius of the study area	Data's from census handbook 2011 and from the satellite imagery	Study Area	Satellite Imagery Primary Survey
*Soil	Physio-Chemical Characteristics	Once during the study period	6 (1 core & 5 buffer zone)	IS 2720 Agriculture Handbook - Indian Council of Agriculture Research, New Delhi
*Water Quality	Physical, Chemical and Bacteriological Parameters	Once during the study period	6 (1 surface water & 5 ground water)	IS 10500& CPCB Standards
Meteorology	Wind Speed Wind Direction Temperature Cloud cover Dry bulb temperature Rainfall	1 Hourly Continuous Mechanical/Automatic Weather Station	1	Site specific primary data& Secondary Data from IMD Station
*Ambient Air Quality	PM <sub>10</sub> PM <sub>2.5</sub> SO <sub>2</sub> NO <sub>x</sub> Fugitive Dust	24 hourly twice a week (Oct – Dec 2022)	8 (1 core & 7 buffer)	IS 5182 Part 1-23 National Ambient Air Quality Standards, CPCB
*Noise Levels	Ambient Noise	Hourly observation for 24 Hours per location	8 (1 core & 7 buffer zone)	IS 9989 As per CPCB Guidelines
Ecology	Existing Flora and Fauna	Through field visit during the study period	Study Area	Primary Survey by Quadrate & Transect Study Secondary Data – Forest Working Plan
Socio Economic Aspects	Socio-Economic Characteristics, Population Statistics and Existing Infrastructure in the study area	Site Visit & Census Handbook, 2011	Study Area	Primary Survey, census handbook & need based assessments.

### 3.2 LAND ENVIRONMENT

A visual interpretation technique has been adopted for land use classification based on the keys suggested in the chapter – V of the guidelines issued by NNRMS Bangalore & Level III classification with 1:50,000 scale for the preparation of land use mapping. Land use pattern of the area was studied through LISS III imagery of Bhuvan (ISRO). The 10 km radius map of study area was taken for analysis of Land use cover.

**TABLE 3.1: LAND USE / LAND COVER TABLE 10 KM RADIUS**

Sl. No.	Classification	Area In Ha	Area in %
1	Builtup, Rural	322.14	1.0
2	Builtup Mining	60.05	0.2
3	Agricultural, Crop Land	16363.70	51.1
4	Agricultural, Plantation	2480.42	7.7
5	Agriculture, Fallow	8198.36	25.6
6	Forest Plantation	651.15	2.0
7	Barren/Waste./ Scrub land	1455.91	4.5
8	Wetland/Water./River/Stram/Canals	2046.78	6.4
9	Wetland/Water./Reservoir/LakePonds	434.77	1.4
	<b>Total</b>	<b>32013.34</b>	<b>100.00</b>

From the above table and pie diagram it is inferred that the majority of the land in the study area is Agriculture land (includes crop land) 84.4 % followed by water bodies (Rivers Stream Canals) 7.8 %.

The total mining area within the study area is 60.05 ha i.e., 0.2 %. The cluster area of 8.80.0 ha contributes about 14.65 % of the total mining area within the study area. This small percentage of Mining Activities shall not have any significant impact on the environment.

### 3.3 SOIL ENVIRONMENT

The samples were analysed as per the standard methods prescribed in “Soil Chemical Analysis (M.L. Jackson, 1967) & Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India”. The important properties analysed for soil are bulk density, porosity, infiltration rate, pH and Organic matter, kjeldahi Nitrogen, Phosphorous and Potassium

#### Interpretation & Conclusion

- The nature of soil is slightly alkaline to strongly alkaline with pH range 7.96 to 8.21
- The available Nitrogen content range between 149 to 188.3 kg/ha
- The available Phosphorus content range between 1.09 to 1.56 kg/ha
- The available Potassium range between 28.9 to 51.2 mg/kg

### **3.4 WATER ENVIRONMENT**

The study area is studded with few tanks that serve as the source of drinking water and also their surplus feeds adjoining tanks. The rainfall over the area is moderate, the rainwater storage in open wells and trenches are in practice over the area and the stored water acts as source of freshwater for couple of months after rainy season.

#### **Surface Water**

##### **Ph:**

The pH varied from 7.77 to 7.81 while turbidity found within the standards (Optimal pH range for sustainable aquatic life is 6.5 to 8.5 pH).

##### **Total Dissolved Solids:**

Total Dissolved Solids varied from 488 to 890 mg/l, the TDS mainly composed of carbonates, bicarbonates, Chlorides, phosphates and nitrates of calcium, magnesium, sodium and other organic matter.

##### **Other parameters:**

Chloride varied between 51.0 mg/l and 221 mg/l. Nitrates varied from 17.1 to 28.3 mg/l, while sulphates varied from 37.5 to 79.2 mg/l.

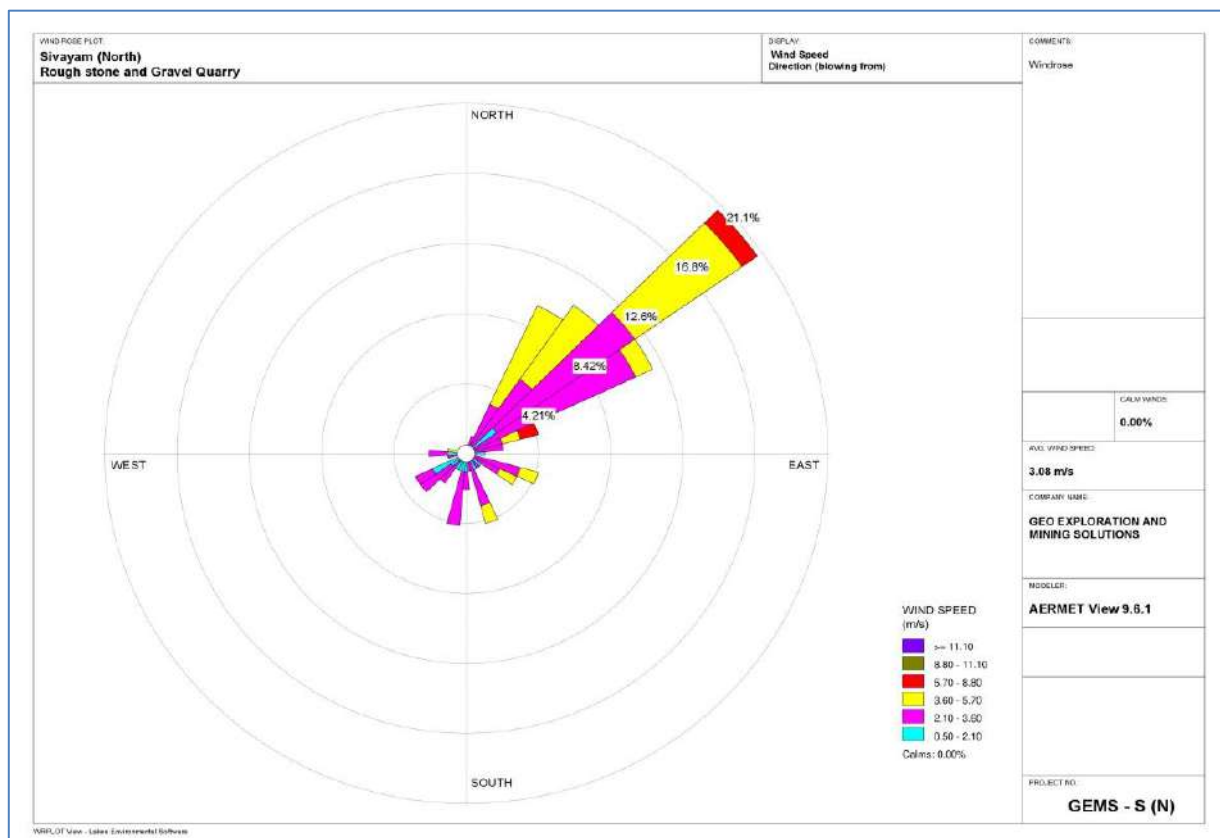
#### **Ground Water**

The pH of the water samples collected ranged from 7.1 to 8.05 and within the acceptable limit of 6.5 to 8.5. pH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. On Turbidity, the water samples meet the requirement. The Total Dissolved Solids were found in the range of 412- 663 mg/l in all samples. The Total hardness varied between 118.9- 221.6 mg/l.

On Microbiological parameters, the water samples from all the locations meet the requirement. The parameters thus analysed were compared with IS 10500:2012 and are well within the prescribed limits.

### **3.5 AIR ENVIRONMENT**

The baseline studies on air environment include identification of specific air pollution parameters and their existing levels in ambient air. The ambient air quality with respect to the study zone of 10 km radius around the proposed quarry forms the baseline information.

**FIGURE – 5: WIND ROSE DIAGRAM**

### 3.6 SUMMARY OF AMBIENT AIR QUALITY

As per monitoring data, PM<sub>10</sub> ranges from 31.2 µg/m<sup>3</sup> to 60.2 µg/m<sup>3</sup>, PM<sub>2.5</sub> data ranges from 19.1 µg/m<sup>3</sup> to 39.0 µg/m<sup>3</sup>, SO<sub>2</sub> ranges from 5.3 µg/m<sup>3</sup> to 10.1 µg/m<sup>3</sup> and NO<sub>2</sub> data ranges from 10.9 µg/m<sup>3</sup> to 16.8 µg/m<sup>3</sup>. The concentration levels of the above criteria pollutants were observed to be well within the limits of NAAQS prescribed by CPCB.

### 3.7 NOISE ENVIRONMENT

Ambient noise levels were measured at 8 (Eight) locations around the proposed project area.

Noise levels recorded in core zone during day time were from 54.3 – 55.1 dB (A) Leq and during night time were from 45.3 – 45.8dB (A) Leq. Noise levels recorded in buffer zone during day time were from 43.1 – 53.7 dB (A) Leq and during night time were from 35.6 – 46.2 dB (A) Leq.

The values of noise observed in some of the areas are primarily owing to quarrying activities due to cluster of quarries within 500m radius, movement of vehicles and other anthropogenic activities. Noise monitoring results reveal that the maximum & minimum noise levels at day time were recorded in the range of 59.7 dB(A) in core zone and 35.1 dB(A) in Kulanthaipatti village and 50.5 dB(A) in Kulanthaipatti Village & 36.1 dB(A) in Core zone at night time. Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

### **3.8 ECOLOGICAL ENVIRONMENT**

The study involved in the collection of primary data by conducting a survey in the field, examination of floral and faunal records in previously published reports and records. Analysis of the information is the view of the possible alteration in the environment of the project site. For the survey of fauna, both direct and indirect observation methods were used.

There is no schedule I species of animals observed within study area as per Wildlife Protection Act 1972 as well as no species is in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area. Hence this small operation over short period of time will not have any significant impact on the surrounding flora and fauna.

### **3.9 SOCIO ECONOMIC ENVIRONMENT**

It includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication, transportation, prevailing diseases pattern as well as feature like temples, historical monuments etc., at the baseline level. This will help in visualizing and predicting the possible impact depending upon the nature and magnitude of the project.

The socio economic study of surveyed villages gives a clear picture of its population, average household size, literacy rate and sex ratio etc. It is also found that a part of population is suffering from lack of permanent job to run their day to day life. Their expectation is to earn some income for their sustainability on a long-term basis.

The proposed project will aim to provide preferential 36 persons to the local people there by improving the indirect employment opportunity for 15-20 persons and in turn the social standards will improve.

## **4. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

In order to maintain the environmental commensuration with the mining operation, it is essential to undertake studies on the existing environmental scenario and assess the impact on different environmental components. This would help in formulating suitable management plans sustainable resource extraction.

### **4.1 LAND ENVIRONMENT:**

#### **ANTICIPATED IMPACT**

- Permanent or temporary change on land use and land cover.
- Change in Topography: Topography of the ML area will change at the end of the life of the mine.
- Movement of heavy vehicles sometimes cause problems to agricultural land, human habitations due to dust, noise and it also causes traffic hazards.
- Due to degradation of land by pitting the aesthetic environment of the core zone may be affected.
- Earthworks during the rainy season increase the potential for soil erosion and sediment laden water entering the water ways.

- If no due care is taken wash off from the exposed working area may choke the water course & can also causes the siltation of water course

### **MITIGATION MEASURES**

- The mining activity will be gradual confined in blocks and excavation will be undertaken progressively along with other mitigative measures like phase wise development of greenbelt etc.,
- Construction of garland drains all around the quarry pits and construction of check dam at strategic location in lower elevations to prevent erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area
- Green belt development along the boundary within safety zone. The small quantity of water stored in the mined-out pit will be used for greenbelt
- Thick plantation will be carried out on unutilized area, top benches of mined out pits, on safety barrier, etc.,
- At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir
- In terms of aesthetics, natural vegetation surrounding the quarry will be retained (such as in a buffer area i.e., 7.5 m safety barrier and other safety provided) so as to help minimise dust emissions.
- Proper fencing will be carried out at the conceptual stage, Security will be posted round the clock, to prevent inherent entry of the public and cattle

## **4.2 SOIL ENVIRONMENT**

### **IMPACT ON SOIL ENVIRONMENT**

**Erosion and Sedimentation** (Removal of protective vegetation cover; Exposure of underlying soil horizons that may be less pervious, or more erodible than the surface layers; Reduced capacity of soils to absorb rainfall; Increased energy in storm-water runoff due to concentration and velocity; and Exposure of subsurface materials which are unsuitable for vegetation establishment).

### **MITIGATION MEASURES FOR SOIL CONSERVATION**

- Run-off diversion – Garland drains will be constructed all around the project boundary to prevent surface flows from entering the quarry works areas. And will be discharged into vegetated natural drainage lines, or as distributed flow across an area stabilised against erosion.
- Sedimentation ponds - Run-off from working areas will be routed towards sedimentation ponds. These trap sediment and reduce suspended sediment loads before runoff is discharged from the quarry site. Sedimentation ponds should be designed based on runoff, retention times, and soil characteristics. There may be a need to provide a series of sedimentation ponds to achieve the desired outcome.



- Retain vegetation – Retain existing or re-plant the vegetation at the site wherever possible.
- Monitoring and maintenance – Weekly monitoring and daily maintenance of erosion control systems so that they perform as specified specially during rainy season

## **4.2 WATER ENVIRONMENT**

### **ANTICIPATED IMPACT**

- The major sources of water pollution normally associated due to mining and allied operations are:
  - Generation of waste water from vehicle washing.
  - Washouts from surface exposure or working areas
  - Domestic sewage
  - Disturbance to drainage course in the project area
  - Mine Pit water discharge
- Increase in sediment load during monsoon in downstream of lease area
- This being a mining project, there will be no process effluent. Waste from washing of machinery may result in discharge of Oil & grease, suspended solids.
- The sewage from soak pit may percolate to the ground water table and contaminate it.
- Surface drainage may be affected due to Mining
- Abstraction of water may lead to depletion of water table

### **MITIGATION MEASURES**

- Garland drain, settling tank will be constructed along the project area. The Garland drain will be connected to settling tank and sediments will be trapped in the settling traps and only clear water will be discharged out to the natural drainage
- Rainwater will be collected in sump in the mining pits and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judiciously utilize the rainwater as part of rainwater harvesting system.
- Providing benches with inner slopes and through a system of drains and channels, allowing rain water to descent into surrounding drains, so as to minimize the effects of erosion & water logging arising out of uncontrolled descent of water
- Reuse the water collected during storm for dust suppression and greenbelt development within the mines
- Installing interceptor traps/oil separators to remove oils and greases. Water from the tipper wash-down facility and machinery maintenance yard will pass through interceptor traps/oil separators prior to its reuse;
- Using flocculating or coagulating agents to assist in the settling of suspended solids during monsoon seasons;
- Periodic (every 6 month once) analysis of quarry pit water and ground water quality in nearby villages
- Domestic sewage from site office & urinals/latrines provided in ML is discharged in septic tank followed by soak pits

- Waste water discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes
- De-silting will be carried out before and immediately after the monsoon season
- Regular monitoring (every 6 month once) and analysing the quality of water in open well, bore wells and surface water

### 4.3 AIR ENVIRONMENT

#### ANTICIPATED IMPACT

- During mining, at various stages activities such as excavation, drilling, blasting, and transportation of materials, particular matter (PM), gases such as Sulphur dioxide, oxides of Nitrogen from vehicular exhaust are the main air pollutants.
- Emissions of noxious gases due to incomplete detonation of explosive may sometimes pollute the air.
- The fugitive dust released from the mining operations may cause effect on the mine workers who are directly exposed to the fugitive dust.
- Simultaneously, the air-borne dust may travel to longer distances and settle in the villages located near the mine lease area.

#### MITIGATION MEASURES

**Drilling** – To control dust at source, wet drilling will be practiced. Where there is a scarcity of water, suitably designed dust extractor will be provided for dry drilling along with dust hood at the mouth of the drill-hole collar.

#### Advantages of Wet Drilling:-

- In this system dust gets suppressed close to its formation. Dust suppression become very effective and the work environment will be improved from the point of occupational comfort and health.
- Due to dust free atmosphere, the life of engine, compressor etc., will be increased.
- The life of drill bit will be increased.
- The rate of penetration of drill will be increased.
- Due to the dust free atmosphere visibility will be improved resulting in safer working conditions.

#### Blasting –

- Establish time of blasting to suit the local conditions and water sprinkling on blasting face
- Avoid blasting i.e., when temperature inversion is likely to occur and strong wind blows towards residential areas
- Controlled blasting include Adoption of suitable explosive charge and short delay detonators, adequate stemming of holes at collar zone and restricting blasting to a particular time of the day i.e. at the time lunch hours, controlled charge per hole as well as charge per round of hole
- Before loading of material water will be sprayed on blasted material

- Dust mask will be provided to the workers and their use will be strictly monitored

#### **Haul Road & Transportation –**

- Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation
- Transportation of material will be carried out during day time and material will be covered with tarpaulin
- The speed of tippers plying on the haul road will be limited below 20 km/hr to avoid generation of dust.
- Water sprinkling on haul roads & loading points will be carried out twice a day
- Main source of gaseous pollution will be from vehicle used for transportation of mineral; therefore weekly maintenance of machines improves combustion process & makes reduction in the pollution.
- The un-metalled haul roads will be compacted weekly before being put into use.
- Over loading of tippers will be avoided to prevent spillage.
- It will be ensured that all transportation vehicles carry a valid PUC certificate
- Grading of haul roads and service roads to clear accumulation of loose materials

#### **Green Belt –**

- Planting of trees all along main mine haul roads and regular grading of haul roads will be practiced to prevent the generation of dust due to movement of dumpers/trucks
- Green belt of adequate width will be developed around the project areas

#### **Occupational Health –**

- Dust mask will be provided to the workers and their use will be strictly monitored
- Annual medical check-ups, trainings and campaigns will be arranged to ensure awareness about importance of wearing dust masks among all mine workers & tipper drivers
- Ambient Air Quality Monitoring will be conducted six month once to assess effectiveness of mitigation measures proposed

## **4.4 NOISE ENVIRONMENT**

### **ANTICIPATED IMPACT**

Noise pollution poses a major health risk to the mine workers. Following are the sources of noise in the existing open cast mine project are being observed such as Drilling, & Blasting, Loading and during movement of vehicles.

### **MITIGATION MEASURES**

- Usage of sharp drill bits while drilling which will help in reducing noise;
- Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders;
- Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained;

- The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system;
- Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise;
- Provision of sound insulated chambers for the workers working on machines (HEMM) producing higher levels of noise;
- Silencers / mufflers will be installed in all machineries;
- Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise;
- Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and their use will be ensured through training and awareness.
- Regular medical check-up and proper training to personnel to create awareness about adverse noise level effects.

#### **4.5 BIOLOGICAL ENVIRONMENT**

##### **ANTICIPATED IMPACT**

There is no Forest land, National Parks, Eco sensitive areas, Wild life sanctuaries within the radius of 10km.

There are no migratory corridors, migratory avian-fauna, and rare endemic and endangered species. There are no wild animals in the area. No breeding and nesting site were identified in project site. No National park and Wildlife Sanctuary found within 10km radius. The dumps / bunds around the mine itself act as a good barrier for entry of stray animals. In the post mining stage, barbed wire fencing is proposed all around the mined-out void to prevent fall of animals in the mine pits.

##### **MITIGATION MEASURES**

Keeping all this in mind the mitigations have been suggested under environmental management plan. With the understanding of the role of plant species as bio-filter to control air pollution, appropriate plant species (mainly tree species) have been suggested conceding the area/site requirements and needed performance of specific species. The details of year wise proposed plantation program are given in Table 4.13.

The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas

In order to compensate the loss of vegetation cover, it is suggested to carry out afforestation program mainly in proposed areas falls in the cluster earmarked for plantation program as per Approved Mining Plan in different phases. This habitat improvement program would ensure the faunal species to re-colonize and improve the abundance status in the core zone.

##### **The objectives of the green belt cover will cover the following:**

- Noise abatement
- Ecological restoration

- Aesthetic, biological and visual improvement of area due to improved vegetative and plantations cover.

#### **GREENBELT DEVELOPMENT PLAN**

Year	No. of trees proposed to be planted	Survival %	Area to be covered	Name of the species	No. of trees expected to be grown
I	1680	80%	Safety zone, Approach road and village road	Neem, Pongamia Pinnata, etc.,	1400

#### **4.6 SOCIO ECONOMIC ENVIRONMENT**

##### **ANTICIPATED IMPACT**

- Dust generation from mining activity can have negative impact on the health of the workers and people in the nearby area.
- Approach roads can be damaged by the movement of tippers
- Increase in Employment opportunities both direct and indirect thereby increasing economic status of people of the region

##### **MITIGATION MEASURES**

- Good maintenance practices will be adopted for all machinery and equipment, which will help to avert potential noise problems.
- Green belt will be developed in and around the project site as per Central Pollution Control Board (CPCB) guidelines.
- Air pollution control measure will be taken to minimize the environmental impact within the core zone.
- For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices will be provided as per mines act and rules.
- Benefit to the State and the Central governments through financial revenues by way of royalty, tax, duties, etc., from this project directly and indirectly.
- From above details, the quarry operations will have highly beneficial positive impact in the area

#### **5. ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)**

No alternatives are suggested as all the mine sites are mineral specific

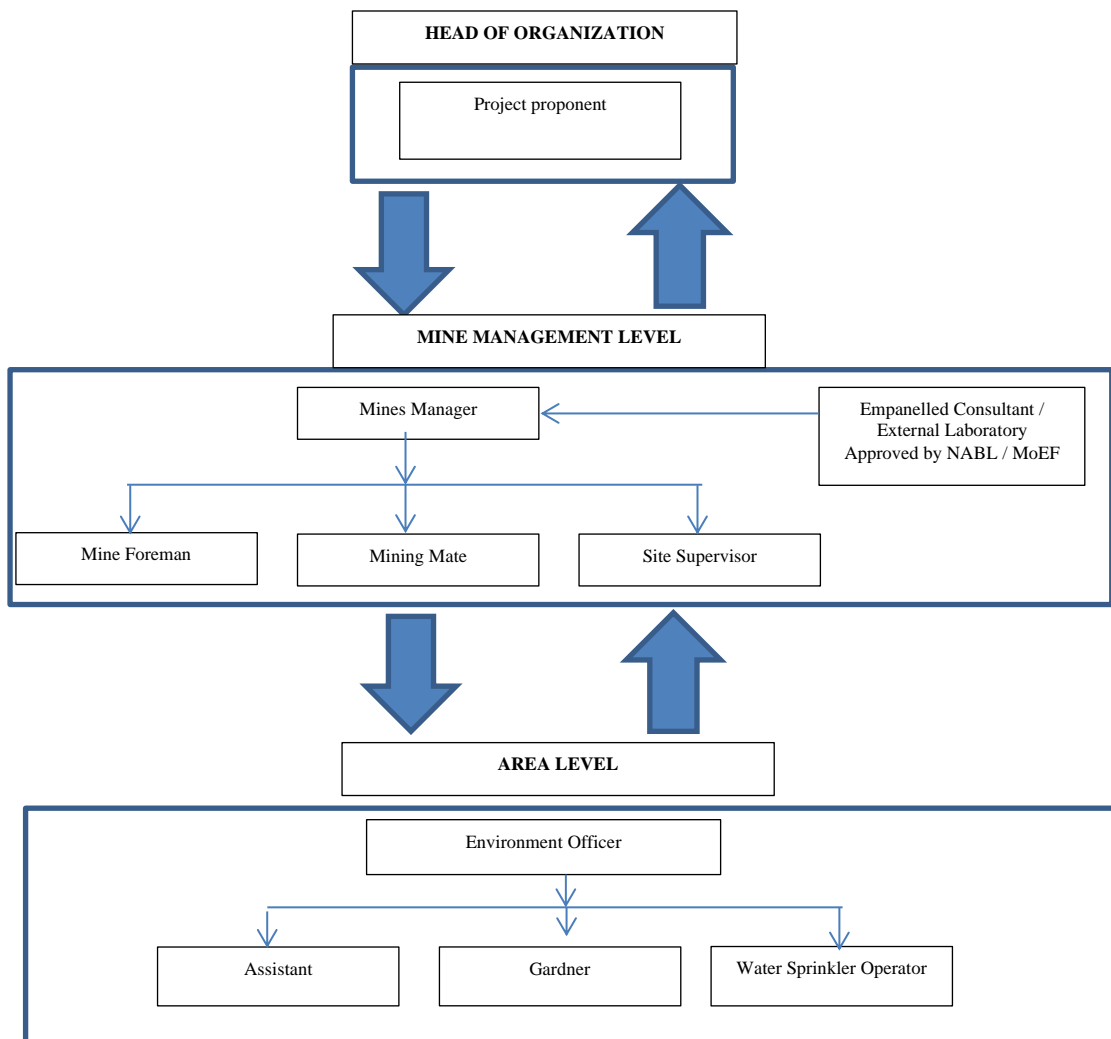
#### **6. ENVIRONMENT MONITORING PROGRAM**

An Environment monitoring cell (EMC) will be constituted to monitor the implementation of EMP and other environmental protection measures in all the proposed quarries.

The responsibilities of this cell will be:

- Implementation of pollution control measures
- Monitoring programme implementation
- Post-plantation care
- To check the efficiency of pollution control measures taken
- Any other activity as may be related to environment
- Seeking expert’s advice when needed.

**6.1 ENVIRONMENTAL MONITORING CELL**



**6.2 POST ENVIRONMENTAL CLEARANCE MONITORING SCHEDULE**

S. No.	Environment Attributes	Location	Monitoring		Parameters
			Duration	Frequency	
1	Air Quality	2 Locations (1 Core & 1 Buffer)	24 hours	Once in 6 months	Fugitive Dust, PM <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>2</sub> and NO <sub>x</sub> .
2	Meteorology	At mine site before start of Air Quality Monitoring & IMD Secondary Data	Hourly / Daily	Continuous online monitoring	Wind speed, Wind direction, Temperature, Relative humidity and Rainfall

3	Water Quality Monitoring	2 Locations (1SW & 1 GW)	-	Once in 6 months	Parameters specified under IS:10500, 1993 & CPCB Norms
4	Hydrology	Water level in open wells in buffer zone around 1 km at specific wells	-	Once in 6 months	Depth in bgl
5	Noise	2 Locations (1 Core & 1 Buffer)	Hourly – 1 Day	Once in 6 months	Leq, Lmax, Lmin, Leq Day & Leq Night
6	Vibration	At the nearest habitation (in case of reporting)	-	During blasting Operation	Peak Particle Velocity
7	Soil	2 Locations (1 Core & 1 Buffer)	-	Once in six months	Physical and Chemical Characteristics
8	Greenbelt	Within the Project Area	Daily	Monthly	Maintenance

## 7. ADDITIONAL STUDIES

### 7.1 RISK ASSESSMENT

The methodology for the risk assessment has been based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide Circular No.13 of 2002, dated 31<sup>st</sup> December, 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations and assess the risk levels of those hazards in order to prioritize those that need immediate attention. Further, mechanisms responsible for these hazards are identified and their control measures, set to timetable are recorded along with pinpointed responsibilities.

The whole quarry operation will be carried out under the direction of a Qualified Competent Mine Manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad for proposed project. Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening

### 7.2 DISASTER MANAGEMENT PLAN

Natural disasters like Earthquake, Landslides have not been recorded in the past history as the terrain is categorized under seismic zone III. The area is far away from the sea hence the disaster due to heavy floods and tsunamis are not anticipated

The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities.

The objective of the Disaster Management Plan is to make use of the combined resources of the mine and the outside services to achieve the following:

- Rescue and medical treatment of casualties;
- Safeguard other people;

- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Secure the safe rehabilitation of affected area; and
- Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the emergency.

### 7.3 CUMULATIVE IMPACT STUDY

#### CUMULATIVE PRODUCTION LOAD OF ROUGH STONE

Quarry	Mineable Reserve in m <sup>3</sup>	Per Year Production in m <sup>3</sup>	Per Day Production in m <sup>3</sup>	Number of Lorry Load Per Day
P1	3,95,935	79,187	264	44 Trips/day
E1	88,100	7,690	26	4 Trips/day
E2	1,40,785	25,275	84	14 Trips/day
E3	1,28,350	17,102	57	10 Trips/day
E4	90,105	10,827	36	6 Trips/day
<b>TOTAL</b>	<b>8,43,275</b>	<b>1,40,081</b>	<b>467</b>	<b>78 Trips/day</b>

#### CUMULATIVE PRODUCTION LOAD OF GRAVEL

Quarry	Mineable Reserve in m <sup>3</sup>	Per Year Production in m <sup>3</sup>	Per Day Production in m <sup>3</sup>	Number of Lorry Load Per Day
P1	49,332	24,666	82	14 Trips/day
E1	7,128	1,426	5	1 Trips/day
E2	13,536	2,707	9	2 Trips/day
E3	15,042	7,521	25	4 Trips/day
E4	50,652	5,246	17	3 Trips/day
<b>TOTAL</b>	<b>1,35,690</b>	<b>41,566</b>	<b>138</b>	<b>24 Trips/day</b>

#### PREDICTED NOISE INCREMENTAL VALUES FROM CLUSTER

Location ID	Background Value (Day) dB(A)	Incremental Value dB(A)	Total Predicted dB(A)	Residential Area Standards dB(A)
Habitation Near P1	44.2	47.0	48.9	55
Habitation Near E1	48.0	51.5	53.1	
Habitation Near E2	42.3	45.3	47.1	
Habitation Near E3	42.8	43.0	45.9	
Habitation Near E4	43.1	45.8	47.7	

#### SOCIO ECONOMIC BENEFITS

	Employment	Project Cost	CER Cost
P1	36	Rs 64,48,505/-	Rs 5,00,000/-
E1	11	Rs 35,59,000/-	Rs 72,000/-
E2	11	Rs 55,52,000/-	Rs 1, 11,000/-
E3	12	Rs 60, 08,500/-	Rs 1, 20,000/-
E4	11	Rs 76, 16,500/-	Rs 1, 52,330/-
<b>Total</b>	<b>81</b>	<b>Rs 2,91,84,505/-</b>	<b>Rs 9,55,330/-</b>

### 8. PROJECT BENEFITS



- ✚ Tvl Navamani Mines Pvt Ltd Rough Stone and Gravel Cluster – Proposed Quarries aims to produce about – 3,95,935 m<sup>3</sup> Rough Stone & 49,332 m<sup>3</sup> of Gravel over a period of 5 Years. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits
- ✚ Increase in Employment Potential
- ✚ Improvement in Socio-Economic Welfare
- ✚ Improvement in Physical Infrastructure
- ✚ Improvement in Social infrastructure

Improvement in Social infrastructure

## 9. ENVIRONMENT MANAGEMENT PLAN

The Environment Monitoring Cell discussed formed by the mine management will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through Mine Management Level.

The said team will be responsible for:

- ✚ Monitoring of the water/ waste water quality, air quality and solid waste generated
- ✚ Analysis of the water and air samples collected through external laboratory
- ✚ Implementation and monitoring of the pollution control and protective measures/ devices which shall include financial estimation, ordering, installation of air pollution control equipment, waste water treatment plant, etc.
- ✚ Co-ordination of the environment related activities within the project as well as with outside agencies
- ✚ Collection of health statistics of the workers and population of the surrounding villages
- ✚ Green belt development
- ✚ Monitoring the progress of implementation of the environmental monitoring programme
- ✚ Compliance to statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance as well as the consents to establish and consents to operate.

## 10. CONCLUSION

Various aspects of mining activities were considered and related impacts were evaluated. Considering all the possible ways to mitigate the environmental concerns Environmental Management Plan was prepared and fund has been allocated for the same. The EMP is dynamic, flexible and subjected to periodic review. For project where the major environmental impacts are associated, EMP will be under regular review. Senior Management responsible for the project will conduct a review of EMP and its implementation to ensure that the EMP remains effective and appropriate. Thus, the proper steps will be taken to accomplish all the goals mentioned in the EMP and the project will bring the positive impact in the study area.