EXECUTIVE SUMMARY

Thiru. T. Jagadeeswaran

ROUGH STONE AND GRAVEL QUARRY

S.F. Nos: 197 (P) – Extent: 1.50.0 ha

Kolumanguzhi Village, Dharapuram Taluk, Tiruppur District

Tamil Nadu State

"B1" CATEGORY – MINOR MINERAL – /CLUSTER/PATTA LAND/EXISTING QUARRY

*** CLUSTER EXTENT = 6.38.5 HA**

Complied as per ToR Obtained vide

Lr.No. SEIAA-TN/F.No. 7735/SEAC/ToR-832/2021 Dated: 25.02.2021

Project Proponent

Thiru. T. Jagadeeswaran,
S/o. Thangamuthu,
No.4/28, Orampathur,
Kolumanguzhi, Dharapuram Taluk,
Tiruppur District – 638 703

Environmental Consultant

GEO EXPLORATION AND MINING SOLUTIONS

Old No. 260-B, New No. 17,
Advaitha Ashram Road, Alagapuram,
Salem – 636 004, Tamil Nadu, India
Accredited for sector 1, 28 & 38 Category 'A'
Certificate No : NABET/EIA/1922/SA 0139
Phone: 0427-2431989,
Email: ifthiahmed@gmail.com, geothangam@gmail.com
Web: www.gemssalem.com

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

1. INTRODUCTION

Rough Stone is the major requirement for construction industry. The proposed projects is categorized under category "B1" Activity 1(a) (mining lease area in >5ha). This EIA Report is prepared for Thiru. T. Jagadeeswaran Rough Stone and Gravel Quarry over an extent of 1.50.0 ha at Kolumanguzhi Village, Dharapuram Taluk, Tiruppur District and Tamil Nadu State, and there are Two existing quarries within a radius of 500 m from this proposed project.

This EIA report is prepared by considering Cumulative load of proposed & existing Rough Stone Cluster Quarries consisting of One Proposed and Two Existing Lease Quarries with total extent of Cluster of 6.38.5 ha the cluster area calculated as per MoEF & CC Notification S.O. 2269(E) Dated 1st July 2016.

Environmental Impact Assessment (EIA) study is a process, used to identify the Environmental, Social and Economic impacts of a project prior to decision-making. EIA systematically examines both beneficial and adverse consequences of the proposed project and ensure that these impacts are taken into account during the project designing.

This EIA Report is prepared in compliance with ToR obtained vide letter No Lr No. SEIAA-TN/F.No.7735/SEAC/ToR-832/2021 Dated: 08.02.2021.

The Baseline Monitoring study has been carried out during winter season (March - 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 –

Name of the Project Proponent	Thiru. T. Jagadeeswaran
Address	No.4/28, Orampathur, Kolumanguzhi, Dharapuram Taluk, Tiruppur District – 638 703
Mobile No	98656 68228
E-Mail	sonybluemetals@gmail.com

The project proponent is an individual.

1.2 QUARRY DETAILS WITHIN 500 M RADIUS

PROPOSED QUARRY				
CODE	**Name of the Owner**	**S.F. Nos**	**Extent**	**Status**
P1	Thiru. T.Jagadeeswaran, S/o. Thangamuthu, No.4/28, Orampathur, Kolumanguzhi, Dharapuram Taluk, Tiruppur District – 638 703	197 (P)	1.50.0 ha	TOR Obtained: Lr.No. SEIAA-TN/F.No.7735/SEAC/ToR-832/2021 Dated: 08.02.2021
Total Extent			**1.50.0 ha**	
EXISTING QUARRIES				
CODE	**Name of the Owner**	**S.F. Nos**	**Extent**	**Status**
E1	V.Manivel, S/o. K.M. Velusamy, Kallimettupalayam, Kolumanguli, Dharapuram Taluk, Tiruppur - 638 703.	155/1 & 155/2	3.47.0 ha	21.01.2016 – 20.01.2021
E2	T.Jagadeeswaran, S/o. Thangamuthu Gounder, Orambu Puthur, Kolumanguli village, Dharapuram Taluk, Tiruppur District - 638710	156/2B(P)	1.41.5 ha	16.04.2018 – 15.04.2023
Total Extent			**4.88.5 ha**	
Total Cluster Extent			**6.38.5 ha**	

TABLE 1.3 SALIENT FEATURES OF THE PROJECT

Name of the Mine	Thiru. T. Jagadeeswaran - Rough Stone and Gravel Quarry	
Toposheet No	58 – F/09	
Latitude Betwen	10°51'59.28"N to 10°52'04.09"N	
Longitude Between	77°30'03.27"E to 77°30'10.61"E	
Highest Elevation	274 m AMSL	
Proposed Depth of Mining	36 m	
Water Level in the surrounds area	65 – 60 m bgl	
Method of Mining	Opencast Mechanized Mining Method involving Jackhammer drilling and Controlled blasting using slurry explosives	
Topography	The lease applies is Plainvterrain. The gradient is gentle towards Southeastern side and altitude of the area ranges from 274 AMSL	
Machinery Proposed	Tractor mounted compressor with Jack Hammer	4
	Excavator bucket & Rock breaker attached	1
	Tippers	2
Proposed Blasting Method	Controlled Blasting Method by shot hole drilling and small dia of 25mm slurry explosive are proposed to be used for shattering and heaving effect for removal and winning of Rough Stone. No deep hole drilling is proposed.	
Manpower Proposed	17 Nos	
Mining Plan Period / Lease Period	5Years/5Years	
Ultimate Pit Dimension	128 L (m) x 99 W (m) x 36 D bgl (m)	
Nearby Water Bodies	Odai	40m S
	Amaravathi River	9.0km SE
500 m Radius Quarries	Proposed Quarry – 1 No (1.50.0 ha) Existing Quarry – 1 No (4.88.5 ha)	

Project Cost	**Rs. 40,16,700/-**	
CER Cost @ 2% of Project Cost	Rs 80,334	
EMP cost	Rs. 3,80,000/-	
Greenbelt Development Plan	Proposed to plant 300 trees in 2,600 Sqm area 7.5 m Safety Zone	
Nearest Reserve Forest	Nil	
Proposed Water Requirement	2.5 KLD	
Nearest Habitation	1.2km Northeast	
	Rough Stone	**Gravel**
Geological Resources in m^3	5,68,560	14,214
Mineable Reserves in m^3	1,90,190	10,584
Topsoil Conservation	No topsoil is anticipated	

1.3 STATUTORY DETAILS

- The proponent participated in tender and awarded Rough Stone Quarry Lease Dated :10.10.2016
- Precise Area Communication Letter was issued by the District Collector Rc.No.717/Mines/2019 Dated:28.02.2020
- The Mining Plan was prepared and got approved by Assistant Director, Geology and Mining Rc. No. 717/ 2019/ Mines, Dated:07.05.2020
- Proponent applied for ToR for Environmental Clearance vides online Proposal No. SIA/TN/MIN/55695/2020 Dated:17/08/2020

2. 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

Nearest Roadway	NH-81- Coimbatore- Trichy -13Km- N side SH-37- Tiruppur – Dharapuram Road- 3.0Km- western side
Nearest Village/Habitation	Kolumanguzhi – 1.0Km-NW
Nearest Town	Dharapuram – 15Km – S
Nearest Railway	Tiruppur Railway station – 32Km - NW
Nearest Airport	Coimbatore Airport – 53Km - NW
Seaport	Kochi – 170 km – SW

2.2 LAND USE PATTERN OF THE PROPOSED PROJECTS

Description	Present area in (ha)	Area at the end of life of quarry (Ha)
Area under quarry	Nil	1.09.0
Infrastructure	Nil	0.01.0
Roads	Nil	0.02.0

Green Belt	Nil	0.26.0
Un – utilized area	1.50.0	0.12.0
Grand Total	**1.50.0**	**1.50.0**

2.3 OPERATIONAL DETAILS OF LEASE APPLIED AREA

PARTICULARS	**DETAILS**	
	Rough Stone (5Year Plan Period)	**Gravel (3 Year Plan Period)**
Geological Resources in m^3	5,68,560	14,214
Mineable Reserves in m^3	1,92,360	10,584
Production for five-year plan period in m^3	1,92,360	10,584
Mining Plan Period	5Years	
Number of Working Days	300 Days	
Production per day in m^3	128	12
No of Lorry loads (6 m^3 per load)	22 Nos	2 Nos
Total Depth of Mining	36m bgl	

FIGURE – 1: GOOGLE IMAGE SHOWING PROJECT AREA

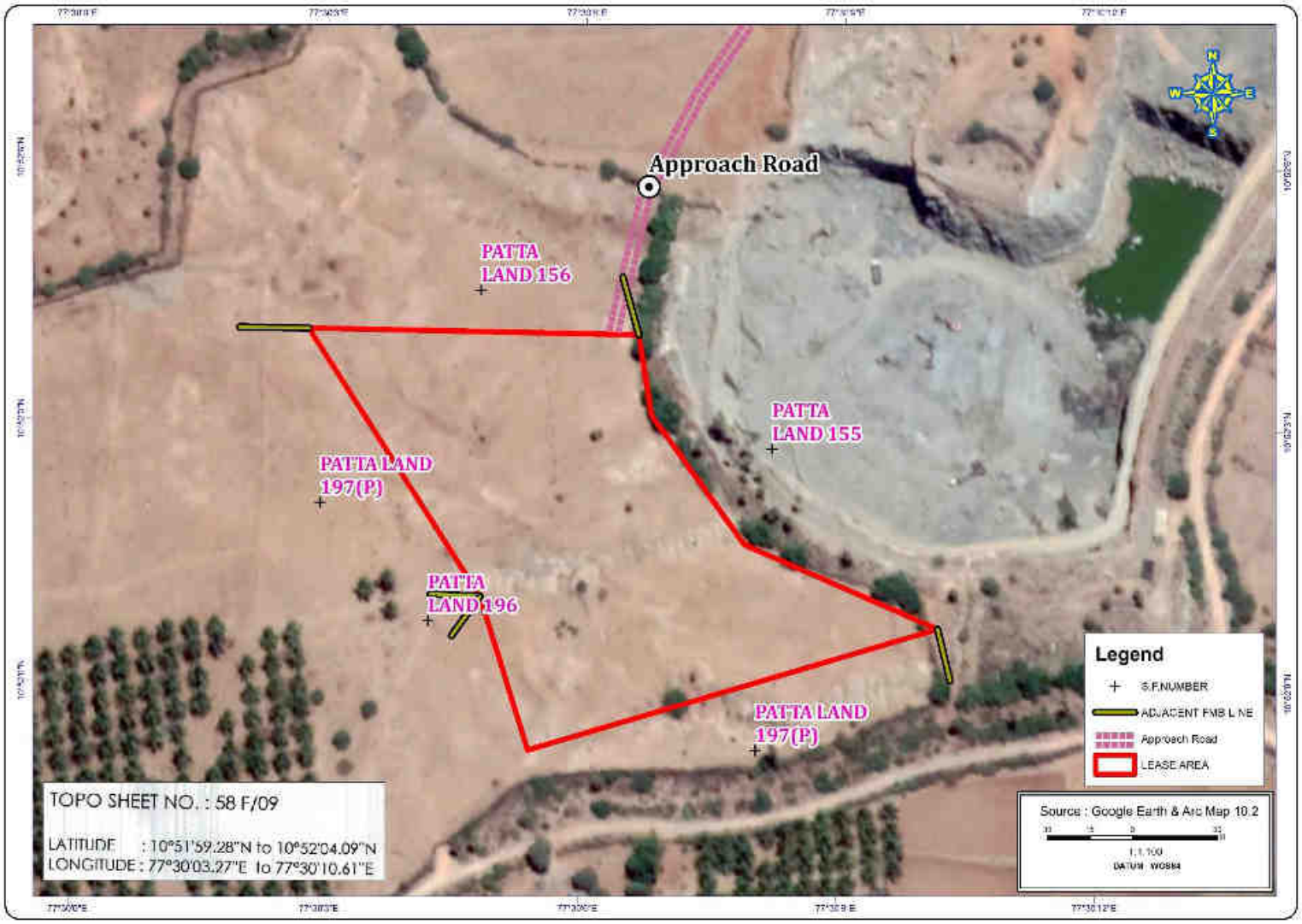


FIGURE – 2: GOOGLE IMAGE SHOWING CLUSTER (500 m QUARRIES)

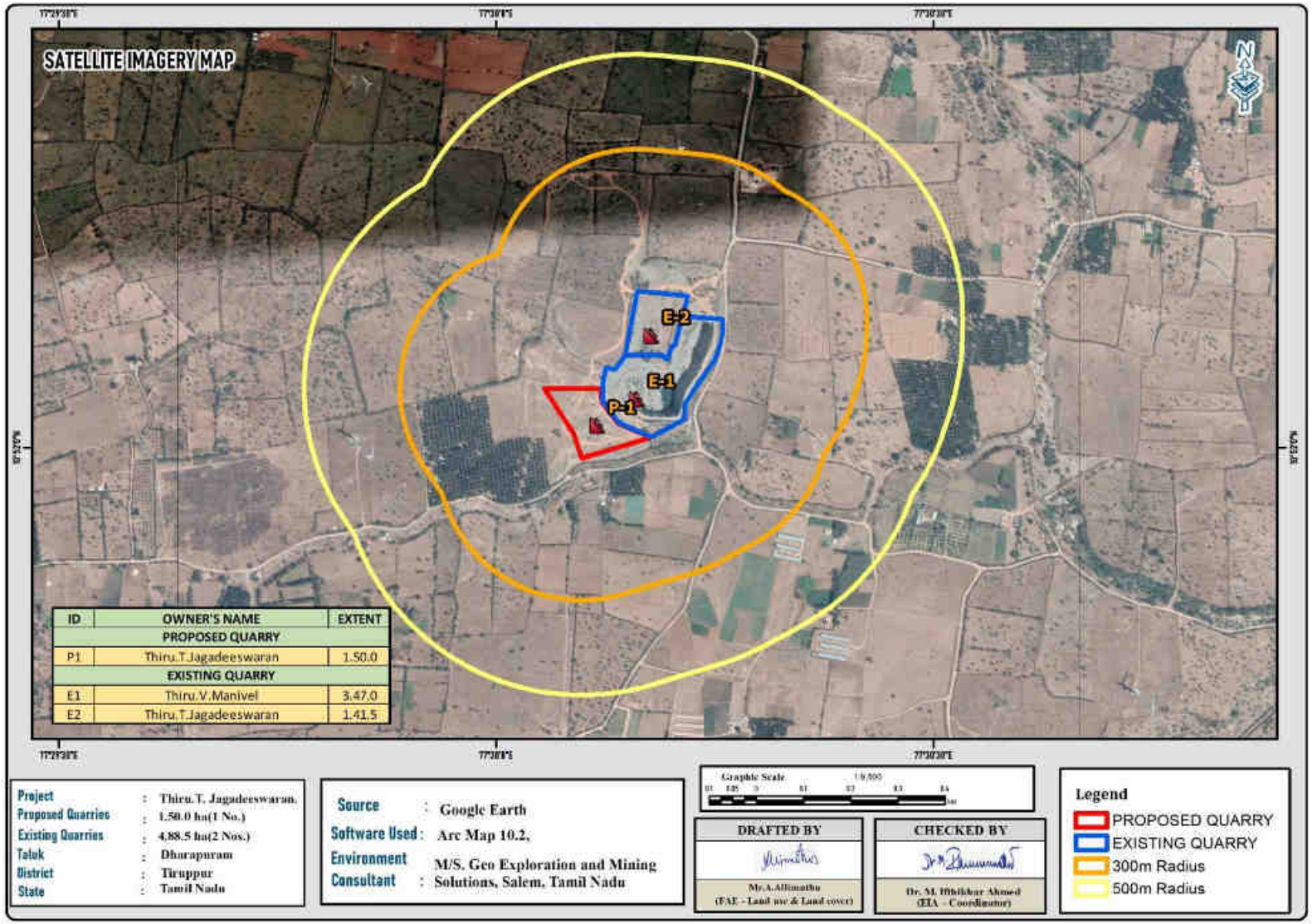


FIGURE – 3: TOPOSHEET MAP COVERING 10 KM RADIUS

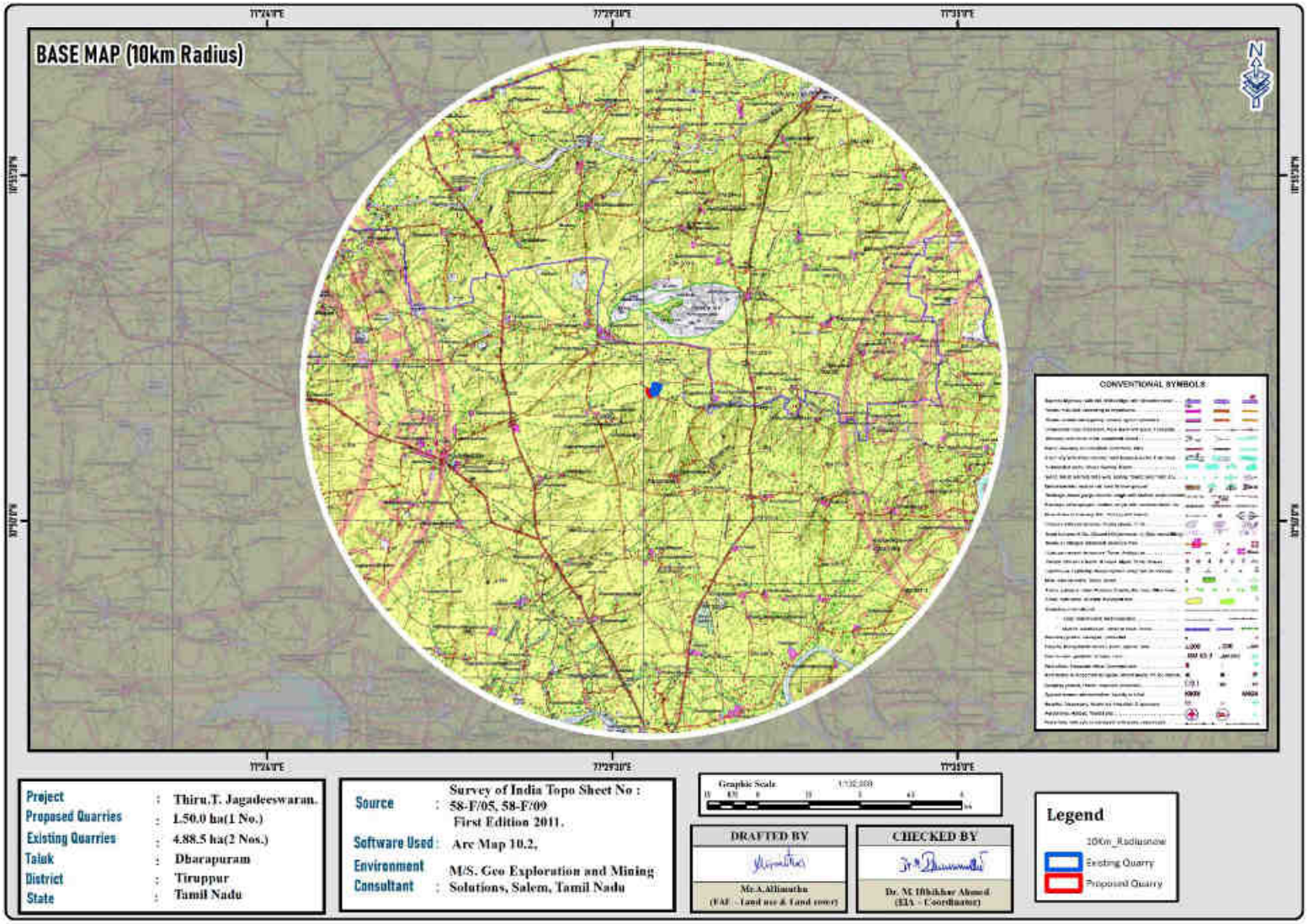


FIGURE – 4: QUARRY LEASE PLAN & SURFACE PLAN

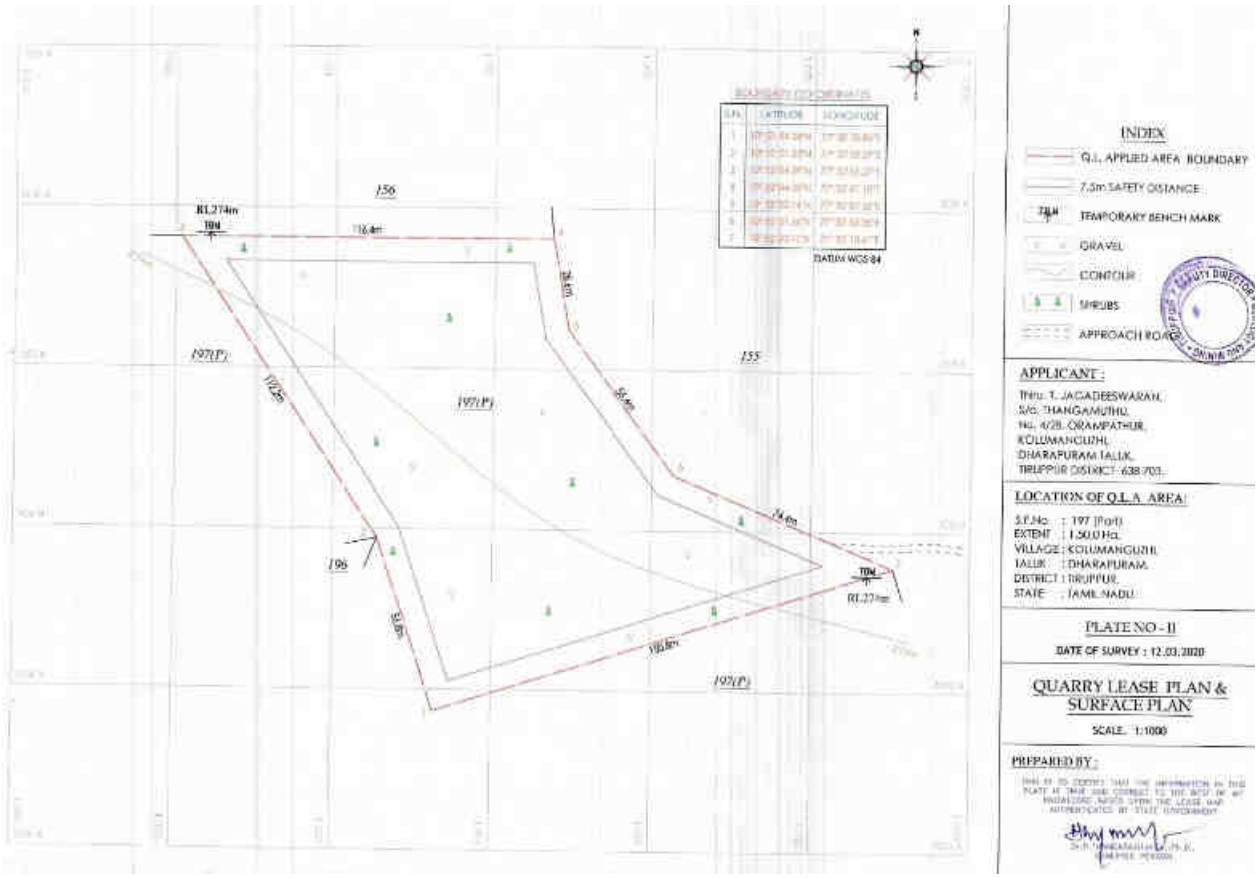


FIGURE – 5: PHOTOGRAPHS OF THE PROJECT AREA

2.4 METHOD OF MINING

Proposed Method of Mining is common for all the Proposed Projects – The method of mining is 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.

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	Tractor Mounted Compressor	3	40 HP	Diesel Drive
2	Jack Hammer	1	32 mm dia	Compressed air
3	Excavator with Bucket / Rock Breaker Unit	1	0.90 m^3 Bucket Capacity	Diesel Drive
4	Tippers / Dumpers	2	5/10 Tonnes	Diesel Drive

2.6 CONCEPTUAL MINING PLAN/ FINAL MINE CLOSURE PLAN

Conceptual mining plan is prepared with an object of long-term systematic development of benches, lay outs, selection of permanent ultimate pit limit, depth of quarrying and ultimate pit, selection of sites for construction of infrastructure etc. The ultimate pit size is designed based on certain practical parameters such as economical depth of quarrying, safety zones, permissible area etc.

2.7 ULTIMATE PIT DIMENSION

Pit	Length (Max) (m)	Width (Max) (m)	Depth (Max) (m)
I	128	99	36m bgl

3.0 DESCRIPTION OF THE ENVIRONMENT

Field monitoring studies to evaluate the base line status of the project site were carried out covering March 2021, April 2021 & May 2021 as per CPCB guidelines. Environmental Monitoring data has been collected with reference to proposed mine by Enviro – Tech Services Certified & MoEF Notified Laboratory

3.1 ENVIRONMENT MONITORING ATTRIBUTES

Sl.No.	Attributes	Parameters	Source and Frequency
1	Ambient Air Quality	PM_{10}, $PM_{2.5}$, SO_2, NO_x	Continuous 24 hourly samples twice a week for three months at 8 locations
2	Meteorology	Wind speed and direction, temperature, relative humidity and rainfall	Near project site continuous for three months with hourly recording and from secondary sources of IMD station
3	Water quality	Physical, Chemical and Bacteriological parameters	Grab samples were collected at 6 ground water and 1 surface water locations once during study period.
4	Ecology	Existing terrestrial and aquatic flora and fauna within 10 km radius circle.	Limited primary survey and secondary data was collected from the Forest department.
5	Noise levels	Noise levels in dB(A)	7 locations – data monitored once for 24 hours during EIA study
6	Soil Characteristics	Physical and Chemical Parameters	Once at 5 locations during study period
7	Land use	Existing land use for different categories	Based on Survey of India topographical sheet and satellite imagery and primary survey.
8	Socio-Economic Aspects	Socio-economic and demographic characteristics, worker characteristics	Based on primary survey and secondary sources data like census of India 2011.
9	Hydrology	Drainage pattern of the area, nature of streams, aquifer characteristics, recharge and discharge areas	Based on data collected from secondary sources as well as hydro-geology study report prepared.
10	Risk assessment and Disaster Management Plan	Identify areas where disaster can occur by fires and explosions and release of toxic substances	Based on the findings of Risk Modelling done for the risk associated with mining.

3.2 LAND ENVIRONMENT

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. The main objective of this section is to provide a baseline status of the study area covering 10 km radius around the mine site so that temporal changes due to the mining activities on the surroundings can be assessed in future.

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

S.No	CLASSIFICATION	AREA_Ha	AREA_%
BUILTUP			
1	Builtup-Urban	91.4402	0.28
2	Builtup-Rural	434.886	1.33
3	Mining Area	94.0531	0.28
AGRICULTURAL LAND			
4	Agricultural Land	1391.74	4.27
5	Crop Land	16901.7	51.9
6	Fallow Land	11995.2	36.8
BARREN/WASTE LANDS			
7	Scrub Land	336.872	1.03
WATER BODIES			
8	River	397.59	1.22
FOREST			
9	Deciduous Forest	352.832	1.08
10	Scrub Forest	561.813	1.72
		32558.1263	100

From the above Land Use Map, Pie Diagram and land Use Table; it is inferred that the majority of the land in the study area is Agriculture land (includes, crop land, fallow land) 92.97 % followed by Built-up area (Rural & Urban) 1.61 %, Mining area 0.28 %, Barren & scrub 1.03 % and water bodies (Rivers Stream Canals) is around 1.22 %. The total built up mining area within the study area is 94.053 ha i.e. 0.28 %. The area of 1.50.0 ha contributes about 1.59 % of the total mining area within the study. 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

- Variation in pH of the soil in the study area was found to be 7.01 to 8.5
- Mostly the soils collected from different location in the study area are Sandy loam in texture.
- The bulk density of the soil in the study area ranged between 0.92 – 1.26 g/cc.
- Available Nitrogen content in the soil in the study area ranged between 162 – 210 Kg/hec
- Available potassium content in the soil in the study area ranged between 28.4 – 42.7 mg/Kg

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 7.56 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 612 mg/l, the TDS mainly composed of carbonates, bicarbonates, Chlorides, phosphates and nitrates of calcium, magnesium, sodium and other organic matter.

Other parameters:

Chloride is 181 mg/l. Nitrates is 14.8 mg/l, while sulphates is 25.5 mg/l.

Whereas, the micronutrient iron (Fe) ranges from 0.22 mg/kg and whereas the values of zinc (Zn) and copper (Cu) are in Below Detection Limit (BDL).

Ground Water

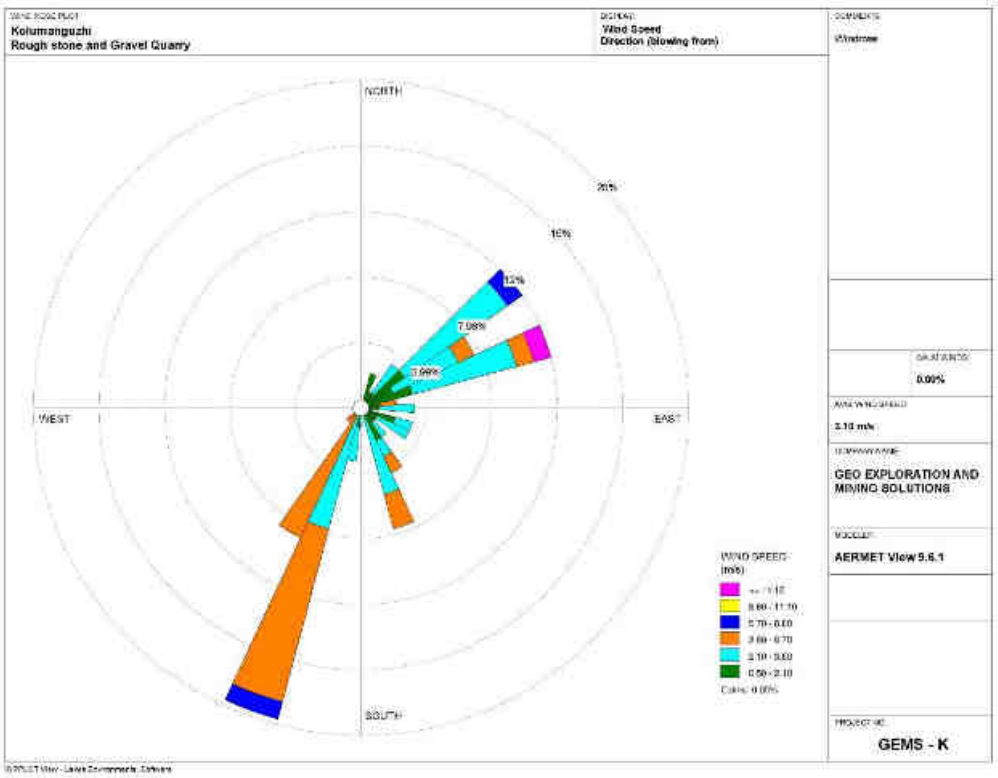
The pH of the water samples collected ranged from 6.52 – 7.59 and within the acceptable limit of 6.5 to 8.5. pH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. On Turbidity, the water samples meet the requirement. The Total Dissolved Solids were found in the range of 450 to 539 mg/l in all samples. The Total hardness varied between 145.2 to 195.06 mg/l for all samples.

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 – 6: WIND ROSE DIAGRAM



3.6 SUMMARY OF AMBIENT AIR QUALITY

As per monitoring data, PM10 ranges from 39.5 µg/m3 to 47.7 µg/m3, PM2.5 data ranges from 18.6 µg/m3 to 26.9 µg/m3, SO2 ranges from 5 µg/m3 to 10.7 µg/m3 and NO2 data ranges from 13.5 µg/m3 to 26.7 µg/m3. 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 47.3 dB (A) Leq and during night time were from 37.3 dB (A) Leq.
- Noise levels recorded in buffer zone during day time were from 39.3 – 47.2 dB (A) Leq and during night time were from 35.7 – 38.7 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.

3.8 ECOLOGICAL ENVIRONMENT

There is no Forest land, National Parks, Eco sensitive areas, Wild life sanctuaries within the radius of 10 km. An ecological survey of the study area was conducted particularly with reference to the listing of species and assessment of the existing baseline ecological (terrestrial) condition in the study area.

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 26 persons to the local people there by improving the indirect employment opportunity for 40 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

The main anticipated impact on the Land Environment due to quarrying operation is change in Landscape, change in Land – use Pattern. The total area applied for quarry lease is 1.57.0 ha.

MITIGATION MEASURES

Due to the quarrying activities, the land use pattern will be altered. In order to minimize the adverse effects, the following control measures will be implemented:

- 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 soil 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

The proposed project area is covered by gravel, which will be removed and sold directly in open market

ANTICIPATED IMPACT

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

- 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 ON SURFACE AND GROUND WATER

The impact due to mining on the water quality is expected to be insignificant because of no use of chemicals or hazardous substances during quarrying process. For the quarrying activity water will be utilized for wire saw cutting (which will be recycled), water sprinkling on haul roads and greenbelt development. The quarrying activity will not intersect ground water table as ultimate depth of the quarry is 36 m (35m + 1m)BGL and water table is found at a depth of 65m to 60m BGL.

MITIGATION MEASURES

- Garland drains, settling tank will be constructed along the individual mining leases. The Garland drains of the individual leases will be connected to settling tank and after settling the 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 onwards and such sites where dust likely to be generated and for developing green belt. The proponent will collect and judicially utilize the rainwater as part of rainwater harvesting
- 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 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 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 taurpaulin
- 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 though 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

To reduce the adverse effects on natural flora/fauna status of the area due to deposition of dust generated from mining operations, water sprinkling and water spraying systems will be ensured in all dust prone areas to arrest dust generation. Methodical and well-planned plantation scheme will be carried out.

GREENBELT DEVELOPMENT PLAN

Year	No. of tress proposed to be planted	Survival %	Area to be covered sq.m	Name of the species	No. of trees expected to be grown
I	60	80%	520	Neem, Casuarina, etc.,	48
II	60	80%	520		48
III	60	80%	520		48
IV	60	80%	520		48
V	60	80%	520		48

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 plant 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.
- Appropriate 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, DMF, NMET etc, from this project directly and indirectly.

5. ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

The site has been selected based on geological investigation and exploration as below:

- Occurrence of minerals at the specific site.
- Transportation facility for materials & manpower.
- Overall impact on environment and mitigation feasibility
- Socio – economic background.

Enough infrastructure exists and lesser resources are required to be deployed. Since, any further construction for infrastructure is not required and hence does not affect the environment considerably. The mineral deposits are site specific in nature; hence question of seeking alternate site does not arise for this project.

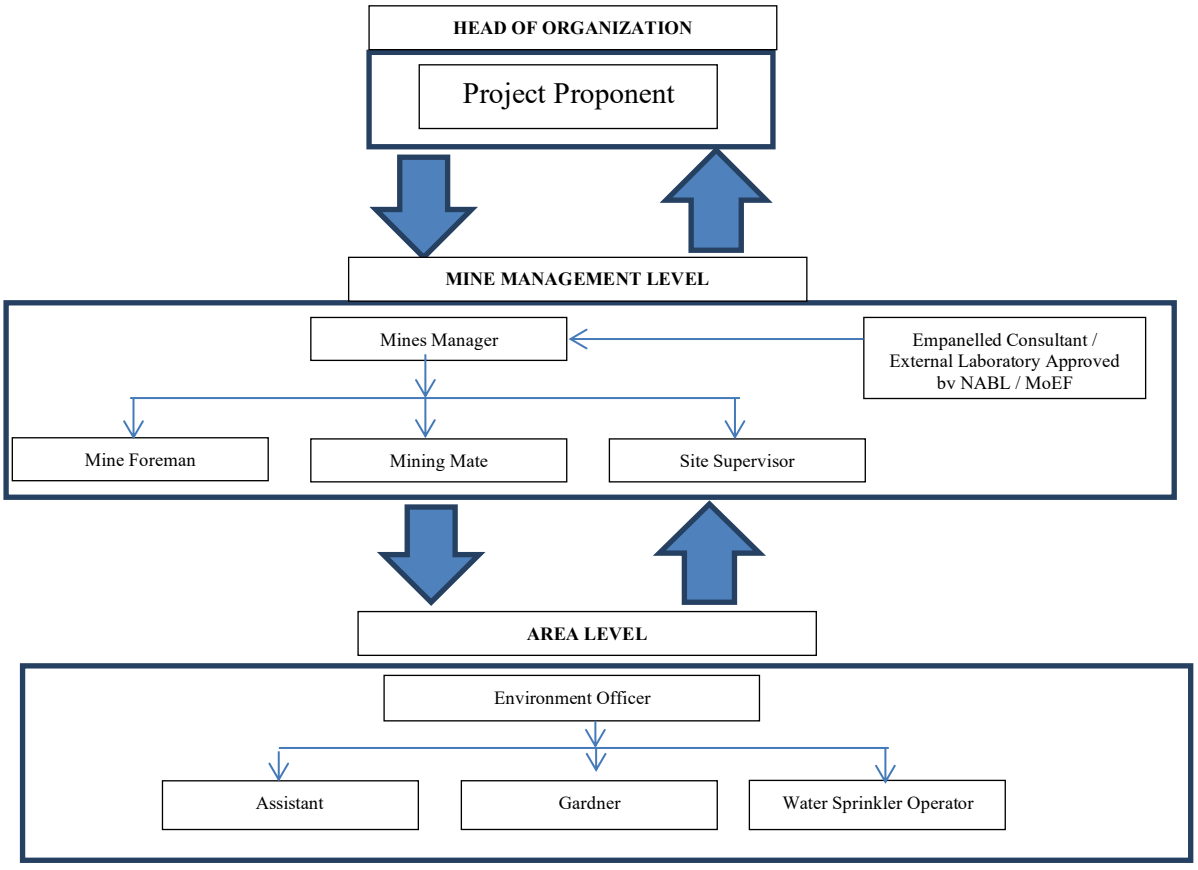
6. ENVIRONMENT MONITORING PROGRAM

Usually an impact assessment study is carried over short period of time and the data cannot bring out all variations induced by natural or human activities. Hence regular monitoring program of Environmental parameters is essential to take into account the changes in the Environment.

The Objective of Monitoring -

- To check or assess the efficiency of the controlling measures;
- To establish a data base for future impact assessment studies.

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, $PM_{2.5}$, PM_{10}, SO_2 and NO_x.
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 31st 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. Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening.

7.2 DISASTER MANAGEMENT PLAN

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	Proposed 5 Year Mining Plan Period Reserves in m^3	Avg. Per Year Production m^3	Per Day Production m^3	Number of Lorry Load Per Day
P1	1,90,190	38,038	127	22
E1	1,46,120	29,224	98	17
E2	1,33,180	26,636	89	15
TOTAL	**4,69,490**	**93,898**	**314**	**54**

CUMULATIVE PRODUCTION LOAD OF GRAVEL

Quarry	Proposed 5 Year Mining Plan Period Reserves in m^3	Avg. Per Year Production m^3	Per Day Production m^3	Number of Lorry Load Per Day
P1	10,584	3,528	12	2
E1	-	-	-	-
E2	20,880	10,440	35	6
TOTAL	**31,464**	**13,968**	**47**	**8**

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 P1-750m	51.8	42.6	52.3	55

NEAREST HABITATION FROM EACH MINE

Location ID	Distance in Meters
Habitation Near P1	1.2Km North West
Habitation Near E1	1.2Km North West
Habitation Near E2	1.1Km North West

GROUND VIBRATIONS AT 3 MINES

Location ID	Maximum Charge in kgs	Nearest Habitation in m	PPV in m/ms
P1	55	1.2Km North West	0.146
E1	42	1.2Km North West	0.118
E2	38	1.1Km North West	0.125

SOCIO ECONOMIC BENEFITS FROM 3 MINES

	Project Cost	CER @ 2%
P1	Rs. 40,16,700/-	Rs. 80,334/-
E1	Rs. 50,78,145/-	Rs. 1,01,562/-
E2	Rs. 58,29,500/-	Rs. 1,16,590/-
Total	**Rs. 1,49,24,345/-**	**Rs. 2,98,486/-**

EMPLOYMENT BENEFITS FROM 3 MINES

	Direct Employment	Indirect Employment
P1	17 Nos	34 Nos
E1	25 Nos	45 Nos
E2	11 Nos	6 Nos
Total	**53 Nos**	**85 Nos**

8. PROJECT BENEFITS

Thiru. T. Jagadeeswaran Rough and Gravel Stone Quarry aims to produce about 1,90,190 m^3 of Rough Stone & 10,584 m^3 of Gravel for 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

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

It can be concluded from overall assessment of the impacts, in terms of positive and negative effects on various environmental components, that the mining activities will not have any adverse effect on the surrounding environment.

To mitigate any impacts due to the mining activities, a well-planned EMP and a detailed post project monitoring system is provided for regular monitoring and immediate rectification at site. Due to the cluster quarrying activities, socio economic conditions in and around the project site will be improved substantially. Hence, the Prior Environmental Clearance shall be granted at the earliest.