

REPORT FOR ROUGH STONE AND GRAVEL QUARRY OF THIRU. J.SUBBURAJAN, AT SURVEY NO. 1123/2 OVER AN AREA OF 4.23.0HECTARES IN PADMANABAMANGALAM VILLAGE, SRIVAIKUNDAM TALUK, THOOTHUKUDI DISTRICT AND TAMILNADU STATE.

1.3 EXISTING ENVIRONMENTAL SCENARIO:

The studies and data collection have been carried out systematically and meticulously as per relevant IS codes, CPCB and MoEF&CC guidelines and as per approved ToR during **Summer Season (Mar 2025 to May 2025)** For the purpose of this study, the area has been divided into two zones, namely, core and buffer zones. The lease area is considered to be the core zone while the buffer zone encompasses a 10km radius from the periphery of the core zone.

The proposed Rough stone and gravel quarry is located in Padmanabamangalam Village, Srivaikundam Taluk, Thoothukudi district. Based on 2011 census data, in the 10km radius there are 48 Rural villages from three Taluks namely Srivaikundam, Tiruchendur and Thoothukudi and 3 urban areas of two taluks namely Srivaikundam (TP) & Perungulam (TP) of Srivaikundam Taluk and Alwarthirunagari (TP) of Tiruchendur Taluk. The demographic profile of the study area is given below:

Table 2: Social, Economic And Demographic Profile of the Study Area

Details	Population	Percentage
A. Gender-wise distribution		
Male Population	67786	49.24
Female Population	69869	50.76
Total	137655	100
B. Caste-wise population distribution		
Scheduled Caste	34056	24.74
Scheduled Tribes	475	0.35
Other	103124	74.91
Total	137655	100
C. Literate and Illiterate population		
Literate Males	55167	40.08
Literate Females	50570	36.74
Total Literate Population	105737	76.81
Others Males	12619	9.17
Others Females	19299	14.02
Others Population	31918	23.19
Total	137655	100
D. Occupational structure		
Main workers	51618	37.50

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Details	Population	Percentage
Marginal workers	7021	5.10
Total Workers	58639	42.60
Total Non-workers	79016	57.40
Total	137655	100

Further developments in this area with respect to these various facilities has occurred over the years.

1.3.1 EXISTING ENVIRONMENTAL QUALITY:

Table 3: Baseline Data

A. <u>Ambient Air Quality Data</u> – 5 Locations			
Parameters	Core Zone	Buffer Zone	Limits
Particulate Matter (Size <10 µm)	46.1 - 59.4	41.1-64.3	100
Particulate Matter (Size <2.5 µm)	21.2 - 27.2	18.5 -29.9	60
Sulphur Dioxide (as SO ₂)	4.8 - 7.4	4.3– 7.1	80
Nitrogen Dioxide (as NO ₂)	8.7 - 12	7.3-13.8	80
Conclusion: The existing Ambient Air Quality levels for PM10, PM2.5, SO2 and NO2, are within the NAAQ standards prescribed CPCB limits. The CO values in all the locations were found to be below detectable limit. Silica values in the study area are found to be below detectable limit. (Detection limit – 0.05 mg/m3)			
B. <u>Water Quality</u> – 5 Locations			
PARAMETER	Result	*LIMIT (µg/m3)	
pH at 25 °C	6.74 – 7.45	6.5-8.5	
Total Dissolved Solids, mg/L	510 – 880	2000	
Chloride as Cl ⁻ , mg/L	205 – 260	1000	
Total Hardness (as CaCO ₃), mg/L	278 – 390	600	
Total Alkalinity (as CaCO ₃), mg/L	142– 270	600	
Sulphates as SO ₄ ²⁻ , mg/L	195 – 302	400	
Iron as Fe, mg/L	0.05 – 0.11	0.3	
Nitrate as NO ₃ , mg/L	1.56 – 3.89	45	
Fluoride as F, mg/L	0.36 – 0.65	1.5	
Conclusion: The water quality of ground water is found to be within the prescribed Permissible limits of IS: 10500 Norms in the absence of an alternative source as per Drinking Water Specifications.			
C. <u>Noise Levels</u> – 5 Locations			
Parameter	Core Zone	Buffer Zone	Limit
Day Equivalent	53.6	48.1 – 50.2	55
Night Equivalent	41.4	39.4 – 42.1	45
Comparing with the MOEF&CC Norm of 55 dB(A) for day time and 45 dB(A) for night time, the monitored ambient noise levels were within the limit values for Residential areas.			

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D. Soil Quality – 3 Locations	
Parameter	Buffer Zone
pH	6.72 to 7.84
Electrical Conductivity (µmho/cm)	47.96 – 52.47
Organic matter (%)	0.59 – 1.24
Total Nitrogen (mg/kg)	142 - 544
Phosphorus (mg/kg)	1.52 – 4.62
Sodium (mg/kg)	520- 932
Potassium (mg/kg)	945 -1055
Soil is of CLAY LOAM type	

A. LAND ENVIRONMENT:

From the above table it is seen that From the above table it is seen that 30.77 % of the study area is agriculture land and 20.59 % are fallow land and Land with scrub constitutes 29.31 % and the balance falls under other land use categories.

BIOLOGICAL ENVIRONMENT:

Flora: The lease area is a non forest, private land & area is mostly barren interspersed with thorny bushes only.. Buffer Zone comprise of Vaagai, Karuvelan, Vembu, Murungai & Pongai., etc. Southern part study area especially near the Tamirabarani river influenced by Tamirabarani exhibits fertile land, better cultivated and distinctly differ from the northern part which comprises of mostly hard rocky formation with poor soil condition unfit for agriculture activities.

Fauna: Vallanadu Black buck sanctuary is located at a distance of 2.2 km from the lease area. ESZ of the sanctuary lies at 1.8 km from the lease boundary. Domesticated animals like Cows, Buffalos, Dogs, Cats etc., are commonly found. Peafowl and Blackbuck placed under Schedule-I as per Wild Life (Protection) Act, 1972 is found in the Study area. As per MoEF & CC's final notification S.O.2773(E) dated 31st July 2019, Vallanadu Black buck sanctuary is located at a distance of 2.2 km from the lease area. ESZ of the sanctuary lies at 1.8 km from the lease boundary. As such the project site is located outside the ESZ. Hence, NBWL is not applicable.

B. HYDROLOGICAL STUDY:

In the study area, the northern part containing elevated, hard rocky formations contains less ground water potential and mainly bore wells are the dependable source. Recharge of groundwater in hard rock formations is influenced by the intensity and depth of weathering. In the southern part along the Tamirabarani command area, shallow aquifer is developed through dug

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wells and deeper aquifer through tube wells. The wells are of shallow depth where as the bore wells are 150- 200 ft deep.

Recharge of groundwater in hard rock formations is influenced by the intensity and depth of weathering. From the Geophysical survey in the lease area, it is found that the subsurface litho units are gravel, weathered layers poorly fractured and terminated with hard and compact massive rocks with fully devoid of fractures. The mining area consists of hard compact rock, no major water seepage within the mine is expected. The nearby working pit/ mine voids also show no visible seepage from the hard rock mine faces.

The proposed lease area falls in **Srivaikundam block** and the stage of ground water development as per Central Ground Water Authority study is categorized under “**Safe**” category.

1.4 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The identified impacts due to the mining operation in the lease during mining and associated activities have been studied in relation to various environmental components like Air, water, noise, vibration, land, transport etc.,

1.4.1 AIR ENVIRONMENT:

The proposed mining and allied operations may cause deterioration of air quality due to pollution arising from the project operation if prompt care is not taken. The principal sources of air pollution in general due to mining and allied activities will be:

Dust generation in the mine due to:

- ❖ Excavation of material
- ❖ Movement of HEMM such as Excavators, tippers etc.
- ❖ Loading and unloading operation
- ❖ Transportation

In case of this mine, the following measures will be adopted to control impact on the air quality due to mining operations in the lease area:

- Regular wetting of transport road using mobile water tanker.
- Wet drilling / Covering of drill holes with wet clothes
- Use of controlled blasting techniques with Nonel to keep the dust generation within the prescribed limits.

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- Proper maintenance of roads.
- Avoiding overloading of tippers
- Transportation of material by tarpaulin covered trucks
- Proper maintenance of HEMM to minimize gaseous emission
- Setting up of tyre washing facility in the lease area exit.
- Vehicular emission tests with digital smoke meter.
- Provision of green netting around the lease periphery on all sides.
- Development of green belt/ plantation in various areas within the mine lease area etc.

By adoption of all these measures, no adverse impact on air quality is envisaged due to this proposed opencast mining operation.

The impact on air quality through model simulations are done using AERMOD View Gaussian Plume Air Dispersion Model for the air pollutant arising from the mining operations, namely, PM₁₀, PM_{2.5}. **Ground Level Concentration (GLC)** have been computed. It can be seen, the resultant added concentrations with baseline figures with respect to PM₁₀ is in the range of 53.3 µg/m³ to 65.3 µg/m³ and with respect to PM_{2.5} are in the range of 25.3 µg/m³ to 30.9 µg/m³, which are within the stipulated statutory limits for the project.

1.4.2 WATER ENVIRONMENT:

The water requirement for this project is expected to be 8 KLD. The water will be sourced initially from outside agencies. Later the rainwater collected in the mine pit sump will be used for this purpose.

The domestic effluent to be generated from the project will be collected in septic tank with soak pits arrangements. This being a mining project there will not be any process effluent.

There is a Kanmai is located at 260 m E & 310 m W, Due to scanty rainfall these kanmai remains dry for most of the year. By proper surface runoff management, the rainwater from the lease periphery will be channelized through the peripheral garland drain all around the lease area and clear water will be discharged ensuring proper flow of rainwater for downstream users. There is no proposal to discharge any effluent into this waterbody. As such no major impact is envisaged on the nearby water bodies due to project operations.

1.4.3 NOISE ENVIRONMENT:

During mining operation there will be noise generation due to working of excavators, movement of vehicles, etc. However, it will be felt near the active working area only and at away from its source it will get reduced. There will also be attenuation due to vegetation, tin sheet/ green netting to be erected by the proponent all around the lease and as such there will not be any adverse noise propagation outside the lease boundary Due to natural attenuation effects, by proper green belt development, design / maintenance of machines, etc., the impact on noise levels will be negligible and are expected to be well within the prescribed limits.

1.4.4 VIBRATION:

In the proposed mine workings, blasting & vibration effects will be controlled by adopting following measures.

- Carrying out controlled blasting using Nonel delay detonator.
- Optimum design for burden and spacing.
- Reducing explosive charge per delay to minimum.
- The peak particle velocity (PPV) of ground vibration will be kept very low through optimally controlled blasting techniques, after necessary field trials.
- To contain fly rocks, stemming column to be less than burden of the hole. Blasting area will also be muffled, if necessary, to stop fly rocks propagation.
- Blasting will not be carried out when strong winds are. Blasting will be done during midday time.
- Controlled blasting to avoid tension cracks which may endanger the stability of bench slopes in the mine.
- Proper care and supervision during blasting by a competent and experienced person to be carried out.
- Adopting different blast timing for the leases in the cluster
- Besides, different blasting time for the projects is suggested and the timing is to be mentioned in the display board in the mines entrance.

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By adoption of above measures, it will be ensured that ground vibrational levels due to blasting will be maintained within the prescribed DGMS conditions of 10 mm/s for the domestic houses/structures.

1.4.5 IMPACT ON LAND ENVIRONMENT:

In the post mining stage entire 3.49.0 Ha will be left as water body. 0.05.0 Ha will be the mine roads & infrastructure, 0.69.0 Ha will be covered with vegetation. Effective post closure monitoring will be done to ensure that there will be no adverse impact due to mining operations.

1.4.6 BIOLOGICAL ENVIRONMENT:

Leased and its nearby area is of dry rocky type with very little vegetation. Necessary mitigative measures like dust suppression, proper maintenance of equipment's, greenbelt and plantation etc., will be carried out to prevent dust generation & any further impact on the vegetation. About 2100 trees will be planted in and around the lease area.

From the impact assessment, it is observed that the incremental pollution load near the Vallanadu Blackbuck Sanctuary with respect to air quality , noise levels are negligible. From the blasting study, it is concluded that due to the adoption controlled blasting with less charge per delay & other additional control measures given in the report, the impact of mining on the VBS with respect to ground vibration is expected to be negligible.

Though there is no adverse impact on the Vallanadu Blackbuck Sanctuary due to mining operations with effective implementation of EMP measure, the project proponent is committed to associate with forest department towards conservation of species within the VBS boundary. Following additional activities are identified and financial provision is made for the same:

- ✓ Providing Tin sheet/ Green net fencing around the quarry periphery with 2 watch towers and least 2 no's of the security sentries round the clock.
- ✓ developing & maintaining grass fodder farm within the VBS and nearby forest land, regular supply of drinking water for animals, fencing of the sanctuary & other measures in consultation with concerned CWLW / DFO.
- ✓ Following proper blast parameters as specified in the proposed blast vibration study report.
- ✓ Construction of trenches of at least 1.5m depth in the lease periphery to prevent blast vibration propagation.
- ✓ Developing three tier plantation around the lease area

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- ✓ Conducting awareness program, training of locals and monitoring.
- ✓ Installation of CCTV cameras around the mines and intervening places and track for movement of habitat if any.
- ✓ To collaborate and strengthen the wildlife conservation activities of the state wildlife wing

1.4.7 SOCIO ECONOMIC ENVIRONMENT:

The entire lease area is a private patta land. There are no habitations or hutments in the core zone area and no rehabilitation or resettlement is involved. The mining operations in the proposed mines will each employ about 26 persons directly and about 50 persons. Besides through allied opportunities in logistics, trading, repairing works etc. good employment potential will arise in this area, which will provide raising income levels and standards of living in the area through various service-related activities connected with the project operations.

Towards the socio-economic development of the surrounding area, Rs.5.0 Lakhs is allocated for this project. The activities identified under CER will be implemented in a phased manner by provision of facilities in nearby Government School.

1.4.8 IMPACT ON LOCAL LOGISTICAL SYSTEM DUE TO PROJECT:

The material mined out from this lease area will be directly transported to the crusher units for producing stone aggregates of different sizes or construction of roads, bridges, buildings and other buyers etc. Since the production from this lease is very low there will be hardly 5 to 6 trips per hour of material transportation. The transport route will be properly maintained to absorb this traffic due to this project. The following mitigative measures are suggested for mitigation of adverse impacts on the logistical aspect of the project:

- ❖ Water sprinkling on material in the transport vehicles before transporting, so that no dust nuisance during transport will arise.
- ❖ Plantation on either side of the transport road in consultation with the concerned department.
- ❖ Proper maintenance of transport roads and vehicles
- ❖ Avoiding overloading of material
- ❖ Covering of loaded vehicles with tarpaulins sheet if warranted.
- ❖ Provision of tyre washing facility at the mine outlet

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1.4.9 WASTE MANAGEMENT:

Since the entire mined out material will be used there will not be any solid waste generation from this project. There is no process effluent generation from mines. Hence no liquid waste is generated. The hazardous waste generated will be stored in a separate storage area with impervious containers for waste oil, oil contaminated clothes, used lead acid batteries, scraps, tyre storage etc. It will be disposed through authorized recyclers or re-processors periodically. The hazardous wastes will be transported in accordance with the provisions of rules. By effective implementation of above said mitigation measures no major impact due to Hazardous waste is expected. Single use plastics/ use and throwaway plastics will be banned in the site as directed by the Tamil Nadu Government vide GO(Ms)No.84 regarding ban on use of plastic products. The employees will be encouraged to use compostable material or reusable material.

1.5 ENVIRONMENTAL MONITORING PROGRAMME:

Regular, systematic and sustained programme schedules for implementation and monitoring of various control measures are devised with clear cut guidelines of various concerned plans for keeping a continuous surveillance on the various environmental quality parameters in the area. The Mines Manager in the mine project site will be directly responsible for various environmental activities in the mine and will undertake effective monitoring and implementation of various environmental control measures promptly and effectively and to oversee various environmental management schemes for air quality control, water quality status, noise level control, plantation programme, social development schemes, etc in the mine. Towards implementation of the environmental control measures, Rs. 28.64 Lakhs is allocated under capital cost and Rs. 33.91 Lakhs/annum under recurring cost per will be spent under recurring cost.

1.6 CONCLUSION:

By systematic and scientific mining adhering to all the statutory norms and enforcing and strictly implementing the above said mitigation measures mentioned in this report, no adverse impact is envisaged. The proposed mining project will benefit this region in the fields of potential employment opportunities, improved income for local people, improved social welfare facilities in respect of education, medical healthcare systems, etc. in its own way and also revenue to Government through royalty, taxes etc. Besides, it will meet the raw material requirement of the construction industry also.

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