EXECUTIVE SUMMARY

PARAPPALAR RESERVOIR SAND AND SILT QUARRY

(For Resorting the capacity of Parappalar Reservoir)

Vadakadu Villages, Oddanchatram Taluk, Dindigul District

In S.F. Nos: 225, 226 and 227

Extent: 25.31.7 ha

NON-FOREST LAND/ GOVERNMENT LAND / FRESH MINE/ MINOR MINERAL

As per TOR vide

Lr No. SEIAA-TN/F.No.8788/SEAC/ToR-1062/2022 Dated: 17.02.2022

Project Proponent

The Executive Engineer

Public Works Department / Water Resources Department
Nanganjiyar Basin Division,
Palani Taluk, Dindigul District,
Tamil Nadu State.

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 Category 'A' & 38 Category 'B'
Certificate No : NABET/EIA/1922/SA0139
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Baseline Monitoring Season – March to May 2022

ENVIRONMENTAL LAB

CHENNAI METTEX LAB PRIVATE LIMITED

(Approved by AAI, AGMARK, APEDA, BIS, EIC, FSSAI, GAFTA, IOPEPC, MOEF & TEA BOARD)

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai – 600 032, Tamil Nadu, India.

- **INTRODUCTION**

This EIA report is prepared by considering Cumulative load of the proposed sand and silt quarry is falling in the B1 category (One proposed Quarry) total extent of Parappalar Reservoir Sand & Silt Quarry 25.31.7 ha.

This EIA Report is prepared in compliance with ToR obtained vide letter No. SEIAA-TN/F.No.8788/SEAC/ToR-1062/2021 Dated: 17.02.2022

Now, as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green Tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018 clarified the requirement for EIA, EMP and therefore, Public Consultation for all areas from 5 to 25 ha falling in Category B- 1 and appraised by SEAC/ SEIAA as well as for cluster situation.

The proposed project is categorized under category "B1" Activity 1(a) and will be considered at SEIAA – TN after conducting Public Hearing and Submission of EIA/EMP Report for Grant of Environmental Clearance.

"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	:	The Executive Engineer
Address	:	PWD/ WRD Nanganjiyar Basin Division, Palani Taluk, Dindigul District.
State	:	Tamil Nadu
Pin code	:	621 216
Mobile No	:	04545 - 250159
Email id.	:	eepwdwrdpalani@gmail.com

1.1 QUARRY DETAILS WITHIN 500 M RADIUS

PROPOSED QUARRIES				
CODE	**Name of the Owner**	**S.F. Nos**	**Extent**	**Status**
P1	The Executive Engineer, PWD/WRO, Naganjiyar Basin Division, Palani Taluk, Dindigul District.	S.F.No.225, 226 and 227	25.31.7 ha	ToR obtained vide : Lr.No.SEIAA-TN/F.No.8788/SEAC/ToR-1062/2022 Dated:7.02.2022
TOTAL			**25.31.7 ha**	
EXISTING QUARRIES				
CODE	**Name of the Owner**	**S.F. Nos& Village**	**Extent**	**Lease Period**
Nil				
TOTAL				
CODE	**Name of the Owner**	**S.F. Nos& Village**	**Extent**	**Lease Period**
Nil				
TOTAL CLUSTER EXTENT			**25.31.7 ha**	

TABLE 1.2 SALIENT FEATURES OF THE PROPOSAL PROJECT

DESCRIPTION	DETAILS			
Name of the project	Parappalar Reservoir Sand & Silt Quarry			
Name of Mineral	Sand and Silt			
S.F. No's and Village	S.F.No 225, 226 and 227, Vadakadu Village			
Extent	25.31.7 ha			
Classification of Land	Government Land Maintained by Public Works Department WRD, Nanganjiyar Basin Division, Palani			
Taluk	Oddanchatram			
District	Dindigul			
State	Tamil Nadu			
Latitude Between	10°24'53.62"N to 10°26'30.60"N			
Longitude Between	77°40'39.56"E to 77°42'00.28"E			
Toposheet No	58- F/11			
Topography of the area	The topography of the area is undulated topography having gentle slope towards western side. Highest Elevation between: 542m to 554m AMSL			
Life of Mine	5 years			
Geological Reserves	6,26,683m^3 of ROM(31,854m^3 of Sand and 5,94,829m^3 of Silt)			
Mineable Reserves	5,84,127m^3 of ROM 30,191m^3 of Sand and 5,53,936m^3 of Silt			
Yearwise Production (5 Years)	5,84,127m^3 of ROM 30,191m^3 of Sand and 5,53,936m^3 of Silt			
Mining Method	Opencast Mechanized Method of Mining without Drilling and Blasting			
Proposed depth of mining for this plan period	3.56m below from the existing ground level			
Ultimate Depth of Mining	Section	Max.Length (m)	Max.Width (m)	Average Depth (m)
	X1Y1-AA'	645	19	1.25
	X2Y2 -BB'	1079.7	70	3.56
	X3Y3-CC'	700	80	3.45
	X4Y4-DD'	1330	70	3.55
	X5Y5-EE'	1045	20	1.65
Employment Potential	30 Nos			
Ground Water Level	13m – 18 m BGL			
Ground Water Table Intersection	Quarrying operation will be carried out well above the ground water table, hence ground water will not be affected by proposed mining.			
Drainage Pattern	The drainage pattern of the area is dendritic.			
Water Requirement & Source	Total water requirement for dust suppression, Greenbelt and drinking is 4.0 KLD. Water will be sourced from nearby villages by water tankers and drinking water will be sourced from approved water vendors.			
500m Radius Letter from the Assistant Director, Dindigul District	Existing Quarries - Nil Expired/Abandoned Quarries - Nil Proposed Quarry - 1 No (25.31.7ha)			
Project Cost	**Rs 41,25,000 /-**			

1.3 STATUTORY DETAILS

- Gazette (2D) No.72, Public Works Department Dated: 18.08.2021
- Precise Area Communication letter issued by District Collector, Dindigul vide Letter No. 459/2015(Mines) Dated: 01.09.2021 for preparation of Mining Plan and for Obtaining Prior-Environmental Clearance.
- The Mining Plan was prepared under Rule 41 & 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 and the Mining Plan was approved by Assistant Director of Geology and Mining, Dindigul District vide Letter No: 459/2015 (Mines), Dated: 09.09.2021
- The proposed project falls under "B1" Category as per Order Dated: 04.09.2018 & 13.09.2018 passed by Hon'ble National Green tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018
- The proponent applied for ToR for Prior Environmental Clearance vide online Proposal No. SIA/TN/MIN/67595/2021 Dated: 15.09.2021
- The proposal was placed in 242nd SEAC meeting held on 03.02.2022 and the committee recommended for issue of ToR
- The proposal was considered in 485th SEIAA meeting held on 15.02.2022 and issued ToR vide Letter No SEIAA-TN/F.No. 8788/SEAC/ToR-1062/2022 Dated 17.02.2022

2.0 PROJECT DESCRIPTION

Parappalar Reservoir Sand & Silt Quarry project over an extent of 25.31.7 ha; Opencast Mechanized Mine catering to needy customers at various destinations.

The proposed project aims to produce 30,191m^3 of Sand and 5,53,936m^3 of Silt (Mining Plan Period) Five years plan period.

The project area exhibits undulated topography with gentle sloping towards western side. The altitude of the area between 542m to 554m AMSL. The sand is derived by erosion of weathered rocks and mineral particles and transported by the river water and deposited on the floor of the reservoir in the interface.

Opencast method of shallow mining is proposed. Initially to approach the proposed site a temporary road will be formed by using of Gravel mixed with bio-degradable materials and formed a grit around the sand desilting site to move the vehicles easily. During forming the approach road and grit, necessary temporary pipes will be provided wherever necessary for free flow of water to downstream. After forming this approach roads, the trucks/ lorries are allowed for transportation after paying the necessary fees to the Government bodies. In this process contract labours from neighbouring villages are engaged for the purpose of maintaining the approaches. Regulating the vehicle movements, assisting to take levels, issuing of permits etc., to regulate the desilting operation in a scientific and systematic manner. The sand will be loaded directly to the trucks / Lorries for transportation to the needy customers and the Silt will be directly loaded to the trucks / Lorries for transportation to the nearby Farmers for Agriculture purpose with free of cost. Hence, no mineral processing is involved.

The trucks are loaded by excavators in direct supervision of the Assistant / Junior Engineers Public Works Department. The competent statutory mines foreman will also be deployed for the safety movement of vehicles inside the quarry.

2.1 SITE CONNECTIVITY TO THE PROJECT AREA

Nearest Village/Habitation	Vadakadu – 4km – NE (4,157 Population)
Nearest Railway Station	Oddanchatram – 7 km NE
Nearest Airport	Madurai Airport - 80km – South East
Nearest State Highway	(SH-37) Oddanchatram – Madurai – 10km – East
Nearest National Highway	(NH-209) Dindigul – Coimbatore – 3.0km - North.
Nearest Sea Port	Kochi – 168 km SW
Nearest Interstate boundary	Kerala Interstate boundary – 52 km – South West
Nearest Coastal zone	Bay of Bengal – 164 km – South East

2.2 OPERATIONAL DETAILS OF LEASE APPLIED AREA

Description	Quantity in m^3	
	Sand	**Silt**
Geological Resources	31,854	5,94,829
Mineable Reserves	30,191	5,53,936
Yearwise Production	30,191	5,53,936
Peak Production Proposed	20,793 (1st year)	1,18,023 (5th year)
Peak Production per Day	69	393

Source: Approved Mining plan of respective quarry leases

FIGURE – 1: GOOGLE IMAGE SHOWING APPLIED QUARRY LEASE AREA

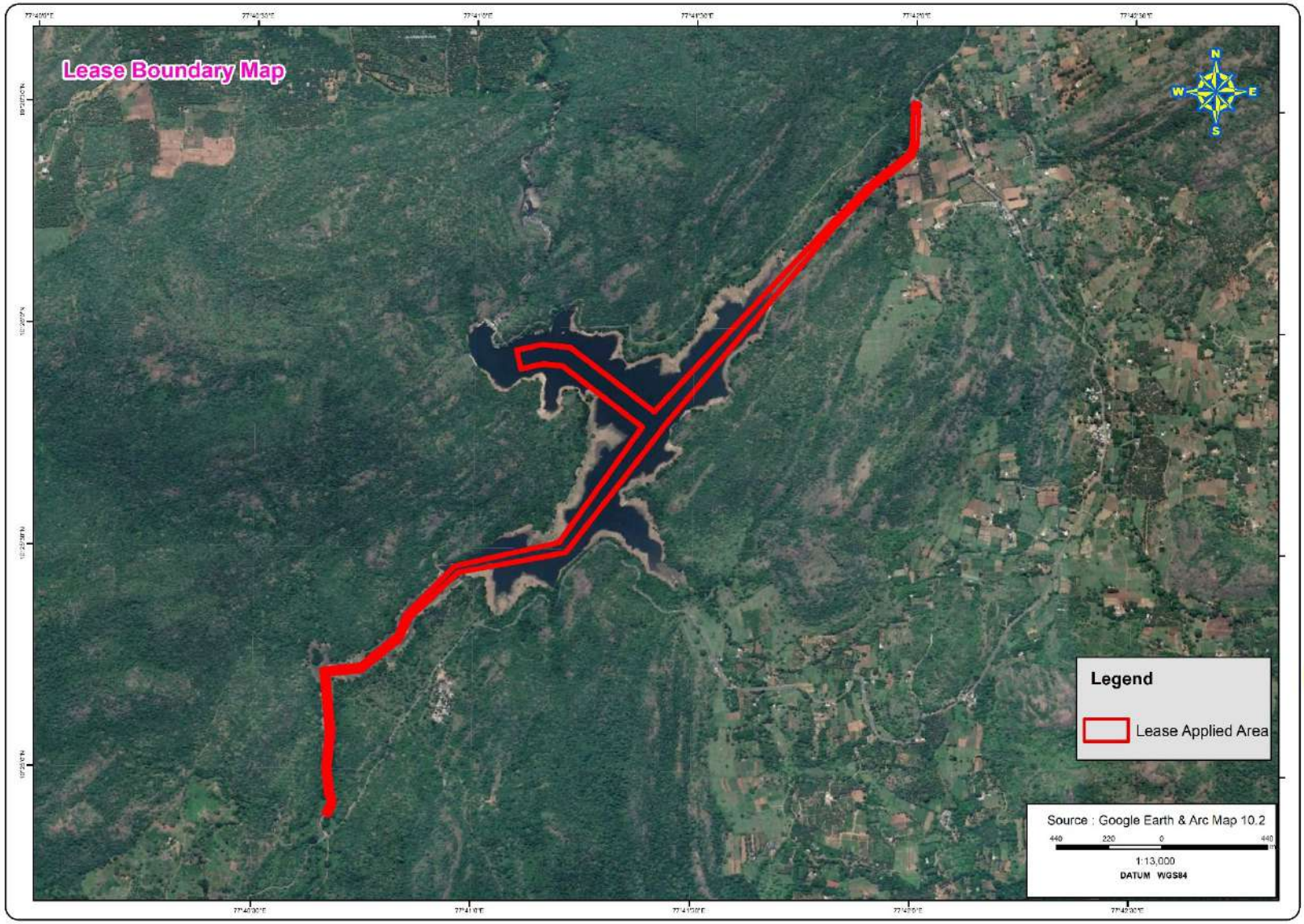


FIGURE –2: GOOGLE IMAGE SHOWING CLUSTER (500 m QUARRIES)

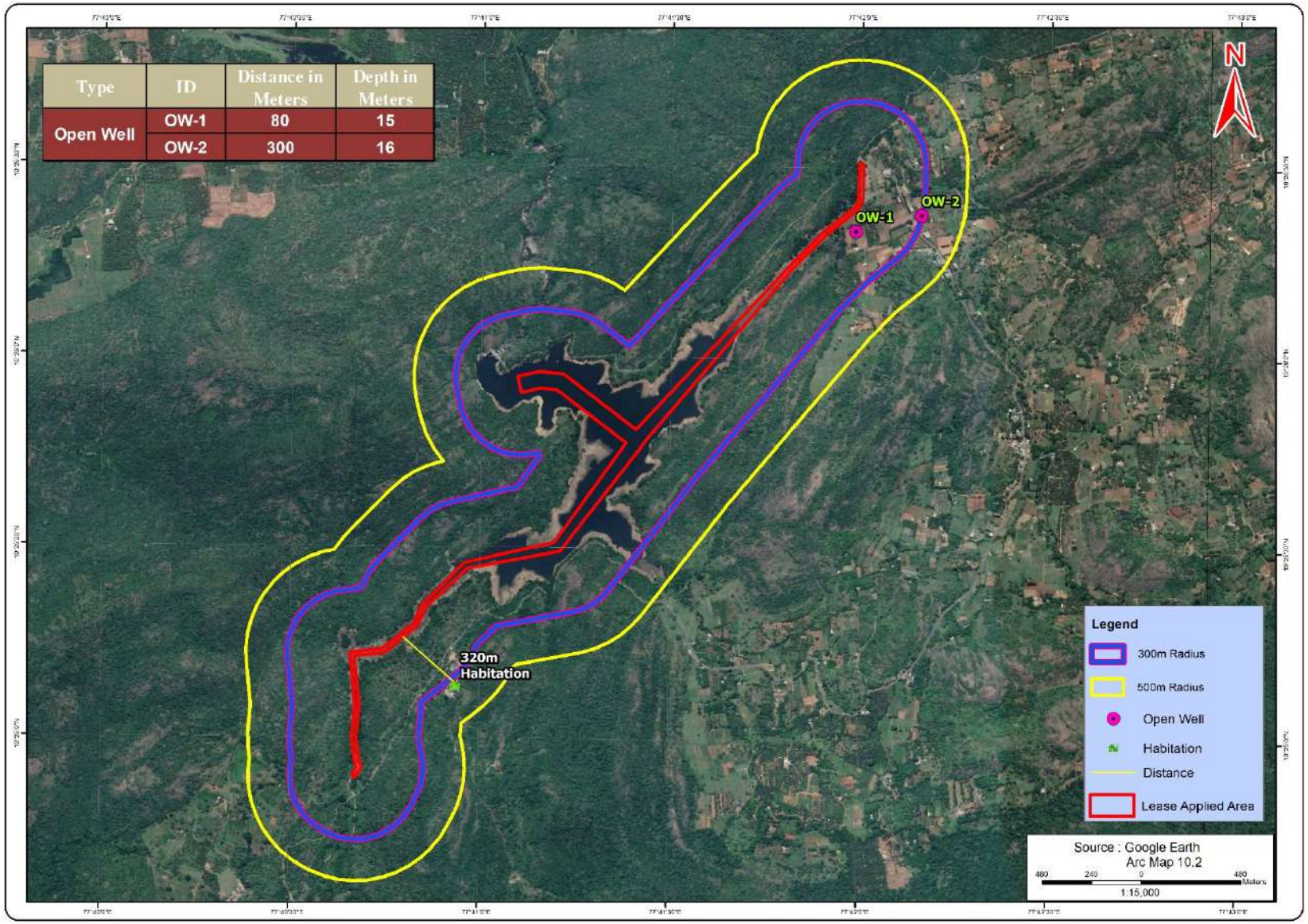


FIGURE – 3: TOPOSHEET MAP COVERING 10 KM RADIUS

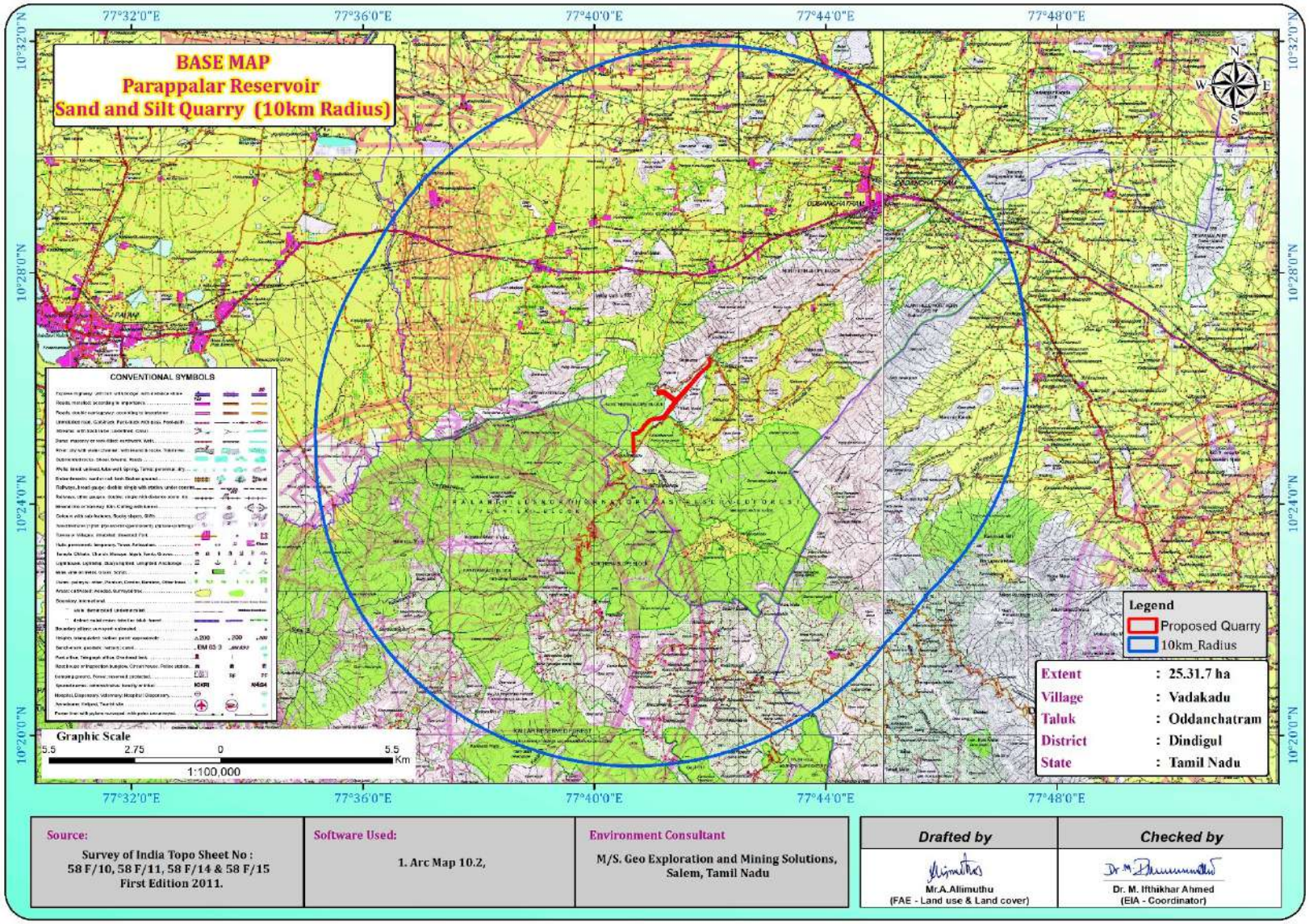


FIGURE – 4: QUARRY LEASE PLAN & SURFACE PLAN

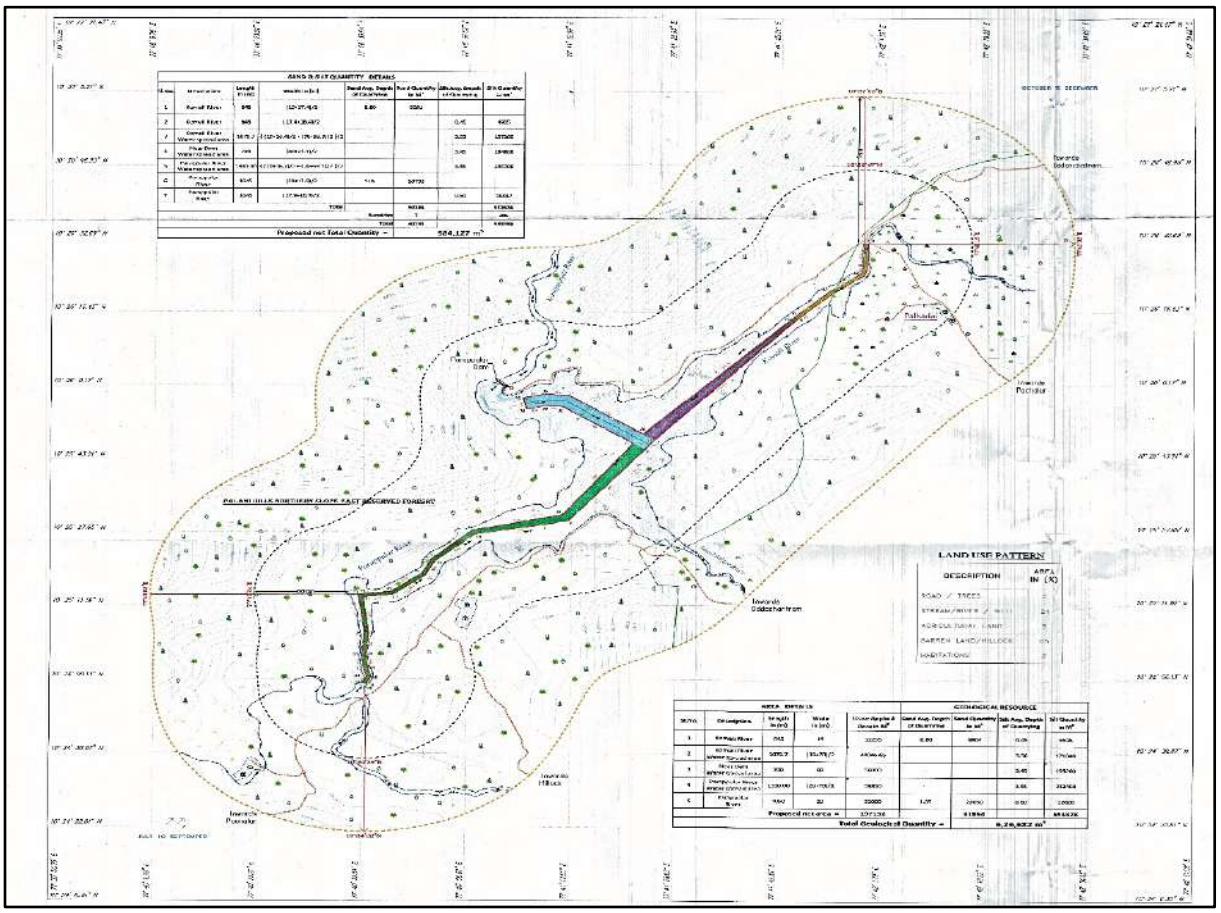
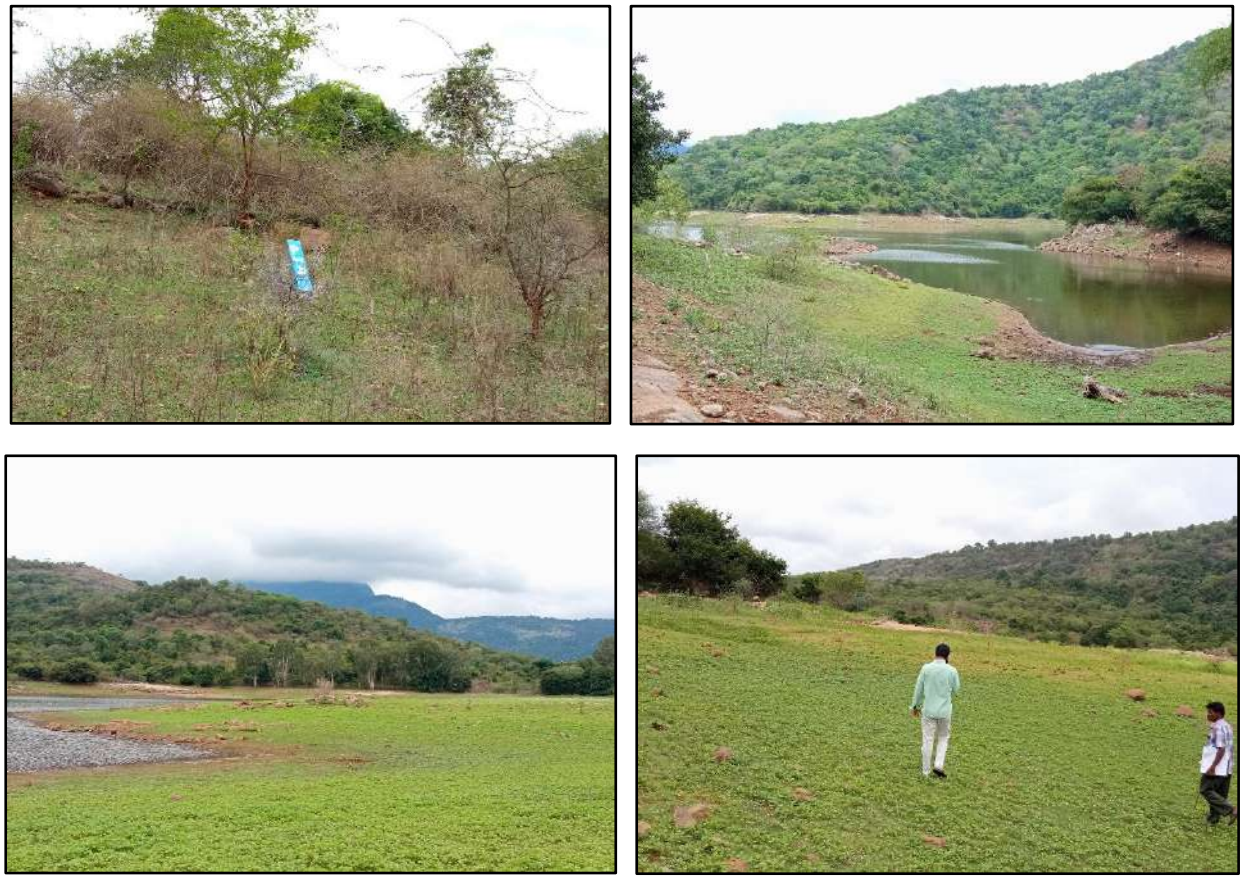


FIGURE –5 : PHOTOGRAPHS OF THE PROJECT AREA



2.4 METHOD OF MINING

Opencast method of shallow mining is proposed. Initially to approach the proposed site a temporary road will be formed by using of Gravel mixed with bio-degradable materials and formed a grit around the sand desilting site to move the vehicles easily. During forming the approach road and grit, necessary temporary pipes will be provided wherever necessary for free flow of water to downstream. After forming this approach roads, the trucks/ lorries are allowed for transportation after paying the necessary fees to the Government bodies. In this process contract labours from neighbouring villages are engaged for the purpose of maintaining the approaches. Regulating the vehicle movements, assisting to take levels, issuing of permits etc., to regulate the desilting operation in a scientific and systematic manner. The sand will be loaded directly to the trucks / Lorries for transportation to the needy customers and the Silt will be directly loaded to the trucks / Lorries for transportation to the nearby Farmers for Agriculture purpose with free of cost. Hence, no mineral processing is involved.

The trucks are loaded by excavators in direct supervision of the Assistant / Junior Engineers Public Works Department. The competent statutory mines foreman will also be deployed for the safety movement of vehicles inside the quarry.

After that the loaded vehicles are allowed to go out only after covering the sand and silt load properly by tarpaulin to avoid any spillage.

2.3 PROPOSED MACHINERY DEPLOYMENT

Sl.No.	Machinery	Numbers of Units	Capacity	Make	Motive Power
1	Excavator attached with bucket	2	0.90m3	TATA Hitachi	Diesel Drive
2	Tipper	10	10/20 tons	Tata	Diesel Power

2.5 CONCEPTUAL MINING PLAN/ FINAL MINE CLOSURE PLAN

The sand and silt deposit are soft & fragile in nature and occurring as a thin layer of around 3.56m thick. The maximum depth of mine working will be 3.56 meters. The quarried out sand will be directly loads into tippers to the needy customers and silt will be distributed to the neighbouring farmers for their agriculture purpose with free of cost. It is proposed to mine entire sand and silt reserves in 5 years Life of Mine.

2.6 ULTIMATE PIT DIMENSION

Section	Max.Length (m)	Max.Width (m)	Average Depth (m)
X1Y1-AA’	645	19	1.25
X2Y2 -BB’	1079.7	70	3.56
X3Y3-CC’	700	80	3.45
X4Y4-DD’	1330	70	3.55
X5Y5-EE’	1045	20	1.65

3.0 DESCRIPTION OF THE ENVIRONMENT

Field monitoring studies to evaluate the base line status of the project site were carried out covering March 2022, April 2022 & May 2022 as per CPCB guidelines. Environmental Monitoring data has been collected with reference to proposed mine by CHENNAI METTEX LAB PRIVATE LIMITED LABORATORIES Approved by AAI, AGMARK, APEDA, BIS, EIC, FSSAI, GAFTA, IOPEPC, MOEF & TEA BOARD

3.1 ENVIRONMENT MONITORING ATTRIBUTES

Attribute	Parameters	Frequency of monitoring	No. of locations	Protocol
Land-use	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 Characteristics	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	5 (2 surface water & 3 ground water)	IS 10500& CPCB Standards
Meteorology	Wind Speed Wind Direction Temperature Cloud cover	1 Hourly Continuous Mechanical/Automatic Weather Station	1	Site specific primary data& Secondary Data from IMD Station

	Dry bulb temperature Rainfall			
Ambient Air Quality	PM_{10} $PM_{2.5}$ SO_2 NO_X CO	24 hourly twice a week (March – May 2022)	8 (2 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 (2 core & 6 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.

Source: On-site monitoring/sampling by Chennai Mettex Lab Private Limited Laboratories in association with GEMS
* All monitoring and testing are been carried out as per the Guidelines of CPCB and MoEF & CC.

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 3.2: Land Use / Land Cover Table 10 Km Radius

S.No	Classification	Area_ha	Area_%
	Builtup		
1	Urban	836.22	2.11
2	Rural	243.96	0.62
3	Mining	134.70	0.34
	Agricultural Land		
4	Crop Land	13932.07	35.14
5	Plantation	7109.56	17.93
6	Fallow Land	841.83	2.12
	Forest		
7	Evergreen/Semi Evergreen	2739.98	6.91
8	Deciduous	6459.21	16.29
9	Forest Plantation	3657.03	9.23
10	Scrub Forest	237.87	0.60
	Barren/Waste Lands		
11	Scrub Land	3153.02	7.95
12	Barren Rocky	62.40	0.16
	Wetlands/ Water Bodies		
13	Water Bodies/River/Lake	233.89	0.59
Total		**39641.73**	**100.00**

The area falls in the Vadakadu Village of Oddanchatram Taluk, Dindigul District. Total land required for the project is 25.31.7 ha and the area is devoid of major vegetation

Land use refers to "man's activity and the various uses which are carried on land." Land Cover refers to "natural vegetation, water bodies, rock/ soil, artificial cover and others resulting due to land transformation.".

3.3 SOIL ENVIRONMENT

It is observed that the pH ranges from 8.10 to 8.32 and found to be strongly alkaline in nature. The soils collected from different location in the study area are Clay, Sandy loam and Clay loam in texture. Water holding capacity was found between 44.0- 53.8 %.

The soils with low bulk density have favourable physical conditions whereas those with high bulk density exhibit poor physical conditions for agriculture crops. The bulk density of the soil in the study area ranged between 1.15 – 1.26 g/cc. Organic carbon and available nitrogen shows good trend and is suitable for plantation. The fertility of the soil is medium, even though it supports growth of the vegetation.

3.4 WATER ENVIRONMENT

The water resources, both surface and groundwater play a significant role in the development of the area. Selected water quality parameters of surface and ground water resources in the study area have been studied for assessing the water environment and evaluate anticipated impact on continuation of the mining project. Understanding the water quality is essential in preparation of Environmental Impact Assessment Report and to identify critical issues with a view to suggest appropriate mitigation measures for implementation. The purpose of this study is to assess the water quality characteristics for critical parameters and evaluate the impacts on agricultural productivity, domestic community usage, recreational resources and aesthetics in the vicinity. The water samples were collected and transported as per the norms in pre-treated sampling cans to laboratory for analysis.

Surface water

The applied area is located in Parappalar Reservoir and it was formed across Parpappalar river and tributary of Amaravathi River. The 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, trenches is in practice over the area and the stored water acts as source of freshwater for couple of months after rainy season.

Ground water

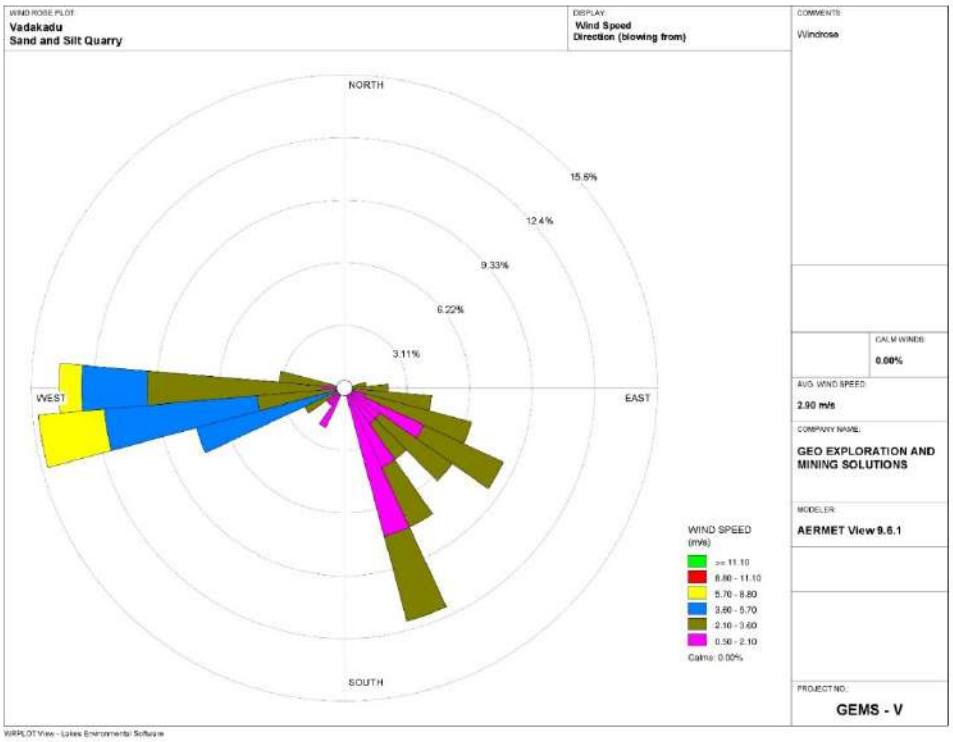
Dindigul district is underlain entirely by Archaean Crystalline formations with Recent alluvial deposits occurring along the river and streams courses and colluvium of valley-fills. The important aquifer systems in the district are constituted by weathered, fissured and fractured crystalline rocks and the recent alluvial deposits.

Ground water occurs under phreatic conditions. The maximum saturated thickness of these aquifers is upto 5 m depending upon the topographic conditions. The study area falls in the Karur which is categorized as Safe (< 70%) as per G.O (MS) No 113 dated 09.06.2016.

3.5 AIR ENVIRONMENT

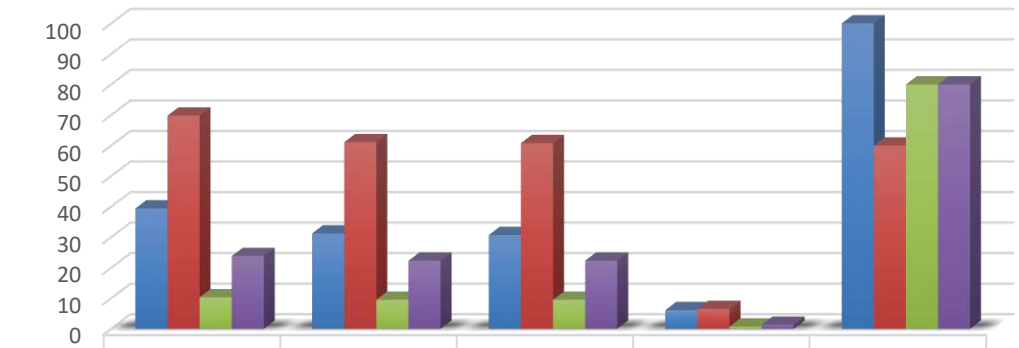
The baseline studies on air environment include identification of specific air pollution parameters and their existing levels in ambient air. The ambient air quality with respect to the study zone of 10 km radius around the proposed quarry forms the baseline information.

FIGURE – 6: WIND ROSE DIAGRAM



3.6 SUMMARY OF AMBIENT AIR QUALITY

The results of ambient air quality monitoring for the period (March to May 2022) are presented in the report. Data has been complied for three months.



	98th Percentile Value	Arithmetic Mean	Geometric Mean	Standard Deviation	NAAQ Norms*
PM10	39.4	31.2	30.7	6.1	100
PM2.5	69.8	61.1	60.8	6.5	60
SO2	10.3	9.5	9.5	0.7	80
NO2	23.8	22.3	22.3	1.3	80

As per monitoring data, PM_{10} is ranges from 50.1 µg/m^3 to 69.9 µg/m^3, $PM_{2.5}$ data ranges from 20.0 µg/m^3 to 39.9 µg/m^3, SO2 ranges from 8.7 µg/m^3 to 10.3 µg/m^3 and NO_2 data is ranges from 20.0 µg/m^3 to 23.8 µg/m^3. 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. Minimum and maximum noise levels recorded in core zone during day time were from 61.8 – 64.2 dB (A) Leq and during night time were from 49.7 – 51.3 dB (A) Leq. Minimum and maximum noise levels recorded in buffer zone during day time were from 49.7 – 51.4 dB (A) Leq and during night time were from 39.2 – 41.7 dB (A) Leq. Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

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 30 persons to the local people there by improving the indirect employment opportunity in the area were around 15 persons 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 sand and silt quarry Extent is 25.31.7 ha, the project area is Government Land maintained by Public Works Department, WRD, Nanganjiyaru Basin Division, Palani. The ultimate depth of the proposed project is quarrying is varying from 3.56m below the ground level and will not intersect the ground water table. The project is site specific.

MITIGATION MEASURES

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

* Excavated pits will get replenished annually in monsoon itself & will be restored to original.

4.2 WATER ENVIRONMENT

The mining in the riverbed area may cause the ground water contamination due to intersection of the water table. Change in topography will divert the river flow.

MITIGATION MEASURES

The quarrying operation is restricted well above the water table. The water table will not be intersected during mining in the riverbed. There is no proposal of any stream modification/diversion due to this mining activity hence there will be no any impact on flow of the river.

4.3 AIR ENVIRONMENT

Quarrying Operations will be to carried out by opencast method without involving drilling and blasting, dust particles are generated only due to Excavation, Loading, handling of mineral and transportation. The air quality in the study area depends upon the nature and concentration of emissions and meteorological conditions. Prediction of impacts on air environment has been carried out taking into consideration proposed production of 5,53,936m^3 of sand and 30,191m^3 of silt on air environment and net increase in emissions by Open pit source modeling in AERMOD Software.

The major air pollutants due to mining activity includes:-

* Particulate Matter (Dust) of various sizes.
* Gases, such as, Sulphur Dioxide, Oxides of Nitrogen, Carbon Monoxide etc., from vehicular exhaust.
* Dust is the single air pollutant observed in the open cast mines. Diesel operating vehicles produce NO_X, SO_2 and CO emissions, usually at low levels. Dust can be of

significant nuisance surrounding land users and potential health risk in some circumstances.

ANTICIPATED IMPACT

Mining Operations are carried out by opencast mechanized mining, the fugitive dust and air borne particulate matter generated during mineral excavation and transportation.

The emissions of Oxides of Nitrogen (NO_X) & Sulphur dioxide (SO_2), contributed by diesel operated excavation/loading equipment and vehicles plying on haul roads are marginal.

Prediction of impacts on air environment was carried out taking into consideration proposed production and net increase in emissions.

The major air pollutants due to mining activity includes:-

- Fugitive dust and Particulate Matter of various sizes.
- Gases, such as, Sulphur Dioxide, Oxides of Nitrogen, Carbon Monoxide etc., from vehicular exhaust.

Fugitive Dust is the major air pollutant observed in the open cast mines. Diesel operating drilling machines, small amount of blasting and movement of machinery/ vehicles produce NO_X, SO_2 and CO emissions, usually at low levels.

Anticipated incremental concentration due to this quarrying activity and net increase in emissions due to quarrying activities within 500 meters around the project area is predicted by Open Pit Source modelling using AERMOD Software.

MITIGATION MEASURES

In the study area adequate control measures will be implemented at the time of quarrying operation. Mitigated measures suggested for air pollution controls are based on the baseline ambient air quality of the area. From the point of view of maintenance of an acceptable ambient air quality in the region, it is desirable that air quality is monitored on a regular basis to check compliance of standards as prescribed by regulatory authorities. In case of non-compliance, appropriate mitigated measures need to be checked.

The following additional measures will also be adopted such as:

- Water sprinkling on haul roads, service roads will help in reducing considerable dust pollution
- Closed Cabins with AC for shovel and dumpers and dust masks to workers will be provided
- Weekly maintenance of quarrying equipment's will be carried out
- Transport of sand and silt in trucks covered with tarpaulin.
- Information on wind direction and meteorology will be considered while planning, so that pollutants, which cannot be fully suppressed by engineering technique, will be prevented from reaching the nearby agriculture area.
- Comprehensive green belt in the river bund will be carried out to reduce to propagation of fugitive dust emissions in order to create clean and healthy environment.
- The vehicles and machinery will be kept in well maintained condition so that emissions will minimize

* PPE will be provided to all workers
* Regular health check–up of workers and nearby villagers in the near vicinity of the project area will be carried out and also yearly occupational health assessment of employees will be carried out as per DGMS Guidelines.
* Ambient Air Quality Monitoring will be conducted on half-yearly basis to assess the quality of ambient air.

4.4 NOISE ENVIRONMENT

ANTICIPATED IMPACT

In order to assess the baseline noise levels, impact of noise assessment around the project site and on the nearby settlements have been carried out exclusively and objectively in the core and buffer zone covering 10km radius in 8 locations. Following are the sources of noise in this project are generated during excavation, loading and transportation of mineral. These activities will not cause significant impact to the inhabitants of this area because there is no human settlement in close proximity to the project area.

MITIGATION MEASURES

* Provision of earplugs to workers exposed to high noise generating activities. Workers and operators at work site will be provided with earmuffs
* Development of thick green belt around mining area and haul roads to reduce the noise
* Conducting periodical medical checkup of all workers for any noise related health problems.
* Proper training to personnel to create awareness about adverse noise level effects
* Periodic noise monitoring at suitable locations in the mining area and nearby habitations to assess efficacy of adopted control measures

4.5 BIOLOGICAL ENVIRONMENT

ANTICIPATED IMPACT AND MITIGATION MEASURES

* To reduce the adverse effects on flora/fauna status of the area due to deposition of dust generated from mining operations, water sprinkling systems will be installed in all dust prone areas to arrest dust generation. Methodical and well-planned plantation scheme will be carried out
* The river bund will be utilized for Greenbelt development with native species like Neem, coconut, Pungam etc.,
* Development of dense poly-culture plantation using local flora species in the mining area at conceptual stage.
* There’s no breeding/ nesting sites of birds and animals in the nearby areas

To control the dust deposition in the nearby lands and vegetation, water will be sprinkled in the haul road, approach road and dust prone areas.

Systematic plantation will be carried out in the phased manner in every year. Three tier plantations will be carried out to arrest the dust.

Objective of the greenbelt development:-

* Noise abatement
* Prevention of soil erosion
* Ecological Restoration

Year	Plantation Area	Proposed number of trees	Proposed Species
I	Approach road and village roads	100	Neem, Thespesia popilnea and pungamia pinnata,etc.,
II		100	
III		100	
IV		100	
V		100	
Total		**500**	

Source: Approved Mining plan

Plantation Programme:-

Greenbelt programme in the safety barrier:-

* Suitable Green cover with minimal maintenance
* Trees with high foliage density, leaves with larger leaf area
* Easy, quick early growth and establishment

4.6 SOCIO ECONOMIC ENVIRONMENT

- The socio-economic impacts of quarrying operation are many. Impacts of a mine project may be positive or Negative. The adverse impacts attribute to physical displacement due to land acquisition, which is followed by loss of livelihood, mental agony, changes in social structure, and risk to food security etc.,
- The villages and their inhabitants in the buffer zone will not be disturbed from their settlements due to the mining operations. There is no habitation within the project area and within the radius of 500m from the periphery of the project site.
- Therefore, neither villages nor any part of village or any hamlet will be disturbed during the short period of the mine.
- This quarry project will provide job opportunities to 30 workers directly and 15 workers indirectly. Employed for mining work earning wages as per the minimum wages act applicable for un-skilled, semi-skilled and highly skilled categories.

5 ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

The mining project is site specific and no alternate sites are proposed. Consideration of alternatives to a project proposal is a requirement of EIA process. There is no ore beneficiation, mineral processing proposed in the project. The entire quarried out sand will be directly located tippers needy customers and silt will be distributed to the neighboring Farmers for their agriculture purpose with free of cost.

No workshops, housing, colonies are proposed within the project area. The workers are being employed from the nearby community/ villages; hence, there is no impact on selection of alternates.

6. ENVIRONMENT MONITORING PROGRAM

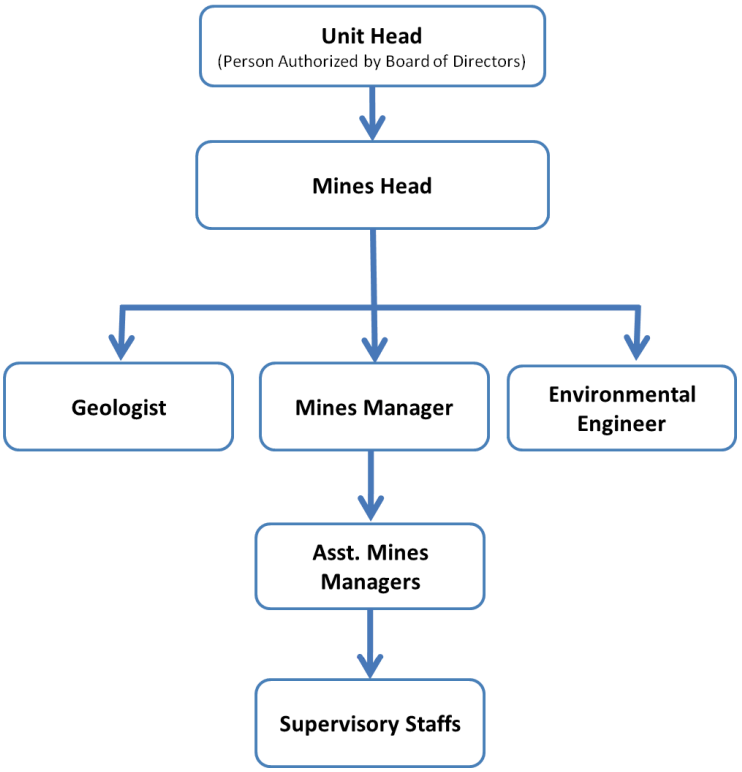
Usually an impact assessment study is carried over short period of time and the data cannot bring out all variations induced by natural or human activities. Hence regular monitoring program of Environmental parameters is essential to take into account the changes in the Environment.

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

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 & 1Buffer)	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 (1Core & 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

TABLE 7.1 CUMULATIVE IMPACT STUDY

PROPOSED QUARRIES				
CODE	**Name of the Owner**	**S.F. Nos**	**Extent**	**Status**
P1	The Executive Engineer, PWD/WRO, Naganjiyar Basin Division, Palani Taluk, Dindigul District.	S.F.No.225, 226 and 227	25.31.7 ha	ToR obtained vide : Lr.No.SEIAA-TN/F.No.8788/SEAC/ToR-1062/2022 Dated:7.02.2022
TOTAL			**25.31.7 ha**	
EXISTING QUARRIES				
CODE	**Name of the Owner**	**S.F. Nos& Village**	**Extent**	**Lease Period**
Nil				
TOTAL				
CODE	**Name of the Owner**	**S.F. Nos& Village**	**Extent**	**Lease Period**
Nil				
TOTAL CLUSTER EXTENT			**25.31.7 ha**	

TABLE 7.1 SALIENT FEATURES OF PROPOSAL "P1"

DESCRIPTION	DETAILS
Name of the project	Parappalar Reservoir Sand & Silt Quarry
Name of Mineral	Sand and Silt
S.F. No's and Village	S.F.No 225, 226 and 227, Vadakadu Village
Extent	25.31.7 ha
Classification of Land	Government Land Maintained by Public Works Department WRD, Nanganjiyar Basin Division, Palani
Taluk	Oddanchatram
District	Dindigul
State	Tamil Nadu
Latitude Between	10°24'53.62"N to 10°26'30.60"N
Longitude Between	77°40'39.56"E to 77°42'00.28"E
Toposheet No	58- F/11
Topography of the area	The topography of the area is undulated topography having gentle slope towards western side. Highest Elevation between: 542m to 554m AMSL
Life of Mine	5 years
Geological Reserves	6,26,683m^3 of ROM 31,854m^3 of Sand and 5,94,829m^3 of Silt
Mineable Reserves	5,84,127m^3 of ROM 30,191m^3 of Sand and 5,53,936m^3 of Silt
Yearwise Production (5 Years)	5,84,127m^3 of ROM 30,191m^3 of Sand and 5,53,936m^3 of Silt
Mining Method	Opencast Mechanized Method of Mining without Drilling and Blasting
Proposed depth of mining for this plan period	3.56m below from the existing ground level

Ultimate Depth of Mining	Section	Max.Length (m)	Max.Width (m)	Average Depth (m)
	X1Y1-AA'	645	19	1.25
	X2Y2 -BB'	1079.7	70	3.56
	X3Y3-CC'	700	80	3.45
	X4Y4-DD'	1330	70	3.55
	X5Y5-EE'	1045	20	1.65
Employment Potential	30 Nos			
Ground Water Level	13m – 18 m BGL			
Ground Water Table Intersection	Quarrying operation will be carried out well above the ground water table, hence ground water will not be affected by proposed mining.			
Drainage Pattern	The drainage pattern of the area is dendritic.			
Water Requirement & Source	Total water requirement for dust suppression, Greenbelt and drinking is 4.0 KLD. Water will be sourced from nearby villages by water tankers and drinking water will be sourced from approved water vendors.			
500m Radius Letter from the Assistant Director, Dindigul District	Existing Quarries - Nil Expired/Abandoned Quarries - Nil Proposed Quarry - 1 No (25.31.7ha)			
Project Cost	**Rs 41,25,000 /-**			

8. PROJECT BENEFITS

Parappalar Reservoir Sand & Silt Quarry aims to produce 5,84,127m^3 of Sand & Silt for a period of 5 years. This will enhance the socio-economic activities in the adjoining areas. The enhancement of production will result the following benefits

- Improvement in Physical Infrastructure.
- Improvement in Social infrastructure.
- Increase in Employment Potential.
- Revenue to Both Central Govt. & State Govt.
- Post mining Enhancement of Green cover.
- Supply – Demand chain of cement will be maintained without demand to the state.

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