

ENVIRONMENT MANAGEMENT PLAN

1. INTRODUCTION

The Environmental Management Plan (EMP) has been formulated and integrated with the mine planning to mitigate the adverse impacts which are likely to be caused due to the quarrying operation.

2. QUARRYING PROCESS

Open cast, Mining would be carried out by opencast semi-mechanized method. Excavation of sand by using hydraulic excavator into the tipper and partly manual method using hand shovel and load into Bullock Cart, As the sand is loose granular material, it does not require any drilling.

2.1 PRODUCTION DETAILS

Total production of sand is 33,155 m³ including shoal portion. The average production is about 221 m³ /per day.

3. MANPOWER REQUIREMENT

The manpower requirement for the proposed project will be around 42. This includes manpower for excavation, maintenance as well as loading of minerals.

4. BASELINE ENVIRONMENT

The EMP has been developed considering its implementation and monitoring of environmental protection measures during quarrying operations. Baseline study was carried out during 10.12.2020.

ENVIRONMENT MANAGEMENT PLAN

There would not be any adverse impact in the existing environment arising from this mining activity. To protect the environment, the proponent would do adequate afforestation program and spend CER @ 2% of the project cost and CSR at a rate of 2.5% of the profit through local Panchayat for the welfare of Oriyur Village.

TABLE NO: 2: ENVIRONMENT MANAGEMENT PLAN

S.No	Parameters	Mitigation Measures
1	Water Environment	<ul style="list-style-type: none">▪ Mining activity will be above the ground water level and hence ground water table will not be affected.▪ Drinking water utilized from Mineral water industries▪ Total Water requirement will be 5.0 KLD
2	Air Environment	<ul style="list-style-type: none">▪ Water sprinklers along the sides of haul road shall be

		<p>fixed to control fly of dust while transporting minerals and waste</p> <ul style="list-style-type: none"> ▪ Avenue trees along roads around ML boundary shall be planted as per the norms of MoEF&CC to control fly of dust, noise etc. ▪ Labours engaged in such dust prone areas should be provided with safety devices like ear muff, mask, goggles as per the MMR, 1961 amendments and circulars of DGMS.
3	Noise Environment	<ul style="list-style-type: none"> ▪ This eco-friendly quarrying operation does not involves any blasting and drilling methods. Hydraulic excavator is less than 80db. ▪ Hence noise will be minimal and this is only due to the movement of Excavator and trucks. ▪ Plantation will help in arresting noise at source ▪ Periodical monitoring of noise and vibration to ensure safety environment for workers.
4	Soil Environment	<ul style="list-style-type: none"> ▪ Humus top soil shall be preserved for reuse in afforestation and agriculture.
5	Land Environment	<ul style="list-style-type: none"> ▪ By permitting quarrying of sand from this silted bed can be deepened and it will enable to increase the water holding capacity of the tank. ▪ Greenbelt will be developed around the mine lease boundary
6	Ecology and Biodiversity	<ul style="list-style-type: none"> ▪ No rare species of flora and fauna identified except regional common species.
7	Waste Management	<ul style="list-style-type: none"> ▪ There is no wastage is encountered during the quarrying operation the entire quarry is utilized.
8	Occupational Health and Safety	<ul style="list-style-type: none"> ▪ Workers involved in quarrying work shall be provided protective equipments such as Thick Gloves, Goggles, ear plugs, safety boot wears, etc... ▪ First Aid station as per provision under Rule (44) – schedule III of the Mines Rules 1955 to be provided. ▪ Qualified First Aid personnel should be appointed /nominated to attend emergency first aid treatment. ▪ Periodic medical examination has to be made for occupational health once in six months in addition to

		attending medical treatment of occupational injuries under Rule 45 (A).
9	CSR Activities	<ul style="list-style-type: none"> The proponent is proposed to spend CSR @ 2.5% of profit as per the Companies Act, 2013 and CSR Rules, 2014 through local Panchayat for maintenance of road, street light, school sanitation etc., The CER will be @ 2% of the project cost.

NOISE AND VIBRATION

Major noise generating sources may be considered as excavation, drilling blasting, loading and vehicle movement during transportation of minerals. With the starting of quarrying operations, it is imperative that noise levels shall increase. In order to assess the impact baseline ambient noise level, noise monitoring has been carried out at different points using Sound level meter



Fig.2: Image showing Measuring Noise Level

TABLE: NO: 3 AMBIENT NOISE LEVELS

S. No	Location	Noise levels dB (A)	Limits as per TNPCB dB(A)
			(Day Time: 6:00 AM – 10:00PM)
1	Core zone	41.8	Industrial – 75db (A) Residential – 55dB (A)
2	At Pillars lease boundary	37.7	
		42.1	


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		35.7	
		37.4	

- The noise level found to be within the limits as per TNPCB Standards. Being manual mining the noise pollution is very minimal level.

i. Mitigation Measures

- Greenbelt will be developed around the mine lease as well as safety zones which will help in arresting noise at source
- Safety devices provided to workers, where noise is more than 80dB (A)

AIR ENVIRONMENT

Drilling and blasting operations are source of fugitive dust emission but its effect is more or less localized. Ambient Air monitoring has been carried out in the core zone.



Fig: No: 3: Ambient Air Monitoring

The major part of the dust generated during such operations usually gets settle down and thus the effect of such operation will be localized phenomenon.

S. Pragasam
14/02/22
Executive Engineer, WRD.,

TABLE: NO: 4 AMBIENT AIR QUALITY MONITORING

S. No	Parameters ($\mu\text{g}/\text{M}^3$)	Measured Value	NAAQS
1	Particulate Matter ($\text{PM}_{2.5}$)	33	60
2	Respirable Particulate Matter (PM_{10})	47	100
3	Sulphur Dioxide (SO_2)	8	80
4	Nitrogen Dioxide (NO_2)	15	80
5	Ozone (O_3)	26	180
6	Lead (Pb)	BDL (DL=0.1)	1
7	Carbon Monoxide (CO) 1 hour	BDL (DL=1.17)	4
8	Ammonia (NH_3)	28	400
9	Arsenic (As)	BDL (DL=1.0)	6
10	Nickel (Ni)	BDL (DL=0.1)	20
11	Benzene (C_6H_6)	BDL (DL=0.1)	5
12	Benzo (a) Pyrene	BDL (DL=0.1)	1

BDL = Below Detectable Limit, DL = Detection Limit
NAAQS = National Ambient Air Quality Standards

The above results comply with NAAQS. The generation of dust is controlled and suppressed at source by sprinkling of water on haul roads, loading points at regular intervals as shown below.

i) Mitigation Measures

- Water sprinklers along the sides of haul road shall be fixed to control fly of dust while transporting minerals and waste.
- Labours engaged in such dust prone areas should be provided with safety devices like ear muff, mask, and goggles as per the MMR, 1961 amendments and circulars of DGMS.

SOIL CLASSIFICATION

Soils in the area have been classified into i) Black Clayey soil, ii) Sandy soil and iii) Red – ferruginous soil.

In the Ramanathapuram district, majority of the area is covered by Black Clayey soil type. These soils are mostly black or black to brownish in colour and are found in parts of Ramanathapuram, Paramakudi, Kamuthi, Tiruvadanaï and Mudukulathur blocks. Sand occur in flat elevation along the Rameshwaram and Kadaladi blocks, Alluvial soils occur along the river courses of Vaigai and Gundar river covering in the blocks Paramakudi, Tiruvadanaï and Muthukulayhur. The Red ferruginous soil of the Chettinad plains occurs as few pockets around Paramakudi and Tiruvadanaï blocks.

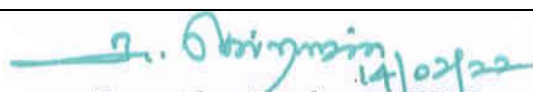


Fig No-4. Collection soil Sample

TABLE NO:5: SOIL TEXTURE ANALYSIS

Physical Parameters

S. No	Parameters	Unit	Result
1.	Texture	-	Sand -64% Silt -28% Clay -8% “SANDY CLAY LOAM”
2.	Bulk Density	g/cc	1.50
3.	pH	-	8.48
4.	Electrical Conductivity	µmho/cm	131
5.	Moisture	%	0.10
6.	Water Holding capacity	%	44


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CHEMICAL PARAMETERS

S. No	Parameters	Unit	Result
7.	Calcium	mg/kg	0.16
8.	Calcium Carbonate	mg/kg	82.5
9.	Chloride	g/100g	16.33
10.	Organic Matter	g	13.66

WATER ENVIRONMENT

Quarrying does not have any significant impact on the water quality, as the neither quarrying nor intercept with the ground water level neither there is any surface water body near the site.

TABLE: NO: 6 WATER QUALITY ANALYSIS- SAMPLE
Physical and Chemical Properties of Ground water sample

S.No	Parameters	Units	Results	Limits
1.	Acidity as CaCO ₃	mg/l	10	2mg/l to 1000mg/l
2.	Bicarbonate	mg/l	26.3	1mg/l to 5000mg/l
3.	Calcium as Ca	mg/l	45.87	0.4mg/l to 2000mg/l
4.	Carbonate	mg/l	39.45	1mg/l to 5000mg/l
5.	Chloride as Cl ⁻	mg/l	56.666	1mg/l to 5000mg/l
6.	Electrical Conductivity(EC)	μS/cm	459	0.1μS/cm to 50000μS/cm
7.	Magnesium as Mg	mg/l	10.60	0.4mg/l to 1000mg/l
8.	pH	-	7.41	8.05 ± 0.011
9.	Total Alkalinity as CaCO ₃	mg/l	65.75	1mg/l to 1000mg/l
10.	Total Dissolved Solids (TDS)	mg/l	138	500mg/l to 2000mg/l
11.	Total Hardness as CaCO ₃	mg/l	159.14	1mg/l to 5000mg/l
12.	Total Suspended Solids(TSS)	mg/l	0.012	2mg/l to 5000mg/l
13.	Turbidity	NTU	0.006	1 NTU to 100NTU

Micro biological examination

S. No	Parameters	Protocol	Unit	Result	Range
1	<i>Escherichia coli</i>	IS 5887 (Part 1): 1976	Per 100ml	Absent	Qualitative
2	Total Coliforms	IS 5401 (Part 2): 2012	Per 100ml	Absent	Qualitative




i. Mitigation Measures

- The quality of ground water is fairly good. There is no liquid waste discharge from quarrying activity, which is likely to pollute water.
- People already consuming this water for drinking purposes and no health implications reported.
- Total water requirement will be 5.0 KLD



Flora and Fauna

a)Flora

Table No.7.A List of Flora of the lease area



S. No.	Tamil /English Name	Botanical Name	Number of Trees	Photograph
1.	Vivasaaya Maram	Acasia bushes	Innumerable	
2.	Panai/ Palmyra tree	Borassus fiabellifer	Innumerable	
3.	Eechamaram/ Melaleuca Alternifolia	Sylvestries.	30	

G. Pringman
 14/02/22
 Executive Engineer, WRD.,

4.	Karuvelamaram	Prosopis juliflora	Innumerable	
5	Avaram poo	Cassia Auricuiata	Innumerable	

d) Herbs:

Table No.7.B List of Shrubs of the lease area

S.No	Tamil Name	Botanical Name	Number of Plants	Photograph
1.	Erukku Chedi	Calotropis Gigantea	Innumerable	
2.	koraipull	(coco-grass, <i>Cyperus rotundus</i>)	innumerable	

Fauna:

The fauna species may be found around the project site is given below,

a) Mammals:

Table No.8.A List of Mammals of the lease area

S.No.	Tamil & English Name	Zoological Name
1.	Keeri(Common Mongoose)	Herpestes edwardsii
2.	Anil (Three Striped Squirrel)	Funambulus palmarum
3.	Thavalai (Frog)	Cane toad

b) Avian Fauna:

Table No.8.B List of Avian Fauna of the lease area

S.No.	Tamil & English Name	Zoological Name
1.	Kalugu (<i>Black kite</i>)	Milvis migrans
2.	Myna (<i>Black drogue</i>)	Dicrurus macrocercus
3.	Kakka (<i>House crow</i>)	Corvus splendens
4.	Chittukuruvi (<i>Indian Robin</i>)	Saxicoloides fulicatus
5.	Parunthu(Brahminy Kite)	Haliastur indus


c) Butterfly/Insects:

Table No.8.C List of Butterfly/Insects of the lease area

S.No.	Tamil & English Name	Zoological Name
1.	Theil (Scorpion)	Scorpiones
2.	Vannthupoochi (Millipedes)	Diplopoda

EIA GENERAL CONDITIONS

1. The area does not attract the Forest (Conservation) Act 1980,There is no reserve forest 10km radius.
2. Interstate boundary is located at 185km on western side between Tamil Nadu and Kerala border.
3. There is no wild animal sanctuary within 10Kms radius from the project site area under the Wildlife (Protection) Act, 1972.
4. The proposed quarry is located 7.5km away from Bay of Bengal on Eastern side.
Hence, the project doesn't attract the C.R.Z. Notification, 1991


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OTHER PERMANENT STRUCTURES

1. Habitations / Village:

Population of Oriyur village 5065, it is small village in Thiruvadanai Taluk and Ramanathapuram District. Other Village hamlets were given in the following table,

Table No.9. Human settelement

Direction	Name of Village	Distance from Mines in Km (Approx)	Population
South	oriyur	1.3	5065
NorthWest	Sirugambaiyur	0.6	1726
West	Chittamangalam	2.9	358
East	Kannamangalam	1.5	1306

2 Power Lines (HT / LT): There is no HT or LT lines is found nearby.

3 Water Bodies: The site itself is a river bed.

4 Archaeological / historical monuments: There is no archaeological monument.

5 Road (NH, SH others):

1. Nearest NH is NH210, connecting Ramanathapuram- Trichirappalli, located about 17.9km on SW side.

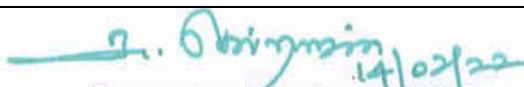
2. Nearest SH is SH 33, connecting Madurai – Thondi, located about 14km on south side.

3. MDR Puliyur road is situated about 4.5 km on southwestern side.

4. Village road is located about 500m on western side.

6 Places of worship: Nil

7 Reserved forest / Forest / Social forest / wild life sanctuary etc: Nil


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8 Any other structures: Nil


No quarry is found around 500m radius. The quarry lease area does not attract the general conditions as per EIA Notification, 2006.

The project cost is about Rs. 5.0Lakhs and EMP cost is Rs. 4.0 Lakhs.

Signature of Project Proponent

Signature of EIA- Coordinator

Along with signature


Executive Engineer, WRD.,
Mining and Monitoring Division,
Madurai

For Aadhi Boomi Mining &
Enviro Tech (P) Ltd.

Director

The Executive Engineer

(S.Suriyakumar)

Project Proponent

M.Sc., M.Phil, F.C.C. (Min)

Public Works Department,

PGDBA, DIPC

Water Resources Organization,

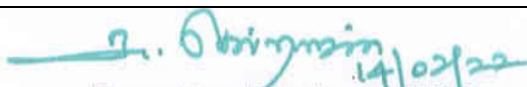
EIA Co-ordinator (Mining)

Mining and Monitoring Division,

Madurai- 625 002

Date : 14.02.2022

Place : Salem


Executive Engineer, WRD.,