

Executive Summary
Of
Draft Environmental Impact
Assessment/Environmental Management Plan

For

**Proposed Granite/Building Stone Quarry of Mr. Gowtham Vattappara
Pavithran, Director, M/s Crown Aggregates (P) Ltd.
For Lease Area of 3.8446 ha**

**At Pazhayannur Grama Panchayath,
Survey No.- 1830 (Part), 1837 (Part), 1884 (Part), 1855 (Part), 1886 (Part),
Pazhayannur Village,
Thalapilly Taluk,
Thrissur District
of
Kerala State**

APPLICANT

**M/s Crown Aggregates (P) Ltd.
Director, Mr. Gowtham Vattappara Pavithran
Address- Vellapara Estate Enclave, Ward XVII, BLDG, No. 317, Pazhayannur,
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Executive Summary

1.1 Introduction

The lease of Granite Building stone quarry is situated near Village- Pazhayannur, Taluk- Thalapilly, District- Thrissur, State- Kerala for an area of 3.8446 Ha. The mining plan has been submitted as per Rule 58 for the proposed Granite Building Stone Quarry at Survey No. 1830 (Part), 1837 (Part), 1884 (Part), 1885 (Part), 1886 (Part) , Village- Pazhayannur, Taluk- Thalapilly, District- Thrissur, State- Kerala for an extent of 3.8446 ha.

Letter of Intent issued by Directorate of Mining and Geology, Thrissur, vide letter no.- 2093/M3/2016, dated 05.07.2016 to Mr. Gowtham Vattappara Pavithran, Director, M/s Crown Aggregates (P) Ltd.

EC Details- Sri Robin Jose Director M/s Crown Aggregates Private Limited, Pazhayannur Village, Thalapilly Taluk, Thrissur District had filed online application for environmental clearance for the Granite Building Stone Quarry Project of M/s Crown Aggregates Private Limited covering 3.8446 Hectares of land comprised in Survey Nos.- 1830/P, 1837/P, 1884/P, 1885/P, 1886/P of Pazhayannur Village Thalapilly Taluk.

Sri Robin Jose, Director, M/s Crown Aggregates (P) Ltd. has already received EC by DEIAA (District Environment Impact Assessment Authority) Thrissur, EC Letter No.- **1/2016/DEIAA**, dated- **31.05.2017**.

It is an old mining lease that lies in Toposheet of (C43K6 & C43K5). Mine plan was prepared by registered RQP Mr. C. J. Thanigaivel (RQP/MAS/045/88/A) of Department of Mining & Geology Govt. of Kerala. The mining plan was approved by Department of Mining & Geology Govt. of Kerala District office, Thrissur for the period of Fifteen (15) years, Vide Letter No.- 3109/C2/TDO/2016, dated 07.09/2016 for Mining of Granite Building stone of total production of 1,28,000 TPA from Granite Building Stone Quarry.

Mr. Gowtham Vattappara Pavithran, Director, M/S Crown Aggregates (P) Ltd.	Granite Building Stone Quarry at Survey No.- 1830 (Part), 1837 (Part), 1884 (Part), 1885 (Part), 1886 (Part), Village- Pazhayannur, Taluk- Thalapilly, District- Thrissur of State- Kerala for Lease Area of 3.8446 Ha.	EIA Report
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It is proposed to carry out opencast semi-mechanized mining operations in the building stone quarry, by developing benches of 5 m height and 6 m width. The quarrying operations is done by jack hammer drilling machine, blasting, rock breakers and excavators. The excavated material shall be transported to the crushing unit located near to the area and local usage as per demand. Estimated project cost is Rs. 75 Lakhs. The capacity of production is proposed to be 1,28,000 TPA and 14,22,895 Tons is the total production during the plan period. The expected life of mine will be 15 Years.

The proposed project is categorized under category 1 (a) – B1 category {Mining of Minerals} as the lease area attracts cluster condition and one mining lease of 2.8936 ha within the 500 meters of the lease of Mr. Gowtham Vattappara Pavithran, Director, M/s Crown Aggregates (P) Ltd., lease area 3.8446 ha.

1.1.1 Location of Lease Area

The proposed Granite Building Stone Quarry at Survey no. 1830 (Part), 1837 (Part), 1884 (Part), 1885 (Part), 1886 (Part) of Pazhayannur Village, Thalapilly Taluk, Thrissur District, Kerala State.

Granite Building Stone Quarry of M/s Crown Aggregates (P) Ltd.	
Name of Authorized Signatory/ Applicant	Mr. Gowtham Vattappara Pavithran
Designation/ Firm	Director
Correspondence Address	Vellapara Estate Enclave, Ward XVII, BLDG., No.317, Pazhyannur, Thrissur- 680587, Kerala
Contact Number	+919562225566
Email Id	gouthmecworks@gmail.com



Mr. Gowtham Vattappara Pavithran, Director, M/S Crown Aggregates (P) Ltd.	Granite Building Stone Quarry at Survey No.- 1830 (Part), 1837 (Part), 1884 (Part), 1885 (Part), 1886 (Part), Village- Pazhayannur, Taluk- Thalapilly, District- Thrissur of State- Kerala for Lease Area of 3.8446 Ha.	EIA Report
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1.1.2 Detail of Mining Lease

S. No.	Information	Details				
1.	Project Name	Building Stone Quarry Project				
2.	Project Proponent	M/S Crown Aggregates (P) Ltd. (P) Ltd Proponent- Director, Mr. Gowtham Vattappara Pavithran				
3.	Toposheet No.	C43K6 & C43K5				
4.	Altitude of the Area	Highest Point: 158 m MSL Lowest Point: 128 m (Average Depth- 57 m)				
5.	Project Coordinates	Co-ordinates of the project site				
		Pillars.	Lattitude	Longitude		
		1	10°40'26.9"N	76°24'13.5"E		
		2	10°40'26.1"N	76°24'20.9"E		
		3	10°40'26.0"N	76°24'21.9"E		
		4	10°40'28.6"N	76°24'22.5"E		
		5	10°40'30.7"N	76°24'22.7"E		
		6	10°40'31.0"N	76°24'21.5"E		
		7	10°40'31.5"N	76°24'17.4"E		
		8	10°40'31.4"N	76°24'14.4"E		
		9	10°40'29.3"N	76°24'14.1"E		
6.	Location	1830(Part), 1837(Part), 1884(Part), 1885(Part). 1886(Part).				
	Lease Hold Area	Proposed Area for Mining: 3.8446 ha , (Under Cluster Total area is 6.7382 ha)				
		Name of Owner of the Quarry project	Taluk	Village	Survey No.	Extent in Ha.
		Nila Metals Pvt. Ltd	Thalapilly	Pazhaya nnur P. O	1853/1, 1854, 1855, 1856, 1857, 1858, 1860/1	2.8936 ha
	Village	Pazhayannur				
	Taluk	Thalapilly,				
	District	Thrissur				
	State	Kerala				
7.	Category of the Project	Category: 'B-1'				
8.	Lease Status	New Mines, as per LOI vide letter no.- 2093/M3/2016 Dated- 05.07.2016 of the Director of Mining & Geology Thrissur of life of mines 15 Years and lease period is 12 years.				
9.	Topography of Mine lease area	The topography of the lease area and its surrounding is a part of elevated and undulated terrain with trees, bushes and shrubs. The				



<i>Mr. Gowtham Vattappara Pavithran, Director, M/S Crown Aggregates (P) Ltd.</i>	<i>Granite Building Stone Quarry at Survey No.- 1830 (Part), 1837 (Part), 1884 (Part), 1885 (Part), 1886 (Part), Village- Pazhayannur, Taluk- Thalapilly, District- Thrissur of State- Kerala for Lease Area of 3.8446 Ha.</i>	<i>EIA Report</i>
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S. No.	Information	Details
		lease area is hilly, the highest elevation of the lease area MSL 158.0 m and the lowest level 128.0 m (Average Depth: 57.0m).
10.	Mode of Mining	Opencast Semi Mechanized
11.	Name of the Mineral	Granites Building Stone
12.	Geological Reserves	27,44,453 Tons
13.	Mineable Reserves	14,22,895 Tons
14.	Capacity of Production	1,28,000 Tons per Annum
15.	Life of mine	15 Years
16.	Lease period	12 Years
17.	Drilling / Blasting	Yes (Drilling and Blasting will be done when required)
18.	Man Power Used	20
19.	Working days	300
20.	Land utilization Pattern	Grazing land.
21.	Project Cost	75 Lakhs
22.	Budgetary Provision for EMP	8.28 Lakhs
23.	CER Cost	8.0 Lakhs
24.	Water requirements and source	Water Requirement: 8.25 KLD of water will be used for the project site (Dust Suppression, Mine operation, Drinking, domestic use and sprinkling) Source: Potable tankers will be the source of the water.
25.	Power Requirement	Quarry operations are done only with diesel operated mining machineries and hence electricity is not needed. Power requirement for administrative building and other utilities is met from the KSEB power grid.
26.	Plantation	During the proposed area is 0.5963 ha shall be developed as green belt & 2250 saplings to be planted in the greenbelt area.
27.	Topsoil	There will be generation of Top Soil about 41,050 Tonnes during the operations of the Mine. The marginal waste generated shall be utilized for the road's repairs, soft spot filling, and backfilling and as base for plantation.
28.	Overburden	There will be generation 39,260 Tonnes During the operation of mine and overburden material will be stored and will be used for road levelling and refilling of mining pits.



1.2 Project Description

Semi-mechanized opencast mining will be applied on the stone quarry of Mr. Gowtham Vattappara Pavithran, Director, M/s Crown Aggregates (P) Ltd. The mining lease is spread over an area of 3.8446 ha. The proposed capacity of the project within a period of Fifteen (15) years will be 14,22,895 Tonnes for stone. The average number of working days in the year would be 300 days. The height of the bench will not be kept more than 5.0 m and the width of the benches will always be kept safe according to the provisions of MMR 1961.

Table 1.1: Land Use of lease area

Sr. No	Particulars	Existing period hectare	Plan period hectares	Conceptual period hectares
1.	Area under quarry pit	0	2.4758	3.1300
2.	Green belt /plantation	0	0.1987	0.5963
3.	Dump	0	0.1183	0.1183
4.	Rain harvesting pond	0	0	0
5.	Area for Future Use / Undisturbed	3.8446	1.0518	0
	Total	3.8446	3.8446	3.8446

Life of the Mine

Life of the Quarry = 15 Years

Lease Period = 12 Years

1.2.1 Mining & Method of Mining

Mining Method: Opencast, Semi-Mechanized Method.

1.2.1.1 Production for Five Years Plan Period

The production for the quarrying plan period of First 5 year is given below:

Year Wise	Production	Waste		Ratio (Production / Waste)
		Topsoil	Overburden	
I st year	1,27,980	6800	7200	1:0.10
II nd year	1,28,250	6850	7150	1:0.10
III rd year	1,26,900	6845	7180	1:0.11
IV th year	1,27,575	6900	7250	1:0.11
V th year	1,27,845	0	0	1:0.0

Year Wise	Production	Waste		Ratio (Production / Waste)
		Topsoil	Overburden	
Total	6,38,550	27,395	28,780	1:0.08

1.2.1.2 Machineries Used

a) For Mining b) Loading equipment c) Transportation inside the mine & to destination

Table 1.2: Machineries Used

S. No.	Equipment	Capacity	Units	Output/ hour
1.	Atlas Copco XA 280 compressors	100 PSI	2	
2.	Jack Hammers	32 mm	3	10 m/ hour
3.	Atlas Copco Hydraulic rock breaker	46 KW	1	80 t/ hour
4.	Water springier with tanker	---	1	---
5.	Tippers	20 t	6	---

1.2.1.3 Extent of Mechanization

Semi-mechanized opencast mining Method will be used in open excavation without affecting the ground water table.

1.3 Description of the Environment

For monitoring the environmental parameters like meteorology, air, water, soil and noise quality, the monitoring stations have been established in the study area. Additionally, four stations were selected for surface water sampling. The baseline data has been collected in the pre-monsoon season (**October 2024, November 2024, December 2024**). The detail of the sampling locations is given in below: -

Table 1.3: List of Monitoring Stations

S. No.	Locations	Distance (km)	Direction	Latitude	Longitude
Ambient Air quality, Noise quality, Ground Water and Soil sampling locations-					
1	Project site	-	-	10°40'27.37"N	76°24'17.71"E
2	Pazhayannur	1.70	E	10°40'42.32"N	76°25'17.82"E
3	Tarur Palli	7	E	10°40'18.01"N	76°28'14.36"E
4	Adakode	2.20	WSW	10°40'5.44"N	76°23'4.36"E
5	Potta	2.80	SE	10°39'37.21"N	76°25'32.29"E
6	Kallamkulam near SH-74	1.70	NW	10°41'20.84"N	76°23'47.35"E

7	Kumbalacode	1.60	SSW	10°39'36.77"N	76°23'57.13"E
8	Ramanchetti near Peechi- Vazhani Wildlife Sanctuary	4.20	S	10°38'14.18"N	76°24'5.11"E
Surface Water sampling locations-					
1	Gayathri Puzha- River Up stream	4	NE	10°42'23.98"N	76°25'27.19"E
2	Gayathri Puzha- River Down stream	3.50	N	10°42'26.99"N	76°24'32.44"E
3	Mangalam River Up stream	5.40	ESE	10°39'25.93"N	76°27'8.71"E
4	Mangalam River Down stream	4.80	E	10°40'18.75"N	76°27'1.10"E
5	Kulli Todu	7.20	W	10°41'21.85"N	76°20'18.97"E

1.3.1 Land Environment

1.3.1.1 Land Use

The land use pattern of the study area based on the latest satellite imagery is given below: -

Table 1.4: LULC Classes

S. No.	LU/LC Class	Area (ha)	Area (%)
1	Built-up Land	1143.98	3.55
2	Water Bodies	277.74	0.86
3	Sand	29.71	0.09
4	Forest Land	7408.31	23.01
5	Cultivation Land	1343.53	4.17
6	Plantation	9867.93	30.66
7	Rocky Knob/Mine	4.55	0.01
8	Agricultural Land	12113.19	37.63
	Total Study Area	32218.94	100

1.3.1.2 Soil Quality

Soil samples were collected from **Eight** representative sampling locations. The soil analysis results are given below: -

- It has been observed that the pH of the soil in the study area ranged from 5.68 to 6.74.
- The electrical conductivity was observed to be in the range of 102 μ S/cm to 245 μ S/cm.

- The available nitrogen values range between 87 to 138 kg/hectare.
- The phosphorus values range between 25 to 98 kg/hectare, indicating that the phosphorus content in the study area falls in less to medium category.
- The total potassium values range between 29 – 54 kg/hectare.

1.3.2 Water Environment

Surface Water

- The analysis results indicate that pH and total coliform of the Surface water was found to be in range of 5.68 - 6.69 and 110 - 330 MPN/100ml.

Ground Water

- The analysis results of ground water samples showed the pH in range of 5.02-6.87 where specified standard limits of 6.5 to 8.5.
- Color and turbidity of the samples 4.0 to 14.0 Hazens and <1.0 to 8.9 NTU.
- The total hardness of the samples ranged from 10.2 mg/l – 48.6 mg/l.
- Calcium and magnesium concentrations ranged from 4.12- 12.3 mg/l and 1.23- 4.52 mg/l respectively.
- The total dissolved solids of the samples ranged from 56 mg/l – 165mg/l. The TDS values are within the stipulated 2000 mg/l
- Range of chlorides and sulphates concentrations ranges from 12.3 mg/l- 65.2 mg/l and 8.5 mg/l – 21.5 mg/l respectively.
- Fluoride concentration ranged from 0.10 to 0.35 mg/l and is found to be within the permissible limits.
- Iron concentrations in ground water varied from 0.17-0.87 mg/l. Zinc levels varied from <0.1 mg/l respectively.
- Aluminium concentration in ground water is <0.01 mg/l at all locations.

1.3.3 Air Environment

To assess the baseline status of the air quality in the study area systematic ambient air quality monitoring has been carried out for criteria pollutants (PM₁₀, PM_{2.5}, NO_x, SO₂ and CO) at **Eight** (Including mine site) representative ambient air quality monitoring stations.

1.3.3.1 Meteorology

The recorded meteorological data for the study period at mine site is given below:

-

Table 1.5: Summary of Meteorological Parameters

Month & Year	Temperature (°C)		Relative Humidity (%)		Precipitation (mm)		Wind Speed (mph)	
	Max	Min	Max	Min	Max	Min	Max	Min
October – 2024	32	22	90	65	1.0	0.00	8.4	2
November – 2024	32	22	88	60	0.8	0.00	10.2	2.3
December – 2024	32	22	86	60	1.2	0.00	9.8	2.4

1.3.3.2 Ambient Air Quality

The observation based on the perusal of the results is summarized below: -

PM₁₀: The maximum value for PM₁₀ observed at Pazhayannur is 76.3 µg/m³ and minimum value for PM₁₀ observed at Project site is 24.5 µg/m³. The 24 hours applicable limit for industrial, Residential Rural and Other Areas is 100.00 µg/m³.

PM_{2.5}: The maximum value for PM_{2.5} observed at Kallamkulam near SH-74 is 47.3 µg/m³ and minimum value for PM_{2.5} observed at Project site is 10.3 µg/m³. The 24 hours applicable limit for industrial, Residential Rural and Other Areas is 60.00 µg/m³.

SO₂: The maximum value for SO₂ observed at Kallamkulam near SH-74 is 10.4 µg/m³ and minimum value for SO₂ observed at Project site & Ramanchetti near Peechi-Vazhani Wild life sanctuary is 1.0 µg/m³. The 24 hours applicable limit for industrial, Residential Rural and Other Areas is 80.00 µg/m³.

NO₂: The maximum value for NO₂ observed at Pazhayannur is 18.6 µg/m³ and minimum value for NO₂ observed at Ramanchetti near Peechi-Vazhani Wild life sanctuary is 1.0 µg/m³. The 24 hours applicable limit for industrial, Residential Rural and Other Areas is 80.00 µg/m³.

CO: The maximum value for CO observed at Pazhayannur is 956 µg/m³ and minimum value for CO observed site Ramanchetti near Peechi-Vazhani Wild life sanctuary 312 µg/m³. The 8 hours applicable limit for Industrial, Residential Rural and other areas is 2000 µg/m³.

Conclusion- The results of the monitored data indicate that the ambient air quality of the region in general is conformity with respect to norms of National Ambient Air Quality standards, at all locations monitored.

1.3.4 Noise Environment

The noise monitoring has been conducted for determination of noise levels at 8 locations in the study area. The noise levels at each location were recorded for 24 hrs. The results obtained were compared with the national standards and were found to be within the standards. The collected data are: -

A) Day time Noise Levels L_{eq} (day)

The day time (L_{eq} day) noise levels are observed within the prescribed limit of 55 dB(A) except at Pazhayannur & Kallamkulam near SH-74.

B) Night time Noise Levels L_{eq} (night)

The night time (L_{eq} night) Noise levels are observed within the prescribed limit of 45 dB(A) except at Pazhayannur & Kallamkulam near SH-74.

1.3.5 Biological Environment

Based on the field studies and review of published literature, it is observed that there are schedule-I species present in the buffer zone. There is Peechi-Vazhani Wildlife Sanctuary is about 7.5 km in SW direction and Chulannur Peafowl Sanctuary is about 7.2 km in NE direction. The species present in the Peechi-Vazhani Wildlife Sanctuary and Chulannur Peafowl Sanctuary are given in the Chapter-3. However, some RF are present within 10 km radius from the mine site.

1.3.6 Socio-Economic Environment

Project will generate both direct and indirect employment. At present agriculture is the main occupation of the people as more than half of the population depends on it. With the implementation of the proposed mining project the occupational pattern of the people in the area will change making more people engaged in industrial and business activities rather in agriculture. Thus, there will be a gradual shifting of population from agriculture to mining and industry. The study area is still lacking in education, health, housing, water, electricity etc. It is expected that same will improve to a great extent due to proposed mining project and associated

industrial and business activities. All persons aged seven years and above, who can both read and write with understanding in any language have been considered as literate in this study.

1.4 Anticipated Environmental Impacts & Mitigation Measures

Impact	Mitigation Measures
Land Environment	
Land will be degraded due to mining and dumping of waste	<ul style="list-style-type: none"> ➤ Plantation will be made in the mine benches by laying 1 m waste and top soil (2.88.00 ha.) ➤ Water harvesting will be made in the bottom level of mining pit (0.25.00 ha) ➤ Rehabilitated by plantation (0.5963 ha.). ➤ Soil will be used for plantation. ➤ In the applied quarrying lease area, there will be generation of Top soil of about 41,050 tonnes during the 15 years operations. Top soil will be removed separately and will be preserved separately in dumps. The top soil will be used for afforestation. The Overburden of about 39,260 tonnes is generated. The Overburden materials will be temporarily stored and will be used for road leveling and refilling of mining pits.
Water Environment	
Discharge of effluents water from the mine. Intersection of ground water table during mining operations.	There will be no discharge of effluent from the mine. Mine sump will act as reservoir of water and also allow settlement of sediments, if any, so that clear water is available for dust suppression and plantation and other activities like washing etc. As per the approved Modified Mining Plan ultimate pit level will be above the ground water table and hence it will not be intersected.
Air Environment	
<ul style="list-style-type: none"> ➤ Dust will be generated mainly during excavation, loading & unloading activities. ➤ Gaseous pollutants will be generated mostly by the traffic. 	<ul style="list-style-type: none"> ➤ It will be ensured that all the vehicles plying in the working zone are properly tuned and maintained to keep emissions within the permissible limits. ➤ At loading & unloading points and transportation routes, arrangement for water sprinkling will be made to minimize dust generation. ➤ In order to predict changes in the air quality, ISCST 3 model was used. The maximum incremental ground level concentrations of particulate matter PM₁₀ & PM_{2.5}, and gaseous pollutants NO_x & CO from the different mining activities for the

Impact	Mitigation Measures
	study period (post-monsoon) with EMP were observed within the National Ambient Air Quality Standards.
Noise Environment	
<ul style="list-style-type: none"> ➤ Noise due to mining activities. ➤ Noise due to vehicular movement. 	<ul style="list-style-type: none"> ➤ The noise levels from all these sources are periodical and restricted to particular operation. ➤ The noise measurement data indicated that present noise levels in the study area is within the permissible limits of National Ambient Noise Quality Standards. ➤ Thus, due to natural attenuation effects by proper green belt/ maintenance of machines etc., the impact of noise levels will be minimal.
Socio-Economic Environment	
<ul style="list-style-type: none"> ➤ Employment generation ➤ Health impacts ➤ Education Facilities 	<ul style="list-style-type: none"> ➤ The mining activity puts negligible change in the socio-economic profile. ➤ No displacement (0) is proposed due to the present mine. ➤ Approx. 20 workers will get employment opportunities along with periodical training to generate local skills. ➤ New patterns of indirect employment/ income will generate. ➤ Regular health Checkup camp.
Biological Environment	
<ul style="list-style-type: none"> ➤ Impact on biodiversity ➤ Impact on threatened species 	<ul style="list-style-type: none"> ➤ The core zone and buffer zone does not encompass any threatened flora or fauna species. ➤ Native species should be preferred for afforestation and reforestation measures in the region. It is very important to promote native species during reforestation/afforestation.

1.5 Analysis of Alternatives

The proposed project is a Granite Building Stone Quarry for an area of 3.8446 ha by M/s Crown Aggregates (P) Ltd., situated in Survey no. 1830 (Part), 1837 (Part), 1884 (Part), 1885 (Part), 1886 (Part), Village- Pazhayannur, Taluk- Thalapilly, District- Thrissur, State- Kerala. The topography of the lease area and its surrounding is a part of elevated and undulated terrain with trees, bushes and shrubs. The lease area is hilly, the highest elevation of the lease area MSL 158.0 m and the lowest level 128.0 m (Average Depth: 57.0m). The total production of mine will be about 14,22,895 MT. The expected life of mine estimated will be about 15 Years. The mining operation will be carried out by Opencast Semi-mechanized method as per the approved Mining Plan.

Alternative Technology- Type of mining is contingent on geological, topographical conditions of the mine area. The mining activity proposed as stone boulders mining with total capacity of about 14,22,895 MT. The extraction capacity is high, and semi-mechanized method is ruled out. The proposed mining method is for extraction of mineral and ROM is opencast mechanized with blasting. NONEL technology will be adopted to minimize the ground vibration, noise impacts. Bench height and width will be maintained as 5 meters. Blast holes of 1.2 to 1.5 m depth. Top soil shall be removed separately and stored at the place earmarked for it and used for green belt development.

Alternative Site- The mineral exploration of minor mineral in the mine area is facilitated by the lease of the land by Government of Kerala. The project is mineral specific and there is abundance of the mineral in the mine area. The proposed mine area is however found to be away from any ecologically sensitive / protected areas. There are no archaeological, historical, and cultural or defense installations within 10 km from the mine lease boundary. There are two Wildlife sanctuaries within 10 km from the mine lease area. There is no national park/ecologically sensitive area within 10 km from the mine lease boundary. The mine area is not part of any flood plain and high hazard zone (landslide). No human settlements within 200 m radius of proposed lease area. Due to the above-mentioned reasons, there is no need for alternative site.

1.6 Environmental Monitoring Programme

1.6.1 Air

Air quality monitoring will be carried out as per norms of SPCB and CPCB.

1.6.2 Water

Regular monitoring of ground water quality will be carried out at suitable locations. Water samples will be collected four times in a year i.e. Pre - Monsoon, Monsoon, Post - Monsoon and winter.

1.6.3 Noise

Noise level will be recorded periodically at mine site near operating machines during day and night time.

1.6.4 Health and Sanitation

Periodical medical checkup of workers is being done and medical facility provided. Toilets and urinals will be provided near the mine site. Drinking water will be made available to the workers.

1.7 Additional Studies

1.7.1 Risk Assessment & Management

1.7.1.1 Risk Assessment and Disaster Management Plan

The complete mining operation will be carried out under the management control and direction of a qualified mine manager holding. The DGMS have been regularly issuing standing orders, model standing orders and circulars to be followed by the mine management in case of disaster, if any. Moreover, mining staff will be sent to refresher courses from time to time to keep them alert.

1.7.1.2 Disaster Management Plan

Emergency preparedness is an important aspect in the planning of Disaster Management. Personnel would be trained suitably and prepared mentally and physically in emergency response through carefully planned, simulated procedures. Similarly, the key personnel and essential personnel shall be trained in the operations.

1.8 Project Benefits

The impact on the civic amenities will be substantial after the commencement of mining activities. Medical facilities will be provided in the form of first-aid facility at the mine. These medical facilities will also be available to local people in the surrounding in case of emergencies.

- Generation of employment and improved standard of living;
- Increased revenue to the State by way of royalty, taxes and duties; and
- Superior communication and transport facilities etc.

- The employment of local people in primary and secondary sectors of project will upgrade the prosperity of the region.

This proposed mining will generate direct and indirect employment. Economy of the area will get a boost and there will be overall growth of the region in terms of education, health, training, awareness, transport, automobile, industry, and infrastructure. The standard of living accordingly will also get an upliftment on the positive side. Plantation will be carried out as social forestry programme in villages, school and the areas allocated by the Panchayat/ State authorities to improve environment of its surrounding area.

1.9 Environmental Management Plan

Environmental Management Plan (EMP) aims at the reservation of ecological system by considering in - built pollution abatement facilities at the mine site. Some of the major criteria governing the environmental measures will be adopted.

S. No.	Particulars	Environment Management Plan
1.	Land Environment	<ul style="list-style-type: none"> ➤ Plantation will be made in the mine benches by laying 1 m waste and top soil (2.88.00 ha.) ➤ Water harvesting will be made in the bottom level of mining pit (0.25.00 ha) ➤ Rehabilitated by plantation (0.5963 ha.). ➤ Soil will be used for plantation. ➤ In the applied quarrying lease area, there will be generation of Top soil of about 41,050 tonnes during the 15 years operations. Top soil will be removed separately and will be preserved separately in dumps. The top soil will be used for afforestation. The Overburden of about 39,260 tonnes is generated. The Overburden materials will be temporarily stored and will be used for road levelling and refilling of mining pits.
2.	Water Environment	<ul style="list-style-type: none"> ➤ Measurement of water level fluctuations to assess impact of mining activity on the water table depletion in close proximity of dug wells and bore wells. ➤ Rainwater harvesting (percolation tank) has been proposed for augmenting ground water resources and for arresting/ reversing the declining trends of ground water levels.

S. No.	Particulars	Environment Management Plan
		<ul style="list-style-type: none"> ➤ Regular monitoring and analysis of water samples at strategic locations will be carried out to monitor the water quality of the area. ➤ Domestic waste water will be channelized into septic tank followed by soak pit.
3.	Air Environment	<p>Unpaved Roads</p> <ul style="list-style-type: none"> ➤ Water sprinkling will be done for dust suppression. ➤ Leveling of roads will be done to maintain the uniform speed of the trucks/tippers. <p>Paved Roads</p> <ul style="list-style-type: none"> ➤ The roads will be maintained. ➤ Regular cleaning will be done to reduce the chances of road dust to become airborne. ➤ Water sprinkling will be done on a fixed stretch of paved road passing through the villages. ➤ Adequate transportation routes will be decided to transport the mineral and will be maintained properly. ➤ Speed breakers will be constructed to restrict the speed of transporting vehicles. However, limiting of vehicular speed will be adopted. <p>Transportation</p> <ul style="list-style-type: none"> ➤ The vehicles will be maintained to control the air emissions. ➤ The speed of the vehicles will be maintained uniform. ➤ PUC certified vehicles will be used. ➤ The loaded vehicles will be covered with tarpaulin. ➤ Over loading will be avoided.
4.	Noise Environment	<ul style="list-style-type: none"> ➤ Regular inspection and maintenance of vehicles and equipment will be performed to ensure efficiency and worn parts will be replaced. ➤ Limited numbers of equipments will be used on-site. ➤ The vehicles will be maintained in good condition and overloading will be avoided. ➤ Speed limits will be enforced in relation to road conditions and on-route communities. ➤ Road surfaces will be maintained in good condition to reduce tyre noise and to assure continuous traffic flow to avoid prolonged idling. ➤ Noise monitoring will be conducted on a regular basis to determine compliance with noise criteria.

S. No.	Particulars	Environment Management Plan
		<ul style="list-style-type: none"> ➤ Personal protective devices i.e., earmuffs and earplugs will be provided to workers, working in high noise areas. ➤ Periodical medical checkup will be organized for all workers to check any noise related health problems.
5.	Occupational Health and Safety	<p>Heat & Light</p> <ul style="list-style-type: none"> ➤ The mine site will have adequate drinking water supply so that workers do not get dehydration. ➤ Lightweight and loose-fitting clothes having light colors will be preferred to wear. ➤ Rigorous exercise and more physical activities will be avoided in hot weather. <p>Noise</p> <ul style="list-style-type: none"> ➤ Noise exposure measurements will be taken to determine the need for noise control strategies. ➤ The personal protective equipment will be provided for each mine workers. ➤ Supervisor will be instructed for reporting any problems with hearing protectors or noise control equipment. ➤ At noisy working activity, exposure time will be minimized. <p>Dust control</p> <ul style="list-style-type: none"> ➤ PPE like face mask etc. will be provided during mining activity. ➤ Periodic medical examinations will be provided for all workers. ➤ Awareness program will be organized for workers
6.	Biological Environment	<ul style="list-style-type: none"> ➤ The core zone and buffer zone does not encompass any threatened flora or fauna species. ➤ Native species should be preferred for afforestation and reforestation measures in the region. It is very important to promote native species during reforestation/ afforestation.
7	Socio-Economic Aspect	<ul style="list-style-type: none"> ➤ Direct employment to the local people which help to sustain their livelihood. ➤ During the operational phase by the implementation of certain CER activities indirect employment will also generate. Improved livelihood. ➤ Training will be provided to the local persons ➤ Awareness programme will be organized.

<p><i>Mr. Gowtham Vattappara Pavithran, Director, M/S Crown Aggregates (P) Ltd.</i></p>	<p><i>Granite Building Stone Quarry at Survey No.- 1830 (Part), 1837 (Part), 1884 (Part), 1885 (Part), 1886 (Part), Village- Pazhayannur, Taluk- Thalapilly, District- Thrissur of State- Kerala for Lease Area of 3.8446 Ha.</i></p>	<p><i>EIA Report</i></p>
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1.10 Conclusion

EIA study was performed as per the approved TOR. Various environmental attributes were studied relating with aspects of mining activities. The related impacts were identified and evaluated. Considering all the possible ways to mitigate the environmental concerns Environmental Management Plan was prepared and accordingly fund was allocated. The EMP has been dynamic, flexible and subject to periodic review. CSR activities were identified and for its time bound implementation, fund has been allocated.

The project will increase the revenue of the State Govt. as well as it will help in the social upliftment of the local people. The greenbelt development programme will help in increasing the green cover in the nearby areas. Thus, proposed project is not likely to affect the environment or adjacent ecosystem adversely. The Senior Management will be responsible for the project review of EMP and its implementation to ensure that the EMP remains effective and appropriate. Thus, the proper steps will be taken to accomplish all the goals mentioned in the EMP and the project will bring the positive impact in the study area.
