

Executive Summary of EIA/ EMP Report for the Ornamental Stone (Pink Granite) Quarry in 15-16 Acres (6.232 Ha.) of Non-Forest Patta Land, in Sy. Nos. 51/1/2, 51/1/3, 51/1/5, 51/1/6, 51/2/1, 51/2/2, 51/2/3 & 51/2/4 of Kadur Village, Kustagi Taluk, Koppala District, Karnataka

- M/s R S Granites, a Registered Partnership Firm, registered under the Indian Partnership Act, 1932, headed by Sri. Shrikanth Gouda Patil, as its Partner and having its office at Bangalore, Karnataka, has proposed for extraction of Ornamental Stone (Pink Granite) in 15 Acres 16 Guntas (6.232 Ha.) of Non-Forest Patta (Private) Land, located in Sy. No. 51/1/2, 51/1/3, 51/1/5, 51/1/6, 51/2/1, 51/2/2, 51/2/3 & 51/2/4 of Kadur Village, Kustagi Taluk, Koppala District, Karnataka.
- After securing the clearances from concerned govt. departments, they have obtained the Notification from the Dept. of Industries & Commerce, Govt. of Karnataka, vide No. CI 226 MMN 2020, dated 02.07.2020, for a period of 30 years, from the date of lease.
- The proposed Ornamental Stone (Pink Granite) Quarry Lease area, falls within a Latitude of 15° 59' 22.4" N to 15° 59' 30.3" N and Longitude of 76° 00' 25.9" E to 76° 00' 36.7" E.
- There is no agriculture on the proposed mining land
- Within 500m radial distance of the proposed quarry, there are Eleven (11) existing quarries, with a total extent of 29 Acres 17 Guntas (11.9083 Hectares), of which Nine (09) Leases, with a Combined Extent of 24 Acres 28 Guntas (9.9961 Ha.), were exempted from Cluster Effect, as per the Gazette Notification No. S.O. 2269 (E), dated 01st July 2016, issued by the Ministry of Environment, Forests & Climate Change (MoEFCC), Govt. of India, due to the fact that either they were granted prior to 09th Sept. 2013 (Six Leases) or have obtained the Environmental Clearance prior to 15th Jan. 2016 (Three Leases). The remaining two leases, with a combined extent of 4 Acres 29 Guntas (1.9122 Ha.), will fall under cluster. Hence the total cluster area, including the present proposed area of 15 Acres 16 Guntas (6.232 Ha.), will be about 20 Acres 05 Guntas (8.1446 Ha.). Thus, as per the Office Memorandum No. F. No. L-11011/175/2018-IA-II(M), dated 12th Dec. 2018, the above proposal becomes "B1" category, and hence needs to carry-out Environmental Impact Assessment (EIA) Studies, followed by Public Hearing.
- The Proponent had applied for Environmental Clearance to State Environment Impact Assessment Authority (SEIAA), Karnataka and they have issued the Terms of Reference (ToR), for carrying-out Environment Impact Assessment (EIA) studies and preparation of an EIA/ EMP (Environmental Management Plan), for the proposed Ornamental Stone (Pink Granite) Quarrying, vide Lr No. SEIAA 217 MIN 2021, dated 29.09.2021.
- M/s Envipro Solutions Pvt. Ltd., Bangalore, Karnataka, have been retained by the Proponent to carry-out EIA Studies and preparation of EIA/EMP report. The baseline data collection (environmental monitoring) was conducted as per MOEF

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& CC norms for Post-Monsoon Season (Oct. 2021 to Dec. 2021).

- Present summary is of the EIA report as per TOR and has been prepared as per generic structure given in Appendix III of EIA notification 2006 by MOEF & CC.
- Ornamental Stone (Pink Granite) Mining is important for the Construction Industry, in domestic as well as international market.
- This is a new project & RQP has prepared the mining plan for mining of Ornamental Stone (Pink Granite), by maintaining proper safety standards.
- It is proposed to mine Ornamental Stone (Pink Granite), at a uniform saleable production of 8,991 m³ per Annum (24,006 Tons per Annum), in the form of granite blocks and 20,979 m³ per Annum (56,014 Tons per Annum) of Saleable building stone (from rejected granite blocks), by semi-mechanized open cast mining method.
- Life of the mine is about 16.73 years (say 17 years), considering an estimated mineable reserve of 1,50,390 m³ (excl. waste). The anticipated saleable quality granite will be of 30% of the total mined quantity in the form of blocks and the balance 70% of the mined material (rejected blocks) will be used as building stone.
- The Estimated Geological and Mineable Reserves, are as under:

Details	Geological Reserves (CuM)			Mineable Reserves (CuM)		
	Gross	Blocks	B.S.	Gross	Blocks	B.S.
Proved	4,20,650	1,26,195	2,94,455	2,97,900	89,370	2,08,530
Probable	3,00,150	90,045	2,10,105	2,03,400	61,020	1,42,380
Possible	3,00,150	90,045	2,10,105	-	--	-
Total	10,20,950	3,06,285	7,14,665	5,01,300	1,50,390	3,50,910

- Local Geology: The quarry lease area is composed of pink granite of about 20% and remaining about 80% is of soil cover. The granites, coarse grained igneous rock of even texture and light colour, composed chiefly of quartz and feldspars. It usually contains small quantities of mica or hornblende and minor accessory minerals may be present. Depending on the feldspar present, granite may be pink, dark pink or light pink. It is commonly believed to have solidified from molten rock (called magma) under pressure. Origins of granites are formed from magma. Granitic magma has many potential origins but it must intrude other rocks. Most granite intrusions are emplaced at depth within the crust, usually greater than 1.5 km and upto 50km depth, within thick continental crust.

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- Topography of the site: The topography of the area, in essence consists of pink granite moderate land. The height of the area ranges from 559 m to 620m above the MSL. Topography is both structurally and lithologically controlled. The area ranges extend in N 20° E - S 20° W. the subject area falls within this region confining to a part of Kadur village. The highest elevation of the lease area is 562m and the lowest elevation is 551m above the MSL. The slopes are drained by nallas and are outside the quarry lease area.
- There are no sensitive receptors or ecosystems or water bodies in the core zone.
- Nearest Village Kadur is at 0.45 km. There is no agriculture on the proposed lease area. It is a barren land.
- There are no eco sensitive areas within 10 km of the lease. There are no major industries within this area.

Proposed Mining

- The method of working for pink granite in the quarry area for the proposed plan period is by semi-mechanized method of opencast quarrying.
- Considering the technical parameters like surface topography, quality variations, geo-technical aspects, required rate of production & available resources etc., it is proposed to work this deposit by adopting 6m bench height and with an ultimate pit slope of 45°.
- Only jack hammer drilling is required and there is no requirement of blasting for quarrying of the blocks.
- The benches height and width will be maintained as specified by DGMS. The width of the working benches, shall not be less than the height.
- Initially thorny shrubs present in the proposed area of excavation will be removed. Then topsoil and the overburden will be scraped using a wheel loader or a backhoe. Weathering of the rock in the proposed area is not anticipated.
- The primary block size should be around 10m x 6m x 2m to 6m x 2m x 2m. The primary block will be observed carefully on six faces for defects, shape and size.
- Later, it will be cut into secondary blocks with the help of jack hammer drilling and wedge cutting to various sizes of 3m x 2m x 2m to 1.6m x 1.2m x 0.6m, depending on primary block size.
- While cutting primary blocks into secondary blocks, some undersize blocks or defective material or shapeless blocks will generate. This type of unmarketable material will be treated as waste and this waste material will be shifted to the dump yard, with the help of excavators and tippers.
- The secondary blocks will be shifted to stockyard by tippers and then these blocks will be dressed to perfect sizes before transportation to market. The undulated faces of the secondary blocks will be dressed with the help of jack hammer drilling and wedge cutting.
- Due care will be taken in designing the benches by straightening and advancing the benches for effective and economical operation of the quarry. Since the ground

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water table is much below, and the rainfall is not very high during monsoon, drainage of water inside the pit will not pose problem.

- Loading of pink granite blocks will be done mechanically to tippers of 20 tons capacity and transported from the quarry to the stack yard and mineral rejection/ waste will also be handled mechanically; the rejects/ waste will be dumped separately. Proposed rejection dump is away from the working pit.
- In the quarry, the road will be maintained with 1 in 16 gradients. Sufficient number of bunds and parapet walls will be made all along the quarry haulage roads, wherever necessary in order to maintain safe working conditions.
- The likely grade of the recoverable pink granite blocks would be 0.30 Cubic Meters and above.
- The details of year wise excavation during the plan period, are as under:

Year	Total ROM		Recovery of 30% (Pink Granite)		Balance 70% used as Building Stone Material	
	CuM	Tons	CuM	Tons	CuM	Tons
1st Year	29,970	80,020	8,991	24,006	20,979	56,014
2nd Year	29,970	80,020	8,991	24,006	20,979	56,014
3rd Year	29,970	80,020	8,991	24,006	20,979	56,014
4th Year	29,970	80,020	8,991	24,006	20,979	56,014
5th Year	29,970	80,020	8,991	24,006	20,979	56,014
TOTAL	1,49,850	4,00,100	44,955	1,20,030	1,04,895	2,80,070
Average	29,970	80,020	8,991	24,006	20,979	56,014

The production plan during the conceptual period shall be as under:

Period	Total ROM		Recovery of 30% (Pink Granite)		Balance 70% used as Building Stone Material	
	CuM	Tons	CuM	Tons	CuM	Tons
Plan period	1,49,850	4,00,100	44,955	1,20,030	1,04,895	2,80,070
1 st Scheme	1,49,850	4,00,100	44,955	1,20,030	1,04,895	2,80,070
2 nd Scheme	1,49,850	4,00,100	44,955	1,20,030	1,04,895	2,80,070
3 rd Scheme	51,750	1,38,173	15,525	41,452	36,225	96,721
TOTAL	5,01,300	13,38,473	1,50,390	4,01,542	3,50,910	9,36,931

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Base line environmental quality:

Air:

- There are no industrial gaseous emission sources. Predominant wind directions during the study period are from E (23.87%), followed by ESE (18.39%), ENE (14.67%) and NE (8.15%). Average wind speed is 2.61 m /sec.
- Atmospheric stability class at Kustagi Taluk is “moderately unstable to slightly unstable” during the day. Area has mixed (rural & urban) setting.
- Concentrations of criteria pollutants were found to be well below National air quality criteria viz. PM₁₀, PM_{2.5}, SO₂ and NO_x which are respectively 100, 60, 80 and 80 µg/m³.
- Predominant emissions during open cast mining operations would be generation of particulate matter during drilling, wire saw cutting, loading/unloading and transportation activities.

Noise: Ld, Ln & Ldn values were typical of rural background.

	Lease (Core) dB(A)	Buffer (Min.) dB(A)	Buffer (Max.) dB(A)
Ld	38	40	52
Ln	36	36	48
Ldn	37	39	50

Sources of noise would be during drilling and wire saw cutting.

Water: There are no surface sources viz. rivers/ lake in the lease area. The average annual rainfall in Koppal District is about 572mm per year. As per the Ground Water Brochure (December 2008) prepared for Koppal District, by Central Ground Water Board, GoI, the average ground water levels in Kustagi Region is about 10-20m BGL (Pre-Monsoon) and there is not much change in the Post-Monsoon season as well. Based on the interaction with locals, the average ground water level is 35-40m BGL during pre-monsoon and it raises to 30-35m BGL in the post-monsoon season.

The ground water quality in and around the proposed lease area is slightly alkaline, with the pH levels ranging from 7.38 to 8.09. The total hardness is ranging from 188 to 344 mg/liter as CaCO₃, whereas the Total Dissolved Solids content is varying between 234 to 475 mg/liter. The fluoride levels are ranging from 0.391 to 1.098 mg/liter and the nitrate levels are varying between 2.51 to 8.49 mg/liter. The sulphate levels are ranging from 22.1 to 31.3 mg/liter and the chloride levels are varying between 52.98 to 160.95 mg/liter. In general, the ground water quality in the study area, confirms to the permissible limits of IS:10500-2012 (Drinking Water Specification).

- Surface runoffs during monsoon from lease will enter the quarry pits. Of this, some water will evaporate and some can slowly percolate down.

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Solid waste:

During the mining plan period, the mineral rejects are estimated to be 2,80,070 Tons (1,04,895 m³) and for the conceptual period, the total mineral rejection will be about 9,36,931 Tons (3,50,910 m³). It is proposed to utilize the rejected granite blocks, for manufacturing of aggregates and it is proposed to sell the waste to nearby crushers, after obtaining permission from Dept. of Mines & Geology, Govt. of Karnataka.

However, as a contingency arrangement, provision of 1-20 Acres (6,071 Sq. M), has been made to dump the rejects, in the designated area within the lease site and its height will be stored as per IBM Norms. The waste dump will be provided with a toe wall and garland drain, to drain off the storm water. Leachates from granite dumps will be innocuous.

Impacts:

Land: There is top soil, of about 8-10m thick in the entire lease area, but no agriculture. There are no existing quarry pits or dumps. One pit will be made during the operational phase of the quarry, with proper bench formation, leaving the buffer zone all around the quarry. Hence there would not be any major adverse impact on topography/drainage or on land use or agriculture. Appearance will continue to be as it is. Based on the present estimates, the mineable reserves can last for 17 years, at the proposed rate of production. The geological records on these granite deposits state that considerable granite quantity may be present in the area, even after extracting the presently estimated mineable reserves, during the lease period of the mine, as per approved mining plan. Hence backfilling or reclamation of the mined-out area is not proposed. Alternately, mined-out pit will be used as a "rainwater" storage structure till mining starts again. It is likely that recharge ground water aquifer takes place. Also, reservoir water can be used for miscellaneous purposes like plantation, fish culture etc.

During the lease period, about 9,36,931 Tons (3,50,910 m³) of mineral rejects (waste) is expected to be generated, which will be stored in the designated area of 1-20 Acres (6,071 m²) 0.6071 Hectares. This will be used for progressive back-filling of the quarry pit, during the closure. These waste dumps are not expected to cause any adverse impact on the surrounding environment. Leachates from dumps will not contain any toxic material.

The Landuse details, in lease area, are as under:

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#	Proposed Land Use	Area (In A-G)	Area (In Ha.)
1	Area for Mining	4-10	1.720
2	Waste Dumps	1-20	0.600
3	Mineral Storage	0-02	0.020
4	Infrastructure	0-02	0.020
5	Roads	0-14	0.140
6	Greenbelt	1-28	0.700
7	Others (Parapet walls, settling Tanks)	0-15	0.150
8	Undisturbed Area	7-05	2.882
Total		15-16	6.232 Ha.

Air:

As ornamental stone (pink granite) mining doesn't involve typical mining activities like blasting etc., it is not proposed to cause any major adverse effects on the surrounding air environment. However, the activities like drilling, vehicle movement, etc., is likely to cause some increase in the dust content, within the lease area. Ground level concentrations of air pollutants for lease area, will not change significantly.

Water:

There would not be any impact on aquatic environment including hydrology, drainage or quality because a) there is no drain in the lease, b) ground water table will not be intercepted, c) dewatering of pits will not be required and d) granite pit water is suitable for irrigation. Regular monitoring for fluoride content is required.

Noise:

Sources during mine operation would be drilling and wire saw cutting. Drillers would be exposed to about 75-80 dB(A). In this case, no blasting is involved. Pit-walls would absorb the vibrations due to drilling. Hence, there would not be any adverse impact. There are no structures over the lease area, as well as within 1 km radius of the quarry lease area.

Biological:

There is no sensitive fauna and flora or endangered species within 10 km radius of the lease. Lease is a part of Reserve Non-Forest area. However, this area is not known for any special kind of biodiversity. Project proponent will carry out plantation in scientific way. He will choose locally suitable species in consultation with local forest department.

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Socioeconomic & health:

There will not be any displacement on account of this project because land is an uninhabited land and no agriculture is being carried-out in the area, due to hard sheet rock spread over the entire lease area. Also, the proposed area has been notified in favour of the Project Proponent. It is proposed to a) prefer employment to deserving local persons in mining related trades like loading/unloading of granite blocks, waste handling, drilling etc., b) train residents of nearby villages for harvesting rain water, and sanitation practices etc., c) employment of local people for works related to development & maintenance of greenbelt and afforestation.

Monitoring schedule:

Env. segment	Parameter	Frequency
Water quality	IS 10500	Quarterly
G.W. table	Fluctuation in monsoon & post monsoon period	May & October
AAQ	Particulate matter PM10 & PM2.5	during drilling, wire saw cutting - Quarterly
Noise	Equi. noise levels	during drilling, wire saw cutting- Quarterly
Health	Pulmonary function, eye sight, audiometry, B.P., etc.	Annual record
Plantation	Survival	annual survival rate
Data analyses	Efficiency of mitigation measures	Half Yearly

Plantation:

The proposed quarry area and its buffer zone, has a rocky outcrop and hence it is not possible to take-up any plantation in the 7.5 m wide safety zone. However, it is proposed to take-up plantation, on either side of the approach road. It is proposed to plant about 1,000 locally suitable species, as part of green belt development. One cubic meter pits will be made on either side of the approach road and will be filled with top soil from lease area. Refuse or garbage will be added as per availability. Growth in the first year will be observed. Species will be chosen from the following and depending on availability.

Common name	Botanical name
Neem	<i>Azadirachta indica</i>
Honge Mara	<i>Pongamia pinnata</i>
Arali Mara	<i>Ficus religiosa</i>
Alada Mara	<i>Ficus benghalensis</i>

Occupational Health & Safety Measures:

The employees working in the quarrying activity will be provided with suitable personnel protective equipment (PPE) like safety shoes, dust masks, helmets, etc. Also, they will be subjected to annual health check-up, particularly for hearing

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related illness and respiratory disorders. Protective shelters for workers with treated R.O. Water, First Aid facilities, Dining facility etc. will be provided.

Corporate Social Responsibility:

A few are mentioned below:

- (i) Supply of Drinking Water unit to the nearby Kadur Village, with an approx. cost of 2.50 Lakhs (one time investment)
- (ii) Project Proponent will organize annual health camp, in the nearby villages.

CSR - funds

Activity	Anticipated funds/year Rs
Supply of Drinking Water Unit to nearby Kadur Village	Rs. 2.50 Lakhs (One time investment)
Annual Health camps in the nearby villages	Rs. 1,00,000/- per camp

N.B. Costs are indicative

Economics of project:

Granite deposits in proposed quarry area are of good quality. It has high demand in the domestic as well as international market. The proposed land has a rocky patch and is non-productive and unsuitable for agriculture. Therefore mining will be in the interest of State revenue and of the people around. Direct and indirect employment to locals is assured.

Lease is a rocky land in Non-Forest Govt. Land. It has some wild shrubs and thorny bushes. The rain water collected in the quarry pits will be used for purposes like dust suppression, tree watering etc. Therefore there would not any damage to environmental quality.

Initiation of mining by M/s R S Granites will improve revenue to the state without deterioration in environmental quality. On the contrary population in nearby villages will become aware of importance of potable water quality and sanitation.

Openings for indirect employment to locals in plantation, loading/ unloading operations etc. are possible. Additional water supply source in form of pit-water, recharge of aquifer is likely.