PRE FEASIBILITY REPORT

For

Proposed Colour Granite Mine over an Extent of 20.50 Hectares, in Un-surveyed area of Surjini Village, Meliaputti Mandal, Srikakulam District, Andhra Pradesh

Submitted To

Ministry of Environment and Forest, GOI,

New Delhi

Submitted By

M/s. RAJYOG MINERALS PVT LTD

B-161,P Marg,DLF Phase-1, Gurgaon,Haryana

EXECUTIVE SUMMARY

1. INTRODUCTION OF THE PROJECT/BACK GROUND INFORMATION

M/s RAJYOG MINERALS PVT LTD, Srikakulam, have applied for grant of quarry lease for Colour Granite over an extent of 20.50 Hectare in Un-surveyed Hill of Surjani Village, Meliaputti Mandal, Srikakulam District, Andhra Pradesh. Vide The Director of Mines and Geology, Hyderabad, Notice No :13600/R1-1/2010 dated 20-06-2015.

After careful examination of the proposals of the Assistant Director of Mines and Geology, Tekkali and Zonal Joint Director of Mines and Geology, Hyderabad, in principle has decided to grant the quarry lease for Colour Granite over an extent of 20.50 Hectares in Un-surveyed Hill of Surjani Village, Meliaputti Mandal, Srikakulam District, Andhra Pradesh, in favour of M/s RAJYOG MINERALS PVT LTD, Srikakulam, for a period of (20) years subject to submission of Approved Mining Plan. With a condition that the Approved Mining Plan shall reflect the restrictions to be adopted by the applicant while conducting quarry operations due to existence of any structures, railway line, roads, water bodies such as river etc., and the stipulated distances as per the various regulations prescribed under Mines and Metalliferrous Regulations '1961 along with Consent for Establishment from A.P. Pollution Control Board & Clearance from Ministry of Environment & Forests as per Environmental Impact Assessment Notification issued vide S.O.1533 dated 14-09-2006 to consider grant of quarry lease for Colour Granite vide DMG, Hyderabad. Notice No :13600/R1-1/2010 dated 20-06-2015.,and the Zonal Joint Director Of Mines And Geology Govt of A.P,Visakhapatnam has approved the mining plan, Vide letter No: 2041/MP-TKL/2015 Dated 03.08.2015.

India is one among the leading countries in mining and export of granite and is rich in granite reserves. Geologically, the southern and eastern belts of the Nation are abundant in granite deposits. Different shades of granites are available in abundance in Tamil Nadu, Andhra Pradesh, Karnataka, Maharashtra, Assam, Bihar, Rajasthan, Odisha, Meghalaya and Madhya Pradesh. Indian Granite Stone has become the most sought-after and extensively used stone material and massive structural works throughout the world, and it is well known in the International market, not only for its elegance and aesthetic quality, but also for its durability.

Granite is a very hard crystalline, igneous or metamorphic rock primarily composed of feldspar, quartz and lesser amounts of dark minerals. India has vast resources of granite with about 110 varieties of different colours and textures such as black, grey, Colour, multi coloured, etc. These varieties are used to produce monuments, building slabs, titles, surface plates etc. However, popular varieties are mainly found in South India.

Granite in the form of slabs and tiles has several attractive features, which, inter alia, includes extra-fine mirror-polish, scratch-free glossy surface and durability. Granite can be compared very well with other floor and wall application materials such as ceramics and marble.

The lessee is in the Granite Quarrying Industry for more than decade meeting the domestic demand and exports of Granite to industries which is found to have use for Monuments, Flooring slabs/tiles, Kitchen articles, sculptures & for domestic use.

The lease area is found to have prominent exposures of Colour Granite covering most of the Quarry lease area. Detailed study of the area has been done by the applicant/lessee by sampling exposed blocks of Colour Granite and depth of the existing working pit. In view of the proposal for development and production of Colour Granite, the applicant/lessee intends to produce 16,200 cubic meters/annum with Run of Mine (ROM) of 81,000 cubic meters/annum by carrying out medium scale quarrying/mining by engaging both manual & machineries i.e. Open cast method other than fully mechanized/semi mechanized of quarrying/mining with drilling.

The Mining Plan is prepared under Rule of "Granite Conservation and Development Rule, 1999" the application for Environmental Clearance along with this report is herewith submitted to MOEF for obtaining Environmental Clearance.

Present Proposal:

The present proposal is submitted to the Ministry of Environment & Forests under the EIA Notification 2006 as per the Orders of the Honorable Supreme Court dated 27.02.2012 directing that leases of minor minerals including their renewal for an area of less than 5 ha be granted/renewed after getting environmental clearance from MOEF due to an interstate boundary of Andhra Pradesh and Orissa is located at a distance of 0.5 km from the ML area.

Need for the project:

Rapid industrialization and growth in infrastructure has made global as well as domestic demand for Granite. So number of Granite manufacturing quarries & industries are coming up in this sector. Granite is the chief material in this sector, for the export industries like monuments, flooring slabs, Kitchen articles, sculptures & export. The size & quality parameters for supply of the mineral will be as per the requirements of the user industry.

Based on the demand of Granite, the Company intends to also increase the production to meet their required quantum of Colour Granite for domestic & international market. As per EIA notification 2006 project proponent is submitting the proposal to get Clearance for production capacity of 16,200 cubic meters/annum of granite blocks from Expert Appraisal Committee (Mining,) MoEF, GOI, for the purpose of colour granite mine shall be worked by semi-mechanized method of working.

- ***Employment Potential:***

  The proposed Manpower is around 66 including Mining Engineer with Mines Manager competency certificate, Geologist, Foreman and other Staff. About 50 peoples will be assigned job relating to the handling of the granite and waste & others are working at sundry and other routine works in the mines. The Mine shall provide indirect employment for 50 people. The working hours at the mines will be 8 hours/day for 300days/year.

2. PROJECT DESCRIPTION

The site is geographically located between North Latitude $18^{o}47'13.49''$ to $18^{o}47'29.46''$ and East Longitude 84^{o} 13'32.82" to 83^{o} 13'53.29". The project site and 50% of its 10kms buffer zone falls in the Survey of India Toposheet No. 74 B/2. The Lease area is a mound. The area is devoid of any forest or tree cover. It comprises shrubs only.

There are no prominent natural drainage channels in the area. In general the area is plain studded with isolating hillocks. Sometimes they may raise gently as continuous hills, presenting a rugged topography.

The Other details are given below:

Toposheet NO.	*74 B/2*
Latitudes	*18^o47'13.49" to 18^o47'29.46" N*
Longitudes	*84^o 13'32.82" to 83^o 13'53.29". E*
Survey No. & Villages	*Unsurveyed area of Surjini village*
Mandal & District	*Meliaputti*
Extent Area	*20.50 Ha.*
Type of Land	*Government Land (Barren)*
Road Connectivity	*A B.T. road of 0.7 km length is connecting to the area from PeddaLakshmipuram village*
Nearest Railway station	*40 Kms of Palasa is the nearest Railway Station/sidings*
Method of Quarry	*Opencast other than fully mechanized/semi mechnized quarrying with drilling.*
Interstate Boundary	*A.P and Orissa interstate boundary is at distance of 0.5 km from ML area*

- ***Geology of the Area***

The applied Quarry Lease area consists of an undulating terrain and comprise of hill range locally known as 'Durgam Hill'. The quarry lease area is located on the flank of a rather steeply sloping hill and is occupied of boulders and sheet of Colour Granite which are exposed to the surface. The maximum RL is 404 m in the North Western part and the minimum RL is 156 m in the Northern Eastern part of the, thus having a relief of about 248 m. The area slopes rather steeply in the Northern direction.. The drainage is of dentritic pattern.

Exploration & Reserves

The reserves are estimated by sectional method. It consists of calculating the sectional area and multiplying it by zone of influence to arrive at the volume.

The total reserves under the three category of proved, probable and possible is estimated as 87,76,000 cu m and considering 20% recovery, the reserves of saleable blocks are 17,55,200 cu m and 70,20,800 cu m is considered as wastage. The reserves are likely to change once the quarry is fully opened up. The reserves given here are taking in to

consideration one homogenous mass there are every likely hood that the material may be more defective than what is anticipated.

The Estimated Reserves (Quantity in Cu. Mtrs)

Sl.No.	*Description*	*Quantity in Cu m*
01	*In situ reserves under proved category*	*43,88,000*
02	*Reserves blocked in the 7.5 m buffer zone*	*3,15,900*
03	*Blocked in benches*	*4,38,800*
04	*Depleted so far*	*Nil*
05	*Total blocked (2+3+4)*	*7,54,700*
06	*Balance reserves (1-5) =*	*36,33,300*
07.	*Recovery @ 20%*	*7,26,660*

Considering mineable reserves as 7, 26,660 cu m and an average annual production of 13,320 cu m, the life of the mine is 7, 26,660 cu m / 13,320 cu m = 55 years. The life of the mine and reserves will be periodically reviewed and are likely to change after the proposed exploration and trail production in the unexplored area is completed. The reserve estimated here is purely based on visual estimate of the deposit.

- ***Projected productions of ROM and Marketable blocks during the plan period-***

Year	*Volume in Cum*	*Recoverable Blocks (20%) cum*	*Wastage 80% in cum*
First	*54,000*	*10,800*	*43,200*
Second	*60,000*	*12,000*	*48,000*
Third	*66,000*	*13,200*	*52,800*
Fourth	*72,000*	*14,400*	*57,600*
Fifth	*81,000*	*16,200*	*64,800*
TOTAL	*3,33,000*	*66,600*	*2,66,400*

- ***Method of Quarry***

The Colour Granite in the quarry lease area is exposed on the surface with boulders. Hence, it is proposed to mine the boulders / sheet by open cast, semi-mechanized methods, by developing the benches of 6 M height. Wire Saw cutting will be deployed based on the

favourable conditions. The development of benches in the sheet rock will be maintained @ 60^0 safety slopes. The separation of blocks from the mother rock will be carried out by drilling, wedge cutting, excavation will be done by the machinery.

- ***Solid Waste Management:***

The granite body exposed to the surface. Hence, the weathering on the surface of the rock closely spaced joints and shears along with inherent defects like moles, dark patches and acidic veins contribute a large extent of waste generation during the mining. The waste that will be generated during the mining will be dumped due North Eastern part of the quarry lease renewal area (within the quarry lease renewal area) over an area of 30,000 M^2 or 3 ha,The waste will be dumped to a height of about 18 m in 2 benches. A retaining wall will be constructed around the dump for preventing the slanting of boulders. It is estimated that in the next five years a total of 2,66,400 cu m of waste is expected to be generated with an average of 64,800 M^3 per annum.

Some part of the material from the waste may be sorted out and used for making small blocks known as[1] khandas' to be used by the local unit for making tiles. The market for tiles is good at he moment and they will offer a better substitute for marble in terms of price and quality. Some rejected and unsorted material may be used in the civil engineering projects in the vicinity of the area. The waste material can also be crushed into smaller sizes and can be used as road metal.

- ***Hydrology***

The surface water is in the form of seasonal rainfall and the ground water bodies encountered below 50-60 m depth in the area from the surface level. The area is small, so, far no report on hydrological studies has been carried out in the area under question. There is no potential of acid mine drainage.

3. SITE ANALYSIS

- ***Connectivity***

The Quarry Lease area is located near Jangalapadu village, which is located at a distance of 8 kms from Meliaputti and is connected by a good road via Pattupuram. Meliaputti, the Mandal headquarter, is located at a distance of 20 kms from Tekkali town. Tekkali is located on the Chennai- Howrah Highway at a distance of 50 kms from Srikakulam Town.The location of the area is indicated in Key – Cum – Location Map.

- ***Topography:***

The Quarry lease area consists of an undulating terrain and comprise of hill range locally known as 'Durgam Hill'. The quarry lease area is located on the flank of a rather steeply sloping hill and is occupied of boulders and sheet of Colour Granite which are exposed to the surface. The maximum RL is 404 m in the North Western part and the minimum RL is 156 m in the Northern Eastern part of the, thus having a relief of about 248 m. The area slopes rather steeply in the Northern direction. The water table is located at a depth of about 50-60 m from the ground level. The region has a tropical humid climate with the maximum and minimum temperature varying from 28-38 degrees in summer and 25-15 degrees in winter. The average rainfall is around 900-1000 mm and the monsoon is from June to September. The occupation of the people in of the region is agriculture. The drainage is of dentritic pattern.

Existing Infrastructure:

The construction of temporary structures for Mines office, Rest shelter, First aid station, sanitation & etc., are provided in the non mineralized area of Quarry lease.

The details are collected from the core and Buffer zone of the lease. The Drinking water, electricity and primary education facilities are available in almost all the villages. The Police Stations, Post Offices, Dispensary facilities, Phones, College, and Railway station are present in Mandal and District head quarters of Srikakulam. There are good approachable weather roads are present in the buffer zone of the area. State highway passing through major towns and near by villages. No Sensitive areas for ecological reasons within 10 kms.

4. PLANNING BRIEF

- ***Conceptual Quarry Plan***

The entire strike length of the deposit of the Colour Granite bodies running parallel is exposed & the mine is working forming benches of 6.0 mtrs height with a general pit slope of 45°. The ultimate pit limit is marked as shown on the Geological Plan & Sections. Conceptual plan period production & development details as furnished in the Conceptual Mine Plan. However, when the Colour Granite is proved to its full depth, the conceptual plan will be duly modified. Dumping will be done in the worked out pit area within the lease area. At the end of the Conceptual Period complete dumps will be afforested and wherever possible and along road sides afforestation will be carried out. Safety bunds, fencing &

retaining walls shall be constructed as per the directions and guidelines of Directorate General of Mines Safety.

- ***Population Projection***

The man power of mines includes Mines manager, Engineer, Geologist, skilled and unskilled Labours and medical officers etc. As for the socio-economic is concerned from the Quarry activity near by villagers shall get direct employment for about 66 persons. The proposed Quarry activities also shall bring the positive change in the villages as the mine shall provide indirect employment to more than 100 people indirectly.

- ***Afforestation:***

Each year some part of the barrier zone will be subjected to afforestation and care will be taken to protect the sapling. Fruit growing trees are proposed to be planted.

- ***Assessment of Infrastructure Demand:***

The existing road network will be sufficient to meet the proposed production capacity. However, required infrastructure for transport within the leasehold area will be further strengthened and improved. No new routes or alternations are required in this regards.

- ***Amenities/Facilities***

Lessee proposes to employ about 66 persons. This employment has a positive impact on the socio-economic conditions of the surrounding as most of the work force employed will be from the nearby areas. Local persons will be hired for meeting the requirement of trucks loading, plantation, construction of check dams, retaining walls etc.

The following are the benefits due to Quarry to the local population:

- *Direct and indirect employment opportunities.*
- *Improved road and communication network.*

5. PROPOSED INFRASTRUCTURE

The extent of lease area is 20.50 Ha. of Government barren land is recommended for colour granite mining. The proposed method of Quarry operation will be opencast Quarry with drilling & by use of wire saw cutting, use of excavators & cranes with tippers/dumpers for

internal transport. The lease area does not have any public roads; railways lines, telephone lines, public buildings etc.

Present infrastructure will meet the requirement of the project. The conditions of the roads in the buffer zone are unlikely to be impacted due to the proposed small scale expansion. The project authorities in association with the adjacent mine/quarry owners & district administration will also contribute to development & maintenance of roads.

- ***Green belt Development***

It is proposed to develop a green belt of the portion of the non mineralized areas and in addition, the place around the haul road and slopes of the dumps shall have plantation. Every year it is proposed to carry out afforestation by planting about 50 saplings within & about 100 outside the lease area. The species chosen for green belt are fast growing with good canopy and dense leaf density, and some ornamental plants to give good aesthetic look. Varieties like Neem, Teak, Tamarind, Subabul, Rain tree, Badam, Ficus will be used to develop green belt in the surrounding & Quarry area. More emphasis will be given for planting local species. Each year some part of the 7.5 m barrier zone will be subjected to afforestation and care will be taken to protect ths sapling. Fruit growing trees are proposed to planted.

- ***Social Infrastructure***

The applied Quarry Lease area is located near Jangalapadu village, which is located at a distance of 8 kms from Meliaputti and is connected by a good road via Pattupuram. Meliaputti, the Mandal headquarter, is located at a distance of 20 kms from Tekkali town. Tekkali is located on the Chennai- Howrah Highway at a distance of 50 kms from Srikakulam Town. The nearest railhead is Palasa and is about 25 kms from the area.

Drinking Water Management

There are no Water courses within or adjacent to the quarry lease and hence there is no possibility of disturbance & rainwater will continue to flow in the same direction as it is in existence. Since the water is not withdrawn (from any sources outside the lease area) for Quarry purposes for Quarrying operations no adverse impact is foreseen on the existing water regime. The rainwater stored in the pits shall be utilized for mitigating dust and other activities.

The surface water in the buffer zone is in the form of seasonal rainfall and the ground water bodies encountered below 50-60 m depth in the area from the surface level. The area is small, so, far no report on hydrological studies has been carried out in the area under question. There is no potential of acid mine drainage. The drinking water available for near by bore wells and water can be stored in to syntax tanks. During the course of Quarry operation no diversion of water course is considered as it doesn't exists.

- ***Sewerage System***

The existing watercourses shall not be disturbed and rain water will continue to flow in the same direction. Check dams have been constructed by the side of the O.B Dumps, water will percolate in the premises of the mines area. There is no generation of domestic sewage.

- ***Industrial Waste management***

There is no generation of affluent/toxic substance; hence treatment of mine water doesn't arise.

- ***Solid waste management***

About 64,800 cum / year of waste will be generated. The waste rock produced shall be stacked separately and marketed for tiles or slabs as and when the demand arises. No toxic or hazardous elements are reported in the waste & hence, no effect on the surface/ground water.

- ***Power requirement and Supply***

There will not be any requirement of power supply to the project site. The Quarry activities are envisaged to be carried out only during day time by manually for drilling and machinery for cutting by wire saw, loading, unloading by excavators & cranes with tippers/dumpers for transport. & , and all the equipment shall be operated with diesel as motive power.

6. RECLAMATION & REHABILITATION

Surface Quarry will make alteration in the topography of the area by way of excavation and surface dumps. This will lead to water pollution, silting of agricultural lands, air pollution etc. The primary objectives of reclamation are to restore the affected area to the original state as near as possible.

The various reclamation proposals planned during the plan period as well, rest of the Quarry period such as broad working benches with safe angle of slope, stabilization of dumps, installation of effective drainage system, prevention of erosion and excessive run off, & revegetation or afforestation.

As far as Quarry area is concerned, so far none of the proposed Quarry area is matured or completely exhausted. Hence, the measures like Retention walls, drainage system and afforestation works etc., shall be taken up.

7. PROJECT SCHEDULE AND COST ESTIMATES:

The estimated total cost of the project is Rs. 100 lacs. The land belongs to the government i.e. revenue land including the cost of the machinery and additional preliminary works and working capital i.e. for the application and processing fee, etc ,.

The return on the investment is by way of sale of mineral. All the minerals shall be marketed. The machinery is of the Company and additional required if any shall be on hire basis as per the requirement for production.

The proposed production of Colour Granite is 16,200 Cubic meters/annum. The major components required to project the financial status of a project are

- *Cost of the project*
- *Means of financing*
- *Cost of production*
- *Tax burden and flows*
- *Profitability*

➢ *Cost of the Project*

The cost of the project consists of the following major components:

- *Land and site development*
- *Buildings and civil works*
- *Machinery*
- *Processing charges and Consultancy charges for preparation of Quarry Plan, Environment Monitoring for generation of baseline data, EIA & EMP report, Public Consultation, pollution control board clearance etc*
- *Provision for contingencies*
- *Margin money for working capital*

S. No	Activity	Quantity	Recur. cost/ annum (Rs)
01	Afforestation work	50 sapling/annum	10,000
02	Retaining wall	100 mtrs/annum	15,000
03	Check dam	01/annum	25,000
04	Dust suppression	5,000 lts/day	3,00,000
05	Environmental Mitigative measures	Annual	1,00,000
06	Miscellaneous	Annum	3,00,000
Total			**7,50,000**

The total estimated cost of the project is Rupees 100 lakhs. The Quarry lease area is Government Revenue Land.

- ***Cost of Production***

The average proposed production of Colour Granite during the first five years is around 16,200 Cubic meters per annum. The proposed ROM to be excavated is 81,000 Cubic meters per annum.

The cost of the production includes the following components:

Parameters

1) *Reserves available for expolitation – 7, 26,660 cu m*
2) *Nature of ore – Colour Granite*
3) *Production: Colour Granite – 16,200 cubic mtrs per annum*

A) Direct costs of Quarry

Sl. No	*Particulars*	*Expenditure*	*Cost/cubic meter Rs*
1	*Exploration*	*Proposal for drilling*	*50.00*
2	*Production cost*	*Drilling - Rs. 600* *Rock breaker - Rs. 650* *Loading& transportation - Rs. 7000* *Excavation cost - Rs 1600*	*9850.00*
3	*Power, water & fuel*	*Annual power, water & fuel*	*8500.00*
4	*Developemnt, repairs & maintenance cost*		*8000.00*
5	*Wire saw cutting*		*1500.00*
6	*Royalty to Government*		*2555.00*
7	*Admin & Miscellaneous expenses*		*300.00*
	Total		*30,755.00*

B) Environmental Costs

Sl. No.	*Particulars*	*Expenditure*	*Cost/M^3 Rs.*
1	*Air pollution! control*	*Rs. 3,00,000*	*18.52*
2	*Environmental protective measures*	*Rs.1,00,000*	*6.17*
3	*Green belt / Afforestation*	*Rs. 10,000*	*0.62*
4	*Engineering construction like Retention walls Water garlands*	*Rs.40,000*	*2.46*
5	*Miscellaneous*	*Rs.3,00,000*	*18.52*
	Total	*Rs. 7,50,000 i.e Rs.46.29/M^3*	

C) Health and Safety:

Sl. No.	*Particulars*	*Expenditure*	*Cost/M^3 Rs.*
1	*Medical facilities*	*Rs. 3,00,000*	*18.52*
2	*Doctor (Part time) & staff*	*Rs. 50,000*	*3.08*
3	*Health Check up & Medicines*	*Rs. 50,000*	*3.08*
4	*Safety*	*Rs. 25,000*	*1.54*
		Rs. 4,25,000	*Rs.26.23*

D) Socio Economic:

Sl. No	***Particulars***	***Expenditure***	***Cost/M^3 Rs.***
1	*Education* *i) School books, uniforms conveyance to school* *ii) Scholarships* *iii) Repairs & maintenance of school buildings*	*Rs. 1,00,000*	*6.17*
2	*Health camps*	*Rs. 50,000*	*3.08*
3	*Plantation in villages*	*Rs. 1,00,000*	*6.17*
	Sub Total	*Rs. 2,50,000*	*Rs. 15.43*

E) Capital cost Rs.75 lakhs

Total pit head cost per M^3 of Colour Granite	*:*	*Rs.30843/-*
Pit head realization for Colour Granite/M^3	*:*	*Rs. 45000/-*
Profit/ M^3	*:*	*Rs. 14157/-*
Gross profit/annum for 16,200 cu.mtrs	*:*	*Rs.2293.43 lakhs*
Net profit after taxation @35%	*:*	*Rs.80.27 lakhs*
Profit/cu. Mtr	*:*	*Rs. 4954/cu.mtr*

8. ANALYSIS OF PROPOSAL

M/s. RAJYOG MINERALS PVT LTD *is proposed for annual production of 16,200 Cubic meters/annum of Colour Granite. The financial estimates reveal very high rate of returns. The project is economically viable. The estimates have also taken into consideration the occupational health expenses, environmental protective measures, social welfare activities etc., The Form-I and Mining Plan are submitted with this document.*

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