

EXECUTIVE SUMMARY

of

'PATHAKOTHACHERUVU QUARTZ MINE'

Land Type	:	Govt. Revenue land
Sy No	:	40/Part
Village	:	Pathakothacheruvu
Mandal	:	Guntakal
District	:	Anantapur
State	:	Andhra Pradesh
Extent	:	36.423 Ha.(90.00 Acres)

Smt. D. MANJULA

D.No.45/D-1, Old Market Road,
Cantonment, BELLARY - 583104,



Prepared by

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Executive Summary

of Rapid Environmental Impact Assessment & Environmental Management Plan

1.0 INTRODUCTION

Smt. D.Manjula, Bellary, possess a Mining Lease for White Quartz in Sy. No. 40/Part of Pathakothacheruvu Village, Guntakal Mandal, Anantapur District, Andhra Pradesh State over an extent of 36.423 Hect. (90.00 Acres).

The mining lease was granted for extraction of White Quartz for a period of 20 years from 11-07-2001 to 10-07-2021 vide proceedings No. 1657/M1/01, dated 11.07.2001. The Mining Scheme was approved by Deputy Director, Department of Mines & Geology, Kurnool vide letter No. 741/MS-ATP/2016, dated 23-03-2017. The Mining Scheme period is approved for the period of 2017 – 18 to 2020 – 2021.

It is mandatory to obtain environmental clearance from MOEF, New Delhi as per 2006 EIA notification and subsequent amendments. Accordingly, application has been submitted for obtaining environmental clearance to SEIAA-AP. The authority (SEIAA) has issued standard Terms of Reference (TOR) vide letter No. SEIA/AP/ANT/MIN/07/2017/360-502 dated 06.6.2018. Hence, studies were carried out by M/s Global Environment & Mining Services, Hospet during December 2017 – February 2018 covering Air, water, Noise, land, etc., as per the EIA guidelines laid by MOEF and various authorities. The findings of study carried out during winter season are presented in this report.

2.0 LOCATION & ACCESSIBILITY

The ML area situated off the state Highway road connecting Guntakal – Gooty. From the state highway to the mine is about 3.5 km away. The nearest railway station Pathakothacheruvu is at a distance of 0.50 kms. The Guntakal city is at a distance of 15 kms away. The Hyderabad airport is located at a distance of 315kms from quartz mine.

SALIENT FEATURES OF THE STUDYAREA

Details of The Area:	
District & State	Anantapur, Andhra Pradesh
Mandal	Guntakal
Village	Pathakothacheruvu
Khasra No. / Plot No / Block	Survey No. 40/Part
Mine Lease Area/Extent	36.423 Ha. (90.00 Acres)
Type of the Area	Govt. Revenue land
Survey of India Toposheet No	57 E/8, E/12
Latitude	N 15° 10' 27.6'' to 15° 10' 58.3''
Longitude	E 77° 30' 44.7'' to 77° 31' 23.7''

3.0 GEOLOGY & EXPLORATION:

3.1 TOPOGRAPHY:

The mining lease area is a hillock. The highest and lowest elevation in the ML area is 490m and 400m from the assumed bench mark of 440m. The ML area is about 90m from general ground level. The hill slopes are towards North and South.

3.2 REGIONAL GEOLOGY:

The region of the subject area constitutes of Granites and Granitic Gneiss of varying colours. These are melanocratic in nature and generally exhibits porphyritic texture, in addition to coarse grained texture. These Granites are traversed by fracture filling of Quartz veins and intrusive of Dolerite dyke. When observed locally, they reflect variation in thickness of the Quartz veins.

3.3 LOCAL GEOLOGY:

The White quartz reef is outcropping in the lease area. In the lease area the surface soil is having 0.5 to 1.0 mt thickness here & there. There are three Quartz bands are existing in the lease area namely Band 1, 2 & 3. The strike length of Band 1 deposit is about 994 m and average width 30 m, Band 2 strike length is 750 m and average width 20 m and Band 3 strike length is 182 m and average width 25 m in North-East and south-west strike direction. The ore body is reef deposit and dip of the ore body is almost vertical. No other structural disturbances like fold & fault are observed in the lease area.

Quartz float ore exists both side of the quartz reef with 2m thickness. The recovery of the deposit will be 90% in reef zone and 50 % in float zone because even under size i.e. 4 mm to - 200 mm size is marketable. The balance 10 % and 50 % will be intercalated waste with red gravel with shale. The color of the Quartz is Cream & White milky.

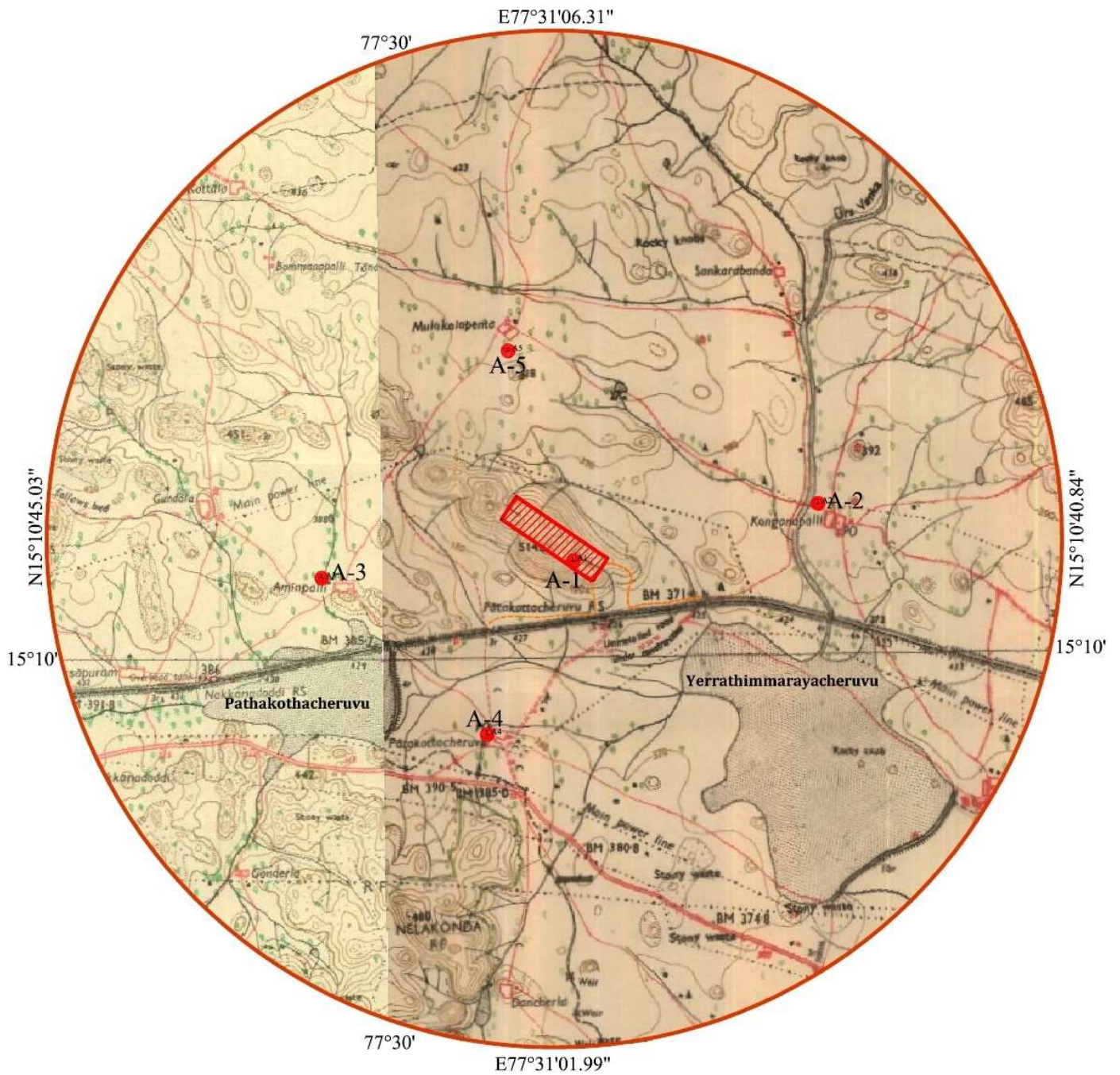
3.4 GEOLOGICAL RESERVES

The geological resources and Mineable reserves of float quartz ore and band wise quartz ore are as given below. The total Geological Resources are 1.548 million tons and Mineable Reserves are 1.467 million tons.









Table No 1: - Geological Reserves

Particulars	Geological Resources in Tons.	Mineable Reserves in Tons.
Float ore	561624	535668
Band - 1	531157	512542
Band - 2	395377	358024
Band - 3	60826	60826
Total	1548984	1467060

LOCATION PLAN

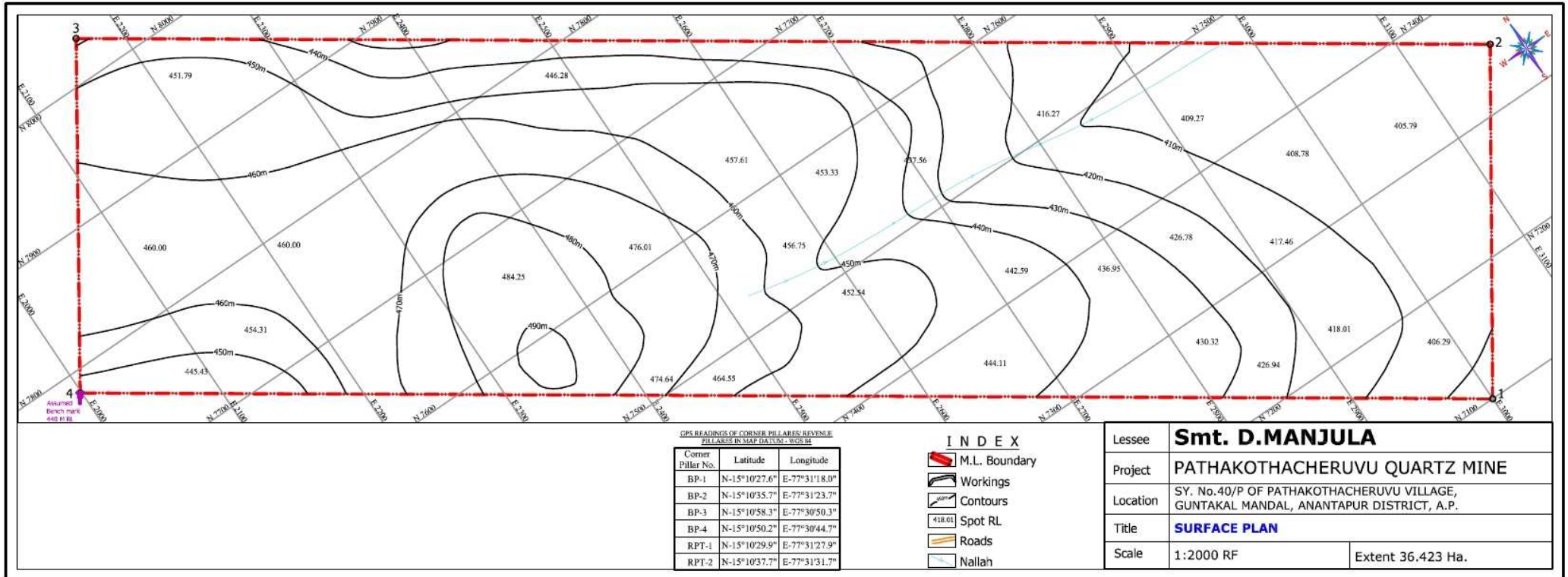


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Lessee	Smt. D.MANJULA		
Project	PATHAKOTHACHERUVU QUARTZ MINE		
Location	SY. No.40/P OF PATHAKOTHACHERUVU VILLAGE, GUNTAKAL MANDAL, ANANTAPUR DISTRICT, A.P.		
Title	KEY PLAN		
Scale	1:50,000 RF	Extent 36.423 Ha.	Toposheet No :- 57 E/8, E/12

SURFACE PLAN



GPS READINGS OF CORNER PILLARS REVENUE PILLARS IN MAP DATUM - WGS 84

Corner Pillar No.	Latitude	Longitude
BP-1	N-15°10'27.6"	E-77°31'18.0"
BP-2	N-15°10'35.7"	E-77°31'23.7"
BP-3	N-15°10'58.3"	E-77°30'50.3"
BP-4	N-15°10'50.2"	E-77°30'44.7"
RPT-1	N-15°10'29.9"	E-77°31'27.9"
RPT-2	N-15°10'37.7"	E-77°31'31.7"

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Lessee	Smt. D.MANJULA	
Project	PATHAKOTHACHERUVU QUARTZ MINE	
Location	SY. No.40/P OF PATHAKOTHACHERUVU VILLAGE, GUNTAKAL MANDAL, ANANTAPUR DISTRICT, A.P.	
Title	SURFACE PLAN	
Scale	1:2000 RF	Extent 36.423 Ha.

3.5 SALIENT FEATURES OF MINING:

This is a virgin mining lease area and no mining operations was carried out for want of Environmental Clearance and also poor market conditions for Quartz. The demand for quartz minerals is improved in various industries. Keeping in view of this, it is proposed to operate the mine in systematic and scientific manner.

The fully mechanized mining methods is proposed to be adopted during ensuing Mining Scheme Period. This method and mode of operation is taken into account mainly by considering all the parameters and the geological attitudes of the ore body and mine is proposed to work with Mechanised method of opencast mining.

Initially, the outcrops shall be excavated by slicing method and then after reaching a depth of five metres from ridge, there will be sufficient width for development of benches. A boxcut shall be formed initially which shall be developed along the width of the reef by a trench cut. The bench height shall be maintained at 6m and a minimum width of 6m shall be maintained. The width of the working bench shall be at least twice the height of the bench. The slope of the working benches shall be maintained at 60°. The haulage roads shall have a gradient of 1 in 20 to enable comfortable movement of traffic of dumpers.

The Ultimate Pit Limit, so drawn on the basis of the field studies, exploration data and the updated geological mapping carried out so far in the area remains very tentative. However, based on the future exploration the defined, Ultimate Pit Limit is likely to change. The said Ultimate Pit Limit is demarcated on the Geological plan. Since there is drilling and blasting in this said mine, to excavate / exploit the ore and waste, initially, it will be drilled and blasted. Hydraulic excavators will be deployed for removal/winning/excavation of the quartz and loading the same in tipper. For transportation of minerals and waste within the lease area 10 ton tippers will be used.

Since the white quartz is hard in nature the drilling and blasting will be restricted only for this hard strata. Where the soft in nature the same will be removed with the help of the excavators. The ore and waste will be exploited separately. The waste will be carried to the waste dump and it will be disposed off. The white quartz will be sent to the consumers.

For the future development and production a systematic mine working is proposed for the next one year keeping the long benches and good width for the movement of the mining machineries and for transportation. One wheel loader will be continuously deployed for road maintenance for smoother operation of the mining machineries and transportation. For using the Heavy earth moving machineries necessary permission from DGMS under rule 106 (2) (b) will be obtained.

SALIENT FEATURE OF LEASE AREA

Sl. No.	Items	Proposed
1	Geological reserves	1.548 Million Tons
2	Mineable ore reserves	1.467 Million Tons
3	Method of Mining	Fully Mechanized Open cast method.
4	Bench height	6 mtrs.
5	Bench width	12 mtrs.
6	Production	207792 Tonnes/Annum (Max)
7	Waste generation / annum	83240 Tonnes/Annum (Max)
8	Ore to O/B ratio	1: 0.412
9	Life of the mine with Avg. Production	15Years
10	Water Requirement	24.5 KLD
11	Man power	18 members
12	Cost of the Project	200 Lakhs

3.6 PROPOSED PRODUCTION:

The proposed quantities of development and production expected year wise during the scheme period are given in Table No.2.

Table No.2:-Proposed Production

YEAR	PRODUCTION‘Tons’	DEVELOPMENT‘Tons’
2017-2018	176153	80826
2018-2019	202512	82040
2019-2020	207264	80880
2020-2021	207792	83240
TOTAL	793721	326986

3.7 MINEABLE RESERVES AND ANTICIPATED LIFE OF THE MINE:

The reserves have been estimated by cross sections drawn at an interval of 176m to 280m depending upon the Quartz exposures. Proved reserves considered up to 15m depth from the surface of the exposed quartz reef. From the cross sectional area of ore zone, volumes are arrived using the cross sectional interval. The bulk density of quartz and waste has been found as 2.4 t/Cum & 2.0 t/Cum. The recovery of quartz in reef deposit is 90 % & 50 % in float deposit.

The total reserves in this quarry area are 1467060 Tonnes. It is proposed to work entire 1.467 million tons in next 15 years. Hence the life of the quarry is 15 years. These reserves are calculated based on the present exposed quartz and existing pits. However, by modifying the ultimate height of benches the reserves and subsequent age of mines will increase after detailed exploration.

3.8 DRILLING & BLASTING:

Since the mining is proposed to work by mechanized and the benches are kept 6m height and the white quartz is a material which is hard to very hard in nature. it requires the drilling and blasting to exploit the same. Blast hole diameter is normally 115mm and the depth of the hole is 6.6m inclusive of sub grade drilling of 0.6 meters to avoid toe formation. Blasting pattern is generally square or staggered with burden ranging from 3.0 to 3.5 meters and spacing of 3.5 to 4.0 meters.

Usually single / double row of holes is blasted along free face to achieve optimum powder factor, best fragmentation and minimized adverse impacts on account of blasting. Maximum numbers of holes will be blasted at a time in a round are generally limited to 15 to 20 with normal delay detonators to mitigate adverse impacts such as air blast, throw and the ground vibration.

Precautions to be observed during drilling and blasting:

Drilling precautions:

- Drilling with dust extractors.
- Use of sharp drill bits, delivery of compressed air at optimal pressure and proper maintenance of compressor and drilling machine.
- Provision of ear plugs/ear muffs to drillers.

Blasting precautions:

- Proper charge per delay shall be regulated
- Millisecond delay detonators or sequential blasting exclusively used.
- Stemming column shall be more than the burden to avoid blown out shots.
- Each blast would be is carefully planned, supervised, executed and observed by expert staff.

3.9 EMPLOYMENT POTENTIAL:

The list of the staff and workmen those shall be employed in the mine is given in Table No.3

Table No.3:-Employment Potential

Sl. No.	Particulars	Total No's
1	Mines Manager cum Mining Engineer	1
2	Geologist	1
3	Mine Foreman	1
4	Mate cum blaster	1
5	Semi Skilled	4
6	Un Skilled	10
Total		18

Others shall be employed through contractor

3.10 SITE SERVICES:

As at present there is no any site services exist, now it is proposed a small office, rest shelter, first aid room and urinal will be construct at the entrance of the lease area.

4.0 LAND USE:

The ultimate landuse plan (the land proposed to be degraded due to quarrying and other allied activities at the end of Scheme Period is given in Table No.4.

Table No.4:-land use at the end of scheme period

Particulars	Land use pattern years of mining scheme period) Ha.
Area for Mining	9.00
Area for Waste dump	1.50
Mineral Storage	0.50
Infrastructure	0.30
Area for Road	1.50
Mineral separation plant	1.00
Area for safety barrier/green belt	0.50
Unused area	22.123
Total Lease area	36.423

5.0 NATIONAL SANCTUARY/ ARCHAEOLOGICAL IMPORTANCE SITES/ INTERSTATE BOUNDARY WITHIN 5 KM RADIUS?

There is no National parks, Wild life Sanctuaries, Biosphere reserves, Tiger reserves, Elephant corridor heritage site, Archaeological importance sites, Interstate boundaries, Habitate etc., within 5Kms radius. There are two lakes Pathkothacheruvu and Y.T.Chervu are located in buffer zone area of 5 kms. radius.

6.0 PUBLIC BUILDINGS, PLACES OF WORKSHIP AND MONUMENTS :

There are no buildings and monuments of historic importance within the ML area. However, the Pathakothacheruvu railway station is at a distance of 0.5 kms away from the lease boundary.

7.0 COST OF THE PROJECT:

Considering the fluctuating market scenario and present domestic market conditions of the products, the cost of the project estimated to be around 200 Lakhs.

8.0 ENVIRONMENTAL STUDIES:

The Environmental Monitoring studies were carried out during Dec 2017 – Feb 2018 (Winter Season). The environmental studies were carried out in Core zone and buffer zone of 5 kms radius for Meteorological data, Air, Water, Noise, Soil, Flora, Fauna etc.,

8.1 METEOROLOGY :

8.1.1 Temperature

On perusal of last 5 years temperature data reveals that the highest temperature is 44°C during the peak summer season & maintains the maximum temperature for a week and the minimum temperature is 12 °C during the winter nights.

The perusal of mean monthly temperature data shows that lowest & highest temperature of 12.80°C and 37.10°C respectively were observed in the month of Jan-18 and Dec-17. The Summary of Monthly Max, Min Temperatures for the study period are given in Table No.5

Table No.5:-Monthly Maximum & Minimum Temperature

Month	Temperature in °C	
	Min.	Max.
Dec -2017	14.30	37.10
Jan-2018	12.80	36.20
Feb-2018	13.70	34.50

8.1.2 Relative Humidity

The morning and evening relative humidity data collected shows that the highest is 94% in Dec-17 and lowest humidity is 10% in Feb-18. The values of different month for the study period are given in Table No.6

Table No.6:-Monthly Maximum & Minimum Relative Humidity

Month	Relative Humidity in %	
	Min.	Max.
Dec- 2017	16.00	94.00
Jan-2018	10.00	92.00
Feb-2018	10.00	89.00

8.1.3 Rainfall

The Average rainfall for the year 2014- 2017 given in Table No.7. On perusal of the 4 years rainfall data, the average rainfall in the region is 470.9mm. During the study period the minimum rainfall is 0.3mm in the month of Dec-17 and maximum rainfall of 1.1mm is observed in the month of Feb-18.

Table No.7:-Rainfall data for the period of year 2014-2017

Year	Rainfall (mm)
2014	300.5
2015	479.8
2016	441.7
2017	661.9

8.1.4 Wind Velocity & Direction

Predominant Wind directions during this period were from the E to W sector. Wind speeds during this period were varying between 6.50 to 13.23kmph. The wind of less than 0.5m/s was treated as calm, and calm conditions are 21.48%. Percentage frequencies of wind in 16 directions have been computed from the recorded data of winter season during the study period to plot wind rose diagram. Fig- 1 Represents the wind pattern of the study period. The max. wind speed is 13.23 m/s during study period. For the month of December, January & February flow vector is predominantly towards East and West.

Table No.8:-Wind Velocity & Direction

Month	Wind Speed in m/sec.	Predominant Wind Direction
	Max.	
Dec-2017	13.23	E
Jan-2018	6.50	E
Feb-2018	13.00	SE

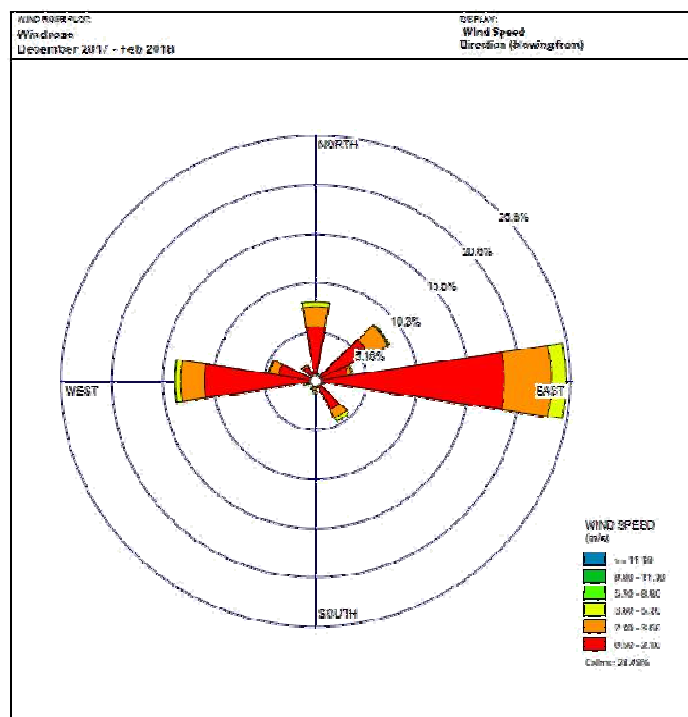


Fig: 1 Windrose Diagram of Dec 2017 to Feb 2018

8.2 AIR ENVIRONMENT :

Ambient air quality monitoring is done to determine the general background concentration levels. Samples were collected in the 5 km study area to observe pollution trends throughout the region. The various sources of air pollution in the region are vehicular traffic, dust arising from unpaved village roads & domestic fuel burning. The Prime objective of baseline air quality survey is to assess the existing air quality of the area. This will also be useful in assessing the conformity to standards of the ambient air quality during the mine operation.

8.2.1 Sampling Locations

To assess the ambient air quality level, five (5) monitoring stations were set up. Out of these 5 stations, one was set up in core zone, while the rest were outside the mining lease in buffer zone and within a radius of 5km. The location of the Ambient Air quality monitoring stations, distance & directions shown in Table No.9.

Table No.9:-Ambient Air Quality Monitoring Stations

Sl. No.	Location	Station Code	Project area		Zone (Core/Buffer)	Remarks
			Distance (Kms)	Direction		
1	Core Zone	A1	-	-	Core Zone	Industrial area
2	Kongannapalli village	A2	2.93	E	Buffer Zone	Residential area
3	Ameenpalle village	A3	2.60	W	Buffer Zone	
4	Pathakothacheruvu village	A4	2.28	S	Buffer Zone	
5	Mulakalapenta village	A5	2.13	NNW	Buffer Zone	

Villages/locations have been selected in the downwind direction as well as in the upwind direction for AAQ monitoring from the mine site.

Ambient air quality monitoring is done to determine the concentration levels of pollutants (Such as PM₁₀, PM_{2.5}, SO₂, NO₂ & Lead) in the atmosphere. Samples were collected in core zone and buffer zone within 5km radius from lease area to observe pollution trends throughout the region. It helps in providing a data base for evaluation of effects of a project activity in that region.

In general, Mining activity contributes to pollution of air due to working of mining equipment and transportation. Since the mine is proposed to work by fully mechanized means, there is a pollution to the air. However, the ambient air quality results area well within the standards and lead is Below Detectable Limits.

Total five Ambient Air Quality Monitoring Stations were identified, the pollutant results summary of which are as follows.

Table No. 10:-Comparative Results of Ambient Air Quality

Station Code	Name of Sampling Location	24 hour average contribution ($\mu\text{g}/\text{m}^3$)							
		PM ₁₀		PM _{2.5}		SO ₂		NO _x	
		Min	Max	Min	Max	Min	Max	Min	Max
Core zone									
A1	MineLease Area	38.32	57.84	10.23	24.87	3.55	6.52	4.32	8.12
Buffer zone									
A2	Kongannapalli village	35.04	46.21	8.53	13.26	5.10	12.62	7.01	13.12
A3	Ameenpalle village	32.65	46.86	7.03	14.80	5.51	10.15	6.75	11.22
A4	Pathakothacheruvu village	36.09	48.63	9.12	15.80	5.08	9.16	6.11	11.13
A5	Mulakalapenta village	40.03	51.99	7.70	18.23	5.27	10.91	6.85	11.05

8.2.2 IMPACTS

The mining operation being mechanized open-cast mining method, the dust generation due to breaking of land, movement of machinery on unpaved surfaces & handling of rejects, sub-grade ore & products is common. The impacts on air are mainly due to generation of fugitive dust during loading, unloading crushing, screening and transportation of ore and some emissions from the transporting trucks. The air pollutants are SPM/SO₂/NO_x emissions from the mining and transportation activities.

8.2.3 CONTROL MEASURES

There may be minor increase in dust level in the core and buffer zone. To control the same, water tankers will be engaged to spray water on haul roads continuously to suppress the dust.

Another important abatement program is to avoid spillage. This will be achieved by:

- Avoiding overloading of the trucks.
- Transportation of ore in tarpaulin covered trucks
- Formation of green belts.
- Sharpening of drilling bits.
- Development of green barriers all along the Roads, hill slopes, Waste dumps and vacant areas.
- By suppression of dust at the source itself.

8.3 NOISE QUALITY

Noise levels were monitored at six locations. One station representing core zone and the remaining five stations representing Villages in the buffer zone. Monitoring was conducted during day time and night time.

8.3.1 SOURCES OF NOISE POLLUTION

Noise pollution in mining area is mainly due to noise generation from the moving of machinery & Transportation. The noise level may increase in core zone due to drilling, Blasting and Mining operations. Since this mine is worked by means of fully mechanized, the noise levels are monitored as per the norms laid down by the governing agencies. The results are shown in the following Table No.11.

Table No.11:-Summary of the Noise Level

Sl. No.	Location	Day Noise (Ld) level (dBA)			Night Noise (Ln) level (dBA)		
		Dec-2017	Jan -2018	Feb -2018	Dec-2017	Jan -2018	Feb -2018
1	Core Zone	50.58	49.27	48.54	40.92	38.51	37.64
2	Kongannapalli village	52.52	53.80	52.01	41.81	38.70	41.50
3	Ameenpalle village	49.96	51.80	50.25	41.47	39.47	40.69
4	Pathakothacheruvu village	50.96	51.92	51.71	42.74	39.47	39.29
5	Mulakalapenta village	51.25	52.04	53.09	44.17	40.62	43.19
6	Pathakothacheruvu Railway Station	52.67	57.26	57.80	48.88	49.18	50.06

Ambient noise levels were measured at 6 locations around the mine site. Noise levels in core zone varied from 48.54 to 50.58LeqdB(A) during day time and during night time noise levels ranged from 37.64 to 40.92Leq dB(A). In Buffer zone 49.96 to 57.80Leq dB(A) day time and during night time noise levels ranged from 38.70 to 50.06Leq dB(A).

From the above study and discussions it can be concluded that noise levels in the study area are well within the prescribed limits as prescribed by the CPCB.

8.3.2 NOISE CONTROL MEASURES

Noise levels will be kept within acceptable limits by:

- Good maintenance of machineries and roads.
- Providing silencers & mufflers to machineries and transport vehicles.
- Avoiding overloading and speeding of the trucks
- Sharpening of Drill bits
- Planting of trees with thick foliage along the roads
- Provision of ear muff/ear plugs to Drillers, Loader operators and compressor operators.

8.4 WATER ENVIRONMENT

Six ground water & two surface water samples locations were selected to know the water quality in the study area. The samples were collected and analysed. The summary and results are given in Table No.12 & 13. The physico-chemical characteristics of the samples analyzed as per ISO standards.

Natural valleys drain the rainwater. Water table is at a greater depth and there is no chance of encountering water into pit even at ultimate level. There is no proposal of use of water during beneficiation of ore. Hence, there is no discharge of water to environment.

Table No.12:-Summary of Ground Water Analysis

Station No.	Location	pH	TH mg/l	TDS mg/l	Ca mg/l	F mg/l	pH	TH mg/l	TDS mg/l	Ca mg/l	F mg/l
		Winter Season (max.)					Summer Season (max.)				
GW1	Mulakalapenta village	7.63	508	1060	106	1.44	7.56	542	1060	116	1.46
GW2	Konganapalli village	7.90	310	586	44	1.61	8.04	300	630	40	1.62
GW3	Pathakothacheruvu village	7.62	960	2016	170	1.56	7.76	1100	2406	200	1.68
GW4	Pathakothacheruvu Rly. Stn.	8.01	552	1280	92	1.48	8.07	690	1366	74	1.54
GW5	Sankarabanda village	8.00	248	560	43	1.41	7.84	290	604	58	1.58
GW6	Ameenpalli Village	7.99	412	930	54	1.70	8.10	400	976	60	1.70

Table No.13:-Summary of Surface Water Analysis

Station No.	Location (Pond)	pH	TH mg/l	TDS mg/l	Ca mg/l	F mg/l	pH	TH mg/l	TDS mg/l	Ca mg/l	F mg/l
		Winter Season (max.)					Summer Season (max.)				
SW1	Y.T. Cheruvu	7.79	230	696	40	0.90	7.925	214	870	30.0	0.96
SW2	Pathakothacheruvu	7.48	352	806	58	0.81	7.852	208	826	34.0	0.87

8.4.1 Observation of Surface Water:

A review of the above mentioned summary of Surface water analysis reveals that there is not much variation in chemical composition of water samples from above water bodies. The total physical and chemical analysis of Surface water is analyzed.

Analysis results of surface water reveal the following: -

- pH varied from 7.48 to 7.925.
- Total Hardness varied from 230 mg/l to 352 mg/l
- Total dissolved solids varied from 696 mg/l to 870 mg/l

8.4.2 Impacts on Water Environment

There are no natural drainage channels within mining lease area.

The ground water table is available at a depth of 40 m from the general ground level. No seepage water is envisaged in the mine as no other mine pits are existing above the present working level of subject mine. Hence there will not be much impact on the ground water table due to mining activities.

To avoid soil erosion, rain water entering into the mine pit, and carry of the silt material with rain water, Mine Management will provide suitable garland drains all along the active mine area. Construction of retention wall all along the toe of the dumps, afforestation on the active dumps, construction of Check dams, Gully plugs etc. Hence impacts due to storm water by soil erosion followed by siltation are minimal.

8.4.3 Water Control Measures

- Retention Wall construction
- Check dam construction
- Dump stabilization
- Garland drains formation
- Massive afforestation
- Drains all along the road side
- Grass sowing on broken area
- Gully plugging

8.4.4 Water Consumption and Sources

The water consumption in this opencast mine is mostly used for dust suppression by water sprinkling on haulage road, afforestation and domestic use etc. The maximum handling (ore & waste) from this mine is 291032 tones/annum which is about 970.10tones/day. The mining shall be carried out by engaging Drilling & Blasting, Excavators, wheel Loader and tippers. The specific water consumption for various purposes is given in the Table shown in Table No.14.

Table No.14:-Water Consumption and Sources

Purpose	m³/day
Drinking water & Domestic	01.00
Afforestation	03.00
Dust suppression	20.50
Total	24.50

The water shall be drawn from the private boreholes located outside the lease area. It is also proposed to drill the bore holes near the mine area for the purpose of drinking water.

9.0 LAND ENVIRONMENT

The mining area falls in the revenue lands on hilltop with slopes on both sides. Most of the area is covered with soil formations over which some vegetation exists. Very little soil is covered on the slopes. This could be managed by reclaiming dumps, worked out pits and used for afforestation purpose and storage of rain water.

Due to mining and exploitation, there will be change in the ground profile in the form of pits and dumps. However, the impact is confined to mine premises only and is very minimal.

Table No.15:-Land use Pattern (in Ha.)

Particulars	Land use pattern At present stage	Land use pattern (end of scheme period)
Area for Mining	1.00	9.00
Area for Waste dump	0.20	1.50
Mineral Storage	0.10	0.50
Infrastructure (Buildings)	0.10	0.30
Area for Road	0.30	1.50
Mineral Separation plant	-	1.00
Area for safety barrier/green belt	0.10	0.50
Unused area	34.623	22.123
Total Lease area	36.423	36.423

9.1 Soil Quality

Four Soil samples were collected from both core and buffer zones to evaluate the soil quality in the study area.

Table No.16:-Chemical Properties of Soil

Sl No	Parameters	Unit	Results			
			S1	S2	S3	S4
1	pH	-	7.813	7.545	8.404	7.437
2	Electrical Conductivity	µS/cm	0.03	0.07	0.26	0.02
3	Chloride	mg/kg	7.08	28.32	88.50	31.86
4	Sodium Absorption Ratio	meq/l	13.49	15.58	51.54	10.67
5	Moisture	%	0.86	0.29	0.67	0.43
6	Sodium as Na ₂ O	mg/kg	28.67	38.58	91.72	19.57
7	Potassium as K ₂ O	mg/kg	5.86	21.12	10.24	8.16
8	Phosphorus as P ₂ O ₅	mg/kg	1.20	1.60	0.20	0.79
9	Organic Matter	%	2.27	3.24	2.06	1.99

All the samples are showing moderately fertile in nature and favorable for afforestation/ agriculture.

10.0 FLORA AND FAUNA

As the lease area covered by rocky out crop, so no vegetation is found any how some thorny bushes are seen here and there.

The core zone is partly rocky area and does not support vegetation. There are no endangered and endemic plant species. There are no reports of wild animals.

Aquatic Flora and Fauna of the Study Area

There are several small villages and there are mainly two water bodies exists in the study area namely Pathakothacheruvu & Erritimmarayacheruvu pond. Aquatic weeds are found to be growing in 5 km radius area viz. in water pond. Some of the aquatic flora such as *Eichhorniacrassipes*, *Hydrillaverticillata*, *Typhaangustata*, *Vallisneriaspiralis* etc, was found growing all along the drains of villages, small waterlogged depressions, along the agricultural fields lacking water but containing enough moisture to support its growth. And where water is present, *Eichhorniacrassipes* has taken its roots and covered the entire water surface by its sprawl and invasion. Aquatic fauna found in water bodies such as *Catlacatla*, *Sperataseenghala*, *Cirrhinusmrigala*, *Cyprinuscarpio* etc.

10.1 Disasters Management.

The complete mining operation will be carried out under direction of qualified mines manager and superior mining personnel, following the directions of Directorate General of Mines Safety (DGMS) and officers of Dept. of Mines & Geology.. Code of practice of different operations will be formulated to maintain of high standard of safety. Work persons have been given vocational training and further the standing will be continued to new entrants. The nearest Police Station & Fire Brigade Station is Guntakal at a distance of 15 kms from lease area. The contact person responsible for Disaster Management and Risk Assessment is as follows:

Name	:	Smt. D.Manjula
Address	:	W/o Sri.D.Ramana Kumar, D.No.45/D-1, Old Market Road,Cantonment, BELLARY – 583104. KARNATAKA,
Telephone	:	+91 9343187911

10.2 Plantation Program

About 4800m2 area along SE boundary will be planted during first five years. In every year about 150m length and 7.5m width of the barrier will be planted with 500 plants like *Pangamiapinnata*, *Neem*, *Tamarindus indica* etc at 2 to 3 m grid interval.

Under plantation programme, it is suggested to develop 500 plants per annum in green belt area & also along the road. The implementation of the development of green belt around the hillock will be of paramount importance as it will not only add up as an aesthetic feature, but also act as a pollution sink.

The species to be grown in the areas should be dust tolerant and fast growing species so that a permanent green belt is created.

Apart from the green belts and aesthetic plantation, other massive plantation efforts shall be decided and executed with the assistance and co-operation of the local forest department to benefit the community and to reduce the effects of fugitive emissions and noise pollution.

Table No.17:-Year wise plantation Programme

Year	No. of plants	Location	Survival rate %	Common Name	Botanical Name
2017 - 18	500	Around the lease area and Haul roads	70	Kaniga	<i>Pangamia pinnata</i>
				Vepa Chettu	<i>Azadirachta indica</i>
2018 - 19	500		70	Raavi Chettu	<i>Ficus religiosa</i>
				SeethaPhala	<i>Annona squamosa</i>
2019 - 20	500		70	Thumma Chettu	<i>Acacia serrugenea</i>
				Marri Chettu	<i>Ficus bengalieuensis</i>
2020 - 21	500		70	Chinta Chettu	<i>Tamarindus indica</i>
				Neredu chettu	<i>Syzygium cumini</i>

As there is no good rainfall in the area regular watering is required to improve the survival rate.

11.0 SOCIO-ECONOMIC BENEFITS

Apart from the various environmental protection measures, the company is conscious of its corporate social responsibility and as any good corporate citizen, it is undertaking the following works in the surrounding areas of the mine.

In order to enhance the contribution of mining industry and share a greater responsibility not only towards its employees but also for the community residing around lease area. Hence, it is considered necessary to provide minimum facilities to the surrounding villages for their better living standards.

This mine has proposed to provide financial assistance of Rs.6.0laks/annum for the development of social infrastructure of the area. Following measure will be taken to improve the Social infrastructure of the study area:

- Scholarships for the best outstanding students.
- Health care camps arrangements and distribution of medicines freely.
- Employment oriented training to youth.
- Providing transport for nearby school children to go to come from school.
- Assisting social forestry programme.

Agricultural Improvement:

- Help in arranging in association with nearby agricultural department for soil testing and technical inputs for increasing yield.

Employment :

Preference should be given to local population while inducting the man power (both skilled and unskilled). Necessary training shall be provided to locals to improve their skill.

Communication :

The mine roads to the project site from nearest village roads shall be constructed and maintained. The facilities like Bank, schools and post office is available at the Pathakothacheruvu and Konganapalli village whereas the Hospital, Market facilities, Higher Educational and Transportation facilities are available at Guntakal & Gooty towns which are at a distance of 15 kms from the lease area. The mode of transportation for local people is Bus, Railways, auto rickshaw and two wheelers.

Spurt in industrialization and mining activities have invariably brought a drastic change in the environment including the society connected with region. Mostly remote areas tucked away from urbanization and influence of modern civilization fall within the limits of mine development. A natural corollary to this the socio economic aspects of the local inhabitants who have dwelling this region for generations, get suddenly and probably a radical change, consequent to their abrupt exposure to the mining activities.

The impact of this mining project will be positive. The subject-mining project provides employment for about 56 persons and also creates in the service sector for an equivalent number of persons will be indirectly employed in the other allied activities. Thus a population of about 150 persons can sustain their lively hood on this project. Majority of the work force shall be local people coming from and within the district.

The local people will get employment opportunities, better Medical and Educational facilities etc., mainly due to the mining operation from this project. In addition to this the literacy rate and better living standards shall increase due to the enhanced earning capacity of villagers. This area will also have better Medical, Educational, Transportation and communication facilities, which are also directly, linked with the establishment of the mining project.

In the buffer zone villages, this project will be one of the major economic activities resulting in generation of revenues to the state and central governments, by way of Royalties, Taxes, DMF, Central Excise etc., and the living condition of the persons shall improve, thus contributing to the overall up gradation of living standards. There would tremendous earning of

foreign exchange due to export of value added products instead of raw material alone from this region.

The socio-economic parameters of the area undergo change due to:

- Changes in the employment pattern of the area.
- Changes in the pattern of facilities available, both in respect of the infrastructure facilities as well as other services.
- Improvements in money supply in the area through better earning capacity of population.

12.0 FINANCIAL IMPLICATIONS

In order to restore the environment, environment management plan will be designed for which applicant proposed to spend 23.25 lakhs / annum. Details of the proposed implementation of different programmes / activities are as follows:

Table No.18:- Financial Implications

Sl.No.	Work Name	Capital	Annual recurring Cost (in Rs.)
1	Occupational Health & Safety		75,000
2	Air Pollution Control : Gunny bags/ cloth for covering drill rods, Water sprinkling haul roads & greenbelt, developing greenbelt	2,200,000	900,000
3	Water Pollution Control: Constructing garland drains with silt traps & Check dam	500,000	100,000
4	Greenbelt Development	-	150,000
5	Medical Examination	-	100,000
6	Environment Monitoring	-	400,000
7	Social Welfare Measures	-	600,000
Total			23,25,000

13.0 CONCLUSION

Based on the EIA study it is observed that there will be a marginal increase in the dust pollution, which will be controlled by sprinkling of water and transportation of ore in tarpaulin closed trucks. There will be insignificant impact on ambient environment and ecology due to the mining activities on the other hand mining operation will lead to direct and indirect employment generation in the area.

Hence, it can be summarized that the development of **Pathakothacheruvu Quartz Mine of D. Manjula** will have a positive impact on the socio-economic of the area and lead to sustainable development of the region.
