

7.2 DISASTER MANAGEMENT AND EMERGENCY PREPAREDNESS PLAN – LIMESTONE MINE

The limestone deposit in this area is massive in nature and of sedimentary formation, without any overburden capping. Winning of mineral and development of faces is done by mechanized opencast mining method with deep hole drilling and blasting practices, using heavy earth moving machinery for transporting the mineral from the mine. The deposit being hard and compact, the bench height is maintained at a maximum of 8 mts. and the sides are adequately sloped or secured so as to prevent danger from fall of sides. The width of the bench is maintained not less than the height of the bench. The overall pit slope of 80° shall be maintained, to avoid collapse or fall of sides during post mining period. The mine approach ramp gradient will be kept at a minimum of 1 in 16. The fencing shall be checked inspected by the competent persons to avoid unauthorized persons entering into the Mine.

High risk accidents like subsidence, landslides, earthquake, tailing dam failures etc are not existent/ associated in this kind of deposit. In case of inundation due to heavy rain fall in the area, sudden inrush water to the lower benches, and in case of sudden irruption of fire in the machines to safe guard the men and machinery, an action plan called Emergency Plan/ Disaster Management Plan prepared by the Manager of the Mine is as detailed below:

Disaster Management Plan (DMP) has been introduced as a tool for dealing with any serious event that might lead to great harm/damage, so as to attempt to minimize the consequences of such an event, prevent loss of life, avoid consequential damage, localize the effects/prevent them from spreading to the immediate neighborhood, etc. In order to ensure that the DMP is effective, Risk Management Plan, involving the following is formulated and implemented.

1. Risk identification, Risk evaluation
2. Risk assessment and prioritization
3. Risk Controls.
4. Auditing of the system



7.2.1 RISK IDENTIFICATION

The first step in Disaster management is the risk identification. All the activities having potential for exposure to such risks were identified, under the following elements-

PEOPLE	: Occupational health & safety
EQUIPMENT	: Equipment / property damage
MATERIAL	: Resource depletion / resource wastage
ENVIRONMENT	: Air pollution, water pollution, land contamination, noise pollution, house keeping

The identification was done based on:

- Inventory of activities, trades & tasks
- List of critical equipment's & processes
- Study of past accidents, break downs, near-misses
- Experiences of concerned persons
- Experiences of neighboring mines
- Incidents mentioned in various circulars issued by Statutory agencies

The mining operations at this mine have been classified as follows:

1. Preparation of drilling area and marking of blast-holes
2. Primary drilling
3. Sampling and testing blast hole cuttings
4. Blasting

RISK EVALUATION:

The risks identified are evaluated to judge their relative importance or significance on the different elements detailed earlier. This evaluation of impact was done under 3 conditions, which are the combination of certain criteria with scores. These conditions are

Normal operating condition: These conditions, which exist as a result of routine operations according to normal operating procedure.

Ex. Dripping of oil from connecting flanges while unloading HSD.



Abnormal operating conditions: Those conditions which exists as a result of non-routine operations or unforeseen happenings. Breakdowns and start and stop situations are considered as abnormal condition.

Emergency conditions: Accidents, fire, explosion, etc. are considered potential emergency situation. A five-component rating scale has been evolved using the following evaluation criteria.

- i) Legislation ii) Impact iii) Occurrence iv) Control v) Detection

7.2.2 RISK ASSESSMENT & PRIORITIZATION

A quantification method was evolved using a simple 3 level scale of 1, 2, 3. Suitable explanation for each level under each criteria is given below **Table – 7.1**. The rating is done on a 5-component scale as detailed above.

TABLE – 7.1
RATING SCALE

Normal, Abnormal & Emergency conditions:		
A. Legislation score criteria	B. Impact score criteria	C. Occurrence score criteria
Y. Meeting legislation	1. Fatal or permanent disabling injury / accident or loss of body part / long term health effects.	3. Several times a day or continuous
N. Not meeting Legislation	2. Medical aid injury or temporary disability or short-term health effects.	2. once a day
NA. No Legislation	3. First aid injury/slight inj- jury, temporary health effects	1. Once a month or less frequent
D. Controls score criteria	E. Detection score criteria	
3. Absence of effective controls.	3. Above 8 hours.	
2. Mechanism in place but not possible.	2. Between 1 & 8 hours.	
1. Available & effective	1. Immediately	
Formulae: Total score (F) = B X C X D X E		



7.2.3 RISK CONTROLS

After identification of critical risks, controls were imposed through 3 possible alternatives, namely

Termination: Termination of the risks by such activities, that they cease to exist. Usually these are specific actions that can be implemented in short term. Examples are securing a ladder on the ground, which was initially kept unsecured.

Treatment: Improvement can be achieved through treatment of critical risks associated with different activities, through formulation and implementation of performance improvement programs as detailed below in **Table – 7.2:**

TABLE – 7.2
PERFORMANCE IMPROVEMENT PROGRAMS

Sl. No.	PROGRAM
1	Usage of cage for tyre inflation
2	Traffic signals & road dividers in mines roads
3	Reduction of sharp turns in mine haul roads
4	Procurement of the firefighting system for HEMM
5	Modification of coupling guards, providing of safety meshes near conveyors, toe guards in conveyor gallery, platforms, ladders & hand rails
6	Development of plantation
7	Formulation of code of practice for hired trucks

Tolerance: Toleration was inevitable, wherever risks were not easily amenable for performance improvements, or improvement programs could not be taken up on account of non-availability of resources. However, such activities are carried out so as to maintain present level of performance.

Deployment of hired equipment, and treatment of their operating personnel:

(A) The personnel operating the hired equipment are -

1. Imparted Initial (basic) and refresher training
2. Provided Personnel Protective Equipment
3. Not allowed to work beyond normal working periods.
4. Subjected to Periodical medical examination



(B) The hired equipment is maintained in good working order as follows:

1. Daily inspection of machine by competent engineer to ensure safety of the machine.
2. Regular inspection and prompt supervision
3. Reliability of machines are maintained

7.2.4 RISK – BASED AUDITING

Risk assessment facilitates appropriate attention of the management for higher risk items, in terms of treatment, planning, Monitoring and/or auditing.

Risk based auditing is a strategy to establish the amount of auditing required based on the risk priority and level of existing controls. It is imperative that if control risks are high (ie. inadequate or partial existing controls) and inherent risks are high (ie. significant and high risks) then only a low detection risk can be tolerated (ie. Extreme amount of auditing is required). All high risks require an extreme amount of auditing.

RISK CONTROL ACTION PLAN:

The control effort and urgency in proportion to risk tolerance is decided as given in the **Table -7.3** and activity wise risk assessment is given in **Table – 7.4**.

**TABLE – 7.3
RISK TOLERANCE**

RISK LEVEL	ACTION AND TIME SCALE
Trivial	No action is required.
Tolerable	No additional controls are required; consideration may be given to more cost-effective solutions or improvements that impose additional cost burden. Monitoring is required to ensure that controls are maintained.
Moderate	Efforts should be made to reduce the risk, but the cost of prevention should be carefully measured and limited risk reduction measures should be implemented.
Substantial	Work should not be started until the risk has been reduced. Considerable resources may have to be allocated to reduce the risk. When the risk involves work in progress, urgent action should be taken.
Intolerable	Work should not be started or continued until the risk has been reduced. If it is not possible to reduce the risk even with unlimited resources, work has to remain prohibited.



**TABLE - 7.4
ACTIVITY WISE RISK ASSESSMENT**

Sl. No.	Activity / hazard	Persons at risk	Risk	Existing control measures	Likelihood of harm	Severity of harm	Risk level
01	Drilling operations	Drillers and helpers	1) Noise generation 2) Slippery of accessories 3) Injury while handling accessories	Adequate	Unlikely	Slightly harmful	Trivial
02	Handling of explosives	1) Blasters and helpers 2) Surrounding employees and if public dwellings are nearby	1) Noise generation & air blast 2) Ground vibration 3) Flying fragments 4) Improper sheltering 5) Stray currents & lightening	Adequate	Unlikely	Extremely harmful	Substantial
03	Machines	Operators, mechanics and helpers	1) Mechanical 2) Hydraulic 3) Auto-electrical 4) Operational 5) Maintenance 6) Safety & house keeping	Adequate	Unlikely	Slightly harmful	Tolerable
04	Electrical	Electrician, wiremen and helpers	1) Direct contact with live circuit 2) Formation of an electric arc 3) Fire 4) Defective installation 5) Defective maintenance 6) Unauthorized interference	Adequate	Unlikely	Extremely harmful	Substantial
05	Gas cutting and welding work	Welders and helpers	1) Eye damage 2) Skin injuries 3) Burns	Adequate	Unlikely	Extremely harmful	Substantial



Sl. No.	Activity / hazard	Persons at risk	Risk	Existing control measures	Likelihood of harm	Severity of harm	Risk level
			4) Inhalation of toxic gases 5) Electrical shock				
06	Excavator, loading equipment operation	Operators and helpers	1) Unauthorized operation 2) Swing over cabin of trucks 3) Under cutting in face 4) Not using safety devices 5) Starting without warning	Adequate	Unlikely	Slightly harmful	Trivial
07	Hauling equipment's	Operators, helpers and co-workers	1) Unauthorized operation 2) Operating at unsafe speed 3) Making safety devices inoperative 4) Not using safety devices 5) Using unsafe equipment 6) Unauthorized riding	Adequate	Unlikely	More harmful	Moderate

7.2.5 EMERGENCY MANAGEMENT PROGRAMS

Managing emergencies is integral to risk management. While inherently safe design, operational practices, maintenance procedures and monitoring activities cover the prevention of emergencies, emergency response planning and emergency preparedness are part of mining activities. An emergency preparedness plan will be formulated to deal with events likely to cause serious dislocation of work, loss of property,



production, human life, and general deterioration in the levels of morale of the employees.

Onsite Emergency plan for the mine:

Public safety can be endangered on occasions through negligence or unusual or unforeseen circumstances. Detailed list of risk events w.r.t. Safety, health and environment, are identified that might affect mining at Kanakadripalli Limestone Mine. The details are as under.

- Mine design - Un-reclaimed mine.
- Mine operation-Housekeeping, HEMM operation, traffic movement, machinery maintenance, handling of explosives, fire, personal competence, personal protective equipment, etc.
- Occupational health and safety.
- Environment-Contamination of land, water, air, noise, public disease & health risks.

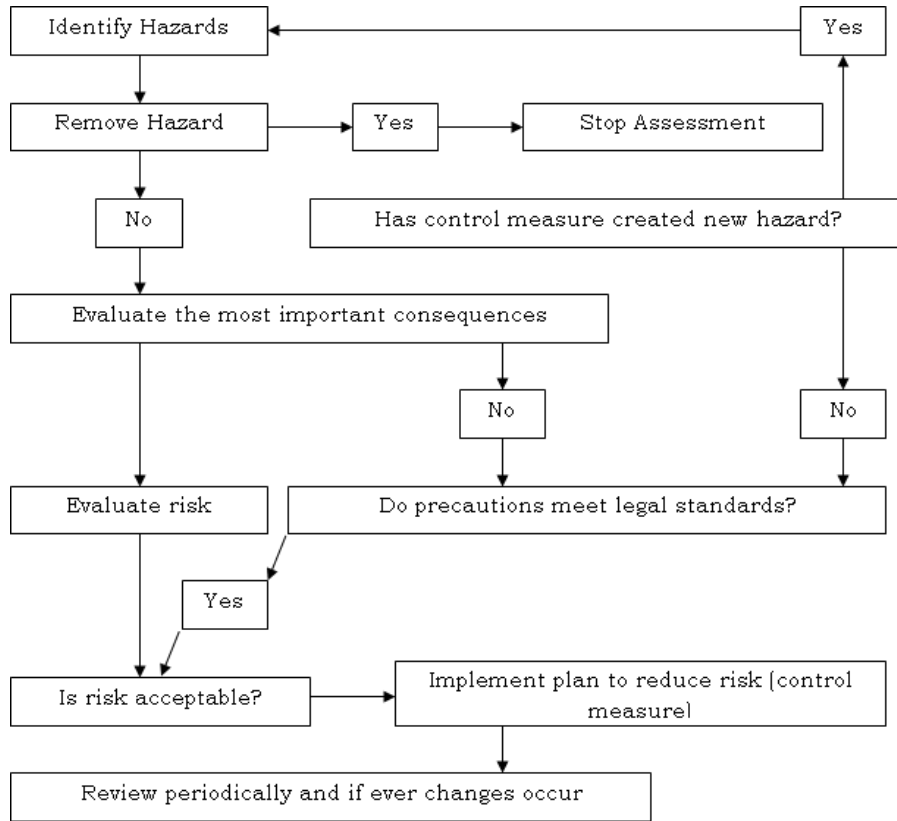
To deal with each type of risk, a model as designed and detailed below in **Fig – 7.1** will be followed:

As per the guidelines as laid down by DGMS and other competent regulatory agencies and the provisions of safety precautions as laid down in Metalliferous Mine Regulation, 1961 will be followed while undertaking the mining operations.

Mining equipment will be provided with on-board firefighting devices. A mobile service van will be contemplated for deployment, to take care of maintenance operations. Personal will be provided with protective equipment like safety helmets, safety shoes, safety belts, goggles, dust masks, gloves, ear muffs, etc., for adequate protection to workers during mining operations. Entry of unauthorized persons shall be prohibited.



**FIG – 7.1
RISK MODEL**



Personnel will be regularly provided adequate training to likely safety hazards in mines and plant. The company will organize and will participate in mines safety week, Mines Environment & Mineral Conservation (ME&MC) week celebrations from time to time. The latest developments will be discussed on such occasions and their implementation programs are checked out.

The proposed onsite emergency plan for the mines is given below

A) Duties and Responsibilities of Mines Manager:

He will be the overall incharge for all operational and administrative functions in case of any major emergency effecting mines. In the absence of Manager or till he arrives on site, Assistant Manager will assume overall responsibility. He will take decisions on all matters as given hereunder and till Mines Manager arrives at the site and shall be responsible for all operations.



- Essential communication and flow of information
- Emergency control and rescue operation
- Transportation, evaluation and logistics
- First aid and medical facility
- Relief and rehabilitation
- Security
- Public relations
- Accommodation, catering and refreshment
- Investigation and statutory requirements

B) Duties and Responsibilities of Safety Officer/Assistant Manager

- Ensure safe working conditions at all times.
- Ensure safety of personnel engaged in emergency & rescue operations.
- Take care that rescue operations are being carried out in a safe manner.
- Isolate & cordon off all hazardous equipment/zones in the affected area.
- Remove affected personnel to first aid center for medical attention.
- Bring to the notice of Mines Manager/Assistant Manager all unsafe conditions prevailing in the affected area.
- Extend any other help required.

C) Duties and responsibilities of Shift in charge

- Immediately inform to Mines Manager, Time office, and Security Officer
- Inform all persons working in the mines at different locations
- Ensure facilities like vehicles and ambulance
- Try to rescue, maintain order, salvage and contain

Asst. Managers are the shift in charges and they are responsible for the safety of individual shifts.

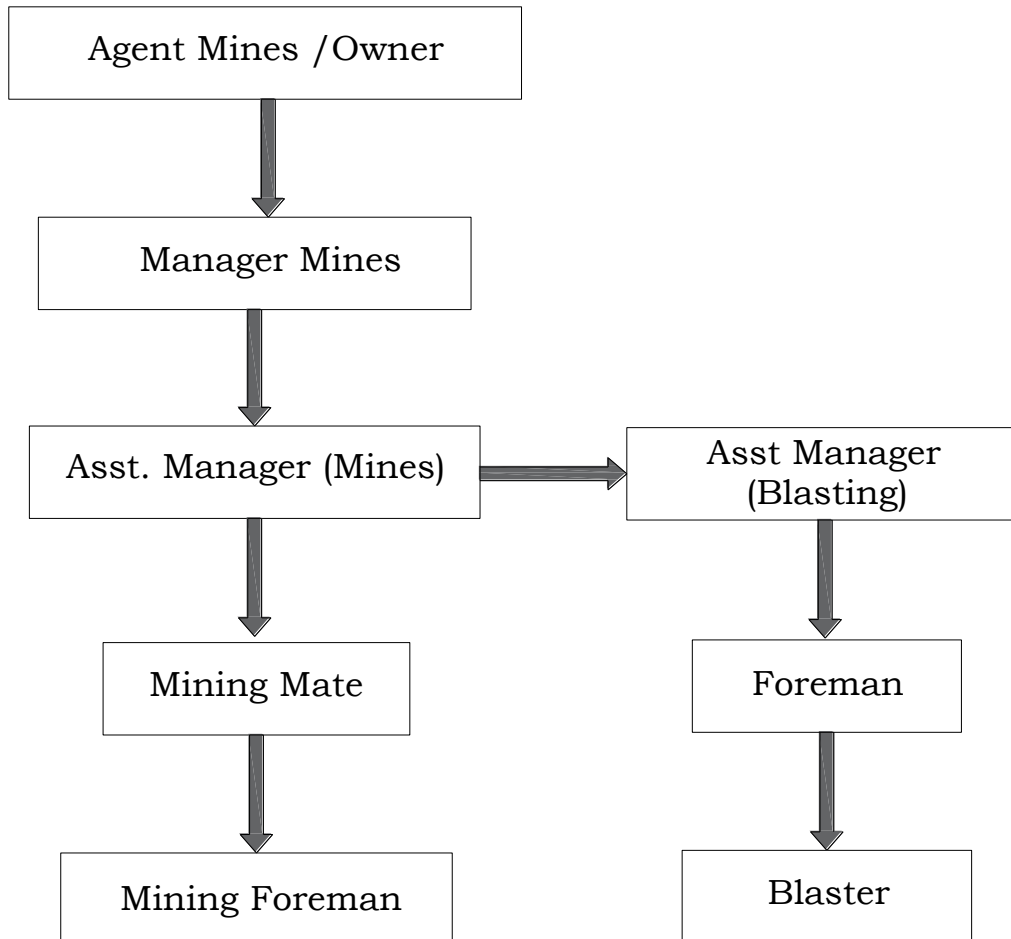
The details of nearest Police station, Hospital and Fire station of Kanakadripalli will be displayed in the mines office.

To carry out/ implement the above responsibilities the Mines Department has employed required staff and executives which will



be strengthened further. The organizational structure to control emergencies is given below in **Fig – 7.2**.

FIG – 7.2
ORGANIZATIONAL STRUCTURE TO CONTROL EMERGENCIES



7.2.6 TRAINING

The training of mine personnel will be conducted regularly with respect to environmental protection. Training facilities exist in the cement plant and the same will be extended to mine staff too.

7.3 PREVENTION OF ILLEGAL MINING AND PILFERAGE OF MINERAL NEEDS

RCL will adopt the following measures for prevention of illegal mining and pilferage of mineral

1. RCL will establish check post drop gate at the mine's entry point.



2. RCL will form peripheral bund all along ML boundary with plantation and make trench at all pilferage entry points.

TRCL will adapt following procedure as per approved Mining Plan by Indian Bureau of Mines

As per MCDR,2021, in the prescribed template online Monthly returns and Annual returns will be submitted incorporating the details of top soil/OB quantity excavated and production / dispatches of limestone to the concerned authorities of State Govt and Indian Bureau of Mines and the same will be re-conciled

Annual auditing will be done by the Dept. of Mines and Geology and reconciled as against the materials excavated and transported and payment of royalty, DMF/NMET etc.,

TRCL will conduct internal and external audit every year and the records of re-conciliation will be maintained as per Statutory records & returns etc.

TRCL will arrange security at mines, use of surveillance system, installation of weighbridge, GPS tracking system.

The raw mix design study can be conducted, once clinkerisation unit is commissioned. Presently conversion factor taken as 1:1.5 (Clinker: Limestone) based on the experience and standard norm of NCCBM. Specific gravity considered for limestone 2.5 Ton/Cu.m, Soil 1.6 ton/Cu.m.

7.4 TRAFFIC STUDY AND ESTIMATION OF ADDITIONAL LOAD

Traffic study has been carried out on

1. State Highway (SH- 57) connecting Kolimigundla –Gooty Road near to Project site of Kanakadrialle Village and
2. Itikala Ummayapalli Road near to road connecting State Highway of Itikala Viilage.

FIG – 7.3



PHOTOGRAPH SHOWING EXISTING ROAD CONNECTIVITY



State Highway (SH- 57) connecting Kolimigundla –Gooty Road

Itikala Ummayapalli Road

The Present traffic observations on the State Highway (SH- 57) connecting Kolimigundla –Gooty road are given in **Table – 7.5** and Itikala Ummayapalli Road are given in **Table – 7.6**

**TABLE – 7.5
TRAFFIC OBSERVATIONS - STATE HIGHWAY CONNECTING
KOLIMIGUNDLA –GOOTY ROAD**

Timing	2 Wheelers	3 Wheelers	4 Wheelers (Cars,Jeeps, Vans)	Buses/ Lorries/Trucks	Heavy Vehicles	Total
22-12-2021, 07:00 AM to 22-12-2021, 07:00 PM						
07:00 -08:00	168(84)	50(50)	70(98)	95(209)	68(272)	451(713)
08:00 -09:00	180(90)	58(58)	68(95)	74(163)	72(288)	452(694)
09:00 -10:00	200(100)	63(63)	78(109)	102(224)	63(252)	506(749)
10:00 -11:00	184(92)	66(66)	95(133)	85(187)	54(216)	484(694)
11:00 -12:00	156(78)	45(45)	52(73)	96(211)	63(252)	412(659)
12:00 -13:00	142(71)	48(48)	41(57)	71(156)	71(284)	373(617)
13:00 - 14:00	132(66)	52(52)	43(60)	73(161)	52(208)	352(547)
14:00 - 15:00	125(63)	53(53)	56(78)	69(152)	53(212)	356(558)
15:00 - 16:00	185(93)	52(52)	55(77)	59(130)	54(216)	405(567)
16:00 - 17:00	153(77)	44(44)	57(80)	71(156)	49(196)	374(553)
17:00 - 18:00	198(99)	49(49)	52(73)	82(180)	65(260)	446(661)
18:00 - 19:00	189(95)	50(50)	53(74)	83(183)	66(264)	441(665)

Note: The highest peak observed is 749 PCU's/hr during 09:00 -10:00AM The traffic count is taken for both the side together. Values reported in brackets are PCUs.

TABLE – 7.6



TRAFFIC OBSERVATIONS - ITIKALA UMMAYAPALLI ROAD

Timing	2 Wheelers	3 Wheelers	4 Wheelers (Cars, Jeeps, Vans)	Buses/ Lorries/ Trucks	Heavy Vehicles	Total
23-12-2021, 06:00 AM to 23-12-2021, 06:00 PM						
07:00 -08:00	22(11)	29(29)	15(21)	9(20)	21(84)	96(165)
08:00 -09:00	38(19)	25(25)	16(22)	13(29)	22(88)	114(183)
09:00 -10:00	29(15)	26(26)	18(25)	15(33)	17(68)	105(167)
10:00 -11:00	26(13)	32(32)	17(24)	14(31)	16(64)	105(164)
11:00 -12:00	24(12)	27(27)	22(31)	13(29)	17(68)	103(166)
12:00 -13:00	28(14)	22(22)	21(29)	12(26)	19(76)	102(168)
13:00 - 14:00	19(10)	20(20)	19(27)	18(40)	16(64)	92(160)
14:00 - 15:00	23(12)	19(19)	15(21)	16(35)	15(60)	88(147)
15:00 - 16:00	28(14)	16(16)	16(22)	12(26)	21(84)	93(163)
16:00 - 17:00	30(15)	22(22)	17(24)	14(31)	14(56)	97(148)
17:00 - 18:00	26(13)	21(21)	15(21)	16(35)	16(64)	94(154)
18:00 - 19:00	19(10)	23(23)	19(27)	15(33)	17(68)	93(160)

Note: The highest peak observed is 183 PCU's/hr during 08:00 -09:00 AM. The traffic count is taken for both the side together. Values reported in brackets are PCUs.

ADDITIONAL TRAFFIC

The limestone will be transported by tippers to crusher located in Chinthalayapalli Mine. The number of trucks required for transportation of total quantity of 0.1 MTPA of limestone. The estimation of additional trucks is shown **Table – 7.7**.

**TABLE – 7.7
ESTIMATION OF TRUCKS FOR TRANSPORT**

	TOTAL MATERIAL TRANSPORT
Total Quantity, MTPA	0.1
Capacity of each truck, Tonnes	30
Number of trucks for total quantity	3333
Operational days	300
Operational hours for trucks in a day	8
Number of trucks per hour	2.0+2.0* (i.e 9 PCU/hr)

*Two ways considered

It can be seen from the above table that, the maximum trucks which would add to the existing traffic will be 4 trucks / hour (9 PCU/hr) due to the transportation of limestone from proposed mine site to crusher located at Chinthalayapalli mine site.



The details of existing traffic scenario and level of service and proposed addition of number of trucks and level of service are given in **Table – 7.8**

**TABLE-7.8
EXISTING TRAFFIC SCENARIO AND LEVEL OF SERVICE (LOS)**

Road	Existing V	C	Existing V/C	LOS
State Highway (SH- 57) connecting Kolimigundla –Gooty Road	749 PCU/Hr	1900	0.394	B Very Good
Itikala Ummayapalli Road	183 PCU/Hr	2400	0.07	A Excellent

EXISTING & ADITIONAL TRAFFIC SCENARIO AND LEVEL OF SERVICE (LOS)

Road	Existing V	Additional	C	Total	Additional V/C	LOS
State Highway (SH-57) connecting Kolimigundla – Gooty Road	749 PCU/Hr	4 (9) PCU/Hr	1900	749+9=758	0.398	B Very Good (No Change)
Itikala Ummayapalli Road	183 PCU/Hr	4 (9) PCU/Hr	2400	183+9=192	0.08	A Excellent (No Change)

V/C	LOS	Performance
0.0 - 0.2	A	Excellent
0.2 - 0.4	B	Very Good
0.4 - 0.6	C	Good / Average / Fair
0.6 - 0.8	D	Poor
0.8 - 1.0	E	Very Poor
1.0 & above	F	Very Very Poor

*** Note: Capacity as per IRC-106:1990. Guide line for capacity for urban roads Page 11, Table-2 V= Volume in PCU's/hr & C= Capacity in PCU's/ hr
LOS= Level of Service**

The Level of Service which is at present in A & B Category (Excellent & Very Good) will retain the same for respective roads.

From the above data, it is clearly evident and concluded that due to the proposed limestone production of mine, there is no adverse impact on the studied roads as the loaded and unloaded trucks to be added are very less in number.

RCL will provide parking facility and canteen, toilets, rest rooms, etc. for truck drivers. Separate office building equipped with all communication and other infrastructure will be provided to the transporters.

