EIA/EMP REPORT
WITH
EXECUTIVE SUMMARY ENGLISH & HINDI
FOR

CLUSTER No. 49 EKALSINGHA GRANITE MINE
CLUSTER AREA OF 11-EXISTING MINING LEASE-13.3779 HECTARE
PROPOSED 1- L.O.I APPLIED AREA- 1.0023 HECT
TOTAL CLUSTER AREA- 14.3802 HECTARE
NEAR VILLAGE- EKALSINGHA,
TEHSIL – KEKRI & DISTRICT- AJMER,
(RAJASTHAN).)

IN FAVOR OF

S.No	Applicant	M.L No	Area	Mineral	Near Village	Production Capacity TPA (ROM)
1.	Sh. Devraj Gurjar	51/2018	1.0023	Granite	Ekalsingha	1,62,960
2.	M/S A.G Mines & Minerals	24/2018	1.4143	Granite	Ekalsingha	99,006.13
3.	M/S Sawai Bhoj Granites	31/2018	1.3006	Granite	Ekalsingha	1,82,127
4.	Shree Giriraj Granite	57/2018	1.5835	Granite	Ekalsingha	4,21,686
5.	M/s Satya Suman Marble & Granite	86/2018	1.0025	Granite	Ekalsingha	1,28,294
6.	Shree Sagar Sharma	119/2018	1.0229	Granite	Ekalsingha	1,66,964
7.	M/s Sh. Tirupati Granite Mines	18/2019	1.3848	Granite	Ekalsingha	60,060
8.	M/s Arihant Granites	22/2019	1.4797	Granite	Ekalsingha	2,03,212
9.	Sh. Jagdish Bairwa	07/2019	1.0144	Granite	Ekalsingha	52,650
10.	Shiraj Gurjar	28/2018	1.0001		Ekalsingha	2,51,206
11.	M/s Aditi Granite & Mineral	70/2018	1.00	Granite	Ekalsingha	2,00,000
12.	M/s Basarani Granite	108/2018	1.1751	Granite	Ekalsingha	2,72,764
TOTAL			14.3802			22,00,929.13 TPA (ROM)

CATEGORY- B-1
CLUSTER PROJECT COST 11-EXISTING LEASE AS PER E.C GRANTED- 10.45 CRORE
APPLIED PROJECT COST AS PER ISSUED ToR LETTER-0.95 CRORE
TOTAL CLUSTER PROJECT COST- 11.40 CRORE
PURPOSE- ENVIRONMENT CLEARANCE

EIA CONSULTANT
M/S N.S. ENVIRO – TECH LABORATORIES & CONSULTANT
OFFICE ADD- P. NO. 51, GANETA HOUSE, SHIV VIHAR COLONY
NEAR PATRAKAR COLONY ROAD, MANSAROVAR JAIPUR - 302020 (RAJ.)
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Quality Council of India

National Accreditation Board for Education & Training

CERTIFICATE OF ACCREDITATION

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The organization is accredited as Category-A under the QCI-NABET Scheme for Accreditation of EIA Consultant Organization, Version 3: for preparing EIA-EMP reports in the following Sectors –

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1.	Mining of minerals including opencast / underground mining	1	1 (a) (i)	A
2.	Highway	34	7 (f)	A
3.	Aerial ropeways	35	7 (g)	A

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated Sept 04, 2020 and supplementary MoM Jan 15, 2021 posted on QCI-NABET website.

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Sr. Director, NABET
Dated: Feb 01, 2021

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August 18, 2022

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PLATE 6	MINE LAYOUT PLAN
PLATE 7:	CONCEPTUAL PLAN
PLATE 8:	ENVIRONMENT PLAN
PLATE9	PMCPPLAN

ABBREVIATIONS

AAS/ICPA	:	Atomic Absorption Spectrophotometer/Inductively Coupled Plasma Analyzer
AAQ	:	Ambient Air Quality
AAQM	:	Ambient Air Quality Monitoring
AAQS	:	Ambient Air Quality Standards
ADM	:	Additional District Magistrate
AIS & LUS	:	All India Soil and Land Use Survey
AMSL	:	Above Mean Sea Level
ANFO	:	Ammonium Nitrate - Fuel Oil
APHA	:	American Public Health Association
BH	:	Business Head
BHs	:	Bore Holes
BIS	:	Bureau of Indian Standards
BGL	:	Below Ground Level
CAZRI	:	Central Arid Zone Research Institute
CC	:	Calcium Carbonate
CCA	:	Culturable Command Area
CFM	:	Cubic Feet per Minute
CWC		Central Water Commission
CPCB	:	Central Pollution Control Board
CCR	:	Central Control Room
CSR	:	Corporate Social Responsibility

CMO	:	Cement Manufacturing Officer
DFO	:	District Forest Officer
DGMS	:	Directorate General of Mines Safety
DMP	:	Disaster Management Plan
DMG	:	Department of Mines and Geology
DSB	:	Differential Sub Basin
DTH	:	Down the Hole
E	:	East
EAC	:	Expert Appraisal Committee
EC	:	Environmental Clearance
ECO	:	Emergency Coordinating Officer
EIA	:	Environmental Impact Assessment
EMC	:	Environment Management Cell
EMP	:	Environmental Management Plan
EMP	:	Environmental Monitoring Programme
ESE	:	East of South East
ENE	:	East of North East
EPA	:	Environmental Protection Act
ETP	:	Effluent Treatment Plant
ERDAS	:	Earth Resources Data Analysis System
EPO	:	Emergency planning officer
FPS	:	Fine Particulate Sampler
FCC	:	False Color Composite

Govt.	:	Government
GCP	:	Ground Control Points
GLC	:	Ground Level Concentration
GOI	:	Government of India
GPS	:	Global Positioning System
GSI	:	Geological Survey of India
GWEC	:	Ground Water Estimation Committee
Ha	:	Hectare
HIV	:	Human Immunodeficiency Virus
HEME	:	Heavy Earth Moving Equipment
HP	:	Horse Power
HOD	:	Head of Department
HSD	:	High Speed Diesel
IBM	:	Indian Bureau of Mines
IMD	:	India Meteorological Department
IS	:	Indian Standards
ISO	:	International Organization of Standardization
IUCN	:	International Union for Conservation of Nature
KLD	:	Kilo Liter Per Day
LOI	:	Letter of Intent
LUS	:	Land Use Study
LU/LC	:	Land Use / Land Cover
mRL	:	Meter Reduced Level

MC	:	Magnesium Carbonate
MHHS	:	Multi House Hold Survey
ML	:	Mining Lease
MoEF&CC	:	Ministry of Environment , Forests & Climate Change
MSK	:	Medvedev- Sponheur - Karnik Scale
MSL	:	Mean Sea Level
MT	:	Metric Tonnes
MTPA	:	Metric Tonnes Per Annum
N	:	North
NAAQS	:	National Ambient Air Quality Standards
NABET	:	National Accreditation Board for Education & Training
NATMO	:	National Atlas & Thematic Mapping Organization
NABL	:	National Accreditation Board for Testing and Calibration Laboratories
NDIR	:	Non Depressive Infrared Spectroscopy
NE	:	North East
NH	:	National Highway
NNE	:	North of North East
NGO	:	Non Governmental Organization
NNW	:	North of North West
NRBPT	:	National Registration Board for Personnel & Training
NRSA	:	National Remote Sensing Agency
NRSC	:	National Remote Sensing Centre
NW	:	North West

OB	:	Over Burden
OBC	:	Other Backward Classes
OHS	:	Occupational Health and Safety
OSHA	:	Occupational Safety and Health Administration
PETN	:	Penta Erythritol Tetra Nitrate
PFR	:	Pre Feasibility Report
pH	:	Potential of Hydrogen
PHCS	:	Public Health Centers
PM	:	Particulate Matter
PPE	:	Personal Protective Equipment
PPV	:	Peak Particle Velocity
QCI	:	Quality Council of India
RSPM	:	Reparable Suspended Particulate Matter
SDO	:	Sub Divisional Officer
SC	:	Scheduled Caste
SE	:	South East
SEIAA	:	State Environmental Impact Assessment Authority
SHE	:	Safety, Health & Environment
SI	:	Sustainability initiatives
SIA	:	Social Impact Assessment
SOI	:	Survey of India
SPCB	:	State Pollution Control Board
SPM	:	Suspended Particulate Matter

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SSW	:	South of South West
ST	:	Scheduled Tribe
SW	:	South West
TC	:	Total Carbonate
TDS	:	Total Dissolved Solids
TNT	:	Tri Nitro Toluene
ToR	:	Terms of Reference
TPD	:	Tonnes Per Day
TRC	:	Technical Research Cell
TW	:	Tube Well
UNFC	:	United Nations Framework Classification
UPA	:	Urban Planet Atlas
USDA	:	United States Department of Agriculture
USEPA	:	United States Environmental Protection Agency
VT	:	Vocational Training
RF	:	Reserved Forest
PF	:	Protected Forest
W	:	West
WNW	:	West of North West
WSW	:	West of South West
$\mu g/m^3$	:	Micro gram per meter cube
µm	:	Micro Meter
cu. m	:	Cubic meter
dB	:	Decibel
gm/sec	:	Gram per second
gm/cc	:	Gram per cubic meter
hr/day	:	Hour per day
kg	:	Kilogram
Kg/hr	:	Kilogram per hour
Kg/ha	:	Kilogram per hectare
km	:	Kilometer
m	:	Meter

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mg/l	:	Milligram per Liter
mm	:	Millimeter
Sq.km	:	Square Kilometer
t/hr	:	Tonnes per hour

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CHAPTER – I
INTRODUCTION

Mining Environment and development have become complimentary to each other. As a result of developmental activities visible ill-effects of the environmental degradation are clear and give signals of the concern. Therefore a sustainable development of the area involving extraction of mineral wealth vis-à-vis protection of environment is the ultimate solution for betterment of mankind. As per EIA notification 2006 and subsequent amendments Environmental Clearance is mandatory for Existing & New Mining Project. This proposed mine area Falls in Cluster. As per the said Notification the activities has been categories as Category B2 (is <5.00 Hectare) and Category B-1 is (<5.00 Hectare to >100.00 Hectare) and Category A is (>100.00 Hectare). As per MoEF & CC no notification S.O. 141 (E) dt. 15th January 2016 "A cluster shall be formed when the distance between the peripheries of one lease is less than 500 m from the periphery of other lease in a homogeneous mineral area.

As per situation of Cluster No. 49 "Ekalsingha" Granite Mine area total 12 leases falls in this Cluster. Out of which 11 is Existing leases and running at the time & 1 is Proposed applied L.O.I. The total Cluster area is 14.3802 Hectare. As per MoEF & CC no notification S.O. 141 (E) dt. 15th January 2016 "A cluster shall be formed when the distance between the peripheries of one lease is less than 500 m from the periphery of other lease in a homogeneous mineral area the cluster area is greater than 5.00 Hectare & less than 100.00 Hectare, so the project falls in B-1 category.

PURPOSE OF REPORT

Environment Impact Assessment (EIA) is a process used to identify the environmental, social & economic impacts of a project prior to decision making. It is a decision-making tool, which guides the decision makers in taking appropriate decisions for proposed projects. It aims predicting environmental impacts at an early stage of project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision makers. By using EIA, both environmental & economic benefits can be achieved. By considering environmental effects prediction & mitigation, early benefits in project planning, protection of environment, optimum utilization of resources, thus saving overall time & cost of the project. Economic, social and environmental change is inherent to development. Whilst development aims to bring about positive change it can lead to conflicts. The need to avoid adverse impacts and to ensure long term benefits led to the concept of sustainability. This has become accepted as an essential feature of development, if the aim of increased well-being and greater equity in fulfilling basic needs is to be met for this and future generations.

Mankind, as it is developed today, cannot live without taking up developmental activities for his food, security and other needs. Consequently, there is a need to harmonize developmental activities with the environmental concerns. Environmental Impact Assessment (EIA) is one of the tools available with the planners to achieve the above mentioned goals.

An Environmental Impact Assessment (EIA) may be defined as:

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"A formal process to foresee the environmental consequences of human developmental activities and to plan appropriate measures to eliminate or reduce adverse effects and to augment positive effects".

EIA is an assessment of the possible impact-positive or negative-that a proposed project may have on the environment, together consisting of the natural, social and economic aspects.

The purpose of the assessment is to ensure that decision makers consider the ensuing environment impacts when deciding whether to proceed with a project or not.

EIA, thus, has three main functions:

- To predict problems
- To find ways to avoid them, and
- To enhance positive effects.

Law requires that every project proponent must take Environmental Clearance from Ministry of Environment and Forests, New Delhi, /SEIAA before starting up any project. The Environmental Clearance is also mandatory for the expansion, modernization. The conditions are applicable as per the MOEF guidelines and EIA Notification issued and amended from time to time.

To keep the environment congenial for better standard of living, the provisions have been made in the constitution of India and many enactments have taken place, so that, industrialization may not have adverse impact on the environment. There are many Acts / Rules / Notifications issued by MOEF, few of them are mentioned below.

- ✓ Environment (Protection) Act, 1986;
- ✓ Environment (Protection) Rules, 1986;
- ✓ Water (Prevention & Control of Pollution) Act,1974;
- ✓ Air(Prevention & Control of Pollution) Act,1981;
- ✓ Environmental Impact Assessment (EIA) Notifications, dated 14th September 2006, amended as on date.

As per the present case comes under the purview of EIA Notification, MoEF, Govt. of India, New Delhi dated 14th September 2006 and subsequent amendments. This EIA study has been carried out to the Cluster No. 49 "Ekalsingha" Granite Mine assess the environmental, Social and economic impacts of the project and formulate action plans to reduce adverse impacts, shape projects to suitable the local environmental and present the predictions and options.

A systematic examination of both beneficial and adverse consequences of the project has been done and ensured that these impacts are taken into account during the project design.

The process involves an analysis of the likely impacts on the environment, recording those effects and proposed appropriate control measures and management to ensure a secure and healthy environment in a report, undertaking a public consultation exercise on the report, taking into account the comments of the public while preparing final EIA/EMP report for final decision for grant of EC by SEAC and informing the public about that decision afterwards.

The sole purpose of the EIA report is to provide a coherent statement of the potential impacts of a proposal and the measures that can be

taken to eliminate, reduce and remedy them, it contains essential information for:

✓ The proponent to implement the proposal in an environmentally and socially responsible way:

✓ The responsible authority to make an informed decision on the proposal, including the terms and conditions that must be attached to an approval or authorization; and

✓ The public to understand the proposal and its likely impacts on people and the environment.

1.1 CONSTITUTATION OF CLUSTER

There is large number of mines present in district Ajmer and the work of obtaining EC for each mine, individually, would take a lot of time. Since the environmental problems being faced are of regional nature and not confined to individual mines alone, it was proposed that cluster/groups of such mines may be identified for preparing cluster-wise integrated EIA & EMPs, addressing environmental concerns comprehensively and ensuring effective co-ordination of environmental control measures within each cluster. The subject was detailed in amendment notification of EIA-Mining by MoEF&CC dated 15-01-2016. Accordingly, the mines were distributed into clusters in District Ajmer by the District Mining Engineer. The EIA & EMP for Cluster No. 49 "Ekalsingha" Granite Mine which constitute 12 mines in total for which EC has been proposed for 1 L.O.I mines Holder named in table no.-1 & 11- Existing mines in this Cluster. The EIA/EMP report has been prepared on the basis of 'Terms of Reference' issued by SEAC, Rajasthan.

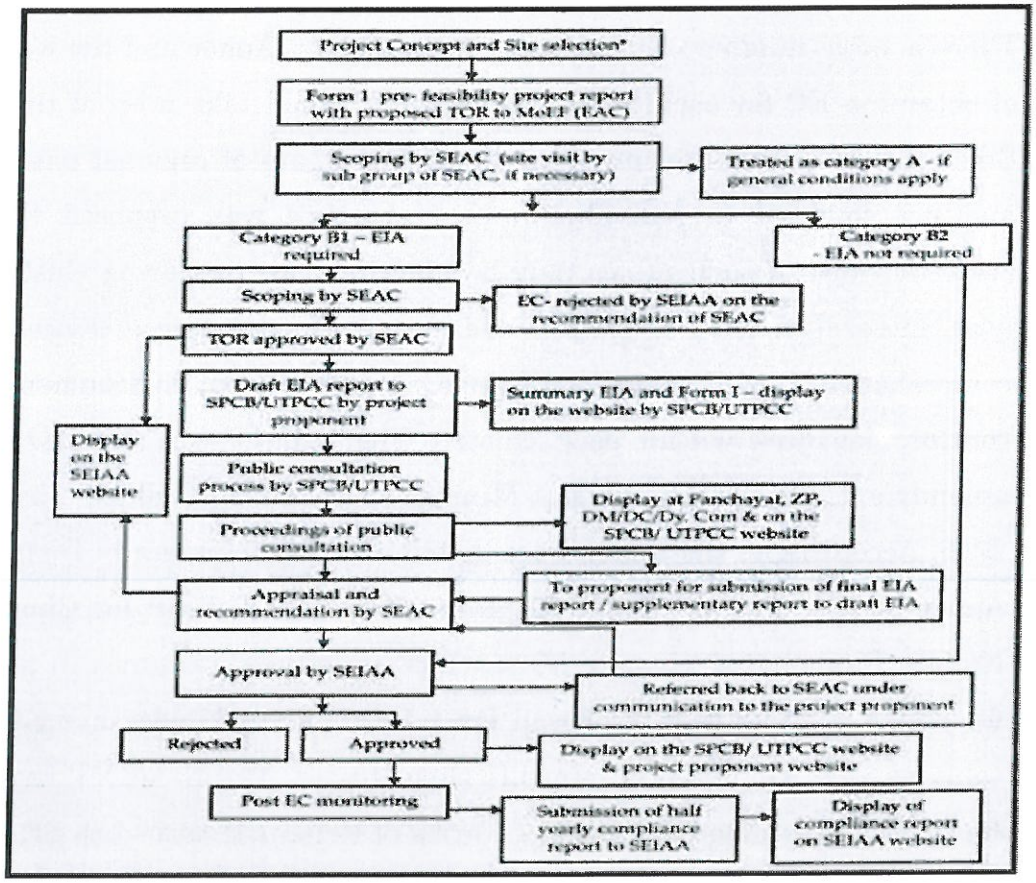
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1.2 EIA/EMP PROCESS FOR THE PROPOSED PROJECT

Environment Clearance from the competent authority, which is mandated by the EIA notification of 2006 and subsequent amended notifications issued by MOEF&CC.

- ✓ Scoping
- ✓ Public Consultation or Public Hearing
- ✓ Appraisal



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1.3 IDENTIFICATION OF PROJECT & PROJECT PROPONENT OF CLUSTER

As per the MoEF &CC, New Delhi Gazette dated 14th September 2006 amended in December 2009, April 2011, Dec 2012, March 2013, Sep 2013 and Jan 2015, the proposed mining project is categorized as category 'B1' project. The projects are proposed to mine Granite, from the cluster named **Cluster No. 49 "Ekalsingha" Granite Mine** located near N/v Ekalsingha, Tehsil: Kekri, Dist: Ajmer (Raj.).

The Proposed Cluster No. 49 "Ekalsingha" Granite Mine (Total Cluster Area- 14.3802 hectare) & applied area- 1.0023 Hectare. Located Near Village – Ekalsingha, Tehsil- Kekri, District – Ajmer, (Raj.).

Total 12 mines is been falling in this cluster area. Out of which 11 is Existing mines & 1 is Proposed Fresh L.O.I.

The Details of 6-Existing Mines & 1- Proposed fresh L.O.I given in table No- 1.1 & 1.2.

Table No-1.1

Details of 1- Proposed L.O.I Project & Project Proponent

Sr. No	Name of Project	M.L No	Area in Hq.	Status of Lease in Cluster
1.	Sh. Devraj Gurjar S/O Sh. Gopi Lal Gurjar	51/2018	1.0023	Fresh Proposed L.O.I Letter No- SME/Aj/Sawar/M.L NO- 51/2018/ on dated 19-12-2018

- The above mentioned projects constituting mine M.L No- 51/2018 are identified for preparing cluster-wise integrated EIA & EMPs, addressing environmental concerns comprehensively and ensuring effective co-ordination of environmental control measures within cluster.

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TABLE 1.2

Details of Existing Mines are part of Cluster area as per Environmental Clearance Granted

S.No	Name of Applicant	Location	Area in Hect.	Khasra No.	M.L No	EC Details
1.	M/s A.G Mines & Minerals	N/v-Ekalsingha Tehsil, kekri, District-Ajmer (Raj)	1.4143	888,889, 890 & 890/1099	24/2018	Environmental Clearance (EC) Granted vide letter No-DEIAA/AJM/M-Sectt/2018-19/245 (928) on dated 26.11.2018
2.	M/s Sawai Bhoj Granite	N/v-Ekalsingha Tehsil, kekri, District-Ajmer (Raj))	1.3006	852	31/2018	Environmental Clearance (EC) Granted vide letter No-DEIAA/AJM/M-Sectt/2018-19/245(935) on dated 26.11.2018
3.	Shree Giriraj Granite	N/v-Ekalsingha Tehsil, kekri, District-Ajmer (Raj))	1.5835	859,860, 861,1202/862	57/2018	Environmental Clearance (EC) Granted vide letter No-F1(4)SEIAA/SEAC-Raj/Sectt/Project/Cat. 1(a)B2(15700)2019-20 on dated 30.07.2019.
4	M/s Satya Suman Marble & Granite	N/v-Ekalsingha Tehsil, kekri, District-Ajmer	1.0025	820,824 ,835	86/2018	

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		(Raj))				
5	Sh. Sagar Sharma	N/v- Ekalsingha Tehsil, kekri, District-Ajmer (Raj)	1.0229	765/1023,766	119/2018	Environmental Clearance (EC) Granted vide letter No- F1(4)SEIAA/SEAC-Raj/Sectt/Project/Cat. 1(a)B2(15671)2019-20 on dated 03.06.2019.
6	M/s Shri Tirupati Granite Mines	N/v- Ekalsingha Tehsil, kekri, District-Ajmer (Raj)	1.3848	910/1087,917	18/2019	
7	M/s Arihant Granites	N/v- Ekalsingha Tehsil, kekri, District-Ajmer (Raj)	1.4797		22/2019	
8	Sh. Jagdish Bairwa	N/v- Ekalsingha Tehsil, kekri, District-Ajmer (Raj)	1.0144	849	07/2019	
9	Shivraj Gurjar	N/v- Ekalsingha Tehsil, kekri, District-Ajmer (Raj)	1.0001	844,845,846,841,863/1118	28/2018	
10	M/s Aditi Granite & Mineral	N/v- Ekalsingha Tehsil, kekri, District-Ajmer (Raj)	1.00	1204/865,1203/862	70/2018	
11	M/s Basarani Granite	N/v- Ekalsingha Tehsil, kekri, District-Ajmer (Raj)	1.1751	878	108/2018	

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TABLE 1.3

DETAILS OF APPLIED AREA L.O.I HOLDER & APPROVED MINING PLAN FALLS IN CLUSTER AREA

S. No	Name of Project	Ref. No	Area in Hq.	Status of Lease in Cluster Proposed Fresh L.O.I	Individual Mining Plan Approval Letter No
1	Sh. Devraj Gurjar S/O Sh. Gopi Lal Gurjar	51/2018	1.0023	Fresh Proposed L.O.I Letter No- SME/Aj/Sawar/M.L NO- 51/2018/ on dated 19-12-2018	SME/Aj/Mining Plan/F-S-475/2018/673 on dated 21-01-2019

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DETAILS OF PROPOSED L.O.I & EXISTING MINES DETAILS FALLS IN CLUSTER "EKALSINGHA" GRANITE & MASONRY STONE MINE

EC TO BE GRANTED																		
Sr. No	Name of Project	M.L /Plot No	Area in (ha.)	Production Capacity (TPA)	Total Reserve	No. Of Trucks to be used per day	Expected Dust Emission					Date of E.C Issued	D.F.O Certificate	Arravali Certificate	Cluster Certificate	Cluster Map	L.O.I Letter	Details of Mining Plan Approval Letter
							PM_{10}	$PM_{2.5}$	SO_X	NO_X	CO							
1.	Sh. Devraj Gurjar S/O Sh. Gopi Lal Gurjar	51/2018	1.0023	162960	625773.5	5	104.28	74.28	27	40.69	16.54	Proposed L.O.I	--	AME/Sawar/Machi/M.L (LOI)-51/2018/38 on dated 11-02-2021	AME/Sawar/M.L (LOI)-51/2018/39 on dated 11-02-2021	AME/SWR/DRG.NO/13 on dated 11-02-2021	Fresh Proposed L.O.I Letter No-SME/Aj/Sawar/M.L NO-51/2018/ on dated 19-12-2018	SME/Aj/Mining Plan/F-S-475/2018/673 on dated 21-01-2019
E.C ALREADY GRANTED																		

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Sr. No	Name of Applicant	Plot M.L No	Area	Existing Capacity (TPA)	Mineable Reserve	No. Of Trucks to be used per day	PM10	PM2.5	SOx	NOx	CO	Date of EC Granted	Details of E.C Letter of Existing Mine falls in Cluster
1.	M/s A.G Mines & Minerals	24/2018	1.4143	99,006.13	4389688.92	4	98.47	68.47	21.19	34.88	10.73	26.11.2018	Environmental Clearance (EC) Granted vide letter No-DEIAA/AJM/M-Sectt/2018-19/245 (928)
2.	M/s Sawai Bhoj Granite	31/2018	1.3006	1,82,127	47829	5	106.02	76.02	28.74	42.43	18.28	26.11.2018	Environmental Clearance (EC) Granted vide letter No-DEIAA/AJM/M-Sectt/2018-19/245(935)
3.	Shree Giriraj Granite	57/2018	1.5835	4,21,686	2092986	7	127.76	97.76	50.48	64.17	40.02	30.07.2019.	Environmental Clearance (EC) Granted vide letter No-F1(4)SEIAA/SEAC-Raj/Sectt/Project/Cat. 1(a)B2(15700)2019-20
4	M/s Satya Suman Marble & Granite	86/2018	1.0025	1,28,294	316435.5	4	101.13	71.13	23.85	37.54	13.39		
5	Sh. Sagar Sharma	119/2018	1.0229	1,66,964	533436	5	104.64	74.64	27.36	41.05	16.9	03.06.2019.	Environmental Clearance (EC) Granted vide letter No-F1(4)SEIAA/SEAC-Raj/Sectt/Project/Cat. 1(a)B2(15671)2019-20
6	M/s Shri Tirupati Granite Mines	18/2019	1.3848	60,060	615940	3	94.94	64.94	17.66	31.35	7.2		
7	M/s Arihant Granites	22/2019	1.4797	2,03,212	1214206	6	107.93	77.93	30.65	44.34	20.19		
8	Sh. Jagdish Bairwa	07/2019	1.014	52,650	299520	3	94.17	64.27	16.99	30.68	6.53		

			4										
9	Shiraj Gurjar	28/2018	1.0001	2,51,206	299456	6	112.29	82.29	35.01	48.8	24.55		
10	M/s Aditi Granite & Mineral	70/2018	1.00	2,00,000	624752.5	6	107.64	77.64	30.36	44.05	19.9		
11	M/s Basarani Granite	108/2018	1.1751	2,72,764	466203	7	114.24	84.24	36.96	50.65	26.5		

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TABLE 1.4
DETAILS OF APPROVED CLUSTER MINING PLAN OF APPLIED AREA L.O.I HOLDER FALLS IN CLUSTER AREA

S.No	Name of Project	Ref. No	Area in Hq.
1	Sh. Devraj Gurjar S/O Sh. Gopi Lal Gurjar	51/2018	1.0023

TABLE 1.5
DETAILS OF APPROVED MINING PLAN OF 11-EXISTING LEASE HOLDER FALLS IN CLUSTER AREA

S. No.	Name of Applicant	M.L No & Area	Approval Letter of Individual Approved Mining Plan	L.O.I Letter No
2	M/s A.G Mines & Minerals	M.L No- 24/2018 & Area- 1.4143	SME/AJ/M.Plan/F-S-278/2018/3964 on dated 31-08-2018	SME/AJ/Sawar/M.L-24/2018/4774 on dated 24/08/2018
3	M/s Sawai Bhoj Granite	M.L No- 31/2018 & Area- 1.3006	SME/AJ/M.Plan/F-S-288/2018/4962 on dated 05-09-2018	SME/AJ/Sawar/M.L-31/2018/4741 on dated 24/08/2018
4.	Shree Giriraj Granite	M.L No- 57/2018 & Area- 1.5835	SME/AJ/M.Plan/F-S-384/2018/6487 on dated 19-11-2018	SME/AJ/M.L-57/2018/6001 on dated 28/08/2018
5	M/s Satya Suman Marble & Granite	M.L No- 86/2018 & Area- 1.0025		SME/Aj/Sawar/M.L - 86/2018/1639 on dated 27/02/19
6	Sh. Sagar Sharma	M.L No- 119/2018 & Area- 1.0229	SME/AJ/M.Plan/F-S-06/2019/252 on dated 09-01-2019	SME/AJ/Sawar/M.L-119/2018/267 on dated 02/01/2019
7	M/s Shri Tirupati Granite Mines	M.L No- 18/2019 & Area- 1.3848	SME/Aj/Mining Plan/F-A-96/2019/3709 on dated 9-04-19	SME/Aj/Sawar/ML-18/2019 on dated 06/03/19
8	M/s Arihant Granites	M.L No- 22/2019 & 1.4797	SME/Aj/Mining Plan/ F-A-152/2019/2812 on dated 29-05-19	
9	Sh. Jagdish Bairwa	M.L No- 07/2019 & Area- 1.0144	SME/Aj/Mining Plan/ F-A-177/2019/6465 on dated 08-07-19	
10	Shivraj Gurjar	M.L No- 28/2018 &	SME/Aj/Mining	SME/Aj/Sawar/M.L-

		Area- 1.0001	Plan/F-S-404/2018/5093 on dated 15-10-18	28/2018/5905 on dated 28-09-2018
11	M/s Aditi Granite & Mineral	M.L No- 70/2018 & Area- 1.00	SME/Aj/Mining Plan/F-S-396/2018/5078 on dated 15-10-18	SME/Aj/Sawar/M.L - 70/2018/5050 on dated 25-09-2018
12	M/s Basarani Granite	M.L No- 108/2018 & Area- 1.1751	SME/Aj/Mining Plan/F-S-16/2019/885 on dated 29-01-2019	SME/Aj/Sawar/M.L-108/2018/122 on dated 01-09-2019

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1.4 BRIEF DESCRIPTION OF NATURE, SIZE, LOCATION OF THE PROJECT AND ITS IMPORTANCE TO THE COUNTRY, REGION

(Location Details of Cluster)

S.No.	Particulars	Details
A.	Nature of the Project	Cluster No. 49 "Ekalsingha" Granite Mine, Near village- Ekalsingha, Tehsil- Kekri, District- Ajmer, Rajasthan.
B.	Size of the Project	Total Applied area– 1.0023 hectare Total Existing Lease Area- 13.3779 hectare Total Cluster Area- 14.3802 Hectare
1.	Mining Lease Area	Total Applied area– 1.0023 hectare Total Cluster Area-14.3802 Hectare
2.	Proposed Production Capacity.	Proposed Production of 1-Applied area- 1,62,960 TPA (ROM). Existing 11 Mine Production Capacity- 20,37,969.13 TPA (ROM). Total Cluster Production Capacity- 22,00,929.13 TPA (ROM).
C.	**Location Details** (Location Map, Google Image, and Cluster Map have been given in Figure 1.1, 1.2 & 1.3, Chapter 1, Page no. 31, 32 & 33 respectively.)	
1.	Villages	Ekalsingha
2.	Tehsil	Kekri
3.	District	Ajmer
4.	State	Rajasthan
5.	Toposheet No.	45 N/04
D.	**Environmental Settings of the Area** (Map showing 10 km radius of the study area of the Mine lease boundary has been given in Figure 3.1, Chapter 3, Page no.67.)	
1.	Nearest Town / City	Ekalsingha is about 0.70 km in NE direction from the ML area.
2.	Nearest Highway	SH-12 About 2.56 Km in W direction.
3.	District Headquarter	Ajmer is at a distance of 73.96 Km in NW direction from Cluster Lease area

4.	Nearest Railway Station	Bandanwara Railway Station. (About 52.62 Km in WNW direction).
5.	Nearest Airport	Jaipur International Airport (About 107.79 Km in SW direction)
6.	National Parks, Wild Life Sanctuaries, Biosphere Reserves etc., Reserved / Protected Forest within 10 Km radius study area	There is no National Park, Wild Life Sanctuary, Biosphere Reserve, Tiger Reserve, Ramsar Site and Wildlife Corridor etc. within 10 km radius.
7.	Water body within 10 km radius of Study area	• Dai nadi at of distance 2.5 km in N direction from Cluster area.
8.	Seismic zone	Zone – II as per IS: 1893 (Part-I) : 2002
D.	Cost Details	
1.	Total Cluster Project Cost	Rs. 10.45 Crore/- (Existing Mines) Rs. 0.95 Crore/- (Proposed L.O.I) Total- 11.40 Crore of Cluster No. 49 "Ekalsingha" Granite Mine
2.	Cost for Environment Protection Measures	Cost for Cluster: Rs. 45.60 Lac

EIA Coordinator

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TABLE- 1.7 GEOGRAPHICAL CO-ORDINATES OF CLUSTER AREA

(GEOGRAPHICAL COORDINATES OF INDIVIDUAL LEASE HOLDER)

A Sh. Devraj Gurjar S/O Sh. Gopi Lal Gurjar (Proposed L.O.I)

Pillar No	Latitude (N)	Longitude (E)
A	26° 01' 16.28519"N	75° 12' 13.37401"E
B	26° 01' 15.80944"N	75°12' 17.07852"E
C	26° 01' 15.04865"N	75°12' 17.56291"E
D	26° 01' 13.98014"N	75°12' 17.45758"E
E	26° 01' 13.00862"N	75°12' 16.95412"E
F	26° 01' 13.43594"N	75°12' 15.94404"E
G	26° 01' 14.61354"N	75°12' 16.55428"E
H	26° 01' 15.16126"N	75°12' 15.36913"E
I	26° 01' 13.92478"N	75°12' 14.72838"E
J	26° 01' 13.10020"N	75°12' 14.08723"E
K	26° 01' 14.74277"N	75°12' 11.19149"E

(A) M/s A.G Mines & Minerals:-

From	To	Bearing	Distance(M)
F.R.P	A	345⁰ 00'	273 m
A	B	26⁰ 00'	123 m
B	C	305⁰ 00'	104 m
C	D	222⁰ 00'	70 m
D	E	122⁰ 00'	32 m
E	F	208⁰ 00'	87 m
F	G	127⁰ 00'	40 m
G	H	31⁰ 00'	30 m
H	A	120⁰ 23'26'	51.4971 m

(B) M/s Sawai Bhoj Granites

From	To	Bearing	Distance(M)
F.R.P	A	226⁰ 30'	691 m
A	B	119⁰ 00'	110 m
B	C	216⁰ 00'	92 m
C	D	302⁰ 45'	46 m
D	E	232⁰ 00'	24 m
E	F	300⁰ 00'	25 m
F	G	220⁰ 30'	60 m
G	H	307⁰ 00'	30 m
H	A	36⁰ 49'44.4'	166.2334 m

(C) Sh. Giriraj Granite

From	To	Bearing	Distance(M)
F.R.P	A	38⁰ 00'	260 m
A	B	30⁰ 00'	58 m
B	C	302⁰ 00'	118 m
C	D	30⁰ 00'	32 m
D	E	298⁰ 00'	107 m
E	F	204⁰ 00'	84.50 m
F	A	121⁰ 40' 58.15'	216.1235 m

(d) M/s Satya Suman Marble & Granite

From	To	Bearing	Distance(M)
F.R.P	A	312⁰ 00'	345.00 m
A	B	208⁰ 00'	55.00 m
B	C	200⁰ 00'	73 m
C	D	111⁰ 00'	85 m
D	E	22⁰ 00'	12 m
E	F	112⁰ 00'	32 m
F	G	24⁰ 00'	47 m
G	H	297⁰ 00'	69 m
H	I	20⁰ 00'	54 m
I	A	301⁰ 09' 09"	45.3817 m

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(e) Sagar Sharma

From	To	Bearing	Distance(M)
F.R.P	A	209⁰ 00'	323 m
A	B	120⁰ 00'	45 m
B	C	209⁰ 00'	104 m
C	D	291⁰ 00'	38 m
D	E	333⁰ 00'	78 m
E	F	289⁰ 00'	60 m
F	G	72⁰ 00'	45 m
G	A	91⁰ 50" 30.80"	96.3197 m

(f) M/s Sh. Tirupati Granite Mines

From	To	Bearing	Distance(M)
F.R.P	A	175⁰ 00'	99.50 m
A	B	116⁰ 00'	60 m
B	C	200⁰ 00'	14 m
C	D	112⁰ 00'	12 m
D	E	217⁰ 00'	91 m
E	F	300⁰ 00'	119.50 m
F	G	298⁰ 00'	29 m
G	H	24⁰ 00'	66.50 m
H	I	101⁰ 23'26'	56 m
I	J	116⁰ 00'	42
J	A	18⁰ 14'29.26"	12.2249 m

(g) M/s Arihant Granites

From	To	Bearing	Distance(M)
F.R.P	A	260⁰ 00'	220 m
A	B	304⁰ 00'	60 m
B	C	25⁰ 00'	56 m
C	D	269⁰ 00'	11 m
D	E	207⁰ 00'	45 m
E	F	298⁰ 00'	23 m
F	G	221⁰ 00'	88 m
G	H	295⁰ 00'	85 m
H	I	207⁰ 00'	24 m
I	J	120⁰ 00'	100 m
J	K	107⁰ 00'	120 m
K	A	19⁰ 04' 09.62	85.0707 m

(h) Sh. Jagdish Bairwa

From	To	Bearing	Distance(M)
F.R.P	A	293⁰ 45'	113 m
A	B	276⁰ 00'	47 m
B	C	324⁰ 00'	14 m
C	D	292⁰ 00'	68 m
D	E	200⁰ 00'	71 m
E	F	119⁰ 00'	135 m
F	G	14⁰ 59' 43.85'	93.6441 m

(I) Shivraj Gurjar

From	To	Bearing	Distance(M)
F.R.P	A	208⁰ 00'	645 m
A	B	111⁰ 00'	23 m
B	C	201⁰ 06' 57.53'	158.7821 m
C	D	147⁰ 00'	11 m
D	E	169⁰ 00'	07 m
E	F	122⁰ 00'	25 m
F	G	202⁰ 00'	34 m
G	H	178⁰ 00'	23 m
H	I	300⁰ 00'	86 m
I	J	24⁰ 00'	117 m
J	K	18⁰ 23' 47'	83.3283 m
K	A	114⁰ 00'	07.45 m
L	A	24⁰ 00'	18 m

(J) M/s Aditi Granites & Mineral

From	To	Bearing	Distance(M)
F.R.P	A	40⁰ 45'	277 m
A	B	114⁰ 00'	188 m
B	C	28⁰ 00'	70 m
C	D	290⁰ 00'	55 m
D	E	199⁰ 00'	15 m
E	F	292⁰ 00'	118 m
F	G	202⁰ 00'	8.54 m
G	H	292⁰ 00'	18.07 m
H	A	209⁰ 29' 53.01'	37.9409 m

(K) M/s Basarani Granites

From	To	Bearing	Distance(M)
F.R.P	A	90⁰ 00'	53.00 m
A	B	322⁰ 00'	234.00 m
B	C	111⁰ 00'	44.00 m
C	D	209⁰ 00'	240.00 m
D	A	299⁰ 12' 08.24	55.8188 m

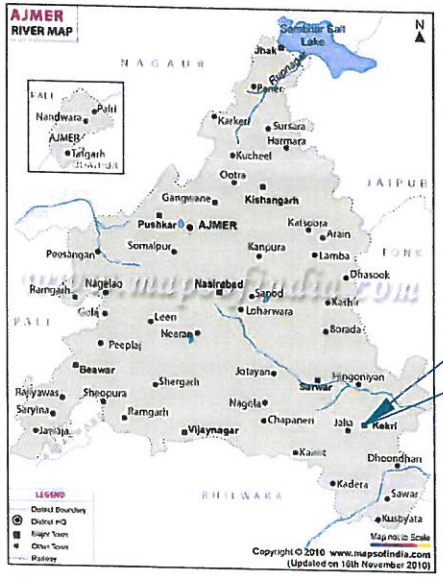
LOCATION PLAN

India

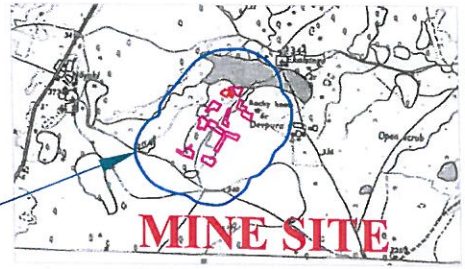


Rajasthan





GT SHEET NO 45N/4



LOCATION MAP

CLUSTERNo-49 " EKAL SINGH" GRANITE MINE
APPLICANT-SH. DEVRAJ GURJAR

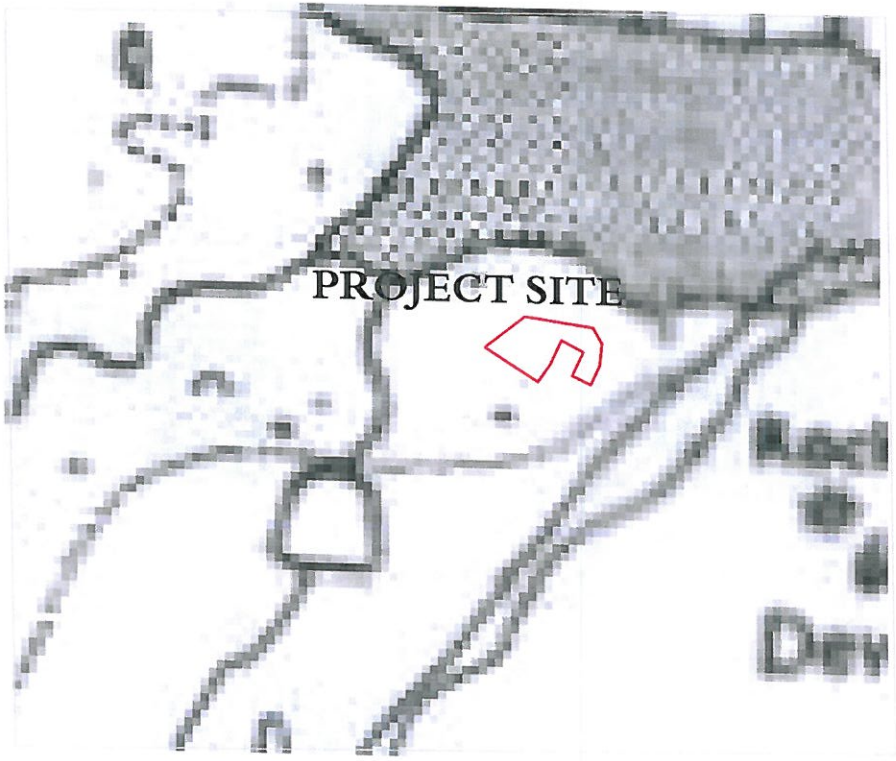
APPILED AREA - 1.0023 HECT

NEAR VILLAGE-EKAL SINGH
TEHSIL-KEKRI,DISTRICT- AJMER (RAJ)

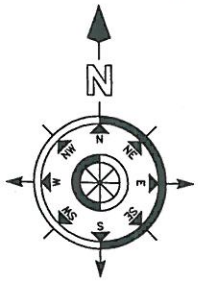
TOTAL CLUSTER AREA -14.3802 HECT.

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CORNER COORDINATES



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Applied Area

Pillar No	Latitude (N)	Longitude (E)
A	26° 01' 16.28519"N	75° 12' 13.37401"E
B	26° 01' 15.80944"N	75°12' 17.07852"E
C	26° 01' 15.04865"N	75°12' 17.56291"E
D	26° 01' 13.98014"N	75°12' 17.45758"E
E	26° 01' 13.00862"N	75°12' 16.95412"E
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J	26° 01' 13.10020"N	75°12' 14.08723"E
K	26° 01' 14.74277"N	75°12' 11.19149"E

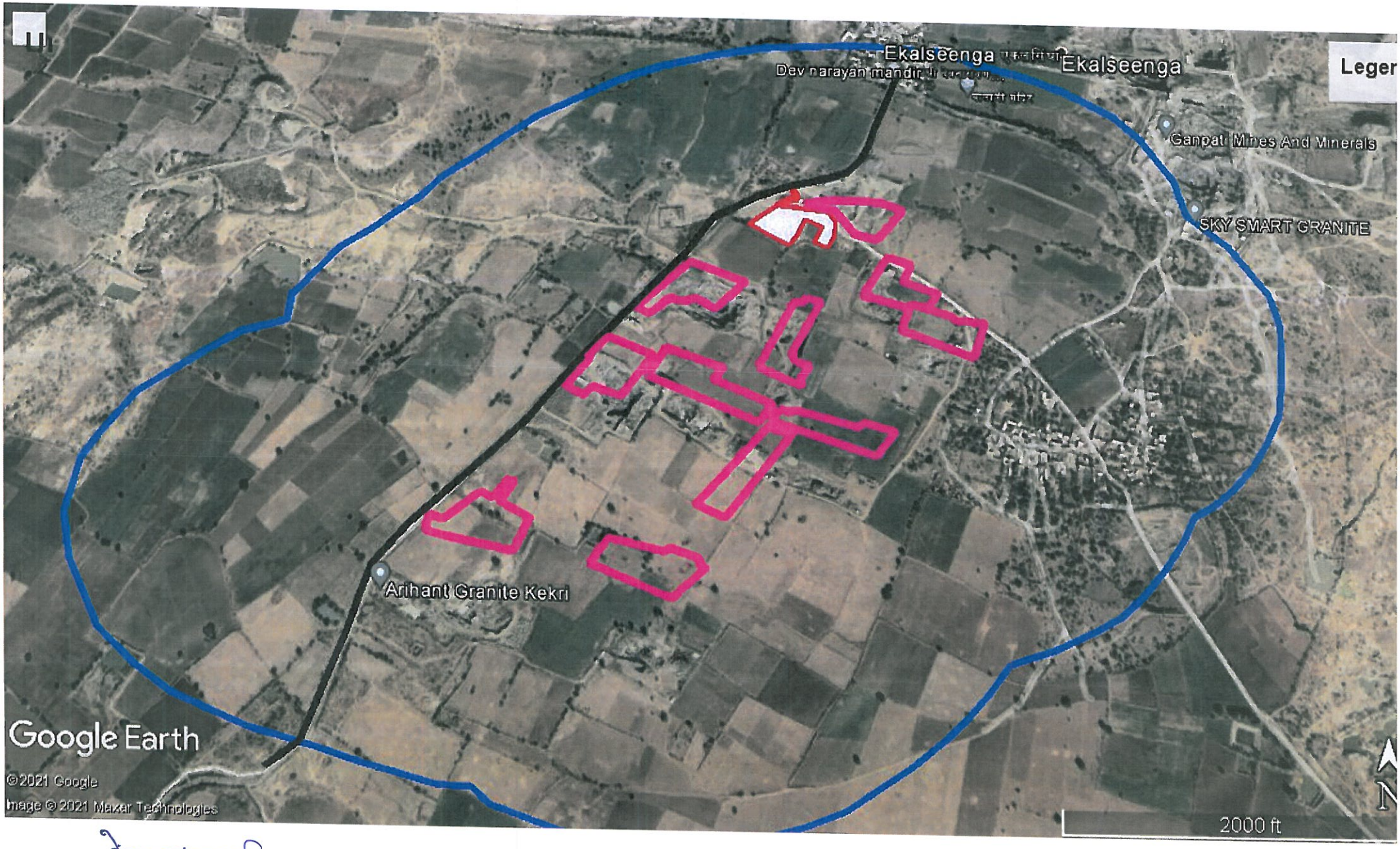
Mineral –Granite

ML No –51/2018

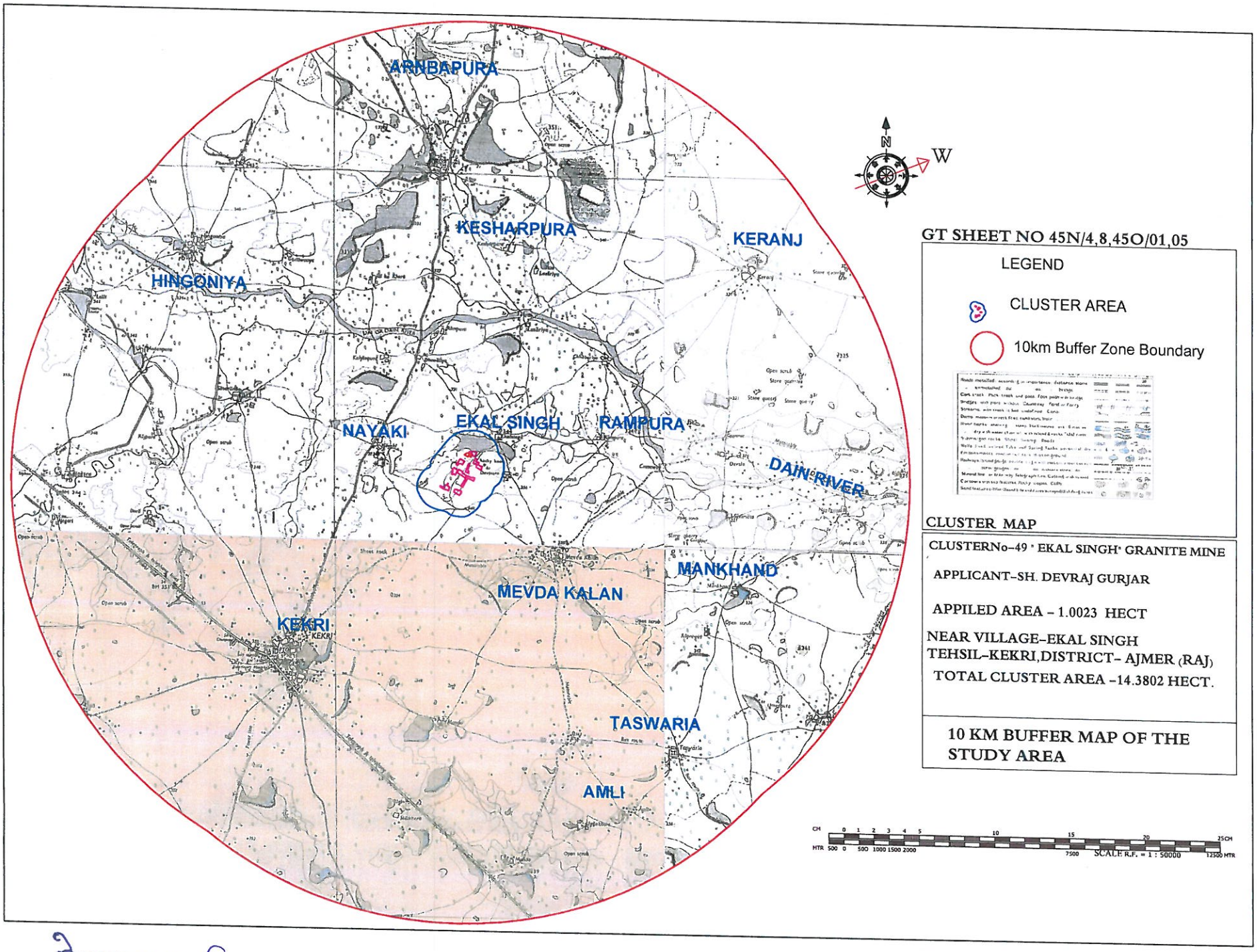
N/V–Ekal singh, Teh.–Kekri, District– Ajmer (RAJ)

Applied By–Sh. Devraj Gujar




Ekalseenga
Dev narayan mandir
Ekalseenga
Leger
Ganpati Mines And Minerals
SKY SMART GRANITE
Arihant Granite Kekri
Google Earth
©2021 Google
Image © 2021 Maxar Technologies
2000 ft

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ARNIBAPURA
KESHARPURA
KERANJ
HINGONIYA
NAYAKI
EKAL SINGH
RAMPURA
DAIN RIVER
MANKHAND
MEVDA KALAN
KEKRI
TASWARIA
AMLI
N
W
GT SHEET NO 45N/4,8,45O/01,05
LEGEND
CLUSTER AREA
10km Buffer Zone Boundary
CLUSTER MAP
CLUSTERNo-49 ' EKAL SINGH' GRANITE MINE
APPLICANT-SH. DEVRAJ GURJAR
APPILED AREA - 1.0023 HECT
NEAR VILLAGE-EKAL SINGH
TEHSIL-KEKRI,DISTRICT- AJMER (RAJ)
TOTAL CLUSTER AREA -14.3802 HECT.
10 KM BUFFER MAP OF THE STUDY AREA
SCALE R.F. = 1 : 50000

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1.5 CLUSTER PRODUCTION & COST DETAILS FOR BOTH PROPOSED & EC GRANTED MINES

TABLE NO-1.8

DETAILS OF PRODUCTION & PROJECT COST OF 1-PROPOSED L.O.I

S.No	Name of Project	M.L No	Area in Hq.	Production Capacity in TPA (ROM)	Cost in Crore
1.	Sh. Devraj Gurjar	51/2018	1.0023	162960 TPA (ROM)	0.95 Crore
TOTAL				162960 TPA (ROM)	0.95 Crore

TABLE NO-1.9

DETAILS OF PRODUCTION & PROJECT COST OF 6-EXISTING LEASE

S. No	Name of Existing Lease	M.L No	Area in Ha.	Existing Production as per E.C In Tonnes	Existing Production as per approved Cluster Mining Plan in TPA (ROM)	Project Cost in Crore
1	M/s A.G Mines & Minerals	24/2018	1.4143	90,000 MTPA	99006.13 TPA (ROM)	0.95
2	M/s Sawai Bhoj Granite	31/2018	1.3006	76,049 MTPA	1,82,127 TPA (ROM)	0.95
3	Shree Giriraj Granite	57/2018	1.5835	2,21,940 MTPA	4,21,686 TPA (ROM)	0.95
4	M/s Satya Suman Marble & Granite	86/2018	1.0025		28,294 TPA (ROM)	0.95
5	Sh. Sagar Sharma	119/2018	1.0229	1,09,707 MTPA	1,66,964 TPA (ROM)	0.95
6	M/s Sh. Tirupati Granite Mines	18/2019	1.3848		60,060 TPA (ROM)	0.95
7	M/s Arihant Granites	22/2019	1.4797		2,03,212 TPA (ROM)	0.95
8	Sh. Jagdish Bairwa	07/2019	1.0144		52,650 TPA (ROM)	0.95
9	Shivraj Gurjar	28/2018	1.0001		2,51,206	0.95

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					TPA (ROM)	
10	M/s Aditi Granite & Mineral	70/2018	1.00		2,00,000 TPA (ROM)	0.95
11	M/s Basarani Granite	108/2018	1.1751		2,72,764 TPA (ROM)	0.95
Total			14.3802		22,00,929.13 TPA (ROM)	10.45 Crore

CONNECTIVITY DETAILS:

Connectivity Details		Aerial Distance & Direction
Nearest Railway Station	Bandanwara Railway Station.	(About 52.62 Km in WNW direction).
Nearest Airport	Jaipur International Airport.	(About 107.79 Km in SW direction).
Nearest NH/SH	SH-12	About 2.56 Km in W direction.

CLUSTER SURROUNDING DETAILS:

Status of Protected / other area	There is no any protected & Reserve forest falls around the 10 km radius from the cluster area
Water Body / Check dams	• Dai nadi at of distance 2.5 km in N direction from Cluster area.
Nearest Facility	Ekalsingha, is about 0.66 km in NE direction from the ML area.
Nearest Educational Facilities	Ekalsingha, is about 0.66 km in NE direction from the ML area.

1.6 PROJECT IMPORTANCE:

The proposed cluster compresses of mining leases of Granite. Due to globalization, the requirement for Granite Mine has been on the rise over the last few years. Mineral Granite Mine uses in various forms such as Blocks. Mining Industry play an important role in economic sector in India. The

important benefits of the project to the state in form of royalty and can be stated as boost to local and regional economy. The development of mining in the area provides direct & indirect employment opportunities, better infrastructural facilities, communication and socio-economic infrastructure.

1.7 REGULATORY COMPLIANCE:

S. No	Applicant	M.L No	Date	ToR & E.C Letter No.
1	M/s A.G Mines & Minerals	24/2018	26.11.2018	Environmental Clearance (EC) Granted vide letter No- DEIAA/AJM/M-Sectt/2018-19/245 (928)
2	M/s Sawai Bhoj Granite	31/2018	26.11.2018	Environmental Clearance (EC) Granted vide letter No- DEIAA/AJM/M-Sectt/2018-19/245(935)
3	Shree Giriraj Granite	57/2018	30.07.2019	Environmental Clearance (EC) Granted vide letter No- F1(4)SEIAA/SEAC-Raj/Sectt/Project/Cat. 1(a)B2(15700)2019-20
4	M/s Satya Suman Marble & Granite	86/2018		
5	Sh. Sagar Sharma	119/2018	03.06.2019	Environmental Clearance (EC) Granted vide letter No- F1(4)SEIAA/SEAC-Raj/Sectt/Project/Cat. 1(a)B2(15671)2019-20
6	M/s Shri Tirupati Granite Mines	18/2019		
7	M/s Arihant Granites	22/2019		
8	Sh. Jagdish Bairwa	07/2019		
9	Shivraj Gurjar	28/2018		
10	M/s Aditi Granite & Mineral	70/2018		
11	M/s Basarani Granite	108/2018		

- The Baseline study was conducted during March 2021 to May 2021.

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- Mining plan was approved by Superintendent Mining Engineer, Department of Mines & Geology, Jaipur-Circle, Jaipur, Rajasthan.

1.8 POST ENVIRONMENTAL CLEARANCE MONITORING:

Proposed project being a "B1" Category project, the proponent shall prominently advertise in the newspapers indicating that the project has been accorded environmental clearance and also the details of website where it is displayed.

The project management shall also submit half yearly compliance reports in respect of the stipulated prior environmental clearance terms and conditions on 1st June and 1st Dec. of each calendar year.

1.9 SCOPE OF THE STUDY

Environmental Impact Assessment and Environment Management Plan report is prepared to comply with the General Terms of Reference (TOR) which have been issued on by SEAC, Rajàsthan. The points given by the SEAC, Rajasthan in the TOR has been considered and its compliance have stated below.

Sr. No.	TOR Conditions	Compliance Status
1	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.	This is a Proposed fresh L.O.I mining projet falls in Entire Cluster No. 49 "Ekalsingha" Granite Mine, Located near village- Ekalsingha, Tehsil- Kekri, Dist- Ajmer, Rajasthan.
2	A copy of the document in support of the fact that the **Proponent** is the rightful lessee of the mine should be given.	All the supporting document will be enclosd for fact that the **Proponent** is the rightful lessee of the mine as **Annexure-I** (Copy of L.O.I letter) at page no-317
3	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.	Content in all documents are synchorenizing with one another in terms of applied area, production levels, waste generation and its management and mining technology. Both the Approved mining plan & applied area in the name of **Shri Devraj Gurjar S/O Sh. Gopi Lal Gurjar** who is the lessee of fresh area LOI. Copy of LOI of applied area is enclosed as Annexure-II & Mining Plan Approval Letter is enclosed as Annexure-V at page No- 317 & 359
4	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the areashould be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	All corners of the coordinates of applied area are superimposed on Toposheet of Survey of India Toposeet No. 45N/4. Same as has furnished in Chapter II as figure 2.2 of EIA/EMP Report. Land use/Land Cover map has been prepared using High Resolution Imagery and also incorporated in Chapater-3 as Figure No-3.2 & 3.3 at Page No- 89-90
5	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and	All maps are provided superimposed on Toposheet of Survey of India. The Key Plan showing applied area has been prepred on the scale of 1:50,000 is given in Chapter-II as Figure 1.1 at Page No- 46

	mining history of the area, important water bodies, streams and rivers and soil characteristics	
6	Details about the land proposed for mining activities should be givenwith information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	This is a proposed mining for above issued L.O.I M.L No- 51/2018 and the type of land is Khatedari land so no any permission is required from State land use board or the concerned authority.
7	It should be clearly stated whether the **Proponent** Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large,may also be detailed in the EIA Report.	Noted & Agreed
8	Issues relating in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	This is Opencast mining for mineral of Granite & All the safety measures has been submitted in Draft EIA/EMP report in Chapter No-4 at Page no- 208
9	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.	The Details of study area has been comprise of 10 km zone around the cluster area has been submitted in Chapter no-III at Page No-82 and the details of waste generation and life of cluster has been incorporated in Chapter no-II of Draft EIA/EMP Report at Page No- 75
10	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be incorporated in Chapter-III as Figure 3.2 & 3.3 at Page No- 196-198 of EIA/EMP Report.Land use plan of

	prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	the mine lease area showing the preoperational, operational and post operational phases is incorporated in Chapter IV of the EIA/EMP at Page No- 215-217
11	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.	The waste will be stacked in mine lease area at dumping site. No any human settlement has been falls in around cluster area so no R&R has been applied for Entire Cluster No. 49 "Ekalsingha" Granite Mine.
12	A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project **Proponent** regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.	The D.F.O letter for proposed area is enclosed as Annexure-V - with EIA/EMP report at Page No-
13	Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	The D.F.O letter for proposed area is enclosed as Annexure-V with EIA/EMP report at Page No-
14	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.	Noted and Agreed.
15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	The Details of RF/PF area falls in around 10 km of cluster area is given in Chapter no-I at Page No- 39 of EIA/EMP Report.
16	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project	The Biological study has been done in around 10 km radius of cluster area and describe the details of biological status of the study area in Chapter no-III at

	on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	Page No- 171-178 of EIA/EMP report.
17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.	There is no such any National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed) in around 10 km radius of cluster site. A DCF certificate has been enclosed as Annexure no-V with EIA/EMP Report at Page No-
18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan alongwith budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.	The Biological study has been done in around 10 km radius of cluster area and describe the details of biological status of the study area in Chapter no-III of the EIA/EMP report on Page No-173-178
19	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.	The project site is not falling in proximity to area declared as Critically Polluted. The project site does not falls in Aravali Range,. The Aravalli Certificate is enclosed as **Annexure IV. on** Page No-356-358

20	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.	No displacement is involved for the proposed project. Hence, R&R plan is not applicable for the project.
21	One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)]primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	The Baseline monitoring season has been done in Summer Season of the month of March 2021 to May 2021. The Details of AAQM, Noise quality Monitoring, Water Quality monitoring & Soil Quality Monitoring is given in Chapter no-III of EIA/EMP report on Page No-124-165

22	Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.	Air quality modeling will be submitting in Final EIA/EMP Report.
23	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.	Noted and Agreed The Total Water Requirement of the Applied area is 4.5 KLD per day. The details of water requirement has been incorporated in Chapter No-II of EIA/EMP report on **Page No-** 85
24	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	Not Applicable Water will be taken from near villages through tankers.
25	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	The projects consume water except for drinking, dust suppression, plantation & cutting of Granite. Plantation is proposed, which will increase the water holding capacity and help in recharging of ground water. The details are incorporated in **Chapter-II on** page no- 84
26	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	**Surface Water** -There will not be any adverse impact on the surface water as there is no any water stream/body crossing. There is no waste water disposed off outside the premises. **Ground Water** - The ground water quality will not be changed because mining activity will not intersect the ground water table as it is restricted to 36 m depth. Impact of the project on the water quality and its mitigation measures has been incorporated in Chapter-IV on page no- 202 of EIA/EMP report.
27	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should	The ground water level of the lease area is 80 m approximately. The mining activity will not intersect the ground water table as it is restricted to 36m depth. So mining activity will not intersect the ground water table. Systematic diagram of mining depth also incorporated in **Chapter-IV**. On Page no- 215 Water will

	be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.	be sourced from the hired tankers.
28	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	There is no stream modification/ diversion proposed in the lease area. The mining activity will not intersect the ground water table as it is restricted to 36 m depth. So mining activity will not intersect the ground water table.
29	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.	Maximum Working Depth : 36m bgl Ground water table: 80 m bgl Information about site elevation, working depth has been incorporated in Chapter II **on** Page no-86
30	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should begiven. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.	A suitable combination of trees that can grow fast and also have good leaf cover shall be adopted to develop the greenbelt. It is proposed to plant 4740 trees/Year of native species during the plan period Progressive Green belt Development Plan have been incorporated in Chapter IV on Page no- 217 of EIA/EMP report.
31	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving	Impact on local transport infrastructure due to the project has been assessed. There will not be much impact on local transport. The LOS value from the proposed mining will be changed for SH-12 from "Very Good" to "Good", but LOS value for MDR 50 will remain the same. So the additional load on the carrying capacity of the concern roads is not likely to have any significant adverse affect.

	the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project **Proponent** shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	
32	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	The Workers come from nearby area. However rest shelter will be provided.
33	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	Conceptual post mining Land use is incorporated in Chapter IV on **Page no-** 217 of the EIA/EMP Report.
34	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	The impact on OHS of employee and proper mitigation along with budgetary provision incorporated in Chapter-IX on page no-275. Person protective measures, pre-placement medical examination and periodical medical examination schedules, management plan have been furnished in Chapter –IX on Page no-276, EIA/EMP report.
35	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	Public health implication like respiratory disorder, noise induced problems are major issues which will be addressed properly. Study has been performed which includes to gain an understanding of the source, identification of exposure pathway and determination of likely receptor. The impact will not be concentrated and confined to particular zone. The budgetary allocations of for Labour Welfare are incorporated in Chapter IX on **page no- 276** of the EIA/EMP Report.
36	Measures of socio economic significance and influence to the local community proposed to be provided by the Project **Proponent** should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	Socio economic measures for the local people have been proposed under the component of the Corporate Social Responsibility along with the budgetary allocation have been incorporated in Chapter IX on Page no-287, in EIA/EMP report. Proposed project will provide the employment opportunity to the local community hence project will

		have positive impact on the surrounding local community.
37	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	Details of environment management plan are incorporated in Chapter IX on **Page no-** 287, of the EIA/EMP Report. Details of occupational health impacts along with proposed mitigation measures are incorporated in Chapter IX on **Page no-** 288 of EIA/EMP Report.
38	Public Hearing points raised and commitment of the Project **Proponent** on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	Noted and Agreed This is a Draft EIA/EMP report submmtting for conducting Public Hearing. The Details of public Hearing Proceeding will be given in Final EIA/EMP Report.
39	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	The is no any litigation pending againt the proposed project.
40	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	The costs of project as well as the cost of EMP have been incorporated in Chapter-2 on page no- 80 □ Capital cost of the project is **Rs. 11.40 Crore** □ Cost for Environmental Protection Measures are Rs **45.60 Lakhs** .
41	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	A Disaster management plan has been given in Chapter no-VII on Page no 258 of EIA/EMP Report.
42	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	The benefits of the project has been prepared and incorporated in Chapter VIII on **Page No-** 264 of EIA/EMP report.
43	**Besides the above, the below mentioned general points are also to be followed:-**	

A	Executive Summary of the EIA/EMP Report.- **Complied**	
B	All documents to be properly referenced with index and continuous page numbering. -**Complied**	
C	Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated – **indicated**	
D	Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All original analysis/testing reports should be available during appraisal of the project. –**Submit at the time of presentation.**	
E	Where the documents provided are in language other than English, an English translation should be provided. -**Noted**	
F	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall be filled and submitted. – **Noted**	
G	While preparing the EIA report, the instructions for the proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed. –**Followed**	
H	Changes, if any made in the basic scope and project parameters (as submitted in Form-1 and the PFR for securing TOR) should be brought to the attention of MoEF&CC with reasons for such changes and the permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation. – **No Modification done**	
I	As per the circular no. J-11011/618/2010-IA(I) dated 30.05.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable. – **Not Applicable**	
J	The EIA report also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area. -**Included**	
•	**Specific ToR in the cases of cluster situation**	
1	The PP shall conduct Environmental Impact Assessment Study and prepare Environmental Management Plan for the entire cluster in order to capture all the possible externalities. These reports are required to incorporate carrying	The EIA/EMP Report has captured carrying capacity of the entire cluster, transportation and related issues is incorporated **Chapter II** on page no-66, replenishment and recharge issues, geo-hydrological study of the cluster incorporated **Chapter III on page no-107**

	capacity of the cluster, transportation and related issues, replenishment and recharge issues, geo- hydrological study of the cluster.	
2	The EIA/EMP shall be prepared by the state or state nominated agency or group of PP in the cluster or the PP in the cluster. The PP shall get one public consultation done for the entire cluster and after which prepare final EIA/EMP reports.	Noted and Agreed.
• **Specific ToRs applicable, in the cases of violation in terms of the Notification dated 14.3.2017 and 8.3.2018 and OMs dated 30.5.2018, 4.7.2018 of the MoEF&CC :** Noted		

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CHAPTER-II

PROJECT DESCRIPTATION

1.0 Need & Type of the Project

This is a Cluster No. 49 "Ekalsingha" Granite Mine, Total Cluster Area-14.3802 Hectare, Located at Near Village-Ekalsingha, Tehsil– Kekri, District – Ajmer (Rajasthan) lease falls in Survey of India Toposheet No. 45N/04. The Cluster Boundary covers an area of 14.3802 hectare. As per Cluster Situation total 12 leases falls in this Cluster area. The L.O.I has been Granted by Superintendent Mining Engineer, Department of Mines & Geology, Jaipur - Circle, Jaipur, Rajasthan. The Details of L.O.I Letter given in Chapter No-1, Table No-1.3.

However, the individual mining lease area of the flat land under reference have either been auctioned or to be Khatedari Land for long term mine lease of 50 years for Granite Minor Mineral as per RMMCR Act-2017. Based on the application and the surface plan provided by the applicant, the respective existing & fresh applied L.O.I holders of individual mine lease area would obtain statutory clearance liked approved mining Plan and Environmental Clearance for starting the mining process at L.O.I area for mining of Mineral Granite. The Details of Approved Mining plan for Proposed L.O.I holders given in Chapter No-1, Table No-1.3

However, the mine lease area of Cluster No. 49 "Ekalsingha" Granite Mine are located within a distance of 500 m. therefore, as per Notification of MoEF & CC vide S.O. No 3977 (E), Appendix-XI, dated 14-08-2018; environmental clearance for the cluster is required to be obtained before getting Environmental Clearance for individual auctioned Existing L.O.I area & fresh applied area in the Cluster. As per the above Notification, (Cluster No. 49 "Ekalsingha" Granite Mine) over total mineralized area is 14.3802 Hectare

is categorized as B-1 category for consideration of environmental Clearance from State Environment Impact Assessment Authority, Jaipur.

1.1 Location Details

The details regarding the mining lease are given

Table 2-1 Details of the Mining Lease

Sr. No.	Particulars	Details
A.	Nature of the Project	Cluster No. 49 "Ekalsingha" Granite Mine, Located Near village- Ekalsingha, Tehsil- Kekri, District- Ajmer, Rajasthan.
B.	Size of the Project	
1.	Mine area	Applied area for Proposed L.O.I falls in Cluster – 1.0023 hectare Total Cluster Area- 14.3802 Hectare
2.	Proposed Production Capacity	Proposed Production of Fresh 1-Applied L.O.I- 162960 TPA (ROM). 11-Existing mine Production Capacity- 20,37,969.13 TPA (ROM). Total Cluster Production Capacity- 22,00,929.13 TPA (ROM).
C	Location Details	
1.	Village	Ekalsingha
2.	Tehsil	Kekri
3.	District	Ajmer
4.	State	Rajasthan
5.	Toposheet Numbers	45N/04

1.2 CLUSTER AREA:

Cluster Name	Cluster No. 49 "Ekalsingha" Granite Mine
Location of the Project	Located Near village- Ekalsingha, Tehsil- Kekri, District- Ajmer, Rajasthan
Toposheet No-	45N/04

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1.3 Geology

The Cluster No. 49 "Ekalsingha" Granite Mine area of 14.3802 hectare falls within Cluster. The mining lease area is slightly hilly. Highest elevation of the area is 335 mRL & lowest elevation of the area is 328 mRL. The ultimate depth of mining will be up to 303 mRL. No other perennial nallah / water bodies exist in the core area.

1.3.1 Regional Geology

The area covers part of Ajmer & Tonk Districts of Rajasthan. There are as well connected by roads, as jaipur-Kota & Kekri-Nasirabad-Ajmer state Highway Pass through the area. The easterly flowing Dia River and its tributaries pass through the southern part of the area.

Era/period	Group	Sub-Group	Formation	Lithology
Quaternary				Unclassified alluvium and Aeolian Sand
				Granite
	Intrusive		Raypur-Jalayan Mafic Rocks	Granite & Granite gneiss
				Giyangarh Asind Acidic rocks
				Amphibolite
Archaean to Palaeo-proterozoic	Bhilwara-Super Group	Mangalwar Complex	Kekri Formation	Migmatite Composite Gneiss and mica-Schist
		Sand Mata Complex	Shambhugarh	Migmatite and gneiss

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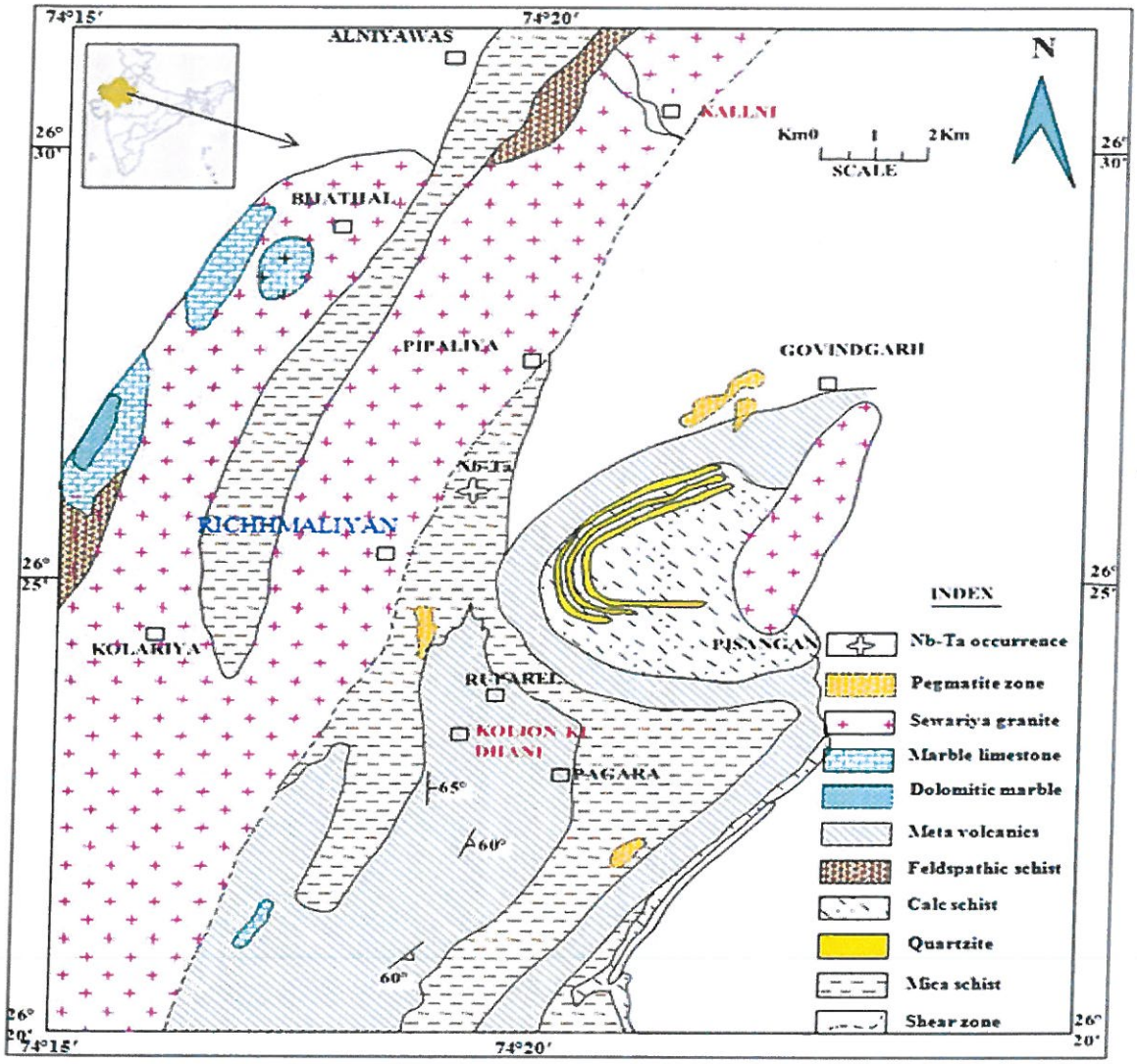


Figure-2.1 Geological Map of Ajmer District

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1.3.2 Geomorphology

The distinguishing feature of the district is Aravalli hill ranges, which divides plains of Marwar from the high table land of Mewar. Hill ranges runs parallel to each other giving rise to elongated valleys. Highest range is 970.3 mamsl at Bhutia Dungra. Sand dunes and cluster of sand mounds cover a large part of the Sarsuti valley and area around Picholian & Pushkar valley. These features are formed due to abrupt termination of a hill range or existence of wind gaps in the hills.

The district falls in the Banas (64.88%), Luni (23.74%) & Shekhawati Basin (11.38).

1.3.3 TOPOGRAPHY

The district is broadly triangular in shape. It is generally a plain area interspersed with low hills of Aravalli range running roughly NE-SW direction and irregular terrain lying in the southwestern part of the district. The Kekri block forms the southeastern part of the district, and is a level plain; The Kishangarh block which is in the northeastern portion of the district is sandy except for a few isolated hills. The major rivers of the district are Banas, Khari, Sagarmati and Rupnagar, which developed very good drainage system of the district along with their tributaries like Nearan, Mashi, Sodara and Mahar etc. Minimum elevation (301 m) is found in Kekri block whereas highest elevation is reached (870 m) in Peesangan block.

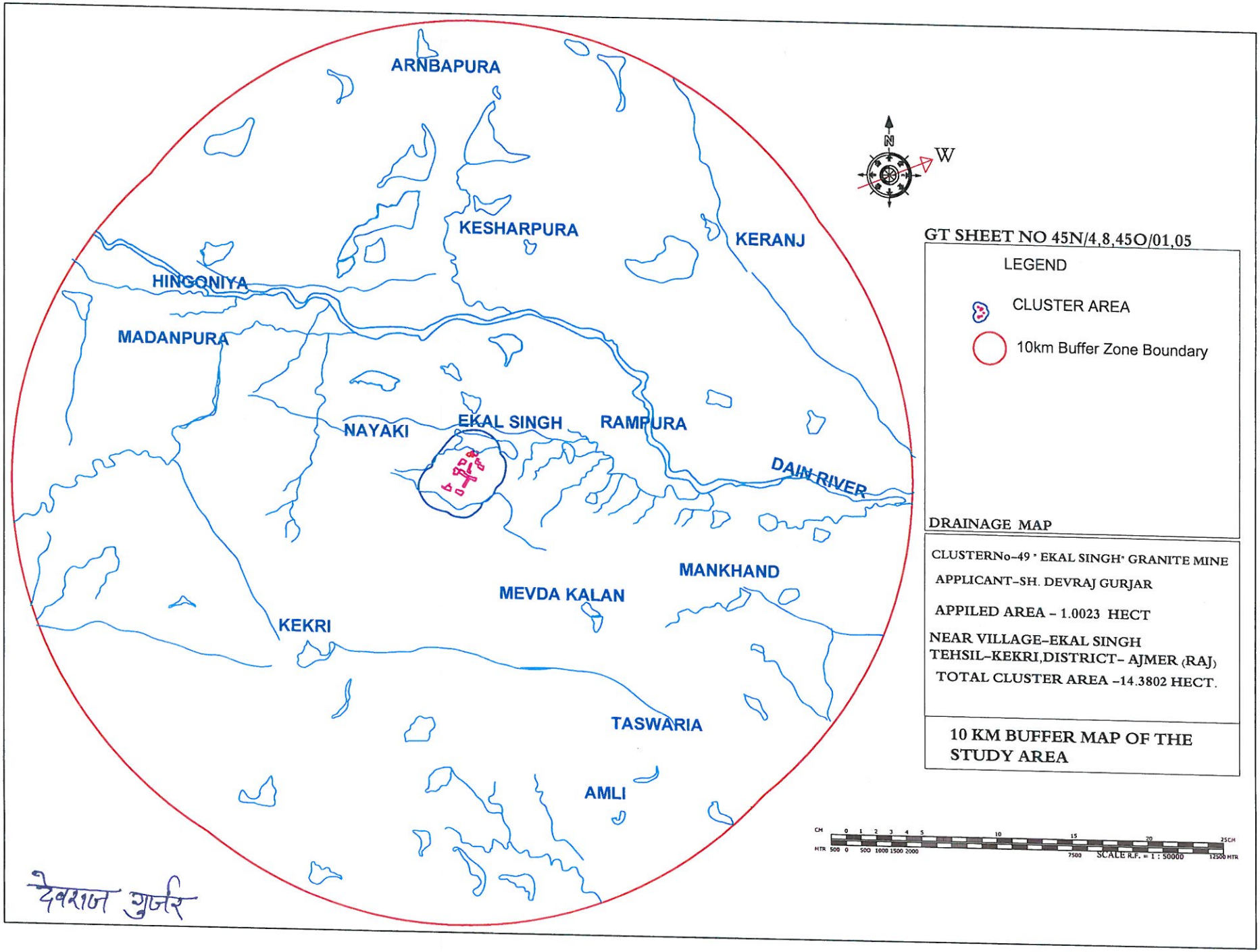
Table No-2.2
Block Wise Minimum & Maximum Elevation

S.No	Block Name	Minimum Elevation (m amsl)	Maximum Elevation (m amsl)
1	Arain	326.4	421.9
2	Bhinay	347.3	689.0
3	Jawaja	377.6	819.8
4	Kekri	301.0	547.3
5	Kishangarh	360.8	717.5
6	Masuna	390.1	584.5
7	Peesangan	366.4	870.0
8	Srinagar	367.6	850.9

2.3.4 DRAINAGE PATTERN OF CLUSTER AREA

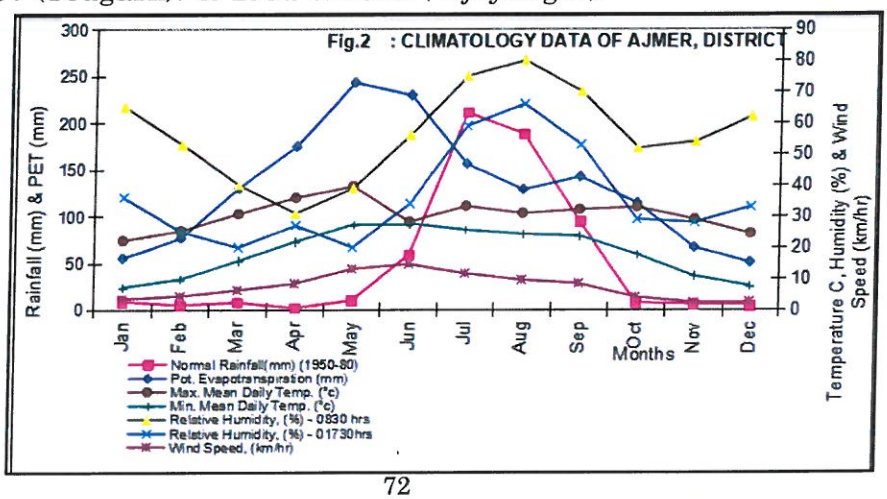
The Ground water table is 80 m from the surface (in rainy season) to 100 m (in Dry Season). The district is broadly triangular in shape and is generally a plain area interspersed with low hills of Aravalli ranges. The Aravalli hill ranges run parallel to each other roughly in NE-SW 6 direction giving rise to elongated valleys and divide plains of Marwar from the high elevated land of Mewar. The minimum elevation of 301 m amsl is found in Kekri block whereas highest elevation of 870 m amsl is observed in Pisangan block. Sand dunes and cluster of sand mounds cover a large part of the Sarsuti valley and area around Picholian & Pushkar valley. These features are usually formed due to abrupt termination of a hill range or existence of wind gaps in the hills. There are no perennial rivers in the district. The major rivers of the district are Dai or Dain, Khari, Sagarmati and Rupnagar, which are ephemeral in nature and develop very good drainage system of the district. The district falls under three basins, i.e., Banas (64.88%), Luni (23.74%) & Shekhawati (11.38%). The breakup of the basin area falling in various tehsils:

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ARNBAPURA
KESHARPURA
KERANJ
HINGONIYA
MADANPURA
NAYAKI
EKAL SINGH
RAMPURA
DAIN RIVER
MANKHAND
MEVDA KALAN
KEKRI
TASWARIA
AMLI
N
W
GT SHEET NO 45N/4,8,45O/01,05
LEGEND
CLUSTER AREA
10km Buffer Zone Boundary
DRAINAGE MAP
CLUSTERNo–49 " EKAL SINGH" GRANITE MINE
APPLICANT–SH. DEVRAJ GURJAR
APPILED AREA – 1.0023 HECT
NEAR VILLAGE–EKAL SINGH
TEHSIL–KEKRI,DISTRICT– AJMER (RAJ)
TOTAL CLUSTER AREA –14.3802 HECT.
10 KM BUFFER MAP OF THE STUDY AREA
SCALE R.F. = 1 : 50000
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2.3.5 CLIMATE & RAINFALL

January is the coldest month of this district with mean minimum temperature of 7.6° C and maximum temperature of 22.7°C. The temperature in the summer month of June reaches up to 48°C. The there is drop in temperature due to onset of monsoon in the end of June and temperature rises again in the month of September. The atmosphere is generally dry except during the monsoon period. The humidity is highest in the month of August with mean daily relative humidity of 80%. The annual potential evapotranspiration in the district is 1565.6 mm and is the highest in the month of May (243 mm). The Climatologically data of Ajmer district is shown in figure 3. 8 The mean annual rainfall (1987-2013) of the district is 450.2 mm. Almost 95% of the total annual rainfall is received during the southwest monsoon, which enters the district in the last week of June and withdraws in the middle of September. The probability of average annual rainfall exceeding 300 mm is only 90%, except at Mangliawas. However, there is 10% probability that the average rainfall exceeds 600 mm. The drought analysis based on agriculture criteria indicates that the district is prone to mild and normal type of droughts. Severe & very severe type of droughts are very rare and have occurred only twice in the following areas: 1987 & 2002 (Srinagar); 1977 & 1987 (Todgarh); & 1991 & 1993 (Vijaynagar).



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2.4 SOIL CLASSIFICATION

The four types of soils are generally found in Ajmer district, i.e., Sierozome, Lithosol & Regosol, Brown soil and Alluvium which are discussed below.

A. Sierozome: This is arid soil, sandy loam to sandy clay, deep brown, calcareous and found in the northern part of Silora block. Cultivation is limited due to climatic factors.

B. Lithosols and Regosols of Hills: This type of soil is found in the western part of district in the Aravalli hills and hill slopes. These are reddish brown to greyish brown in colour and are mainly found at shallow depths where usually gravels are present. Cultivation is limited due to limited root zone.

C. Brown Soils (Saline Phase): These soils are pale brown to yellowish brown in colour and are developed mainly from alluvium and Proterozoic & Archaen rocks. These are associated with seasonal water table and are saline in nature. Cultivation is limited due to salinity.

D. Alluvium: These are found in plains and derived from alluvium. The richest type of alluvium soil is obtained from the sand hills of Pushkar. These are non-calcareous, semi-consolidated to 9 unconsolidated, brown, loamy sand to sandy loam and occupy gently sloping terrains in central and eastern part of the district.

2.5 Method of Mining

The Mining Method will be done open cast Semi-Mechanized Method. The Cluster area is Mostly Soil Covered and partly exposures of Granite. The bench height would not be kept greater then (the statutory provision of the prevailing Act) the width of the benches. Benches of 6 m Height have been

Planned with width more than height of the bench. The mining has been proposed to start southeast of the Cluster area. The required Barrier along the mine boundary shall be kept 7.5 m. as shown in the plates of each mine in Cluster area.

A granite mine has two types of activates i.e. one is removing of waste rock and overburden and the other is extraction of granite blocks.

Overburden/Fractured capping is removed by drilling small dia holes blasted with light explosives charge (to prevent damage to Granite blocks from crakes) and the overburden is removed with help of excavator and loaded in to Dumper. The muck is transported and dumped in the lease area at proposed dumping site.

When granite is exposed, a free face in the strike direction along weak zone of strata is opened out by trench box and local terminology is called galli preparation. Thus a bench is formed. The vertical holes are drilled by jack hammer drill and with the wedging the big blocks are separated and toppled by using jacks. Big size block is further divided into small blocks by drilling and wedge method.

2.5.1 Salient Features of Mining Method

The salient features of Cluster No. 49 "Ekalsingha" Granite Mine method are:-

- The height of the bench will be maintained at 6.0 m. in each mine in cluster.
- Benches are to be kept sufficiently advance of subsequent lower benches to facilitate the movement of trucks for lifting the sized Granite & Masonry Stone production from the mine.
- Mining will be done from top to bottom.

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- Considering the stability of rocks, the final slope or say ultimate pit slope is proposed 45° from vertical.
- Transportation of the mineral from mine to Gang Saw unit will be done by hired trucks.

The schematic process of mining is shown in below:

Flow Chart showing the operation:

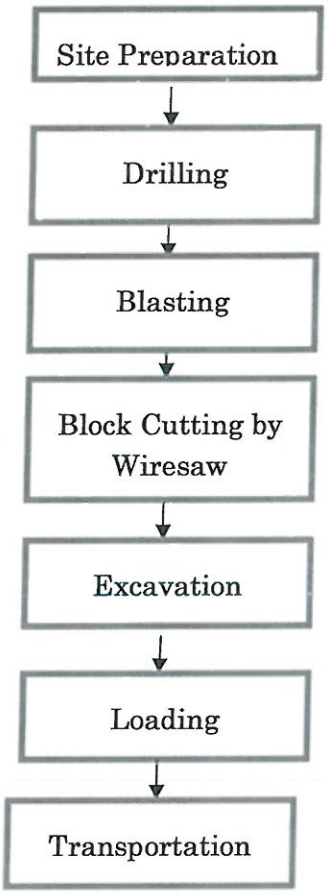


Figure 2.2 Cluster No. 49 "Ekalsingha" Granite Mine

2.6 Blasting

Blasting is required only for Removing waste Rock. The Blasting shall be controlled so that it is does not damage the Granite Mine Block. Light

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explosive will be used for removing overburden. The blasting shall be done contract basis by the licensed person / agency.

The Board blasting parameters will be as under: -

The 1.5 m deep holes of 32 mm dia are drilled for overburden removal by jackhammer, the burden and spacing is 1m and 1.2 m respectively. One hole of 1.5m depth and 32mm dia will break about 5.0 MT rock. The powder factor in the overburden at the mine normally 3-4. Each hole will have to be charged with about 250 Gms of explosives. The number of holes per blast is 10 No. Mainly special gelation cartridges of 25 mm dia and 140mm length are used with R-Cord and Delay detonator.

The waste rock can be removed by blasting tha rocks to break in to small places.

SECONDARY BLASTING

Secondary Blasting will not need.

SAFETY PRECAUTIONS

Steps will be taken to prevent any person approaching the shot. The safety precautions like efficient siren will be blown prior to the blasting and at the clearance of blasting.

2.7 Mineral Transportation

The Granite blocks are transported to Kishangarh dist. Ajmer and other places from Cluster mine in trucks / Tippers dispatched to the Gang saw unit for processing. The overburden is transported from mine to dump yard by tippers / dumpers.

2.8 Production Details & Waste Generation

Cluster No. 49 "Ekalsingha" Granite Mine, Located near Village- Ekalsingha, Tehsil- Kekri, Dist- Ajmer, Rajasthan, Total Cluster area is 14.3802 Hectare.

The Details of L.O.I holders given in Chapter No-I.

(A) PROPOSED PRODUCTION CAPACITY OF APPLIED L.O.I OF M.L NO- 51/2018, AREA-1.0023 HECTARE OF SHRI DEVRAJ GURJAR S/O SH. GOPI LAL GURJAR

YEAR	ROM IN MT	Total Saleable Mineral in MT	Waste in MT
First year	76524	30299	46225
Second year	80304	33096	47208
Third year	144026	59003	85023
Fourth year	162960	64680	98280
Fifth Year	142212	64831	77381
Total	**606026**	**251909**	**354117**

(A) EXISTING PRODUCTION CAPACITY OF M.L NO-24/2018 A.G MINES & MINERALS

YEAR	Total Saleable Mineral in tonnes	Waste in tonnes	Top Soil in MT	Total Waste in tonnes
First year	57,748	10,191	3,345.08	13,536.08
Second year	79,006	13,942	--	13,942
Third year	79,868	14,094	5,044.13	19,138.13
Fourth year	62,259	10,987	--	10,987
Fifth Year	36,592	6,457	2,730.53	9,187.53
Total	**3,15,473**	**55,671**	**11,119.74**	**66,790.74**

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(B) EXISTING PRODUCTION CAPACITY OF M.L NO-31/2018
M/S SAWAI BHOJ GRANITES

YEAR	Total Saleable Mineral in tonnes	Waste in tonnes	Fractured waste & overburden in tonnes	Total Waste in tonnes
First year	17,707	46,889	--	46,889
Second year	20,010	44,006	--	44,006
Third year	30,066.5	56,285.5	--	56,285.5
Fourth year	50,081	77,977	--	77,977
Fifth Year	76,049	1,06,078	--	1,06,078
Total	**1,93,913.5**	**3,31,235.5**	--	**3,31,235.5**

(C) EXISTING PRODUCTION CAPACITY OF M.L NO-57/2018 SHEE GIRIRAJ GRANITE

YEAR	Total Saleable Mineral in tonnes	Waste in tonnes	Fractured waste & overburden in tonnes	Total Waste in tonnes
First year	1,34,946	1,21,451	--	1,21,451
Second year	1,45,314	1,30,783	--	1,30,783
Third year	1,57,302	1,41,572	--	1,41,572
Fourth year	1,68,480	1,51,632	--	1,51,632
Fifth Year	2,21,940	1,99,746	--	1,99,746
Total	**8,27,982**	**7,45,184**	--	**7,45,184**

(D) EXISTING PRODUCTION CAPACITY OF M.L NO- 86/2018
M/S SATYA SUMAN MARBLE & GRANITE

YEAR	TOTAL MINERAL ROM MT	TOTAL SALEABLE MINERAL IN MT	WASTE IN MT
First year	56616	15002	41614
Second year	63227	20205	43022
Third year	80010	25301	54709
Fourth year	95491	34742.5	60748.5
Fifth Year	128294	55037	73257
Total	423638	150287.5	273350.5

(E) EXISTING PRODUCTION CAPACITY OF M.L NO-119/2018

SHREE SAGAR SHARMA

YEAR	TOTAL SALEABLE MINERAL IN TONNES	WASTE IN TONNES	FRACTURED WASTE & OVERBURDEN IN TONNES	TOTAL WASTE IN TONNES
First year	19,659	16,937	--	16,937
Second year	21,470	16,498	--	16,498
Third year	26,138	19,586	--	19,586
Fourth year	34,706	25,466	--	25,466
Fifth Year	1,09,707	57,257	--	57,257
Total	2,11,680	1,35,744	--	1,35,744

(F) EXISTING PRODUCTION CAPACITY OF M.L NO- 18/2019 M/S SH. TIRUPATI GRANITE MINES

YEAR	TOTAL MINERAL ROM MT	TOTAL SALEABLE MINERAL IN MT	WASTE IN MT
First year	60060	42042.00	18018.00
Second year	59982	41987.40	17994.60
Third year	59982	41987.40	17994.60
Fourth year	59982	41987.40	17994.60
Fifth Year	59982	41987.40	17994.60
Total	299988	150287.5	89996.4

(G) EXISTING PRODUCTION CAPACITY OF M.L NO- 18/2019 M/S ARIHANT GRANITES

YEAR	TOTAL MINERAL ROM MT	TOTAL SALEABLE MINERAL IN MT	WASTE IN MT
First year	168958	67245	101713
Second year	146865	75670	71195
Third year	153971	87048	66923
Fourth year	178801	106975	71826
Fifth Year	203212	132088	71124
Total	851807	469026	382781

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(H)EXISTING PRODUCTION CAPACITY OF M.L NO- 07/2019 SH. JAGDISH BAIRWA

YEAR	TOTAL MINERAL ROM MT	TOTAL SALEABLE MINERAL IN MT	WASTE IN MT
First year	5226	36582	15678
Second year	52650	36855	15795
Third year	52650	36855	15795
Fourth year	52650	36855	15795
Fifth Year	52650	36855	15795
Total	262860	184002	78858

(I) EXISTING PRODUCTION CAPACITY OF M.L NO- 28/2018 SH. SHIVRAJ GURJAR

YEAR	TOTAL SALEABLE MINERALS IN TONNES	WASTE IN TONES	FRACTURE WASTE & OVERBURDEN IN TONNES	TOTAL WASTE IN TONNES
First year	3002	12006	--	12006
Second year	8020	15573	--	15573
Third year	15039	33317	--	33317
Fourth year	27804	43932	--	43932
Fifth Year	100000	151206	--	151206
Total	153865	256034	--	256034

(J) EXISTING PRODUCTION CAPACITY OF M.L NO- 70/2018 M/S ADITI GRANITES & MINERALS

YEAR	TOTAL SALEABLE MINERALS IN TONNES	WASTE IN TONES	FRACTURE WASTE & OVERBURDEN IN TONNES	TOTAL WASTE IN TONNES
First year	3080	12320	--	12320
Second year	10080	40320	--	40320
Third year	20056	45198	--	45198
Fourth year	38926	38926	--	38926
Fifth Year	100000	100000	--	100000
Total	172142	236764	--	236764

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(K)EXISTING PRODUCTION CAPACITY OF M.L NO- 108/2018 M/S BASARANI GRANITES

YEAR	TOTAL SALEABLE MINERALS IN TONNES	WASTE IN TONES	FRACTURE WASTE & OVERBURDEN IN TONNES	TOTAL WASTE IN TONNES
First year	21512.5	52810.5	--	52810.5
Second year	23414.5	51975.5	--	51975.5
Third year	32216	49860	--	49860
Fourth year	44748	75926	--	75926
Fifth Year	120000	152764	--	152764
Total	241891	38336	--	38336

2.9 EXTENT OF MECHANIZATION: (For Each Mine)

S.No	Machinery	For Proposed L.O.I	11-Existing Mines
1	Jack Hammer	2	24
2	Compressor	1	12
3	Wire saw	2	24
4	D.G Set	1	12
5	Derrick Crane	2	24
6	Excavator	1	12
7	Dumper	2	24
8	Water Tanker	1	12

2.10 Anticipated Life of Mine of Cluster No. 49 "Ekalsingha" Granite & Mine, Located Near Village- Ekalsingha, Tehsil- Kekri, Dist- Ajmer, Rajasthan.

TABLE NO-2.4 Life of Cluster

S.No	Name of Lease	Mineable Reserves	Production (TPA)	Life of Mine as per Cluster approved Mining Plan
1	Sh. Devraj Gurjar	625773.5	50382	12
2	M/s A.G Mines & Minerals	438968.92	74229	6
3	M/s Sawai Bhoj Granite	478129	38783	12
4	Shree Giriraj Granite	2092986	199746	11
5	M/s Satya Suman Marble & Granite	316435.5	30057.5	11

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6	Sh. Sagar Sharma	533436	42336	13
7	M/s Shri Tirupati Granite Mines	615940	60000	10
8	M/s Arihant Granites	1214206	93805	13
9	Sh. Jagdish Bairwa	299520	52650	5.68
10	Shivraj Gurjar	299456	30773	10
11	M/s Aditi Granite & Mineral	624752.5	34429	18
12	M/s Basarani Granite	466203	48378	10
TOTAL		8005806	755568.5	18 Years Max.

Considering average Production of 625773.5 TPA of Granite minor mineral in the Cluster.

Life of mine of Cluster = Total Mineable reserve (Proved+Probable) / Av. Annual Production = 35932544.42/755568.5 = 14 Years.

2.11 WASTE GENERATION & ITS DISPOSAL

The mine waste shall be excavated up to end of conceptual mining plan. It will be disposed in the form of temporary external dump. One retaining wall will be made for stacking of waste.

Dumping Site:

Initially the dump will be dumped in the mine lease area as shown in plate of individual lease in the cluster and ultimately it is proposed to shift in backfilled and existing as well as new over burden site approved by Govt. nearby the cluster.

Maximum height and spread of Dump:

The height of dump will be kept up to 21 m. The total overburden in five years will be about 2518096.3 MT. The retaining wall will be erected to arrest the waste mineral during rainy season.

Table No-2.5 Details of Waste Generation of Proposed 1-L.O.I

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S. No	Applicant	M.L No	Waste Generation from Proposed L.O.I in Tonne
1	Sh. Devraj Gurjar S/O Sh. Gopi Lal Gurjar	51/2018	3,54,117
Total Waste			3,54,117

Table No-2.6 Details of Waste Generation from Existing 11-Mines

Applicant/Lessee	M.L No/Ref No	Total Reject (MT)
M/s A.G Mines & Minerals	24/2018	66790.74
M/s Sawai Bhoj Granite	31/2018	331235.5
Shree Giriraj Granite	57/2018	745184
M/s Satya Suman Marble & Granite	86/2018	273350.5
Sh. Sagar Sharma	119/2018	135744
M/s Shri Tirupati Granite Mines	18/2019	89996.4
M/s Arihant Granites	22/2019	382781
Sh. Jagdish Bairwa	07/2019	78858
Shivraj Gurjar	28/2018	256034
M/s Aditi Granite & Mineral	70/2018	236764
M/s Basarani Granite	108/2018	383336

Table No-2.7 Details of Total Waste Generation from Cluster No. 49 "Ekalsingha" Granite Mine

S.No	Total Waste from 1-Prposed L.O.I in MT	Total Waste from 11-Existing Mines in MT	Total Waste Generation from Cluster Mining
1.	3,54,117	29,80,074	**33,34,191**

2.12 GARLAND DRAIN

Garland drain (size, gradient and length) shall be constructed for mine pit and sump capacity is designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the Cluster area. Sump capacity will provide adequate retention period to allow proper settling of silt material. Sedimentation pits

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should be constructed at the corners of garland drains and desilted at regular intervals.

2.13 RECLAMATION/RESTORATION WORKS

At the end of Mining operation, A Part shall be backfilled and remaining part of the lease area would be used as water reservoir and a part of the remaining region would be used for plantation. Plantation will be carried in statutory barrier and in own proposed land, along the haul road, school, Panchayat lands after grant of permission.

The mining lease holders will after ceasing mining operations undertake re-grassing the mining area and any other area which have been disturbed due to mining activities and restore the land to the condition suitable for growth of fodder, flora, fauna etc.

2.14 PLANTATION: GREEN BELT DEVELOPMENT

Plantation is proposed about 33 percent of the lease area at the boundary of the lease, both sides of the road, & at the end of life of mine some plantation will be carried out at backfilled area.

Approximately 4740 Plants will be planted by Cluster Lease Holders of Cluster area. The Details given Chapter -IX

2.15 WATER REQUIREMENT AND WASTEWATER GENERATION

The total water requirement for the project is estimated 42 KLD (For Cluster No. 49 "Ekalsingha" Granite Mine) Water for mining operation (dust suppression) and for domestic & drinking purpose will be supplied from PHED supply & Hand pump/Tube well situated nearby village through water tankers. The detailed breakup of the water requirement is given below in.

Table No-2.9 (Water requirement for Cluster No. 49 "Ekalsingha" Granite Mine

Applicant/Lessee	M .L No-	Water Requirement in KLD
Sh. Devraj Gurjar	51/2018	3.5
M/s A.G Mines & Minerals	24/2018	3.5
M/s Sawai Bhoj Granite	31/2018	3.5
Shree Giriraj Granite	57/2018	3.5
M/s Satya Suman Marble & Granite	86/2018	3.5
Sh. Sagar Sharma	119/2018	3.5
M/s Shri Tirupati Granite Mines	18/2019	3.5
M/s Arihant Granites	22/2019	3.5
Sh. Jagdish Bairwa	07/2019	3.5
Shivraj Gurjar	28/2018	3.5
M/s Aditi Granite & Mineral	70/2018	3.5
M/s Basarani Granite	108/2018	3.5
Total		42

S. No.	Purpose	Total Requirement (KLD) Water For Cluster area	Total Requirement in (KLD) for applied area
1	Dust suppression	12	1.0
2	Drinking & other purposes	6.0	0.5
3	Green belt	12	1.0
4	Wire Saw Cutting	12	1.0
TOTAL		42 KLD	3.5 KLD

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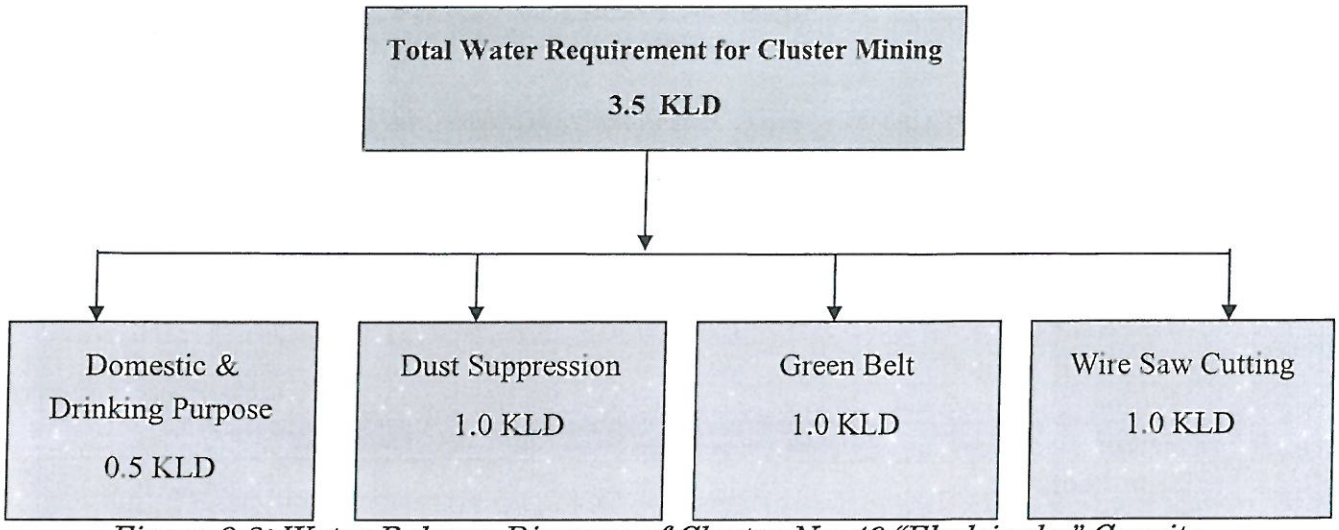


Figure 2-3: Water Balance Diagram of Cluster No. 49 "Ekalsingha" Granite Mine

2.16 Power Requirement

The Electricity is required in Cluster No. 49 "Ekalsingha" Granite Mine as per power requirement for Cluster No. 49 "Ekalsingha" Granite Mine a electricity line passing through near by village Ekalsingha. Power supply will be obtained from nearby village as per requirement of Existing leases. Total 6 HSD diesel will be required for Cluster Mining for operate the machinery.

2.17 Employment Details

The total manpower required for the Cluster No. 49 "Ekalsingha" Granite Mine will be 300-360 people. Priority for employment will be given to local workers. Staff & workers proposed to be employed are given in Table 2.11.

Table 2.10: Manpower Requirement for Cluster No.49 "Ekalsingha" Granite Mine

S. No.	Particulars	No.
1	Managerial & Supervisory personnel	
	Mines manager (As per MMR, 1961)	12
	Asst. Manager	12
	Total	24
2	Mines Mate	12
3	Watchman	12
4	Unskilled Labour	204
5	Skilled	60
6	Driver	36
7	Storekeeper	12
	Total	360

Table No-2.11 Details of Man Power Requirement of Applied Area

S. No.	Particulars	No.
1	Managerial & Supervisory personnel	
	Mines manager (As per MMR, 1961)	1
	Asst. Manager	1
	Total	2
2	Mines Mate	1
3	Watchmen	1
4	Unskilled Labour	17
5	Skilled	5
6	Driver	3
7	Storekeeper	1
	Total	30

2.18 Project Cost

Rs. 10.45 Crore/- +(11-Existing Mine)

Rs. 0.95 Crore/- (1-Proposed L.O.I)

Total- 11.40 Crore/- of Cluster No.49 "Ekalsingha" Granite Mine

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CHAPTER NO-III

DESCRIPTION OF ENVIRONMENT

3.0 Introduction

For the Description of baseline environment scenario, the project falls in cluster area, Area-14.3802 Hectare, Cluster No. 49 "Ekalsingha" Granite Mine Located near Village- Ekalsingha, Tehsil- Kekri, Dist- Ajmer, Rajasthan is flat land. And it has been considered as the core zone. As the cluster mine lease area exhibits an irregular shape, thus to arrive at a more reasonable study, the buffer area has been fixed at 10 km radius from the extremities of the Cluster area.

3.1 Components of Study

1. Land Environment:	Topography & Drainage
	Geology
	Land Use
	Soil
2. Water Environment:	Ground Water
	Surface Water
3. Air Environment:	Metrological Data (Wind Speed and Direction,
	Rainfall, Relative Humidity, Temperature, Visibility)
	Ambient Air Quality (AAQ)
4. Noise Environment:	Noise Level Monitoring
5. Biological Environment:	Terrestrial Flora & Fauna
	Aquatic Flora & Fauna

3.2 Study Area

The study area is taken in accordance with the provisions of sector specific EIA guidance manual for Mining of Minerals manual, published by Ministry of Environment and Forests, during 2010. The study area for the proposed Granite Cluster Mining Project was as follows:

- The Cluster No. 49 "Ekalsingha" Granite Mine area is considered as 'Core Zone'.
- 10 km. radius from the boundary limits of the Cluster area is considered as 'Buffer Zone'.

The study area is entirely rural and falls in Village Ekalsingha, Tehsil - Kekri, District Ajmer of Rajasthan State.

The environmental setting of the Cluster area is given *in Table 3.1*

Table 3-1: Environmental Setting of the Cluster Area

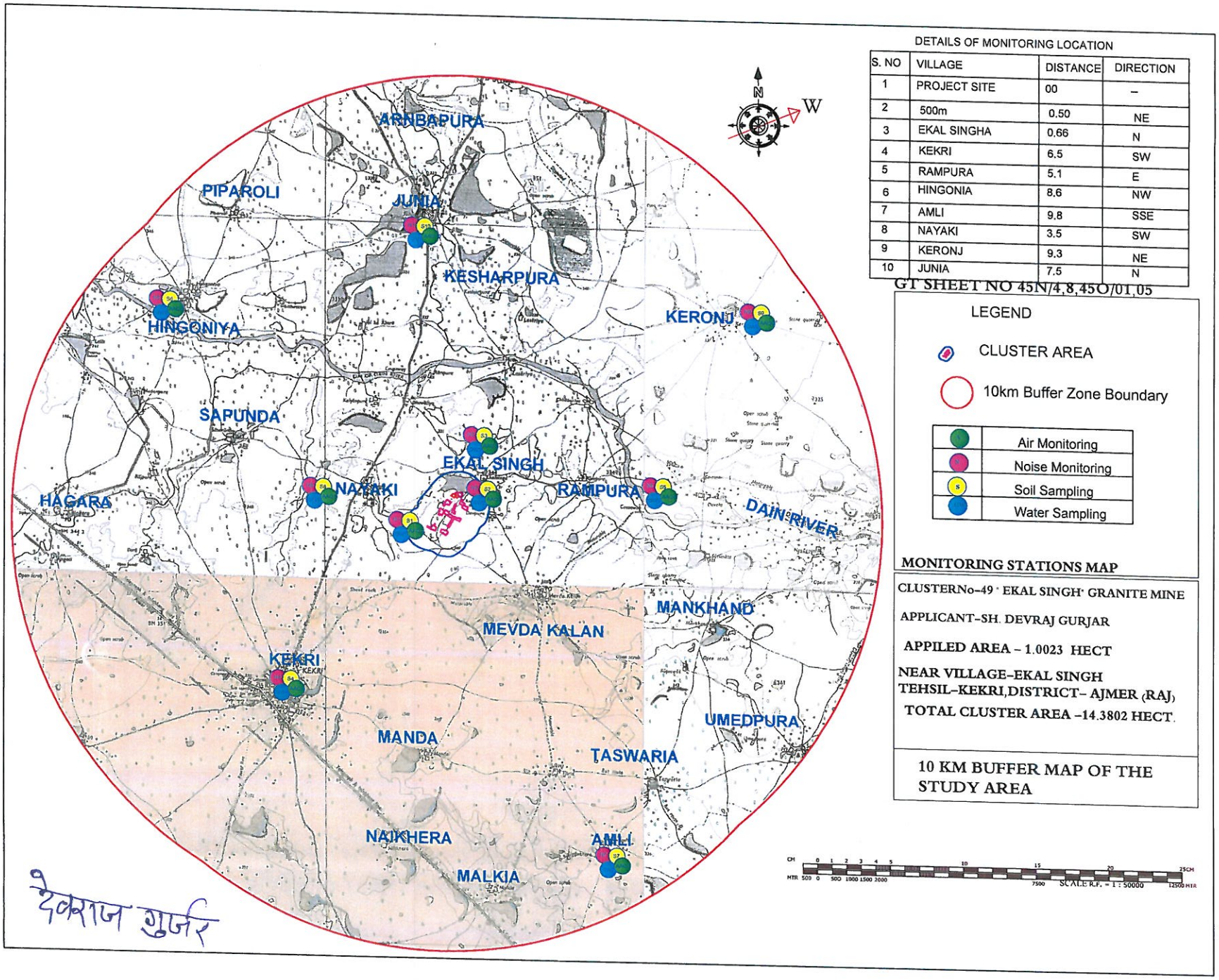
Sr. No.	Particulars	Details
A.	Nature of the Project	Cluster No. 49 "Ekalsingha" Granite Mine, Located Near village- Ekalsingha, Tehsil- Kekri, District- Ajmer, Rajasthan.
B.	Size of the Project	
1.	Cluster Mine Area	Applied Area – 1.0023 Hectare Total Cluster Area- 14.3802 Hectare
2.	Proposed Production capacity of cluster	Proposed Production of Applied area-1,62,960 TPA (ROM). Existing mines Production Capacity- 20,37,969.13 TPA (ROM). Total Cluster Production Capacity- 22,00,929.13 TPA (ROM).
C	Location Details of Cluster	
1.	Village	Ekalsingha
2.	Tehsil	Kekri
3.	District	Ajmer

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Sr. No.	Particulars	Details
4.	State	Rajasthan
5.	Toposheet No.	45N/04
D	Environmental Settings of the Study Area	
1.	Ecological Sensitive Areas	No Protected & Reserved Forests fall within 15 km radius from the mining lease.
2.	River / water body	Available water bodies and rivers falls within 15 Km radius Buffer zone as follows: • Dai Nadi at a distance of 2.5 km in N direction of cluster area.
3.	Nearest Town / City	Ekalsingha About 0.70 km in from NE Direction from the Cluster area.
4.	Nearest Railway Station	Nearest Railway Station is Bandanwara railway station at a distance of 52.62 km in WNW Direction from the Cluster area.
5.	Nearest Airport	Airport – Jaipur at a distance of 107.79 km in SW Direction from the Cluster area.
6.	State Boundary	No State boundary passes through the project site
7.	Seismic Zone	Seismic zone – II
D	Cost Details	
1.	Total Project Cost of cluster	Rs.10.45 Crore/- (11-Existing Mines) Rs. 0.95 Crore/- (1-Proposed L.O.I) **Total- 11.40 Crore of Cluster No. 49 "Ekalsingha" Granite Mine**
E	Requirements of The Project	
1.	Proposed Water Requirement	42 KLD (For Cluster No. 49 "Ekalsingha" Granite Mine
2.	Fuel requirement	6 HSD for Cluster No.49 "Ekalsingha" Granite Mine
3.	Man Power Requirement	300-360 for Cluster No.49"Ekalsingha" Granite Mine

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ARNIAPURA
PIPAROLI
JUNIA
KESHARPURA
HINGONIYA
KERONJ
SAPUNDA
EKAL SINGH
NAYAKI
RAMPURA
HAGARA
DAIN RIVER
MANKHAND
MEVDA KALAN
KEKRI
MANDA
UMEDPURA
TASWARIA
NAIKHERA
AMLI
MALKIA
N
W
DETAILS OF MONITORING LOCATION
S. NO | VILLAGE | DISTANCE | DIRECTION
1 | PROJECT SITE | 00 | –
2 | 500m | 0.50 | NE
3 | EKAL SINGHA | 0.66 | N
4 | KEKRI | 6.5 | SW
5 | RAMPURA | 5.1 | E
6 | HINGONIA | 8.6 | NW
7 | AMLI | 9.8 | SSE
8 | NAYAKI | 3.5 | SW
9 | KERONJ | 9.3 | NE
10 | JUNIA | 7.5 | N
GT SHEET NO 45N/4,8,45O/01,05
LEGEND
CLUSTER AREA
10km Buffer Zone Boundary
Air Monitoring
Noise Monitoring
Soil Sampling
Water Sampling
MONITORING STATIONS MAP
CLUSTERNo–49 ' EKAL SINGH' GRANITE MINE
APPLICANT–SH. DEVRAJ GURJAR
APPILED AREA – 1.0023 HECT
NEAR VILLAGE–EKAL SINGH
TEHSIL–KEKRI,DISTRICT– AJMER (RAJ)
TOTAL CLUSTER AREA –14.3802 HECT.
10 KM BUFFER MAP OF THE STUDY AREA
SCALE R.F. = 1 : 50000

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3.3 Study Period

The baseline environmental quality represents the background scenario of various environmental components in the study area. As part of Environmental Impact Assessment Study, baseline environmental monitoring was carried out for summer season covering the months of *Summer Season March 2021 to May 2021.*

3.3.1 Land Environment

Land Cover is the physical material at the surface of the earth (it includes grass, asphalt, trees, bare ground, water etc.) whereas Land use is the human use of land. Land Use involves the management and modification of natural environment or wilderness into built environment such as fields, pastures and settlements. It has also been defined as the arrangements, activities and inputs people undertake in a certain land cover type to produce, change or maintain it. Studies on land use aspects of eco-system play an imperative role in identifying susceptible issues and to take appropriate action to uphold ecological equilibrium in the region. The main objective of this section is to provide a baseline status of the study area, covering 10 km radius around the mining lease so that temporal changes due to the mining activities on the surroundings can be assessed in future.

3.3.2 Land Use Studies

Studies on Land use aspects of eco-system play an imperative role in identifying susceptible issues and to take appropriate action to uphold ecological equilibrium in the region. The main objective of this section is to provide a baseline status of the study area covering 10 km radius around the exiting cluster site so that temporal changes due to the mining activities on the surroundings can be assessed in future.

OBJECTIVES:

The objective of the land use study is given below:

- To develop land use & land cover map using land coordinates of the Cluster area.
- To identify and mark important basic features according primary and secondary data.
- To suggest measures for conservation and sustainable use of land.

Data Input

IRS LISS3 Multispectral digital FCC (False Color Composite) data from NRSC Bhuwan Portal has been used for preparation of Land use/ Land cover thematic map of study area. Cluster site mine plan map & Google maps and Toposheet has been used as a reference map for preparation of base layer map like road, rail network, project site boundary, landmarks point etc.

Satellite Image	:	IRS LISS3
Band Combination	:	2, 3, 4
DIP Software	:	ERDAS Imagine 9.2 & Arc GIS 9

Methodology

Land use / Land cover map preparation, Base map creation; and Geometric correction of satellite image has been processed using ERDAS Imagine 9.2 Software. The methodology used for land use land cover study is as follows:

Geo Referencing of Topo Map

Toposheet has been geo-referenced in geographic lat/long coordinate system using ERDAS Imagine Software.

Base Map Layer Creation

Base map has been prepared using ancillary Google maps as a reference map on 1:50000 scale. In base layer linear and point feature like road, rail, canal, village location and plant site have been created in vector data format

Table No-3.2 Land Use / Land Cover Statistics of Cluster Study area Land Use cover of 10 Km Radius

S. No	Classes Name	Area in Hectare	% (Area)
1	Habitation	1063.71	3.34
2	River/Water Bodies	1185.79	3.72
3	Crop Land	8802.98	27.62
4	Fallow Land	12063.68	37.85
5	Scrub/Barren Land	8760.02	27.48
TOTAL		31876.18	100

Intrepretation of Land use/Land Cover of Study Area

The study area is predominarly surrounded by 31876.18 hectares out of which Agriculture Land 8802.98 ha. (27.62%). The Fallow Land of about 12063.68 ha (37.85 %), 1063.71 hectare (3.34%) of Habitation, and 8760.02 ha (27.48%) of Scrub Land, 1185.79 hectare (3.72%) of Water Bodies/River. The 10 km radius False color Composite saelite map surrounding the project site is provided in Figure 3.2 and LULC map around the 10 km radius of Proposed Cluster No. 49 "Ekalsingha" Granite Mines is provided.

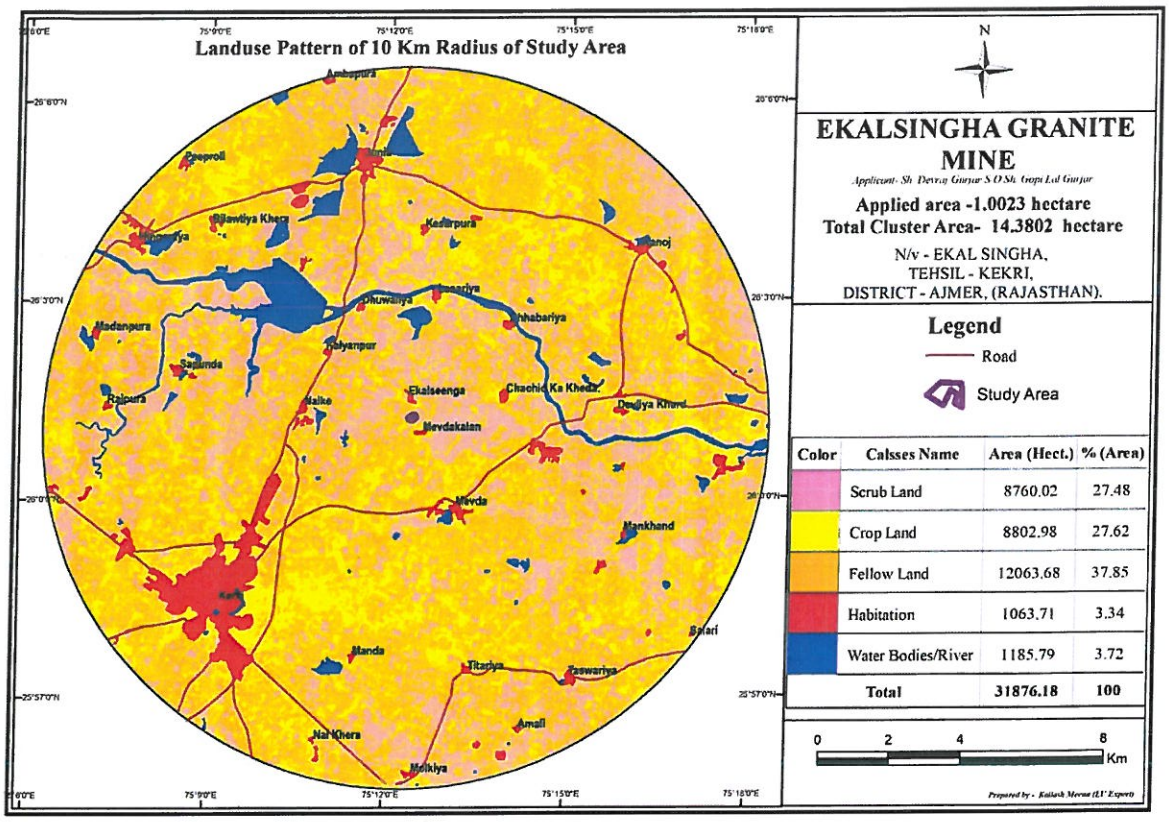


Figure-3.2 Land Use Map of Cluster No. 49 "Ekalsingha" Granite Mine

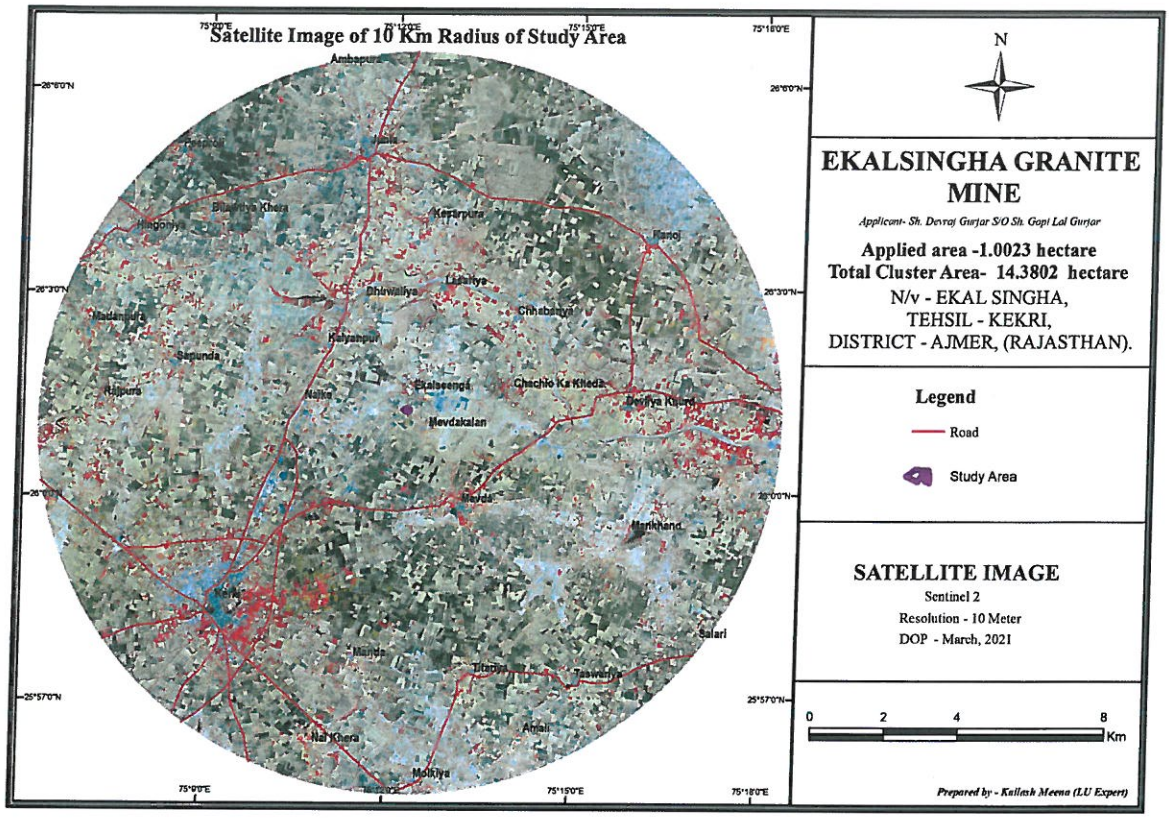


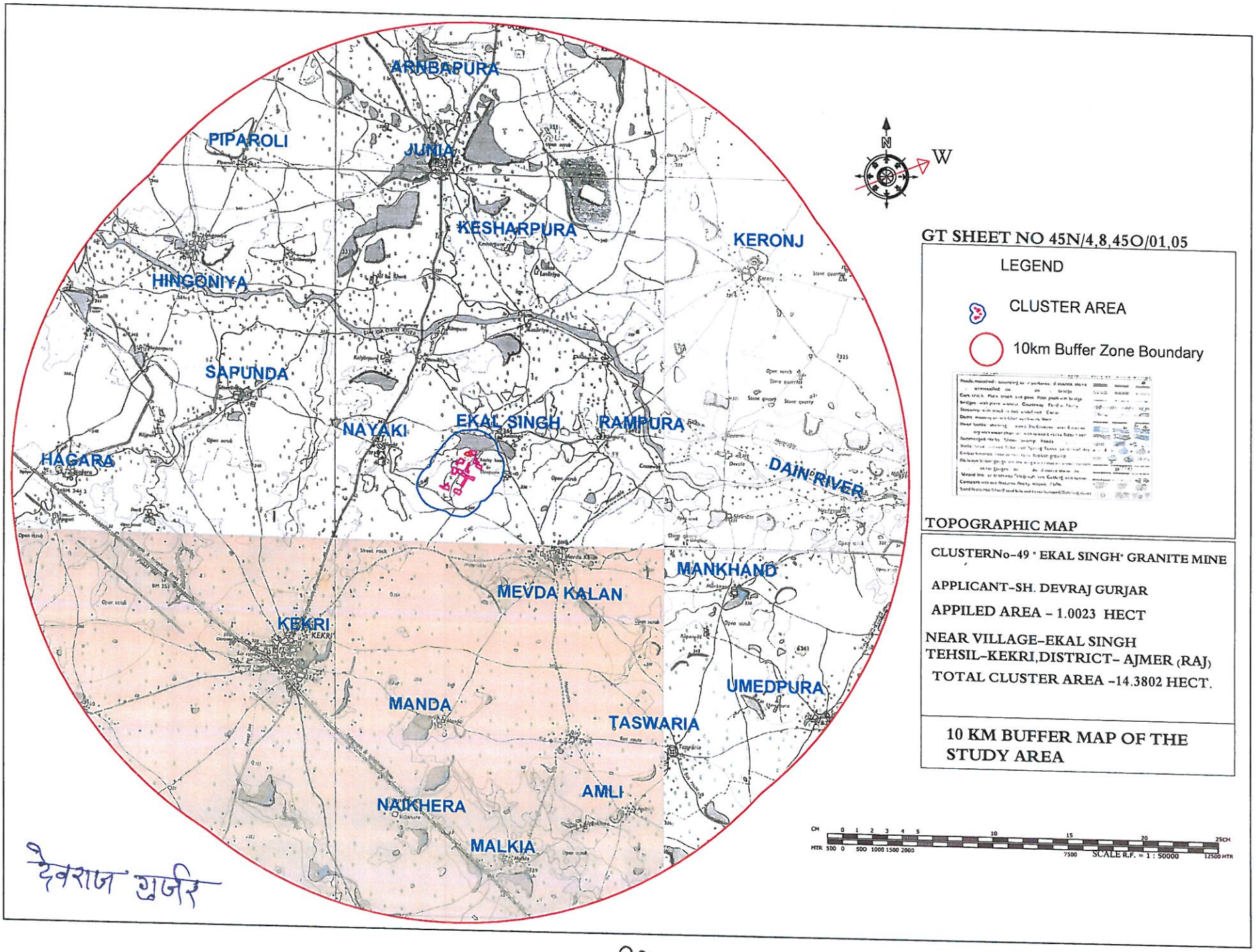
Figure-3.3 Satellite Image of Cluster No. 49 "Ekalsingha" Granite Stone Mine

Conclusion :

The area statistics shows that the study area dominally surrounded by Fallow Land and there will be no impact on farming land as the mining will be done in the core area of the lease

3.3.3 Topography:

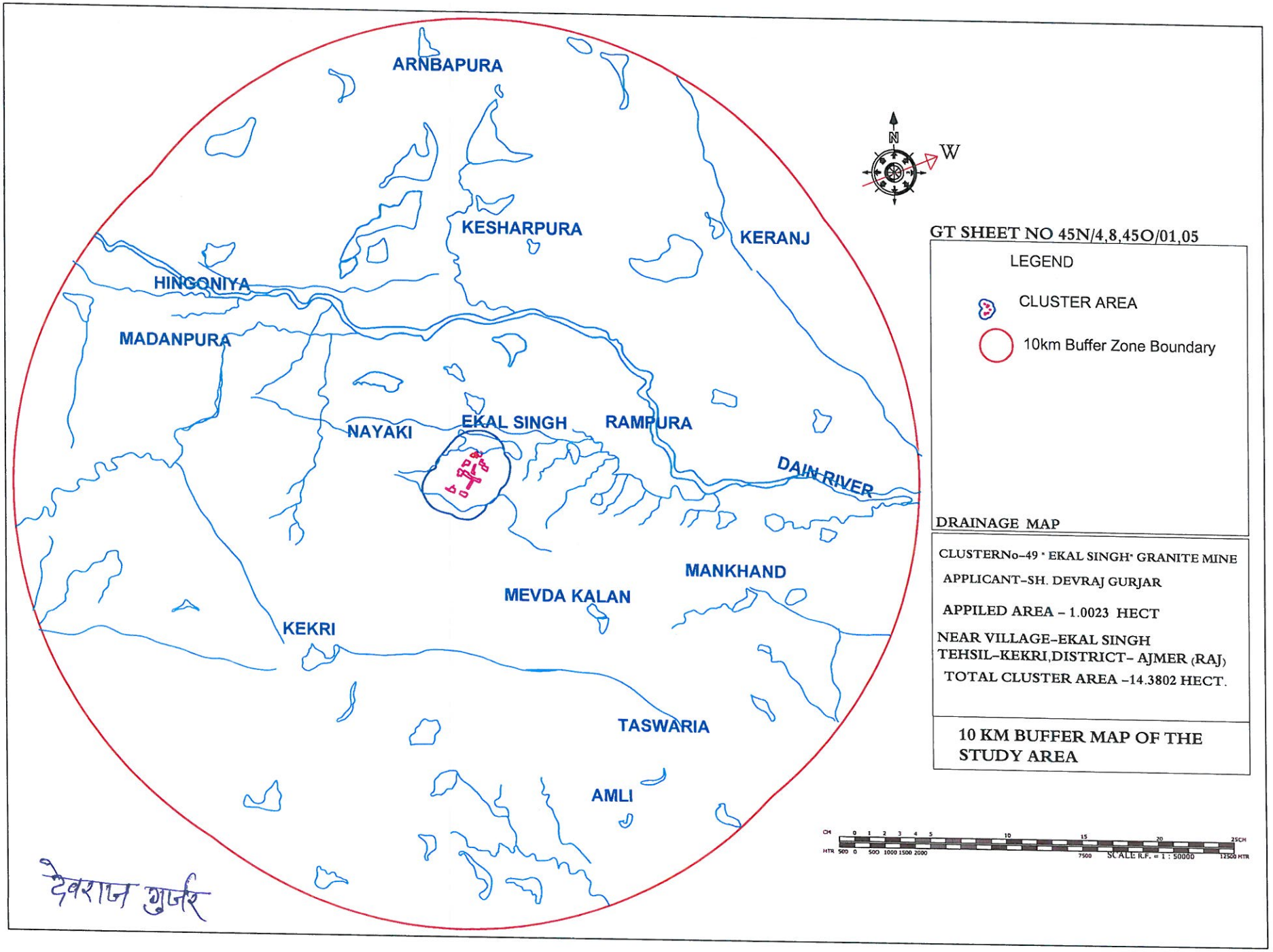
The district is broadly triangular in shape. It is generally a plain area interspersed with low hills of Aravalli range running roughly NE-SW direction and irregular terrain lying in the southwestern part of the district. The Kekri block forms the southeastern part of the district, and is a level plain; The Kishangarh block which is in the northeastern portion of the district is sandy except for a few isolated hills. The major rivers of the district are Dai or dain, which developed very good drainage system of the district along with their tributaries like Nearan, Mashi, Sodara and Mahar etc. Minimum elevation (301 m) is found in Kekri block whereas highest elevation is reached (870 m) in Peesangan block.


ARNBAPURA
PIPAROLI
JUNIA
KESHARPURA
KERONJ
HINGONIYA
SAPUNDA
NAYAKI
EKAL SINGH
RAMPURA
HAGARA
DAIN RIVER
MANKHAND
MEVDA KALAN
KEKRI
UMEDPURA
MANDA
TASWARIA
AMLI
NAIKHERA
MALKIA
N
W
GT SHEET NO 45N/4,8,45O/01,05
LEGEND
CLUSTER AREA
10km Buffer Zone Boundary
TOPOGRAPHIC MAP
CLUSTERNo-49 " EKAL SINGH" GRANITE MINE
APPLICANT-SH. DEVRAJ GURJAR
APPILED AREA - 1.0023 HECT
NEAR VILLAGE-EKAL SINGH
TEHSIL-KEKRI,DISTRICT- AJMER (RAJ)
TOTAL CLUSTER AREA -14.3802 HECT.
10 KM BUFFER MAP OF THE STUDY AREA
SCALE R.F. = 1 : 50000

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3.3.4 Drainage Pattern:

The Ground water table is 80 m from the surface (in rainy season) to 100 m (in Dry Season). The district is broadly triangular in shape and is generally a plain area interspersed with low hills of Aravalli ranges. The Aravalli hill ranges run parallel to each other roughly in NE-SW 6 direction giving rise to elongated valleys and divide plains of Marwar from the high elevated land of Mewar. The minimum elevation of 301 m amsl is found in Kekri block whereas highest elevation of 870 m aMSL is observed in Pisangan block. Sand dunes and cluster of sand mounds cover a large part of the Sarsuti valley and area around Picholian & Pushkar valley. These features are usually formed due to abrupt termination of a hill range or existence of wind gaps in the hills. There are no perennial rivers in the district. The major rivers of the district are Banas, Khari, Sagarmati and Rupnagar, which are ephemeral in nature and develop very good drainage system of the district. The district falls under three basins, i.e., Banas (64.88%), Luni (23.74%) & Shekhawati (11.38%). The breakup of the basin area falling in various tehsils:


ARNBAPURA
KESHARPURA
KERANJ
HINGONIYA
MADANPURA
NAYAKI
EKAL SINGH
RAMPURA
DAIN RIVER
MANKHAND
MEVDA KALAN
KEKRI
TASWARIA
AMLI
N
W
GT SHEET NO 45N/4,8,45O/01,05
LEGEND
CLUSTER AREA
10km Buffer Zone Boundary
DRAINAGE MAP
CLUSTERNo-49 " EKAL SINGH" GRANITE MINE
APPLICANT-SH. DEVRAJ GURJAR
APPILED AREA - 1.0023 HECT
NEAR VILLAGE-EKAL SINGH
TEHSIL-KEKRI,DISTRICT- AJMER (RAJ)
TOTAL CLUSTER AREA -14.3802 HECT.
10 KM BUFFER MAP OF THE STUDY AREA
SCALE R.F. = 1 : 50000

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3.3.5 Land Use Pattern of Mining Lease (Core Area)

The Cluster lease area of 14.3802 Hectare Total 12 leases falls in Cluster area.

Table 3-3: Present Land use pattern of the Core Zone

(Proposed 1- L.O.I Lease Holder)

S.No	All the area are given in hectare	Shri Devraj Gurjar S/O Sh. Gopi lal Gurjar `		
		Present land use	**During five year plan period**	**At the end of life of mine**
1	Water Reservoir	--	0.13303	0.13303 (water reservoir)
2.	Top Soil Dump	--	--	--
3.	OB Dump	--	0.0140	--
4.	Mineral Storage	--	0.0015	--
3.	Backfilled area	--	--	--
4.	Stack Yard	--	--	--
5.	Sub Grade stack yard	--	--	--
6.	Infrastructure	--	0.0045	0.0020
7.	Road	--	--	--
8.	Railway	--	--	--
9.	Green Belt area	--	0.0503	0.0683
10.	Non Utilized	1.0023	0.79897	0.79897
Total		**1.0023**	**1.0023**	**1.0023**

Table 3-4: Existing Land use pattern of the Core Zone

(Existing 11- Lease Holder)

S. No	All the area are given in hectare	M/s A.G Mines & Minerals	M/s Sawai Bhoj Granite	Shree Giriraj Granite	M/s Satya Suman Marble & Granite	Sh. Sagar Sharma	M/s Shri Tirupati Granite Mines	M/s Arihant Granites	Sh. Jagdish Bairwa	Shivraj Gurjar	M/s Aditi Granite & Minerals	M/s Basarani Granite
1	Water Reservoir	---	--	--	--	--	--	--	--	--	--	--
2.	Top Soil Dump	---	--	--	--	--	--	--	--	--	--	--
3.	Backfilled area	---	--	--	--	--	--	--	--	--	--	--
4.	Stack Yard	---	--	--	--	--	--	--	--	--	--	--
5.	Sub Grade stack yard	---	--	--	--	--	--	--	--	--	--	--
6.	Infrastructure	--	--	--	--	--	--	--	--	--	--	--
7.	Road	---	--	--	--	--	--	--	--	--	--	--
8.	Railway	---	--	--	--	--	--	--	--	--	--	--
9.	Green Belt area	---	--	--	--	--	--	--	--	--	--	--
10.	Non Utilized	1.4143	1.3006	1.5835	1.0025	1.0229	1.3848	1.4797	1.0144	1.0001	1.00	1.1751
Total		**1.4143**	**1.3006**	**1.5835**	**1.0025**	**1.0229**	**1.3848**	**1.4797**	**1.0144**	**1.0001**	**1.00**	**1.1751**

3.4 Seismicity of the Study Area

The study area comes under Zone-II i.e. Low damage risk zone. Many parts of the Indian subcontinent have historically high Seismicity. Seven catastrophic earthquakes of magnitude greater than 8 (Richter scale) have occurred in the western, northern and eastern parts of India and adjacent countries in the past 100 years. By contrast, peninsular India is relatively less seismic, having

suffered only infrequent earthquakes of moderate strength. The main seismogenic belts are associated with the collision plate boundary between the Indian and Eurasian plates. The Cluster area as well as study area lies in Zone-II of Seismic Zoning Map. The Seismic Zone Map of Rajasthan is shown in Figure 3.6.

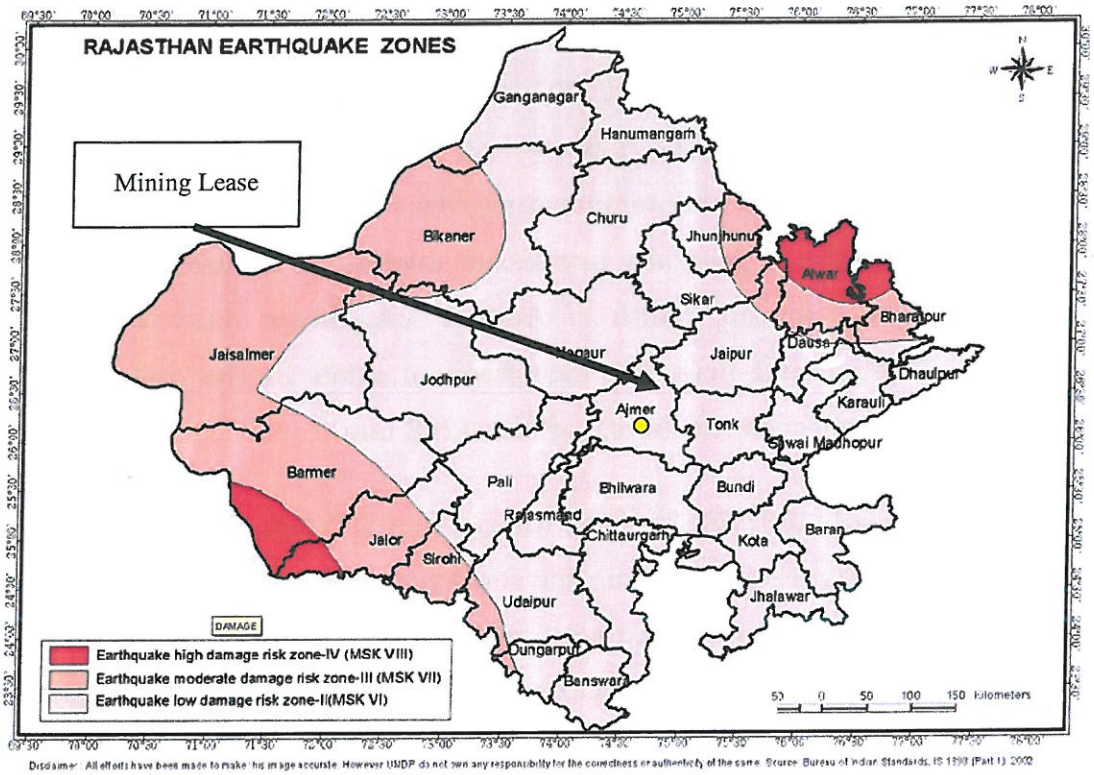


Figure 3-6: Seismic Map of Rajasthan

3.4.1 Meteorology

Meteorology plays a vital role in affecting the dispersion of pollutants, once discharged into the atmosphere. Since meteorological factors show wide fluctuations with time, meaningful interpretation can be drawn only from long-term reliable data. Such source of data is the India Meteorological Department (IMD), which maintains a network of meteorological stations at several important locations. The nearest IMD station to the study area is located at

Ajmer. The Meteorological parameters obtained from this station are temperature, humidity, rainfall, wind speed, and wind direction etc. A micro meteorological station was installed at site to record micrometeorological parameters on hourly basis during study period to understand the wind pattern, temperature variation, relative humidity variation etc. Meteorological Data collected for the nearest IMD station Ajmer.

3.4.2 Climate

January is the coldest month of this district with mean minimum temperature of 7.6° C and maximum temperature of 22.7°C. The temperature in the summer month of June reaches up to 48°C. The there is drop in temperature due to onset of monsoon in the end of June and temperature rises again in the month of September. The atmosphere is generally dry except during the monsoon period. The humidity is highest in the month of August with mean daily relative humidity of 80%. The annual potential evapotranspiration in the district is 1565.6 mm and is the highest in the month of May (243 mm).

3.4.3 Rainfall

The mean annual rainfall (1987-2013) of the district is 450.2 mm. Almost 95% of the total annual rainfall is received during the southwest monsoon, which enters the district in the last week of June and withdraws in the middle of September. The probability of average annual rainfall exceeding 300 mm is only 90%, except at Mangliawas. However, there is 10% probability that the average rainfall exceeds 600 mm. The drought analysis based on agriculture criteria indicates that the district is prone to mild and normal type of droughts. Severe & very severe type of droughts are very rare and have occurred only twice in the following areas: 1987 & 2002 (Srinagar); 1977 & 1987 (Todgarh); & 1991 & 1993 (Vijaynagar).

3.4.4 Meteorological Status at the Cluster area:

Meteorological station was set-up at site to record surface meteorological parameter during study period; Summer Season, March 2021 to May 2021.

Climatology during study period

- Maximum Temperature 41.80°C
- Minimum Temperature : 31.60°C

Table 3.5 Meteorological Condition of the Study Area

Month	Temperature °C		Relative Humidity (%)		Wind Speed (km/hr)	
	Max.	Min.	Max.	Min.	Max.	Min.
March 2021	31.60	22.70	74	58	45	04
April 2021	38.0	25.37	71	45	55	05
May 2021	41.80	28.30	66.0	56	58	06

3.4.5 Relative Humidity

Most humid conditions are found in the monsoons, followed by post-monsoons, winter and summer in that order. Mornings are more humid than evenings and humidity. The Relative humidity is minimum 66% & high of 25% during the study period.

3.4.6 Wind Speed/Wind Rose Diagram

Wind speed and wind direction data recorded during the study period is useful in identifying the influence of meteorology on the air quality of the area. Based on the collected meteorological data, relative percentage frequencies of different wind directions are calculated and plotted as wind roses of Sixteen directions viz., N, NNE, NE, ENE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW and NNW for twenty four hour duration respectively. Maximum and minimum temperatures including percentage relative humidity were recorded simultaneously. The average wind speed recorded was 2 m/s. wind rose diagram from the monitored data shows that the predominant wind direction during the study period was mainly from NE. The meteorological condition of the study area has been tabulated in Table 3.3. The Wind rose diagram has been shown in Figure 3.7.

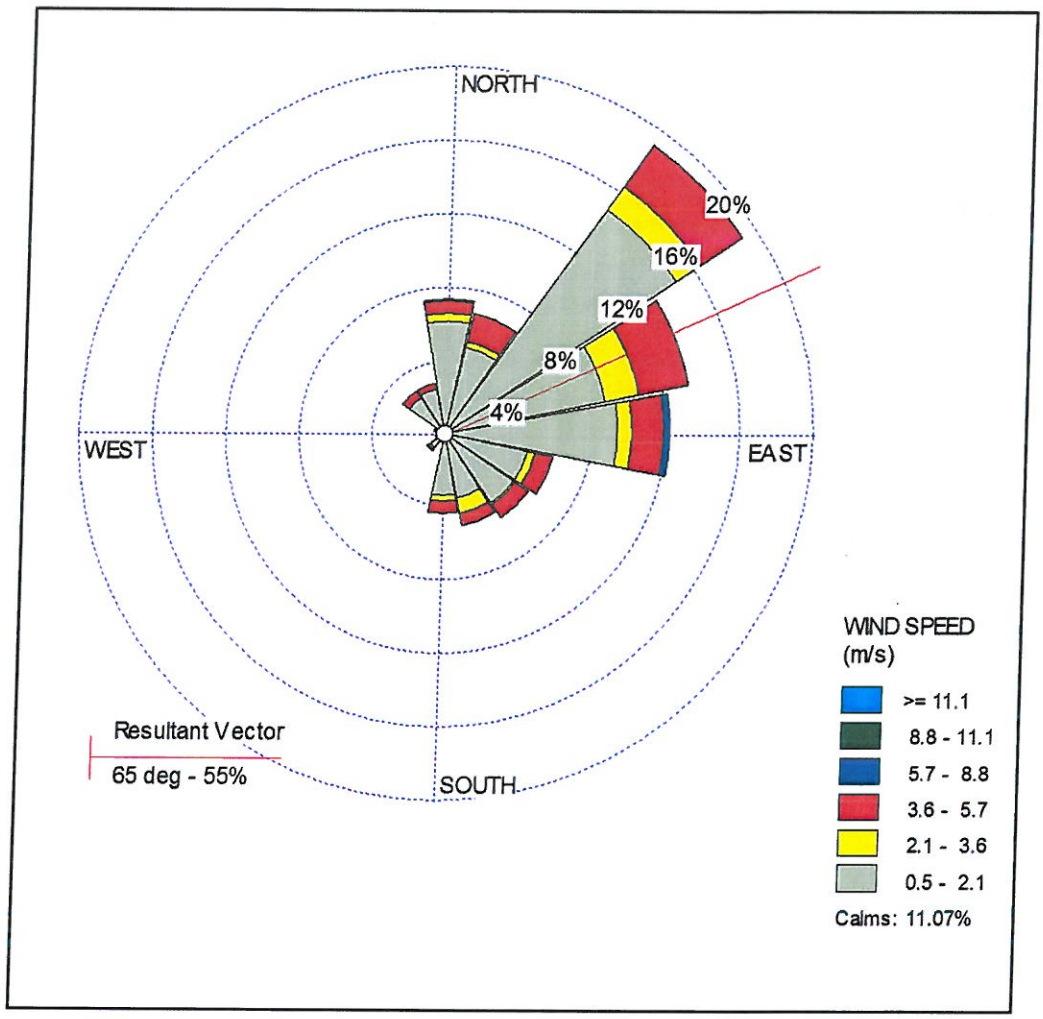


Figure 3.7: Wind Rose Diagram of Study Area

Keeping in view above mentioned points, 10 nos. of Ambient Air Quality Monitoring Stations were established with in the study area. The sampling locations and their distances are shown in **Table 3.6** and in **Figure 3.7**.

It can be observed from the wind rose diagram, that the predominant wind direction during the study period was from West. Villages / locations have been selected in downwind direction as well as in the upwind direction for AAQ monitoring from the proposed activity site.

3.4.7 Hydrology

Major water bearing formations are alluvium, schist, gneiss, granites, limestone and phyllite of Bhilwara Supergroup & Delhi Supergroup. Ground water occurs under unconfined to semi-confined conditions in weathered and fractured part of the consolidated formation. These form generally poor aquifers compared to alluvium.

Granite gneiss covers 4811 sq km (56.73%) and found in the eastern part falling in Kekri, Arain, Bhinia and parts of Masuda, Srinagar, Silora and Jawaja blocks. Quality of water varies from potable to brackish. Yield is generally poor and varies from 30 to 90 m3/day

Hydrogeology

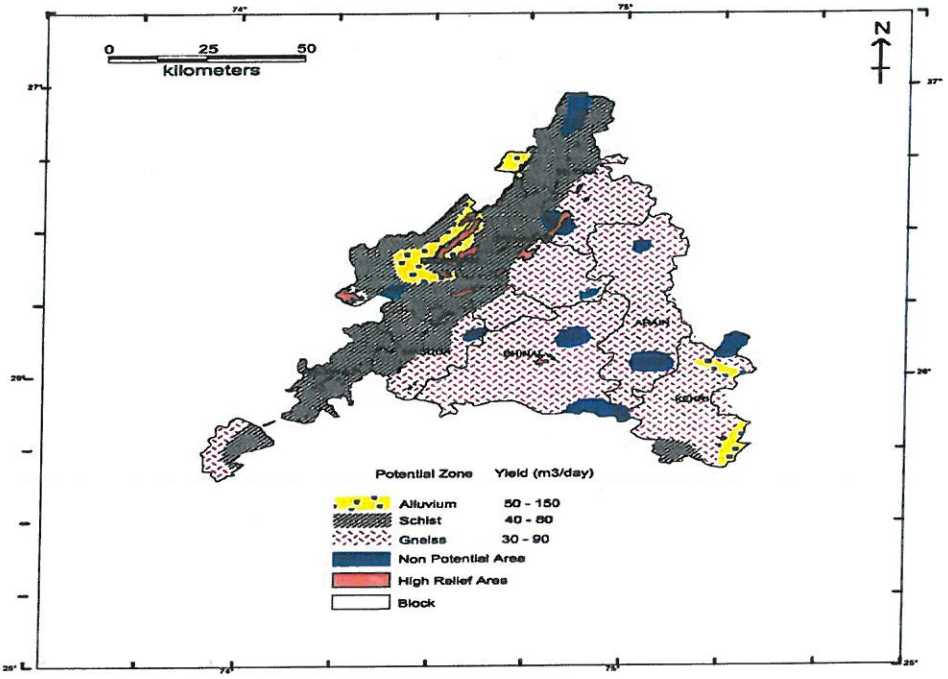


FIGURE-3.8 HYDROGIOLOGICAL MAP OR AJMER DISTRICT

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Schist is confined to 2,690 sq km (31.72%) in the western part of the district falling in parts of Pisangan, Srinagar, Silora, Masuda and Jawaja blocks. Open wells tapping schist yield 40 to 80 m3/day whereas wells located along the intrusions of quartz vein and pegmatites yield 100 to 170 m3/day.

Alluvium covers only 494 sq km (5.83%) and found at isolated locations in eastern (Kekri block) & western part (Pisangan, Srinagar & Silora block) of the district. Thickness of alluvium near Srinagar is 20 m whereas in the Roopnagar valley it is quite thick and extends up to 40m. Yield of tube wells in alluvium varies from 50 to 150 m3/day.

Quartzite forms aquifer is different disconnected areas of limited extent in topographic lows in the western part of the district in the vicinity of Roopnagar, Kishangarh, Ajmer, Beawar and west of Nasirabad. Yield of wells tapping quartzite very from 40 to 100 m3/day. Limestone occurs between Bassi & Nand along Sasuti valley; confluence of Sasuti & Sagarmati Rivers in the north and Baktawarpura in the south. These do not form potential aquifer. Yield of wells at isolated location may goes up to 100 m3/day.

Depth of dug wells is below 50 m, generally restricted to weathered thickness. Nearly 90% wells are in the depth range of 10 to 25 mbgl. The yield of shallow wells varies from 20 to 30 m3/day and it may go up to 150 m3/day depending upon formation. Bore wells/ tube wells are generally 60 to 175 m deep.

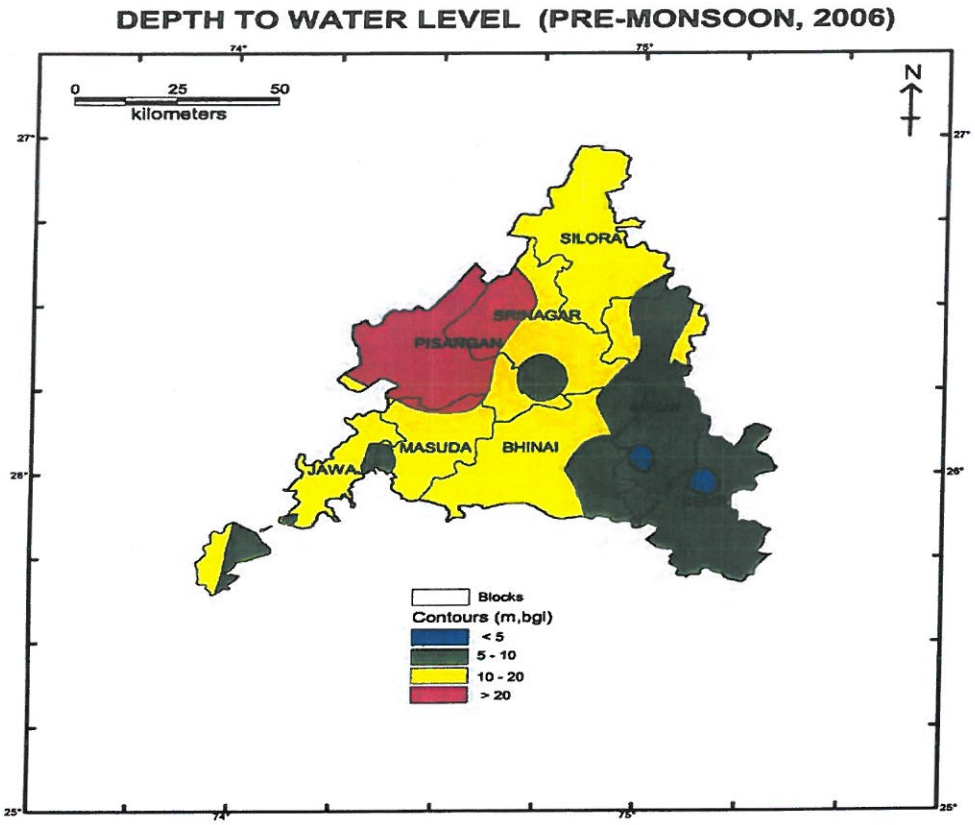


Figure No-3.9- Depth of Water Table pre-Monsoon

Depth to water level as recorded in 28 NHS (2006) ranges from 3.13 to 30.80 and 1.45 to 28.89 mbgl during pre-monsoon and post monsoon respectively. Block-wise depth to water level is as follows:

Block	Pre Monsoon		Post Monsoon		Water level fluctuation (Pre–Post)			
					Rise		Fall	
	Min	Max	Min	Max	Min	Max	Min	Max
Arain	3.13	11.50	4.41	8.57	1.36	4.89	0.46	1.28
Bhinai	7.32	15.05	3.59	9.86	2.85	8.92	0.39	0.39
Jawaja	9.88	18.98	1.45	10.9	1.18	9.23		
Kekri	3.82	8.86	2.62	7.64	1.20	1.22		
Masuda	4.45	17.25	2.72	13.2	1.73	9.23		
Pisangan	-	30.80	28.89	28.89	1.91	1.91		
Silora	-	18.36	22.53	22.53			4.17	4.17
Srinagar	5.55	21.56	3.4	20.91	0.65	7.33		
District	**3.13**	**30.80**	**1.45**	**28.89**	**0.65**	**9.23**	**0.39**	**4.17**

During pre monsoon, shallow (<5 m) water levels were observed at isolated location in Kekri and Arain blocks. Water level between 5 & 10mbgl was recorded in most of the parts of the Kekri and Arain blocks while water level more than 20mbgl in Pisangan & Srinagar blocks.

Post monsoon data shows depth to water level below 2m at isolated location in Jawaja block, 2 to 5m in Arain, Bhinai, Kekri, Masuda, Jawaja & Srinagar blocks. Western and northwestern part of the district has deeper water levels i.e. more than 20 mbgl. Water level between 10 & 20mbgl is in Silora, Srinagar, Pisangan, Masuda and Bhinai blocks. Rest of the area falls under 5 to 10m category.

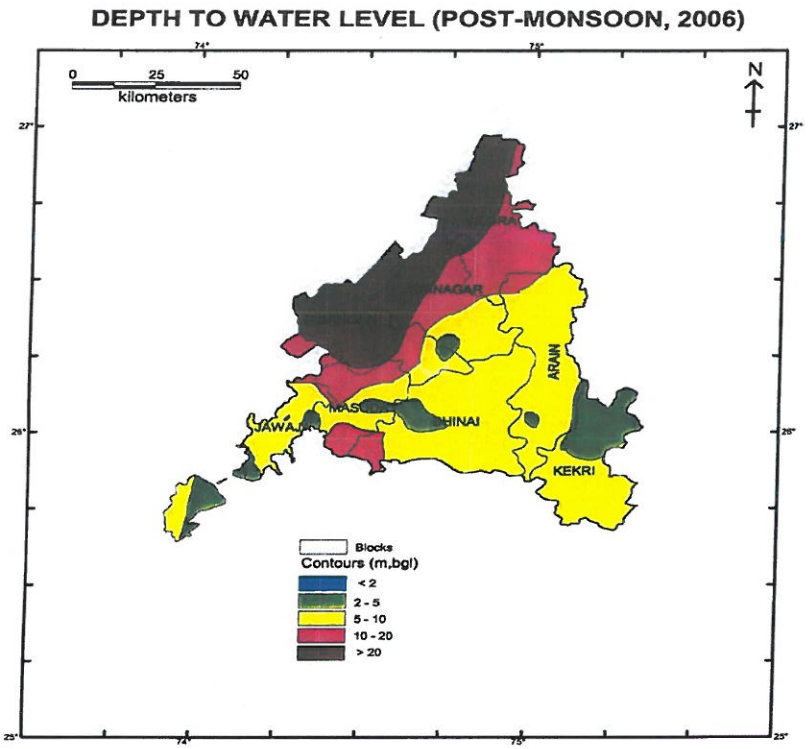


Figure No-3.10 Depth of water level Post Monsoon, 2006

Broadly, water table slopes follows drainage direction. Water table elevation & gradient ranges from 310 meter above mean sea level (aMSL) along southeastern part (Kekri block) to more than 660 aMSL in southwestern part (Jawaja block) & 1.0 (Kekri block) to 13.3m/km (Jawaja block) respectively.

Seasonal fluctuation of pre & post monsoon, 2006 indicates rise in most part of the district. Out of this, rise in water level more than 4m was observed in entire district except in Kekri, Pisangan and Silora. However, few locations in Arain, Bhinai & Silora blocks show decline at isolated locations.

Long term pre monsoon (1997-2006) water level data of Hydrograph Stations show declining trend in entire district. Srinagar block shows decline of more than 1 m during pre & post monsoon due to urban water supply and poor yielding aquifer. Block-wise pre & post monsoon decadal trend is as follows:

Block	Pre Monsoon (m/yr)	Post Monsoon (m/yr)
	Decline	Decline
Arain	0.57	0.57
Bhinai	0.19	0.70
Jawaja	0.53	0.49
Kekri	0.43	0.49
Masuda	0.47	0.33
Pisangan	0.58	2.54
Silora	0.30	0.55
Srinagar	1.02	1.23
Average	0.51	0.86

Specific yield of schist is 2%, gneiss – 1.5% and Alluvium-8% (Reappraisal of ground water resources of Ajmer district, 2004). The Trans emissivity of aquifer tapping alluvium aquifer is about 40 m2/day whereas in hard rock areas in the district it varies from 4.6 & 330 m2/day.

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3.4.8 Ground Water Quality

Ground water quality in shallow aquifer is deteriorated in northern part of Arian, southeastern part of Srinagar, southwest Bhinai and central part of Jawaja blocks where electrical conductance exceeds 3000 mmhos/cm at 250 C. Groundwater of electrical conductance less than 750 mmhos/cm at 250 C occurs in Kekri, Pisangan & southern part of Jawaja block. In rest of the area electrical conductance varies between 750 & 2000 mmhos/cm at 250 C.

As compared to shallow aquifer, deeper aquifers are brackish to saline with electrical conductance ranges between 670 & 12320 mmhos/cm at 250 C. Groundwater is brackish (more than 3000 to 18030) at Bhilwara – Ajmer border along the Khari River. High conductivity in groundwater makes the area unfit for non-salt tolerance crops. Salt tolerant crops are suggested in these areas.

Fluoride concentration in groundwater exceeding permissible limit (1.5 mg/l) has been reported from all the blocks. Higher values of fluoride have been observed at Goela (10.6), Bogla (7.56), Arian (5.54), Nasirabad (4.8), Bandanwara (4.43), Ludiana (3.85), Taragarh (2.85), Baglia (2.84), Kekri (2.28), Jawaja (2.04), Kishangarh (1.95) & Tabiji (1.65). Deeper aquifer has relatively better quality water in respect of fluoride contamination and varies from 1.0 to 7.96 mg/l.

Higher concentration of Iron (permissible limit 1.0 mg/l) were observed in hydrograph stations at Bogla (16.5), Ghugra (8.05), Jawaja (6.08), Sanpla (1.14) & Ludiayan (1.09) in shallow aquifer.

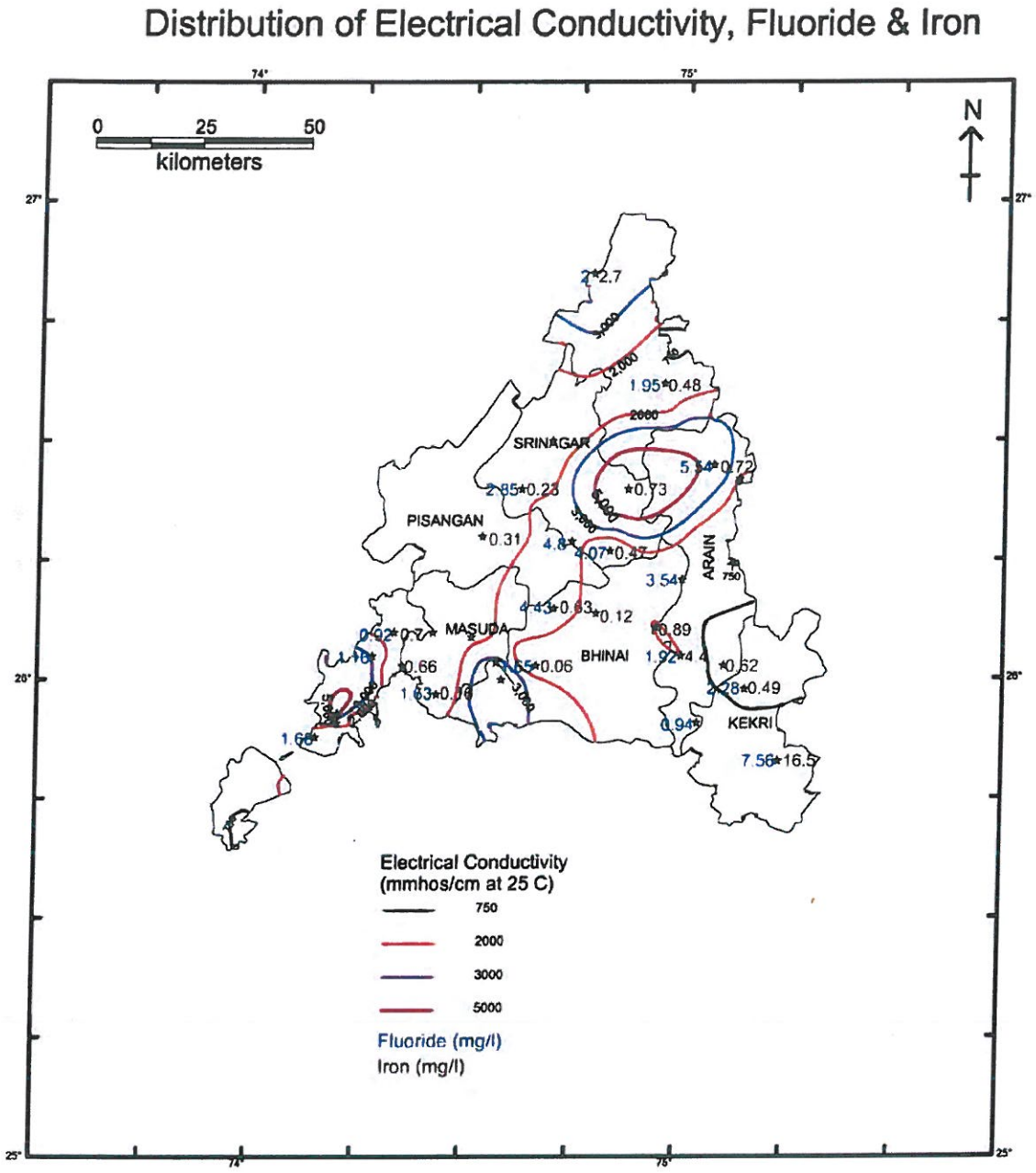


Figure-3.11 Iso Electrical conductivity map of Ajmer District

3.4.9 Ground Water Resources

Groundwater resources have been reassessed as on 31.3.2004 based on Ground Water Estimation Committee (1997) are given below:

Block	Area (Sq.Km)	Type of Area	Potential Zone Area (Sq.Km.)	Net Annual GW availability (mcm)	Agriculture Draft (mcm)	Dom. & Ind Draft (mcm)	Annual Gross Draft for All Uses (mcm)	Stage of GW Dev (%)	Category
Arain	1194.4	NC	1064.01	37.8179	34.5084	3.7982	38.3066	101.29	O E
Bhinai	1216.19	NC	1150.82	37.0594	38.5668	4.4150	42.9818	115.98	O E
Jawaja	674.51	NC	484.33	22.3821	26.7428	5.7790	32.5218	145.3	O E
Kekri	985.92	NC	889.67	63.7925	55.6809	5.2867	60.9676	95.57	Critical
Masuda	891.99	NC	817.00	30.7444	25.1460	4.6027	29.7487	96.76	Critical
Pisangan	1239.91	NC	1108.05	54.2009	88.1961	8.4450	96.6411	178.3	O E
Silora	1245.09	NC	1012.88	42.8952	44.6370	4.2836	48.9206	114.05	O E
Srinagar	1032.99	NC	940.00	30.6722	32.8512	9.4477	42.2989	137.91	O E
DISTRICT			7466.76	319.5646	346.3292	46.0579	392.3871	122.79	

O E– Over-exploited NC – NonCommand

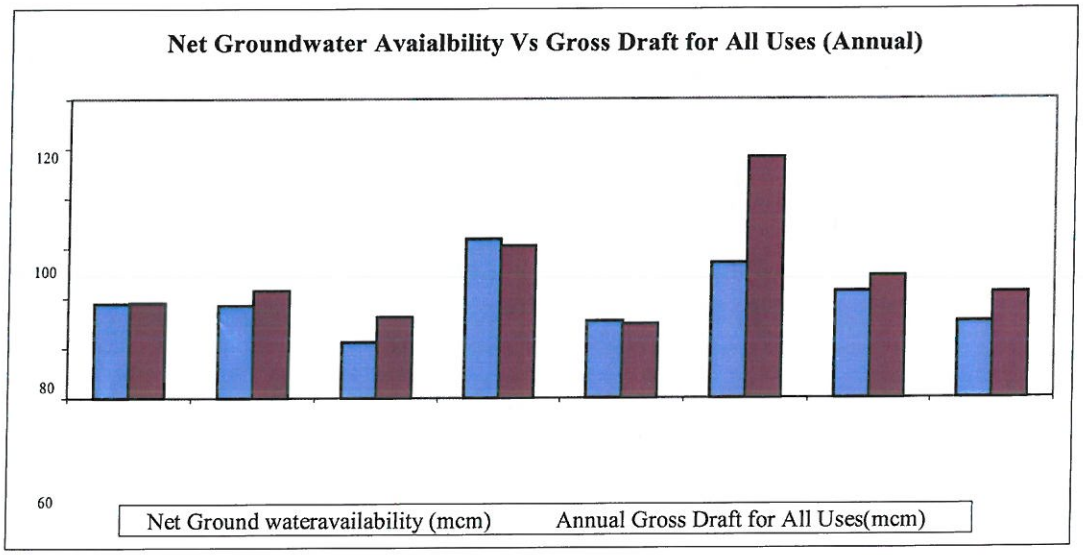
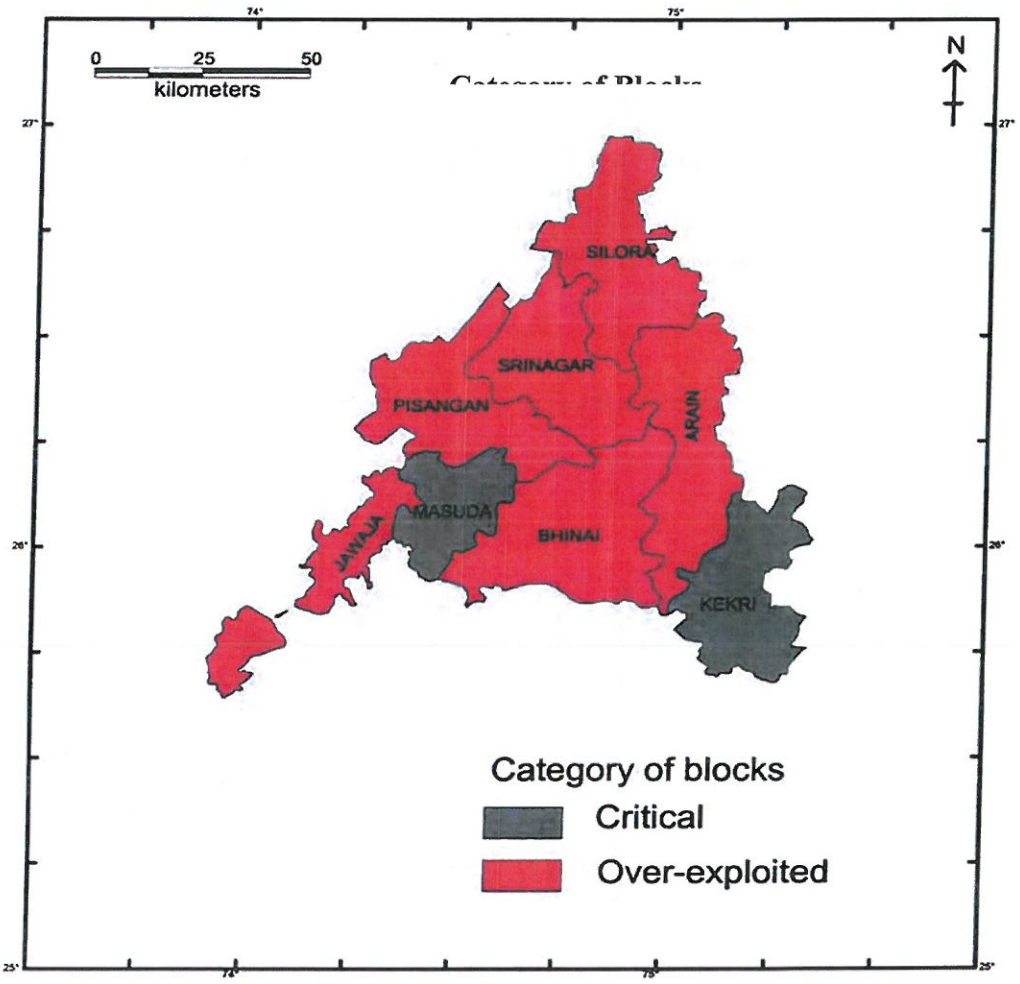


Figure 3.15- Chart Showing block wise net Ground Water availability Vs. gross ground water draft in Ajmer District

3.4.10 Ground Water Development

The ground water development in the district is being done by dug wells, bore wells and dug cum bore wells. Dug wells with horizontal boring are very common. Diameter of dug well varies from 1 m to 4 m with depth ranging from 5 m to 50 m. The present stage of ground water development in the district is 122.79%, which indicates that the scope of ground water development is already exhausted. Out of 8 blocks, 6 falls under "Over-exploited" category and 2 under "Critical" category.



Alluvium area is restricted to riverbeds. Ground water occurs under unconfined to semi-confined conditions. Depth and diameter of the dug wells and bore wells depend on formation and geomorphology. However, general depth of dug well ranges from 5 to 25m, tube wells between 30 & 45m & bore wells between 65 & 175m. Details of groundwater abstraction structures is as follows:

Formation	Yield of Dug well (m^3/day)	Discharge of Bore well (lpm)	Depth (m)		Diameter		Type of pump/Water lifting devices
			Dug well	Bore well	Dug well (m)	Bore well (mm)	
Alluvium (Tube well)	20 -30	20 - 330	5 - 40	31 - 45	4-5	200	Submersible /Centrifugal pump/ Bullock
Gneiss	30 – 90	24 - 720	50	68 - 173	4-5	200	
Schist	40 - 80	30 - 600	50	75 - 175	4-5	200	

Ajmer town falls in Pisangan block with total urban population 5,05,311 with 22% decadal growth since 1991. Most of the dug wells dried up during pre monsoon period. Water was previously supplied from Sagarmati and Sasuti River. Presently Leela Sewri, Ganhera & Budha Pushkar supplying water to Ajmer town. Most of the water supply to the town is being supplied from Bisalpur Project.

Ajmer district has eight major towns namely Ajmer, Kishangarh, Beawar, Nasirabad, Kekri, Sarwar, Vijaynagar and Pushkar. The Vijaynagar town is covered under fluoride project and connected to Bisalpur dam recently. While Pushkar has its own source and Ganhera water is used for piped water supply system. Remaining all the towns of the district are covered by piped water supply schemes through Bisalpur Dam. All the schemes except for Nasirabad are maintained by the Public Health Engineering Department of the state. Water for Nasirabad town is supplied by the PHED in bulk quantities to the Cantonment Board for civilians and to MES for the Military requirement.

Table 3.5 Meteorological Condition of the Study Area

Month	Temperature °C		Relative Humidity (%)		Wind Speed (km/hr)	
	Max.	Min.	Max.	Min.	Max.	Min.
March 2021	31.60	22.70	74	58	45	04
April 2021	38.0	25.37	71	45	55	05
May 2021	41.80	28.30	66.0	56	58	06

Relative Humidity

Most humid conditions are found in the monsoons, followed by post-monsoons, winter and summer in that order. Mornings are more humid than evenings and humidity. The Relative humidity is minimum 66% & high of 25% during the study period.

Wind Speed/Wind Rose Diagram

Wind speed and wind direction data recorded during the study period is useful in identifying the influence of meteorology on the air quality of the area. Based on the collected meteorological data, relative percentage frequencies of different wind directions are calculated and plotted as wind roses of Sixteen directions viz., N, NNE, NE, ENE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW and NNW for twenty four hour duration respectively. Maximum and minimum temperatures including percentage relative humidity were recorded simultaneously. The average wind speed recorded was 2 m/s. wind rose diagram from the monitored data shows that the predominant wind direction during the study period was mainly from NE. The meteorological condition of the study area has been tabulated in Table 3.5. The Wind rose diagram has been shown in Figure 3.16.

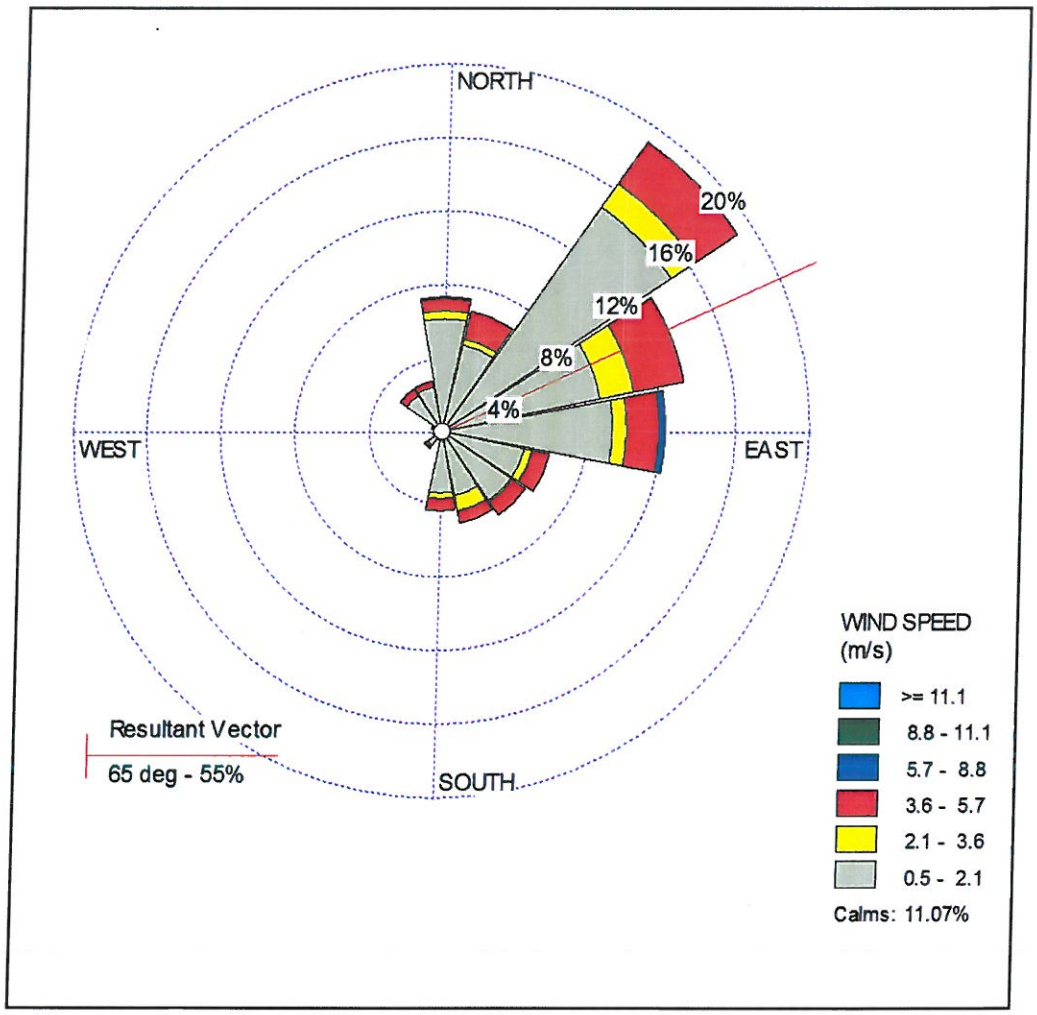


Figure 3.16: Wind Rose Diagram of Study Area

3.5.2.3 Frequency and peremeter for Sampling:

The ambient air monitoring has been carried out at the frequency of two days per week at ten locations covering one complete summer season i.e. March 2021 to May 2021. The ambient air quality along with their frequency of sampling is given in below table:

Parameters Sampling Frequency
PM_{10} 24 hourly sample twice a week
PM_{10} 24 hourly sample twice a week
Sulphur Dioxide (SO_2) 8 hourly for 24 hrs sample twice a week
Sulphur Dioxide (SO_2) 8 hourly for 24 hrs sample twice a week

Instrument used for sampling:

Instrument Name	Make
Weather Monitoring Station	M/S Envirotech Pvt.Ltd
Respirable Dust Sampler for PM_{10} with gaseous sampling attachment	M/S Envirotech Pvt.Ltd
Fine Particulate Sampler PM2.5 with gaseous sampling Attachment	M/S Envirotech Pvt.Ltd

Sampling and Analytical Techniques:

S.No.	Parameter	Method	Technical protocol
1.	PM_{10}	Gravimetric	IS-5182 (Part-23) 2006
2.	PM2.5	Gravimetric	40 CFR-part-49-50, USEPA, appendix L
3.	Sulphur Dioxide	Improved West and Greake	IS-5182 (Part-II) 2001
4.	Nitrogen Oxide	Modified Jacob & Hochheiser/ Arsenite	IS-5182 (Part-VI) 2011

3.5.2.4 Ambient Air Quality

In order to identify the background air quality data and also represent the interference from various local activities, screening techniques have been used for identification of air quality stations in the study area. Ambient air quality of the study area has been assessed through a network of Seven ambient air quality monitoring stations to represent whole study area including the Cluster area with at least one monitoring location in downwind and two in up wind direction.

Ambient air quality monitoring was carried out in Summer Season of March 2021 to May 2021.

3.5.2.3 Selection of Ambient Air Sampling Location:

The baseline status of the air quality in the study area was assessed though a scientifically designed ambient air quality monitoring network. The selection of monitoring network was based on the following aspects:

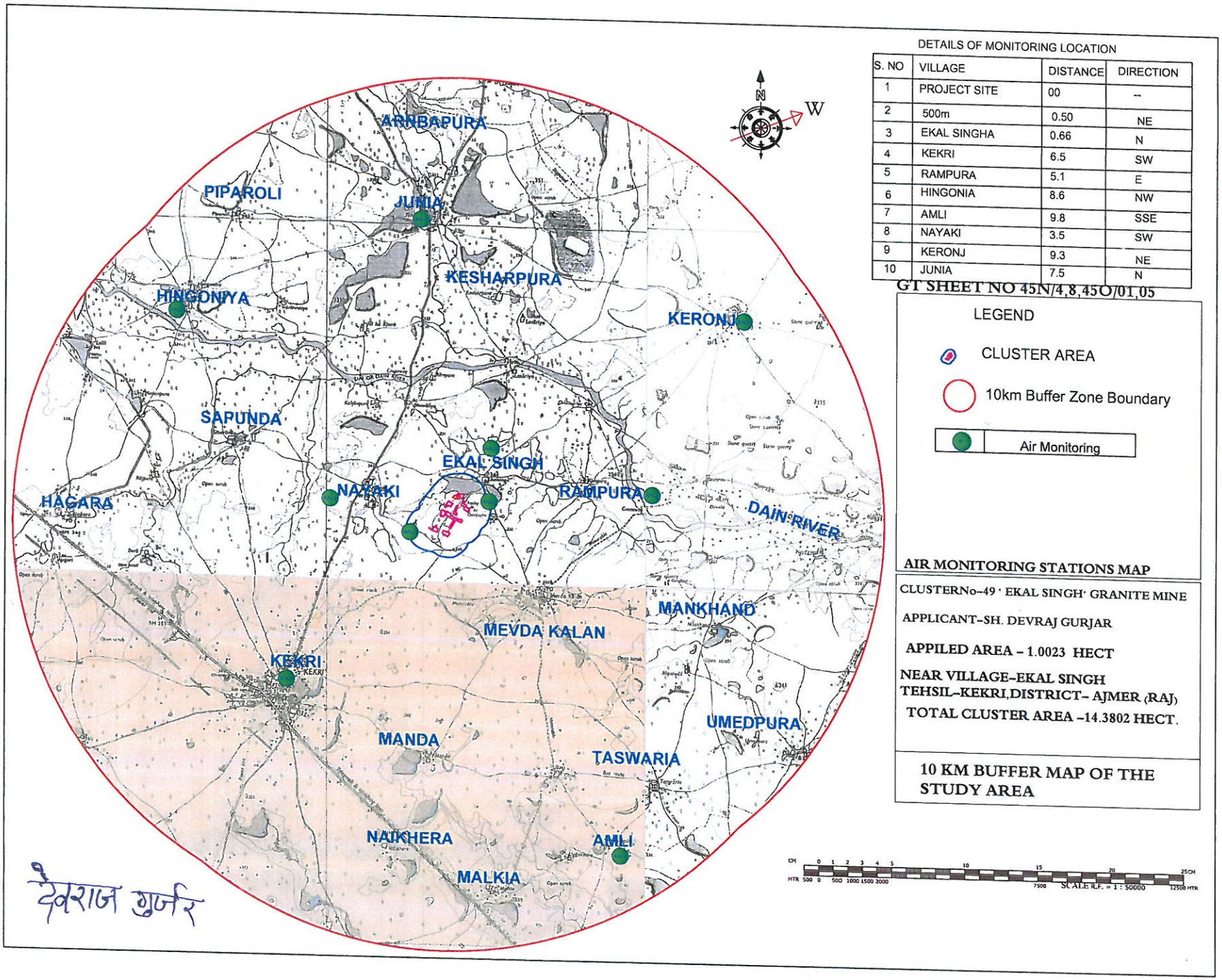
- Topography / terrain of the study area
- Populated area within the study area
- Residential and sensitive areas within the study area.
- Magnitude of the surrounding industries.
- Representation of regional background levels

The monitoring locations are given in Table 3.6 and also shown in Figure 3.17.

Table 3.6: Ambient Air Quality Monitoring Locations

Sr. No.	Area Description	Sample Code	Distance from M.L. area(km)	Direction from Mining lease area
Core Zone				
1	Mine Site	AAQM1	0.00 km	-
2	In 500Mtr Radius Of Mine Site	AAQM 2	0.50	NE
3	Ekalsingha	AAQM 3	0.66	NE
Buffer Zone				
4	Kekri	AAQM 4	6.5	SW
5	Rampura	AAQM 5	5.1	E
6	Hingonia	AAQM 6	8.6	NW
7	Amli	AAQM 7	9.8	SSE
8	Nayaki	AAQM 8	3.5	SW
9	Keronj	AAQM 9	9.3	NE
10	Junia	AAQM 10	7.5	N

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DETAILS OF MONITORING LOCATION

S. NO	VILLAGE	DISTANCE	DIRECTION
1	PROJECT SITE	00	--
2	500m	0.50	NE
3	EKAL SINGHA	0.66	N
4	KEKRI	6.5	SW
5	RAMPURA	5.1	E
6	HINGONIA	8.6	NW
7	AMLI	9.8	SSE
8	NAYAKI	3.5	SW
9	KERONJ	9.3	NE
10	JUNIA	7.5	N

GT SHEET NO 45N/4,8,45O/01,05

LEGEND

CLUSTER AREA

10km Buffer Zone Boundary

Air Monitoring

AIR MONITORING STATIONS MAP

CLUSTERNo-49 ' EKAL SINGH' GRANITE MINE

APPLICANT-SH. DEVRAJ GURJAR

APPILED AREA - 1.0023 HECT

NEAR VILLAGE-EKAL SINGH
TEHSIL-KEKRI,DISTRICT- AJMER (RAJ)

TOTAL CLUSTER AREA -14.3802 HECT.

10 KM BUFFER MAP OF THE STUDY AREA

SCALE: R.F. = 1 : 50000

3.5.1.4 Parameter Monitored and Methodology

The parameters monitored were PM_{10}, $PM_{2.5}$, Sulphur Dioxide (SO_2), Nitrogen Oxides (NO_x). These parameters have been selected based on the guidelines given by the MoEF & CC and the ToR issued by MoEF& CC. The detailed monitoring methodology for ambient air is given in Table 3.7.

Table 3-7: Methodology of Ambient Air Monitoring

Sr. No.	Parameters	Test Method	Range	Instrument used	Model & Make of instrument
1	PM_{10}	IS 5182 (Part-23) 2006,Gravimetric CPCB Guidelines for Ambient Air Monitoring	100 $\mu g/m^3$	RDS (Respirable Dust Sampler)	APM 860BL (Envirotech)
2	$PM_{2.5}$	IS 5182 (Part-23) 2006,Gravimetric CPCB Guidelines for Ambient Air Monitoring	60 $\mu g/m^3$	RDS (Respirable Dust Sampler) with attachment for $PM_{2.5}$	APM 154BL (Envirotech)
3	SO_2	IS 5182 (Part-II) 2001,Reaff.2006	80 $\mu g/m^3$	Gas sampler	APM411 (Envirotech) AAS109 (Ecotech)
4	NO_2	IS 5182 (Part-VI) 2006	80 $\mu g/m^3$	Gas sampler	APM411 (Envirotech) AAS109 (Ecotech)

3.5.1.3 Result of Ambient Air Quality Monitoring

Result of ambient air quality monitoring of Cluster is given in Table 3.8.

Table 3-8: Ambient Air Quality Monitoring Results

Ambient Air Quality in the Study Area PM_{10}

Location Code	Name of the station	PM_{10} (µg/m³)			
		Min	Max	Average	98th Percentiles
AAQ-1	Mine Site	64.1	74.3	68.79	73.93
AAQ-2	In 500Mtr Radius Of Mine Site	60.4	75.9	65.75	75.26
AAQ-3	Ekalsingha	50.8	68.3	62.47	68.30
AAQ-4	Kekri	55.3	67.5	61.75	67.45
AAQ-5	Rampura	62.3	76.5	70.27	76.22
AAQ-6	Hingonia	63.6	70.4	66.74	70.31
AAQ-7	Amli	45.5	58.7	53.38	57.87
AAQ-8	Nayaki	52.6	65.4	60.94	65.35
AAQ-9	Keronj	63.38	89.49	76.53	89.04
AAQ10	Junia	52.45	71.53	62.83	71.40

Ambient Air Quality in the Study Area $PM_{2.5}$

Location Code	Name of the station	$PM_{2.5}$ (µg/m³)			
		Min	Max	Average	98th Percentiles
AAQ-1	Mine Site	38.7	48.3	43.36	48.21
AAQ-2	In 500Mtr Radius Of Mine Site	39.1	44.8	41.46	44.75
AAQ-3	Ekalsingha	35.7	44.8	41.37	44.66
AAQ-4	Kekri	40.4	48	44.25	47.82
AAQ-5	Rampura	40.5	49.2	44.96	48.83
AAQ-6	Hingonia	37.2	46.5	41.27	46.09
AAQ-7	Amli	35.6	46.1	41.59	46.01
AAQ-8	Nayaki	39.6	47.2	43.80	46.79
AAQ-9	Keronj	38.67	59.49	47.73	56.87
AAQ10	Junia	24.56	39.42	30.80	39.29

Ambient Air Quality in the Study Area SO_2

Location Code	Name of the station	SO_2 (µg/m³)			
		Min	Max	Average	98th Percentiles
AAQ-1	Mine Site	7.3	11.3	9.68	11.25
AAQ-2	In 500Mtr Radius Of Mine Site	6.2	10.7	9.08	10.70
AAQ-3	Ekalsingha	8.3	12.8	10.75	12.57
AAQ-4	Kekri	7.6	12.0	10.27	11.59
AAQ-5	Rampura	8.5	13.1	11.18	13.01
AAQ-6	Hingonia	8.5	12.5	10.27	12.45
AAQ-7	Amli	5.6	7.9	6.67	7.90
AAQ-8	Nayaki	6.7	11.2	9.17	10.88
AAQ-9	Keronj	5.35	8.76	7.08	8.76
AAQ10	Junia	8.2	12.21	9.92	12.16

Ambient Air Quality in the Study Area NO_2

Location Code	Name of the station	NO_2 (µg/m³)			
		Min	Max	Average	98th Percentiles
AAQ-1	Mine Site	14.2	19.7	16.84	19.47
AAQ-2	In 500Mtr Radius Of Mine Site	15.8	21.5	17.28	20.86
AAQ-3	Ekalsingha	13.9	20.1	16.87	19.87
AAQ-4	Kekri	16.5	20.6	18.78	20.51
AAQ-5	Rampura	16.5	25.9	20.87	25.39
AAQ-6	Hingonia	15.1	22.3	17.50	21.38
AAQ-7	Amli	13.5	20.6	16.63	20.23
AAQ-8	Nayaki	17.7	21.3	19.13	21.21
AAQ-9	Keronj	10.67	15.97	13.15	15.87
AAQ10	Junia	10.34	15.95	11.45	15.71

Ambient Air Quality in the Study Area CO

Location Code	Name of the station	CO (µg/m³) Min	Max	Average	98th Percentiles
AAQ-1	Mine Site	0.043	0.064	0.05	0.06
AAQ-2	In 500Mtr Radius Of Mine Site	0.027	0.052	0.04	0.05
AAQ-3	Ekalsingha	0.089	0.098	0.09	0.10
AAQ-4	Kekri	0.058	0.074	0.07	0.07
AAQ-5	Rampura	0.092	0.124	0.11	0.12
AAQ-6	Hingonia	0.052	0.072	0.06	0.07
AAQ-7	Amli	0.066	0.089	0.08	0.09
AAQ-8	Nayaki	0.075	0.095	0.09	0.09
AAQ-9	Keronj	0.046	0.055	.05	0.05
AAQ10	Junia	0.35	1.75	1.14	1.75

Presentation of Results:

The analysis results for the study period are presented in above monitoring tables. Various statistical parameters like 98th percentile, average, maximum and minimum values have been computed from the observed raw data for all the AAQ monitoring stations. These are compared with the standards prescribed by Central Pollution Control Board (CPCB) for rural and residential zone.

Data Interpretation

In Core Zone

PM_{10} is observed at cluster site is minimum range between 50.8 µg/m³ to 75.9 µg/m³. The $PM_{2.5}$ range between 35.7 to 48.3 µg/m³ . SO2 range between 6.2 to 12.8 µg/m³. NO2 range between 13.9 to 21.5 µg/m³. CO range between 0.027 to 0.098 µg/m³.

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In Buffer Zone:

Sr. No	Peremeter	Observation Results
1.	$PM_{2.5}$	The maximum concentration for PM2.5 was observed at i.e. 59.49 µg/m3 and minimum concentration is 24.56 µg/m3. The 24 hours applicable limit for industrial, Residential Rural and Other Areas is 60 µg/m3.
2.	PM_{10}	The maximum concentration for PM_{10} was observed at 89.49 µg/m3 and minimum concentration is 45.5 µg/m3. The 24 hours applicable limit for industrial, Residential Rural and Other Areas is 100 µg/m3.
3.	SO_2	The maximum concentration for SO_2 was observed i.e. 12.21 µg/m3 and minimum concentration is 5.6 µg/m3. The 24 hours applicable limit for industrial, Residential Rural and Other Areas is 80 µg/m3.
4.	NO_2	The maximum concentration for NO_2 was observed 25.9 µg/m3 and minimum concentration is 10.34 µg/m3. The 24 hours applicable limit for industrial, Residential Rural and Other Areas is 80 µg/m3.
5.	CO	The maximum concentration for CO was observed 1.75 mg/m3 and minimum concentration is 0.027 mg/m3. The 24 hours applicable limit for industrial, Residential Rural and Other Areas is 2.0 mg/m3.

Envisaged Environment Impact Due to Cluster

a. Impact on Air Environment: The impact of the cluster on air environment is envisaged due to the following two reasons.

i) The dust rising due to the internal transport within the mining area plus the common transport area, and

ii) The exhaust additives due to the machine operations,

3.5.1.4 Methodology of impact assessment:

The dust rising machinery is mainly trucks and then during loading at site. The mines have their internal transport roads and all of them travel to a destination through some portion of common road. From the survey the common road is B.T. Road for both the quarries is already developed. SH-12

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is located at a distance of 2.56 km from the mine that is used by all trucks of both the quarries.

3.5.1.5 Total road distance travelled by each truck per day for production:

The following table shows the details of road lengths likely to be used exclusively by individual mines and also the length of common roads. From the projected production the total numbers of tippers that ply on the road are arrived at. The laden weight of the machine and gross weight of the machine is taken to arrive at theoretical quantity of dust rising. Finally the destination distance until which the trucks travel is also given below.

Details of common road patches of travel in cluster

Sr no	Mine	Exclusive road used in meters by each truck outside the lease area meters	Shared Road in meters each truck outside lease area meters	Total number of trucks per day plying on common road
1	Sh. Devraj Gurjar S/O Sh. Gopi Lal Gurjar	3192.86	3192.86	5
For 11 Existing Mines				
1	M/s A.G Mines & Minerals	2519.76	2519.76	4
2	M/s Sawai Bhoj Granite	2806.44	2806.44	5
3	Shree Giriraj Granite	2919.06	2919.06	7
4	M/s Satya Suman Marble & Granite	2864.14	2864.14	4
5	Sh. Sagar Sharma	2842.04	2842.04	5
6	M/s Shri Tirupati Granite Mines	2758.78	2758.78	3
7	M/s Arihant Granites	2984.88	2984.88	6
8	Sh. Jagdish Bairwa	29919.97	29919.97	3
9	Shivraj Gurjar	3056.04	3056.04	6
10	M/s Aditi Granite & Mineral	2861.63	2861.63	6
11	M/s Basarani Granite	2840.84	2840.84	7

Total in-lease road distance travelled by each truck per day for waste hauling:

The following table shows the details of road lengths likely to be used exclusively by individual Mines internally for waste transport. From the projected production the waste Quantities are arrived at and the total numbers of tippers that ply are arrived at. The laden weight of the machine and gross weight of the machine is taken to arrive at theoretical quantity of dust rising. The details of the trucks are also given below in table 2.

3.5.1.6.1 Machine calculation: 11- mines are existing and 1 Applied area are related to same cluster so they are going to use same capacity of machinery for loading and excavation. For this purpose, a $1m^3$ bucket capacity excavators in Granite mines. The total loading hours is calculated based on the total production needed and hourly production capacity of the excavators. The method of arriving at the optimum fleet of machines is given below in the table. From the calculation of the machined hours the total diesel likely to be consumed is arriving at the exhaust emissions. The exhaust emissions are calculated for CO_2 equivalent as per the available thumb Rules. Likewise the dust likely to be generated is arrived from the distance of travel of the material on road, in terms of Ton-kilometres.

Trucks requirement for the production projected of Granite

Sr No.	Mine	Daily Production in a Tonnes	Truck capacity T	No. Of truck tripe Per day	Hr of operation in a Per Day	Truck required Per Day	Total Diesel consumed Lts Per Day
1	Sh. Devraj Gurjar S/O Sh. Gopi Lal Gurjar	465.6	20	4	6	5	300
• For 11 Existing mines							
2	M/s A.G Mines & Minerals	282.87	20	3	4	4	160
3	M/s Sawai Bhoj Granite	520.36	20	4	6	5	300
4	Shree Giriraj Granite	1204.81	20	8	8	7	560
5	M/s Satya Suman Marble & Granite	366.55	20	4	6	4	240
6	Sh. Sagar Sharma	477.04	20	4	6	5	300

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7	M/s Shri Tirupati Granite Mines	171.6	20	2	3	3	90
8	M/s Arihant Granites	580.60	20	4	6	6	360
9	Sh. Jagdish Bairwa	150.42	20	2	3	3	90
10	Shivraj Gurjar	717.73	20	6	7	6	420
11	M/s Aditi Granite & Mineral	571.42	20	4	6	6	360
12	M/s Basarani Granite	779.32	20	6	7	7	490
			Total	51	68	61	3670

Excavator requirement with diesel consumption details

Sr No.	Mine	Daily Production	Machine capacity M^3	Hr of operation	No. of machines	Total Diesel consumed Lts/hour	Total Diesel consumed Lts/Day
1	Sh. Devraj Gurjar S/O Sh. Gopi Lal Gurjar	465.6	1	4	1	11.50/hour	46
For 11 Existing Mines							
2.	M/s A.G Mines & Minerals	282.87	1	4	1	11.50/hour	46
3.	M/s Sawai Bhoj Granite	520.36	1	5	1	11.50/hour	57.5
4.	Shree Giriraj Granite	1204.81	1	8	1	11.50/hour	92
5	M/s Satya Suman Marble & Granite	366.55	1	4	1	11.50/hour	46
6	Sh. Sagar Sharma	477.04	1	4	1	11.50/hour	46
7	M/s Shri Tirupati Granite	171.6	1	4	1	11.50/hour	46

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	Mines						
8	M/s Arihant Granites	580.60	1	5	1	11.50/hour	57.5
9	Sh. Jagdish Bairwa	150.42	1	4	1	11.50/hour	46
10	Shivraj Gurjar	717.73	1	6	1	11.50/hour	69
11	M/s Aditi Granite & Mineral	571.42	1	5	1	11.50/hour	57.5
12	M/s Basarani Granite	779.32	1	6	1	11.50/hour	69
		Total					678.5

For each mine one compressor of 1cfm is taken in to account and thus 1 excavator will operate for each mine. So total 1 will be proposed for fresh L.O.I and 11 compressor has been already running in existing mine. So the total 12 compresor has been used in Cluster No. 49 "Ekalsingha" Granite Mine. As per standards the compressor consumes around 20 litres of diesel per hour and each compressor will operate for 4 hours in Cluster mine site.

Thus the total operational hours is taken as (4x12) + (1x12) = 48 hours. Thus the total diesel consumed for compressors is 960 litres per day for Cluster No. 49 "Ekalsingha" Granite Mine.

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Fleet of machinery used for given cluster and diesel consumption

Sr. No.	Machine	Number	Diesel / day in it
1	Excavator	12	678.5
2	Dumper / Truck	61	3670
3	Compressor	12	960
	Total		5308.5

3.5.1.6.2 Impact of burning diesel and emission of CO_2 on air environment:

As a thumb rule every litre of diesel burnt generates around 2.6 kg of CO_2. The method of arriving at this figure is as follows. 1 litre of diesel weighs 835 grams. Diesel consists of 86.2% of carbon, i.e. 720 grams of carbon per litre diesel. In order to combust this carbon to CO_2, 1920 grams of oxygen is needed. The sum is then 720 + 1920 = 2640 grams of CO_2/litre diesel. Thus for the total burning of 5308.5 litres of diesel the CO_2 generated in tons is 5308.5 x 2.6 = 13802.1 kg or 13.8021 T per day.

3.5.1.6.3 Impact of waste dumping on air & Land environment:

Waste generated for five years for granite is 2518096.3 mt.

Waste generated during lease period is i.e. 20 years is 7554288.9 m^3.

Dump area will be required for 20 years with the height of 21 m 1=4556 m^2=0.45 Ha. Suppose will provide the double of the area it's required = 0.90 Ha.

Dump area will be required for 20 years with the height of 18 m 1=5558 m^2=0.55 Ha. Suppose will provide the double of the area it's required = 1.1 Ha.

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The amount of dust lifted from the surface of the landfill is dependent upon the speed of the wind, the condition of the = surface and the size of the dust particle. Emissions of the dust as a result of wind-blow can be significantly reduced if the surface is wet. If the dust generation has been marked as a problem as a problem, the dust suppression methods such as surface wetting are to be followed to avoid the effects of wind-blow. The distance travelled by dust emissions will depend on the particle size and on the wind speed and turbulence. Smaller dust particles will stay airborne for longer period of time and disperse over a wider area. Strong and turbulent winds will also keep larger particles airborne for longer period of time. Thus the dust has impact on the health of persons and also cause reduced potential to work in the given atmosphere

3.5.1.6.4 Machine operations and dust generation criteria:

Vehicular traffic on haul roads has been identified as the most prolific source of fugitive dust, and can contribute as much as 80% of total dust. It was estimated that about 50% of the total dust is released during the journey time of a dumper on an unpaved haul road, with 25% being released during both loading and unloading of the dumper respectively.

It was estimated that 0.01% of the material is lost during loading and unloading. Nair and Singh (1990) estimated that road dust contains more than 5% of respirable dust. Another major source of fugitive dust is wind erosion from stock piles. *Jutze (1976)* has given estimates of fugitive dust from mining operations that are given as under.

The exposure of workers in opencast mining varies from 3-5 mg/m^3 in mineral working faces and 1-2 mg/m^3 in overburden faces. After the haul road, drilling is the next important source of fugitive dust.

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Theoretical quantities of fugitive dust from mining operations (source: *Jutze (1976))*

Sr No.	Operation	Emission estimated kg	Remarks
1	OB Handling	1-1.5 / T	Without controlling measures
2	Haul roads	0.1 - 3	Kg/vehicle/km/day
3	Truck dumping	1.5 -2.0	Kg/Trip
4	Waste disposal	1 – 1.5	Kg/T
5	Drilling	10 -15	Kg/day/drill

Hours of operation

As per the above norm governing the dust generation in the Mines the following dust generation quantities is arrived at. It is to be kept in mind that these generations projected when no steps are taken to reduce the emission or spread of dust. The total dust generated is estimated in the mines as given in the following table.

3.5.1.7 Criterion of calculations of dust generation due to trucks:

The standard of truck movement dust is taken as 1.5 kg/vehicle/km/day. Since the present calculations are being made for a day the standard becomes 1.5kg/vehicle/km. Average haul distance per truck trip is 0.20 km.

Quantity of dust generation on unpaved roads without any measures of suppression

Sr. No.	Activity	Quantity/measure/day	Dust generated per unit operation kg	Total dust generated For given activity kg	Respirable dust @ 2% kg
1	Production equivalent of mineral	465.6 T	1.5	1.5 x 465.6 = 698.4	13.97
2	Drilling	20 units	15	20 x15 = 300	6.0
3	Haul road	0.20 km	3.0 kg/km	0.20 x 3 = 0.6	0.012
Total respirable dust generated					19.982

1. Impact of dust on persons and environment:

From the above, we can see that the total dust generated without any measures of control is 19.982 kg in one day. As against the dust generated with adoption of suppression methods is 5 kg per day during winter and 7.5 kg per day during summer. The summer quantities indicated are fugitive fully. As per the geo-mechanical properties of masonry stone, it is found that the generation shown is assuming that no steps are taken to control the dust.

The reasons for the dust rising in the mines are given below in the order of intensity of dust generation that they cause.

a. The amount of dust generated is proportionate to the speed of the vehicle.

b. The amount of dust generated is inversely proportionate to the distance between two moving vehicles is less than or equal to 25 meters, one being behind other.

c. When two vehicles travel parallel to each other in same direction within 25 meters of line distance, highest dust is generated.

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d. Unpaved road create more dust than paved ones.

e. Overloading of vehicles causes spillage and subsequent journey causes dust.

f. In the type of operation in Granite mines, the dust generation due to loading and unloading is very minimal.

2. **Impact of operations on water environment:**

Local Physiography and water flow:

In this area the ground water table is at 80 m below ground level where as mine working are done up to depth of 30 m in first five years, at the end of the lease period it will reaches to maximum depth of 30 m so there is no significant impact on ground water due to proposed quarry.

3. **Impact on land degradation:**

As per the projected production quantities the total land degradation is envisaged as 9.42053 hectares. The estimated production is up to a level of 30 m down. Therefore at the end of the life of the mines, the present level of 335 meter RL will be coming down to 328 RL. If the level is allowed to exceed below 30 meters There will be no impact on the ground or land on where persons are already living. New land development is not envisaged in this case. Thus the impact due to mining on land environment is only as explained above.

The above lowering of minable area will not cause any drastic changes in the local climate.

4. **Impact on socio economic conditions:**

It is pertinent to mention that the present mines have been started and working is also carried out by deploying the environment from the nearby villages. Thus the impact on socio economics of the persons living in the area is bare minimum on either side.

5. **Impact on health of persons working:**

The impact on health of persons working in the mining is possible if there is '*Respirable Fractions'* in the airborne dust. The term respirable dust is a dust mentioned in the 'Mines Act'. As per the MMR 1961 Regulation 124, a place is deemed to be in a harmless state for person to work, if the 8 hours time – weighted average concentration of airborne respirable dust, in milligrams per cubic meter of air sampled is less than the value arrived

at by dividing the figures of fifteen with the percentage of PM10 & PM2.5 particulates.

In the present case, there is no possibility of collection of any air samples. Therefore assuming that the dust settled on unpaved roads is the one that rises, the dust on unpaved roads is collected and analysed for its size fraction.

3.5.1.8 Pollution due to Diesel engine exhaust:

Diesel engine, like other internal combustion engines, converts chemical energy contained in the fuel into mechanical power. Diesel fuel is a mixture of hydrocarbons which – during an ideal combustion process – would produce only carbon dioxide (CO_2) and water vapour (H_2O). Indeed, diesel exhaust gases are primarily composed of CO_2, H_2O and the unused portion of engine charge air. The volumetric concentrations of these gases in diesel exhaust are typically in the following ranges as per manufacturer's manual.

- CO_2 - 12 %
- H_2O – 12 %
- O_2 - 17%
- N_2 – balance.

The concentrations of released exhausts depend on the engine load, with the content of CO_2 and H_2O increasing and that of O_2 decreasing with increasing engine load. None of these principal diesel emissions (with the exception of CO_2 for its greenhouse gas properties) have adverse health or environmental effects.

Diesel emissions include also pollutants that can have adverse health and/or environmental effects. Most of these pollutants originate from various non ideal processes during combustion, such as incomplete combustion of fuel, reactions b/w mixture components under high temperature and pressure, combustion of engine lubricating oil and oil fuel, such as Sulphur compounds and fuel additives. Common pollutants include unburned hydrocarbons (HC), Carbon Monoxide (CO), nitrogen oxides (NOx) or Particulate matter (PM). Total concentration of pollutants in diesel exhaust gases typically amounts to some tenths of one percent.

This HP is developed at maximum revolutions. If the normal revolutions are reduced by some extent the fuel consumption drastically reduces. To give an idea, a diesel engine of 400 HP consumes 70 litres per hour at full revolutions and whereas at ½ of its maximum revolutions it consumes only 10 litres.

About 2.68 kg of CO_2 is produced by burning a litre of diesel. Carbon dioxide (CO_2) is a good indicator of how much fossil fuel is burnt and how much of other pollutants are emitted as a result.

Whatever the source of Green House Gasses and the calculation methodology, the resulting value should be in mass unit in carbon dioxide equivalent form. By multiplying the resulting value of gas other than CO_2 with the respective Global Warming Potential (GWP) will result in CO_2 equivalent form. The concept of Global Warming Potential (GWP) has been developed in order to enable comparison of the ability of different GHGs to trap heat in the atmosphere.

Sources and effects of Air pollutants

Pollutant	Health Effects	Environment Effects
Ozone (O_3)	Breathing problem, reduced lung function, asthma, irritates eyes.	Damages crops, forests, and other vegetation.
Nitrogen oxides (NOx)	Lung damage, respiratory illnesses	Ozone (smog) effects; precursor of acid rain which damages trees, lakes, and soil; aerosols can reduce visibility.
Carbon Monoxide (CO)	Reduces ability of blood to bring oxygen to body cells and tissues.	
Particulate matter (PM)	Eye, nose, and throat irritation; lung damage; bronchitis; cancer; early death.	Ashes, smoke, soot, and dust can dust can dirty and discolour structures and property.
Sulphur dioxide (SO_2)	Respiratory illness, breathing problems, may cause permanent damage to lungs.	Precursor of acid rain, which can damage trees, lakes, and soil; aerosols can reduce visibility. Acid rain also causes buildings, statues, and monuments to deteriorate.
Lead	Brain and nervous system damage (esp. Children), digestive and other problems. Some lead-containing chemicals cause cancer in animals.	Harm to wildlife and livestock.
Mercury	Liver, Kidney, and brain damage; Neurological and developmental damage.	Accumulates in food chain.

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g. Impact on Safety of persons during operations:

The mining industry is a hazardous industry as far as the safety of persons is concerned. The Mines Act 1952 and its subordinate Legislation details the nature of possible un-safe conditions of the activity and the remedial methods. The accident prone areas in the mining activities are as under –

- Injury of persons while excavator loading, especially while they come within swing zone.
- Accidental collision of excavators with trucks under loading,
- Accidents while reversal of tippers,
- Fall of person in the excavated water logged portion of the mine,
- Collapse of roads formed due to excess removal of sand from the road width,
- Any type of fire accident in the machines,
- Accidents while repairing, and
- Accidents near dumping and loading points.

The mines in the present cluster are covered under definition 'Cluster' and do not posses permission under MMR 106(2(b)) needed for safe operations in opencast mines using heavy machinery.

3.5.2 Noise Environment

Noise is defined as an unwanted sound. The acoustic environment varies dynamically in magnitude and character throughout in most of the communities. The noise level variation can be temporal, spatial. It interferes with speech and hearing and is intense enough to damage hearing or is otherwise annoying. The definition of noise as unwanted sound implies that it has an adverse effect on human beings and their environment. Noise can also disturb natural wildlife and ecological system. Sound is mechanical energy from a vibrating surface, transmitted by cyclic series of compression and rarefaction of molecules of the materials through which it passes. Sound can be transmitted through gases, liquids and solids. The number of compressions and refractions of the air molecules in the unit of time is

described as its frequency. Frequency is expressed in hertz (Hz), which is the same as the number of cycles per second.

3.5.2.1 Methodology of Ambient Noise Monitoring

Instant Sound Level Meter (SLM) is used for the collection of data related to noise at an interval of one hour. The day noise levels have been monitored during 6:00 AM to 10:00 PM and night noise levels during 10:00 PM to 6:00 AM at ten locations in the study area. Measured noise level displayed as a function of time provides a useful scheme for describing the acoustical climate of a community. Noise levels recorded at each station are computed for equivalent noise levels. Equivalent noise level is a single number descriptor for describing time varying noise levels. The equivalent noise level is defined mathematically as:-

$10 \text{ Log} 1/ T \Sigma (10Ln/10)$

Where L = Sound pressure level a function of time dB (A)

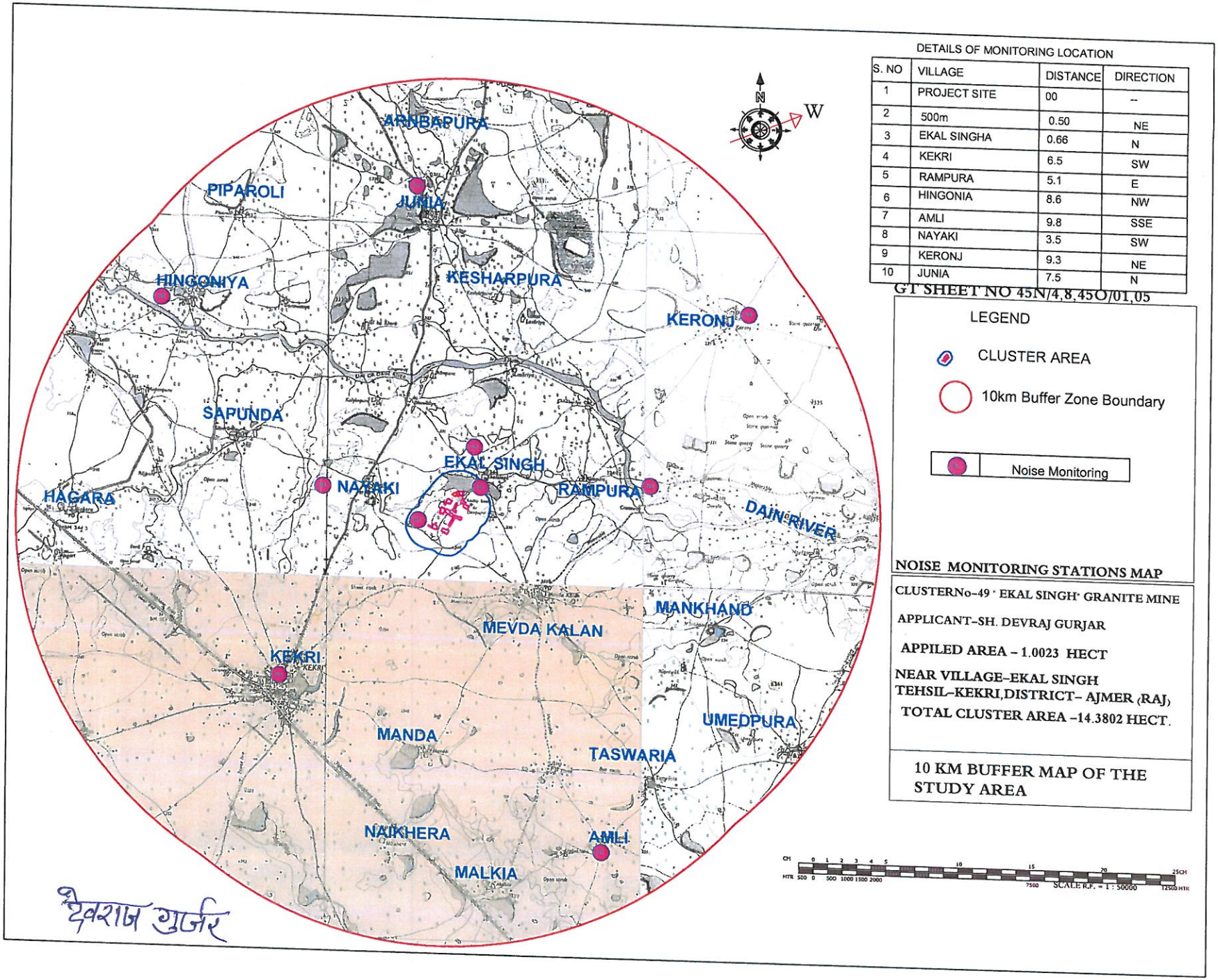
T = Time interval of observations

3.5.2.2 Noise Monitoring Locations

The hourly Leq noise levels were recorded at 10 locations in the study area; sampling locations are given in Table 3.9.and also shown in Figure 3.18

Table 3.9.Noise Monitoring Locations of Cluster Area

Sr. No.	Area Description	Sample Code	Distance from M.L. area(km)	Direction from Mining lease area
1	Mine Site	NQ1	0.00 km	-
2	In 500Mtr Radius Of Mine Site	NQ2	0.50	NE
3	Ekalsingha	NQ3	0.66	NE
4	Kekri	NQ4	6.5	SW
5	Rampura	NQ5	5.1	E
6	Hingonia	NQ6	8.6	NW
7	Amli	NQ7	9.8	SSE
8	Nayaki	NQ8	3.5	SW
9	Keronj	NQ9	9.3	NE
10	Junia	NQ10	7.5	N



DETAILS OF MONITORING LOCATION

S. NO	VILLAGE	DISTANCE	DIRECTION
1	PROJECT SITE	00	--
2	500m	0.50	NE
3	EKAL SINGHA	0.66	N
4	KEKRI	6.5	SW
5	RAMPURA	5.1	E
6	HINGONIA	8.6	NW
7	AMLI	9.8	SSE
8	NAYAKI	3.5	SW
9	KERONJ	9.3	NE
10	JUNIA	7.5	N

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LEGEND

CLUSTER AREA

10km Buffer Zone Boundary

Noise Monitoring

NOISE MONITORING STATIONS MAP

CLUSTERNo-49 ' EKAL SINGH' GRANITE MINE

APPLICANT-SH. DEVRAJ GURJAR

APPILED AREA – 1.0023 HECT

NEAR VILLAGE-EKAL SINGH
TEHSIL-KEKRI,DISTRICT- AJMER (RAJ)

TOTAL CLUSTER AREA -14.3802 HECT.

10 KM BUFFER MAP OF THE STUDY AREA

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3.5.2.3 Results of Ambient Noise Monitoring

Noise reading was taken from 10 locations during the study period the results of ambient noise monitoring are given in Table 3.10.

Table 3-10: Ambient Noise Monitoring Results

Sampling code	Name of the location	CPCB Limit		Noise levels dB(A)	
		Leq day (6.0 AM TO 10.0 PM)	Leq night (10.0 PM TO 6.0AM)	Leq day (6.0 AM TO 10.0 PM)	Leq night (10.0 PM TO 6.0AM)
NQ1	Mine Site	75	70	58.1	38.4
NQ2	In 500Mtr Radius Of Mine Site	55	45	56.4	38.9
NQ3	Ekalsingha	55	45	59.2	41.4
NQ4	Kekri	55	45	57.6	36.2
NQ5	Rampura	55	45	56.9	38.3
NQ6	Hingonia	55	45	59.4	38.1
NQ7	Amli	55	45	57.2	37.8
NQ8	Nayaki	55	45	58.6	39.0
NQ9	Keronj	55	45	56.4	40.1
NQ10	Junia	55	45	56.7	39.2

Generally, noise levels in public places like temples and community hall have higher values in day time. In the study area, higher Noise value of 59.5 dB (A) was recorded during day time at Gopalpura Village & lower Noise value of 38.4 dB (A) was recorded during night time at Bhagwanpura.

Data Interpretation of Noise Monitoring:

- Day time Noise Levels (Leqday)
    - The day time (Leq day) noise levels are observed to be in the range of 56.4 to 58.1 dB (A).
- Night time Noise Levels (Leq night)

- The night time (Leq night) Noise levels are observed to be in the range of 36.2 to 41.4 dB (A) which are within the prescribed limit of 45 dB (A).

3.5.3 Water Environment

3.5.3.0 Introduction

Renewable freshwater resources have major environmental and economic value. Their distribution varies widely among and within countries. Pressures on freshwater resources are exerted by overexploitation and by pollution. Relating resources abstraction to renewal of stocks is a central issue in sustainable freshwater resource management. If a significant share of a country's water comes from Transboundary Rivers, tensions between countries can arise, especially if water availability in the upstream country is greater than in the downstream one. Countries are quite interdependent with regard to water resources. The Convention on the Protection and Use of Transboundary Watercourses and International Lakes requires that the Parties introduce sustainable water management, including an ecosystem approach and the rational and fair use of transboundary waters.

3.5.3.1 Methodology Adopted for Selection of Sampling Station The sampling was done for underground water. The samples were taken from the identified monitoring locations within the 10 Km radius of the study area. Total of 10 samples were taken.

Sr. No.	Parameters	Test Method
1.	pH value	APHA 22nd Edition, 4500- H-B
2.	Color	APHA 22nd Edition, 2120 B
3.	Turbidity	APHA 22nd Edition, 2130 B
4.	Odor	APHA 22nd Edition, 2150 B
5.	Taste	APHA 22nd Edition, 2160 B
6.	Total Hardness as CaCO3	APHA 22nd Edition, 2340 C
7.	Calcium(as Ca)	APHA 22nd Edition, 3500 Ca B
8.	Alkalinity (as Ca CO3)	APHA 22nd Edition, 2320 B
9.	Chloride as Cl)	APHA 22nd Edition, 4500-CI-B
10.	Cyanide (as CN)	APHA 22nd Edition, 4500CN-D

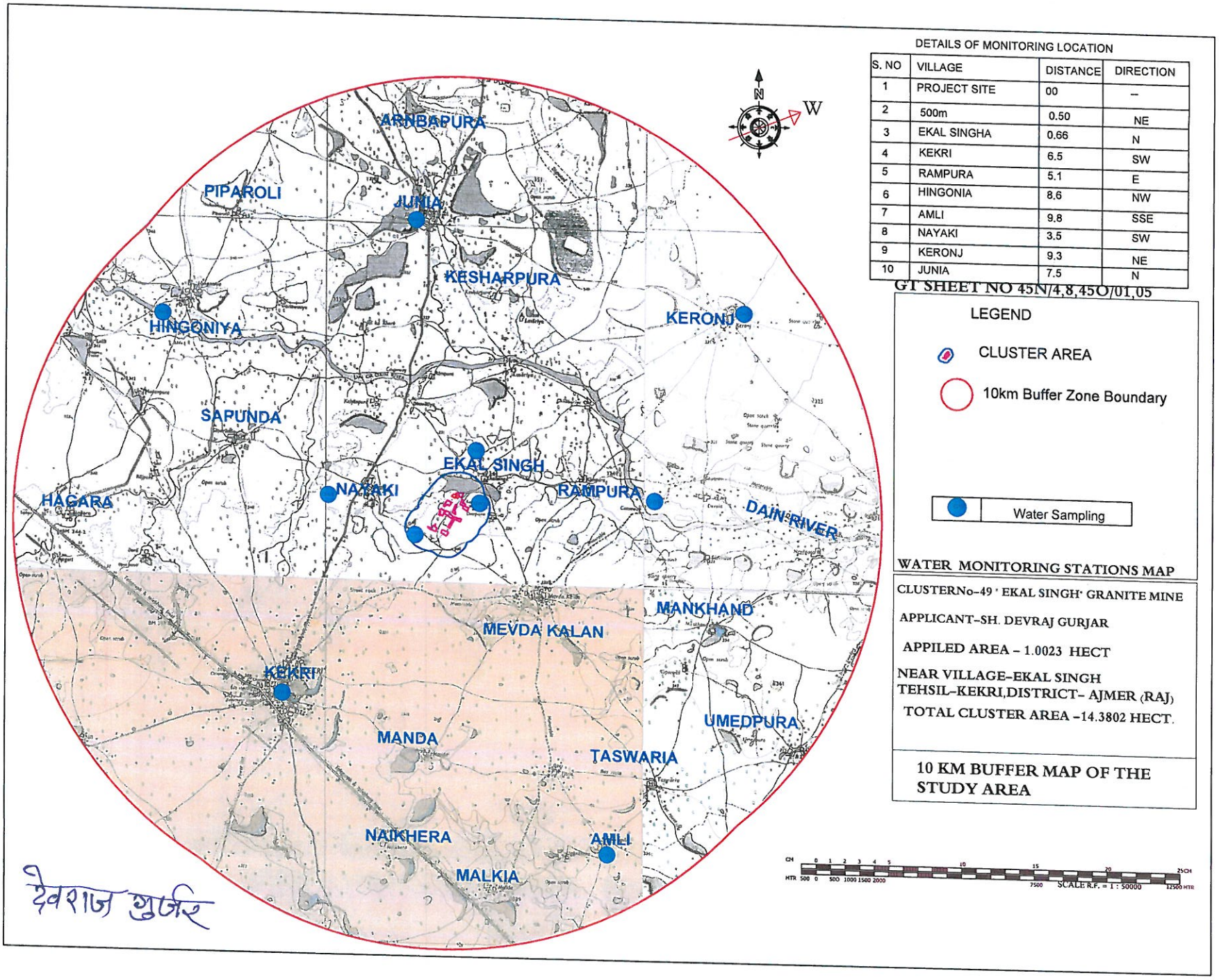
Sr. No.	Parameters	Test Method
11.	Magnesium (as Mg)	APHA 22nd Edition, 2340 B
12.	Total dissolve solid (TDS)	APHA 22nd Edition, 2540 C
13.	Sulphate (as SO4)	APHA 22nd Edition, 4500 E
14.	Fluoride(as F)	APHA 22nd Edition, 4500 – F- D
15.	Nitrate as NO3)	IS 3025 (P-34) 1988
16.	Iron (as Fe)	APHA 22nd Edition, 3500 – Fe- B
17.	Aluminum (as l)	APHA 22nd Edition, 3111 B
18.	Boron (as B)	APHA 22nd Edition, 4500 B C
19.	Hexa Chromium (Cr + 6)	APHA 22nd Edition, 3111 B
20.	Phenolic Compound	APHA 22nd Edition, 5530 C
21.	Mineral Oil	Clause 6 of IS : 3025 (Part 39)
22.	Anionic surface Detergents (as MBAS)	APHA 22nd Edition, 5540 C
23.	Zinc (as Zn)	APHA 22nd Edition, 3111 B
24.	Copper (as Cu)	APHA 22nd Edition, 3111 B
25.	Manganese (as Mn)	APHA 22nd Edition, 3111 B
26.	Cadmium (as Cd)	APHA 22nd Edition, 3111 B
27.	Lead (as Pb)	APHA 22nd Edition, 3111 B
28.	Selenium (as Se)	APHA 22nd Edition, 3111 B
29.	Arsenic (as As)	APHA 22nd Edition, 3111 B
30.	Mercury (as Hg)	APHA 22nd Edition, 3111 B
31.	Total Coliform	IS 1622, 1981 (Reaffirmed 2003)
32.	E. Coli	IS 1622, 1981 (Reaffirmed 2003)

The water quality sampling locations are described in Table 3.11 and shown in Figure 3.19.

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Table 3.11 Ground Water Sampling Station

Sr. No.	Area Description	Sample Code	Distance from M.L. area(km)	Direction from Mining lease area
1	Mine Site	WQ1	0.00 km	-
2	In 500Mtr Radius Of Mine Site	WQ2	0.50	NE
3	Ekalsingha	WQ3	0.66	NE
4	Kekri	WQ4	6.5	SW
5	Rampura	WQ5	5.1	E
6	Hingonia	WQ6	8.6	NW
7	Amli	WQ7	9.8	SSE
8	Nayaki	WQ8	3.5	SW
9	Keronj	WQ9	9.3	NE
10	Junia	WQ10	7.5	N



DETAILS OF MONITORING LOCATION

S. NO	VILLAGE	DISTANCE	DIRECTION
1	PROJECT SITE	00	--
2	500m	0.50	NE
3	EKAL SINGHA	0.66	N
4	KEKRI	6.5	SW
5	RAMPURA	5.1	E
6	HINGONIA	8.6	NW
7	AMLI	9.8	SSE
8	NAYAKI	3.5	SW
9	KERONJ	9.3	NE
10	JUNIA	7.5	N

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LEGEND

CLUSTER AREA

10km Buffer Zone Boundary

Water Sampling

WATER MONITORING STATIONS MAP

CLUSTERNo-49 ' EKAL SINGH' GRANITE MINE

APPLICANT-SH. DEVRAJ GURJAR

APPILED AREA - 1.0023 HECT

NEAR VILLAGE-EKAL SINGH
TEHSIL-KEKRI,DISTRICT- AJMER (RAJ)

TOTAL CLUSTER AREA -14.3802 HECT.

10 KM BUFFER MAP OF THE STUDY AREA

SCALE R.F. = 1 : 50000

3.5.3.2 Groundwater Monitoring Results

Groundwater was monitored at 10 locations inside the study area during the Summer season of March 2021 to May 2021 are shown in Table results are shown *in Table 3.12.*

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CLUSTER NO 49 "EKALSINGHA" GRANITE MINE

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Table 3-12: Groundwater Monitoring Results of Cluster area

S. NO	Parameter	Requirement (Desirable Limit) (As per BIS 10500:2012)	Permissible limit in the Absence of Alternate source (As per BIS 10500: 2012	Location and Source of Water Sample									
				GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8	GW9	GW10
1	Color	5	15	<1.0	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
2	Odor	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	1	5	<1.0	<1.0	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
5	pH value	6.5 To 8.5	No Relaxation	7.47	7.28	7.49	7.37	7.61	7.43	7.72	7.32	7.20	7.23
6	Total dissolve solid (TDS)	500	2000	963	1053	964	962	890	998	1029	1127	926	1241
7	Aluminum (as l)	0.03	0.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
8	Total Amonia	0.5	No Relaxa	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

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S. NO	Parameter	Requirement (Desirable Limit) (As per BIS 10500:2012)	Permissible limit in the Absence of Alternate source (As per BIS 10500: 2012 tion	Location and Source of Water Sample									
				GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8	GW9	GW10
9	Anionic surface Detergents(as MBAS)	0.2	1.0	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
10	Barium (as Ba)	0.7	No Relaxation	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
11	Boron (as B)	0.5	1.0	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
12	Calcium(as Ca)	75	200	67.86	68.20	67.89	68.10	76.50	67.91	70.11	78.2	67.93	69.15
13	Chloramines(as CL2)	4.0	No Relaxation	<1.00	<1.0	<1.0	<1.0	<1.00	<1.0	<1.0	<1.0	<1.0	<1.0
14	Chloride (asCL)	250	1000	231.9	230.41	230.6	232.1	175.21	230.6	210.13	234.6	230.46	234.1

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S. NO	Parameter	Requirement (Desirable Limit) (As per BIS 10500:2012)	Permissible limit in the Absence of Alternate source (As per BIS 10500: 2012	Location and Source of Water Sample									
				GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8	GW9	GW10
15	Copper (as Cu)	0.05	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
16	Fluoride (asF)	1.0	1.5	1.56	1.54	1.58	1.55	1.85	1.57	1.36	2.03	1.52	1.20
17	Free Residual Chlorine	0.2 To be applicable only when water is chlorinated. Tested at consumer end . When protection against	1.0	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

S. NO	Parameter	Requirement (Desirable Limit) (As per BIS 10500:2012)	Permissible limit in the Absence of Alternate source (As per BIS 10500: 2012	Location and Source of Water Sample									
				GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8	GW9	GW10
		viral infection is required, it should be minimum 0.5 mg/l											
18	Iron (as Fe)	0.3	No Relaxation	0.194	0.192	0.196	0.195	0.220	0.194	0.182	0.205	0.26	0.223
19	Magnesium (as Mg)	30	100	31.97	31.80	32.09	31.98	60.04	31.93	41.07	43.54	47.53	35.01
20	Manganese (as Mn)	0.1	0.3	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
21	Mineral Oil	0.5	No Relaxation	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

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S. NO	Parameter	Requirement (Desirable Limit) (As per BIS 10500:2012)	Permissible limit in the Absence of Alternate source (As per BIS 10500: 2012	Location and Source of Water Sample									
				GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8	GW9	GW10
22	Nitrate (as NO_3)	45	No Relaxation	14.23	14.36	14.32	14.84	15.92	14.25	13.73	20.24	25.09	17.01
23	Selenium (as Se)	0.01	No Relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
24	Silver (Ag)	0.1	No Relaxation	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
25	Sulphate (as SO_4)	200	400	85.37	84.92	85.38	85.62	41.84	84.98	115.20	37.4	145.18	80.69
26	Sulphide (as H2S)	0.05	No Relaxation	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
27	Alkalinity (as $CaCO_3$)	200	600	219.0	223.0	210.0	228.0	224.0	260.0	261.0	280.0	185.0	250.0
28	Total Hardness	200	600	294.0	302.0	286.0	301.0	291.0	321.0	320.0	328.4	279.0	321.0

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CLUSTER No.49 "EKALSINGHA" GRANITE MINE

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S. NO	Parameter (as $CaCO_3$)	Requirement (Desirable Limit) (As per BIS 10500:2012)	Permissible limit in the Absence of Alternate source (As per BIS 10500: 2012	Location and Source of Water Sample									
				GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8	GW9	GW10
29	Zinc (Zn)	5.0	0.002	0.38	<0.2	0.38	0.37	0.17	0.39	0.51	0.41	0.19	0.40
30	Cadmium (as Cd)	0.003	No Relaxation	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
31	Cyanide (as CN)	0.05	No Relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
32	Lead (as Pb)	0.01	No Relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
33	Mercury (as Hg)	0.001	No Relaxation	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
34	Molybdenum (Mo)	0.07	No Relaxation	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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S. NO	Parameter	Requirement (Desirable Limit) (As per BIS 10500:2012)	Permissible limit in the Absence of Alternate source (As per BIS 10500: 2012	Location and Source of Water Sample									
				GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8	GW9	GW10
35	Nickel (as Ni)	0.02	No Relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
36	Poly Nuclear Aromatic Hydrocarbons	0.0001	No Relaxation	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
37	Poly Chlorinated biphenyls	0.0005	No Relaxation	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
38	Total Aesenic (as As)	0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
39	Total Chromium (as Cr)	0.05	No Relaxation	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

BDL: Below Detectable Limit

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3.5.3.1 Interpritation & Conclusion

The analysis results indicate that the pH ranges from 7.20 to 7.72 at all location, comparable values of pH was assessed among the different water samples and it is based on IS 3025 (Part-11):1984 protocol. Total Hardness as CaCO3 fall in the range of 279.0 to 328.4 mg/l, which are in not accordance with the standards, specified under IS: 10500:2012. Total Dissolved Solids as fall in the range of 890 to 1241 mg/l However, the same will be suitably pre-treated before drinking by removing the hardness by boiling the water. The use of alum in drinking water can effective in removing the impurities of water. Other measures are to be adopted to purify the water used for drinking purpose.

3.5.4 SOIL ENVIRONMENT

3.5.4.1 Soil Profile of District Ajmer

Soils of the district are classified as follows:

Sierozeme: This is arid soil, sandy loam to sandy clay, deep, brown and calcareous, found in the northern part in Silora block. Cultivation is limited due to climatic factors.

Lithosols and Regosols of hills: This type of soil is found in the western part on the Aravalli hills and hill slopes. These are found at shallow depths with gravels near surface, reddish brown to grayish brown. Cultivation is limited due to limited root zone.

Brown soils (Saline phase): These soils are pale brown to yellowish brown and are developed mainly from Proterozoic and Arachaen rocks and alluvium. These are associated with seasonal water table and saline. Cultivation is limited due to salinity.

Alluvium: These are found in plains and derived from alluvium. The richest soil is obtained from the sand hills of Pushkar. These are non-calcareous, semi-consolidated to unconsolidated, brown, loamy sand to sandy loam and occupy gently sloping terrains in central and eastern part of the district.

3.5.4.2 Soil Quality and Characteristics

Assessment of soil quality is an important aspect with reference to tree plantations, percolation of water, ground water impact etc. The information on soils has been collected from various secondary sources and also through primary soil sampling analysis of which is described in this section.

3.5.4.3 Methodology adopted for Selection of Sampling Station

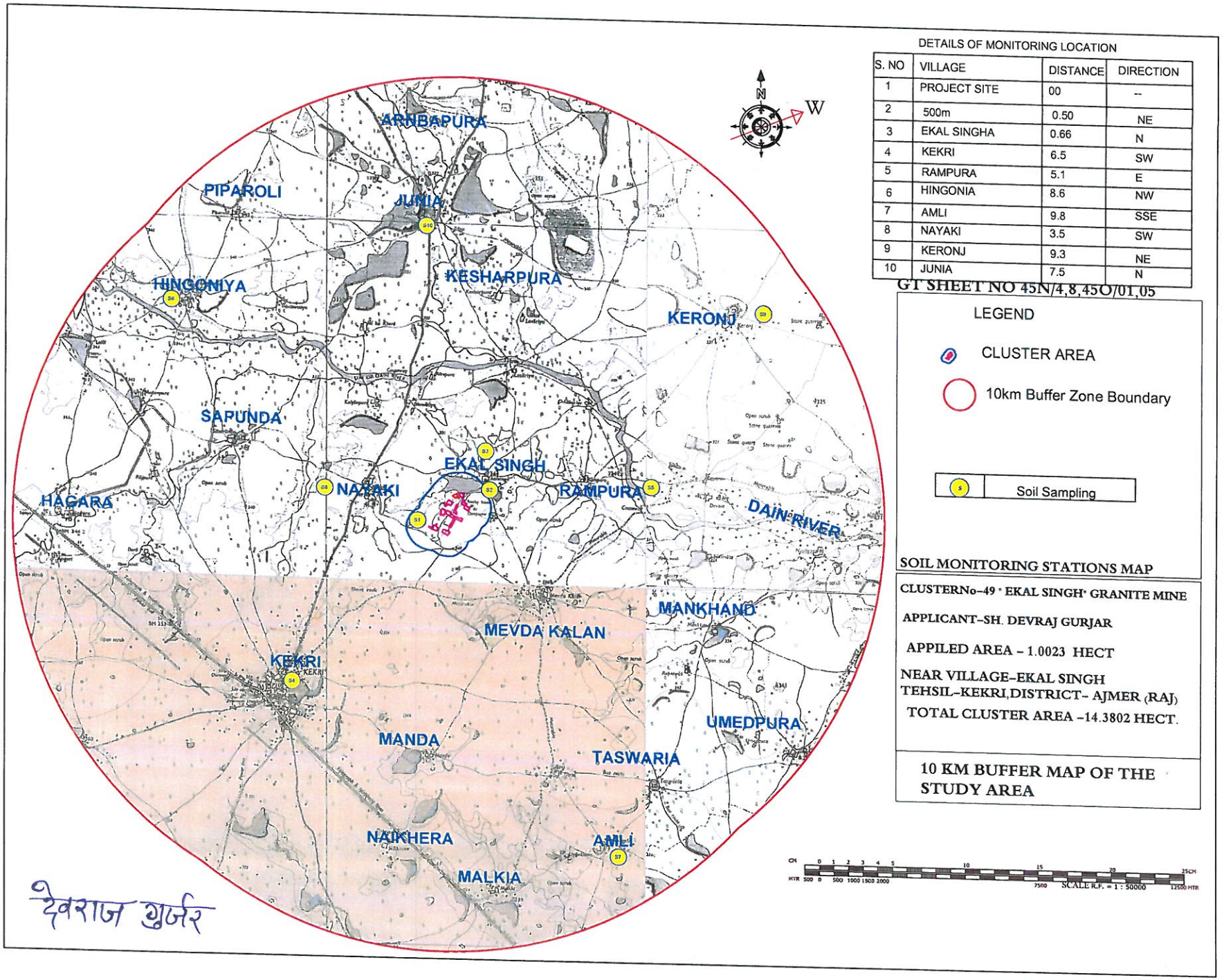
Random soil samples were collected up to depth of 15 cm and homogenized samples were then sent to the laboratory for analysis. The physical and chemical characteristics of the soil of the study area have been assessed by analyzing various parameters as per the methods described in "Soil Chemical Analysis" (Jackson, 1967). The soil quality of the study area has been assessed by collecting samples from 10 different locations. Details of soil sampling locations are presented in Table 3.13 and shown in Figure 3.20.

Table 3.13 Soil Monitoring Station of Cluster area

Sr. No.	Area Description	Sample Code	Distance from M.L. area(km)	Direction from Mining lease area
1	Mine Site	SQ1	0.00 km	-
2	In 500Mtr Radius Of Mine Site	SQ2	0.50	NE
3	Ekalsingha	SQ3	0.66	NE
4	Kekri	SQ4	6.5	SW
5	Rampura	SQ5	5.1	E
6	Hingonia	SQ6	8.6	NW
7	Amli	SQ7	9.8	SSE
8	Nayaki	SQ8	3.5	SW
9	Keronj	SQ9	9.3	NE
10	Junia	SQ10	7.5	N

Analysis Methodology of Soil Sampling

Sr. No.	Parameters	Test Method
1.	pH value	IS : 2720 (P-26, 1987)
2.	Conductivity	IS : 14767 – 2000 Reaffirmed 2006
3.	Soil Texture	USDA Method, 1968
4.	Color	USDA Method, 1968
5.	Water Holding Capacity	USDA Method, 1968
6.	Bulk Density	USDA Method, 1968
7.	Chloride as (Cl)	USDA Method, 1968
8.	Calcium(as Ca)	USDA Method, 1968
9.	Sodium (as Na)	USDA Method, 1968
10.	Potassium (as K)	USDA Method, 1968
11.	Organic Matter	IS : 2720 (P-22, 1972)
12.	Magnesium (as Mg)	USDA Method, 1968
13.	Available Nitrogen (as N)	IS : 14684, 1999
14.	Available Phosphours	USDA, APAH-4500 PC
15.	Zinc (as Zn)	APHA – 3030 D, APAH – 3111 B
16.	Manganese (as Mn)	APHA – 3030 D, APAH – 3111 B
17.	Chromium (Cr)	APHA – 3030 D, APAH – 3111 B
18.	Lead (as Pb)	APHA – 3030 D, APAH – 3111 B
19.	Cadmium (as Cd)	APHA – 3030 D, APAH – 3111 B
20.	Copper (as Cu)	APHA – 3030 D, APAH – 3111 B



DETAILS OF MONITORING LOCATION

S. NO	VILLAGE	DISTANCE	DIRECTION
1	PROJECT SITE	00	--
2	500m	0.50	NE
3	EKAL SINGHA	0.66	N
4	KEKRI	6.5	SW
5	RAMPURA	5.1	E
6	HINGONIA	8.6	NW
7	AMLI	9.8	SSE
8	NAYAKI	3.5	SW
9	KERONJ	9.3	NE
10	JUNIA	7.5	N

GT SHEET NO 45N/4,8,45O/01,05

LEGEND

CLUSTER AREA

10km Buffer Zone Boundary

Soil Sampling

SOIL MONITORING STATIONS MAP

CLUSTERNo-49 ' EKAL SINGH' GRANITE MINE

APPLICANT-SH. DEVRAJ GURJAR

APPILED AREA - 1.0023 HECT

NEAR VILLAGE-EKAL SINGH
TEHSIL-KEKRI,DISTRICT- AJMER (RAJ)

TOTAL CLUSTER AREA -14.3802 HECT.

10 KM BUFFER MAP OF THE STUDY AREA

SCALE R.F. = 1 : 50000

3.5.4.4 Soil Analysis Results

The analysis results of the soil sampling are given in Table 3.14.

Table3.14: Soil Sampling Results of Cluster Area

S. No	Parameter		Unit	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
1	pH value		--	7.62	7.56	7.30	7.36	7.61	7.46	7.60	7.58	7.51	7.63
2	Conductivity		mS/cm	246.00	288.0	295.0	232.0	311.0	262.00	327.00	326.00	262.00	328.00
3	Sodium (as Na)		%	52.41	56.21	56.45	58.00	54.91	57.98	44.94	45.36	57.96	44.96
4	Water Holding Capacity		gm/cc	30.00	29.36	28.86	32.12	30.25	29.67	29.14	28.9	29.65	29.15
5	Potassium (as K)		mg/100gm	236.69	249.95	251.23	250.28	248.69	237.58	227.28	230.15	237.54	227.30
6	Texture	Sand (% by mass)	66.00	66.50	60.00	64.00	60.00	54.00	64.00	64.00	64.00	64.00	64.00
		Clay (% by mass)	17.00	19.20	24.00	22.0	26.00	28.00	16.00	22.00	22.00	22.00	22.00
		Slit (% by mass)	16.00	14.30	16.00	14.0	14.00	18.00	20.00	16.00	16.00	20.00	16.00
7	Calcium(as Ca)		mg/100gm	157.00	155.00	144.00	145.00	143.00	156.00	136.00	137.00	156.00	136.00
8	Magnesium (as Mg)		kg/hec.	67.98	74.32	73.81	72.96	71.88	64.36	53.87	56.43	64.38	53.85
9	SAR		kg/hec.	0.97	1.23	1.56	1.48	1.46	0.98	0.96	0.98	0.97	0.97
10	CEC (meq/100 gm)		mg/100gm	2.25	2.28	2.38	2.24	2.12	2.35	2.74	2.76	2.32	2.76
11	Available Phosphours (as P), (mg/kg)		% by mass	10.73	12.75	12.75	12.46	11.84	12.00	14.68	14.64	12.00	14.69
12	Organic carbon (%)		% by mass	0.41	0.46	0.39	0.42	0.38	0.47	0.47	0.48	0.46	0.48
13	Porosity (% by mass)		% by mass	46.00	46.18	45.93	45.73	45.37	44.75	46.82	46.73	45.02	46.84
14	Permeability (cm/hr)		Meq/100gm	1.83	1.87	1.85	1.76	1.53	1.92	1.78	1.70	1.95	1.78
15	Bulk density		-	1.45	1.36	1.38	1.43	1.47	1.36	1.44	1.42	1.37	1.46
16	TKN %		% by mass	0.03	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02

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Soil Quality Criteria

Sr. No.	Soil test	Classification
1	pH	6.01-6.50 slightly Acidic 6.51-7.30 Neutral 7.31-7.80 Slightly Alkaline 7.81-8.50 Moderately Alkaline 8.51-9.00 Strongly Alkaline 9.01 very strongly Alkaline
2	Electrical Conductivity (mmhos/cm) 1ppm = 640 mmho/cm	Up to 1.00 Average 1.01-2.00 harmful to germination 2.01-3.00 harmful to crops (sensitive to salts)
3	Organic Carbon	Up to 0.2 very less 0.21-0.4 less 0.41-0.5 Medium 0.51-0.8 on an average sufficient 0.81-1.00 sufficient >1.0 more than sufficient
4	Nitrogen (Kg/ha)	Up to 50 very less 51-100 less 101-150 good 151-300 better >300 sufficient
5	Phosphorous (Kg/ha)	Up to 15 very less 16-30 less 31-50 medium 51-65 on an average sufficient 66-80 sufficient >80 more than sufficient
6	Potash (Kg/ha)	0-120 very less 120-180 less 181-240 medium 241-300 average 301-360 better >360 more than sufficient

3.5.4.5 Interpretation of Soil Analysis Results:

The soil analysis results are presented in the EIA/EMP Report. The result obtained is compared with the standard soil classification as given in Agriculture Handbook. Seven numbers of soil samples have been collected within study area and analyzed for physical and chemical properties.

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Samples collected indicate that the pH value is ranging between ~7.30 to 7.63 which show that the soils are neutral to alkaline in nature.

3.6 Biological Environment

Biodiversity studies comprise the systematic examination of the full array of different kinds of organisms together with the technology by which the diversity can be maintained and used for the benefit of humanity.

Biological impact assessment is an integral and important component of "Environmental Impact Assessment" (EIA). Biological impact assessment (BIA) generally includes lists of plants and animals present in the core and buffer areas of the proposed project site. Identified the species then check for their status according to an IUCN list of threat categories viz., endemic, endangered, vulnerable, rare, indeterminate and insufficiently known. In certain cases it is also considered desirable to conduct vegetation analysis using standard phyto-sociological methods.

In India Biological impact assessment comes under the purview of the Environmental Protection Act 1986, Environmental Impact Assessment Notification of 1994, Wildlife Act of 1972, Forest Conservation Act 1980 amended in 1988, Biodiversity Act 2002.

The detailed environmental study was conducted in the project area to assess all possible consequences on the biological environment for Cluster No.49 "Ekalsingha" Granite Mine The present study is highlighting the various issues pertaining to floristic diversity and the faunal wealth in and surrounding of Cluster No. 49 "Ekalsingha" Granite Mine are Located in Near Village- Ekalsingha, Tehsil -Kekri, District- Ajmer– Rajasthan.

3.6.1. Objectives of the study:

The biological study of the area has been conducted in order to understand the ecological status of the existing flora and fauna to generate baseline information and evaluate the probable impacts on the biological environment.

The present objectives were undertaken with the following objectives:

- To collect the baseline terrestrial biodiversity status regarding flora and fauna in the project area.
- To assess the frequency, density, abundance, Importance Value Index (IVI) and Shannon-Wiener Diversity Index (flora).
- To evaluate the dominant species of plant and animal. Secondary data also be collected from the local residents and authenticated list of flora and fauna by the Department of Forest, Govt. of Rajasthan, Rajasthan.
- To identify the endangered / threatened / scheduled species in the study area (both flora and fauna). The conservation plan will be given if any wildlife species of schedule-I is present there.
- To mark the wetlands and other ecologically sensitive areas such as national parks/ sanctuaries, if present there.
- To provide the conservation plan and suggestion / recommendation for social forestry green belt / plantation.
- To assess the effect of construction and operation of the project on existing ecology.

On the basis of on-site observations a checklist of flora and fauna was prepared.

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3.6.2 DESCRIPTION OF THE STUDY AREA

The site is located between latitude 26°01"16.28519" to 26° 01" 14.74277" N and longitudes 75°12"13.37401" to 75°12"11.19149" E at District-Ajmer, Rajasthan.

3.6.3 STUDY APPROACH AND METHODOLOGY

3.6.3.1 Delineation of the Study Area

The Cluster study area was delineated into two zones for biodiversity inventory. The existing Cluster lease boundary was considered as Core Zone while, the area encompassing 10 km radius from the project boundary was designated as Buffer Zone. Field survey was carried out in all major habitats covering both core and buffer zones.

3.6.3.2 Methodology:

3.6.3.2.1 Floral Study

Floral study is based on extensive field survey of the area. The seasonal study has been conducted in summer season. The plant species were identified taxonomically through available literature, consultation with forest department and local people. A nested quadrate technique was used for sampling the vegetation. The size and number of quadrates needed were determined using the species area curve (Mishra,1968) and running mean method (Kershaw ,1973) .Summarization of previously used method and recommendations led to the use of more than often (10x10 m) quadrates laid out of sampling the tree stratum at different altitudinal gradients and (1x1 m) for herbs and grasses. DBH of trees was also determined. All individuals > 10

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cm GBH (Girth at Breast Height) were included in tree category. However, for examining the shrub species 3x3m sample plots were laid out.

The vegetation data collected for biological study were quantitative analyzed for density, Frequency and Abundance according to Curtis and McIntosh (1950). The relative value of frequency, density, and dominance of all the species were summed up to represent Importance Value Index (IVI). The following are the formulae to derive frequency, density, dominance, IVI etc.

$$\text{Frequency} = \frac{\text{Total Number of quadrants in which species occurred}}{\text{Total number of quadrants studied}}$$

$$\text{Abundance} = \frac{\text{Total number of individuals of species in all quadrants}}{\text{Total number of quadrants in which species occurred}}$$

$$\text{Density} = \frac{\text{Total number of individuals of a species}}{\text{Total number of quadrants studied}}$$

$$\text{Dominance} = \frac{\text{Total Basal Area}}{\text{Total area sampled}}$$

$$\text{Relative Frequency} = \frac{\text{Frequency of the species}}{\text{Total frequency of all species}} \times 100$$

$$\text{Relative Density} = \frac{\text{Density of the species}}{\text{Total density of all species}} \times 100$$

$$\text{Relative Dominance} = \frac{\text{Dominance of the species}}{\text{Total dominance of all species}} \times 100$$

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Importance Value Index (IV) = Relative frequency + Relative density +Relative dominance

Shanon – Weaver Index (1948):

The number of species and number of individuals in a community is measure of species diversity which depends on stability of the habitat. Vegetation of the study area was assess by determining Shannon – Weaver diversity index (1948)

$D = -\Sigma (ni / n) \log2 (ni / n)$

ni = Number of individuals of each species in the sample

n = Total number of individuals

3.6.3.2.2. Flora in the study area

Plant species were recorded during site visit for biodiversity assessment in study area.

Table 3.15 Flora of core and buffer zone of Cluster study site

S. No	Scientific Name	Common name	Family	Status	IUCN Conservation Status
1	*Butea monosperma*	Dhak	Fabaceae	Common	Not assessed
2	*Acacia catechu*	Khair	Mimosaceae	Very Common	Not assessed
3	*Acacia nilotica*	Babool	Mimosaceae	Very Common	Not assessed
4	*Azadirachta indica*	Neem	Meliaceae	Common	Not assessed
5	*Ziziphus mauritiana*	Ber	Rhamnaceae	Common	Not assessed
6	*Mangifera indica*	Aam	Anacardiaceae	Common	Data Deficient
7	*Prosopis juliflora*	Baavlia	Fabaceae	Common	Not assessed
8	*Acacia tortilis*	Kikar	Fabaceae	Common	Not assessed
9	*Albizia lebbeck*	Saras	Fabaceae	Common	Not assessed
10	*Delonix regia*	Gulmohar	Fabaceae	Common	Least Concern

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11	*Eucalyptus sp*	Sugandha patra	Myrtaceae	Common	Not assessed
12	*Ficus benghalensis*	Bargad	Moraceae	Common	Not assessed
13	*Ficus religiosa*	Pipal	Moraceae	Common	Not assessed
14	*Pithecellobium dulce*	Jangal Jalebi	Fabaceae	Common	Not assessed
15	*Pongamia pinnata*	Karanj	Fabaceae	Common	Least Concern
16	*Melia azedarach*	Bakain	Meliaceae	Common	Not assessed
17	*Tecomella undulata*	Rohira	Bignoniaceae	Rare	Not assessed
18	*Aegle marmelos*	Bel	Rutaceae	Rare	Not assessed
			SHRUBS		
1	*Datura stramonium*	Dhutura	Solanaceae	Very Common	Not assessed
2	*Echinops echinatus*	Untkantara	Asteraceae	Common	Not assessed
3	*Prosopis spicigera*	Khejri	Leguminosae	Very Common	Not assessed
4	*Calotropis procera*	Aak	Apocynaceae	Common	Not assessed
5	*Adhatoda zeylanica*	Arusa	Acanthaceae	Common	Not assessed
6	*Ageratum conyzoides*	Jungali pudina	Asteraceae	Common	Not assessed
7	*Euphorbia neriifolia*	Thor	Euphorbiaceae	Very Common	Not assessed
			HERBS		
1	*Cynodon dactylon*	Arugu	Poaceae	Very Common	Not assessed
2	*Alternanthera sessilis*	Gathua chara	Amaranthaceae	Common	Least Concern
3	*Euphorbia hirta*	Dudhi	Euphorbiaceae	Very Common	Not assessed

Where, T = Tree, S = Shrub, H = Herb, G = Grass, C= Climber, (-) = absent, (+) = Present

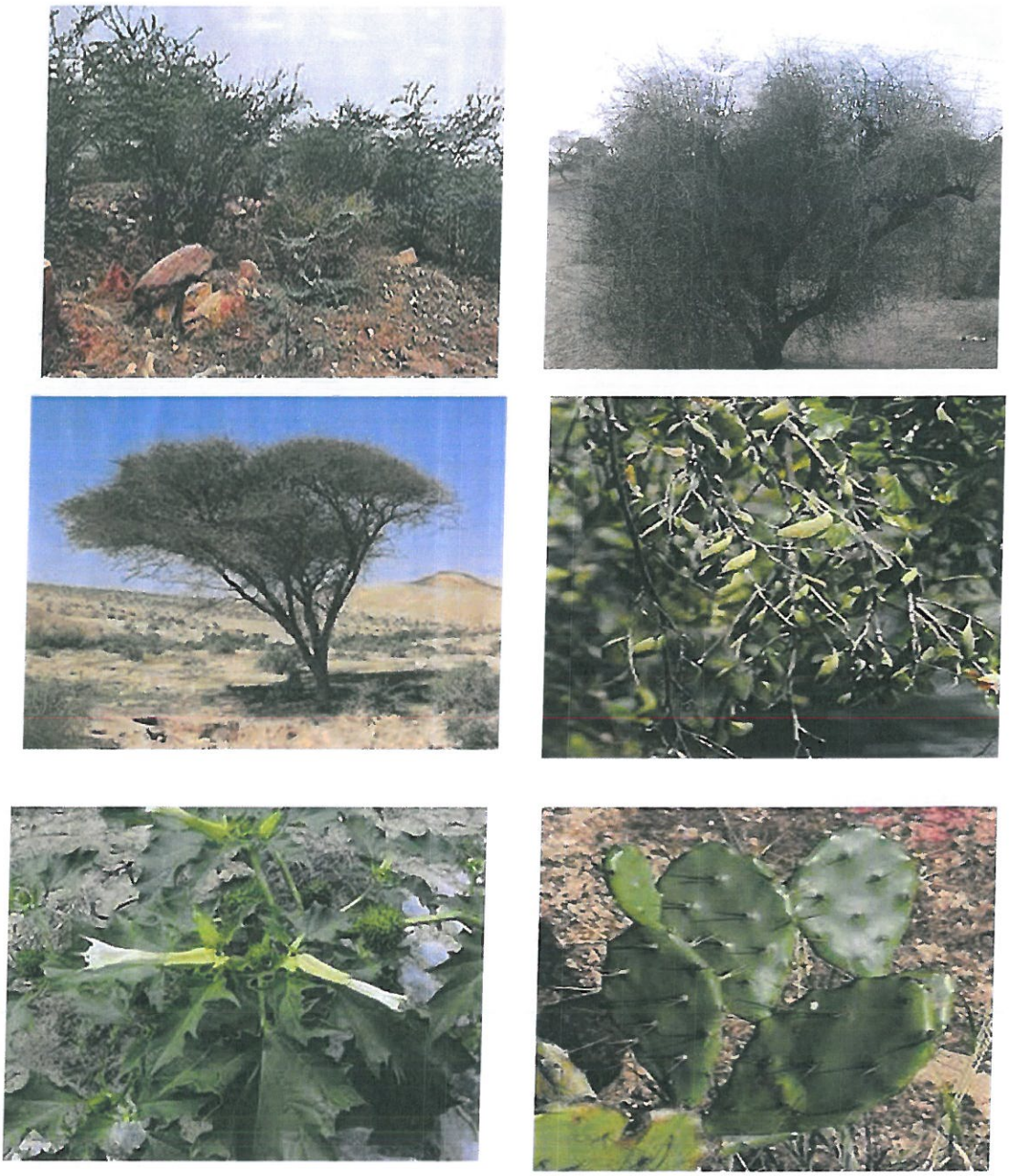


FIGURE 3.21 FLORA OF STUDY AREA

3.6.4 Threat Status of the floristic diversity

Flora recorded from the study sites during the survey when compared with the available literature revealed that none of the species recorded from the region fall under any category of threat status.

3.6.5. Faunal study:

i. Avifauna

Point count method was followed for counting the birds. Opportunistic surveys were also carried out with respect to avifaunal checklist. Identification by calls was also made for species which were not directly encountered or were hidden in the vegetation or canopy. Secondary data collected from the literature.

ii. Herpetofauna

Amphibians and reptiles recorded during area searches were identified by visual characteristics. Aquatic searches involved examining each type of aquatic habitat.

iii. Mammals

Presences of mammals were documented by using both direct sightings and indirect evidences i.e. animal burrows/holes, scats, pellets, droppings and tracks. Opportunistic sightings were also included. Circular Plots were used to search indirect evidences.

During the study in the field and concern with local stakeholder, animals were recorded on project study area.

Table 3.16 .Fauna were recorded in Core and Buffer Zone of Study Site of Cluster Area

Sl.No.	Scientific name	English Name	Schedule of Wildlife Protection Act	IUCN Conservation Status
		Mammals		
1	*Boselaphus tragocamelus*	Nilgai	III	Least Concern
2	*Presbytis entellus*	Common Langur	II	Not assessed
3	*Lepus nigricollis*	Indian Hare	IV	Least Concern
4	*Felis catus*	Cat	--	Not assessed
5	*Rattus rattus*	Black Rat	V	Least Concern
6	*Mus musculus*	Common Mouse	IV	Not assessed
7	*Funambulus pennanti*	Five striped palm squirrel	IV	Not assessed
		Birds		
1	*Corvus macrorhynchos*	Jungle Crow	IV	Least Concern
2	*Acridotheres tristis*	Common Mynah	IV	Least Concern
3	*Egretta garzetta*	Little Egret	IV	Least Concern
4	*Bubulcus ibis*	Cattle Egret	IV	Least Concern
5	*Centropus sinensis*	Greater Coucal	IV	Least Concern
6	*Corvus splendens*	House crow	V	Least Concern
7	*Dicrurus leucophaeus*	Ashy Drongo	IV	Least Concern
8	*Himantopus himantopus*	Black wingged stilt	IV	Least Concern
9	*Dicrurus macrocercus*	Black drongo	IV	Least Concern
10	*Passer domesticus*	House sparrow	IV	Least Concern

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11	*Pycnonotus cafer*	Red Vent Bulbul	IV	Least Concern
12	*Spilopelia senegalensis*	Laughing Dove	IV	Least Concern
13	*Turdoides striata*	Jungle Babbler	IV	Least Concern
14	*Vanellus indicus*	Red-wattled lapwing	IV	Least Concern
15	*Milvus migrans*	Black kite	IV	Least Concern
16	*Columba livia*	Rock pigeon	IV	Least Concern
17	*Accipiter badius*	Shikra	IV	Least Concern
18	*Merops orientalis*	Green bee eater	IV	Least Concern
		Reptiles & Amphibians		
1	*Eryx johnii*	Sand boa	IV	Not assessed
2	*Hemidactylus sp.*	House lizard	--	Not assessed
3	*Rana tigrina*	Common yellow frog	IV	Least Concern
4	*Calotes versicolor*	Common Garden Lizard	II	Not assessed
5	*Naja naja*	Cobra	II	Least Concern
6	*Vipera russelli*	Russells Viper	IV	Not assessed
7	*Ptyas mucosus*	Yellow Rat Snake	II	Not assessed
		Butterflies		
1	*Euploea core*	Common Crow	--	Least Concern
2	*Eurema hecabe*	Common Grass yellow	--	Not assessed
3	*Papilio demoleus*	Lime Butterfly	--	Not assessed

Table 3.16: Fauna Recorded from the Primary Survey in the Study Area (Core Zone) Status of Cluster Area

Sl.No.	Scientific name	English Name	Schedule of Wildlife Protection Act	IUCN Conservation Status
		Mammals		
1	*Presbytis entellus*	Common Langur	II	Not assessed
2	*Felis catus*	Cat	--	Not assessed



Collared Dove- Streptopelia decaocto



House Sparrow - Passer domesticus



Red Vented Bulbul - Pycnonotus cafer



Indian Myna - Acridotheres tristis

FIGURE 3.22 FAUNA OF STUDY AREA

3.6.6 Endangered Species

No plant or animal species recorded is endangered as per the Red Data Book as well as under IUCN category in the study area.

3.6.7 Eco-sensitive Zone

There is no Wildlife Sanctuary, National Park or Biosphere Reserves in the Core as well as buffer zone.

3.6.8 Cropping Pattern of the Study Area

Climatic factors chiefly determine the cropping pattern in the study area/ region. The area comes under semi- arid zone of the state on account of freely availability of adequate water; cropping patter is by and large single only. During Kharif, Maize, Groundnut, Soyabean, Sorghum and Urad are the main crops cultivated and during Rabi, Wheat, Rapeseed, Gram and Mustard are the main crops in the area.

3.6.9 IMPACTS - DUE TO MINES

3.6.9.1 NATURE OF IMPACTS

Impact of mining on land environment gets reflected in land-use pattern of the respective area because the more the land gets exposed to erosion by losing its green cover or by getting disturbed otherwise due to mining and related activities, its water resources gets damaged, soils get contaminated, part or total of flora and fauna gets lost, air and water gets polluted and the more damages go on proceeding in accelerated rates and the cumulative effects push the land towards degradation.

Cluster and their associated infrastructure may impact terrestrial flora and fauna in diverse ways during operational phase. The main impacts the loss and fragmentation of habitats, with a consequent loss of biodiversity and possibly loss of species of special concern. This may result from direct land clearance, or occur indirectly via loss or changes in habitats due to consequent changes in drainage patterns, increased fire risk, or secondary impacts associated socio-economic factors resulting from changes in surrounding land use. During the operational life of the mine, small accumulative impacts also occur Including ongoing mortalities resulting from

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increased road traffic, increased disturbance (noise and light), dust generation, air pollution, increased litter and change in the incidence of fire. All of these factors may impact the surrounding fauna and ecological processes in different ways.

However, in most of the cases it has been observed that the damage due to mining activity has been reflected on decrease in green cover or water resource or both. Greenery bears a pivotal role in protecting the quality of all aspects of environment, also in many cases it is considered as a desired indicator of protector of environmental quality in the region. Regarding desired land use pattern, our National Forest Policy has fixed the national average forest cover at 33%. This fact indicates that there is still some drawback in the land-use management system. Strategies need to be developed including policy intervention, promoting research and stakeholder participation, and technological intervention to check land degradation.

3.6.9.2 EXISTING IMPACTS:

Many existing impacts occur in the region, particularly the loss of sensitive habitats (via primary destruction and secondarily via contamination), loss of faunal diversity (particularly large mammals and birds), loss of species of special concern, and disruption to faunal movements. The direct impacts of mining disturbances to land surfaces are usually significant, with the likelihood of destruction of local biodiversity within natural ecosystems through the removal of natural soils, plants and animals. However, mining is a temporary land use because the mineral deposit is finite and eventually gets exhausted.

The key environmental problem and impacts of mining /quarrying are:

- Degradation of forest and loss of biodiversity
- Air and noise pollution
- Surface and ground water pollution
- Land degradation
- Environmental degradation due to abandoned and closed mine

3.6.9.3 MITIGATION MEASURES

The impact on land cannot be fully eliminated because there are some mining impacts such as loss of agricultural land, water pollution, fall in water table etc are inevitable but its impact can be reduced to an acceptable level by adopting suitable mitigation measures and by doing adequate planning at the initial stage of mine development. Setting aside or exclusion of critically important areas, compensatory afforestation, creation of green belts, rehabilitation of species or individuals are basic actions taken for mitigation of impact. While creating green belt and undertaking the afforestation works, it is required to plant indigenous/local plants and as for as possible exotics should not be introduced. The cost of eco-restoration of the site should be included in the project cost. Some of the land related mitigation measures are as follows:

- Topsoil can be conserved by implementing adequate mitigation and Conservation plan.
- Open area should be planted with trees.
- Stabilization of overburden dumps by mechanical and biological reclamation.

- No mining in area support unique habitant, endemic, threatened or declining species, or species of high economic and cultural value to society.
- Natural drains or nallah should not be disturbed; Incase of diversion alignments should be made by constructing artificial drain.

Plantation is a principal goal of reclamation and results in many desirable secondary water quality and aesthetic benefits. Plantation goals are from simple erosion control to the full restoration of complex native communities. The approaches and protocols employed, therefore, are specific for region, site and land use. The development of a permanent vegetation cover should aim to establish a plant community that will maintain itself indefinitely without attention or artificial aid, and support native fauna. To extract better results, some ecological variables must be considered while selecting species for plantation. These are; their capacity to stabilize soil, soil organic matter and available soil nutrients, and under storey development. In the initial stages of revegetation quick growing grasses with short life cycle and forage crops are recommended. It will improve the nutrient and organic matter content in soil. Plantation of mixed species of economic importance should be done after 2-3 years of growing grasses. While selecting suitable species for plantation in mine area, the following considerations have to be taken into account:

- Planting, pollutant tolerant species.
- Plants of fast growing with thick vegetation foliage
- Indigenous plants species with easy adaptability to the locality.
- Socio economic requirement of the people of the surrounding area.

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There is need for creating green belt (approximately 7.5 to 15 m wide) in the safety area to provide an effective dust, noise and sight curtain in the periphery of the mining area. The trees to be planted in the green belt area shall act as buffers and shock absorber against dusts, noise and stone flying. Trees in the green belt will be tall, wind firm, broad leaved and evergreen.

3.6.9.4 SPECIES FOR PLANTATION AND GREEN BELT DEVELOPMENT

A list of the species suggested for afforestation is giving for the development of mining site for sustainable environment of area. All these plants and Shrubs can be cultivated in less water and have tolerance power of heat and dry conditions of atmosphere. There is some plants name for Green Belt like *Azadirachta indica* (Neem), *Acacia nilotica* (Babool), *Ziziphus mauritiana* (Ber) etc.

3.6.9.5 CONSERVATION MEASURES

Ecological restoration is about a broad set of activities (enhancing, repairing, or reconstructing degraded ecosystems and optimizing biodiversity returns). In essence, the restoration of mined land is based around ecosystem reconstruction. It is usually a question of the re-establishment of the capability of the land to capture and retain fundamental resources (energy, water, nutrients and species). With this in view, it is proposed to plant the trees and undertake development of green belt in the project area at all possible places. As a trend, the faunal population is on decreasing trend in general. Arrangement of adequate funds has been made for enhancing, repairing, or reconstructing degraded ecosystems and optimizing biodiversity returns.

3.6.9.6 Suggestion for conservation of Threatened Species

Direct and indirect approach is required to provide effective conservation, which is suggested as under.

- Some provision of rewards for growing maximum threatened plant species.
- Aware the villagers and encourage them to grow threatened plant species in their farms by mentioning their medicinal and economic value.
- Another way to help preserve the endangered species is to create society dedication towards the ecological ethics. All the conservation measures will be implemented with the help of and in the consultation of the state forest department.
- Organized workshop for conservation awareness of threatened plant species. A series of conservation awareness workshops for village and school children should be conducted in the different villages. Interactive discussion will be carried out participants.
- Encourage afforestation activities around by maintaining them.
- Suggest strategies to minimize negative impacts of changing environment in nearby area of promote conservation.

Mining activities will not cause any harm to riparian vegetation cover as the working will not extend beyond the offset left against the banks. Green belts are created not only for the purpose of protecting sensitive areas or to maintain ecological balance but also act as efficient biological filters. Green belt development provides an important tool to address the issue of mitigating the adverse effect of fugitive emission on surrounding environment.

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3.6.9.7 CONCLUSION

The present study of Biological Impact Assessment (BIA) with the objective is to minimize adverse environmental impacts as discussed. The study covers all possible environmental issues involved in the project and the necessary mitigation measures. The present study reveals that only local and native species of plants (Trees, shrubs, herbs and grasses) were present at the buffer zone of mining site. No adverse impact of mining site was noticed on the flora presently nearby area of mines.

There is no any harmful impact on biological environment due to the running of Cluster No. 49 "Ekalsingha" Granite Mine Total Cluster area- 14.3802 Hectare, Located near Village- Ekalsingha, Tehsil- Kekri, Dist- Ajmer, Rajasthan.

No faunal species of schedule I were recorded nearby the mining area. The habitats of human beings were far from the mining site therefore the air pollution and other environmental Impact will be negligible. Taking appropriate mitigation measures for enhances the surrounding environment of the mining site and the nearby area is our sole responsibility for the "Sustainable Environment".

3.7 SOCIO ECONOMIC ENVIRONMENT

An essential part of environmental study is socio-economic environment incorporating various facts related to socio-economic conditions in the area, which deals with the total environment. Socio economic study includes demographic structure of the area, provision of basic amenities viz., housing, education, health & medical services, occupation, water supply, sanitation, communication, transportation, prevailing diseases pattern as well as feature

of aesthetic significance such as temples, historical monuments etc. at the baseline level. This would help in visualizing and predicting the possible impact depending upon the nature and magnitude of the project.

Socio-economic study of a Cluster area provides a good opportunity to assess the socioeconomic conditions of it. This study will possibly make a change in living and social standards of the particular area benefitted due to the Project. The gross economic condition of the area will be increased substantially due to the existence of this project. It can undoubtedly be said that this project will provide direct and indirect employment and improve the infrastructural facilities and standards of living of the area. The fabrics of socio-economic changes are so complicated that this study would seem to be extremely limited, almost superficial and at time subjective in nature. More thorough and quantified socio-economic study will undoubtedly require vastly longer time and resources and is, therefore, beyond the scope of the present EIA study. The EIA will give a reasonably clear picture of the socio-economic conditions prevailing in the study area.

3.7.1 Objective of Socio Economic Study

The objectives of this socio-economic study are:

- To conduct socio-economic assessment study in Project Area.
- To know the current socio-economic situation in the region to cover the subsectors of education, health, sanitation, water and food security.
- To recommend practical strategic interventions in the sector.
- To help in providing better living standards.
- To provide employment opportunities.

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3.7.2 Scope of Study

The scope of socio economic study area as follows:

- To study the Socio-economic Environment of area from the secondary sources.
- To develop a questionnaire for SIA Survey.
- Data Collection & Analysis.
- Prediction of project impact.
- Mitigation Measures

3.7.3 Methodology

For socioeconomic study, both qualitative and quantitative methods were adopted. Data regarding the field area were collected both from primary and secondary sources. Primary sources include data collected through direct field sampling, observations based on schedules, questionnaires etc. A suitable format of Questionnaires was developed by us & survey was conducted. Secondary sources include various reports, records, literatures, documents, maps, charts and photographs etc, collected from various public and private organizations. To know the perception of local people on socioeconomic impact of Granite mining in the area, a field survey was conducted during Dec-2019 to Feb-2020. The target groups were selected from villages of core and buffer area of Kekri Tehsil. About 100-120 people were interviewed to get response. Focus Group Discussion (FGD) and Participatory Rural Appraisal (PRA) techniques are the two important tools of participatory method used in the field. Household level contacts and interviews have been undertaken with each family for completing the household socioeconomic profile. For individual farmers and community members, qualitative interviews were

used since this approach allows a more in-depth investigation into the each interviewee. It also allows people to speak for themselves without their answers being biased by predetermined hypothesis-based questions. The questionnaire was basically focused to gather respondents' views from the study areas on the impacts of mining.

The data collected from various sources were processed, computed and tabulated to fit the problem. These tabulated data were interpreted and analyzed with the help of various quantitative techniques. More thorough and quantified socioeconomic study will undoubtedly require vastly longer time and resources and is, therefore, beyond the scope of the present EIA study. The EIA will give a reasonably clear picture of the socioeconomic conditions prevailing in the study area.

3.7.4 Background of Study Area

The Cluster is located in near village Ekalsingha, Tehsil - Kekri District, Ajmer is a district of Southern Rajasthan state in western India. It is bordered on the west by Pali District, on the north by Jaipur District, on the east by Tonk District and on the south by Bhilwara District of Rajasthan. The district is characterized by undulating topography. It has almost an irregular triangle in shape.

As of 2011 India census, Ajmer District had a population of 2,583,052. Males constitute 51.27% of the population and females 48.73%. Ajmer has anaverage literacy rate of 69.33%.

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3.7.5 Villages for Socio-Economic Survey

Sr.No.	Villages	Distance	Direction
1.	Ekalsingha	0.66	NE
2.	Nayaki	3.5	SW
3.	Meoda Kalan	3	S
4.	Manda	4.1	N
5.	Kekri	6.5	SW
6.	Gujarwada	5	SE
7.	Kalyanpura	5.5	SSW
8.	Dhuwaliya	4.9	NW
9.	Gopalpura	6.9	NE
10.	Kekri Rural	6.0	WSW
11	Sarsai	7.1	ENE
12	Ajgai	7.9	SSE
13	Ajgara	8.0	SE
14	Rajpura	7.5	N
15	Dorai	8.4	WNW
16	Sapanda	8.3	NNE

17	Mandanpura	9.4	NE
18	Lallai	9.8	ENE
19	Bilawtiya Khera	9.0	SE
20	Hingoriya	10.8	SSE
21	Jai ka khera	8.8	NNE
22	Peeproli	9,2	NNW
23	Juniya	7.7	WNW
24	Kesarpura	8.9	W
25	Jhupda	9.4	ESE
26	Manoharpura	7.6	WSW
27	Lasariya	8.4	WNW
28	Kanoj	8.0	NW
29	Devliya khurd	8.2	NE
30	Naya gaon	7.0	NNE
31	Mankhanda	9.8	WSW
32	Taswariya	9.6	W
33	Titariya	10.1	SSE
34	Amali	10.7	ESE
35	Mojikiya	9.6	WSW

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36	Nai khera	8.7	NNE
37	Ugai	8.5	NE
38	Chak beeliya	8.4	E
39	Chabriya	8.3	ESE

Demography of the Study Area

Study area (buffer zone) is the area within 10 km radius of the Cluster site. It covers 39 villages of Tehsil- Kekri, District- Ajmer, (Rajasthan). The total population of the study area is 53766. We have been surveyed 55.55% of the total villages within the study area. Total household in the primary, secondary & outer zone is 7954 Sex ratio (See Table No. 1.01) within primary zone was found as 984 females per 1000 males, 941 and within secondary zone and outer zone 950 respectively. See the table no(1.01)depicting sex ratio in the study area much better than district and state level sex ratio and the average household/family size is 5 in the region which is a standard size of family in India.

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TABLE-3.18
DEMOGRAPHIC PROFILE OF STUDY AREA OF CLUSTER AREA

Name	HH	TOT_P	TOT-M	TOT_F	SEX-R	P_SC	P-ST	P-LIT	M-LIT	F-LIT	TOT - WORK	MA_ NWORK	MAR_ WORK	NON_ WORK
0 to 3km Area														
Ekalseenga	115	712	362	350	966	177	0	338	214	124	350	333	17	362
Nayaki	202	1181	608	573	942	355	66	632	417	215	375	326	49	806
Meoda kalan	775	3838	1947	1891	971	1266	454	1915	1242	673	1913	1506	407	1925
3km to 5km Area														
Manda	113	569	277	292	1054	112	77	209	152	57	263	239	24	306
Kekri	121	521	268	253	944	91	0	220	155	65	285	278	7	236
Gujarwada	147	754	378	376	994	141	71	420	266	154	438	400	38	316
Kalyanpura	44	219	115	104	904	0	16	105	72	33	99	96	3	120
Dhuwaliya	148	819	423	396	936	126	31	374	268	106	408	407	1	411
5 km to 10km Area														
Gopalpura	119	596	293	303	1034	7	38	260	164	96	289	289	0	307
Kekri rural	214	1123	572	551	963	251	15	517	305	212	426	313	113	697
Sarsai	525	2566	1314	1252	952	571	0	905	660	245	1331	1168	163	1235
Ajgai	351	1991	996	995	998	418	7	1022	638	384	990	990	0	1001
Ajgara	136	628	322	306	950	144	4	344	216	128	304	302	2	324
Rajpura	175	840	440	400	909	154	100	421	296	125	342	326	16	498
Dorai	80	464	232	232	1000	68	0	161	99	62	249	219	30	215

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Sapa[illegible]	302	1674	864	810	936	336	24	767	523	244	820	416	404	854
Mand[illegible]ra	135	636	312	324	1038	0	0	231	159	72	322	320	2	314
Lallai	374	1884	986	898	910	290	34	676	491	185	996	971	25	888
Bilawtiya khera	131	764	380	384	1010	86	0	437	251	186	397	227	170	367
Hingoriya	603	2873	1430	1443	1009	388	75	1618	988	630	1364	791	573	1509
Jai ka khera	192	874	446	428	959	261	64	566	336	230	468	468	0	406
Peeproli	202	1145	584	561	960	151	32	619	409	210	652	395	257	493
Juniya	1053	5462	2826	2636	932	1604	22	3073	1963	1110	2211	2002	209	3251
Kesarpura	118	637	313	324	1035	102	0	280	172	108	335	325	10	302
Jhupda	302	1674	864	810	937	336	24	767	523	244	820	416	404	854
Manoharpura	343	1922	1005	917	912	487	0	942	627	315	994	955	39	928
Lasariya	291	1492	738	754	1021	341	6	837	520	317	720	633	87	772
Kanoj	415	2085	1032	1053	1020	413	115	980	648	332	977	468	509	1108
Devliya khurd	320	1713	867	846	975	398	101	725	513	212	825	721	104	888
Naya gaon	309	1705	895	810	905	71	2	555	442	113	1015	995	20	690
Mankhanda	355	1844	915	929	1015	320	119	822	551	271	957	645	312	887
Taswariya	281	1448	705	743	1053	461	92	732	467	265	738	721	17	710
Titariya	206	1115	563	552	980	189	329	532	360	172	521	518	3	594
Amali	143	785	386	399	1033	163	244	392	263	129	471	67	404	314
Mojikiya	264	891	470	421	895	459	41	348	262	86	527	284	243	364
Nai khera	205	1019	509	510	1001	509	425	543	380	163	475	159	316	544
Ugai	186	802	407	395	970	294	96	401	272	129	447	429	18	355
Chak beeliya	147	761	376	385	1023	220	0	393	244	149	318	156	162	443

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Chabriya	226	987	515	472	916	305	88	446	307	139	462	404	58	525
Total	10368	53013	26935	26078	37962	12065	2812	25525	16835	8690	25894	20678	5216	27119

Source: census of India-2011

_ HH: Household; TOT_P: Total Population; TOT_M: Total Male Population; TOT_F: Total Female Population; SEX_R: Sex Ration; P_SC:Schedule caste Population; P_ST: Schedule Tribe Population; LIT: Literacy Rate; M_LIT: Male Literacy; F_LIT: Female Literacy; TOT_WORK: Total Worker; MA_WORK: Main Worker; MR_WORK: Marginal Worker; NON_WORK: Non Worker.

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CLUSTER No. 49 "EKALSINGHA" GRANITE MINE

M/S N.S.ENVIROTCH LAB. & CONSULTANT

EIA Coordinator

3.7.6 POPULATION DISTRIBUTION

As per the primary data & secondary data we found that the distribution of population varies from place to place. In the study area some villages are densely populated (See table no 3.23) such as Sarsai, Juniya, and Hingoriya etc. But on the other hand some are very less populated i.e. Dorai, Manda, Kekri, etc. Distribution of male and female population are not balanced, all over sex ratio in the area is 968 it is much better than district and state sex ratio.

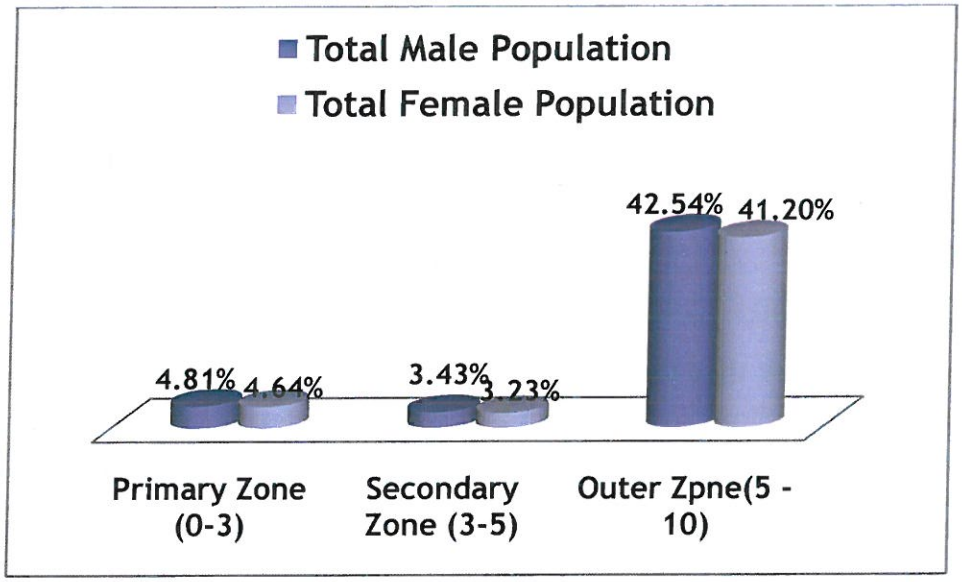


Figure 3.14 Demography of the Study Area

3.7.7 VULNERABLE GROUP

While developing an Action Plan, it is very important to identify the population which falls under the marginalized and vulnerable groups and special attention has to be given towards these groups while making action plans. Special provisions should be made for them. In the observed villages, schedule caste (S.C.) population is 22.75 % and Schedule Tribe (ST) population is 5.30 % in study area.

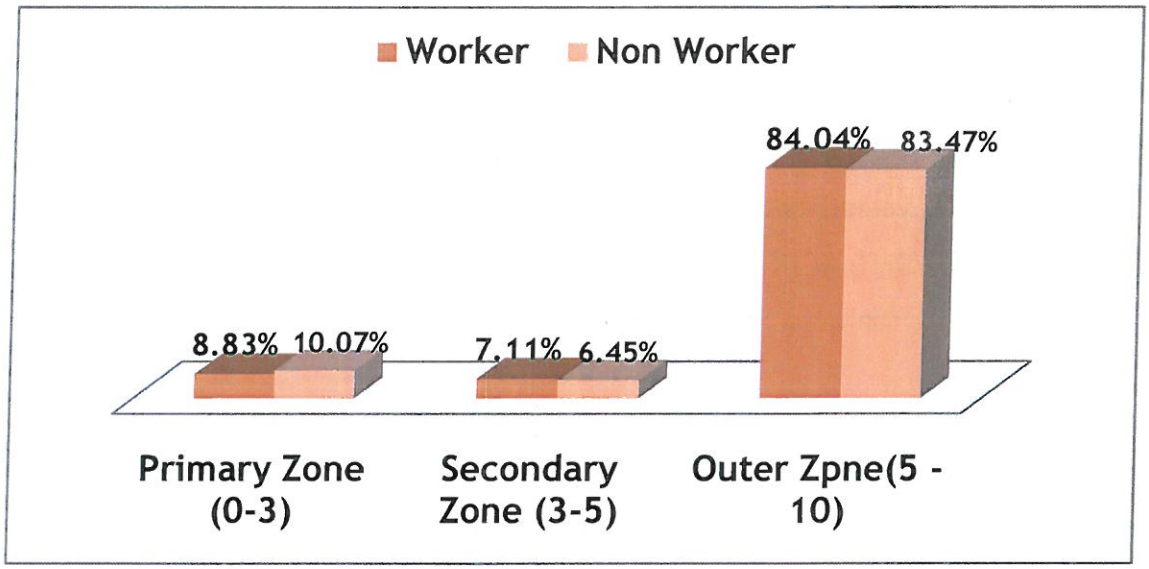


Figure 3.23 (Vulnerable Group of Study Area)

Figure no. 3.23 show that the vulnerable group (i.e. Schedule Caste & Tribes) in primary zone (0-3km) is 4.03 % out of total population, in secondary zone (3-5km) is 1.58% and in outer zone (5-10km) is 22.43%.

3.7.8 Economic Activities

The economy of an area is defined by the occupational pattern and income level of the people in the area. The occupational structure of residents in the study area is studied with reference to work category. The population is divided occupation wise into three categories, viz., main workers, marginal workers and non-workers. The workers include cultivators, agricultural labourers, those engaged in household industry and other services.

The marginal workers are those workers engaged in some work for a period of less than 280 days during the reference year. The non-workers include those engaged in unpaid household duties, students, retired persons, dependents,

beggars, vagrants etc. besides institutional inmates or all other non-workers who do not fall under the above categories.

The below Fig.No.3.24 shows that the percentage of total working population and non working population is 48.84 % and 51.15% respectively. As per the analysis all the villages have large non-working population. 51.15 % of the total population is dependent on working population.

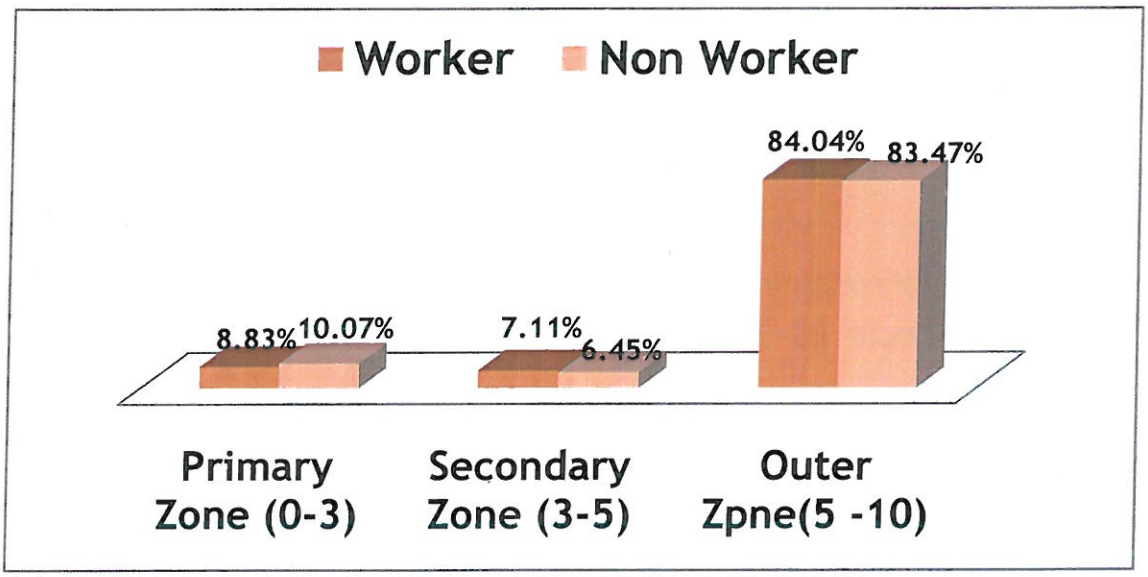


Figure 3.24: Work Force Detail in the Study Area

3.7.9 Literacy Details

Literacy Rate is the percentage of people in a country with the ability to read and write. The analysis of the literacy levels is done in the study area. The 10 km radius study area demonstrates a literacy rate of 48.14% as per Census. The male literacy rate in the study area works out to be 65.95% whereas the female literacy rate, which is an important indicator for social change, is observed to be 34.04% in the study area as per the Census. This indicates that there is a need to focus on education facilities in the region and enhance

further development. The distribution of literates and literacy rates in the villages is given in Fig.No.3.25

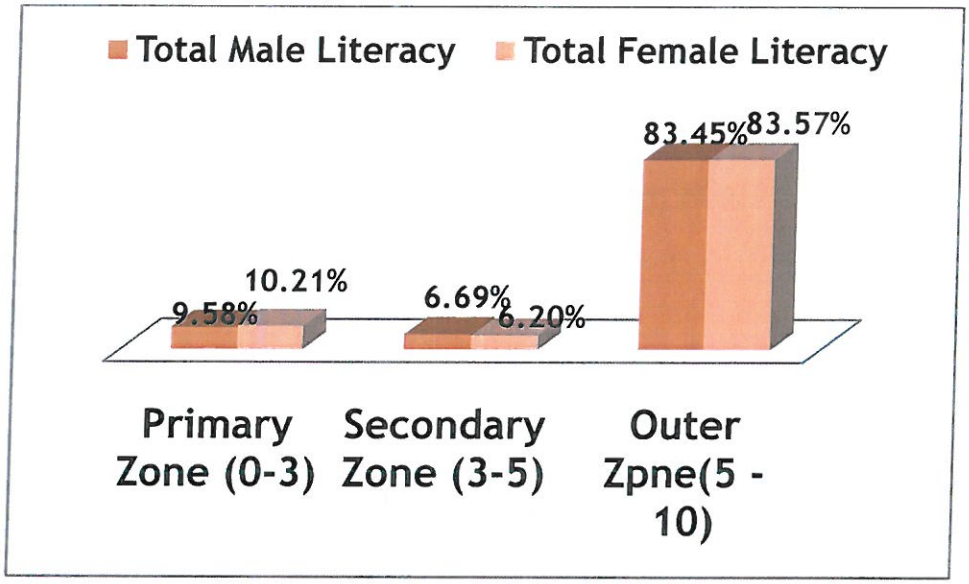


Figure3.25: Gender Wise Literacy Rate in Study Area

In the present study, the literacy rate is quiet moderate in the study area. Male and Female literacy rate of villages are varying place to place. Although Female literacy rate in the region is coming out high as compared to male.

3.7.10 Infrastructure Facilities in the Study Area

Infrastructure is basic physical and organizational structures needed for the operation of a society or enterprise, or the services and facilities necessary for an economy to function. It can be generally defined as the set of interconnected structural elements that provide framework supporting an entire structure of development. It is an important term for judging a country

or region's development. The term typically refers to the technical structures that support a society, such educational institutions, medical facilities banking facilities, telecommunications and so forth, and can be defined as "the physical components of interrelated systems providing commodities and services essential to enable, sustain, or enhance societal living conditions.

3.7.11 Drinking Water Facility

Almost all villages having water facility in the record of census 2011 Main source of water is tap water, tube well, well hand pump, rivers, and others sources are tank water transportation and communication. Transportation is good in study area. Most of the villages having communication facility in the form of post office and telephone connection. The entire region is connecting with bus facility and some villages is using navigable water way.

3.7.12 Sampling Method

A judgmental and purposive sampling method was used for choosing respondents of various sections of the society i.e. Sarpanch, adult males and females, teachers, medical practitioners, businesspersons, agriculture laborers, fishermen, unemployed group etc. Judgmental and purposive sampling method includes the right cases from the total population that helps to fulfill the purpose of research needs.

Data Collection Method

Data collection is a term used to describe a process of preparing and collecting data, for example, as part of a process improvement or similar project. The purpose of data collection is to obtain information to keep on record, to make decisions about important issues, to pass information on to others. Primarily, data are collected to provide information regarding a specific topic. Data collection usually takes place early on in an improvement project, and is often

formalized through a data collection plan which often contains the following activity.

- Pre collection activity — agree on goals, target data, definitions, methods
- Collection — data collection
- Present Findings — usually involves some form of sorting analysis and/or presentation

Main types of data collection include census, sample survey, and administrative by-product and each with their respective advantages and disadvantages. A census refers to data collection about everyone or everything in a group or population and has advantages, such as accuracy and detail and disadvantages, such as cost and time.

Types of Data

The data needed for a social science research may be broadly classified into

- Data pertaining to human beings,
- Data relating to organization,
- Data pertaining to territorial.
- Field Survey and Observations

Field survey involved the collection of primary data or information that was new. This was collected through surveys and questionnaires that are made out specifically for this purpose. Observations were conducted on nearly any subject matter and the kinds of observations were depending on survey question. Field Survey and Observations were made at each sampling village and the quality of life of that region was studied. Visits were made at hospitals, primary health centers and sub-centers to know the health status of the region. Various governmental organizations such as statistical

department, department of census operations etc. were visited to collect the population details of that region.

Interview Method

Interview is verbal questioning. Surveys were also conducted through interviews. Interviews consisted of asking questions, listening to individuals and recording their responses. At times, it was found that it was more profitable to ask questions to a few individuals instead of carrying out a large-scale questionnaire based survey. The interviews were done very informally e.g. as conversations with people met in the fields, at co-operative stores or block offices. In these meetings, one question leads to the next based on the responses given to the previous one. At the other end of the scale, highly structured interviews often rely on questionnaires or interviews held with mostly closed-ended questions that allowed the respondents only a limited range of possible answers. Structured interview method was used to collect data regarding the awareness and opinions from the sample selected of the various socio- economic sections of the community. The questionnaire mainly highlights the parameters of primary needs. The interview method has the advantage that almost all the perfect sample of the general population was to be reached and respond to the approach. Interview method helped to collect more correct and accurate information as the interviewer was present during the field survey.

Socio-economic survey was conducted in four villages of core zone and 2 villages of buffer zone, within the study area located in all directions with reference to the project site. The respondents were asked for their awareness/opinion about the project and their opinion about the impacts of the project, which is an important aspect of socio-economic environment, viz.

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job opportunities, education, health care, transportation facility and economic status.

According to survey done in the study area, the observations made are as follows:

- In the study area, the main occupation of the villagers is agriculture, labour work and small business of cutlery items etc.
- Most of the houses are in pakka form.
- Villages are well connected by tarred roads with the district place
- Farmers depend mainly on monsoon for agricultural activities.
- Communication facility is good due to better mobile network and transportation facilities.
- All villages are well electrified and use of electricity for all purposes.
- Main language in study area is Hindi, English widely spoken by the population.
- LPG is used by villagers in general, as fuel for cooking; otherwise wood, kerosene etc.

3.7.13 Awareness and Opinion

Awareness is the state or ability to perceive, to feel, or to be conscious of events, objects or sensory patterns. In this, level of consciousness, sense data can be confirmed by an observer without necessarily implying understanding. In general, an opinion is a subjective belief, and is the result of emotion or interpretation of facts. An opinion may be supported by an argument, although people may draw opposing opinions from the same set of facts. For assessing the awareness and opinion about the project activity, socio-economic survey was conducted in the sampling villages.

The salient observations drawn through survey are given below:

The engine driven vehicles were categorized into various heads viz. Trucks/Bus, Light carriage Vehicles (LCV), Car/Jeep, Multi Axle Vehicles, Two/Three Wheelers and Cycles/others.

3.8.4 Sampling Location:

Traffic study measurements were performed for mining cluster at one locations given below:

Location Code Location Details	Location Code Location Details
T-1	On SH-12 Near village Ekalsingha

No. of Vehicles Per day:

S. No.	Vehicles distribution	Number of vehicles distribution/day	Passenger car unit (PCU)	Total number of vehicle (PCU)/Day	Total number of vehicle (PCU)/hour
		SH-12		SH-12	SH-12
1.	Cars	218	1.5	327	32.7
2.	Buses	312	3.0	936	93.6
3.	Two wheelers	649	0.5	324.5	32.45
4.	Three wheelers	77	1.0	77	7.7
5.	Trucks	138	3.0	414	41.4
Total		1,394		2078.5	207.85

Existing Traffic Scenario & LOS

Road/NH/SH	V (Volume in PCU/Day)	C (Capacity in PCU/day)	Existing V/C Ratio	LOS
SH-12	2078.5	10,00,000	0.00207	C

Note: The existing level of the services are good enough for the both the highways for the transportation of the mineral.

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- The respondents from almost all the villages were aware about the project activity.
- Some of the respondents have very good opinion about the project and they opined that due to proposed project activity, quality of life of the villages will improve.
- Respondent have suggested minimizing the environmental pollution during and after project activity.

3.8 Traffic Study:

3.8.1 Traffic Density:

The traffic studies have been conducted to know the prevailing traffic volumes on the existing roads. It is essential to consider these details for assessing the anticipated future traffic volumes as a part of overall impacts assessment for the plant.

The variations of traffic densities depend upon the working days and time and also vary in day and night times. In order to assess the prevailing traffic volumes on the roads, the survey was conducted during normal working days of the week by avoiding local holidays or abnormal situations to reflect the true picture of the traffic densities. The traffic study was conducted at one location for 24 hours.

3.8.2 Methodology:

Vehicle Count: The vehicles passing through the road (in both ways) were counted separately for 24 hours at the one selected locations from 06:00 hrs to 06:00 hrs next day continuously. Category-wise vehicle counting has been done continuously and recorded in the traffic volume count on hourly basis under respective categories.

3.8.3 Categorization of Traffic:

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
Note: Capacity as per IRC: 64-1990		

Production Details of individual lease

S.No	Name of Project	Ref. No	Area in Hq.	Production Capacity in TPA (ROM)
1				1,62,960
2	M/s A.G Mines & Minerals	24/2018	1.4143	99,006.13
3	M/s Sawai Bhoj Granite	31/2018	1.3006	1,82,127
4	Shree Giriraj Granite	57/2018	1.5835	4,21,686
5	M/s Satya Suman Marble & Granite	86/2018	1.0025	1,28,294
6	Sh. Sagar Sharma	119/2018	1.0229	1,66,964
7	M/s Sh. Tirupati Granite Mines	18/2019	1.3848	60,060
8	M/s Arihant Granites	22/2019	1.4797	2,03,212
9	Sh. Jagdish Bairwa	07/2019	1.0144	52,650
10	Shivraj Gurjar	28/2018	1.0001	2,51,206
11	M/s Aditi Granite & Mineral	70/2018	1.00	2,00,000
12	M/s Basarani Granite	108/2018	1.1751	2,72,764
TOTAL			14.3802	22,00,929.13 TPA (ROM)

For the transportation of minerals one evacuation routes has been proposed, distributing the traffic load to reduce the traffic congestion. 100 percent of the traffic load will be diverted to SH-12 .

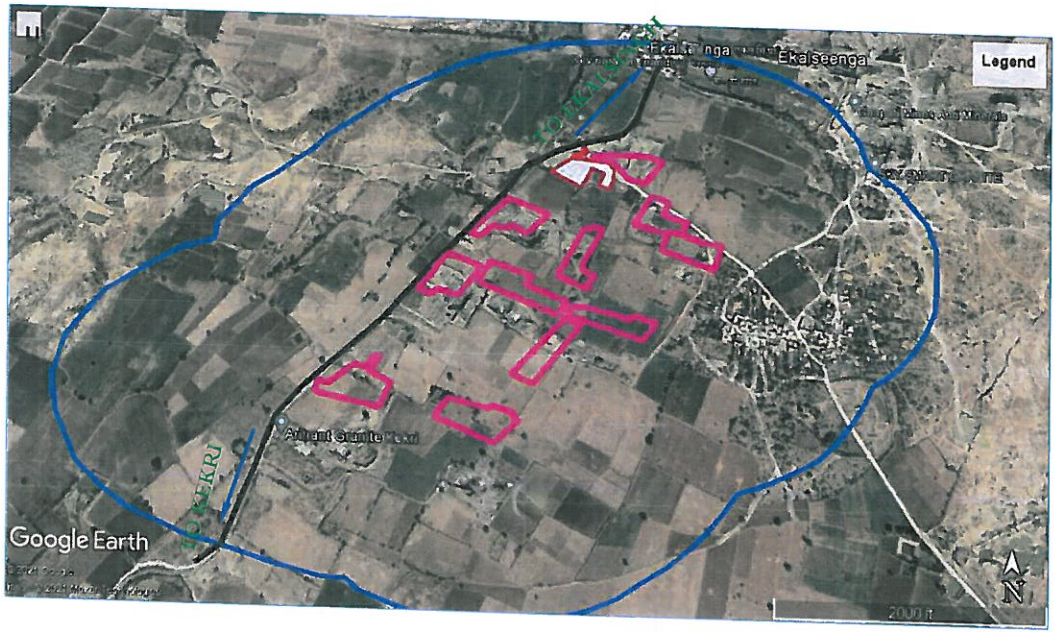
Evacuation route 1:

The lease area is connected to nearest metalled road by an un-metalled road at a distance of about 0.44 km via village Ekalsingha, which further joins with SH-12 in W Direction.

During Mine Operations in cluster:

Total Capacity of cluster	:	22,00,929.13 tonne
No. of working days	:	350
Capacity	:	20 Tonnes
No. of trucks deployed/day	:	61
Frequency of trucks (to and from)	:	61x2 = 122
Increase in PCU/day	:	244

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LEGEND

APPROACH ROAD

TAR ROAD

EXESTING MINE

APPLIED MINE

ROUTE MAP

CLUSTERNo–49 " EKAL SINGH" GRANITE MINE

APPLICANT–SH. DEVRAJ GURJAR

APPILED AREA – 1.0023 HECT

NEAR VILLAGE–EKAL SINGH

TEHSIL–KEKRI,DISTRICT– AJMER (RAJ)

TOTAL CLUSTER AREA –14.3802 HECT.

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CHAPTER NO-IV

ANTICIPATED ENVIRONMENT IMPACTS & MITIGATION MEASURES

4.0 IMPACT ASSESSMENT METHOD

In the present Study, the open cast mining method has been used. This method is best suited to cluster area of Cluster No. 49 "Ekalsingha" Granite Mine assessments, and is not recommended for large regional actions. The mining and allied activities as existing & proposed in the Cluster Area. Which influence the environmental attributes include.

1. Excavation of Mineral
2. Construction of approach and haulage road.
3. Drilling & Blasting
4. Loading & Transportation of mineral & Waste.
5. Processing & Sizing of Mineral
6. Disposal of Overburden/Waste etc.
7. Stockpiling of low-grade mineral.
8. Site Preparation.

Opencast mining activity may cause some impacts on the surrounding environment unless proper mitigation measures are adopted. Selecting suitable sites for mining and also adopting all the guidelines prescribed by the ministry of environment and forest with proper environment management plan can minimize the major impacts. In this chapter, an attempt has been made to quantify the possible environmental impacts and recommend mitigation measures improve the environment and reduce the impacts to acceptable level.

Any human activity in any environment produces impact or modifying it to a status which is considered adverse or beneficial according to the damage or improvement it brings about in physical, chemical and

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biological status of air, water, land including bio-diversity, socio-cultural life styles and economy of the populace it affects. Depending on the nature of activities and existing status, the impacts are assessed for their importance. On the basis of the impact analysis, the mitigating action and future monitoring requirement are focused in the Environmental Management Plan for counting or minimizing adverse impacts.

The parameters, which are relevant in the context, are given below:

- Land use
- Air quality
- Water resources
- Water quality
- Noise levels and ground vibration
- Ecological factors
- Socio-economic conditions

Generally, the environmental impacts can be categorized as either primary or secondary. Primary impacts are those which can be attributed directly to the project. Secondary impacts are indirect or induced and typically include the associated investments and change patterns of social and economic by the proposed actions.

Mining Phase	Activity	Potential Environment Impact
Mine Development Sourcing & Stockpiling	Mining Activity, Land Cleaning, Excavation, and Construction of internal road and site services.	Habitat loss and disturbance of habitation of flora & Fauna. Reduction of biodiversity of the locality. Altered landforms due to construction. Altered drainage and runoff flows increased erosion of site area.
Removal & Storage of Mineral & Waste Mineral	Stripping/Sorting of soil overburden. Waste rock stock piling, extracted mineral piling.	Land alienation from waste rock stock piles. Disturbance from vehicles and machinery noise and site illumination.
Blasting & Mining	Blasting of rock for extraction collection and sizing of Mineral	Ground Surface disturbance. Disturbance due to Noise & Vibration. Dust & Fumes from explosion, mine vehicles and transport system.
Transport the mineral from Cluster to Gang Saw Unit	Loading & Unloading of mineral for Transportation from Cluster to Gang Saw Unit.	Disturbance due to noise, vibration & site illumination. Dust & Fumes from exposed product & Stockpiles.
Mine Closure and Post Operational Waste	Decommissioning of roads, Plantation on backfilled area, Water Quality treatment	Noise & Dust during Backfilling. Continuous discharge of Contaminants to ground and Surface water via seepage.

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Type of Impact

Table No-4.1 Types & Causes of Environment Impact	
Types of Impacts	Impact Cause
Impacts on land and soil	By overburden, mining, top soil generation and solid waste generation.
Impacts on air quality	Generation of Particulate matters from various Sources
Impacts on surface water, ground water and hydrogeology	Run-off from OB dump; wash off of eroded material of soil, leaching of oil /grease, waste water generated due to sanitation purpose and other purposes.
Impact on noise level	Operation of Heavy Earth Moving Machines (HEMM), blasting and drilling
Impact on ecology (flora and fauna)	Loss of forest land, loss of surface vegetation
Impact on socio-economic environment (population and settlement)	Land use pattern change, Economic growth, Environment quality degradation.

TABLE 4.2: IMPACT IDENTIFICATION MATRIX

Aspects / Impacted Attributes	Siting	Mining, Storage and Handling and allied activity										Post Operation		
	Site Clearance	Open Cast-Operation	Back filling of mine	Mineral Transportation	mineral storage/ staking	Water drawl boring	Water Discharge	Maintenance Workshop	Underground Operation	Greenbelt Development	Employment	Urbanization (Buffer)	Transportation	Industrialization
Ambient air	•	•	•	•	•			•		*		•	•	•
Water Resource		•				•						•		•
Water Quality		•			•							•		•
Ambient Noise		•	•	•								•	•	•
Flora and Fauna	•	•	*							*		•		•
Soil and Land use	•	•	*		•				•	*		•	•	•
Infrastructure	•	•		*								*	*	*
Health and Safety		•			•					*				•
Socio-economic	•	•								*	*	*	*	•

CLUSTER No.49 "EKALSINGHA" GRANITE MINE

M/s N.S.ENVIROTCH LAB. & CONSULTANT

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4.1 Land Environment

4.1.1 Impact on Topography

In the Cluster No. 49 "Ekalsingha" Granite Mine the impact on topography is in the form changed landscape due to the mining activities in the form of digging, leveling of land & Dumping of waste etc. there will be topographical change due to mining activity within the area of Cluster area is located within the revenue jurisdiction of Ekalsingha, Tehsil- Kekri, Dist-Ajmer. The targeted area represents a slightly hilly land with highest altitude 335 mRL & the lowest altitude is 328 mRL. Impact on topography can be categorized as follow:-

Land Degradation:

The magnitude and significance of impact on environment due to mining varies from mineral to mineral and also on the potential of the surrounding environment to absorb the adverse effects.

The total area of cluster is 14.3802 hectare. The pre operational, operational, post operational land use of the area is presented in tabular form in section 4.6 of this chapter.

(A) Impact due to Development of Mines & Excavation of Mineral:-

Ultimate extent of the Cluster has been confined to the area of 14.3802 Hectare in Cluster area. As discussed, based upon the total resources of the cluster has been estimated as the probable resource over the mineralized area of the flat land has been mined out during conceptual Period.

(B) Other Impacts:-

The land use pattern undergoes a change due to the use of the land for mining, dumping & other mining and associated activities. The drainage pattern of the surface undergoes a change due to the alterations in the surface topography due to existing mining & proposed activities.

4.1.2 Mitigation Measure for Land Degradation

The excavated area of Cluster No. 49 "Ekalsingha" Granite Mine has been utilized as water reservoir & Backfilled. There will be construction of retaining wall along the Cluster area Boundary and Plantation will be carried out along the lease boundary at safety Barrier zone & backfilled area at the end of life of mine.

- **Mitigation Measures:**

1. The dump slope will be provided with retaining wall and garland Drains to arrest the wash off from the dumps at the Cluster area.
2. Garland drains will be connected to settling tank and settled water will be transferred to the water reservoir and used for green belt development and dust suppression in the Cluster area.
3. As there is no natural drain passing through the project area there will be no diversion of the drainage pattern of the cluster area.

Table 4.3: POST MINING LAND USE PATTERN OF CLUSTER AREA, DETAILS OF POST MINING LAND USE OF PROPOSED 1-L.O.I HOLDERS

S.No	All the area are given in hectare	Sh. Devraj Gurjar S/O Sh. Gopi Lal Gurjar		
		Present land use	During five year plan period	At the end of life of mine
1	Water Reservoir	--	0.13303	0.13303 (water reservoir)
2.	Top Soil Dump	--	0.0140	--
3.	OB Dump	--	--	--
4.	Mineral Storage	--	--	
3.	Backfilled area	--	--	--
4.	Stack Yard	--	--	--
5.	Sub Grade stack yard	--	--	--
6.	Infrastructure	--	--	--
7.	Road	--	--	--
8.	Railway	--	--	--
9.	Green Belt area	--	0.0503	0.0683
10.	Non Utilized	1.0023	0.80497	0.80097
Total		1.0023	1.0023	1.0023

Table 4.4: POST MINING LAND USE PATTERN OF AREA DETAILS OF POST MINING LAND USE OF EXISTING 11-LEASE HOLDERS

S. No	All the area are given in hectare	M/s A.G Mines & Minerals	M/s Swai Bhoj Granites	M/s Sh. Giriraj Granite	M/s Satya Suman Marble & Granite	Sh. Sagar Sharma	M/s Sh. Tirupati Granites	M/s Arihant Granites	Sh. Jagdish Bairwa	Sh. Shivraj Gurjar	M/s Aditi Granites & Minerals	M/s Basarani Granite
1	Water Reservoir	0.7225	0.9083	1.06	0.7636	0.7030	0.9120	0.9612	0.7885	0.7636	0.7694	0.9354
2.	Top Soil Dump	--	--	--	--	--	--	--	--	--	--	--
3.	Backfilled area	--	--	--	--	--	--	--	--	--	--	--
4.	Stack Yard	--	--	--	--	--	--	--	--	--	--	--
5.	Sub Grade stack yard	--	--	--	--	--	--	--	--	--	--	--
6.	Infrastructure	--	--	--	--	--	--	--	--	--	--	--
7.	Road	--	--	--	--	--	--	--	--	--	--	--
8.	Railway	--	--	--	--	--	--	--	--	--	--	--
9.	Green Belt area	0.6918	0.3923	0.5235	0.33	0.3199	0.300	0.488	0.33	0.33	0.33	0.39
10.	Non Utilized	--	--	--	0.0911	--	0.1728	0.0305	0.1041	0.0935	--	--
Total		1.4143	1.3006	1.5835	1.0025	1.0229	1.3848	1.4797	1.0144	1.0001	1.00	1.1751

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TABLE NO-4.5

DETAILS OF LAND USE OF CLUSTER No. 49 "EKALSINGHA" GRANITE MINE, TOTAL CLUSTER AREA- 14.3802 HECTARE

S. No.	Description	Land Use (In Ha.)					
		Plantation	Water Body	Pvt. Land	Crushing	Undisturbed	Total
1	Water Reservoir	--	9.42053	--	--	--	9.42053
2	Top Soil Dump			--			--
3	Backfilled area			--			--
4	Road	--	--	--	--	--	--
5	Sub Grade Stack Yard	--		--	--	--	--
6	Infrastructure (Work Shop, administrative Building)	--	--	--	--	--	--
7	Roads	--	--	--	--		--
8	Railway	--	--	--	--	--	--
9	Green Belt	4.74	--	--	--	--	4.74
10	Tailing Pond	--	--	--	--	--	--
11	Effluent Treatment Plant	--	--	--	--	--	--
12	Mineral Separation Plant	--	--	--	--	--	--
13	Township	--	--	--	--	--	--
14	Non Utilized	--	--	--	--		0.21967
	Total	4.74	9.42053	--	--		14.3802

*About 9.42053 hectare area will be used as water reservoir.
**About 4.74 hectare area will be planted along the lease boundary & outside the lease area.

4.1.3 Impact on Land Environment & Land Use:-

Mining Operations involves in the Cluster area is development of benches, approach road, haul road, drilling, Blasting, excavation of mineral & transport

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and handling of mineral & waste mineral. These activities have significant impact on the land use pattern of the Cluster area. The land use pattern of the buffer zone will be changed due to Cluster mining activities. The mining Cluster area is under Khatedari Land category and this will changed to mine reclaimed land & water reservoir during the conceptual period of Cluster area. The surrounding area of the Cluster will be agriculture land & waste land. The impact from Cluster mining on the surrounding agriculture area will not envisaged.

- Change of land use due to cluster mining, dumping of waste.
- Drainage from the waste dump and contaminated water from the mines that may affect the characteristic of top soil affecting the land use.
- Degradation of vegetation in the Cluster area due to existing leases, dumping and transportation.
- Buffer zone will not be affected as the mining operations are confined only to the Cluster area.
- The tentative area of the Cluster to be put to use at the end of plan as well as conceptual period will be 9.42053 Hectare.

4.1.4 Mitigation Measures:-

The existing mines excavate area will be converted to water reservoir and retaining wall will be constructed along the lease boundary and plantation will be done along the Cluster area boundary at Safety Barrier Zone & backfilled area at the end of life of mine. Waste dumping for the lease cluster will be temporary in nature and will be utilized for maintenance of haul road & backfilling in the Cluster area. Approximately 4740 Plants will be planted by Cluster association lease holders.

At the end of conceptual plan period, considering the present status of exploration over the Cluster area, the further life of mine cannot be ascertained. At the end of life of Cluster period, no waste dump will be there

over the Cluster area. The waste will be used in backfilling process and after the end of life of cluster plantation will be carried out at the Backfilled area. Water sprinkling will be done on haul road by individual lessee of the Cluster at around potential dusting area.

4.2 Impact on Solid Waste Generation:

The Cluster lease area is partly covered with soil mixed rock boulders/pebbles followed by Granite gneiss. The soil to be generated will be stacked in the earmarked temporary soil stack and will be utilized for the Plantation purpose to be undertaken around the respective land and adjacent to haul road of the same in Cluster. Moreover, as envisaged, waste to the tune of about 70% of excavation will be generated during mining which will be utilized by the respective lessee for making of mine road and allied infrastructures. It is proposed to store this top-Soil in the earmarked site and will be utilized for nearby avenue plantation purpose after separated out from the mixed rock boulders and pebbles.

Initially the waste will be dumped in the Cluster mine lease area as shown in the plate of individual lease holder of the entire Cluster and ultimately it is Proposed to shift existing as well as existing over burden at dumps at the inside of individual mine lease area.

The height of dump will be kept up to 21 m. Total reject after considering the above ultimate pit limit, average minerals yield & overburden excavation is anticipated for each mine in a cluster are as 2518096.3 MTPA of cluster area. Mine waste shall be excavated up to the end of conceptual Mining plan Period. It will be disposed in the form of temporary external dump. One retaining wall will be constructed for stacking of waste.

4.2.1 Mitigation Measures:

- It is Proposed Cluster No. 49 "Ekalsingha" Granite Mine the top-Soil in the earmarked site & will be utilized for plantation purpose after separated out from the mixed rock boulders & Pebbles.
- There is no any Hazardous/solid waste will be generated due to Cluster Mining Activity. Only mine waste of mineral granite will be generated due to Cluster mining. The mine waste will be used in Backfilling purpose and haul road maintenance at the end of life of mine.
- Dump slop will be provided with retaining wall and garland drain to prevent the wash.
- Dump slop will be maintained at 45° with the horizontal to make the dump stable.
- There will be no waste dump exists within the lease area during the conceptual period.

4.3 Impact on Soil

The fertility status of the soil near by the cluster area may affect due to extra dust deposition on the soil. The dust will be settled on the top soil resulting in decrease in the fertility of the soil as well as decrease in crop production. Increase in purchasing power of the community members through higher incomes from the mining, compound by population increase and low agriculture productivity as a result of the project will lead to inflation in the cost of goods and services, much to the detriment of the local population especially the poor and vulnerable.

4.3.1 Mitigation Measures

- Garland Drain and retaining wall will be constructed in the slope of the dump and mineral stack, so the surface runoff from the dump will be passed through the garland drain and settled in a settling pit before discharging outside. This decreases the soil erosion or deposition of the contaminants on the agriculture land.

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- The labours in the mines are from the nearby areas so there will be no residential colony development within the Cluster area. This result in very small generation of domestic solid waste. However the domestic solid waste will be treated through septic tank via soak pit.
- The Top Soil generated during the mining activity will be used for plantation.

4.4 Impact on Water Quality

4.4.1 Impact on Surface Water Quality

During rain water will precipitate within the mine and in the vicinity. For that garland during rains all along the existing leases surface edge keeping a barrier from the mine surface will be constructed to arrest incoming water to the mine. Water flows in its normal course. There will be no hindrance or sudden rush of water due to mining activities, which may lead to erosion of water course.

At the 'Conceptual Stage' as area of a part of the Cluster area will be converted into water reservoir which will serve as recharge pits.

4.4.2 Impact on Ground Water Quality

The water table in this region is at depth of 80-100 m below the general ground level. Mining will be carried out above the ground water table. No chemical having toxic elements will be used for carrying out cluster mining activity. Also neither granite nor overburden contains any kind of toxic elements which can contaminate the water. Rain water expected to be accumulated in the pit will be pumped out and will be discharged into storm drains provided for the purpose which will join the natural surface water drains existing in the area. It is observed from the dug wells of the adjacent plain area in the nearby village Ekalsingha that the ground water table varies between 80-100 m from the surface level. During the Existing and proposed plan period of Cluster No. 49 "Ekalsingha" Granite Mine, particular pit will be followed for all the excavation in the flat land of the Cluster area.

Therefore the end of plan period the depth of the respective excavation of the Cluster area is not possible to predict.

4.4.3 Proposed Mitigation Measures

Adequate control measures will be adopted to check not only the wash-off from soil erosion but also uncontrolled flow of mine water. The measures to be adopted are:-

- The ground water table thus shall not be encountered nor shall groundwater regime be affected. Further as per secondary data on hydrogeology, these areas are underlain by semi consolidated and consolidated hard rock's.
- Garland drains will be constructed on all side of cluster mines and external dumps. All the garland drains will be routed through settling pits to remove suspended solids from flowing into storm water. The water collected in the pit, after settling of the suspensions, shall be used for plantation.
- Individual Retaining walls with weep holes will be constructed by cluster lessee for stop the discharging of waste dump during rainy season. The storm water should pass through weep holes to the garland drains as detailed out in mining plan.
- A temporary toilet with septic tank shall be provided at the site for the use of workers during day time to prevent toilet in open.

4.5 Impact on Air Quality

4.5.1 Impact during Construction Phase

There will be no impacts on ambient air quality as no construction stage is involved in this project.

Emission Characteristics for Mining Operations

Dust emission rate from the Mining area, based on the following empirical formula.

a) Dust emission due to excavation:

$$\text{Dust émissions (DE)} = \frac{\text{Pa x 23.6}}{\text{Wd x Wh x 1000}}$$

DE	=	Dust emission in kg/hr
Pa	=	Annual Excavation in Tonnes
Wd	=	No. of days of operation in a year
Wh	=	Effective working hrs in a day

4.5.1.1 Meteorological Data

On site hourly meteorological data for Summer Monsoon (March 2021 to May 2021) in respect of wind speed, wind direction, temperature and cloud amount are utilized in this study. The data was put in model format. The mixing heights have been extracted from CPCB publications.

4.5.1.2 Modeling Procedure

4.5.1.3 Methodology:

Prediction of ground level concentrations (glc's) due to mining have been made by **Industrial Source Complex, Short Term (ISCST3)** as per CPCB guidelines. ISCST3 is US-EPA approved model to predict the air quality. The model uses rural dispersion and regulatory defaults options as per guidelines on air quality models (PROBES/70/1997-1998). The model assumes receptors on undulating and hilly. This model is capable of handling point, area, and line sources simultaneously.

Meteorological inputs required are hourly wind speed and direction ambient temperature, stability class, mixing height and wind exponents. The model details follow.

4.5.1.4 Ambient Air Quality Standards and Background Concentrations

Ambient Air Quality Standards

Ambient air quality standards promulgated by Central Pollution Control Board (CPCB) for all type of land uses for the relevant air quality parameters are as follows:

Concentration ($\mu g/m^3$)		
PM10	SO_2	NO_x
100	80	80

The above standards are for a sampling period of 24 hours.

4.5.1.5 Background Concentration Levels

The background measured concentrations at various ambient air quality monitoring stations are as given below:

Table 4-6: Ambient Air Quality Monitoring Stations of Study area

Sr. No.	Station Code	Location	Parameter and Results				
			PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO
			µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
1.	AAQM 1	Near Mine Site					
		Minimum	64.1	38.7	7.3	14.2	0.043
		Maximum	74.3	48.3	11.3	19.7	0.064
2.	AAQM 2	500 Mtr Radius of Mine site					
		Minimum	60.4	39.1	6.2	15.8	0.027
		Maximum	75.9	44.8	10.7	21.5	0.052
3.	AAQM 3	Ekalsingha Village					
		Minimum	50.8	35.7	8.3	13.9	0.089
		Maximum	68.3	44.8	12.8	20.1	0.098
4.	AAQM 4	Kekri Village					
		Minimum	55.3	40.4	7.6	16.5	0.058
		Maximum	67.5	48	12.0	20.6	0.074
5.	AAQM 5	Rampura Village					
		Minimum	62.3	40.5	8.5	16.5	0.092
		Maximum	76.5	49.2	13.1	25.9	0.124
6.	AAQM 6	Hingonia Village					
		Minimum	63.6	37.2	8.5	15.1	0.052
		Maximum	70.4	46.5	12.5	22.3	0.072
7.	AAQM 7			Amli Village			
		Minimum	45.5	35.6	5.6	13.5	0.066

Sr. No.	Station Code	Location	Parameter and Results				
			PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO
			$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$
		Maximum	58.7	46.1	7.9	20.6	0.089
		Nayaki Village					
8.	AAQM 8	Minimum	52.6	39.6	6.7	17.7	0.075
		Maximum	65.4	47.2	11.2	21.3	0.095
		Keronj Village					
9.	AAQM 9	Minimum	63.38	38.67	5.35	10.67	0.046
		Maximum	89.49	59.49	8.76	15.97	0.055
		Junia Village					
10.	AAQM 10	Minimum	52.45	24.56	8.2	10.34	0.35
		Maximum	71.53	39.42	12.21	15.95	1.75

4.5.2 AIR ENVIRONMENT MANAGEMENT

The significant sources of air emissions are attributed due to various mining activities and vehicular load contributed by all the mines in the area. Cumulative modeling taking in account all the mines in the cluster with maximum production of each individual mine has been undertaken to reveal the worst scenario. The parameters considered are PM10, PM2.5, NOx and CO.

4.5.2.1 MODELING INPUT DATA OF CLUSTER AREA

The major sources of air pollution in the cluster area are dust generation due to excavation, loading and transportation of mineral. United States Environmental Protection Agency (USEPA – 42 series) approved mathematical equations have been used to predict concentrations for different operations in mining including the mineral transportation

4.5.2.2 CUMULATIVE AIR QUALITY IMPACT PREDICTIONS

In order to predict the particulate and gaseous emissions, AERMOD View Version 7.1.0 was used to predict changes in air quality i.e., maximum ground level concentration (GLC's) of PM10, PM2.5, NOx and CO due to the proposed mining activities. The inputs required for the model are:-

- Hourly Micro - Meteorological data (Wind Sped, Direction, Temperature, Monitoring Period, Location, Cloud Cover, Mixing Height etc.).
- Source data (Area and Line Source)
- Receptor data (1681 nos.)
- Programme Control Parameters (Topography, Elevation, Terrain etc.).

The GLC's were predicted for the scenario, with and without EMP in the mine.

4.5.2.3 RESULTS AND CONCLUSIONS

The ground level concentrations are computed for 24-hr average. The maximum ground level concentrations of PM10, PM2.5, NOx and CO from the different mining activities for study period with EMP (75% control for mining activity and 40% for haul roads) and without EMP are given in table 4.2.1. The maximum GLC's for PM10 & PM2.5 were falling at co-ordinates (-500, 0) for the given meteorological and topographical conditions.

The combined impact on ambient air quality at different locations within the study area due to the proposed mining based on the model output for both with without EMP w.r.t PM10, PM2.5, NOx and CO for the study period is given in Table 4.9.

Table 4.9: CUMULATIVE IMPACT DUE TO CLUSTER WITHOUT EMP IN THE STUDY AREA

MAXIMUM 24-HR AVERAGE PM10 CONCENTRATION, µg/m³				
Receptors Locations	Baseline	Predicted Increment	Total	NAAQ Standards
Receptor 1 (Site)	74.3	4.18	78.48	100
Receptor 2 (500 M Radius)	75.9	1.32211	77.22	100
Receptor 3 (Ekalsingha)	68.3	2.2344	70.53	100
Receptor 4 (Kekri)	67.5	0.1300	67.63	100
Receptor 5 (Rampura)	76.5	0.17280	76.67	100
Receptor 6 (Hingonia)	70.4	0.17500	70.57	100
Receptor7 (Amli)	58.7	0.10250	58.80	100
Receptor8 (Nayaki)	65.4	0.41660	65.81	100
Receptor9 (Keronj)	89.49	0.61890	90.10	100
Receptor10 (Junia)	71.53	0.40761	71.93	100
MAXIMUM 24-HR AVERAGE PM2.5 CONCENTRATION, µg/m³				
Receptors Locations	Baseline	Predicted Increment	Total	NAAQ Standards
Receptor 1 (Site)	48.3	2.00	50.3	60
Receptor 2 (500 M Radius)	44.8	0.98330	45.78	60

Receptor 3 (Ekalsingha)	44.8	1.75453	46.55	60
Receptor 4 (Kekri)	48	0.10105	48.10	60
Receptor 5 (Rampura)	49.2	0.12340	49.23	60
Receptor 6 (Hingonia)	46.5	0.12213	46.62	60
Receptor7 (Amli)	46.1	0.06534	46.16	60
Receptor8 (Nayaki)	47.2	0.31214	47.51	60
Receptor9 (Keronj)	59.49	0.48677	59.97	60
Receptor10 (Junia)	39.42	0.30120	39.72	60

MAXIMUM 24-HR AVERAGE PM NO_x CONCENTRATION, $\mu g/m^3$

Receptors Locations	Baseline	Predicted Increment	Total	NAAQ Standards
Receptor 1 (Site)	19.7	2.15	21.85	80
Receptor 2 (500 M Radius)	21.5	0.70650	22.20	80
Receptor 3 (Ekalsingha)	20.1	1.25546	21.35	80
Receptor 4 (Kekri)	20.6	0.07150	20.67	80
Receptor 5 (Rampura)	25.9	0.08781	25.98	80
Receptor 6 (Hingonia)	22.3	0.08305	22.38	80
Receptor7 (Amli)	20.6	0.04567	20.64	80
Receptor8 (Nayaki)	21.3	0.22678	21.52	80
Receptor9 (Keronj)	15.97	0.35783	16.32	80

Receptor10 (Junia)	15.95	0.32689	16.27	80

It is observed from the above table, the cumulative GLC's for PM10 and PM2.5 are well within NAAQMS for mining operations with and without EMP. However, EMP measures should be strictly adhered to maintain incompliance with standards.

4.5.3 Impact during Operation Phase

It is a Cluster No.49 "Ekalsingha" Granite Mine The major impact on ambient air quality in due to opencast mining method in this cluster are as below-

- Dust generation due to Drilling and blasting carried out from lease holders in the Cluster area.
- Dust generation Due to dumping the waste on dump site in the cluster area.
- Dust generation due to loading and unloading of mineral in trucks and tippers at the Cluster area in cluster area.
- Dust generation due to the movement of trucks and tippers due to transportation at haul road and surrounding area in cluster area.
- Emission generation due to the running of machinery at the Cluster area in cluster area. (like- crane, J.C.B, D.G sets and other diesel operated machinery)
- Emission generation due to movement of transportation in the Cluster area.

As the dust generation from mine haul road is the major contributor towards deterioration of air quality, Air Quality Modeling for PM10 emission from haul road is carried out using ISCST3 to assess the severity of impact.

PLAN AND FRAME WORK OF COMPUTATIONS
SELECTION OF LOCATIONS

The locations have been selected around the mining area covering an area of 10 km radius from the centre of mining. The entire area has been put on grid network and grid spacing has been taken as 500 m.

PLAN OF COMPUTATION

The emission rate, dispersion coefficients and other input data being now available; it was planned to compute the following:

The 24 hourly averaged incremental concentration with hourly data. The identification of grid point having peak concentration for the incremental values. Preparation of isopleths for various pollutants.

4.5.4 Mitigation Measures

- Planning transportation routes of mined material so as to reach the nearest paved roads by shortest route. (minimize transportation over unpaved road);
- Dust mask shall be provided to the workers engaged at dust generation points like excavations and loading points;
- Regular water sprinkling on unpaved roads to avoid dust generation during transportation;
- Transportation of material shall be carried out during day time only;
- The speed of trucks plying on the haul road should limited to avoid generation of dust;
- Haul road shall be covered with gravels; and

- Covering of material during transportation on trucks to prevent spillage of sand from the trucks. The trucks shall be covered by tarpaulin. Overloading shall be avoided.

4.6 Impact of Noise/ Vibration

4.6.1 Impact of Noise

The area in general represents calm surroundings. There is no habitation around and the nearest village is about 1.0 Km away. Mostly the source of noise pollution in the cluster area is

- Due to running of mining machinery.
- Due to the loading and unloading of mineral.
- Due to the waste of dump at dumping site.
- Due to drilling and blasting of mineral and waste rocks for excavate of mineral.
- Due to running of vehicles on the Cluster area and haul roads.

4.6.2 Mitigating Measures for Noise:

The mitigation of noise pollution in the cluster has been taken is below-

- A green belt development by individual lessee of proposed and existing Cluster area at both side of haul roads and safety barrier zone and backfilled area.
- All the machinery is running only day time and properly time to time grassing and oiling will be done in machinery.
- Drilling and blasting will be done in the frame work period and blasting has been done in day time only.
- A noise monitoring has been done time to time by individual lessee.
- Wet drilling will be used.
- The waste will be dump from low height at the dump site.
- Vehicles movements will be restricted in night time.
- Ear plugs has been provided to labours
- By carefully designing a blast hole using experience and deciding drilling pattern or blast geometry with appropriate burden distance,

spacing as holes, hole size, hole depth, and stemming height, and powder factor.

- In order to reduce the effect of noise pollution, ear plugs /earmuffs shall be provided to workers.

Ambient and Source Noise level Monitoring will be conducted on regular basis to assess the quality of ambient air w.r.t noise as per the proposed monitoring plan.

The following control measures are been adopted to keep the ambient noise levels well below the limits at the mine boundary:

- Plantation shall be carried out at safety barrier zone & backfilled area at the end of life of mine. The greenbelt minimizes propagation of noise pollution.
- Proper maintenance of vehicles shall be done.
- Mine operations shall be limited to day time i.e 9.0 AM to 6.0 PM
- Power Horns shall not be allowed in trucks. Drivers shall be further instructed not to use music systems at high volumes.
- The compressor used for drilling holes shall be provided with proper enclosures.
- The blasting is of low impact type with a maximum impact area of 500 m
- The excavator use will be for limited hours with breaks at regular intervals. The driver is provided with ear plugs. The excavator will be regularly serviced.
- By carefully designing a blast hole using experience and deciding drilling pattern or blast geometry with appropriate burden distance, spacing as holes, hole size, hole depth, and stemming height, and powder factor.
- In order to reduce the effect of noise pollution, ear plugs /earmuffs shall be provided to workers

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- Ambient and Source Noise level Monitoring will be conducted on regular basis to assess the quality of ambient air w.r.t noise as per the proposed monitoring plan.

4.6.3 Ground Vibration

Ground Vibration is generated by travelling of shock wave into the rock mass and attenuates very quickly. There are four parameters used to define the ground vibration namely.

Particle displacement- The distance that a particle moves before returning to its original positions (mm)

Particle Velocity- the rate at which particle velocity changes (mm/s) or acceleration due to the earth's gravity.

Particle Acceleration- the rate at which particle velocity changes (mm/s) or acceleration due to the earth gravity.

Frequency- The number of oscillation per second of a particle, Hertz (Hz)

However, in all standards the most measured parameters is peak Particle velocity (V_{max}) vibrations and air over pressure are moistened in tribal blasts to generated sufficient statistical data that could not be used for ascertaining site constants. The site characterization or attenuation relation is obtained by regression analysis of scaled distance (distance of blast from monitoring site divided by the square root maximum charge per delay) and peak particle velocity. In the manner a predictor equation is obtained which can be used for fixing of maximum charge per delay, to same degree of reliability according to existing regulations.

$V_{max} = K (D/Q^{-1/2})$

Where
V_{max} = peak Particle Velocity
K&a= site constants

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D= Distance of the structure from the Blast
Q= Maximum Charge Per Day
After the regression analysis of the blast hole records, values for field constants K & as were derived from the following empirical equation.

Table 4.10: Permissible Exposure in case of Noise

Sound Level (dB A)	Continuous Duration (Hours)
Table 85	8
88	4
91	2
94	1
97	0.5
100	0.25

4.7 Impact on Biological Environment

4.7.1 Impact on Wildlife

No Forest Land is situated within Study Area. Mining will not cause a problem to the existing wildlife.

It is also observed that the faunal species found in the study area are common species. No rare, endemic & endangered species are reported in the core / buffer zone. However, during mining activities, the mine management will practice scientific method of mining with proper Environmental Management Plan including pollution control measures especially for air and noise, which will not cause any adverse impact on the surrounding wildlife.

Besides, Plantation & Green belt development will be undertaken to improve the floral cover of the area which will eventually attract micro fauna, birds etc. in the area thereby help in development of wildlife. For that, assistance will be taken from local forest department in selection of species of plants so that green coverage could improve very fast. The varieties that will be planted would include those plants, which are suitable to the area.

4.7.2 Mitigation Measures for Flora

Green Belt Development of cluster area

The sapling for plantation will be selected on basis of water availability of water & according to climatic condition and hence it is proposed to plant 4740 saplings in five year. The plantation will be done on along the lease boundary at safety barrier zone & Backfilled area at the end of life of mine some plantation will be carried out at backfilled area. Year- wise program of green belt development during five years plan period.

Post plantation cares including provision for watering, soil mulching manure supply to plants will be done. Details are given in chapter-IX.

4.8 Mitigation Measures for Fauna

Following measures will be adopted to minimize the impact of mining on faunal environment of the area.

- Measures will be taken to curb pollution in air, water, land & noise environment.
- Greenery development around mine area will help in creating habitats for local faunal species and to create better environment for various fauna.
- Creating and developing awareness for nature and wildlife in the adjoining villages.

4.9 Socio economic Environment

The mining activities in the Cluster No. 49 "Ekalsingha" Granite Mine will definitely help in the improvement of socio-economic status of the people around the mine area by generating direct or indirect employment opportunities. The project will also attract ancillary and related small scale industries in the adjoining areas.

Continued mining activities will benefit the local people due to provision of more infrastructural facilities provided by local industry as mining industry will boost up the local market.

Since, the extraction of the reserves of this mineral is economically viable, their proper utilization will improve the economic status of the people nearby and the country as a whole.

The social welfare activities will be handled by a full time team of village development officials, who will monitor the programme and give necessary back-up support. The programs will be made broad based by involvement of local groups and government agencies to the maximum extent possible.

4.9.1 Measure to Improve Socio Economic Status

With mining activities, local people will have a lot of direct and indirect employment avenues opened up. There will be direct employment opportunities in the mine and also the secondary employment by providing services to the employed manpower. Thus the local people will enjoy the economic upliftment. The following activities will be followed: -

- Rural/village & Community welfare,
- Healthcare of local population,
- Free medical camps
- Literacy awareness, supports to schools etc.
- Environment protection and Environment awareness activities like Environment awareness camps, plantation etc.
- Social awareness program.
- Thus the socio-economic status of the area will be improved.

4.10 Occupational Health and Safety

Occupational health and safety (OHS) is a cross-disciplinary area concerned with protecting the safety, health and welfare of people engaged in work or employment. The goal of all occupational health and safety programs is to foster a safe work environment.

4.10.1 Occupational health hazards at Cluster area:

Mining activity experiences risk of a number of hazards. Some examples of such hazards are as under:

- Exposure to dust
- Noise exposure;
- Physical Hazards;

4.10.2 Vehicular movements and related accidents.

These mainly impact on those working within the mine although health hazards can also impact on local communities. Therefore, protective measures are required for health and safety of the employed persons. The health of workers and the persons around the lease area will be regularly monitored. All the personal protective equipment's will be provided to employed persons. The mining in the area will be got done with all safety measures.

Implementation of Occupational health and safety measures:

Occupational Health & Safety measures result in improving the conditions under which workers are employed and work. It improves not only their physical efficiency, but also provides protection to their life and limb. Lessee will implement the following safety measures:

- Safety clauses in contract order
- Inspection and maintenance of equipment's and accessories
- Pre placement and periodic health check up
- Removal of unsafe conditions and prevention of unsafe acts
- Detailed analysis of each and every incident
- To provide standard PPEs and ensure their uses
- Celebrations of various safety events for awareness
- An effective and clearly audible means of giving warning, in case of fire, to every person shall be provided at the site. A free passage–way giving

access to each means of escape in case of fire shall be maintained for the use of all workers in the mine.

- Medical facilities & first aid boxes will be established in the mine premises.
- Pits, Sumps, openings in floor etc. which may be a source of danger, shall be either securely covered or securely fenced. Securely fencing a pit means covering or fencing it in such a way that it ceases to be a source of danger.

Pre-placement Medical Examination and Periodical Medical Examination Schedules

- The fresh employees when inducted will be thoroughly medically examined under initial medical examination and thereafter during continuation of employment; the periodic medical examination will be conducted.
- The examination will include apart from the general observation the Chest X-ray, Lung function Test, Spirometry, Audiometry and the record of the same will be maintained and submitted to the concerned authorities.

4.11 Impacts due to transportation:

The Mineral produced from the mine is to be consumed by different construction/Infrastructural projects in adjoining areas. Transportation of mined out mineral will be transported by hired/ consumers Dumpers, Tractors, trucks. About 61 dumper/tipper per day will be required in this project. Capacity of each truck is 20 Tonne. The proposed increase in traffic density will not cause significant impact on the traffic since the connecting road and nearby Highway is capable of handling this increase in traffic density. The trucks will be properly covered with tarpaulin and overloading will not be allowed to avoid spillage on roads.

4.11.1 Traffic Management:

- Roads will be repaired regularly and maintained in good conditions.
- A supervisor will be appointed to regulate the traffic movement near the Cluster area.
- Speed breakers will be constructed accident prone areas to calm the traffic and its speed.
- Signage will be erected at the sensitive & precarious places to caution or provide information to road users.

4.12 Mine Closure

Mine closure plan is the most important environmental requirement in mineral mining projects. The mine closure plan should cover technical, environmental, social, legal and financial aspects dealing with progressive and post closure activities. The primary aim is to ensure that the following broad objectives along with the abandonment of the mine can be successfully achieved:

- To minimize environmental damage.
- To conserve valuable attributes and aesthetics.
- To overcome adverse socio-economic impacts.
- To create a productive and sustainable after use for the site, acceptable to mine owner, regulatory agencies and the public.
- To protect public health and safety of surrounding habitation.

4.12.1 Mine Closure Criteria

The criterion involved in mine closure is defined in relation to following key issues.

- Compatibility with agreed post –mining land use
- Physical stability
- Low risk to biota
- Physical stability

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CHAPTER – V

ANALYSIS OF ALTERNATIVES

5.0 Analysis of Alternate Site

The project is a Cluster mining project for mining of mineral Granite and will be operated within the lease grant area. The mining technology is semi mechanized open cast in single shift mining without any change in technology.

Cluster No. 49 "Ekalsingha" Granite Mine Total Cluster area 14.3802 Hectare, Located Near Village- Ekalsingha, Tehsil- Kekri, Dist- Ajmer, Rajasthan.

1. The area chosen for mining activities is not having habitation of any kind.
2. There are some other Granite mines in the study area, hence basic infrastructure such as road and electric connection are available.
3. Better availability of experienced labors from nearby villages.
4. No endangered species around the Cluster area.

5.1 Analysis of Alternate Technology

The mining techniques have transformed dramatically since it began thousands of years ago. With the development of new technologies, many advanced methods have been adopted. It yields more extraction and least environmental impacts. That commitment involves an intense drive to improve the safety and health of workers and lifting the economic and environmental performance of mining operations. Mining methods are constantly changing and improving as companies forge new technologies to enhance rates of extraction and minimize impacts such as noise, dust, and land and water disturbance. The mining methods used are:

(i) open-cast and

(ii) Under ground.

5.1.1 Open- Cast Mining

Open-cast mining known as surface mining is most effective when the mineral deposit is close to the surface. The mining process is fundamentally different between the soft-rock and hard-rock operations. The techniques involves with (or) without blasting depending on the hardness of the rock and removing surface layers of soil and other rocks to reach the deposit. In some cases, a separation process will be used to eliminate waste by-products. It has maximum recovery of mineral compared to underground method of mining.

5.1.2 Underground Mining

There are several variations of underground mining. The common factor for all forms of underground mining is the creation of tunnels extending from the surface into the mineral seam/lode and the use of machinery to extract the mineral. The most commonly used underground mining methods are stopping methods, board & pillar, long wall, caving methods, cut & fill and retreat benching etc. Granite mining is soft material hence underground mining methods are not suitable.

5.1.3 Selection of Mining Technology

After the complete analysis of various technologies, the nature of material to be excavated that are in practice, it is proposed to operate the mine by mechanized opencast method by using dumper for loading of mineral in tippers and dumpers, as Granite deposits are close to the surface. No other alternative technologies can be used because of the nature of the Granite mineral. Applicant will use eco-friendly measures to minimize the impact on the surrounding environment.

5.2 Details of Mining Methodology

The Mining Method will be done open cast Semi-Mechanized Method. The Cluster area is Mostly Soil Covered and partly exposures of Granite. The

bench height would not be kept greater than (the statutory provision of the prevailing Act) the width of the benches. Benches of 6 m Height have been planned with width more than height of the bench. The mining has been proposed to start southeast of the Cluster area. The required Barrier along the mine boundary shall be kept 7.5 m. as shown in the plates of each mine in Cluster area.

A granite mine has two types of activates i.e. one is removing of waste rock and overburden and the other is extraction of granite blocks lumps & grits.

Overburden/Fractured capping is removed by drilling small dia holes blasted with light explosives charge (to prevent damage to Granite blocks from crakes) and the overburden is removed with help of excavator and loaded in to Dumper. The muck is transported and dumped in the lease area at proposed dumping site.

When granite is exposed, a free face in the strike direction along weak zone of strata is opened out by trench box and local terminology is called galli preparation. Thus a bench is formed. The vertical holes are drilled by jack hammer drill and with the wedging the big blocks are separated and toppled by using jacks. Big size block is further divided into small blocks by drilling and wedge method.

Loading & Transportation: - The material will be loaded by dumper into tipping trucks/dumpers from the Cluster area to gangsa unit for Cutting & Polishing.

5.3 Drilling & Blasting:

Blasting is required only for Removing waste Rock. The Blasting shall be controlled so that it is does not damage the Granite Mine Block. Light explosive will be used for removing overburden. The blasting shall be done contract basis by the licensed person / agency.

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CHAPTER-VI

ENVIRONMENT MONITORING PROGRAMME

6.0 Introduction

The environmental monitoring is important in terms of evaluating the performance of pollution control equipments installed in the project. The sampling and analysis of the environmental attributes will be as per the guidelines of Central Pollution Control Board/State Pollution Control Board. The frequency of sampling and location of sampling will be as per the directives of CPCB/RSPCB.

Environmental monitoring will be conducted on regular basis by Cluster Lease holders to assess the pollution level in the surrounding area. Usually, as in the case of the study, an impact assessment study is carried over short period of time and the data cannot bring out all variations induced by the natural or human activities. Therefore, regular monitoring programme of the environmental parameters is essential to take into account the changes in the environment.

The industrial development of any area needs to be intertwined with judicious utilization of non-renewable resources of the study area and within the limits of permissible assimilation capacity. The assimilation capacity of the study area is the maximum amount of pollution load that can be discharged into the environment without affecting the designated use and is being governed by dilution, dispersion and removal due to physicochemical and biological processes. The Environment Monitoring Programme has been done to ensure sustainable development in the study area (10 km) of the project site and to monitor the pollution levels due to the proposed activities.

6.1 Formation of EMC (Environmental Management Cell)

In order to maintain the environmental quality within the standards, regular monitoring of various environmental components is necessary. The cluster of lessees has a full-fledged environmental management cell (EMC) reporting directly to lease owners for environmental monitoring and control. The EMC team taking care of pollution monitoring aspects and implementation of control measures. A group of qualified and efficient engineers with technicians will be deputed for maintenance, up keeping and monitoring the pollution control equipment, to keep them in working at the best of their efficiencies.

Responsibilities of EMC

The responsibilities of the EMC include the following:

- Environmental monitoring of the surrounding area.
- Commissioning of pollution control equipment.
- Specification and regulation of maintenance schedules for pollution control equipment.
- Ensuring that standards are maintained.
- Developing the green belt.
- Ensuring water use is minimized.
- Carrying out the Environmental Management Plan.
- Organizing meetings of the Environmental Management Committee and reporting to the lease owners.

6.2 Measurement Methodologies:

Instrument to be used:

The following instruments will be used for data collection work in the monitoring schedule:

- Respirable Dust Sampler with attachment for gaseous pollutants.
- Fine particulate Matter (FPM) Sampler.
- Hygrometer
- Sound Level Meter.

- ❖ Micro Meteorological Station
- ❖ Global positioning system (GPS)

In addition to the above instruments, the data on land use to be collected by the field team by meeting with a large number of local inhabitants in the study area and different departments/agencies.

Monitoring Schedule and Parameters

The Cluster Post Project monitoring will include details of any major/minor impact in the core zone and area within buffer zone for the following parameter:

- Micro meteorological Data
- Ambient Air Quality monitoring
- Noise level Monitoring
- Land use pattern within core zone and buffer zone including the cropping pattern.
- Monitoring of agriculture crops of the area (one year basis)
- Demography and socio-economic analysis based on last available census data for entire study area.
- Details of the environmental Monitoring Schedule, which will be undertaken for various environmental components, as per conditions of EC & consents, are detailed below:

6.3 Post Project Monitoring:

Methodology Adopted

Post Project monitoring will be carried out as per conditions stipulated in environmental Clearance Letter issued by MoEF, Consent issued by SPCB as well as according to CPCB guidelines. The Cluster area is considered as core zone and the area lying within 10 km radius from the Cluster area is considered to be the buffer zone where some impacts may be observed on physical and biological environment. In the buffer zone slight impact may be observed and that too will be occasional.

Table 6-1: Post project Environmental Monitoring Plan

Attributes	Sampling		Measurement Method	Test Procedure
	Network	Frequency		
A. Air Environment				
Meteorological Wind Direction , Relative Humidity, Rainfall	One station at site	Regularly	Mechanical/Automatic Weather Station	Mechanized station
PM_{10}	3 locations in the project impact area (Minimum 1 locations in upwind side, 1 sites in downwind side / impact zone and one in core zone)	Once in a season	IS 5182 (Part-23) 2006,Gravimetric CPCB Guidelines For Ambient Air Monitoring	As per CPCB norms
SO_2			IS 5182 (Part-Ii) 2001,Reaff.2006	As per CPCB norms
NO_2			IS 5182 (Part-Vi) 2006	As per CPCB norms
B. Water Environment				
pH (at 25⁰ C), Colour, Turbidity, Odour, Taste, Chloride, Total Hardness, Calcium Sulphate, Total Dissolved Solid, Alkalinity, Iron, Fluoride, Magnesium, Boron, Chromium, Copper,	2 Set of grab Samples during pre and post monsoon for ground and surface water in the vicinity	Once in a season	As per IS: 10500: 2012, APHA and IS	As per CPCB norms

Attributes	Sampling		Measurement Method	Test Procedure
	Network	Frequency		
Manganese Nitrate, Cadmium, Lead, Arsenic, Mercury, Selenium, Aluminium, Zinc, Residual Free Chlorine, Anionic Detergents, Cyanide, Phenolic Compounds, Total Coliforms, E Coli				
C. Noise				
Noise levels at Day & night time - Leq dB (A)	3 locations (1 location within Mine boundary, High noise generating areas within the lease and 2 locations of nearest habitation)	Once in a season	Using Sound Level Meter (SLM)	As per CPCB norms
D. Soil				

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Attributes	Sampling		Measurement Method	Test Procedure
	Network	Frequency		
pH (at 250C), Colour Texture, Moisture, Content (%), Soil Texture, Bulk Density, Water Holding Capacity Chloride, Calcium, Sodium, Potassium, Magnesium, Organic Matter, Available Nitrogen as N, Available Phosphorous, Zinc, Manganese, Lead, Cadmium, Copper, Chromium	2 locations in the project impact area	Once in a year	As per USDA Method, APHA and IS	As per CPCB norms
E. Socioeconomic				
CSR spending	In nearby villages	Yearly	Data collection on the amount spent on CSR activities in the villages	Primary (Questionnaires) and Secondary Survey.

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6.4 Post Project Environmental Monitoring Location

The location of the monitoring stations are selected on the basis of prevailing micro – meteorological conditions of the area like; Wind Direction & Wind Speed, Relative Humidity, Temperature. 10 AAQM stations will be selected to assess the ambient air quality of the area. Noise level monitoring will be carried out on Cluster lease boundary & in high noise generating area within the lease. Water & soil monitoring locations will be decided on the basis of general slope of the area & drainage pattern. Locations for the post project monitoring are given in *Table 6-2*.

The monitored data on air quality, water quality, soil quality and noise levels, will be periodically examined for taking necessary corrective measures. The monitored data will be submitted to Rajasthan State Pollution Control Board (RSPCB).

Table 6-2: Post Project Environment Monitoring Location

Sr. No.	Description	Location
1.	Ambient Air Quality	3 locations in the project impact area (minimum 2 locations in upwind side, 1 sites in downwind side / impact zone and one in core zone)
2.	Meteorological data	Cluster area
3.	Noise Level Monitoring	3 locations (1 location within mine boundary, high noise generating areas within the lease and 3 locations of nearest habitation)
4.	Water Level & Quality	Core and Buffer zone 2 locations
5.	Monitoring of Soil quality	Within 10 km radius of Cluster area (7 locations)

6.	Socio – economic status	Within 10 km radius of Cluster area

Data Analysis

Monitoring data analysis will be done as per CPCB guidelines by EPA approved laboratory & shall be submitted to the concerned authority (specified in Environment Clearance Letter issued by MoEF & Consent issued by SPCB) on regular basis.

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CHAPTER NO-VII

ADDITIONAL STUDIES

7.0 Introduction

Terms of reference (TOR) to be adopted for mining of minerals in Cluster No. 49 "Ekalsingha" Granite Mine as commonly applicable is prepared and attached to this report. The 1- L.O.I holders applied for Environmental Clearance in 01-8-2020 & Environment Assessment Committee issue Terms of References. The Details of Terms of References of 1-fresh L.O.I Holders and 11 existing M.L. are given below in table No-7.1

S. No	Applicant	M.L No	Date	ToR/EC Letter No.
1	Sh. Devraj Gurjar S/O Sh. Gopi Lal Gurjar	51/2018	15.072021	F1(4)/SEIAA/SEAC-RAJ/Sectt/Project/Cat.B2(19329)/2019-20
2	M/s A.G Mines & Minerals	24/2018	26.11.2018	Environmental Clearance (EC) Granted vide letter No- DEIAA/AJM/M-Sectt/2018-19/245 (928)
3	M/s Sawai Bhoj Granite	31/2018	26.11.2018	Environmental Clearance (EC) Granted vide letter No- DEIAA/AJM/M-Sectt/2018-19/245(935)
4	Shree Giriraj Granite	57/2018	30.07.2019	Environmental Clearance (EC) Granted vide letter No- F1(4)SEIAA/SEAC-Raj/Sectt/Project/Cat. 1(a)B2(15700)2019-20
5	M/s Satya Suman Marble & Granite	86/2018		
6	Sh. Sagar Sharma	119/2018	03.06.2019	Environmental Clearance (EC) Granted vide letter No- F1(4)SEIAA/SEAC-Raj/Sectt/Project/Cat. 1(a)B2(15671)2019-20
7	M/s Shri Tirupati Granite Mines	18/2019		
8	M/s Arihant Granites	22/2019		
9	Sh. Jagdish Bairwa	07/2019		
10	Shivraj Gurjar	28/2018		

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11	M/s Aditi Granite & Mineral	70/2018		
12	M/s Basarani Granite	108/2018		

1. Public Consultation.
2. Risk Assessment & Disaster Management Plan.
3. Socio-Economic Study.

7.1 Public Consultation

Public hearing will be conducted as per the guideline of EIA Notification 14th September 2006 and its subsequent amendments. The public hearing will be done or conducted as per regional officer Rajasthan state pollution control board, Kishangarh, Ajmer order. This is a EIA/EMP report submission for conducting pubic hearing proceeding. The public hearing details will be given in final EIA/EMP report.

7.2 Hazard identification and Risk Assessment Methodology

All types of industries face certain types of hazards which can disrupt normal activities abruptly and lead to disaster like fires, inundation, failure of machinery to name a few. Similarly Granite mines also have impending dangers or risk which needs to be investigated and addressed. Disaster management plan is formulated with an aim of taking precautionary steps to avert disaster and also to take such action after the disaster which limits the damage to the minimum.

Nevertheless, the following natural/industrial problems may be encountered during the mining operation:

- Inundation-Filling of the mine pit due to excessive rains / flooding.
- Slope failures at the mine faces.
- Accident due to fire.

As per proposal made under the Mining Plan, during proposed working, the area will be developed by means of opencast mining method. Exploitation and Transportation of mineral is to be carried out by mechanized means. Ultimate quarry depth will be 30 m below the surface level. Bench height is kept between 6 m. Ground water table in this region ranges from 60 to 65 m. below ground level i.e 335 mRL to of 328 mRL. Below ground level during pre monsoon period. Mining will not intersect the ground water level. But possibility of accidental disaster is also not ruled out. Therefore, all the statutory precautions should be taken for quick evacuation as per the Mines Act 1952, the Mines Rules 1955, Rule of MMR- 1961 and the Rules of MCDR-1988.

7.2.1 Risk Prioritization based on hazards in mining:

However, there are various factors, which can create unsafe working conditions/ hazards in mining. The following types of hazards are identified during the mining operations:-

- Accident during mineral excavation loading, unloading, transportation and dumping/piling
- Accident due to vehicular movement
- Accident due to storage of explosive and blasting.
- Accident due to fire

7.2.2 Mitigation Measures:

Measures to prevent accidents during loading

The following activities will be done to minimize the risk are:-

- At the time of loading no person will be there within the swing radius of the excavator/ JCB.
- The dumpers/ trucks will stand near the loading equipment and fully braked when the muck is filled in it.

- The truck would be brought to a lower level so that the loading operation suits to the ergonomic condition of the workers.

- The workers will be provided with gloves and safety shoes during loading.
- Opening of the side covers (pattas) should be done carefully and with warning to prevent injury to the loaders.

- Operations during daylight only

7.2.3 Anticipated Disaster and Corrective Actions

7.2.3.1 Inundation

It is Cluster No. 49 "Ekalsingha" Granite Mine. In case of inundation, at any time in the future, the water will be allowed to stand and naturally percolate into the ground. If there is any need to empty out any particular pit for working, then pumps will be used to pump out the water. In other cases where possibility of accumulation of water is there preventative & management measures shall be planned as per Regulation of MMR 1961.

7.2.3.2 Disaster Due to Failure of Slope

The pit slopes may fall at any time causing damage to human life and machinery. The only remedy to the effect of such situation is to dress pit slopes and maintaining the pit slope as specified in Metalliferrous Mine Regulations, 1961.

7.2.3.3 Disaster Due to Fire

No surface fire is involved in Cluster No.49 "Ekalsingha" Granite Mine The lease area does not involve forest area / land.

7.2.3.4 Care and Maintenance during Temporary Discontinuance

During temporary discontinuance of mine the mining operation due to any reason, notice (as per Rule 24 of MCDR, 1988 & Reg.6 of MMR, 1961) will be sent to IBM and mines safety authorities. Notice will be accompanied as per Rule 24 of MCDR, 1988, vide, Form no.D-1. All precautionary steps will be

taken into account in respect of care and maintenance. Following steps will be taken:

Protection of the pits:

The quarry part of the lease will be protected by fence as per DGMS circular all around the open pit with caution board displaying the danger in local language.

Protection of area:

There will be protected by displaying a board at the entry with caption like "Entry in the premises without permission is strictly prohibited" in local language.

Maintenance and monitoring:

The area will be monitored every week by competent person and if maintenance is needed will be done as per requirement.

- All the mining machinery shall be shifted to a safe place.
- Care and upkeep of plantation done shall be carried out on regular basis.
- All rules and regulations shall be followed in case of any temporary discontinuance of mine.

7.3 Risk Prioritization Based on Hazards in Mining:

However, there are various factors, which can create unsafe working conditions/ hazards in mining. The following types of hazards are identified during the mining operations:-

- Accident during mineral excavation loading, unloading, transportation and dumping/piling
- Accident due to vehicular movement
- Accident due to storage of explosive and blasting.

- Accident due to fire

7.4 Mitigation Measures:

Measures to prevent accidents during loading

The following activities will be done to minimize the risk are:-

- At the time of loading no person will be there within the swing radius of the excavator/ JCB.
- The dumpers/ trucks will stand near the loading equipment and fully braked when the muck is filled in it.
- The truck would be brought to a lower level so that the loading operation suits to the ergonomic condition of the workers.
- The workers will be provided with gloves and safety shoes during loading.
- Opening of the side covers (pattas) should be done carefully and with warning to prevent injury to the loaders.

Measures to prevent accidents during vehicular movement & transportation

The following activities will be done to minimize the risk are:-

- The truck will be covered with tarpaulin and maintained to prevent any spillage.
- To avoid danger while reversing the trackless vehicles at tipping points, all areas for reversing of Lorries should be made man free as far as possible.
- The vehicles must be maintained in good repairs and checked thoroughly at least once in a week.

All transportation within the main working will be carried out directly under the supervision and control of the management.

- Overloading should not be permitted and the maximum permissible

speed limit should be ensured.

- The truck drivers should have proper driving license.
- A statutory provision of the fences, constant education, training etc.

will go a long way in reducing the incidents of such accidents.

Storage of Diesel

- Minimum diesel will be stored at the site that will be in the tanks.
- Fire extinguishers shall be available near diesel storage.
- Training & refreshers course for all the employees working in hazards

premises.

7.5 Disaster Prevention Measure

In order to take care of above hazards/disasters, the followings measure/ safeguards will be strictly followed:

- All provisions of MMR 1961, conditions imposed in permission for Deep hole drilling and blasting and use of HEMM, and conditions of explosive license will be followed.
- Firefighting equipment in the machinery/ workshop/ office will be maintained. Persons will be trained in the use of firefighting equipment and mock rehearsal will be conducted.
- Training of security personnel and public relation department.
- Procedures as laid down in Disaster Management Plan to be followed.

Training;

Persons will be trained in the following:

- Knowledge of Chemicals and use of protective equipment
- Procedures for reporting emergencies.
- Location and use of firefighting equipment
- Knowledge of alarm system and siren
- Evacuation procedures.

- Training in First Aid as per Mines Rules 1955

Emergency Equipment & Facilities:

- Telephones / mobiles
- Fire fighting equipments
- Emergency medical supplies
- Protective clothing like fire suit etc.
- Other protective equipments i.e. goggles, helmet, face shield, hand gloves, safety belts, barricade tape.
- First Aid station as per the provisions of Mines Rules 1955.

7.6 Disaster Management Plan:

This should deal with action plan for high risk accidents like landslides, subsidence, flood, in underground mines, fire, seismic activities, tailing dam failures etc. and emergency plan proposed for quick evacuation, ameliorative measures to be taken etc. The capability of lessee to meet such eventualities and the assistance to be required from the local authorities should be described.

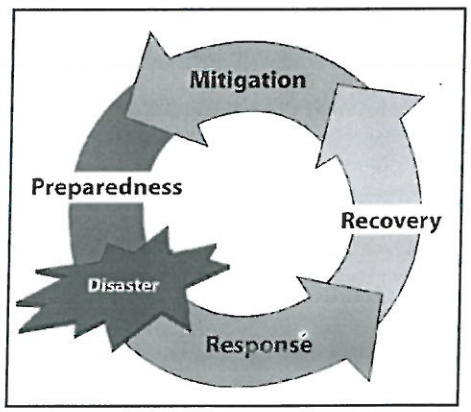
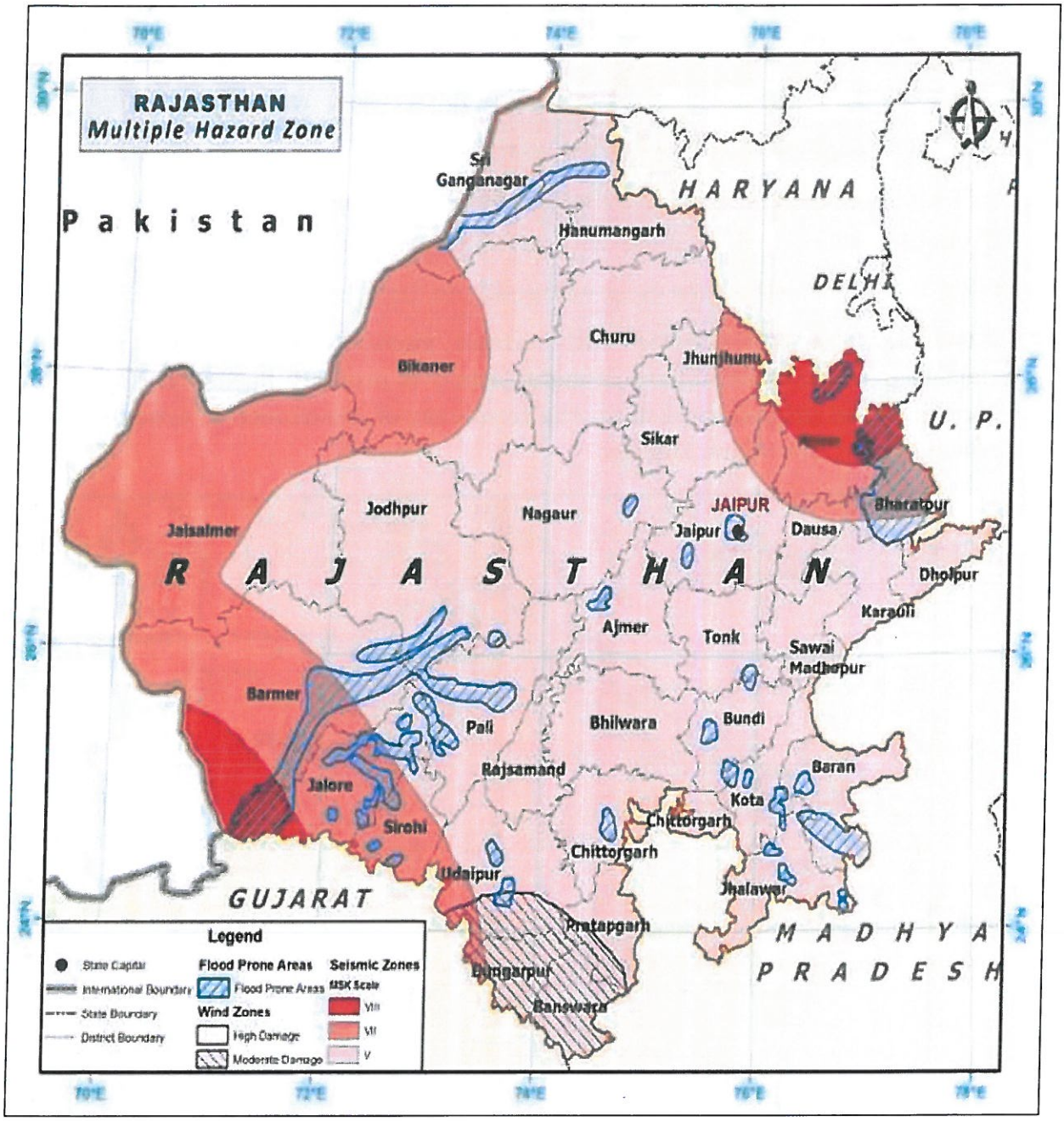


Figure No-7.1 A graphic representation of the four phases in emergency management

- Communication plans with easily understandable terminology and methods.
- Proper maintenance and training of emergency services, including mass human resources such as community emergency response teams.
- Development and exercise of emergency population warning methods combined with emergency shelters and evacuation plans
- Stockpiling, inventory, and maintain disaster supplies and equipment. Develop organizations of trained volunteers among civilian populations.



Multi hazard profile of the State (Source: State Disaster Management Plan)

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Anticipated Disasters

Earth Quake: District Ajmer lies in low damage risk zone V. The area is less prone to earthquakes as it is located on comparatively stable geological plains based on evaluation of the available earthquake zone information.

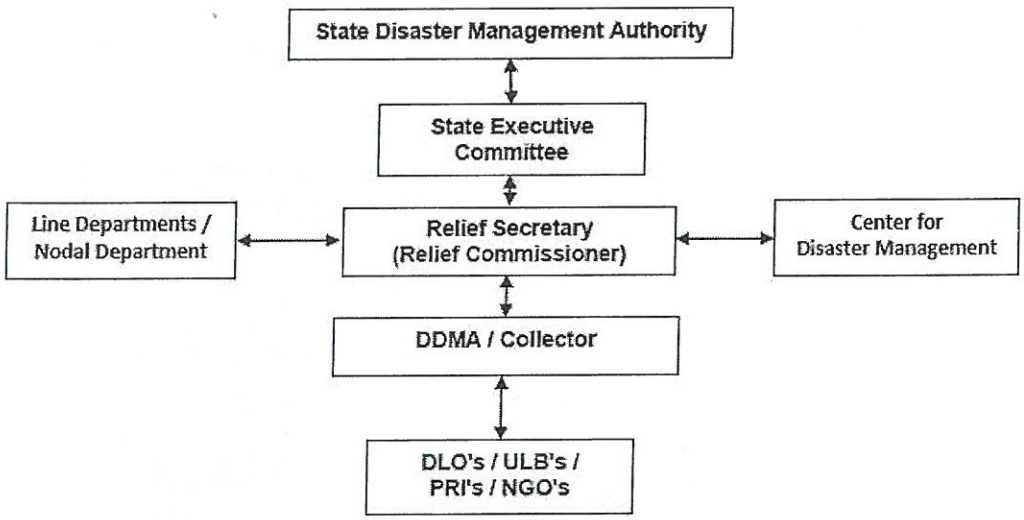
Drought: Low rainfall coupled with erratic behavior of the monsoon in the State makes Rajasthan the most vulnerable to drought.

Flood: Low rainfall coupled with erratic monsoon in the state makes Rajasthan most vulnerable to drought. Ajmer is prone to floods due to river basins. Based on historical data, the frequency of occurrence of droughts in Ajmer is once in 6 years. District



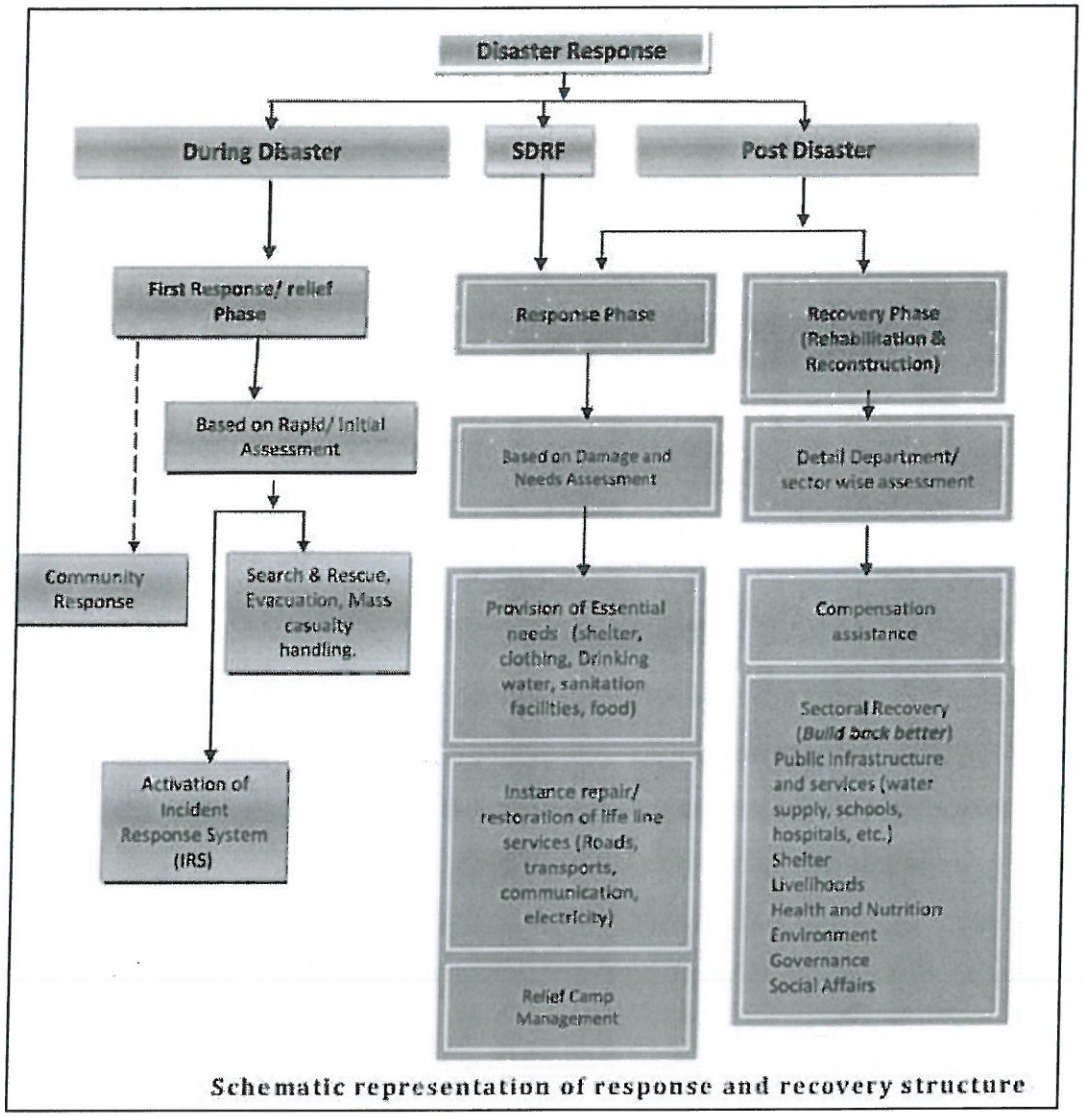
Flood prone area map (Source: Flood Manual, Rajasthan)

The state also has an extensive Disaster Management Plan, to address the problems. Personnel will be made in-charge to maintain a contact to the concerned department in the case of any disaster is foreseen.



- The complete mining operation will be carried out under the Management and control of experienced and qualified Mines Manager having Certificate of Competency to manage the mines granted by DGMS.
- All the provisions of Mines Act 1952, MMR 1961 and Mines Rules 1955 and other laws applicable to mine will strictly be complied with.
- During heavy rainfall the mining activities will be closed.
- All persons in supervisory capacity will be provided with proper communication facilities.
- Periodic drills and training will be provided to the workers and supervisors to react at the time of disaster.
- Detailed warning system, implementation procedure, emergency control centre shall be maintained at the mine with names of trained persons.
- Details and availability of heavy machinery, fire-fighting equipment shall be available at the site.

- Proper arrangements shall be made for treatment of injured person, if any.
- All the safety equipment shall be available at the mine.



Schematic representation of response and recovery structure

7.7 Rehabilitation and Resettlement

There is no human settlement in the mining area hence no R&R is anticipated.

CHAPTER NO-VIII

PROJECT BENIFITES

8.0 Introduction

This is a Cluster No. 49 "Ekalsingha" Granite Mine of mineral Granite. Total Cluster area is- 14.3802 Hectare.

8.1 Social and Economic Development

The Cluster Association will undertake activities for the up liftmen of the social community through community development in various ways as under:

8.2 Education

- Promotion of education programs by Cluster lease holders.
- Promotion of Adult Education program by Cluster lease holders.
- Crèche for children by Cluster lease holders.

8.3 Water

- Repairing of wells and hand pumps by Cluster lease holders.
- Support for water harvesting schemes by Cluster lease holders.
- Awareness programs on safe drinking water by Cluster lease holders.
- Facilities for School (Drinking Water) by Cluster lease holders.

8.4 Health

- An ambulance at the Cluster area
- Periodic medical check-up of employees
- Preventive medical care for rural population shall be promoted.
- Awareness to improve health and hygiene standards.

8.5 Employment Avenues

- Besides direct employment by the mine, indirect employment will also be generated. Preference will be given to the local population for employment based on their educational qualifications and experience.

8.6 Others

- Supplementing Government efforts in health monitoring camps, social welfare and various awareness programs among the rural population.
- Communication facilities such as phone will also be available on Cluster area.

8.7 Proposed Action Plan for ESR

The proposed project will help in improving the socio-economic status of the near-by villages by generating direct or indirect employment opportunities.

The project will contribute additional revenue to the State and Central Govt. in the form of royalty, cess and other taxes etc. Job opportunities to the local people will improve the earning and spending capacity of the people. The people in area will be able to utilize improved facilities with regard to education, health care, hygiene, recreational opportunities, small business opportunities etc.

The main focus areas for the development of local community are as follows:

- Education
- Health and Family Welfare
- Sustainable Development and Livelihood
- Rural Infrastructure Development
- Social Reform

The activities taken into consideration as per the needs of the villagers/ village & Panchayat. The details about ESR is given on Chapter No. 9

8.8 Conclusion

The project activity and the management will provide assistance for the development of public amenities in the region.

The mine management will recruit semi-skilled & unskilled eligible workers from the nearby villages. The overall effect will improve the buying power of employees and thus a higher standard of living viz. better education, improved health and sanitation facilities, housing and acquisition of consumer durables. Housing, transport, medical, educational and other civic amenities will get betterment in the future. This is envisaged as a major positive benefit.

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CHAPTER-IX

ENVIRONMENT MANAGEMENT PLAN

9.0 Introduction

The EIA study for the proposed project has identified impacts that are likely to arise during different phases of the project. The study has also examined the extent to which the adverse impacts identified can be controlled through the adoption of mitigation measures. The Environment Management Plan describes both generic good practice measures and site-specific measures, the implementation of which is aimed at mitigating potential impacts associated with the proposed activities.

The Environmental management plan consists of mitigation measures to be adopted, environmental monitoring & institutional measurers (financial estimates and organizational set-up). The potential identified impacts of the proposed Cluster No. 49 "Ekalsingha" Granite Mine near Village-Ekalsingha, Tehsil of Kekri, Ajmer District have been discussed in earlier Chapter 4. The environment management plan proposed in the lease area. EMP includes monitoring programs and management control strategies for minimizing the adverse impacts of the said mining activity.

9.1 Purpose of EMP

The environment management plan is prepared with a view to facilitate effective environmental management of the project, in general and implementation of the mitigation measures in particular. The EMP provides a delivery mechanism to address potential adverse impacts and to introduce standards of good practice to be adopted for all project works. For each stage of the programme, the EMP lists all the requirements to ensure effective mitigation of every potential biophysical and socio-economic impact identified

in the EIA. For each impact or operation, which could otherwise give rise to impact, the following information is presented:

Keeping in view the mitigation of the adverse environmental impacts due to the process of cluster mining the EMP has been worked out with the following objectives:

- Reclamation of the mined out area where ever and whenever possible.
- Restoration of landscape as near to its original form as far as possible, consistent with the economy of mining operations, keeping in view the drainage pattern, geological stability, vegetation etc.
- Minimization, mitigation and where possible elimination of degradation of land and quality of air as well as water.
- Making least disturbance to the water sources and its water quality.
- Least disruption to the existing basic ecological status in the mining area during mining, which will be conserved and protected.
- Improvement of the overall flora scenario of the area.

Establishment of an environment, in which the activities presently being carried out may change for the better without disruption or disturbance to the socio economic condition.

AIR POLLUTION AND CONTROL

During the mining operation there are various sources of dust emission.

The measures proposed for air pollution control includes:

- Haul road within the cluster area well compacted that will reduce dust emission.
- Periodical water sprinkling on the haul road through water tanker.
- Over loading of transport equipments to be avoided to prevent spillage.

- Water sprinkling on the OB dump to reduce dust emission. About 6 water sprinklers will be installed around the dump in the individual quarry of the cluster area to reduce the dust emission.
- Five year plantation programme should be done in periphery.
- Wet drilling will be in practice to reduce dust emission.
- Regular maintenance of mining equipment and vehicle will be conducted and pollution under control certificate be obtained for the vehicles used in the mining.

WATER MANAGEMENT & WATER POLLUTION CONTROL:

- Cluster No. 49 "Ekalsingha" Granite mine area water shall not be allowed to dissipate, but collected and discharged after allowing settlement of the suspended solids.
- Monitoring of the Cluster area mines water as well as surface flows shall be done at close, regular intervals and records maintained.
- The surface run off from the mines will pass through the garland drain and enter to the settling tank. The silt and solids will be settled down in the tank and only water goes to the drainage.
- Precipitated rainwater should be harnessed by taking advantage of the given situation to create sufficient artificial storage capacities in natural or manmade depressions and inter-connecting them to meet affstonestation and other needs.
- Garland drains along with settling tank and retaining wall shall be constructed around the Cluster area and dumps. While constructing drains routing and tracing shall be done maintaining the overall slope in the direction of the premising flow direction so that the runoff distribution is not affected.

- Garland drain will be developed around waste dump beyond the retaining wall to receive run-off water coming out of the retaining wall of 2-3 m height and settling tank will be made to receive the run-off water from garland drain to settle the sediments and release clean water.

Surface Water Management

To avoid surface run – off during the monsoon season peripheral/ garland drains with the settling tanks have been proposed around the dumps. Further guided channel around the quarry have been proposed to stop the surface run – off in the quarry during monsoon. The dump and mine runoff water does not contain any chemical contaminant as the mining is only road, so there is no chance of contamination of the water. Further the water from the Cluster area after settling can be utilized for irrigation purpose.

During the rainy season the water from the lease area will be guided to the exhausted excavation voids within the Cluster area and will be utilized for water sprinkling and plantation purpose. During the conceptual period the entire quarry will converted to water reservoir and will be utilized for irrigation and agriculture purpose.

Management Plan for Ground water

It is observed from the dug wells of the adjacent plain area and in the nearby villages Ekalsingha that the ground water table varies between 80 m to 100 m from the surface level depending upon seasonal variations. During dry season the water table falls to 100 m from the surface, whereas during rainy season the water table remains at around 80 m from the surface.

During the proposed plan period no particular pit lay out will be followed for all the excavation in the flat land of the Cluster area. Therefore, at the end of the plan (lease) period depth of the respective excavation over the Cluster area area is not possible to predict. However, after Cluster lease period of mining the tentative bottom RLs of Cluster would be 303 mRL. This is above

the ground water table as the RL of ground water table is around 80 m. Therefore such depth of working would not affect the ground water table.

There is chance that during monsoon the run-off water may find access to some of the quarries in the Cluster area. Therefore, the water so discharged will be routed to the natural drainage through series of drains and settling pits. Also, it is proposed to have a peripheral drain around each pit of the individual lease belonging to the cluster area to restrict the surface runoff in to the quarry.

Water requirement for domestic purpose will only sourced from nearby village through water tanker.

NOISE CONTROL:

Noise level shall be maintained below 75 dB (A) in the working zone (CPCB Guidelines). Noise levels are expected to increase at surface work zone with commencement of mining and allied activities. The major source of noise is due to drilling, blasting and transportation of mineral. The following measures will be taken up to reduce the noise level:

- Diesel powered machineries, which are major; source of noise in open cast environment will be properly maintained. Scheduled to prevent undesirable noise. Attention shall be paid towards rigorous maintenance of the silencer pipe of the diesel engines.
- All the workers working with drilling will be provided with ear muffs.
- Static diesel engines shall be housed as far as possible. If possible they will be placed on vibration isolators.
- Truck drivers will be issued ear plugs and ear muffs. Duty of the operators of the noisy machineries will be regulated to keep their noise exposures levels within the limits

Green belt will be developed around the office building and mine to reduce noise exposure level in Cluster.

EMP IMPLEMENTATION AND MONITORING

To meet with the objectives of Environmental Impact and monitoring an "Environmental Management and Monitoring Department (EMMD)" will be formed at Cluster No. 49 "Ekalsingha" Granite Mine area, which will be responsible for implementation of EMP and post operation monitoring. The officers of the department will meet frequently to assess the progress and analyze the data collected.

Table 9.1 Activities to be monitored / Inspected by EMMD

Activities	Inspection methods by EMMD
Land erosion	Regular observation for checking land erosion in flat land.
Drainage	The effectiveness of drainage system depends upon proper cleaning of all drains and sumps. Any blockage due to sitting or accumulation of loose material will be checked on a regular basis.
Re-vegetation and Green Belt Development	Schedule planned for green belt development to be checked after completion of one every year and any alternation required will be implemented. Post plantation status will be regularly checked in every season. Phase wise development in the areas of plantation including rate of growth, survival rate etc., will be recorded systematically.
Water quality Monitoring	Facilities for monitoring both surface run-off water and ground infiltration will be provided. Ground water, treated and untreated discharge water and also surface water bodies and wells will be moistened once in every month. Samples will be analyzed for the parameters specified by Central pollution Control Board Guidelines.

Emissions and Air Quality	Dust prevention and control actions are to be taken at work zone. To monitor the effectiveness of dust control, and compare background levels of airborne dust with conditions downwind, and back this up with an adequate meteorological measurement. Two high volume samplers complete with particle size partitioning and independent power generators should provide sufficient data. The equipment to be selected should be capable of collecting sulfur dioxide & nitrogen oxides samples. The method of deployment would be in downwind condition at the Cluster area and in nearby villages where there is chance of dust nuisance. Air quality analysis will be carried out once every month all round the year. Monitoring shall be carried for particulate matter, Sulphur Dioxide, Nitrogen Oxides and Carbon Monoxide
Occupational Health	Facilities for checking, levels of dust in the workplace will be provided. Cluster mines workers will be monitstoned for health at regular intervals by a specialist.
Socio-economic development	The environment department will be in regular touch with surrounding villages to monitor the implementation of various developmental schemes made by the mine authorities. They will also consider any immediate requirement, which can be taken care of.
Dump Management	Garland drain along with settling tank will be provided to protect wash off or leaching from dump in rainy season. Temporary plantation of grass species on the dump to minimize the impact of wind/ rain water on the dump. The waste will be completely utilized in the backfilling of exhausted quarry.
Backfilling of Exhausted Mine lease area	Backfilling of the exhausted quarry will be done during the conceptual period.

9.2 ENVIRONMENT POLICY

The Cluster No. 49 "Ekalsingha" Granite Mine is presently under the jurisdiction of Tehsildar, Kekri and the concerned authority will stipulate a

well defined Environmental policy for Cluster No. 49 "Ekalsingha" Granite Mine by which the lessee is committed to conduct business with strong environmental conscience towards community, customer & employees. The safety and environment policy is as below:

- The Environment, health and safety policy of Cluster No.49 "Ekalsingha" Granite Mine
- The Lessee is committed towards efficient use of natural resources based on reduce, recycle and reuse method.
- The Project is committed towards identification of possible impacts and will take necessary management plan to mitigate the impacts.
- Our environment and safety performance will regularly monitored and reported and helps for continual improvement of our environment and health performance.
- For health and safety of workers, our efforts are for identification of workplace hazards and creating awareness among the workers for reduces accident. Training to the workforce regarding prevention of accident, accident response and emergency preparedness.
- We strongly believe that accident and adverse environment impact can control through good quality of working environment, safety management and worker's involvement.

9.3 ORGANIZATION MANPOWER

Organizational Setup

Environmental monitoring and reporting will be designed to provide a close watch on the surrounding natural environment and provide early warnings of any adverse changes that may be related to some dimension of the mining and allied operations.

Man Power

EMC will be manned by adequate staff. about 200-220 mine staff and

Services of retired officials may be taken for effective implementation of plantation schemes. For development and maintenance of jobs like drainage, settling tanks etc. assistance from the projects civil engineering department may be taken.

Safety, health and skill development of persons working: The following steps are proposed for safety, health and skill development of persons working.

- To obtain permission by all individual mine managements the permission
- needed under MMR 1961 – 106 (2(b)) as immediately as possible.
- To conduct safety audit and risk assessment once in a year, in the manner needed by statute.
- To get all the employees checked once in 5 years as needed by mines rules.
- To enroll as a member of local MVTC this renders training needed for skill development and also full safety consciousness.

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CLUSTER NO.49 "EKALSINGHA" GRANITE MINE

M/S N.S.ENVIROTCH LAB. & CONSULTANT

EIA Coordinator

BUGDET BREAKUP FOR LABOUR WELFARE FOR CLUSTER No. 49 "EKALSINGHA" GRANITE MINE

S.No	Name Of Project	Ref. No	Bugdet Breakup for Labour Welfare (Rs. In Lakhs)	
			Capital Cost	Annual Recurring Cost
Budget for Labour Welfare for Proposed one Applied area				
1	Sh. Devraj Gurjar S/o Sh. Gopi Lal Gurjar	51/2018	1.90	0.90
Budget for Labour Welfare for 11-Existing Mine Lease holders of Cluster as per mention in EC.				
2	M/s A.G Mines & Minerals	24/2018	1.90	0.90
3	M/s Sawai Bhoj Granite	31/2018	1.90	0.90
4	Shree Giriraj Granite	57/2018	1.90	0.90
5	M/s Satya Suman Marble & Granite	86/2018	1.90	0.90
6	Sh. Sagar Sharma	119/2018	1.90	0.90
7	M/s Shri Tirupati Granite Mines	18/2019	1.90	0.90
8	M/s Arihant Granites	22/2019	1.90	0.90
9	Sh. Jagdish Bairwa	07/2019	1.90	0.90
10	Shivraj Gurjar	28/2018	1.90	0.90
11	M/s Aditi Granite & Mineral	70/2018	1.90	0.90
12	M/s Basarani Granite	108/2018	1.90	0.90
Total			22.80 Lakhs /Year	10.80 Lakhs/Year

Bugdet Breakup For Labour Welfare

Total 22.80 Lakh. Rupess per annum has been expend by labour welfare facilities. The total amount of Labour Welfare has been expend for providing facilities of mine workers. The total amount has been expend by 1- Applied L.O.I Holder & 11 Existing mine lease Holders by Cluster No. 49 "Ekalsingha" Granite Mine association are responsible for care taking of labour welfare Under management and Guidence of Chairmen & Secretary of Cluster No. 49 "Ekalsingha" Granite Mine association.

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CLUSTER No.49 "EKALSINGHA" GRANITE MINE

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DETAILS OF BUGDET BREAKUP FOR LABOUR WELFARE FOR CLUSTER No. 49 "EKALSINGHA" GRANITE MINE

Table No-9.12

S. No.	Facility Provided for Laborers	Capital Cost Rs in Lac	Recurring Cost Rsin Lac
1.	Drinking water provided by Tanker	3.80	2.50
2.	First Aid Box	2.60	1.00
3.	Rest Shelter	2.50	1.30
4.	Washroom Facilities for laborers	6.60	2.50
5	Safety Shoes, hand gloves, Dust mask, Ear plugs, Helmet	1.50	1.00
6	Insurance	5.80	2.50
	Total	**22,80,000/-**	**10,80,000/-**

DETAILS OF BUGDET BREAKUP FOR LABOUR WELFARE FOR APPLIED L.O.I HOLDER

S. No.	Facility Provided for Laborers	Capital Cost Rs/- Lakh/year	Recurring Cost Rs/-Lakh/Year
1.	Drinking water provided by Tanker	10,000	5,000
2.	First Aid Box	20,000	10,000
3.	Rest Shelter	50,000	15,000
4.	Washroom Facilities for laborers	50,000	15,000
5	Safety Shoes, hand gloves, Dust mask, Ear plugs, Helmet	60,000	25,000
6	Insurance	--	20,000
	Total	**1,90,000/-**	**90,000/-**

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CLUSTER No.49 "EKALSINGHA" GRANITE MINE

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Table 9.3: Environment Management Plan

Sr. No.	Potential Impact	Action	Parameter to be Monitored	Timing	Responsibility
1.	Air Emission	All equipments are operated within specified design parameters.	Random checks of equipment log	During the life of mine	Mine In-charge
		Vehicle trips to be minimized to the extent possible	Log of vehicle movement	During Granite transportation	Mine In-Charge
		Topsoil (if any) will be removed and backfilled in the void generated. Preventive action will be taken to minimizing air emission.	Quantity of Top soil stacked	During mining activity	Environmental Officer
		Use proper drill bits for drilling holes and wet drilling method.	Random check by site engineer	During blasting	Mine In-Charge
		Regular Water spraying to be done	Quantity of water used for spraying	During mining activity	Environmental Officer
		Regular monitoring of Ambient air	Monitoring results of PM_{10},$PM_{2.5}$, SO_2 and NO_x	Every three month during mining	Environmental Officer

Sr. No.	Potential Impact	Action	Parameter to be Monitored	Timing	Responsibility
		Quality within the mining lease			
2.	Noise and Vibration	Vehicle trips to be minimized to the extent possible	Log of vehicle movement	During Granite transportation	Mine In-Charge
		Maintenance of Noise generating equipments	Log book for maintenance of vehicles	During mining activities	Environmental Officer
		Ambient Noise monitoring	Noise reading	Every three months during regular monitoring	Environmental Officer
3.	Wastewater Discharge	Sewage generated will be disposed off in soak pits	Log of quantity of waste generated	During life of mine	Environmental Officer

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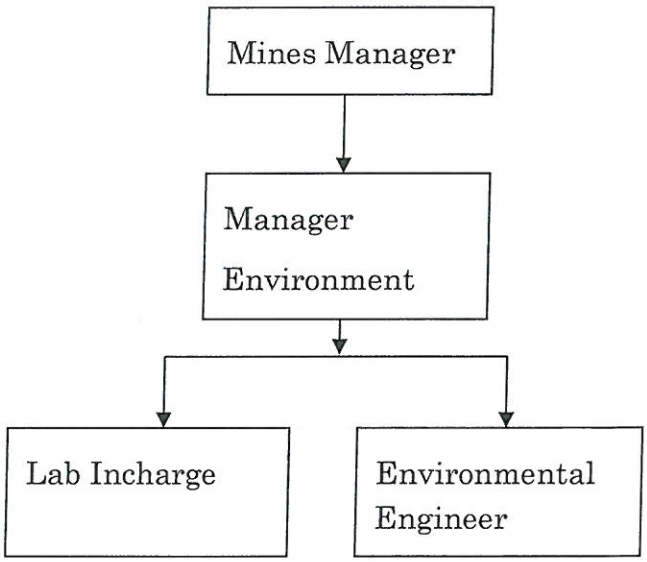
9.4 Environment Management Cell

Apart from having an Environmental Management Plan, it is also necessary to have a permanent organizational set up charged with the task of ensuring its effective implementation of mitigation measures and to conduct environmental monitoring. In this effect, on Cluster No. 49 "Ekalsingha" Granite Mine of Cluster responsibilities to officers from various disciplines to co-ordinate the activities concerned with management and implementation of environment control measures. Environment management is shown in Figure 9.1. Basically, this department undertakes the monitoring of environmental pollution level by measuring, ambient air quality, water and effluent quality, Noise level, etc., either departmentally or appointing external agency whenever required. The Environmental and Safety department will also looking after for preparation of environment statement, carrying out environment audit, preparation of Consent to establish & Consent to operate.

Environmental monitoring cell will be established for monitoring of important and crucial environmental parameters which are of immense importance to assess the status of environment during mine operation. Proponent will be monitored the Environmental Status with the help of third party and give responsibility to Mining or Safety Engineer for compliance and take care the all the things for implementation of EMP as proposed. However, the tentative schematic diagram also shown as follows for the same.

- EMC will oversee that environmental control measures are implemented as per approved action plan.
- Identify and record the constraints in respect of environmental planning and implementation.
- Systematically document and record keeping w.r.t environmental issues.
- Field monitoring and laboratory analysis.

- Monitoring of plantation development.
- Environmental compliance to the regulatory authorities.
- Communication with the concerned departments on the environmental issues. Interact and liaison with State/ Central Government departments
- To monitor compliance of environmental regulations.
- Continual improvement in environmental performance.
- To follow proper documentation and monitoring procedures, for developing better.
- Environmental Management System at the Cluster area.
- To keep up with regulatory requirements and arrange for the necessary certificates
- To conduct yearly environmental monitoring and submit the statement to RSPCB.



9.5 Environmental Monitoring Programme

Environmental Monitoring Program includes periodic Analysis of Air, Soil, Noise and Water samples. Environmental monitoring will be conducted on regular basis to assess the pollution level in the ML area as well in the surrounding areas. Therefore, regular monitoring program of the

environmental parameters is essential to take into account the changes in the environment. The objectives of monitoring are:

- To identify the state of pollution within the ML area.
- To verify the result of the impact assessment study in particular with regards to new developments.
- Generate data for predictive or corrective purpose in respect of pollution.
- To assess and monitor the environmental impacts.
- To establish a database for future Impact Assessment Studies for new projects.

Monitoring will be carried out at the site as per the norms of CPCB.

- Environmental Monitoring Programme will be conducted for various environmental components as per conditions stipulated in Environmental Clearance Letter issued by State Pollution Control Board & Consent to Operate issued by SPCB.

9.6 Monitoring Schedule

Details of the Environmental Monitoring schedule, which will be undertaken for various environmental components, is given in Table 9.4

Table 9.4: Post Project Environment Monitoring Schedule

Sr. No.	DESCRIPTION	FREQUENCY OF MONITORING
1.	Meteorological Data	Daily
2.	Ambient Air Quality at Cluster area	Quarterly/ as per CPCB guideline
3.	Water Quality	Quarterly/ Half Yearly
4.	Noise Level Monitoring	As per CPCB guideline
5.	Soil Quality	Half Yearly/Yearly
6.	Monitoring of Agricultural crops	Yearly
7.	Socio – economic status of nearby	Yearly

	area	

9.7 Post Project Environmental Monitoring Location

The location of the monitoring stations are selected on the basis of prevailing micro – meteorological conditions of the area like; Wind Direction & Wind Speed, Relative Humidity, Temperature. 10 AAQM stations will be selected to assess the ambient air quality of the area. Noise level monitoring will be carried out on lease boundary & in high noise generating area within the lease. Water & soil monitoring locations will be decided on the basis of general slope of the area & drainage pattern. Locations for the post project monitoring is given in Table 9.3.

The monitored data on air quality, water quality, soil quality and noise levels, will be periodically examined for taking necessary corrective measures. The monitored data will be submitted to Rajasthan State Pollution Control Board (RSPCB). The post-project data will be submitted in half-yearly monitoring reports to the same.

Table 9.5: Post Project Environment Monitoring Location

Sr. No.	Description	Location
1.	Ambient Air Quality	Cluster area, Villages in downwind direction from the Cluster area
2.	Meteorological data	Cluster area
3.	Noise Level Monitoring	Mine Boundary, High noise generating areas within the Mine boundary
4.	Water Level & Quality	Surface & Ground water sources (Study area)
5.	Monitoring of Agricultural crops	Study area (on yearly basis)
6.	Socio – economic status	Study area (on yearly basis)

9.8 Greenbelt Development

Vegetation development is Existing & proposed along the lease boundary & outside the lease area. While selecting plant species preference will be given for planting native species of the area and shall have soil binding capacity. Applicants will supply saplings to surrounding villagers for green belt development in their villages and encourage the plantation by means of social forestry.

PLANTATION: GREEN BELT DEVELOPMENT

Plantation is proposed about 4740 Plant (33 percent of the lease area) along the boundary of the lease & outside the lease area will be planted at the end of life of mine.

Approximately 4740 Plants will be planted by Cluster Lease Holders of Cluster . The Details given below Tables no 9.7 & 9.8

Table No-9.7

Green Belt Development Programme for 11-Existing Mine lease holder falls in Cluster No. 49 "Ekalsingha" Granite Mine

Year	Along the lease boundary		On Backfilled area		Outside the lease area		Top Soil Dumps		Total	
	Area (Ha.)	No. of Trees	Area (Ha.)	No. of Trees	Area (Ha.)	No. of Trees	Area (Ha.)	No. of Trees	Area (Ha.)	No. of Trees
2021-2022	0.79	790	--	--	--	--	--	--	0.79	790
2022-2023	0.79	790	--	--	--	--	--	--	0.79	790
2023-2024	0.79	790	--	--	--	--	--	--	0.79	790
2024-2025	--	--	--	--	1.185	1185	--	--	1.185	1185
2025-2026	--	--	--	--	1.185	1185	--	--	1.185	1185
Total	2.37	2370	--	--	2.37	2370	--	--	4.74	4740
• Plantation will be carried out during mining process by Cluster Association. Approximately 4740 plants will be planted along the lease boundary & outside the area at the end of life of mine.										

Note:- Total 4740 no. of plants will be planted in the area of 4.74 hectare (i.e. 33% part of total Cluster area) by 1- Applied L.O.I Holder & 6 Existing mine lease Holders by Cluster No. 49 "Ekalsingha" Granite Mine association are responsible for care taking of Plantation. Under management of Chairmen & Secretary of Cluster No. 49 "Ekalsingha" Granite Mine association.

The sapling for plantation will be selected on basis of water availability of water & according to climatic condition and hence it is proposed to plant 4740 saplings in five year.

Approximately 2370 plantation will be done on along the lease boundary at safety barrier zone & Approximately 2370 Plants outside the lease area at the end of life. Year- wise program of green belt development during five years plan period.

Post plantation cares including provision for watering, soil mulching manure supply to plants will be done.

SPECIES SUGGESTED FOR PLANTATION

SI. No	Name	Scientific Name	Number
1	Neem	Azadirachta indica	500
2	Nimbu	Citrus aurantium	180
3	Mango	Mangifera indica	50
4	Shisham	Dalbergia sisoo	50
5	Amla	Phyllanthus emblica	50
6	Peepal	Ficus religiosa	100
7	Amrud	Psidium guayava	500
8	Jamun	Syzygium cumini	150
9	Imli	Tamarindus indica	150
10	Ber	Zizyphusxylopyra	150
Total			1880/-

Table No-9.8 Green Belt Development Programme for 1-Applied L.O.I Holder

Year	Along the lease boundary		On Backfilled area		Outside the lease area		Top Soil Dumps		Total	
	Area (Ha.)	No. of Trees	Area (Ha.)	No. of Trees	Area (Ha.)	No. of Trees	Area (Ha.)	No. of Trees	Area (Ha.)	No. of Trees
2021-2022	0.0825	55	--	--	--	--	--	--	0.0825	55
2022-2023	0.0825	55	--	--	--	--	--	--	0.0825	55
2023-2024	0.0825	55	--	--	--	--	--	--	0.0825	55
2024-2025	--	--	--	--	0.0825	82	--	--	0.0825	82
2025-2026	--	--	--	--	0.0825	83	--	--	0.0825	83
Total	**0.165**	**165**	--	--	**0.165**	**165**	--	--	**0.33**	**330**

- Plantation will be carried out during mining process by applied area, Approximately 330 plants will be planted along the lease boundary & outside the lease area at the end of life of mine.

Greenbelt development as per the scheduled plan will be reviewed every year plantation records will be maintained for period of plantation, area under plantation, length of avenue plantation, type of species density of planted area and survival rate.

9.9 Budget for Environmental Management Activities

Environmental budget:

a. Dust suppression: Water required for dust suppression will be taken from the existing bore well & Tankers from outside.

b. Green belt development: The total road length (common) is 800 meters. It is proposed to plant one neem tree with a spacing of 10 meters. Thus we need 800*2 = 1600 neem saplings. The cost of these saplings is negligible as the local area has lot of such trees. One person is to be deployed regularly throughout the year for watch and ward. The person supposed to be taking care of the dust suppression will be utilized for this purpose also. Hence no separate budget is needed for green belt development

c. Reclamation and closure options: No reclamation is possible except developing the greenery on the redundant dump

The budget for environmental activities is given in

S.No	Name Of Project	M.L No	Green Belt Plantation (Rs. In Lakhs/year)
1	**Sh. Devraj Gurjar**	**51/2018**	0.87
2	M/s A.G Mines & Minerals	24/2018	0.87
3	M/s Sawai Bhoj Granite	31/2018	0.87
4	Shree Giriraj Granite	57/2018	0.87
5	M/s Satya Suman Marble & Granite	86/2018	0.87
6	Sh. Sagar Sharma	119/2018	0.87
7	M/s Shri Tirupati Granite Mines	18/2019	0.87
8	M/s Arihant Granites	22/2019	0.87
9	Sh. Jagdish Bairwa	07/2019	0.87
10	Shivraj Gurjar	28/2018	0.87
11	M/s Aditi Granite & Mineral	70/2018	0.87
12	M/s Basarani Granite	108/2018	0.87
Total			**10,44,000 Rs/per year**

Table 9.9: Budget for Environmental Management
Cluster No. 49 "Ekalsingha" Granite Mine

S. No.	DESCRIPTION	ITEM	Approximate Capital cost (Rs. In lacs)	Approximate recurring cost per annum (Rs. in lacs)
1	Air Pollution	Dust Suppression / water spray	15,41,000/-	8,00,000/-
		Greenbelt Development along the lease area, backfilled and along approch road.(Tree, Water, Maintenance)	10,44,000/-	6,35,000/-
2	Environment monitoring	**Ambient Air Quality monitoring (PM 10 & PM2.5)**	Nil	1,00,000/-
		Noise Level		
		Water & soil sampling		
3	Faincing & Maintanance		19,75,000/-	5,00,000/-
Total			**45,60,000/-**	**20,35,000/-**

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Table 9.10: Budget for Environmental Management For applied area

S. No.	DESCRIPTION	ITEM	Approximate Capital cost (Rs. Inlacs)	Approximate recurring cost per annum(Rs. in lacs)
1	Air Pollution	Dust Suppression/ water spray	1,50,000/-	50,000/-
		Greenbelt Development along the lease area, backfilled and along approch road . (Tree, Water, Maintenance)	87,000/-	80,000/-
2	Environment monitoring	**Ambient Air Quality monitoring (PM 10 & PM2.5)**	Nil	15,000/-
		Noise Level		
		Water & soil sampling		
3	Faincing & Maintanance	Pit size	1,43,000/-	30,000/-
Total			3,80,000/-	1,75,000/-

Implementation of EMP

As per budgetary breakup of Environmental Management will be implemented and managed by Cluster No. 49 "Ekalsingha" Granite Mine Cluster Association. A Chairman and Secretary of Association shall be fully responsible for implementation of EMP.

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CLUSTER No. 49 "EKALSINGHA" GRANITE MINE

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Proposed Action Plan for ESR

The proposed project will help in improving the socio-economic status of the near-by villages by generating direct or indirect employment opportunities.

The project will contribute additional revenue to the State and Central Govt. in the form of royalty, cess and other taxes etc. Job opportunities to the local people will improve the earning and spending capacity of the people. The people in area will be able to utilize improved facilities with regard to education, health care, hygiene, recreational opportunities, small business opportunities etc.

The main focus areas for the development of local community are as follows:

- Education
- Health and Family Welfare
- Sustainable Development and Livelihood
- Rural Infrastructure Development
- Social Reform

9.10 Conclusion

The project activity and the management will provide assistance for the development of public amenities in the region.

The mine management will recruit semi-skilled & unskilled eligible workers from the nearby villages.

The overall effect will improve the buying power of employees and thus a higher standard of living viz. better education, improved health and sanitation facilities, housing and acquisition of consumer durables. Housing, transport, medical, educational and other civic amenities will get betterment in the future. This is envisaged as a major positive benefit.

9.11 Recommendations: The following recommendations are being made in respect of the cluster of Mines, which are to be in addition to the EC conditions that are laid for the individual Mines.

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Specific recommendations in respect of cluster of Mines

Sr. No.	Environment	Recommendation	Remarks
1	Air	To sprinkle water on common roads	✓
		To grow plants all along the road sides with a spacing of 10 meters on both the sides.	✓
		To conduct air monitoring studies yearly	✓
		To see that the minimum spacing between trucks is at least 25 meters	✓
		To adjust the engine maximum RPM to 80% of full RPM to reduce diesel consumption	✓
		To limit the speed of trucks to 25 kmph	✓
2	Water	To construct garland drains and retaining walls to prevent rolling boulders and silt into nearby water bodies	✓
		To limit the excavation limit to 25 meters for all along the common road side	✓
		To maintain rain water harvesting pits all along the common road side	✓
3	Noise	No specific measure for cluster as a whole	✓
4	Safety	To maintain atleast 10 meters road width for all common roads	✓
		To provide safety road signs	

5	Others	To have common waste oil filling collection facility by engaging a common approved collector	✓
		To have a centralized place of dumping scrap and organize for collection of same through available facility	✓

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CHAPTER-X

SUMMARY & CONCLUSION

10.0 Introduction

As per the MoEF &CC, New Delhi Gazette dated 14th September 2006 amended in December 2009, April 2011, Dec 2012, March 2013, Sep 2013 and Jan 2015, the proposed mining project is categorized as category 'B1' project.

The projects are proposed to mine Granite mineral; from the cluster named Cluster No. 49 "Ekalsingha" Granite Mine located Near Villlage Ekalsingha, Tehsil- Kekri, Dist- Ajmer, Rajasthan. Total Cluster area is 14.3802 Hectare.

As per Cluster Situation total 12 leases falls in this Cluster No.49 "Ekalsingha" Granite Mine Out of Which 1 is Proposed Fresh L.O.I for applied Total area 1.0023 Hectare & 11 is Existing mine for Existing area 13.3779 Hectare. Total Cluster area is 14.3802 Hectare. Details of Proposed Applied Area Project Proponent & Existing Lease holder given below table-

Sr. No	Name of Project	M.L No	Area in Hq.	Status of Lease in Cluster
1	**Sh. Devraj Gurajr**	**51/2018**	**1.0023**	Fresh Proposed L.O.I
2	M/s A.G Mines & Minerals	24/2018	1.4143	Existing Lease
3	M/s Sawai Bhoj Granite	31/2018	1.3006	Existing Lease
4	Shree Giriraj Granite	57/2018	1.5835	Existing Lease
5	M/s Satya Suman Marble & Granite	86/2018	1.0025	Existing Lease
6	Sh. Sagar Sharma	119/2018	1.0229	Existing Lease
7	M/s Shri Tirupati Granite Mines	18/2019	1.3848	Existing Lease
8	M/s Arihant Granites	22/2019	1.4797	Existing Lease
9	Sh. Jagdish Bairwa	07/2019	1.0144	Existing Lease
10	Shivraj Gurjar	28/2018	1.0001	Existing Lease
11	M/s Aditi Granite & Mineral	70/2018	1.00	Existing Lease
12	M/s Basarani Granite	108/2018	1.1751	Existing Lease

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The above mentioned projects constituting mine lease are identified for preparing cluster-wise integrated EIA & EMPs, addressing environmental concerns comprehensively and ensuring effective co-ordination of environmental control measures within cluster.

- L.O.I Lease Details:

S.No	Name of Project	M.L No	Area in Hq.	Status of Lease in Cluster Proposed Fresh L.O.I
1	Sh. Devraj Gurjar S/O Sh. Gopi Lal Gurjar	51/2018	1.0023	Fresh Proposed L.O.I vide letter no-SME/Aj/Sawar/M.L-51/2018 on dated 19-12-2018

- Details of mine lease in Cluster for EIA/EMP reports have been detailed:

S.No	Name of Project	M.L No	Area in Hq.	Coordinates
1.	Sh. Devraj Gurjar S/O Sh. Gopi Lal Gurjar	51/2018	1.0023	Latitude-26° 01' 16.28519" N to 26° 01' 14.74277" N Longitude- 75°12'13.37401" E to 75°12'11.19149" E

10.1 Breif Description of the Cluster

As per the MoEF &CC, New Delhi Gazette dated 14th September 2006 amended in December 2009, April 2011, Dec 2012, March 2013, Sep 2013 and Jan 2015, the proposed mining project is categorized as category 'B-1' project. The projects are proposed to mine Granite, from the cluster named Cluster No. 49 "Ekalsingha" Granite Mine of 12 leases out of which 1 is Proposed fresh L.O.I & 11 is Existing Mine Lease Located N/v- Ekalsingha, Tehsil: Kekri, Dist: Ajmer (Raj.)

The Cluster No. 49 "Ekalsingha" Granite Mine, Total Cluster area- 14.3802 Hectare located at Near Village –Ekalsingha, Tehsil- Kekri, District – Ajmer, (Raj.) falls in Toposheet No. 45N/04.

HIGHLIGHTS

A. The Project

Name of the Project: Cluster No. 49 "Ekalsingha" Granite Mine

Product: Granite

Type of mine: Semi mechanized open cast mining

Rated production capacity :

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Proposed Production of Fresh 1-Applied L.O.I- 162960 TPA (ROM).
11-Existing mine Production Capacity- 2037969.13 TPA (ROM).

Total Cluster Production Capacity- 2200929.13 TPA (ROM).

Table10.4: Salient Feature of Project

• **Culster Production & Cost Details for both proposed and EC granted mine lease:**

S. No.	Particulars	Details
A.	Nature of the Project	Cluster No. 49 "Ekalsingha" Granite Mine, Near village- Ekalsingha, Tehsil- Kekri, District- Ajmer, Rajasthan.
B.	Size of the Project	Total Applied area– 1.0023 hectare Total Existing Lease Area- 13.3779 hectare Total Cluster Area-14.3802 Hectare
1.	Mining Lease Area	Total Applied area– 1.0023 hectare Total Cluster Area- 14.3802 Hectare
2.	Proposed Production Capacity.	Proposed Production of 1-Applied area- 162960 TPA (ROM). Existing 11 -mine Production Capacity- 2037969.13 TPA (ROM). Total Cluster Production Capacity- 2200929.13 TPA (ROM).
C.	**Location Details** (Location Map, Google Image, and Cluster Map have been given in Figure 1.1, 1.2 & 1.3, Chapter 1, Page no. 31, 32 & 33 respectively.)	
1.	Villages	Ekalsingha
2.	Tehsil	Kekri
3.	District	Ajmer
4.	State	Rajasthan
5.	Toposheet No.	45 N/04
D.	**Environmental Settings of the Area** (Map showing 10 km radius of the study area of the Mine lease boundary has been given in Figure 3.1, Chapter 3, Page no.67.)	

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1.	Nearest Town / City	Ekalsingha is about 0.66 km in NE direction from the ML area.
2.	Nearest Highway	SH-12 About 2.56 Km in W direction.
3.	District Headquarter	Ajmer is at a distance of 73.96 Km in NW direction from Cluster Lease area
4.	Nearest Railway Station	Bandanwara Railway Station. (About 52.62 Km in WNW direction).
5.	Nearest Airport	Jaipur International Airport. (About 107.79 Km in SW direction)
6.	National Parks, Wild Life Sanctuaries, Biosphere Reserves etc., Reserved / Protected Forest within 10 Km radius study area	There is no National Park, Wild Life Sanctuary, Biosphere Reserve, Tiger Reserve, Ramsar Site and Wildlife Corridor etc. within 10 km radius.
7.	Water body within 10 km radius of Study area	• Dai Nadi is about 2.5 km in N Direction From Cluster area.
8.	Seismic zone	Zone – II as per IS: 1893 (Part-I) : 2002
D.	Cost Details	
1.	Total Cluster Project Cost	Rs. 10.45 Crore/- (Existing Mines) Rs. 0.95 Crore/- (Proposed L.O.I) **Total- 11.40 Crore of Cluster No. 49 "Ekalsingha" Granite Mine**
2.	Cost for Environment Protection Measures	Cost for Cluster: Rs. 45.60 Lakhs /-

Proposed Production Capacity of Proposed Fresh 1-L.O.I Holders

S.No	Name of Project	M.L No	Area in Hq.	Production Capacity in TPA (ROM)	Cost in Crore
1.	Sh. Devraj Gurjar S/O Sh. Gopi Lal Gurjar	51/2018	1.0023	162960	0.95 Crore

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Existing Production Capacity of 11-Existing Mine Lease Holder

S. No	Name of Existing Lease	M.L No	Area in Ha.	Existing Production as per E.C In Tonnes	Existing Production as per approved Cluster Mining Plan in TPA (ROM)	Project Cost in Crore
1	M/s A.G Mines & Minerals	24/2018	1.4143	90,000 MTPA	99006.13 TPA (ROM)	0.95
2	M/s Sawai Bhoj Granite	31/2018	1.3006	76,049 MTPA	1,82,127 TPA (ROM)	0.95
3	Shree Giriraj Granite	57/2018	1.5835	2,21,940 MTPA	4,21,686 TPA (ROM)	0.95
4	M/s Satya Suman Marble & Granite	86/2018	1.0025		28,294 TPA (ROM)	0.95
5	Sh. Sagar Sharma	119/2018	1.0229	1,09,707 MTPA	1,66,964 TPA (ROM)	0.95
6	M/s Sh. Tirupati Granite Mines	18/2019	1.3848		60,060 TPA (ROM)	0.95
7	M/s Arihant Granites	22/2019	1.4797		2,03,212 TPA (ROM)	0.95
8	Sh. Jagdish Bairwa	07/2019	1.0144		52,650 TPA (ROM)	0.95
9	Shivraj Gurjar	28/2018	1.0001		2,51,206 TPA (ROM)	0.95
10	M/s Aditi Granite & Mineral	70/2018	1.00		2,00,000 TPA (ROM)	0.95
11	M/s Basarani Granite	108/2018	1.1751		2,72,764 TPA (ROM)	0.95
Total			14.3802		22,00,929.13 TPA (ROM)	10.45 Crore

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A. Environmental Aspects

Pollution Potential: Land degradation, generation and propagation of fugitive dust, erosion of soil are the major pollutions anticipated from the proposed mining & allied activities Environmental Impact: Marginal adverse impact on the localized air and land environment, which gets compensated by moderately beneficial impact on the human environment

PROJECT OUTLINE

In this Cluster No. 49 "Ekalsingha" Granite mine Cluster Mining has comprised mineralized area of slightly hilly land over 14.3802 Hectare. The geological reserve (Probable & Possible) for Granite has been estimated as 4916796 cum over mineralized area.

It is evident that demonstrated the mineable reserve (Probable) for building stone/road metal worked out to be **3474772** cum over mineralized area.

Total Reserve Estimation;

S.No	Name of Project	Total Mineable Reserve in MT
1	Sh. Devraj Gurjar	625773.5
2	M/s A.G Mines & Minerals	438968.92
3	M/s Sawai Bhoj Granite	478129
4	Shree Giriraj Granite	209286
5	M/s Satya Suman Marble & Granite	316435.5
6	Sh. Sagar Sharma	533436
7	M/s Sh. Tirupati Granite Mines	615940
8	M/s Arihant Granites	1214206
9	Sh. Jagdish Bairwa	299520
10	Shivraj Gurjar	299456
11	M/s Aditi Granite & Mineral	624752.5
12	M/s Basarani Granite	466203
TOTAL		466203

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Method of mining will be opencast semi mechanized. Handling of slightly hilly land mass will be done both manually and by excavators. Handpicks, spade, chisel, hammer will be used by manual labors for sorting and sizing. Loosening of land mass will be done by drilling and blasting Based on the demand of Granite Cluster Mining as revealed by the respective lessees, a maximum of 466203 MT of Granite will be extracted per annum from 1-Proposed L.O.I Lease holder & 11-Existing Mine Lease area. During next 5 years of the plan period the targeted production expected is given in Table below:- Table No-10.3

A total of 200-220 will be employed during mining operation. The Cluster area is partly covered with soil mixed rock boulders/pebbles followed by granite gneiss/charnockite/migmatite deposit. The soil to be generated will be stacked in the earmarked temporary soil stack and will be utilized for the plantation purpose to be undertaken around the respective haul roads. Moreover, as envisaged, waste from the generated due to excavation which will be utilized by the respective Lessee for making of mine road and allied infrastructures. These are the portions of total excavation which are not suitable for construction purpose due to weathering and softness.

10.2 PRESENT ENVIRONMENTAL SETTING

To achieve these objectives of EIA/ EMP study, the EIA team members of M/s N.S Envirotech Laboratories & Consultant, R/o- Plot No-51, Ganeta House, Shiv Vihar Colony, Near Patrakar Colony, Mansarovar Jaipur monitored different environmental parameters of the core zone (Cluster lease area) and buffer zone (10 km. radial distance) of the project site in accordance with the Guidelines for EIA issued by the MoEF& CC, Govt. of India. The baseline study was carried during the period from March 2021 to May 2021. The baseline monitoring and analysis of different environmental parameters was

conducted by M/s Noida testing Laboratories R/o-GT-20, Sector-117, Noida, Goutam Buddh Nagar, 201301.

10.2.1 LAND USE AND TOPOGRAPHY

Cluster area is located within the revenue jurisdiction of Ekalsingha village under Kekri Tehsil of Ajmer district. The targeted area represents a slightly land with highest altitude of 335 mRL & the lowest altitude of 328 mRL. There is hardly any vegetation. There is no human settlement within the Cluster lease area.

It is observed from the dug wells of the adjacent plain area and in the nearby villages Ekalsingha that the ground water table varies between 80 m to 100 m from the surface level depending upon seasonal variations. During dry season the water table falls to 80 m from the surface, whereas during rainy season the water table remains at around 100 m from the surface.

There is chance that during monsoon the run-off water may find access to some of the quarries in the cluster. The water so discharged will be routed to the natural drainage through series of drains and settling pits. Also, it is proposed to have a peripheral drain around the each pit of the individual lease holder belonging to the cluster to restrict the surface runoff in to the quarry area.

10.2.2 AMBIENT AIR QUALITY

The major contributors of air emissions are industrial emission, vehicular movement combustion of bio-fuel and other man made sources. During the study period the concentration of PM 10 varies from 45.5 to 89.49 µg/m3 and PM2.5 varies from 24.46 to 59.49 µg/m3. The concentration of SO2 varies from 5.6 to 12.21 µg/m3, NOx concentrations vary from 10.34 to 25.9 µg/m3 and CO concentrations vary from 0.027 to 1.75 µg/m3. From the ambient air quality monitoring carried out for three months (March 2021 to May 2021) of

the study period shows that the critical pollutants like PM10, SOx and NOx are well within the permissible limits.

10.2.3 WATER QUALITY

As per the monitoring and analysis of ground water of selected sampling areas, it has been observed that

- Water is colorless and odorless and found to be suitable for human consumption.
- The pH level of the ground water sample ranges from 7.20 ~ 7.72. This indicates that the pH of the ground water in the study area is alkaline and as per the drinking water standard.
- Total hardness ranges from 279 to 328.4 mg/l, and total dissolved solid ranges from 890 to 1241 mg/l.

10.2.4 NOISE QUALITY

At present the area is a barren land without any human interference. So the present noise level of the area is lower comparative with the village. The noise level as measured in the core zone is 56.4 dB (A) in day time and 41.4 dB (A) in the night time. In the buffer zone the noise level ranges from 58.1 to 56.4 dBA during day time and 41.4 to 36.2 dBA during night time. The noise level is slightly high during day time as per the standard of the Noise Rule, 2000 for rural area. The lease area and all the sampling points are comes under rural area

10.2.5 SOIL QUALITY

The soil analysis result shows that, the pH of the soil samples collected are mostly alkaline. Texture of the soil varies from silt loam to sandy clay loam. Electrical conductivity ranges from 232 to 328.0 µs/Cm. Phosphorous content varies from 10.73 to 14.69 Kg/Ha and Magnesium content 53.85 to 74.32 Kg/Ha. Total organic carbon of the soil varies from 0.38 to 0.48 %. From the soil analysis result it can be concluded that the soil of the area is highly fertile and suitable for agricultural purpose.

10.3 PROPOSED MITIGATION MEASURES:

MITIGATION MEASURES OF WATER POLLUTION

- The ground water table thus shall not be encountered nor shall groundwater regime be affected. Further as per secondary data on hydrogeology, these areas are underlain by semi consolidated and consolidated hard rock's.
- Garland drains will be constructed on all side of cluster quarries and external dumps. All the garland drains will be routed through settling pits to remove suspended solids from flowing into storm water. The water collected in the pit, after settling of the suspensions, shall be used for plantation.
- Individual Retaining walls with weep holes will be constructed by cluster lessee for stop the discharging of waste dump during rainy season. The storm water should pass through weep holes to the garland drains as detailed out in mining plan.

A temporary toilet with septic tank shall be provided at the site for the use of workers during day time to prevent toilet in open.

MITIGATION MEASURES OF AIR POLLUTON

- Planning transportation routes of mined material so as to reach the nearest paved roads by shortest route. (minimize transportation over unpaved road);
- Dust mask shall be provided to the workers engaged at dust generation points like excavations and loading points;
- Regular water sprinkling on unpaved roads to avoid dust generation during transportation;
- Transportation of material shall be carried out during day time only;
- The speed of trucks plying on the haul road should limited to avoid generation of dust;

- Haul road shall be covered with gravels; and
- Covering of material during transportation on trucks to prevent spillage of sand from the trucks. The trucks shall be covered by tarpaulin. Overloading shall be avoided.

MITIGATION MEASURES OF NOISE POLLUTION

- A green belt development by individual lessee of proposed and existing Cluster area at both side of haul roads and safety barrier zone and backfilled area.
- All the machinery is running only day time and properly time to time grassing and oiling will be done in machinery.
- Drilling and blasting will be done in the frame work period and blasting has been done in day time only.
- A noise monitoring has been done time to time by individual lessee.
- Wet drilling will be used.
- The waste will be dump from low height at the dump site.
- Vehicles movements will be restricted in night time.
- Ear plugs has been provided to labours
- By carefully designing a blast hole using experience and deciding drilling pattern or blast geometry with appropriate burden distance, spacing as holes, hole size, hole depth, and stemming height, and powder factor.

In order to reduce the effect of noise pollution, ear plugs /earmuffs shall be provided to workers

MITIGATION MEASURES OF SOIL POLLUTION

- Garland Drain and retaining wall will be constructed in the slope of the dump and mineral stack, so the surface runoff from the dump will be passed through the garland drain and settled in a settling pit before

discharging outside. This decreases the soil erosion or deposition of the contaminants on the agriculture land.

- The labours in the mines are from the nearby areas so there will be no residential colony development within the Cluster area. This result in very small generation of domestic solid waste. However the domestic solid waste will be treated through septic tank via soak pit.

The Top Soil generated during the mining activity will be used for plantation

MITIGATION MEASURES FOR BIO-DIVERSITY CONSERVATION

- Measures will be taken to curb pollution in air, water, land & noise environment.
- Greenery development around mine area will help in creating habitats for local faunal species and to create better environment for various fauna.
- Creating and developing awareness for nature and wildlife in the adjoining villages.

MITIGATION MEASURES OF SOCIO-ECONOMIC ENVIRONMENT

- Rural/village & Community welfare,
- Healthcare of local population,
- Free medical camps,
- Literacy awareness, supports to schools etc.,
- Environment protection and Environment awareness activities like Environment awareness camps, plantation etc.
- Social awareness program.

Thus the socio-economic status of the area will be improved.

IMPLEMENTATION OF OCCUPATIONAL HEALTH AND SAFETY MEASURES

- Safety clauses in contract order

- Inspection and maintenance of equipment's and accessories
- Pre placement and periodic health check up
- Removal of unsafe conditions and prevention of unsafe acts
- Detailed analysis of each and every incident
- To provide standard PPEs and ensure their uses
- Celebrations of various safety events for awareness
- An effective and clearly audible means of giving warning, in case of fire, to every person shall be provided at the site. A free passage–way giving access to each means of escape in case of fire shall be maintained for the use of all workers in the mine.
- Medical facilities & first aid boxes will be established in the mine premises.
- Pits, Sumps, openings in floor etc. which may be a source of danger, shall be either securely covered or securely fenced. Securely fencing a pit means covering or fencing it in such a way that it ceases to be a source of danger.

10.4 Proposed ESR Action plan for the Project:

The proposed project will help in improving the socio-economic status of the near-by villages by generating direct or indirect employment opportunities.

The project will contribute additional revenue to the State and Central Govt. in the form of royalty, cess and other taxes etc. Job opportunities to the local people will improve the earning and spending capacity of the people. The people in area will be able to utilize improved facilities with regard to education, health care, hygiene, recreational opportunities, small business opportunities etc.

The main focus areas for the development of local community are as follows:

- Education
- Health and Family Welfare
- Sustainable Development and Livelihood
- Rural Infrastructure Development

- Social Reform

Details given in Chapter -IX.

10.7 DETAILS OF BUGDET LABOUR WELFARE

Already discuss in chapter -IX.

10.8 Conclusion

As discussed, it is safe to say that the collection of minor mineral from the proposed Cluster area is not likely to cause any significant impact on the ecology of the area.

Adequate measures will be taken to control the fugitive emissions to be generating during mining operation. Green belt development along the lease boundary & outside the lease area with the help of local govt. department and local people as social forestry in the area for betterment of environment.

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CHAPTER NO-XI
DISCLOSURE OF CONSULTANT

M/s N.S. Enviro-Tech Laboratories & Consultant is expertise in Mining and Environment Management provides comprehensive professional services for Mining, Cement Plants, Isolated Storage & handling of hazardous chemicals, Ports, harbours, break waters and dredging, Building & Large Construction and Metallurgical industries (ferrous & non-ferrous) sectors.

M/s N.S. Enviro-Tech Laboratories & Consultant was established in the year 2015. It is an ISO 9001:2008 certified organization. It is NABET accredited Organization for preparation of EIA/EMP for Mining, and Cement Plants, Isolated Storage & handling of hazardous chemicals, Ports, harbours, break waters and dredging, Building & Large Construction and Metallurgical industries (ferrous & non-ferrous) sectors projects by NABET.

LIST OF EXPERTS TEAM Of NSETLC

S. No	Name	Qualification /Work Experience
1	Mr.N.S. Naruka (CEO)	M. Phill in Environment Management & M. Sc- Environment Science, Certified lead auditor in Environment Management System. Approved A cat. By NABET, EIA Co-coordinator- Mining A cat. & Functional Area Expert- AP, WP & SHW and more than 15 Years work experience in the field of Environment Clearance and preparation of EIA/EMP Report.
2	Mr. S.P Goyal Ex. Controller of Mines, IBM, India	B.E (Mining). Approved A cat. By NABET, EIA Co-coordinator- Mining (Underground & Opencast) & Functional Area Expert- AP, NV, RH & SHW & more than 6 years experience in the field of Consultancy on Mining and Environment.
3	Mr. S.C. Sharma (Ex. Chief Mining Engineer, Coal India Limited)	B.E (Mining Engineering). Approved A cat. By NABET, EIA Co-coordinator- Mining (Underground & Opencast) & Functional Area Expert- NV, RH & more than 10 years experience in the field of Consultancy on Mining and Environment.

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4	Dr. A. K Pandey	Ph. D & Post Doct. in Environment Science B.J (M.C) in Journalism Diploma in Disaster Management & M. Sc Ecology & Env. Science & more than 25 years experience in the field of Consultancy on Mining and Environment. Approved A cat. By NABET, EIA Co-coordinator- Mining & -1, Highway-34, and Common municipal solid waste-37, Functional Area Expert- EB, & SHW.
5	Mr. Rakesh Giri Goswami(Ex. Sr. Geologist, DMG, Jodhpur.)	M.SC. TECH. in applied Geology. Functional Area Expert- HG & GEO & more than 6 years experience in the field of Consultancy on Mining and Environment.
6	Mrs. Purnima Panwar	M. Sc- Environment Science. Functional Area Expert- EB & SC & TM –AEC- Mining & TM- SHW & more than 9 Years work experience in field of Environment Consultancy.
7	Ms. Anju	M.A- Sociology. Functional Area Expert- SE & more than 10 Years work experience in Social Development & NGO.
8	Mr. Rajveer Singh	M.Sc- Remote Sensing and GIS. EIA Co-coordinator- Rope way & Functional Area Expert- LU and more than 10 Years work experience in the field of Environment Clearance and preparation of EIA/EMP Report.
9	Mr. Kailash Meena	Post-Graduation (M.A. in Geography) & P.G. Diploma in Remote Sensing & GIS Functional Area Expert- LU. More than 5 Year work Experience as Empanelled Expert Land Use.
10	Mr. Vikash Jangir	M. Sc- Environment Science. Functional Area Associated & Team Member- AP & WP & AQ More three years work experience in the field of Environment Clearance and preparation of EIA/EMP Report.

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11	Ms. Sweta Sarkar	M. Sc- Environment Science. Functional Area Associated & Team Member- AP & WP & TM EB & SC More than three years work experience in the field of Environment Clearance and preparation of EIA/EMP Report.
12	Ms. Mansi Patel	M. Sc- Environment Science. Functional Area Associated – EB, SHW & TM- SC one year work experience in the field of Environment Clearance and preparation of EIA/EMP Report
13	Dr. Ravi Kumar Ranjan	Ph. D- Environmental Science and Engineering. M. Tech Environmental Science and Engineering. Functional Area Expert- AQ. More than 7 Year work Experience in the field of Environment Consultancy.
14	Ms. Ambika Bhatt	M. Sc. Microbiology. TM- WP. More than 7 Year work Experience in the field of Environment Consultancy.
15	Mr. Mahipal Singh Chouhan	M. Sc- Geology. TM- HG & GEO. 3 Year work experience in Hindustan Zinc Limited. 2 Year work experience in Environment Consultancy.
16	Mr. Gajendra Singh Chouhan	B-TECH- Civil Engineer. TM- HG & NV. 4 Year work experience in Environment Consultancy.
17	Ms. Poonam Rajora	M.A Sociology & Public Administration. TM-SE. 2 Year work experience in Environment Consultancy.
18	Mrs. Shikha Sharma	AutoCAD Expert

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