

**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL  
PRINCIPAL BENCH, NEW DELHI**

**O. A. NO. - 422 OF 2023**

**IN THE MATTER OF:**

**ABHISHEK SHUKLA**

**... APPLICANT**

**VERSUS**

**SAFDAR ALI**

**... RESPONDENT**

**NDOH : 02.08.2024**

**INDEX**

<b>S.NO.</b>	<b>PARTICULARS</b>	<b>PG NO.</b>
<b>1.</b>	Copy of Environment Impact Assessment Report (EIA) along with necessary Annexures, in compliance with the order dated 20.05.2024 passed by this Hon'ble Tribunal.	1-177

**RESPONDENT**



**S. C. LADIAND COMPANY**

Deeksha L. Kakar and Dhruv Kakar

ADVOCATES

B-6/58, LGF, SAFDARJUNG ENCLAVE

NEW DELHI — 110029

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Enrol.No.D/1154/2008

Place: New Delhi

Dated: 23.07.2024

**Environmental Impact Assessment**  
&  
**Environmental Management Plan**  
**(FINAL EIA REPORT)**

**Building Stone, Khandas & Gitti, Boulder Mining Project**

At

**Gata No. 2450 Khand No.-03**

**(Area 2.0 Ha.)**

**Village Jarar**

**Tehsil Naraini & District- Banda, Uttar Pradesh**

**Production Capacity 20000 m<sup>3</sup> per year**

Project Proponent:- Shri Safdar Ali S/O-Late Shri Farzand Ali

R/O-Muhalla-Khunti Chauraha,

Aliganj, City & District-Banda (U.P.)



**Prepared By:-**

**Environmental Research and Analysis, Lucknow (U.P.)**

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**SUMMARY OF THE PROJECT**

<b>INTRODUCTION</b>			
<b>Project</b>	Building Stone, Khandas & Gitti, Boulder Mining		
<b>Proponent</b>	Shri Safdar Ali, S/O-Late Shri Farzand Ali		
<b>Address</b>	R/O-Muhalla-Khunti Chauraha, Aliganj, City & District-Banda (U.P.)		
<b>Project Site Location</b>	Gata No. 2450 Khand No.-03 (Area 2.0 Ha.) in Village Jarar, Tehsil Naraini & District- Banda, Uttar Pradesh		
<b>Lease Period</b>	20 years		
<b>Lease Area</b>	2.0 Hectares		
<b>Letter of Intent</b>	LOI No.820/ khani-30 , Banda Date- 08/6/2019		
<b>Date of LOI Issued</b>	08/6/2019		
<b>Date of TOR* Issued</b>	429/Parya/SEAC/5000/2019 date 27/11/2019		
<b>EIA study period</b>	Soon after the SEAC granted TOR		
<b>TECHNICAL ASPECTS</b>			
<b>Project Site</b>	Gata No. 2450 Khand No.-03 (Area 2.0 Ha.) Village Jarar, Tehsil Naraini & District- Banda, Uttar Pradesh		
<b>GPS Coordinates</b>	<b>Points. No.</b>	<b>Latitude</b>	<b>Longitude</b>
	A	25° 18' 56.05"N	80° 21' 37.59"E
	B	25° 18' 55.32" N	80° 21' 38.98" E
	C	25° 18' 58.86" N	80° 21' 46.28" E
	D	25° 19' 1.48" N	80° 21' 44.13" E
	E	25° 18' 58.58" N	80° 21' 38.69" E
F	25° 18' 57.21" N	80° 21' 39.20" E	
<b>Elevations</b>	The highest and lowest point in the leasehold is 192.90mRL towards NE direction and 163.10mRL towards SW direction.		
<b>Mode of Mining</b>	Mechanized		
<b>Proposed Quantity</b>	20000 m <sup>3</sup> per annum		
<b>Geological Reserve</b>	453668 m <sup>3</sup>		
<b>Mineable Reserve</b>	20000 m <sup>3</sup> /year		
<b>Mining Plan</b>	Directorate of Geology and Mines, Lucknow vide Letter No. 765/ मातो प्लान / 2016 on dated 13/08/2019		
<b>Workers Required</b>	27 Approximately		

<b>Total tippers required /day</b>	Approximately 5 – 6 movements per day. (Vehicles such as Truck dumper/tipper, Tractor Trolleys, etc. will be in use)
<b>Ease of Mining</b>	
<b>Connecting Highway</b>	MDR 11B about 3.01 km towards East direction from the project site.
<b>Nearest Densely Populated Area</b>	Banda at 18.80 Km towards East direction.
<b>Population</b>	Approximately 2000
<b>Water Requirement</b>	8.35 KLD
<b>Drinking water</b>	0.35KLD
<b>Water Availability</b>	From nearest village through local vendors
<b>Primary Health Centre</b>	Naraini is 18.0 km from the project site towards South-East direction.

**QUESTIONNAIRE FOR ENVIRONMENTAL APPRAISAL OF MINING PROJECTS  
(MINING SECTOR PROJECTS)**

- Note 1: All information to be given in the form of Annex/s should be properly numbered and form part of reply to this performa.
- Note 2: Please enter  $\surd$  in appropriate box where answer is Yes / No
- Note 3: No abbreviation to be used - **Not available** or **Not applicable** should be clearly mentioned.
- Note 4: **Core zone** is the mining lease area.  
**Buffer zone** in case of ML area up to 2.0 ha is to be considered as **5 km** all around the periphery of the core zone and for ML area above 2.0 ha an area **10 km** all around the periphery of the core zone.
- Note 5: Adopt **Scoping process** in carrying out EIA study.
- Note 6: Please indicate source of data.

**1. General Information-**

<b>1</b>	<b>General information</b>	
<b>a</b>	Name of the project	Building Stone, Khandas & Gitti, Boulder Mining Project
<b>I</b>	Name of the proponent	<i>Proponent:- Shri Safdar Ali S/O-Late Shri Farzand Ali</i>
<b>ii</b>	Mailing Address	<i>R/O-Muhalla-Khunti Chauraha, Aliganj, City &amp; District-Banda (U.P.)</i>
	E-mail	-
	Telephone	-
	Fax No.	-
<b>b</b>	Objective of the project	Building Stone, Khandas & Gitti, Boulder Mining Project
<b>c</b>	Location of mine	
	Village	<i>Jarar</i>
	Tehsil	Naraini
	District	Banda
	State	Uttar Pradesh

<b>d</b>	<b>Does the proposal relate to</b>	Yes
i	New mine	✓
ii	Expansion	-
iii	Increase in ML area	-
iv	Increase in annual production	✓
v	Renewal of ML	-
vi	Modernization	-

<b>e</b>	Site Information			
<b>f</b>	Geographical Location			
	Project Coordinates	Point	Latitude	Longitude
		A	25° 18' 56.05"N	80° 21' 37.59"E
		B	25° 18' 55.32" N	80° 21' 38.98" E
		C	25° 18' 58.86" N	80° 21' 46.28" E
		D	25° 19' 1.48" N	80° 21' 44.13" E
		E	25° 18' 58.58" N	80° 21' 38.69" E
		F	25° 18' 57.21" N	80° 21' 39.20" E
<b>g</b>	Survey of India Topo sheet number	63C/7		

	Elevation above Mean Sea Level	<i>The highest and lowest point in the leasehold is 192.90mRL towards NE direction and 163.10mRL towards SW direction.</i>	
	Total mining lease area (in ha.)	2.0 Ha.	
ii	<b>Dominant nature of terrain</b>	<b>Yes</b>	<b>No</b>
	Flat	-	✓
	Undulated	✓	-
	Hilly	-	✓
<b>2.</b>	<b>Land usage of the mining lease area (in ha.)</b>		
a	Agricultural	-	
b	Forest	-	
c	Waste land	2.0 Ha. .	
d	Grazing	-	
e	Surface water bodies	-	
f	Others (River Bed )	2.0 Ha.	
	<b>Total</b>	2.0 Ha.	
<b>3.</b>	<b>Indicate the seismic zone in which ML area falls. In case of zone IV &amp; V, details of earth quakes in last 10 years.</b>		Seismic Zone – II
a	Severity (Richter Scale)		
b	Impact i.e. Damage to	<b>Yes</b>	<b>No</b>
	Life	-	✓
	Property	-	
	Existing mine	-	

4.

**Break-up of mining lease area (in ha.) as per approved conceptual plan:**

Purpose	Mining Lease Area				Total	Area acquired			
	Government		Private			Government		Private	
	Forest	Others	Agri.	Others		Fore st	Others	Agri.	Others
1. Area to be excavated	-	2.0 Ha.	-	-	2.0 Ha.	-	-	-	-
2. Storage for top soil	-	-	-	-	-	-	-	-	-
3. Overburden / Dumps	-	-	-	-	-	-	-	-	-
4. Mineral storage	-	-	-	-	-	-	-	-	-
5. Infrastructure (Workshop, Administrative Building)	-	-	-	-	-	-	-	-	-
6. Roads	-	-	-	-	-	-	-	-	-
7. Railways	-	-	-	-	-	-	-	-	-
8. Green Belt	-	-	-	-	-	-	-	-	-
9. Tailings pond	-	-	-	-	-	-	-	-	-
10. Effluent treatment plant	-	-	-	-	NA	-	-	-	-
11. Coal handling plant / mineral separation plant	-	-	-	-	NA	-	-	-	-

12. Township area	-	-	-	-	Nil	-	-	-	-
13. Other (Safety zone including road)	-	-	-	-	-	-	-	-	-
<b>TOTAL</b>		2.0 Ha.	-	-	2.0 Ha.	-	-	-	-

<b>5</b>	<b>Township (outside mining lease)</b>		<b>Not Applicable</b>		
a	Total area (in ha)		-		
b	No. of dwelling units		-		
c	Distance from mine site		-		
<b>6</b>	<b>Distance of water bodies (in km)</b>				
	<b>Distance</b>	<b>River Bank *</b>	<b>Other Water bodies * Sea / creek / lake / nalla etc. (specify)</b>		
	<b>Mining lease boundary</b>	None	-		
	<b>Ancillary facilities</b>	None	-		
[* From highest flood line / high tide line]					
<b>7</b>	<b>For projects falling within the Coastal Regulation Zone (CRZ)</b>				
	Whether the mineral to be mined is of rare nature and not available outside CRZ?	<b>Yes</b>	-	<b>No</b>	✓
If yes, annex a scaled location map showing low tide line (LTL), high tide line (HTL) duly demarcated by one of the authorized agencies* [ *Director, Space Application Centre, Ahmadabad: Centre for Earth Sciences Studies, Thiruvananthapuram: Institute of Remote Sensing, Anna University, Chennai: Institute of Wetland Management & Ecological Designs, Kolkata: Naval Hydrographers's Office, Dehradun: National Institute of Oceanography, Panjim, Goa: and National Institute of Ocean Technology, Chennai], boundary of mining lease area, distance of ML area from LTL and HTL CRZ boundary and CRZ classification of the project area as per the approved Coastal Zone Management Plan, and settlements, sand dunes, mangroves, forest land/patches, turtles breeding and nesting sites etc., if any, in the project area.					
<b>8</b>	<b>Indicate aerial distance from the periphery of core zone / area from the periphery of the buffer zone to the boundary of following (up to 10 km):</b>				
<b>S. No.</b>	<b>Area</b>	<b>Name</b>	<b>Aerial distance from (in km.)</b>		
			<b>Core Zone</b>	<b>Buffer Zone</b>	
1.	National Park / Sanctuary	Nil	-	-	
2.	Biosphere Reserve / Tiger Reserve / Elephant Reserve / any other Reserve	Nil	-	-	
3.	Forest (RF / PF / unclassified)	Nil	-	-	
4.	Habitat for migratory birds	Nil	-	-	
5.	Corridor for animals of schedule I & II of the Wildlife (Protection) Act, 1972	Nil	-	-	
6.	Archaeological sites * Notified * Others	Nil	-	-	
7.	Defense Installation	Nil	-	-	
8.	Industries / Thermal Power Plants	Nil	-	-	

9.	Other Mines	Nil	-	-
10.	Airport	Chakeri, Kanpur	121.0 Km towards North direction.	
11.	Railway Lines	Banda railway station	18.0 Km North direction from applied area	
12.	National / State Highways	MDR 11B	about 3.01 km towards East direction from the project site	

[\* Buffer zone in case of ML area up to 2.0 ha. is to be considered as **5 km** all around the periphery of the core zone and for ML area above 2.0 ha. an area **10 km** all around the periphery of the core zone].

### 9. Description of flora & fauna separately in the core and buffer zones.\*

[\* Consult the Wildlife (Protection) Act, 1972 as amended subsequently and list species with (1) Common name (2) Scientific name and (3) under which schedule of the Wildlife (Protection) Act the identified species fall. Get the list authenticated by an Expert in the field / credible scientific institute / University / Chief Wildlife Warden Office. **Information to be based on field survey**

**List of Flora & Fauna is given in Section III of Final EIA report.**

10	<b>Details of mineral reserves (as per approved Mining Plan)</b>	Quantity	
a	Proved	287610	
b	Feasibility	75916	
c	Mineable reserves	300246	
11	<b>Major geological formation / disturbances in the mining lease area</b>	<b>Yes</b>	<b>No</b>
a	Geological maps submitted	✓	-
b	Geological sections submitted	-	✓
c	Contour map submitted	-	✓
d	Whether the presence, if any, noted of		
I	Faults	-	✓
ii	Dykes	-	✓
iii	Shear Zone	-	✓
iv	Folds	-	✓
V	Other weak zones	-	✓
e	Source of data (Indicate)	-	
12	<b>Production of mineral(s) and life of mine</b>		
a	Rated capacity of mine mineral wise (Tonnes / annum)	20000 m <sup>3</sup> /year	
b	Life of mine at proposed capacity (Years)	-	
c	Lease period (Years)	20 years	
d	Date of expiry of lease (D /M /Y)	-	
e	Indicate in case of existing mines	NA	
i	Date of opening of mine	-	
ii	Production in the last 5 years 1 <sup>st</sup> year 5 <sup>th</sup> year from year..... to year ..... in million tonnes.	-	
iii	Projected production for the next 6 <sup>th</sup> to 10 <sup>th</sup> year 5 years from year ..... to year	-	

	.....in million tonnes.		
iv	Whether mining was suspended after opening of the mine?		-
v	If yes, details thereof including last production figure and reason for the same.		-
f	Whether plans & sections provided?		-
<b>13</b>	<b>Type and method of mining operations</b>		
	<b>TYPE</b>	<b>METHOD</b>	
	Opencast	✓	Manual ✓
	Underground	-	-
	Both	-	-
<b>14</b>	<b>Details of ancillary operations for mineral processing</b>		
a	Existing		Not applicable
b	Additional		Not applicable
<b>15</b>	<b>Mine details</b>		
a	<b>Opencast mine</b>		
i	Stripping ratio (mineral in tonnes to over burden in m <sup>3</sup> )		-
ii	Ultimate working depth (in m bgl)		6.0 m
iii	Indicate present working depth in case of existing mine (in m bgl)		-
iv	Thickness of top soil (in m.)		-
a	Minimum		-
b	Maximum		-
c	Average		-
v	Thickness of overburden (in m.)		<b>0m</b>
a	Minimum		-
b	Maximum		-
c	Average		-
vi	Mining Plan		<b>Approved by DGM LKO</b>
a	Height and width of the bench in overburden / waste.		
b	Height & width of the bench in ore body / coal seam.		-
c	Proposed inclination / slope of the sides of the opencast mine (separately for overburden, coal / ore and overall slope of the pit sides) both while operating the mine as well as at the time of Closure of the mine.		-
d	Whether transverse sections across the open cast mine at the end of fifth year and at the end of the life of the mine have been submitted?		-
vii	Type of blasting, if any, to be adopted		-
b	Underground mine-		<b>Not Applicable</b>
i	Seam / Ore body		
	Min. Depth (m)		-
	Max. Depth (m)		-
	Avg. thickness (m)		-
	Rate of dip		-
	Direction of dip in degree		-
ii	Mode of entry into the mine		
	Shaft		-
	Adit		-
	Incline		-

iii	Details of machinery		
	On surface	-	
	At Face	-	
	For transportation	-	
	Others	-	
iv	Method of stopping (metalliferrous mines)		
	Open	-	
	Filled	-	
	Shrinkage	-	
	Caving	-	
	Combination of above	-	
	Others (Specify)	-	
v	Extraction method		
	Caving	-	
	Stowing	-	
	Partial extraction	-	
vi	Subsidence		
	Predicted max. subsidence (in m)	-	
	Max. value of tensile strain (in mm/m)	-	
	Max. slope change (in mm/m)	-	
	Whether identified possible subsidence area(s) superimposed on Surface Plan has been submitted?	-	
	Major impacts on surface features like natural drainage pattern, houses, buildings, water bodies, roads, forest, etc.	-	
	Salient features of subsidence management (monitoring and control).	-	
<b>16</b>	<b>Surface drainage pattern at mine site</b>		
	<b>Yes</b>	<b>No</b>	
<b>a</b>	Whether the pre-mining surface drainage plan submitted?	-	✓
<b>b</b>	Do you propose any modification / diversion in the existing natural drainage pattern at any stage? If yes, when. Provide location map indicating contours, dimensions of water body to be diverted, direction of flow of water and proposed route / changes, if any i.e. realignment of river / nallah / any other water body falling within core zone and its impact	-	✓
<b>17</b>	<b>Embankment and / or weir construction</b>		
<b>a</b>	Do you propose, at any stage, construction of		
<b>i</b>	Embankment for protection against flood?	No	
<b>ii</b>	Weir for water storage for the mine?	No	
<b>b</b>	If so, provide details thereof.		
<b>c</b>	Impact of embankment on HFL and settlement around.	-	
<b>d</b>	Impact of weir on downstream users of water	-	
<b>18</b>	<b>Vehicular traffic density (outside the ML area)</b>		
		Type of vehicles	No. of vehicles (in PUC per hour)
<b>a</b>	Existing	Car, Jeep, Truck	30/Hr (approximate)

		<b>estimation)</b>	
b	<b>After the proposed activity</b>	Car, Jeep, Truck	<b>60/Hr (approximate estimation)</b>
c	Whether the existing road network is adequate? If no, provide details of alternative proposal?	Yes	
19	Loading, transportation and unloading of mineral and waste rocks on surface	<b>Yes</b>	<b>No</b>
a	Manual	✓	-
b	Tubs, mine cars, etc.	-	✓
c	Scraper, shovels, dumpers / trucks	✓	-
d	Conveyors (belt, chain, etc.)	-	✓
e	Others (specify)	-	✓
<b>20</b>	<b>Mineral(s) transportation outside the ML area</b>		
		<b>Qty. (in Cum/day)</b>	<b>Percentage (%)</b>
a	<b>Road</b>	66.67	100
b	<b>Rail</b>	-	-
c	<b>Conveyors</b>	-	-
d	<b>Rope way</b>	-	-
e	<b>Water ways</b>	-	-
f	<b>Pipeline</b>	-	-
g	<b>Others (Specify)</b>	-	-
<b>Total</b>		66.67	100

## 21. Baseline Meteorological and Air Quality data

### (a) Micro-meteorological data

[Continuous monitoring through autographic instrument for one full season other than monsoon]

- (i) Wind rose pattern for one full season (16 points of compass i.e. N, NNE, NE, ---) based on 24-hourly data. For coastal area also furnish day-time and night time data.
- Day time
  - Night time
  - 24 – hours period

### (b) Ambient air quality data\* (RPM, SPM, SO<sub>2</sub>, and NO<sub>x</sub>)

[\*Monitoring should be carried out covering one full season except monsoon – same season as in 21 (a) (i)]

[\*Frequency of sampling: Sampling to be done twice a week for the entire season 24 hourly for SPM & RPM. For gaseous pollutants 24- hourly data is given irrespective of the sampling period. ]

No. of samples collected at each monitoring station: **3 × 8 hourly a day (alternatively)**

**22. Stack and emission details, if any\***

S. No.	Process / unit of operation (e.g. DG Set, Boiler)	Height of stack (m)	Internal top dia. (m)	Flue gas exit velocity (m/sec)	Emission rate (kg/hr)				Heat emission rate from top of stack (K.cal/hr)	Exhaust / Flue gas			
					SPM	SO <sub>2</sub>	NO <sub>x</sub>	CO		Temp °C	Density	Specific Heat	Volumetric flow rate (m <sup>3</sup> /hr.)
<b>Not Applicable</b>													

**23. Details of fugitive emissions during mining operations\*****Not Applicable****24. Air Quality Impact Prediction (AQIP)\*****Not Applicable**

- (a) Details of model(s) used for AQIP including grid Size, terrain features, and input meteorological data
- (b) Maximum incremental GLC values of pollutants based on prediction exercise

S. No.	Pollutants	Incremental Value	Ambient Air Quality	Resultant Air Quality (in µg/m <sup>3</sup> )
1.	SPM	--	--	--
2**.	SO <sub>2</sub>	--	--	--
3**.	NO <sub>x</sub>	--	--	--

[\* Question Number 22, 23 &amp; 24 need not be filled-in for mines having ML area of 2.0 ha. or less.]

[\*\*Information on item no. 2 &amp; 3 to be provided in cases with captive power generation of 500 KVA and above]

**25. Water requirement (m<sup>3</sup>/day)**

Purpose	Avg. Demand	Peak Demand
<b>A. Mine site</b>		
1. Mine operation	-	-
2. Land reclamation	-	-
3. Dust suppression	7.20 KLD	7.20 KLD
4. Drinking	0.38 KLD	0.38 KLD
5. Green Belt	-	-
6. Beneficiation	-	-
7. Washeries	-	-
8. Fire Service	-	-
9. Others (Plantation)	0.80 KLD	0.80 KLD
<b>B. Township</b>		
1. Green Belt	-	-
2. Domestic	-	-
<b>C. Other (specify)</b>		
	-	-
<b>Total</b>	<b>8.38 KLD</b>	<b>8.38 KLD</b>

**26. Source of water supply\***

S. No.	Source	m <sup>3</sup> /day
1	River (name)	-
2	Water tanks from local vendors(For Drinking Purposes)	0.38 KLD
3	Mine water (sump / pit)	-
4	Other fort dust suppression from local vendors	7.20 KLD
5.	Plantation from local vendors	0.80 KLD

[\*Annex a copy of sanction letter / permission from the concerned authority (Central Ground Water Authority in case of ground water abstraction is from notified area / State Ground Water Board in case of non-notified area / State Irrigation Department for surface water pumping) for drawing water.]

**27. Water quality\***

- (a) Annex physico -chemical analysis of water at intake point \*\* (**Reports are Annexed**)

**Details are given in Section III**

- (b) In case of existing mine, annex report on quality of water discharge i.e. complete physico - chemical analysis\*\*

[\*For non-discharging mines at least four ground water samples to be taken preferably from downstream direction of the mine in pre-monsoon and post-monsoon periods and analyzed. For discharging mines six samples are to be analyzed]

\*\*All parameters as per BIS 10500. Indicate name of Methodology, Equipment used for analysis, and Detection Level (DL) for each parameter.

\*\*\* Wherever any analytical parameter is below detection level, "BDL" (Below Detection Level) should be written instead of 'NIL'.

<b>28.</b>	<b>Impact on ground water regime / stream / lake / springs due to mine dewatering *</b>	
a	Radius of influence (in m) [To be estimated based on analysis of pumping test data and application of empirical formula]	-
b	Whether saline water ingress will take place? (applicable to coastal areas)	-
c	Impact on stream / lake / springs	-
<p><b>[* Provide a comprehensive hydro-geological assessment report</b> if the average mine dewatering is more than 100 m<sup>3</sup>/day and or going below water table in non-monsoon period. The report should be based on preferably latest one year pre-monsoon and post-monsoon baseline data covering information on ground water situation, aquifer characteristics, water level conditions (April – May and November), estimate of ground water resources, predicted impact of the project on ground water regime and detailed remedial / conservation measures such as artificial recharge of ground water etc. The report should be based on actual field inventory out of existing wells, at least 30 observation wells in the buffer zone with supplementary information from secondary sources (mention name). For estimation** of ground water resource (refer question no. 28 above) be designated study area of the buffer zone may be sub-divided into command and non-command areas, watershed-wise (in case of hard rock / consolidated formations) / block-wise / mandal-wise in case of alluvial / unconsolidated formations)]</p>		
<p>[**For estimating ground water resources in the area follow the Ground Water Estimation Committee recommendations of 1997]</p>		
<b>29.</b>	<b>Waste Water Management</b>	<b>Not Applicable</b>
a	Daily average discharge (m <sup>3</sup> /day) from different sources	
i	Mine water discharge during	
	Lean period	
	Monsoon period	
ii	Workshop	
iii	Domestic (mine site)	
iv	Beneficiation / Washeries	
v	Coal Handling Plant	
vi	Tailings pond	
vii	Others (Specify)	
	Total	
b	Waste water treatment plant; flow sheet for treatment process attached.	
c	Quantity of water recycled / reused / to be recycled in	
i	Percentage	
ii	m <sup>3</sup> /day	
d	Point of final discharge	
	Final Point	Quantity discharged (in m <sup>3</sup> /day)
1	Surface	

i	Agricultural land												
ii	Waste land												
iii	Forest land												
iv	Green belt												
2	River / nallah												
3	Lake												
4	Sea												
5	Others (specify)												
	Total												
e	Users of discharge water	<b>Yes</b>	<b>No</b>										
i	Human												
ii	Livestock												
iii	Irrigation												
iv	Industry												
v	Others (specify)												
F	Details of the river / nalla, if final effluent is / will be discharged (cumecs)												
i	Average flow rate												
ii	Lean season flow rate												
iii	Aquatic life												
iv	Analysis of river water 100 meters upstream and 100 meters downstream of discharge point submitted.												
g	Township												
a	Waste water generation from township (m <sup>3</sup> /day)												
b	Are you planning to provide sewage treatment plant?												
c	Usage of treated water												
<b>30.</b>	<b>Attach water balance statement in the form of a flow diagram indicating source (s), consumption (Section-wise) and output.</b>												
	<table border="1"> <thead> <tr> <th>Purpose</th> <th>Demand(KLD)</th> </tr> </thead> <tbody> <tr> <td>Dust Suppression</td> <td>7.20 KLD</td> </tr> <tr> <td>Plantation</td> <td>0.80 KLD</td> </tr> <tr> <td>Domestic (drinking)</td> <td>0.38 KLD</td> </tr> <tr> <td><b>Total Water Required</b></td> <td><b>8.38 KLD</b></td> </tr> </tbody> </table>		Purpose	Demand(KLD)	Dust Suppression	7.20 KLD	Plantation	0.80 KLD	Domestic (drinking)	0.38 KLD	<b>Total Water Required</b>	<b>8.38 KLD</b>	
Purpose	Demand(KLD)												
Dust Suppression	7.20 KLD												
Plantation	0.80 KLD												
Domestic (drinking)	0.38 KLD												
<b>Total Water Required</b>	<b>8.38 KLD</b>												
<b>31</b>	<b>Ambient noise level leq dB(A)</b>	<b>Details given in Section III</b>											
<b>32</b>	<b>Solid Waste</b>	<b>Not Applicable</b>											
a	Top soil and Solid waste quantity and quality												
	Name (Lump/fines/slurry/ Sludge/others)	Composition	Quantity (m <sup>3</sup> /month)										
	Method of disposal												
	Mining activity*												
	a. Top Soil												
	b. Over burden												
	c. Others (specify)												
	Effluent Treatment Plant (sludge)												
	Total												

[* Annex layout plan indicating the dump sites.]					
b (i)	Does waste (s) contain any hazardous/toxic substance/radioactive materials or heavy metals?				
(ii)	If yes, whether details and precautionary measures provided?				
c	Recovery and recycling possibilities.				
d	Possible user(s) of the solid waste.				
e (i)	Is the solid waste suitable for backfilling?				
(ii)	If yes, when do you propose to start backfilling?				
Solid waste (s)	Already accumulated (A)	To be generated (B)	% of A & B to be backfilled		
			A	B	
Over burden					
Others (specify)					
	<b>Land reclamation Plan</b>			<b>Not Applicable</b>	
f	In case waste is to be dumped on the ground, indicate				
i	Associated environmental problems				
ii	Number & type of waste dumps				
	No. of external dumps				
	Max. projected height of dumps (in m)				
	No. of terraces and height of each stage				
	Overall slope of the dump (degree)				
	Proposed reclamation measures				
iii	Section of the waste dump in relation to the adjacent ground profile attached				
<b>33</b>	<b>Fuel / Energy requirements*</b> [*To be furnished for mines having ML area more than 25 ha. or captive power generation of 500KVA and above]			<b>Not Applicable</b>	
<b>a</b>	Total power requirement			(in MW)	
S. No.		Mine Site	Township	Others (specify)	Total
1	Present				
2	Proposed / additional				
	Total				
<b>b</b>	Source of power			(in MW)	
S. No.		SEB/Grid*	Captive power plant	DG Sets	
1	Present				
2	Proposed / additional				
	Total				
[* Annex a copy of the sanction letter from the concerned authority]					
<b>c</b>	Details of fuels				
S.No.	Fuel	Daily Consumption (TPD)		Calorific value (Kcals/kg)	% Ash
		Existing	Proposed		
1	HSD				
2	LSHS				
3	Other (specify)				

34		Storage of inflammable / explosive materials-		Not Applicable
S. No.	Name	Number of Storages	Consumption (in TPD)	Maximum Quantity at any point of time
1	Fuels			
2	Explosives			
35		Human Settlement		
		Core Zone	Buffer Zone	
Population*		-		Details given in Section VI
No. of villages		-		
Number of households village-wise		-		
[* As per 2001 census record or actual survey]				
36.	Rehabilitation & Resettlement (R&R) Plan* [*Provide a comprehensive rehabilitation plan, if more than 1000 people are likely to be displaced, other-wise a summary plan]		Not Applicable	
a	Villages falling within the study area			
		Villages		
		Number	Name	
Core zone				
500 m from the blasting site (s)				
Buffer zone				
Township site				
b	Details of village(s) in the core zone			
S. No.	Village name	Population*		Average Annual Income
		Tribal	Others	
1				
[*As per 2001 census / actual survey]				
c	Population to be displaced and / or Land Oustees			
Name of village(s) falling within		Number of oustees		
		Land (only)	Homestead (only)	Land and Homestead (both)
<u>Mining Lease</u>				
1.				
<u>Township Site</u>				
1.				
d	Whether R&R package has been finalised? If yes, salient features of R&R plan for oustees.		Not Applicable	
i	Site details where the people are proposed to be resettled & facilities existing / to be created.			
ii	Funds earmarked for compensation package			
iii	Agency /Authority responsible for their resettlement.			
iv	Time of commencement of resettlement of Project Affected People (PAP).			
v	Period by which resettlement of PAP will be			

	over.					
<b>37</b>	<b>Lease -wise plantation details</b>	<b>Not Applicable</b>				
a	Lease area (in ha.)	Existing	Proposed			
	i. Area broken up	-	-			
	ii. To be broken up	-	-			
	iii. Area not to be broken-up	-	-			
b	Township area (in ha.)	-				
c	Area afforested and proposed (in ha.)	-				
		Peripheral	Dumps	Roads	Township	Others
i	Existing					
ii	Proposed					
d	No. and type of trees planted and proposed					
i	Existing					
	When plantation was started?		Month / Year			
	No. of plant species planted		Number saplings (per ha.)			
	-		-			
	Survival rate %		Avg. height			
ii	Proposed					
	No. of plant species to be planted		Number of saplings (per ha.)			
	-		-			
<b>38</b>	<b>Environmental health and safety</b>					
a	What major health and safety hazards are anticipated?		None			
	What provisions have been made/proposed to be made to conform to health and safety requirements?		As per Mines Act/ Rules			
b	In case of an existing mine					
i	Comprehensive report on health status of the workers as under the Mines Act annexed		As per Mines Act/ Rules			
ii	Mineralogical composition of RPM (dust)					
	• Free silica		Not applicable			
	• Chromium* (Total as well as Hexavalent)		Not applicable			
	• Lead**		Not applicable			
	[* Only for Chromite mines] [**Only for Base Metal mines]					
	Information on radiation protection measures, if applicable		Not applicable			

### 39. Environmental Management Plan

Salient features of environmental protection measures

S. No.	Environmental issues*	Already practiced, if applicable	Proposed
--------	-----------------------	----------------------------------	----------

1	Air pollution	-	<ul style="list-style-type: none"> <li>▪ Regular water sprinkling</li> <li>▪ Plantation activities along the roads to reduce the impact of dust in the nearby villages</li> </ul>
2	Water pollution	-	<ul style="list-style-type: none"> <li>▪ Mining will be done not beyond the ground water depth, to avoid Ground water pollution.</li> </ul>
3.	Water conservation	-	Not Applicable
4.	Noise pollution	-	<ul style="list-style-type: none"> <li>▪ Well maintained vehicles will be used for transportation in order to reduce noise during movement of vehicles</li> <li>▪ Proper maintenance of machines will be done to reduce the noise levels.</li> </ul>
5.	Solid waste / Tailings	-	Not Applicable
6.	Land degradation	-	Not Applicable
7.	Erosion & Sediment	-	Not Applicable
8.	Top soil	-	Not Applicable
9.	Ground vibration	-	Not Applicable
10.	Wildlife conservation	-	Not Applicable
11.	Forest protection	-	Not Applicable
12.	Others (specify)	-	Not Applicable

[\* As applicable]

40	Compliance with environmental safeguards (For existing units)	Yes	No
	Status of the compliance of conditions of Environmental clearance issued by MoEF, if any, enclosed.	-	✓
	Status of the compliance of 'Consent to Operate' issued by SPCB, if any, enclosed.	-	✓
	Latest 'environmental statement' enclosed.	-	✓
<b>41</b>	<b>Scoping of EIA</b>		
	Whether environmental impact assessment of the project has been carried out by following scoping process?	Yes	
	If yes, a copy of scoping of EIA annexed.	Details given in Section I	
<b>42</b>	<b>Mine closure</b>		
a	Have you planned mine closure?	No	
b	Submitted a conceptual mine closure plan.	No	
c	If yes, indicate estimated amount for implementing the same (in Rs. lakhs)	183600 (3% of the total Project cost)	
<b>43</b>	<b>Capital cost of the project (in Rs.) (Based on latest estimate)</b>	4160000	

**44. Cost of environmental protection measures**

Sr. No.	Environment Management Plan (EMP)	Cost Estimation	Total Cost (Rs.)
a.	Plantation		
i)	No of plants @95 Rs. / sapling)	100 saplings × @95 Rs. / sapling)	9500
ii)	Tree Guard (@1500/- per unit)		2,10,000
b.	Water Demand for plantation (@100saplings × 4 litres of water× twice per day = 800 ltrs.)	(800ltrs. Per day x 300 (working days) x ( 1.1Rs. /L)	264000
c.	Measure for prevention & control of soil erosion and management of silt shall be undertaken. Protection of dump against erosion, if any, shall be carried out with geo-textile matting or other material.	-	20000
d.	Sprinkling on haulage route for dust suppression (600 m length × 6 m width × 1 litres of water per m <sup>2</sup> /2 times a day=7.2KLD (Rs. 1100 for per KLD of water/day)	Rs. 1100×7.2 KLD of water/day x 300 (working days)	2376000
e.	Cost of monitoring of air quality(PM <sub>10</sub> ,PM <sub>2.5</sub> ,NO <sub>x</sub> ,SO <sub>2</sub> ), water quality(ground water and surface water),soil quality and ambient noise level	-	2,50,000
f.	Cost for environmental cell	<ul style="list-style-type: none"> <li>• Environmental Engineer:1</li> <li>• Gardener :3</li> </ul>	400000
g.	Fund for COVID-19		50000
<b>Total</b>			<b>2849700</b>

45	Amount earmarked for socio-economic Welfare measures for the nearby villages other than R&R plans.		
46	Public Hearing	To be followed	
47	Whether the following approvals* (wherever applicable) have been obtained?	YES	NO
a	Site clearance from MoEF	-	✓
b	Consent for Establishment' from the State Pollution Control Board	-	✓
c	NOC from Atomic Mineral Division	-	✓
d	Mining plan approval from IBM / Ministry of Coal	-	✓
e	In case of existing mines, mining scheme approval from IBM	-	✓
f	Forestry clearance under FCA, 1980	-	✓
g	NOC from Chief Controller of Explosives	-	✓
h	Commitment regarding availability / pumping of water from the concerned Authorities	-	✓
i	In case of ML area falling in notified areas of the Central Ground Water Authority, NOC from them.	-	✓

[* Annex copies of approvals and number them]		
<b>48</b>	Was / is there any court case relating to the project or related activities? If so, provide details present status.	<b>No</b>

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II	Approved Mining Plan
III	Khasra Map
IV	Monitoring Map
V	Clustering Certificate
VI	District Survey Report(DSR)

**ABBREVIATIONS**

<b>EIA</b>	Environmental impact assessment
<b>EMP</b>	Environment management plan
<b>MOEF &amp; CC</b>	Ministry of environment, forest & climate change
<b>TOR</b>	Term of reference
<b>EAC</b>	Expert appraisal committee
<b>SEAC</b>	State expert appraisal committee
<b>SPCB</b>	State pollution control board
<b>CPCB</b>	Central pollution control board
<b>NOC</b>	No objection certificate
<b>BGL</b>	Below ground level
<b>GLC</b>	Ground level concentration
<b>NH</b>	National highway
<b>SH</b>	State highway
<b>DB</b>	Decibel
<b>LEQ</b>	Equivalent noise level
<b>HA</b>	Hectare
<b>UNFC</b>	United nations framework classification
<b>HFL</b>	High flood level
<b>LFL</b>	Low flood level
<b>KLD</b>	Kilo litre per day
<b>T/CUM</b>	Tons per cubic meter
<b>KM</b>	Kilo meter
<b>RL</b>	River level
<b>EPA</b>	The environment protection act
<b>HAM</b>	Hectare meter
<b>BOD</b>	Biochemical oxygen demand
<b>DO</b>	Dissolved oxygen
<b>COD</b>	Chemical oxygen demand
<b>TKN</b>	Total kjeldahl nitrogen
<b>PM</b>	Particulate matter
<b>AAQ</b>	Ambient air quality
<b>TPA</b>	Tonnes per annum
<b>R &amp; R</b>	Rehabilitation & resettlement

<b>CER</b>	Corporate environment responsibility
<b>VWG</b>	Village working group
<b>EMC</b>	Environmental management cell
<b>DIC</b>	Department of industries and commerce
<b>RBM</b>	River bed material
<b>NGO</b>	Non-governmental organization
<b>PCU</b>	Passenger car unit
<b>LOS</b>	Level of service
<b>PUC</b>	Pollution under control
<b>NABET</b>	National accreditation board for education and training
<b>QCI</b>	Quality council of india
<b>OSHA</b>	Occupational safety and health administration

## CHAPTER-1

### INTRODUCTION

#### 1.0 PURPOSE OF THE REPORT

Environmental Impact Assessment (EIA) is a decision making tool to the authorities, which brings forth the factual position about a project that enables them in arriving at an appropriate conclusion for the proposed projects, to retain them if environmentally sound, and reject if found having deleterious overall impact. EIA identifies the extent of the environmental, social and economic impacts of a project prior to decision-making. EIA systematically examines both beneficial and adverse impacts of the proposed project over and above the prevailing conditions of environmental parameters and ensure that these impacts are taken into account during the project designing stage itself and the values of the combined impacts are never allowed to exceed and remain within the statutory norms.

Environmental Impact Assessment report is prepared to comply with the Terms of Reference (TOR) received from SEAC vide **Letter no. - 429/parya/SEAC/5000/2019 on dated 27-11-2019** under EIA notification of the MoEF (Feb, 2010) and also the EIA Guidance Manual for Mining of Minerals of MoEF, Govt. of India, for seeking environmental clearance for Building Stone (Khanda, Gitty, Boulder) Mining Project which applied mining lease area is 2.0 hectares falling under category “B1”. The lease area lies near Village Jarar, Tehsil Naraini & District- Banda.

#### 1.1 IDENTIFICATION OF PROJECT PROPONENT

The project is being proposed by Shri Safdar Ali S/O-Late Shri Farzand Ali, The EIA/EMP report is prepared as per the TOR granted under the EIA Notification. In order to assess the impact on environment due to proposed mine, it is necessary to ascertain present status of environment prevailing at the project site and identification and assessment of impacts on the environment of the proposed operations.

#### 1.2 BRIEF DESCRIPTION OF PROJECT

The proposed project is Building Stone, Khandas & Gitti, Boulder Mining Project and the estimated project cost is Rs 61,20,000. The proponent has applied for mining lease for Building Stone, Khandas & Gitti, Boulder Mining over an area of 2.0 Hectare at Village: Jarar ,Tehsil: Naraini ,District Banda, Uttar Pradesh.

#### PROJECT NATURE, SIZE & LOCATION-

##### Nature

The proposed project is Building Stone (Khanda, Gitty, Boulder) Mining Project.

##### Size

**EIA/EMP CHAPTER-1- INTRODUCTION**

It has been proposed to prepare 20000 m<sup>3</sup>/Year of Building Stone annually over an area 2.0 Hectare.

**Location**

The mining area is located in Gata No. 2450 Khand No.-03 in Village Jarar, Tehsil Naraini & District-Banda, Uttar Pradesh. The mining lease / proposed project area falls in Survey of India Toposheet No. 63C/7. The mine lease area is located between as follows:

<b>Project Site co-ordinates</b>	<b>Points. No.</b>	<b>Latitude</b>	<b>Longitude</b>
	A	25° 18' 56.05"N	80° 21' 37.59"E
	B	25° 18' 55.32"N	80° 21' 38.98"E
	C	25° 18' 58.86"N	80° 21' 46.28"E
	D	25° 19' 1.48"N	80° 21' 44.13"E
	E	25° 18' 58.58"N	80° 21' 38.69"E
	F	25° 18' 57.21"N	80° 21' 39.20"E
<b>Minerals of mine</b>	Building Stone, Khandas & Gitti, Boulder Mining Project Mining Project		
<b>Nearest Railway Station</b>	Banda about 18.0 Km North direction		
<b>Nearest Airport</b>	Chakeri, Kanpur about 121.0 km in North direction.		
<b>Nearest Highway/State Highway</b>	NH 76 about 13.0 km towards East direction from the project site.		

**Project's importance to the country and the region**

Building Stone (Khanda, Gitty, Boulder) Mining Project being used for construction material and other various constructional projects. There is large demand of Gitti- Boulder for roads, railway tracks, building construction etc. As per requirement of Gitti-Boulder resource is available under permissible limits. Such mining projects boost up the local as well as the economy of state because of rapid and cost effective infrastructural development.

This project operation will generate employment to the people residing in vicinity for about 300 days annually and approximately 24 peoples employed will be benefited directly and indirectly from the project.

**1.3 REGULATORY COMPLIANCES & APPLICABLE LAWS/REGULATIONS**

- a) There is no legal case against the project and project proponent.
- b) There is no any national park / Sanctuary within 10 kms radius from the project site.

**1.4 SCOPE OF THE STUDY**

The Expert Appraisal Committee (EAC) for mining projects considered the project during its meeting. Based on the information contained in the documents submitted and the presentation made, the SEAC-

**EIA/EMP CHAPTER-1- INTRODUCTION**

Uttar Pradesh prescribed the Terms of Reference (TOR) vide Letter no.: 429/parya/SEAC/5000/2019 dated 27-11-2019.

**1.5 POINT WISE COMPLIANCE OF TOR**

The points have been raised by the SEAC-Uttar Pradesh in the TOR and its compliance given as under:-

S.No.	TOR	Compliance
1.	All pages of technical documents/ EIA/ EMP etc. should be signed by the consultant and project proponent both.	Complied
2.	Copy of all the analysis reports signed by analyst approved by NABL or MOEF&CC shall be annexed with then EIA report and original analysis report should be presented at the time of presentation.	Complied  (Shall be available at the time of presentation.)
3.	MOU signed between the project Proponent and the consultant should be submitted.	Complied  (Record available)
4.	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.	The project proposal submitted in 2019 for 20000 m <sup>3</sup> /year as per LOI. It is newly proposed project only LOI has been issued and production will be commenced after getting EC.
5.	The lab conducting the analysis should be authenticated and registered.	Monitoring has been done by the M/s Ultra Testing & Research Laboratory, Noida, Uttar Pradesh which is certified by NABL and MOEF & CC. The NABL accreditation No. TC-8189. The validity of accreditation upto 15/11/2020
6.	A copy of document in support of fact that the proponent is the rightful lessee of the mine should be given.	The copy of letter of intent (LOI) of mining lease issued by the District Magistrate, Banda, U.P. vide <b>letter no. 820/khanij-30, Banda, dated 08-06-2019 in favour of Shri Safdar Ali S/O-Late Shri Farzand Ali</b> for mining of Building Stone, Khandas & Gitti, Boulder.  LOI (Copy) is attached as <b>Annexure I</b> .
7.	All documents including approved mine plan prepared by RQP (authorized by Indian Bureau of Mines and Directorate of Geology and Mines,	Mining Plan and Progressive Mine Closure Plan of proposed mining lease area has been approved by Director General of Mines and Geology Department, Lucknow (U.P.). <b>Vide</b>

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	Lucknow), EIA and public hearing should be compatible with one and other in terms of the mine lease area, production level, waste generation and its management and mining technology and should be in the name of lessee. The mine plan should take into account the conditions of the mine lease, if any, in terms of distance to be left un-worked from the river flowing nearby.	Letter No. 765/MINING PLAN/2016 on dated 13/08/2019. Approved Mining Plan (Copy) is attached as Annexure II.																					
8.	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/toposheet should 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).	<p>All corners of the coordinates of ML area are superimposed on toposheet of survey of India Toposheet No. 63C/7.</p> <p>Coordinates of the mine lease area as given below.</p> <table border="1"> <thead> <tr> <th>Point</th> <th>Latitude</th> <th>Longitude</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>25° 18' 56.05"N</td> <td>80° 21' 37.59"E</td> </tr> <tr> <td>B</td> <td>25° 18' 55.32" N</td> <td>80° 21' 38.98" E</td> </tr> <tr> <td>C</td> <td>25° 18' 58.86" N</td> <td>80° 21' 46.28" E</td> </tr> <tr> <td>D</td> <td>25° 19' 1.48" N</td> <td>80° 21' 44.13" E</td> </tr> <tr> <td>E</td> <td>25° 18' 58.58" N</td> <td>80° 21' 38.69" E</td> </tr> <tr> <td>F</td> <td>25° 18' 57.21" N</td> <td>80° 21' 39.20" E</td> </tr> </tbody> </table> <p>Imagery of the proposed area clearly shows the land use and other ecological features of the study area (core and buffer zone) for Land use and High resolution Imagery FCC maps are prepared with use a RS-GIS technique.</p>	Point	Latitude	Longitude	A	25° 18' 56.05"N	80° 21' 37.59"E	B	25° 18' 55.32" N	80° 21' 38.98" E	C	25° 18' 58.86" N	80° 21' 46.28" E	D	25° 19' 1.48" N	80° 21' 44.13" E	E	25° 18' 58.58" N	80° 21' 38.69" E	F	25° 18' 57.21" N	80° 21' 39.20" E
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9.	Information should be provided in survey of India toposheet 1:50,000 scale indicating geological map of the area, geomorphology of landform of the area, existing minerals and history of the area, important water bodies, streams and rivers and soil characteristics.	<p>Key plan is enclosed as plate no. I</p> <p>Geomorphology of landform of the area is given in Chapter no 2 of EIA/EMP report as per 1:50,000 scale.</p>																					
10.	Details about the land proposed for mining activities should be given with 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.	Yes mining will be done as per the guideline of central / state govt. Policy.																					
11.	It should be clearly stated whether the proponent company has a well laid down Environment policy approved by	<p>Yes, lessee has a well laid down Environment Policy.</p> <p>Follow-up environmental awareness among the</p>																					

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	<p>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 of 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 indicated in the EIA report.</p>	<p>employees and encourage them to work in an environmentally Responsible Manner.                  Trained, educate and inform our employees about environmental management issues that may not affect their work and Health.                  Where required by legislation or where significant health, safety or environmental hazards exist, develop and maintain appropriate emergency and spill response programmes.                  The Company shall be aware about environmental issued and insuring compliances and conditions which applicable for the project.</p>										
<p>12.</p>	<p>Issues relating to mine safety, including subsidence study 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.</p>	<p>Mining is being done by open cast mining so no subsidence study is required. All the safe guards measures shall be provided whose details are given in Chapter No-4.</p>										
<p>13.</p>	<p>The study area will comprise of 10 km zone around the mine lease from the lease periphery and data contained in the EIA such as waste generation etc. should be for the life of mine / lease period.</p>	<p>Study area comprises of 10 Kms radius around the mine lease boundary. Topographic Map showing 10 Km radius around the ML area has been furnished in the EIA report.</p> <p>All the data contained in the EIA/EMP Report are for lease period of mine</p> <p>Study area selected for monitoring encompasses the area/location around 10 kms (aerial) radius.</p> <table border="1"> <tr> <td>Jarar</td> <td>0.28kms towards East</td> </tr> <tr> <td>Jahangirabad</td> <td>1.06 kms towards South</td> </tr> <tr> <td>Girwan</td> <td>2.34 kms towards East</td> </tr> <tr> <td>Barokhar khurd</td> <td>1.69 kms towards North-East</td> </tr> <tr> <td>Barokhar buzurg</td> <td>4.67 kms towards North</td> </tr> </table> <p>Map showing all the monitoring location is attached as <b>Annexure III</b>.</p>	Jarar	0.28kms towards East	Jahangirabad	1.06 kms towards South	Girwan	2.34 kms towards East	Barokhar khurd	1.69 kms towards North-East	Barokhar buzurg	4.67 kms towards North
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Barokhar buzurg	4.67 kms towards North											
<p>14.</p>	<p>Land use of the study area delineating forest area, agricultural land, grazing</p>	<p>The Lease area falling under stony area and used for Building Stone purpose. Toposheet Map, and</p>										

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	land, wild life sanctuary and national park, migratory route of fauna, water bodies, human settlements and other ecological features should be indicated.	other relevant imageries along with the document support has been Chapter no 2.
15.	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 Mining Lease area does not involve any forest land. The land of the Mining lease area is Government land (Stony area).
16.	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 land of the Mining lease area is Government land on the Stony area and this area is free from any reservation of Forest Department Uttar Pradesh Government.
17.	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.	There is no involvement of forest land in the project area Hence it is not applicable.
18.	The vegetation in the RF/ PF areas in the study area, with necessary details, should be given.	Project area not falling under Reserve forest/Protected Forest in the core zone area.
19.	A study shall be got done to as certain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly	The study areas have No any Wildlife sanctuary with in 10 Kms Radius. Therefore, Not Applicable.

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	<p>detailed mitigative measures required, should be worked out with cost implications and submitted.</p>	
20.	<p>Location of national parks, sanctuaries, biosphere reserves, wild life corridors, 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 wild life warden necessary clearance, if any, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above should be obtained from the state wild life department/Chief Wild Life Warden under the Wild Life (Protection) Act, 1972 and copy furnished.</p>	<p>There is no National Parks, Sanctuaries, Biosphere Reserves, wildlife Corridors, Tiger/Elephant, Reserves within 10 kms within the proposed mine lease area.</p>
21.	<p>A detailed biological study for the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out covering both terrestrial and aquatic flora and fauna. Details of flora and fauna, duly authenticated, separately for core and buffer zone should be furnished based on field survey clearly indicating the schedule of the fauna present.</p>	<p>A detailed biological study (of 10 Kms radius study area) was conducted by Ecology and Biodiversity Expert and the details are incorporated in the EIA/EMP Report.</p> <p>There is a KEN River flowing towards west direction from the project site which is approx. 5 kms, A canal originate from Ken river flowing near to the project site. The East distance of Canal is 2.50 kms from the project site and used for Land Irrigation.</p> <p>The water quality of Canal Water and other villages of monitoring station given in surface water quality.</p> <p>The detailed biological study in the 10 kms periphery has been described in <b>Chapter 4</b>.</p>
22.	<p>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 Dept. Should be secured and furnished to the effect that</p>	<p>The project site is neither falling in proximity area declared as Critically Polluted nor falling in Aravali Range.</p> <p>The valid and lawful LOI of this project site has been granted to the lease holder by the Mining Department of UP Government is enclosed as <b>Annexure-I</b>.</p>

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	the proposed mining activities could be considered.	
23.	Impact of change of land use should be given.	There shall be No alternation in the land use as the project is of Building Stone, Khandas & Gitti, Boulder. Approved Mining plan along with the LOI is attached as <b>Annexure II and I</b> respectively.
24.	Impact of Mining on the hydrology of the area including water flow in the river adjoining the mine lease. It should also take into account the inundation of mined out area due to flow of water from the river.	The water body ken river approx. 5 kms away from the lease area and mining is open cast and there is no water flow from the mine area towards river. There is no any impact on river.
25.	R & R plan/compensation details for the project affected people (PAP) should be furnished. While preparing the R & R plan, the 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 sector al programmes of line departments of the State Government.	There will be no significant Project Affected Person (PAP) by the proposed mining activities. Hence, there is no need of R&R Plan. If any case found on the basis of assessment may be compensate the affected people.
26.	One season (Non Monsoon) primary baseline data on ambient air quality (PM <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>x</sub> and NO <sub>x</sub> ), water quality, noise level, soil and flora and fauna shall be collected and the AAQ data so collected presented data-wise in the EIA and EMP report. Site –specific meteorological data should also be collected. The location of the monitoring stations should be justified. There should be at least one monitoring station within 500 m of the mine lease in the predominant downwind direction.	One season (Non Monsoon) primary baseline data on ambient air quality (PM <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>x</sub> and NO <sub>x</sub> ), water quality, noise level, soil and flora and fauna monitoring was carried in the monitoring sites of 10 kms periphery whereas monitoring site near lease area was also considered as site within 500 m radius. The monitoring was done from 1st Oct, 2019 to 31st December, 2019 by Ultra Testing Research Laboratory (MoEF & CC approved Laboratory). The details have been given in the report where required and the test reports are attached as <b>Annexure V</b> .
27.	Air quality modeling should be carried	Air quality modeling was carried out impact of

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	<p>out for prediction of impact of project on the air quality of the area. It should also take into account the impact of movement of vehicle for transportation of mineral. The details of the dispersion 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 rose showing pre-dominant wind direction may also be indicated on the map.</p>	<p>Air quality has been incorporated in <b>Section 3</b> of EIA/EMP report.</p> <p>Wind Rose Diagram shown in <b>Section 3</b>.</p>
28.	<p>The water requirement for the project, its availability and source to be furnished. Fresh water requirement for the project should be indicated.</p>	<p>The Total Water requirement in this project site is approx. 8.38 KLD which consumed for various purpose as follows- Dust Suppression = 7.20 KLD, Plantation= 0.80 KLD, Domestic Purpose= 0.38 KLD The water requirement for the project is given in <b>Chapter 2</b>.</p>
29.	<p>Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the project should be provided.</p>	<p>Not Applicable Water will be taken from near villages through tankers.</p>
30.	<p>Details of water conservation measures proposed to be adopted in the projected should be given.</p>	<p>The project do not consume any process water except for drinking, dust suppression and plantation.</p>
31.	<p>Details of rainwater harvesting proposed, if any, in the project should be provided.</p>	<p>Not Applicable</p>
32.	<p>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.</p>	<ul style="list-style-type: none"> <li>• <b>Surface Water</b> There is no significant adverse impact on surface water due to project activity. There is no water requirement in project activity.</li> <li>• <b>Ground Water</b> The ground water quality will not be affected due to mining activity. Impact of the project on the water quality and its mitigation measures has been incorporated in the EIA/EMP report.</li> </ul>
33.	<p>Based on the actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary</p>	<p>The maximum working depth of mining will be bench wise width 6 m, height 6m in Stone. So mining depth will not intersect the ground water</p>

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	<p>data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed hydro geological study should be undertaken and report furnished. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of groundwater should also be obtained and copy furnished.</p>	<p>table. Hence permission is not required from CGWA.</p> <p>Water requirement will be met by tanker supply therefore permission from Central Ground Water Authority for pumping of Ground water is not required. The approved mining plan is attached as <b>Annexure II</b>.</p>
34.	<p>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</p>	<p>The canal water flowing 2.50 kms in the East direction which is away from the project site and there is no diversion modification required to canal stream.</p>
35.	<p>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.</p>	<p>There is no field available for plantation in the lease area due to stony surface in liu of land the plantation shall be made by consultation with forest department or Gram Panchayat. The number of trees shall be planted on the basis of the survival in the area.</p>
36.	<p>Impact on local transport infrastructure due to 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 increased load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as state government) should covered.</p>	<p>Impact on local transport infrastructure due to the project has been assessed. There will not so much impact on local transport.</p>
37.	<p>Details of the infrastructure facilities to be provided for the mine workers should be included in the EIA report.</p>	<p>Temporary shelter along with temporary toilet connected to the soak pit at certain distance and drinking water from the mining lease area will be provided to the mine workers.</p>
38.	<p>Conceptual post mining land use and</p>	<p>Conceptual post mining land use is incorporated</p>

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	Reclamation and Rehabilitation of mined out area (with plans and with adequate number of sections) should be given in the EIA report	in Chapter 8 of the EIA/EMP Report.  The soil is also generated from joints cracks due to mining will be stacked in a temporary stack yard will be used for Land Filling purpose.
39.	Occupational health impact of project should be anticipated and preventive measures initiated details in this regard should be provided. Details of pre-placement medical examination and periodical medical examination scheduled should be incorporated in the EMP. Special attention should be in view of stone crusher nearby.	All Relevant Personal Protective measures provided to the all workers. Pre-medical examination and periodical medical examination schedules have been furnished in the management plan of EIA/EMP Report.
40.	Measures of social-economic significance and influence to the local community proposed to be provided by project proponent should be indicated. As far as possible, quantitative dimensions may be given with time frame for implementation	Socio economic measures for the local people have been proposed under the component of the Corporate Environmental Responsibility along with the budgetary allocation have been incorporated in the 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.  An amount of Rs. 166400 will be allocated for CER activities and policy. Detailed break up is incorporated in the EIA/EMP Report.
41.	Public hearing points raised and commitment of the project proponent on the same along with the time bound action plan to implement the same should be provided.	The Public hearing points are raised and commitments are point wise attached in the Annexure I.
42.	Details of litigation pending against the project, if any, with direction / order passed by any court of law against the project should be given.	There is no court case or litigation pending against this project in any court of law.
43.	The cost of project (capital cost and recurring cost) as well as the cost towards implementation of EMP should clearly be spelt out.	The cost of projects (capital cost and recurring cost) as well as the cost towards implementation of EMP) has been described in Chapter 8.
44.	Details of Transportation of mined out materials as per the Indian Road Congress for both the ways (loaded as	The mine material shall be transported as per central/state government. Rules regulation for transportation of Building Stones.

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	<b>well unloaded trucks) load and its impact on Environment.</b>	
<b>45.</b>	<b>02 km kachcha haul road to be made motorable. Submit Plan</b>	A motorable haul road will be constructed to connect the mine site to the nearest road/Highway and the plan for the same is detailed in Chapter 4.
<b>46.</b>	<b>Besides the above, the below mentioned general points are also</b>	
	i) All documents to be properly referenced with index and continuous page numbering.	Complied
	ii) 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
	iii) 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.	Enclosed
	iv) Where the documents provided are in language other than English, an English translation should be provided.	Provided
	v) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall be filled and submitted.	Enclosed
	vi) While preparing the EIA report, the instructions for the proponents and instructions for the Consultants issued by MOEF & CC 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
	vii) 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 Final EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.	No Modifications done
	viii) 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

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## CHAPTER- 2

### PROJECT DESCRIPTION

#### 2.0 GENERAL

The Environmental Impact Assessment report has been prepared in terms of EIA notification of the MoEF dated 14<sup>th</sup> Sept 2006, as amended on 1<sup>st</sup> Dec 2009 & 4<sup>th</sup> April 2011 and the EIA Guidance Manual for Mining of Minerals (Feb, 2010) of MoEF, Govt. of India, for seeking environmental clearance for mining in the existing area of Village: Jarar, Tehsil Naraini & District- Banda, Uttar Pradesh of Building Stone, Khandas & Gitti, Boulder Mining Project mining lease measuring 2.0 hectares with the total cluster area 15.97 Ha. falling under category “B1”.

#### 2.1 DESCRIPTION OF THE PROJECT

The proposed project is Building Stone, Khandas & Gitti, Boulder Mining Project and the estimated project cost is Rs 61,20,000. The proponent has applied for mining lease for Building Stone, Khandas & Gitti, Boulder Mining over an area of 2.0 Hectare at Village: Jarar, Tehsil Naraini & District- Banda, Uttar Pradesh.

#### 2.2 NEED FOR THE PROJECT

Building Stone, Khandas & Gitti, Boulder Mining Project is used for construction material and in other various infrastructural projects. There is large demand of Gitti- Boulder for road, railway track, building construction etc. Abundant Gitti- Boulder resource is available under permissible limits. Such mining projects boost up the local as well as the economy of state because of rapid and cost effective infrastructural development.

**Letter of Intent:** The Letter Of Intent (LOI) has been issued by the District Magistrate, Banda, U.P. vide letter no. 820/khanij-30, Banda, dated 08-06-2019 in favour of Shri Safdar Ali S/O-Late Shri Farzand Ali for mining of Building Stone, Khandas & Gitti, Boulder (Copy of LOI has been enclosed as **Annexure-I**).

**Lease Period:** 20 Years

#### **Mine Plan and Progressive Mine Closure Plan:**

Mining Plan and Progressive Mine Closure Plan of proposed mining lease area has been approved by Director General of Mines and Geology Department, Lucknow U.P. Vide Letter No. 765/MINING PLAN/2016 on dated 13/08/2019 enclosed as **Annexure-II**.

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2.3 LOCATION DETAILS

The mining area is located in Gata No. 2450 Khand No.-03 in Village Jarar, Tehsil Naraini & District-Banda, Uttar Pradesh. The mining lease / proposed project area falls in Survey of India Toposheet No. 63C/7. The mine lease area is located between as follows:

Project Site co-ordinates	Points. No.	Latitude	Longitude
	A	25° 18' 56.05"N	80° 21' 37.59"E
	B	25° 18' 55.32" N	80° 21' 38.98" E
	C	25° 18' 58.86" N	80° 21' 46.28" E
	D	25° 19' 1.48" N	80° 21' 44.13" E
	E	25° 18' 58.58" N	80° 21' 38.69" E
	F	25° 18' 57.21" N	80° 21' 39.20" E
<b>Minerals of mine</b>	Building Stone, Khandas & Gitti, Boulder Mining Project Mining Project		
<b>Nearest Railway Station</b>	Banda about 18.0 Km North direction		
<b>Nearest Airport</b>	Chakeri, Kanpur about 121.0 km in North direction.		
<b>Nearest Highway/State Highway</b>	NH 76 about 13.0 km towards East direction from the project site.		

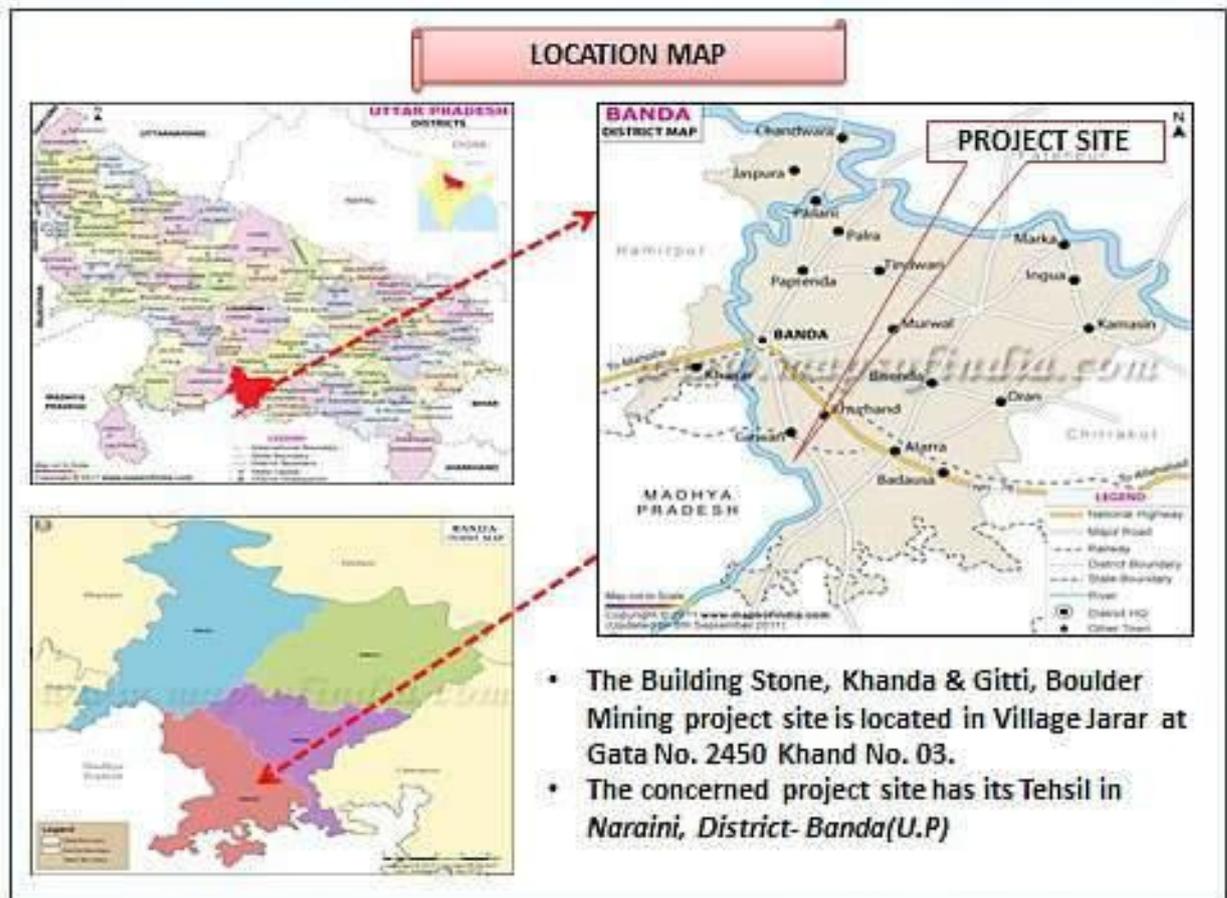


Figure 2.1 Location Map of Project

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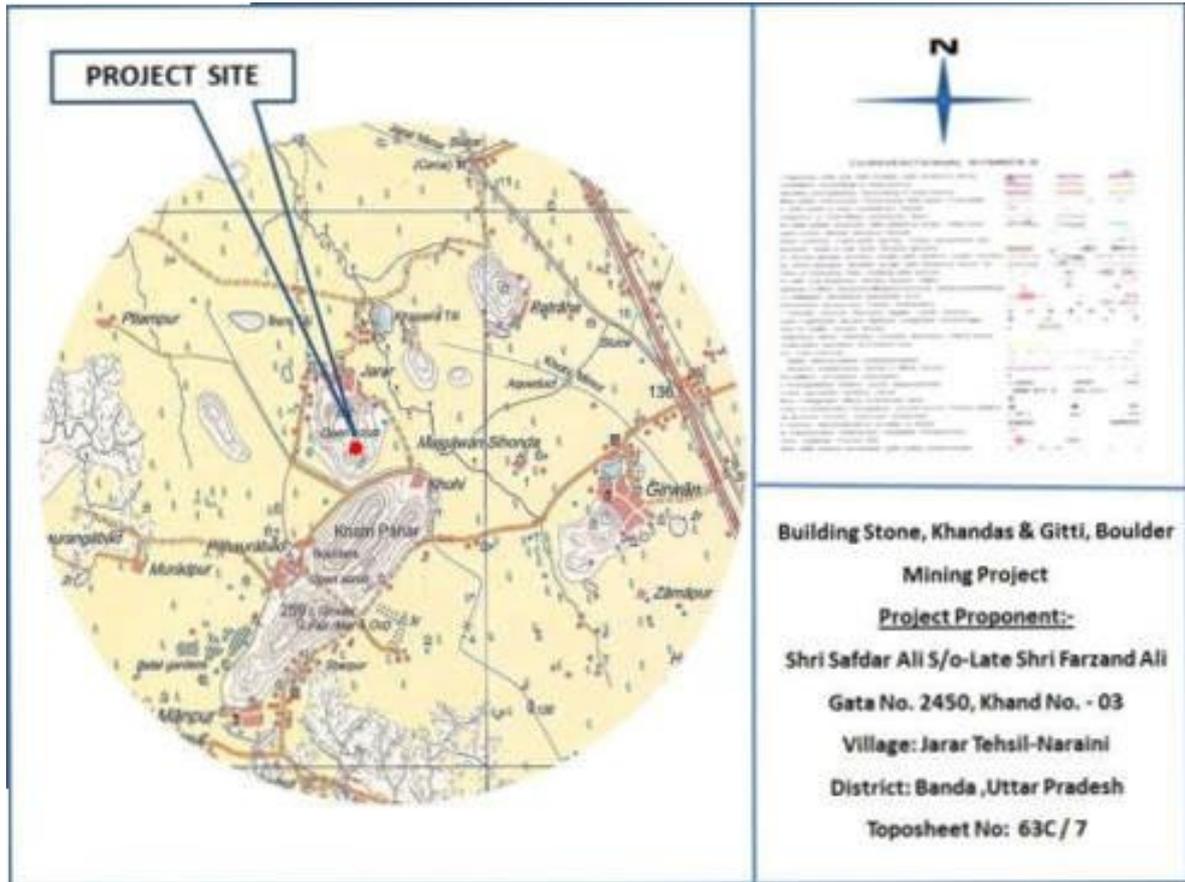


Figure 2.2 Toposheet Map of Project Site

2.4 LEASE HOLD AREA

The entire lease hold area of 1.21 ha lies in the rock of Building Stone, Khandas & Gitti, Boulder Mining Project. The breakup of the land use for ancillary feature around the mining area is given below:

Sr. No.	Land use	Agriculture land (ha)	Forest Land (ha)	Waste land (ha)	Grazing Land (ha)
1	Mining pits Quarry	-	-	0.124	-
2	Approach Road	-	-	0.001	-
3	Dumps	-	-	-	-
4	Office, Resht Shelter etc.	-	-	-	-
5	Balance undisturbed land	-	-	1.875	-
	<b>Total</b>	-	-	<b>2.0</b>	-

2.5 TOPOGRAPHY

The district largely consists of irregular uplands with outcrops of rocks intermingling mostly with lowlands, frequently under water during rainy season. The Baghein River traverses the district from south-west to north-east. The tract lying to the right of the river is intersected by numerous smaller river and rivulets, but to its left is a flat expanse, most part of which is made up of Mar and Kabar soils, eroded and converted into ravines along the banks of the rivers Ken and the Yamuna.

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**2.6 GEOLOGY OF THE AREA:**

The general slope of lease area is from South-West to North-East direction. No seasonal & perennial drainage exists within the lease area. Due to past mining the lease is degraded by mining pit & depth of pit varies 3m to 5m. The highest and lowest point in the leasehold is 149.80 mRL towards South-West direction and 145.10mRL towards North-East direction. Banda district lies between latitude 25° 00'00" and 25°59'00" north and longitude 80°06'00" and 81°00'00" east. Total geographical area of the district is 4460 sq. km. District headquarter is at Banda having 04 tehsils and 8 blocks. As per the 2001 census the district has population of 1501610 of which 807320 males and 694290 females. Scheduled caste population is 311660. Literacy rate of the district is 54.2%.

Geologically the area comprises Precambrian Bundelkhand granites unconfirmably overlain by Vindhyan and quaternary alluvium. The main and major drainage of the district are Yamuna, Ken and Baghain which are part of Yamuna river system.

Physiographically the area can be divided into three physiographic units—

- (1) Alluvial Plain
- (2) Marginal Alluvial
- (3) High Land (Hard rock) area.

Agriculture is the main source of economy of the district. Both surface and ground water are used for irrigation. The net irrigated area is 153804 Ha and the net area sown is 336000 Ha, which shows that 45.77% area is irrigated by ground water and the surface water while the rest depends on rainfall. Length of canal network in the district is 1193 Km. and the number of government tubewells is 460.

Banda district is drained by Yamuna, Ken and Baghain rivers. River Yamuna bifurcates the district Banda from Fatehpur in north and flows from west to east in the entire district. River Ken meets Yamuna at Chilla. River Baghain also bifurcates Banda from Chitrakoot in southeast.

**2.7 GEOMORPHOLOGY & SOIL****a) Geomorphology:**

The district is characterised by alluvial, hard rock as well as marginal alluvium. The district can be broadly classified into three physiographic units. (i) The alluvial Plain, (ii) Marginal Alluvial, (iii) High Land Area.

**b) Soil:**

In Banda district loose sediments as well as black cotton soil is found. Black cotton soil is prominent in the central part. Four major type of soil a) Rakar, b) Mar, c) Kabar and d) Padua are dominant in the district.

**2.8 HYDROGEOLOGY:**

On the basis of hydrogeological information ground water occurs in unconfined conditions in shallow depths and confined conditions in deeper depth in alluvium. The thickness of alluvium varies from

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45.00 to 200.00 mbgl in the district. Granites (Bundelkhand) has also good potential and yield at economical discharge. Ground water occurs in fractures and joints in the hard rock. The potential fractures are encountered from around 28.00 to 96.00 meters in some places.

**Depth To Water Level:**

As per the depth to water level data of 27 permanent ground water monitoring stations in the year 2009, pre monsoon water level ranges from 2.75 mbgl (Khurand) to 26.95 mbgl (Bhitar Kerdera). In the post monsoon period, depth to water level varies from 0.95 mbgl (Girwan) to 22.50 mbgl (Pailani). Water level fluctuation varies from 0.0 in Rolyhdyaajue to 8.02 m at Naraini. It is observed that the hilly and rocky area the fluctuation is higher than the plain. Fluctuation is more where less order streams are found

**Long Term Water Level Trend:**

Long term water level trend records in the area from 27 National hydrographic stations (2000-2009) in ten years show that (except Mataudh) all other wells are showing declining trend. The falling trend ranges from 0.0979 m/yr (Girwan) to 1.5087 m/yr at Paprenda.

**Rainfall & Climate:**

The average annual rainfall is 902.00 mm. The climate is typical subtropical penetrated by long and intense summers. About 80% of the annual rainfall is received from south-west monsoon. May is the hottest month with mercury shooting upto 47.0°C. With the advance of monsoon by mid-June, temperature starts decreasing. January is usually the coldest month with temperature going upto 5.8°C. The relative humidity is highest in August about 85% and lowest in April.

**2.9 MINING:**

**The procedure of Building Stone (Khanda, Gitty, Boulder) Mining Project process are:**

**Proposed Mining Method:** The proposed mining method will include the following steps:

It shall be opencast & mechanized mine. To meet required production wagon drilling with deep hole blasting shall be carried out. The blasted material will be handled with excavator & loaded into dumpers. The height & width of bench shall be kept 6m with face slopes 70°. Secondary blasting with jackhammer drilling shall be carried out if required.

Indicate quantum of development & tonnage & grade of production expected pit wide as in table below:

Year	Overburden (cum)	ROM Gitty, Khanda, Boulder (cum)	Saleable Gitty, Khanda, Boulder (cum)	Sub grade mineral	Mineral reject	Ore to overburden ratio
1st	Nil	20000	20000	Nil	Nil	Nil
2nd	Nil	20000	20000	Nil	Nil	Nil
3rd	Nil	20000	20000	Nil	Nil	Nil
4th	Nil	20000	20000	Nil	Nil	Nil
5th	Nil	20000	20000	Nil	Nil	Nil
Total		100000	0			

**Drilling:**

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The drilling will be done with the help of compressor and jackhammer. In this mine the diameter of hole will be 32-34 mm and depth of hole will be kept from 0.8m to 3.3m in a single hole.

**Blasting:**

The hole will be blasted by using ANFO.

{“Ammonium Nitrate Fuel Oil Explosive (ANFO)” means an explosive mixture of ammonium nitrate and fuel oil which is not cap sensitive, but does not include emulsion or slurry explosive or site mixed explosive (SME)}

**Loading and Transportation:**

Loading of stone block will be done with help of the winch and crane at both face and on truck. Small stone block (patis) is loaded in truck with the help of Excavator. The trucks will be used for transportation of stone block and Khandas from mine site to destination.

*{Note:-Blasting shall be carried out after the permission of District Magistrate, Banda (U.P.) and Directorate General of Mines Safety, Gwalior (U.P.)}*

*Blasting shall be done under the supervision of blaster and necessary preventive measures shall be taken as per the guidelines of Directorate General of Mines Safety, Gwalior (U.P.)}*

**No. of Trucks Required (maximum):**

Total capacity of mine	:	20000 m <sup>3</sup> per year
Total no. of working days	:	300 days
Building Stone, Khandas & Gitti, Boulder extracted in a day	:	66.67 cum
Building Stone, Khandas & Gitti, Boulder extracted in one truck	:	12-13 cum (approx.)
No. of truck required per day	:	Approximately 5-6 Truck/tippers

**Restriction of mining:**

The target testing and advanced stages of exploration require larger field camps and the use of heavy equipment at the worksite. Only trained workers or authorized visitors shall be permitted onto worksites where heavy equipment is operating.

Only properly licensed and trained personnel shall operate heavy equipment. Workers shall be constantly vigilant and never approach heavy equipment unless they are certain the operator knows where they are, what they intend to do and where they intend to go.

Crews shall be fully trained for the job. They shall be provided with appropriate personal protective equipment (e.g., hard hats, steel-toed boots, hearing protection, gloves, goggles and dust masks) Drill rigs shall comply with all safety requirements (e.g., guards that cover all moving parts of machinery, high pressure air hoses secured with clamps and safety chains)

**2.10 GENERAL FEATURES:**

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It is a Building Stone, Khandas & Gitti, Boulder mining project over an area of 2.0 ha. at Village: Jarar, District Banda, Uttar Pradesh. It has been proposed to collect 20000 m<sup>3</sup> per year of Building Stone, Khandas & Gitti, Boulder annually as per LOI.

**Vehicular Traffic Density:**

The roads connect from the mine site to NH-76 which is 13.0 km further East. So, a pass way at every 100 m distance will be provided to facilitate easy and smooth movement of heavy duty trucks. The State Highway has traffic density less than 3-4 trucks per day. On these Highway trucks/trolleys ply regularly and these will easily accommodate additional trucks/tippers per day.

**Township:**

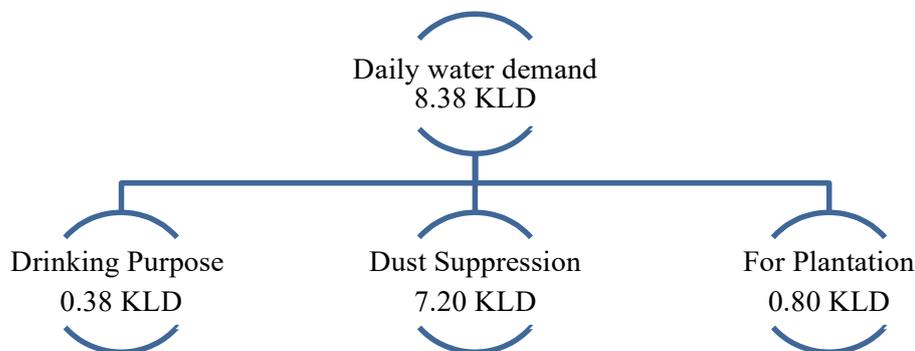
Since this mining is intermittent and laborer employed would be mostly from adjoining areas, no permanent establishment of a colony is proposed.

**Power, Water Supply and Other Infrastructure Requirement Power:**

All the activities will be carried out manually i.e. extraction of the Building Stone, Khandas & Gitti, Boulder and loading by the working people, only during the day time. Hence there is no power requirement for the project. However solar power panels will be provided for lighting in the shelter at the mining bench for the guards in night time.

**Water Supply:**

In the Building Stone, Khandas & Gitti, Boulder projects there is as such no need of water to carry out operations. Water will be required for drinking purpose and dust suppression. The number of working people is 28 so the water required for drinking purpose for the workers will be around 0.38 KLD, for Plantation will be 0.80 KLD & for the dust suppression will be 7.20 KLD, making the total water requirement will be around 8.38 KLD. This water will be supplied from the nearby area.



**Infrastructure /Site Services:**

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The workers are mostly locals living in the close proximity of area and will work in shifts during day time only thus there is no requirement of major infrastructural facilities at the site. The following infrastructure facilities will be made available for the workers.

The site services like temporary shelter, first aid box, drinking water and portable toilets facilities will be provided to workers at the mine site.

- a) **Manager’s Office:** The activities shall be supervised by one competent person as overall manager. In addition one mining mate cum blaster is proposed to supervise the drilling and blasting operation. Main administrative office is proposed to be set up in nearby locality on rental accommodation. However, at site one office of Manager is proposed of about 5 x 3 mtrs Size which shall also provide accommodation for key supervisory staff as well.
- b) **Canteen -cum-rest shelter:** In order to provide the rest shelter for the personnel working in the mine and also to provide tea/refreshment etc. as per the Mines Act, 1952. The arrangement shall be made to install a rest shelter-cum-canteen as shown in plate no.4 and shall be utilized by the workers. The rest shelter will be for having rest during the lunch hours by the operators/ labor. The size of rest shelter shall be about 15 x 3 meter to accommodate the working labors.
- c) **First Aid Room:** To provide the first aid for any sort of injuries encountered during the mining operation, one small first aid room will be provided at mine site. First aid kit and sufficient stock of material/medicines needed for first aid will be provided as per requirement. As the Mining Engineer/Manager and Mining Mates are qualified first aides, they can provide first aid to the labor on the spot.
- d) **Crèche:** At present provision of crèche is not provided, however in future if women workers are employed, arrangement for a small crèche shall be made as per the requirement.
- e) **Water Supply:** The water supply for drinking purpose proposed will be made available by hired tanker. The water will be taken from the village Public water supply which is just 0.5 Km. away from the mine site and is controlled by the public health department of the state Government. The water form supply tube well is used for the entire village Banda. Therefore the same arrangement shall continue for the mines as well.
- f) **Store:** Since the mining operation will involve heavy earth moving machinery, a small storeroom will be provided for day to day operations. No provisions for a separate workshop are being made as the heavy repairs will be carried out elsewhere.

**Manpower Requirement:**

The manpower requirement for the proposed project will be around 28. Apart from these the local manpower may also be required for excavation, transportation and loading/unloading of Building Stone, Khandas & Gitti, Boulder in dumpers/trucks/trolleys.

S. No.	Category	Numbers
1.	Mining Engineer(Full time)	01
2.	Geologist(Full time)	01

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3.	Mines mate / Blaster	01
4.	Drivers	03
5.	Supervisor	02
6.	Time Keeper	01
7.	Office Assistant/Dispatch Supervisor	01
8.	Compressor operator	01
9.	Wagon Drill operator	01
10.	Piece rated workers	16
<b>TOTAL</b>		<b>28</b>

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## CHAPTER-3

### DESCRIPTION OF ENVIRONMENT

#### 3.0 INTRODUCTION

This section contains the description of baseline studies of the area within 10 Km radius surrounding the Jarar, “Building Stone, Khandas & Gitti, Boulder Mine”, Tehsil- Naraini, District- Banda, Uttar Pradesh. The study was undertaken for prevailing environment in respect of land, air, water (both ground and surface), soil, noise, biological (both flora and fauna). The data collected has been used to understand the existing environment scenario around the proposed mining project against which the potential impacts of the proposed project can be assessed.

#### 3.1 STUDY AREA AND PERIOD

Studies of various environmental parameters have been done within 10 km radius area of the proposed project site. The impact identification always commences with the collection of baseline data such as Ambient Air Quality, Meteorology, Ground and Surface Water Quality, Noise levels, Soil Quality, Land use pattern, Biological Environment and Socio-economic aspects, within the study zone of 10 km. radius.

#### 3.2 LAND ENVIRONMENT

##### LAND USE PATTERN

The land use pattern will mainly deal with the land use and land cover study within project site and surrounding buffer area. Land use refers to Man’s activity and various uses which are carried out on land. Land cover refers to natural physical characteristics of earth surface like natural vegetation, water bodies, rock/soil, artificial cover and others result to land transformation.

Land use and land cover are interchangeable process due to man’s activities interference.

10 km radius study buffer area has taken for preparation and analysis of land use pattern.

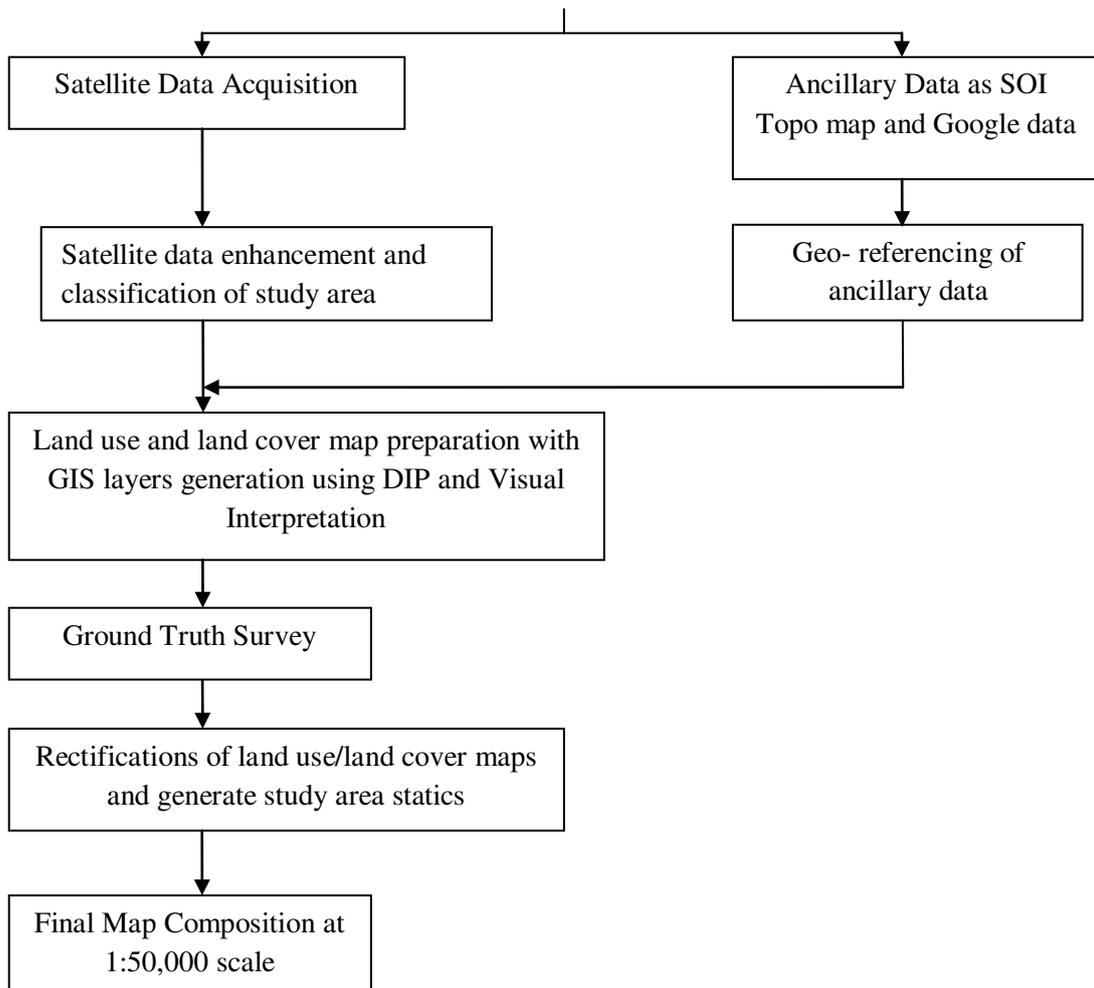
##### Adopted Methodology

###### Data Used

- ✓ Satellite Image- Resourcesat-1
- ✓ Sensor- LISS III
- ✓ Band Combination- 2,3,4
- ✓ Ancillary SOI Toposheets and other reference map

Salient features of the adopted methodology for land use maps preparation of study area are given below:

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Mine Lease Area: - 1.21 Hec.

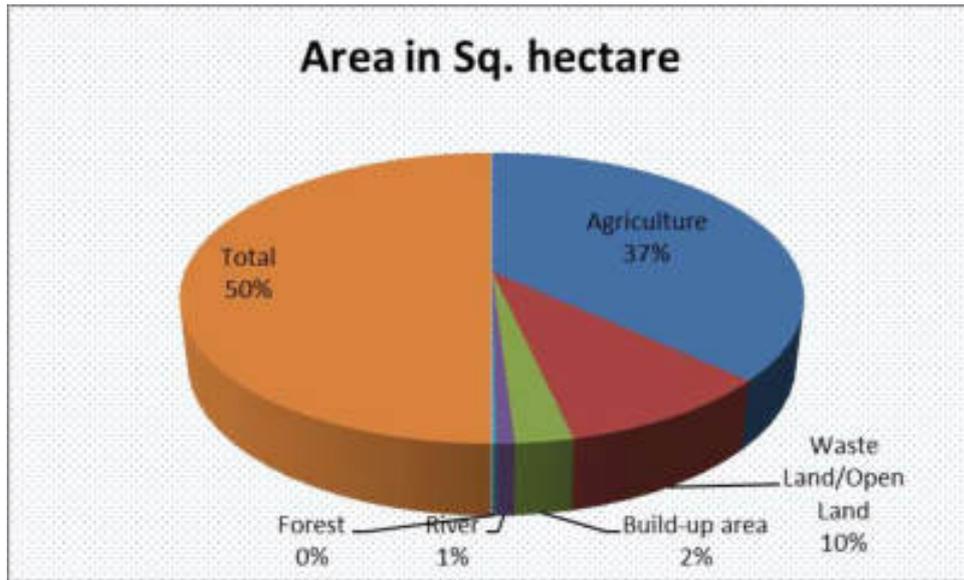
**ANALYSIS OF LAND USE PATTERN**

**Table 3.1 Land Use/Land Cover Area Statics of Buffer Zone**

S.No.	LU/LC Class	Area in Sq. hectare	% Area
1	Agriculture	23210.45	73.85
2	Waste Land/Open Land	6015.62	19.14
3	Build-up area	1587.54	50.5
4	River	491.21	1.56
5	Forest	123.75	0.40
	<b>Total</b>	<b>31428.57</b>	<b>100.00</b>

*Source: Satellite Image Based*

**Pie Chart of LULC 10 km Radius Buffer Study Area**



**3.3 AIR ENVIRONMENT**

**Selection of Air Quality Monitoring Stations**

Ambient air quality monitoring stations were selected primarily on the basis of surface influence, demographic influence and meteorological influence. From the meteorological data already available at the near-most site the frequency and duration of wind is preliminary determined, from which the likely wind rose diagram is first drawn. Out of four, two monitoring stations were selected in the direction of the most predominant wind direction (Up wind); one in the downwind side, one closer to the project site.

24 hourly monitoring was carried out for SO<sub>2</sub>, NO<sub>2</sub>, PM<sub>2.5</sub> & PM<sub>10</sub> twice a week at each station for a study period of 3 months

**3.3.1 Wind Speed**

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 eight hourly and twenty four hour duration respectively. The observed wind pattern during the study period is described below and is plotted for the study period. The predominant over all wind patterns for the study period is from West to East direction.

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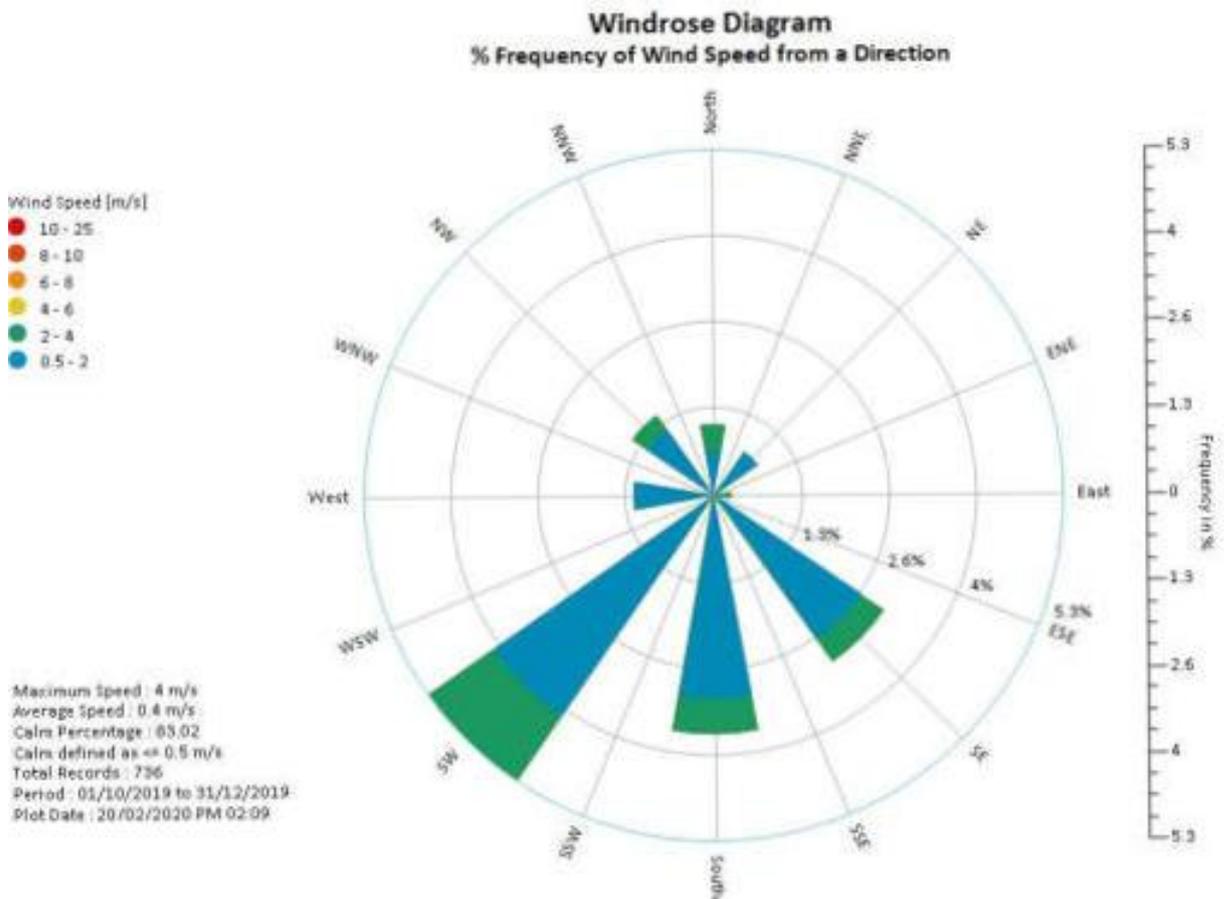


Figure 3.1 Wind rose Diagram

**Methods for monitoring**

The Central Pollution Control Board (CPCB) has published comprehensive document on emission testing regulations (“Emission Regulations Part-3, 1985”). Those procedures relevant to the particulate monitoring are summarized in Table 3.2(i):

**Table 3.2(i): Methods adopted for PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub> and NO<sub>x</sub> (as NO<sub>2</sub>)**

Parameters	Technique	Technical Protocol	Minimum Detectable Limit
PM <sub>2.5</sub>	Gravimetric method	US EPA Method	5 (µg/m <sup>3</sup> )
PM <sub>10</sub>	Gravimetric method	IS 5182 (Part-XXIII)	5 (µg/m <sup>3</sup> )
Sulphur Dioxide	West and Gaeke	IS-5182 (Part-II)	4 (µg/m <sup>3</sup> )
Nitrogen Oxide	Jacob & Hochheiser	IS-5182 (Part-VI)	7 (µg/m <sup>3</sup> )

**i. Particulate Matter (PM):-**

The CPCB method and IS 5182 (Part-XXIII) adopt a very similar approach to particulate sampling. There are some differences in the expressions used, but they are generally of no practical significance. It is recommended that CPCB method is adapted.

**ii. Equipment calibration:**

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For accurate testing of emission sources, the components of the sampling train is calibrated by outsource and supplier (Master Calibrator) standards and solutions are used, calibrated under certified reference material.

The ambient air quality primary data were collected to find the existing emissions / conditions. The data is given in Table No. 3.2 (ii) and the ambient air quality Secondary data is used. The data is given in Table No. 3.2 (iii)

**Table 3.2 (ii)- Ambient air quality Primary data monitoring stations**

Station Code	Name of the station	Distance from the project site	Zone/Study Area /Project Area
AQ1	Jarar	0.28kms towards East	Project Area
AQ2	Jahangirabad	1.06 kms towards South	Study Area
AQ3	Girwan	2.34 kms towards East	Study Area
AQ4	Barokhar khurd	1.69 kms towards North-East	Study Area
AQ5	Barokhar buzurg	4.67 kms towards North	Study Area

**Table 3.2(iii) Ambient Air Quality Status**

Sr. No.	Pollutant	Location	No. of observation	Maximum	Minimum	Average of total no. of observation	CPCB Standards
1.	SO <sub>2</sub> (µg/m <sup>3</sup> )	AQ1	24	11.98	9.36	10.80	80.0
		AQ2		14.65	9.12	11.44	
		AQ3		11.35	9.12	10.13	
		AQ4		11.46	8.12	10.33	
		AQ5		11.53	8.36	9.62	
2.	NO <sub>2</sub> (µg/m <sup>3</sup> )	AQ1	24	27.14	21.45	24.64	80.0
		AQ2		26.78	21.55	23.82	
		AQ3		27.54	22.46	25.21	
		AQ4		26.78	20.49	24.34	
		AQ5		26.34	20.78	24.03	
3.	PM10 (µg/m <sup>3</sup> )	AQ1	24	68.24	61.48	64.84	100.0
		AQ2		79.65	63.79	70.24	
		AQ3		74.61	61.45	67.26	
		AQ4		75.52	65.45	70.89	
		AQ5		67.13	62.35	64.28	
4.	PM2.5 (µg/m <sup>3</sup> )	AQ1	24	38.51	31.47	33.82	60.0
		AQ2		41.28	34.76	38.10	
		AQ3		38.39	31.15	34.71	
		AQ4		39.51	33.74	37.26	
		AQ5		38.39	32.69	35.21	
5	CO (µg/m <sup>3</sup> )	AQ1	24	0.67	0.53	0.60	4
		AQ2		0.69	0.53	0.64	
		AQ3		0.69	0.53	0.62	

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		AQ4	0.79	0.66	0.73
		AQ5	0.50	0.68	0.63

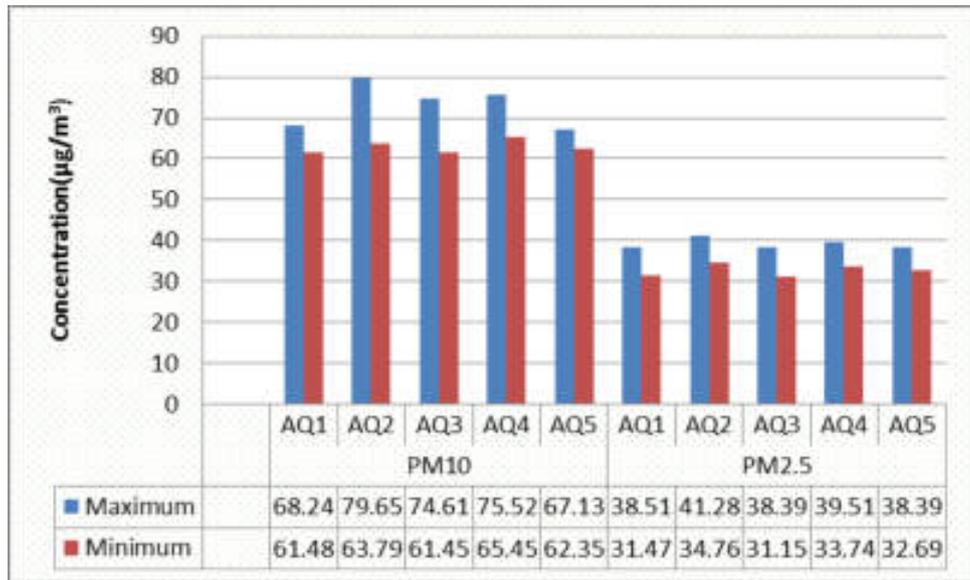


Figure 3.2 Graphical representations of Particulate Pollutants (PM<sub>10</sub> and PM<sub>2.5</sub>)

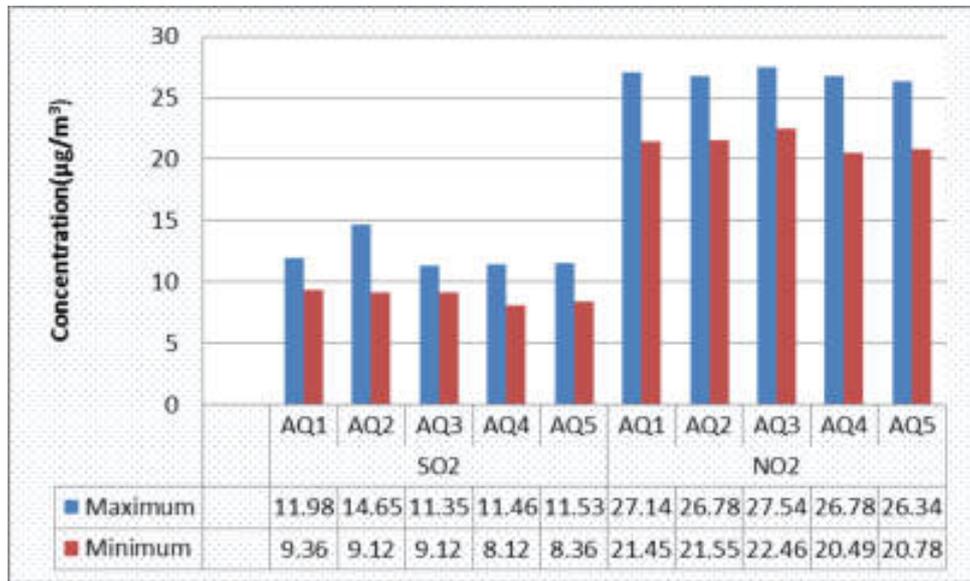


Figure 3.3 Graphical representation of gaseous SO<sub>2</sub> and NO<sub>x</sub> pollutant

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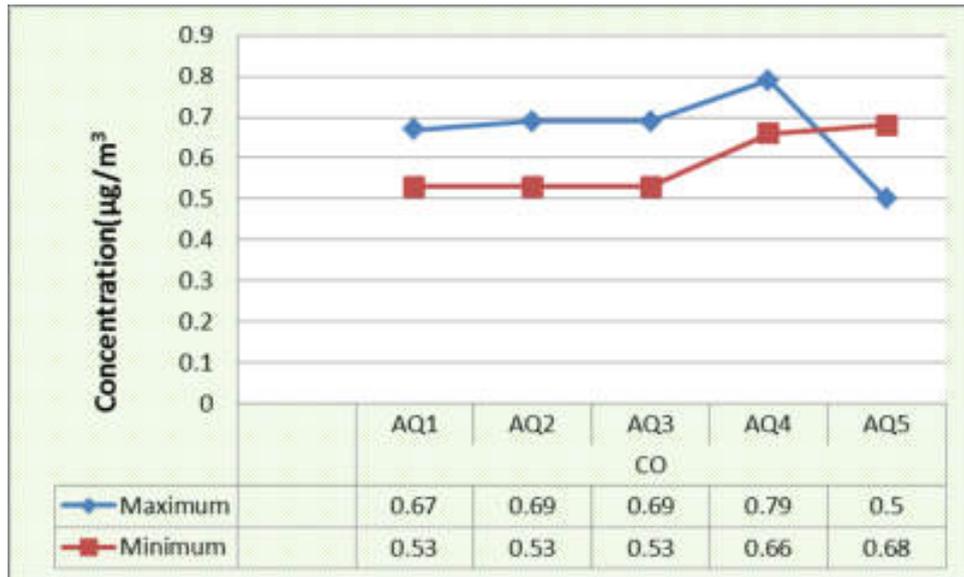


Figure 3.4 Graphical representation of gaseous CO pollutant

**Observations:**

Ambient Air Quality Monitoring reveals that the maximum & minimum concentrations of PM10 for all the AQ5 monitoring stations were found to be ranging between 79.65 µg/m<sup>3</sup> and 61.45 µg/m<sup>3</sup> and the maximum & minimum concentrations of PM 2.5 for all the AQ5 monitoring stations were found to be ranging between 41.28 µg/m<sup>3</sup> and 31.47 µg/m<sup>3</sup>.

As far as the gaseous pollutants SO<sub>2</sub> and NO<sub>2</sub> are concerned, the prescribed CPCB limit of 80 µg/m<sup>3</sup> for residential and rural area has never surpassed at any station. The maximum concentration of SO<sub>2</sub> was found at AQ2 with a value 14.65 µg/m<sup>3</sup> and minimum at AQ4 with a value 8.12 µg/m<sup>3</sup>. The maximum concentrations of NO<sub>2</sub> were found at AQ3 with a value 27.54 µg/m<sup>3</sup> and minimum at AQ5 with a value 20.78 µg/m<sup>3</sup>.

**Free SiO<sub>2</sub>:**

**-Table 3.2 (iv) Silica Contents in dust of air samples collected**

SiO <sub>2</sub> (µg/m <sup>3</sup> )	AQ1	AQ2	AQ3	AQ4	AQ5
Minimum	3.69	4.02	1.95	2.02	3.78
Maximum	4.08	4.78	4.48	4.25	4.17

**Observations:**

The concentrations of SiO<sub>2</sub> were found to be in range of 1.95 to 4.78 µg/m<sup>3</sup>.

**3.4 WATER ENVIRONMENT**

**3.4.1 GROUND WATER**

Three water samples were collected from the study area. The location of sampling points is shown in Table 3.4.1 (i) and the physico-chemical analysis of the water samples is given in the Table 3.4.1 (ii).

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Table 3.4.1 (i) Ground water sampling locations

Station No.	Location	Distance (km)
GW1	Jarar(Handpump)	0.28kms towards East
GW2	Jahangirabad(Handpump)	1.06 kms towards South
GW3	Girwan(Handpump)	2.34 kms towards East
GW4	Barokhar buzurg(Handpump)	4.67 kms towards North

Table 3.3.1 (ii) Physico-chemical properties of ground water Study Area

Sampling October 2019 (GW1)

S.No	Parameter	Test Method	Results	Units	Acceptable Limit	Permissible Limit in the Absence of Alternate Source
1	pH	IS:3025(Part-11)	7.35	-	6.5-8.5	-
2	Colour	IS:3025(Part-4)	<5.0	Hazen	5	15
3	Odour	IS:3025(Part-05)	Agreeable	-	Agreeable	Agreeable
4	Taste	IS:3025(Part-7)	Agreeable	-	Agreeable	Agreeable
5	Turbidity	IS-3025(Part-10)	<1.0	NTU	1	5
6	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	340.00	mg/l	200	600
7	Calcium(as Ca)	IS:3025(Part-40)	56.00	mg/l	75	200
8	Magnesium(as Mg)	IS:3025(Part-46)	48.60	mg/l	30	100
9	Chloride(as Cl)	IS:3025(Part-32)	143.97	mg/l	250	1000
10	Iron(as Fe)	IS:3025(Part-53)	0.15	mg/l	0.3	No Relaxation
11	Fluoride(as F)	APHA-4500 F	0.81	mg/l	1	1.5
12	Total Dissolved Solid	IS:3025(Part-16)	893	mg/l	500	2000
13	Phenolic Compound (as C <sub>6</sub> H <sub>5</sub> OH)	IS: 3025 (Part-43)	<0.001	mg/l	0.001max	0.002 Max
14	Anionic Detergents (as MBAS)	Annex K of IS 13428	<0.1	mg/l	0.2	1.0
15	Sulphate (as SO <sub>4</sub> )	IS:3025(Part-24)	26.79	mg/l	200	400
16	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part-34)	3.07	mg/l	45	No Relaxation
17	Cadmium (as Cd)	IS:3025(Part-41)	<0.001	mg/l	0.003	No Relaxation
18	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.01	No Relaxation
19	Total Chromium (as Cr)	Annex J of IS-13428	<0.01	mg/l	0.05	No Relaxation
20	Copper (as Cu)	IS:3025(Part-42)	<0.01	mg/l	0.05	1.5
21	Total Ammonia	IS: 3025 (Part-34)	<0.1	mg/l	0.5	No Relaxation
22	Chloramines (as Cl <sub>2</sub> )	IS:3025(Part-26)	<1.0	mg/l	4	No Relaxation
23	Free Residual Chlorine	IS:3025(Part-26)	<0.1	mg/l	0.2	1
24	Aluminium (as Al)	IS:3025(Part-55)	<0.01	mg/l	0.03	0.2
25	Zinc	IS:3025(Part-49)	<1.0	mg/l	5	15
26	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.1	0.3
27	Boron (as B)	IS:3025(Part-57)	<0.1	mg/l	0.5	1
28	Selenium (Se)	IS:3025(Part-56)	<0.01	mg/l	0.01	No Relaxation
29	Silver (As Ag)	Annex J of IS 13428	<0.1	mg/l	0.1	No Relaxation
30	Mercury (as Hg)	IS:3025(Part-48)	<0.001	mg/l	0.001	No Relaxation
31	Molybdenum (Mo)	IS:3025(Part-2)	<0.01	mg/l	0.07	No Relaxation
32	Nickel (as Ni)	IS:3025(Part-54)	<0.01	mg/l	0.02	No Relaxation
33	Arsenic (as As)	IS:3025(Part-37)	<0.01	mg/l	0.01	0.05
34	Poly Nuclear Aromatic Hydro Carbons	APHA6440	<0.0001	mg/l	0.0001	No Relaxation
35	Poly Chlorinated biphenyl	APHA6630	<0.0001	mg/l	0.0005	No Relaxation
36	Alkalinity	IS:3025(Part-23)	388	mg/l	200	600
37	Sulphide (as H <sub>2</sub> S)	IS:3025(Part-29)	<0.01	mg/l	0.05	No Relaxation
38	Cyanide (as CN)	IS:3025(Part-27)	<0.01	mg/l	0.05	No Relaxation
39	E.Coli	IS:1622	Absent	E.Coli/100ml	Absent	Absent
40	Coli form	IS:1622	Absent	MPN/100 ml	Absent	Absent

EIA/EMP CHAPTER-3- DESCRIPTION OF ENVIRONMENT

Sampling November 2019 (GW1)

S.No	Parameter	Test Method	Results	Units	Acceptable Limit	Permissible Limit in the Absence of Alternate Source
1	pH	IS:3025(Part-11)	7.47	-	6.5-8.5	-
2	Colour	IS:3025(Part-4)	<5.0	Hazen	5	15
3	Odour	IS:3025(Part-05)	Agreeable	-	Agreeable	Agreeable
4	Taste	IS:3025(Part-7)	Agreeable	-	Agreeable	Agreeable
5	Turbidity	IS:3025(Part-10)	<1.0	NTU	1	5
6	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	356.00	mg/l	200	600
7	Calcium(as Ca)	IS:3025(Part-40)	60.80	mg/l	75	200
8	Magnesium(as Mg)	IS:3025(Part-46)	49.57	mg/l	30	100
9	Chloride(as Cl)	IS:3025(Part-32)	152.08	mg/l	250	1000
10	Iron(as Fe)	IS:3025(Part-53)	0.12	mg/l	0.3	No Relaxation
11	Fluoride(as F)	APHA-4500 F	0.84	mg/l	1	1.5
12	Total Dissolved Solid	IS:3025(Part-16)	916	mg/l	500	2000
13	Phenolic Compound (as C <sub>6</sub> H <sub>5</sub> OH)	IS: 3025 (Part-43)	<0.001	mg/l	0.001max	0.002 Max
14	Anionic Detergents (as MBAS)	Annex K of IS 13428	<0.1	mg/l	0.2	1.0
15	Sulphate (as SO <sub>4</sub> )	IS:3025(Part-24)	27.37	mg/l	200	400
16	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part-34)	3.18	mg/l	45	No Relaxation
17	Cadmium (as Cd)	IS:3025(Part-41)	<0.001	mg/l	0.003	No Relaxation
18	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.01	No Relaxation
19	Total Chromium (as Cr)	Annex J of IS-13428	<0.01	mg/l	0.05	No Relaxation
20	Copper (as Cu)	IS:3025(Part-42)	<0.01	mg/l	0.05	1.5
21	Total Ammonia	IS: 3025 (Part-34)	<0.1	mg/l	0.5	No Relaxation
22	Chloramines (as Cl <sub>2</sub> )	IS:3025(Part-26)	<1.0	mg/l	4	No Relaxation
23	Free Residual Chlorine	IS:3025(Part-26)	<0.1	mg/l	0.2	1
24	Aluminium (as Al)	IS:3025(Part-55)	<0.01	mg/l	0.03	0.2
25	Zinc	IS:3025(Part-49)	<1.0	mg/l	5	15
26	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.1	0.3
27	Boron (as B)	IS:3025(Part-57)	<0.1	mg/l	0.5	1
28	Selenium (Se)	IS:3025(Part-56)	<0.01	mg/l	0.01	No Relaxation
29	Silver (As Ag)	Annex J of IS 13428	<0.1	mg/l	0.1	No Relaxation
30	Mercury (as Hg)	IS:3025(Part-48)	<0.001	mg/l	0.001	No Relaxation
31	Molybdenum (Mo)	IS:3025(Part-2)	<0.01	mg/l	0.07	No Relaxation
32	Nickel (as Ni)	IS:3025(Part-54)	<0.01	mg/l	0.02	No Relaxation
33	Arsenic (as As)	IS:3025(Part-37)	<0.01	mg/l	0.01	0.05
34	Poly Nuclear Aromatic Hydro Carbons	APHA6440	<0.0001	mg/l	0.0001	No Relaxation
35	Poly Chlorinated biphenyl	APHA6630	<0.0001	mg/l	0.0005	No Relaxation
36	Alkalinity	IS:3025(Part-23)	404	mg/l	200	600
37	Sulphide (as H <sub>2</sub> S)	IS:3025(Part-29)	<0.01	mg/l	0.05	No Relaxation
38	Cyanide (as CN)	IS:3025(Part-27)	<0.01	mg/l	0.05	No Relaxation
39	E.Coli	IS:1622	Absent	E.Coli/100ml	Absent	Absent
40	Coli form	IS:1622	Absent	MPN/100 ml	Absent	Absent

EIA/EMP CHAPTER-3- DESCRIPTION OF ENVIRONMENT

Sampling December 2019 (GW1)

S.No	Parameter	Test Method	Results	Units	Acceptable Limit	Permissible Limit in the Absence of Alternate Source
1	pH	IS:3025(Part-11)	7.45	-	6.5-8.5	-
2	Colour	IS:3025(Part-4)	<5.0	Hazen	5	15
3	Odour	IS-3025(Part-05)	Agreeable	-	Agreeable	Agreeable
4	Taste	IS:3025(Part-7)	Agreeable	-	Agreeable	Agreeable
5	Turbidity	IS-3025(Part-10)	<1.0	NTU	1	5
6	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	332.00	mg/l	200	600
7	Calcium(as Ca)	IS:3025(Part-40)	52.80	mg/l	75	200
8	Magnesium(as Mg)	IS:3025(Part-46)	48.60	mg/l	30	100
9	Chloride(as Cl)	IS:3025(Part-32)	133.83	mg/l	250	1000
10	Iron(as Fe)	IS:3025(Part-53)	0.13	mg/l	0.3	No Relaxation
11	Fluoride(as F)	APHA-4500 F	0.82	mg/l	1	1.5
12	Total Dissolved Solid	IS:3025(Part-16)	885	mg/l	500	2000
13	Phenolic Compound (as C <sub>6</sub> H <sub>5</sub> OH)	IS: 3025 (Part-43)	<0.001	mg/l	0.001max	0.002 Max
14	Anionic Detergents (as MBAS)	Annex K of IS 13428	<0.1	mg/l	0.2	1.0

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15	Sulphate (as SO <sub>4</sub> )	IS:3025(Part-24)	26.40	mg/l	200	400
16	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part-34)	3.16	mg/l	45	No Relaxation
17	Cadmium (as Cd)	IS-3025(Part-41)	<0.001	mg/l	0.003	No Relaxation
18	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.01	No Relaxation
19	Total Chromium (as Cr)	Annex J of IS-13428	<0.01	mg/l	0.05	No Relaxation
20	Copper (as Cu)	IS:3025(Part-42)	<0.01	mg/l	0.05	1.5
21	Total Ammonia	IS: 3025 (Part-34)	<0.1	mg/l	0.5	No Relaxation
22	Chloramines (as Cl <sub>2</sub> )	IS:3025(Part-26)	<1.0	mg/l	4	No Relaxation
23	Free Residual Chlorine	IS:3025(Part-26)	<0.1	mg/l	0.2	1
24	Aluminium (as Al)	IS:3025(Part-55)	<0.01	mg/l	0.03	0.2
25	Zinc	IS:3025(Part-49)	<1.0	mg/l	5	15
26	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.1	0.3
27	Boron (as B)	IS:3025(Part-57)	<0.1	mg/l	0.5	1
28	Selenium (Se)	IS:3025(Part-56)	<0.01	mg/l	0.01	No Relaxation
29	Silver (As Ag)	Annex J of IS 13428	<0.1	mg/l	0.1	No Relaxation
30	Mercury (as Hg)	IS:3025(Part-48)	<0.001	mg/l	0.001	No Relaxation
31	Molybdenum (Mo)	IS:3025(Part-2)	<0.01	mg/l	0.07	No Relaxation
32	Nickel (as Ni)	IS:3025(Part-54)	<0.01	mg/l	0.02	No Relaxation
33	Arsenic (as As)	IS:3025(Part-37)	<0.01	mg/l	0.01	0.05
34	Poly Nuclear Aromatic Hydro Carbons	APHA6440	<0.0001	mg/l	0.0001	No Relaxation
35	Poly Chlorinated biphenyl	APHA6630	<0.0001	mg/l	0.0005	No Relaxation
36	Alkalinity	IS:3025(Part-23)	372	mg/l	200	600
37	Sulphide (as H <sub>2</sub> S)	IS:3025(Part-29)	<0.01	mg/l	0.05	No Relaxation
38	Cyanide (as CN)	IS:3025(Part-27)	<0.01	mg/l	0.05	No Relaxation
39	E.Coli	IS:1622	Absent	E.Coli/100ml	Absent	Absent
40	Coli form	IS:1622	Absent	MPN/100 ml	Absent	Absent

EIA/EMP CHAPTER-3- DESCRIPTION OF ENVIRONMENT

Sampling October 2019 (GW2)

S.No	Parameter	Test Method	Results	Units	Acceptable Limit	Permissible Limit in the Absence of Alternate Source
1	pH	IS:3025(Part-11)	7.59	-	6.5-8.5	-
2	Colour	IS:3025(Part-4)	<5.0	Hazen	5	15
3	Odour	IS:3025(Part-05)	Agreeable	-	Agreeable	Agreeable
4	Taste	IS:3025(Part-7)	Agreeable	-	Agreeable	Agreeable
5	Turbidity	IS:3025(Part-10)	<1.0	NTU	1	5
6	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	244.00	mg/l	200	600
7	Calcium(as Ca)	IS:3025(Part-40)	59.20	mg/l	75	200
8	Magnesium(as Mg)	IS:3025(Part-46)	23.33	mg/l	30	100
9	Chloride(as Cl)	IS:3025(Part-32)	117.61	mg/l	250	1000
10	Iron(as Fe)	IS:3025(Part-53)	0.12	mg/l	0.3	No Relaxation
11	Fluoride(as F)	APHA-4500 F	0.78	mg/l	1	1.5
12	Total Dissolved Solid	IS:3025(Part-16)	872	mg/l	500	2000
13	Phenolic Compound (as C <sub>6</sub> H <sub>5</sub> OH)	IS: 3025 (Part-43)	<0.001	mg/l	0.001max	0.002 Max
14	Anionic Detergents (as MBAS)	Annex K of IS 13428	<0.1	mg/l	0.2	1.0
15	Sulphate (as SO <sub>4</sub> )	IS:3025(Part-24)	25.04	mg/l	200	400
16	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part-34)	3.41	mg/l	45	No Relaxation
17	Cadmium (as Cd)	IS:3025(Part-41)	<0.001	mg/l	0.003	No Relaxation
18	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.01	No Relaxation
19	Total Chromium (as Cr)	Annex J of IS-13428	<0.01	mg/l	0.05	No Relaxation
20	Copper (as Cu)	IS:3025(Part-42)	<0.01	mg/l	0.05	1.5
21	Total Ammonia	IS: 3025 (Part-34)	<0.1	mg/l	0.5	No Relaxation
22	Chloramines (as Cl <sub>2</sub> )	IS:3025(Part-26)	<1.0	mg/l	4	No Relaxation
23	Free Residual Chlorine	IS:3025(Part-26)	<0.1	mg/l	0.2	1
24	Aluminium (as Al)	IS:3025(Part-55)	<0.01	mg/l	0.03	0.2
25	Zinc	IS:3025(Part-49)	<1.0	mg/l	5	15
26	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.1	0.3
27	Boron (as B)	IS:3025(Part-57)	<0.1	mg/l	0.5	1
28	Selenium (Se)	IS:3025(Part-56)	<0.01	mg/l	0.01	No Relaxation
29	Silver (As Ag)	Annex J of IS 13428	<0.1	mg/l	0.1	No Relaxation
30	Mercury (as Hg)	IS:3025(Part-48)	<0.001	mg/l	0.001	No Relaxation
31	Molybdenum (Mo)	IS:3025(Part-2)	<0.01	mg/l	0.07	No Relaxation
32	Nickel (as Ni)	IS:3025(Part-54)	<0.01	mg/l	0.02	No Relaxation
33	Arsenic (as As)	IS:3025(Part-37)	<0.01	mg/l	0.01	0.05
34	Poly Nuclear Aromatic Hydro Carbons	APHA6440	<0.0001	mg/l	0.0001	No Relaxation
35	Poly Chlorinated biphenyl	APHA6630	<0.0001	mg/l	0.0005	No Relaxation
36	Alkalinity	IS:3025(Part-23)	348	mg/l	200	600
37	Sulphide (as H <sub>2</sub> S)	IS:3025(Part-29)	<0.01	mg/l	0.05	No Relaxation
38	Cyanide (as CN)	IS:3025(Part-27)	<0.01	mg/l	0.05	No Relaxation
39	E.Coli	IS:1622	Absent	E.Coli/100ml	Absent	Absent
40	Coli form	IS:1622	Absent	MPN/100 ml	Absent	Absent

EIA/EMP CHAPTER-3- DESCRIPTION OF ENVIRONMENT

Sampling November 2019 (GW2)

S.No	Parameter	Test Method	Results	Units	Acceptable Limit	Permissible Limit in the Absence of Alternate Source
1	pH	IS:3025(Part-11)	7.72	-	6.5-8.5	-
2	Colour	IS:3025(Part-4)	<5.0	Hazen	5	15
3	Odour	IS:3025(Part-05)	Agreeable	-	Agreeable	Agreeable
4	Taste	IS:3025(Part-7)	Agreeable	-	Agreeable	Agreeable
5	Turbidity	IS:3025(Part-10)	<1.0	NTU	1	5
6	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	212.00	mg/l	200	600
7	Calcium(as Ca)	IS:3025(Part-40)	54.40	mg/l	75	200
8	Magnesium(as Mg)	IS:3025(Part-46)	18.47	mg/l	30	100
9	Chloride(as Cl)	IS:3025(Part-32)	113.55	mg/l	250	1000
10	Iron(as Fe)	IS:3025(Part-53)	0.11	mg/l	0.3	No Relaxation
11	Fluoride(as F)	APHA-4500 F	0.73	mg/l	1	1.5
12	Total Dissolved Solid	IS:3025(Part-16)	827	mg/l	500	2000
13	Phenolic Compound (as C <sub>6</sub> H <sub>5</sub> OH)	IS: 3025 (Part-43)	<0.001	mg/l	0.001max	0.002 Max
14	Anionic Detergents (as MBAS)	Annex K of IS 13428	<0.1	mg/l	0.2	1.0
15	Sulphate (as SO <sub>4</sub> )	IS:3025(Part-24)	22.32	mg/l	200	400
16	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part-34)	3.30	mg/l	45	No Relaxation
17	Cadmium (as Cd)	IS:3025(Part-41)	<0.001	mg/l	0.003	No Relaxation
18	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.01	No Relaxation
19	Total Chromium (as Cr)	Annex J of IS-13428	<0.01	mg/l	0.05	No Relaxation
20	Copper (as Cu)	IS:3025(Part-42)	<0.01	mg/l	0.05	1.5
21	Total Ammonia	IS: 3025 (Part-34)	<0.1	mg/l	0.5	No Relaxation
22	Chloramines (as Cl <sub>2</sub> )	IS:3025(Part-26)	<1.0	mg/l	4	No Relaxation
23	Free Residual Chlorine	IS:3025(Part-26)	<0.1	mg/l	0.2	1
24	Aluminium (as Al)	IS:3025(Part-55)	<0.01	mg/l	0.03	0.2
25	Zinc	IS:3025(Part-49)	<1.0	mg/l	5	15
26	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.1	0.3
27	Boron (as B)	IS:3025(Part-57)	<0.1	mg/l	0.5	1
28	Selenium (Se)	IS:3025(Part-56)	<0.01	mg/l	0.01	No Relaxation
29	Silver (As Ag)	Annex J of IS 13428	<0.1	mg/l	0.1	No Relaxation
30	Mercury (as Hg)	IS:3025(Part-48)	<0.001	mg/l	0.001	No Relaxation
31	Molybdenum (Mo)	IS:3025(Part-2)	<0.01	mg/l	0.07	No Relaxation
32	Nickel (as Ni)	IS:3025(Part-54)	<0.01	mg/l	0.02	No Relaxation
33	Arsenic (as As)	IS:3025(Part-37)	<0.01	mg/l	0.01	0.05
34	Poly Nuclear Aromatic Hydro Carbons	APHA6440	<0.0001	mg/l	0.0001	No Relaxation
35	Poly Chlorinated biphenyl	APHA6630	<0.0001	mg/l	0.0005	No Relaxation
36	Alkalinity	IS:3025(Part-23)	328	mg/l	200	600
37	Sulphide (as H <sub>2</sub> S)	IS:3025(Part-29)	<0.01	mg/l	0.05	No Relaxation
38	Cyanide (as CN)	IS:3025(Part-27)	<0.01	mg/l	0.05	No Relaxation
39	E.Coli	IS:1622	Absent	E.Coli/100ml	Absent	Absent
40	Coli form	IS:1622	Absent	MPN/100 ml	Absent	Absent

EIA/EMP CHAPTER-3- DESCRIPTION OF ENVIRONMENT

Sampling December 2019 (GW2)

RESULTS						
S.No	Parameter	Test Method	Results	Units	Acceptable Limit	Permissible Limit in the Absence of Alternate Source
1	pH	IS:3025(Part-11)	7.85	-	6.5-8.5	-
2	Colour	IS:3025(Part-4)	<5.0	Hazen	5	15
3	Odour	IS:3025(Part-05)	Agreeable	-	Agreeable	Agreeable
4	Taste	IS:3025(Part-7)	Agreeable	-	Agreeable	Agreeable
5	Turbidity	IS:3025(Part-10)	<1.0	NTU	1	5
6	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	236.00	mg/l	200	600
7	Calcium(as Ca)	IS:3025(Part-40)	51.20	mg/l	75	200
8	Magnesium(as Mg)	IS:3025(Part-46)	26.24	mg/l	30	100
9	Chloride(as Cl)	IS:3025(Part-32)	109.50	mg/l	250	1000
10	Iron(as Fe)	IS:3025(Part-53)	0.09	mg/l	0.3	No Relaxation
11	Fluoride(as F)	APHA-4500 F	0.69	mg/l	1	1.5
12	Total Dissolved Solid	IS:3025(Part-16)	840	mg/l	500	2000
13	Phenolic Compound (as C <sub>6</sub> H <sub>5</sub> OH)	IS: 3025 (Part-43)	<0.001	mg/l	0.001max	0.002 Max
14	Anionic Detergents (as MBAS)	Annex K of IS 13428	<0.1	mg/l	0.2	1.0
15	Sulphate (as SO <sub>4</sub> )	IS:3025(Part-24)	21.16	mg/l	200	400
16	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part-34)	3.23	mg/l	45	No Relaxation
17	Cadmium (as Cd)	IS:3025(Part-41)	<0.001	mg/l	0.003	No Relaxation
18	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.01	No Relaxation
19	Total Chromium (as Cr)	Annex J of IS-13428	<0.01	mg/l	0.05	No Relaxation
20	Copper (as Cu)	IS:3025(Part-42)	<0.01	mg/l	0.05	1.5
21	Total Ammonia	IS: 3025 (Part-34)	<0.1	mg/l	0.5	No Relaxation
22	Chloramines (as Cl <sub>2</sub> )	IS:3025(Part-26)	<1.0	mg/l	4	No Relaxation
23	Free Residual Chlorine	IS:3025(Part-26)	<0.1	mg/l	0.2	1
24	Aluminium (as Al)	IS:3025(Part-55)	<0.01	mg/l	0.03	0.2
25	Zinc	IS:3025(Part-49)	<1.0	mg/l	5	15
26	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.1	0.3
27	Boron (as B)	IS:3025(Part-57)	<0.1	mg/l	0.5	1
28	Selenium (Se)	IS:3025(Part-56)	<0.01	mg/l	0.01	No Relaxation
29	Silver (As Ag)	Annex J of IS 13428	<0.1	mg/l	0.1	No Relaxation
30	Mercury (as Hg)	IS:3025(Part-48)	<0.001	mg/l	0.001	No Relaxation
31	Molybdenum (Mo)	IS:3025(Part-2)	<0.01	mg/l	0.07	No Relaxation
32	Nickel (as Ni)	IS:3025(Part-54)	<0.01	mg/l	0.02	No Relaxation
33	Arsenic (as As)	IS:3025(Part-37)	<0.01	mg/l	0.01	0.05
34	Poly Nuclear Aromatic Hydro Carbons	APHA6440	<0.0001	mg/l	0.0001	No Relaxation
35	Poly Chlorinated biphenyl	APHA6630	<0.0001	mg/l	0.0005	No Relaxation
36	Alkalinity	IS:3025(Part-23)	316	mg/l	200	600
37	Sulphide (as H <sub>2</sub> S)	IS:3025(Part-29)	<0.01	mg/l	0.05	No Relaxation
38	Cyanide (as CN)	IS:3025(Part-27)	<0.01	mg/l	0.05	No Relaxation
39	E.Coli	IS:1622	Absent	E.Coli/100ml	Absent	Absent
40	Coli form	IS:1622	Absent	MPN/100 ml	Absent	Absent

EIA/EMP CHAPTER-3- DESCRIPTION OF ENVIRONMENT

Sampling October 2019 (GW3)

S.No	Parameter	Test Method	Results	Units	Acceptable Limit	Permissible Limit in the Absence of Alternate Source
1	pH	IS:3025(Part-11)	7.61	-	6.5-8.5	-
2	Colour	IS:3025(Part-4)	<5.0	Hazen	5	15
3	Odour	IS:3025(Part-05)	Agreeable	-	Agreeable	Agreeable
4	Taste	IS:3025(Part-7)	Agreeable	-	Agreeable	Agreeable
5	Turbidity	IS:3025(Part-10)	<1.0	NTU	1	5
6	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	304.00	mg/l	200	600
7	Calcium(as Ca)	IS:3025(Part-40)	64.00	mg/l	75	200
8	Magnesium(as Mg)	IS:3025(Part-46)	34.99	mg/l	30	100
9	Chloride(as Cl)	IS:3025(Part-32)	40.55	mg/l	250	1000
10	Iron(as Fe)	IS:3025(Part-53)	0.27	mg/l	0.3	No Relaxation
11	Fluoride(as F)	APHA-4500 F	1.39	mg/l	1	1.5
12	Total Dissolved Solid	IS:3025(Part-16)	706	mg/l	500	2000
13	Phenolic Compound (as C <sub>6</sub> H <sub>5</sub> OH)	IS: 3025 (Part-43)	<0.001	mg/l	0.001max	0.002 Max
14	Anionic Detergents (as MBAS)	Annex K of IS 13428	<0.1	mg/l	0.2	1.0
15	Sulphate (as SO <sub>4</sub> )	IS:3025(Part-24)	20.38	mg/l	200	400
16	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part-34)	1.81	mg/l	45	No Relaxation
17	Cadmium (as Cd)	IS-3025(Part-41)	<0.001	mg/l	0.003	No Relaxation
18	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.01	No Relaxation
19	Total Chromium (as Cr)	Annex J of IS-13428	<0.01	mg/l	0.05	No Relaxation
20	Copper (as Cu)	IS:3025(Part-42)	<0.01	mg/l	0.05	1.5
21	Total Ammonia	IS: 3025 (Part-34)	<0.1	mg/l	0.5	No Relaxation
22	Chloramines (as Cl <sub>2</sub> )	IS:3025(Part-26)	<1.0	mg/l	4	No Relaxation
23	Free Residual Chlorine	IS:3025(Part-26)	<0.1	mg/l	0.2	1
24	Aluminium (as Al)	IS:3025(Part-55)	<0.01	mg/l	0.03	0.2
25	Zinc	IS:3025(Part-49)	<1.0	mg/l	5	15
26	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.1	0.3
27	Boron (as B)	IS:3025(Part-57)	<0.1	mg/l	0.5	1
28	Selenium (Se)	IS:3025(Part-56)	<0.01	mg/l	0.01	No Relaxation
29	Silver (As Ag)	Annex J of IS 13428	<0.1	mg/l	0.1	No Relaxation
30	Mercury (as Hg)	IS:3025(Part-48)	<0.001	mg/l	0.001	No Relaxation
31	Molybdenum (Mo)	IS:3025(Part-2)	<0.01	mg/l	0.07	No Relaxation
32	Nickel (as Ni)	IS:3025(Part-54)	<0.01	mg/l	0.02	No Relaxation
33	Arsenic (as As)	IS:3025(Part-37)	<0.01	mg/l	0.01	0.05
34	Poly Nuclear Aromatic Hydro Carbons	APHA6440	<0.0001	mg/l	0.0001	No Relaxation
35	Poly Chlorinated biphenyl	APHA6630	<0.0001	mg/l	0.0005	No Relaxation
36	Alkalinity	IS:3025(Part-23)	364	mg/l	200	600
37	Sulphide (as H <sub>2</sub> S)	IS:3025(Part-29)	<0.01	mg/l	0.05	No Relaxation
38	Cyanide (as CN)	IS:3025(Part-27)	<0.01	mg/l	0.05	No Relaxation
39	E.Coli	IS:1622	Absent	E.Coli/100ml	Absent	Absent
40	Coli form	IS:1622	Absent	MPN/100 ml	Absent	Absent

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EIA/EMP CHAPTER-3- DESCRIPTION OF ENVIRONMENT

Sampling November 2019 (GW3)

S.No	Parameter	Test Method	Results	Units	Acceptable Limit	Permissible Limit in the Absence of Alternate Source
1	pH	IS:3025(Part-11)	7.43	-	6.5-8.5	-
2	Colour	IS:3025(Part-4)	<5.0	Hazen	5	15
3	Odour	IS-3025(Part-05)	Agreeable	-	Agreeable	Agreeable
4	Taste	IS:3025(Part-7)	Agreeable	-	Agreeable	Agreeable
5	Turbidity	IS-3025(Part-10)	<1.0	NTU	1	5
6	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	300.00	mg/l	200	600
7	Calcium(as Ca)	IS:3025(Part-40)	67.20	mg/l	75	200
8	Magnesium(as Mg)	IS:3025(Part-46)	32.08	mg/l	30	100
9	Chloride(as Cl)	IS:3025(Part-32)	46.64	mg/l	250	1000
10	Iron(as Fe)	IS:3025(Part-53)	0.30	mg/l	0.3	No Relaxation
11	Fluoride(as F)	APHA-4500 F	1.39	mg/l	1	1.5
12	Total Dissolved Solid	IS:3025(Part-16)	723	mg/l	500	2000
13	Phenolic Compound (as C <sub>6</sub> H <sub>5</sub> OH)	IS: 3025 (Part-43)	<0.001	mg/l	0.001max	0.002 Max
14	Anionic Detergents (as MBAS)	Annex K of IS 13428	<0.1	mg/l	0.2	1.0
15	Sulphate (as SO <sub>4</sub> )	IS:3025(Part-24)	20.38	mg/l	200	400
16	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part-34)	1.86	mg/l	45	No Relaxation
17	Cadmium (as Cd)	IS-3025(Part-41)	<0.001	mg/l	0.003	No Relaxation
18	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.01	No Relaxation
19	Total Chromium (as Cr)	Annex J of IS-13428	<0.01	mg/l	0.05	No Relaxation
20	Copper (as Cu)	IS:3025(Part-42)	<0.01	mg/l	0.05	1.5
21	Total Ammonia	IS: 3025 (Part-34)	<0.1	mg/l	0.5	No Relaxation
22	Chloramines (as Cl <sub>2</sub> )	IS:3025(Part-26)	<1.0	mg/l	4	No Relaxation
23	Free Residual Chlorine	IS:3025(Part-26)	<0.1	mg/l	0.2	1
24	Aluminium (as Al)	IS:3025(Part-55)	<0.01	mg/l	0.03	0.2
25	Zinc	IS:3025(Part-49)	<1.0	mg/l	5	15
26	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.1	0.3
27	Boron (as B)	IS:3025(Part-57)	<0.1	mg/l	0.5	1
28	Selenium (Se)	IS:3025(Part-56)	<0.01	mg/l	0.01	No Relaxation
29	Silver (As Ag)	Annex J of IS 13428	<0.1	mg/l	0.1	No Relaxation
30	Mercury (as Hg)	IS:3025(Part-48)	<0.001	mg/l	0.001	No Relaxation
31	Molybdenum (Mo)	IS:3025(Part-2)	<0.01	mg/l	0.07	No Relaxation
32	Nickel (as Ni)	IS:3025(Part-54)	<0.01	mg/l	0.02	No Relaxation
33	Arsenic (as As)	IS:3025(Part-37)	<0.01	mg/l	0.01	0.05
34	Poly Nuclear Aromatic Hydro Carbons	APHA6440	<0.0001	mg/l	0.0001	No Relaxation
35	Poly Chlorinated biphenyl	APHA6630	<0.0001	mg/l	0.0005	No Relaxation
36	Alkalinity	IS:3025(Part-23)	372	mg/l	200	600
37	Sulphide (as H <sub>2</sub> S)	IS:3025(Part-29)	<0.01	mg/l	0.05	No Relaxation
38	Cyanide (as CN)	IS:3025(Part-27)	<0.01	mg/l	0.05	No Relaxation
39	E.Coli	IS:1622	Absent	E.Coli/100ml	Absent	Absent
40	Coli form	IS:1622	Absent	MPN/100 ml	Absent	Absent

EIA/EMP CHAPTER-3- DESCRIPTION OF ENVIRONMENT

Sampling December 2019 (GW3)

S.No	Parameter	Test Method	Results	Units	Acceptable Limit	Permissible Limit in the Absence of Alternate Source
1	pH	IS:3025(Part-11)	7.51	-	6.5-8.5	-
2	Colour	IS:3025(Part-4)	<5.0	Hazen	5	15
3	Odour	IS-3025(Part-05)	Agreeable	-	Agreeable	Agreeable
4	Taste	IS:3025(Part-7)	Agreeable	-	Agreeable	Agreeable
5	Turbidity	IS-3025(Part-10)	<1.0	NTU	1	5
6	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	292.00	mg/l	200	600
7	Calcium(as Ca)	IS:3025(Part-40)	64.00	mg/l	75	200
8	Magnesium(as Mg)	IS:3025(Part-46)	32.08	mg/l	30	100
9	Chloride(as Cl)	IS:3025(Part-32)	42.58	mg/l	250	1000
10	Iron(as Fe)	IS:3025(Part-53)	0.29	mg/l	0.3	No Relaxation
11	Fluoride(as F)	APHA-4500 F	1.30	mg/l	1	1.5
12	Total Dissolved Solid	IS:3025(Part-16)	695	mg/l	500	2000
13	Phenolic Compound (as C <sub>6</sub> H <sub>5</sub> OH)	IS: 3025 (Part-43)	<0.001	mg/l	0.001max	0.002 Max
14	Anionic Detergents (as MBAS)	Annex K of IS 13428	<0.1	mg/l	0.2	1.0
15	Sulphate (as SO <sub>4</sub> )	IS:3025(Part-24)	20.96	mg/l	200	400
16	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part-34)	1.89	mg/l	45	No Relaxation
17	Cadmium (as Cd)	IS-3025(Part-41)	<0.001	mg/l	0.003	No Relaxation
18	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.01	No Relaxation
19	Total Chromium (as Cr)	Annex J of IS-13428	<0.01	mg/l	0.05	No Relaxation
20	Copper (as Cu)	IS:3025(Part-42)	<0.01	mg/l	0.05	1.5
21	Total Ammonia	IS: 3025 (Part-34)	<0.1	mg/l	0.5	No Relaxation
22	Chloramines (as Cl <sub>2</sub> )	IS:3025(Part-26)	<1.0	mg/l	4	No Relaxation
23	Free Residual Chlorine	IS:3025(Part-26)	<0.1	mg/l	0.2	1
24	Aluminium (as Al)	IS:3025(Part-55)	<0.01	mg/l	0.03	0.2
25	Zinc	IS:3025(Part-49)	<1.0	mg/l	5	15
26	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.1	0.3
27	Boron (as B)	IS:3025(Part-57)	<0.1	mg/l	0.5	1
28	Selenium (Se)	IS:3025(Part-56)	<0.01	mg/l	0.01	No Relaxation
29	Silver (As Ag)	Annex J of IS 13428	<0.1	mg/l	0.1	No Relaxation
30	Mercury (as Hg)	IS:3025(Part-48)	<0.001	mg/l	0.001	No Relaxation
31	Molybdenum (Mo)	IS:3025(Part-2)	<0.01	mg/l	0.07	No Relaxation
32	Nickel (as Ni)	IS:3025(Part-54)	<0.01	mg/l	0.02	No Relaxation
33	Arsenic (as As)	IS:3025(Part-37)	<0.01	mg/l	0.01	0.05
34	Poly Nuclear Aromatic Hydro Carbons	APHA6440	<0.0001	mg/l	0.0001	No Relaxation
35	Poly Chlorinated biphenyl	APHA6630	<0.0001	mg/l	0.0005	No Relaxation
36	Alkalinity	IS:3025(Part-23)	356	mg/l	200	600
37	Sulphide (as H <sub>2</sub> S)	IS:3025(Part-29)	<0.01	mg/l	0.05	No Relaxation
38	Cyanide (as CN)	IS:3025(Part-27)	<0.01	mg/l	0.05	No Relaxation
39	E.Coli	IS:1622	Absent	E.Coli/100ml	Absent	Absent
40	Coli form	IS:1622	Absent	MPN/100 ml	Absent	Absent

EIA/EMP CHAPTER-3- DESCRIPTION OF ENVIRONMENT

Sampling October 2019 (GW4)

S.No	Parameter	Test Method	Results	Units	Acceptable Limit	Permissible Limit in the Absence of Alternate Source
1	pH	IS:3025(Part-11)	7.41	-	6.5-8.5	-
2	Colour	IS:3025(Part-4)	<5.0	Hazen	5	15
3	Odour	IS:3025(Part-05)	Agreeable	-	Agreeable	Agreeable
4	Taste	IS:3025(Part-7)	Agreeable	-	Agreeable	Agreeable
5	Turbidity	IS:3025(Part-10)	<1.0	NTU	1	5
6	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	280.00	mg/l	200	600
7	Calcium(as Ca)	IS:3025(Part-40)	62.40	mg/l	75	200
8	Magnesium(as Mg)	IS:3025(Part-46)	30.13	mg/l	30	100
9	Chloride(as Cl)	IS:3025(Part-32)	54.75	mg/l	250	1000
10	Iron(as Fe)	IS:3025(Part-53)	0.11	mg/l	0.3	No Relaxation
11	Fluoride(as F)	APHA-4500 F	0.74	mg/l	1	1.5
12	Total Dissolved Solid	IS:3025(Part-16)	664	mg/l	500	2000
13	Phenolic Compound (as C <sub>6</sub> H <sub>5</sub> OH)	IS: 3025 (Part-43)	<0.001	mg/l	0.001max	0.002 Max
14	Anionic Detergents (as MBAS)	Annex K of IS 13428	<0.1	mg/l	0.2	1.0
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15	Sulphate (as SO <sub>4</sub> )	IS:3025(Part-24)	16.50	mg/l	200	400
16	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part-34)	1.68	mg/l	45	No Relaxation
17	Cadmium (as Cd)	IS-3025(Part-41)	<0.001	mg/l	0.003	No Relaxation
18	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.01	No Relaxation
19	Total Chromium (as Cr)	Annex J of IS-13428	<0.01	mg/l	0.05	No Relaxation
20	Copper (as Cu)	IS:3025(Part-42)	<0.01	mg/l	0.05	1.5
21	Total Ammonia	IS: 3025 (Part-34)	<0.1	mg/l	0.5	No Relaxation
22	Chloramines (as Cl <sub>2</sub> )	IS:3025(Part-26)	<1.0	mg/l	4	No Relaxation
23	Free Residual Chlorine	IS:3025(Part-26)	<0.1	mg/l	0.2	1
24	Aluminium (as Al)	IS:3025(Part-55)	<0.01	mg/l	0.03	0.2
25	Zinc	IS:3025(Part-49)	<1.0	mg/l	5	15
26	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.1	0.3
27	Boron (as B)	IS:3025(Part-57)	<0.1	mg/l	0.5	1
28	Selenium (Se)	IS:3025(Part-56)	<0.01	mg/l	0.01	No Relaxation
29	Silver (As Ag)	Annex J of IS 13428	<0.1	mg/l	0.1	No Relaxation
30	Mercury (as Hg)	IS:3025(Part-48)	<0.001	mg/l	0.001	No Relaxation
31	Molybdenum (Mo)	IS:3025(Part-2)	<0.01	mg/l	0.07	No Relaxation
32	Nickel (as Ni)	IS:3025(Part-54)	<0.01	mg/l	0.02	No Relaxation
33	Arsenic (as As)	IS:3025(Part-37)	<0.01	mg/l	0.01	0.05
34	Poly Nuclear Aromatic Hydro Carbons	APHA6440	<0.0001	mg/l	0.0001	No Relaxation
35	Poly Chlorinated biphenyl	APHA6630	<0.0001	mg/l	0.0005	No Relaxation
36	Alkalinity	IS:3025(Part-23)	296	mg/l	200	600
37	Sulphide (as H <sub>2</sub> S)	IS:3025(Part-29)	<0.01	mg/l	0.05	No Relaxation
38	Cyanide (as CN)	IS:3025(Part-27)	<0.01	mg/l	0.05	No Relaxation
39	E.Coli	IS:1622	Absent	E.Coli/100ml	Absent	Absent
40	Coli form	IS:1622	Absent	MPN/100 ml	Absent	Absent

EIA/EMP CHAPTER-3- DESCRIPTION OF ENVIRONMENT

Sampling November 2019 (GW4)

S.No	Parameter	Test Method	Results	Units	Acceptable Limit	Permissible Limit in the Absence of Alternate Source
1	pH	IS:3025(Part-11)	7.53	-	6.5-8.5	-
2	Colour	IS:3025(Part-4)	<5.0	Hazen	5	15
3	Odour	IS-3025(Part-05)	Agreeable	-	Agreeable	Agreeable
4	Taste	IS:3025(Part-7)	Agreeable	-	Agreeable	Agreeable
5	Turbidity	IS-3025(Part-10)	<1.0	NTU	1	5
6	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	272.00	mg/l	200	600
7	Calcium(as Ca)	IS:3025(Part-40)	59.20	mg/l	75	200
8	Magnesium(as Mg)	IS:3025(Part-46)	30.13	mg/l	30	100
9	Chloride(as Cl)	IS:3025(Part-32)	56.78	mg/l	250	1000
10	Iron(as Fe)	IS:3025(Part-53)	0.11	mg/l	0.3	No Relaxation
11	Fluoride(as F)	APHA-4500 F	0.72	mg/l	1	1.5
12	Total Dissolved Solid	IS:3025(Part-16)	679	mg/l	500	2000
13	Phenolic Compound (as C <sub>6</sub> H <sub>5</sub> OH)	IS: 3025 (Part-43)	<0.001	mg/l	0.001max	0.002 Max
14	Anionic Detergents (as MBAS)	Annex K of IS 13428	<0.1	mg/l	0.2	1.0
15	Sulphate (as SO <sub>4</sub> )	IS:3025(Part-24)	16.11	mg/l	200	400
16	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part-34)	1.63	mg/l	45	No Relaxation
17	Cadmium (as Cd)	IS-3025(Part-41)	<0.001	mg/l	0.003	No Relaxation
18	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.01	No Relaxation
19	Total Chromium (as Cr)	Annex J of IS-13428	<0.01	mg/l	0.05	No Relaxation
20	Copper (as Cu)	IS:3025(Part-42)	<0.01	mg/l	0.05	1.5
21	Total Ammonia	IS: 3025 (Part-34)	<0.1	mg/l	0.5	No Relaxation
22	Chloramines (as Cl <sub>2</sub> )	IS:3025(Part-26)	<1.0	mg/l	4	No Relaxation
23	Free Residual Chlorine	IS:3025(Part-26)	<0.1	mg/l	0.2	1
24	Aluminium (as Al)	IS:3025(Part-55)	<0.01	mg/l	0.03	0.2
25	Zinc	IS:3025(Part-49)	<1.0	mg/l	5	15
26	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.1	0.3
27	Boron (as B)	IS:3025(Part-57)	<0.1	mg/l	0.5	1
28	Selenium (Se)	IS:3025(Part-56)	<0.01	mg/l	0.01	No Relaxation
29	Silver (As Ag)	Annex J of IS 13428	<0.1	mg/l	0.1	No Relaxation
30	Mercury (as Hg)	IS:3025(Part-48)	<0.001	mg/l	0.001	No Relaxation
31	Molybdenum (Mo)	IS:3025(Part-2)	<0.01	mg/l	0.07	No Relaxation
32	Nickel (as Ni)	IS:3025(Part-54)	<0.01	mg/l	0.02	No Relaxation
33	Arsenic (as As)	IS:3025(Part-37)	<0.01	mg/l	0.01	0.05
34	Poly Nuclear Aromatic Hydro Carbons	APHA6440	<0.0001	mg/l	0.0001	No Relaxation
35	Poly Chlorinated biphenyl	APHA6630	<0.0001	mg/l	0.0005	No Relaxation
36	Alkalinity	IS:3025(Part-23)	288	mg/l	200	600
37	Sulphide (as H <sub>2</sub> S)	IS:3025(Part-29)	<0.01	mg/l	0.05	No Relaxation
38	Cyanide (as CN)	IS:3025(Part-27)	<0.01	mg/l	0.05	No Relaxation
39	E.Coli	IS:1622	Absent	E.Coli/100ml	Absent	Absent
40	Coli form	IS:1622	Absent	MPN/100 ml	Absent	Absent

EIA/EMP CHAPTER-3- DESCRIPTION OF ENVIRONMENT

Sampling December 2019 (GW4)

S.No	Parameter	Test Method	Results	Units	Acceptable Limit	Permissible Limit in the Absence of Alternate Source
1	pH	IS:3025(Part-11)	7.61	-	6.5-8.5	-
2	Colour	IS:3025(Part-4)	<5.0	Hazen	5	15
3	Odour	IS:3025(Part-05)	Agreeable	-	Agreeable	Agreeable
4	Taste	IS:3025(Part-7)	Agreeable	-	Agreeable	Agreeable
5	Turbidity	IS:3025(Part-10)	<1.0	NTU	1	5
6	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	284.00	mg/l	200	600
7	Calcium(as Ca)	IS:3025(Part-40)	60.80	mg/l	75	200
8	Magnesium(as Mg)	IS:3025(Part-46)	32.08	mg/l	30	100
9	Chloride(as Cl)	IS:3025(Part-32)	58.80	mg/l	250	1000
10	Iron(as Fe)	IS:3025(Part-53)	0.10	mg/l	0.3	No Relaxation
11	Fluoride(as F)	APHA-4500 F	0.70	mg/l	1	1.5
12	Total Dissolved Solid	IS:3025(Part-16)	674	mg/l	500	2000
13	Phenolic Compound (as C <sub>6</sub> H <sub>5</sub> OH)	IS: 3025 (Part-43)	<0.001	mg/l	0.001max	0.002 Max
14	Anionic Detergents (as MBAS)	Annex K of IS 13428	<0.1	mg/l	0.2	1.0
15	Sulphate (as SO <sub>4</sub> )	IS:3025(Part-24)	16.89	mg/l	200	400
16	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part-34)	1.64	mg/l	45	No Relaxation
17	Cadmium (as Cd)	IS:3025(Part-41)	<0.001	mg/l	0.003	No Relaxation
18	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.01	No Relaxation
19	Total Chromium (as Cr)	Annex J of IS-13428	<0.01	mg/l	0.05	No Relaxation
20	Copper (as Cu)	IS:3025(Part-42)	<0.01	mg/l	0.05	1.5
21	Total Ammonia	IS: 3025 (Part-34)	<0.1	mg/l	0.5	No Relaxation
22	Chloramines (as Cl <sub>2</sub> )	IS:3025(Part-26)	<1.0	mg/l	4	No Relaxation
23	Free Residual Chlorine	IS:3025(Part-26)	<0.1	mg/l	0.2	1
24	Aluminium (as Al)	IS:3025(Part-55)	<0.01	mg/l	0.03	0.2
25	Zinc	IS:3025(Part-49)	<1.0	mg/l	5	15
26	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.1	0.3
27	Boron (as B)	IS:3025(Part-57)	<0.1	mg/l	0.5	1
28	Selenium (Se)	IS:3025(Part-56)	<0.01	mg/l	0.01	No Relaxation
29	Silver (As Ag)	Annex J of IS 13428	<0.1	mg/l	0.1	No Relaxation
30	Mercury (as Hg)	IS:3025(Part-48)	<0.001	mg/l	0.001	No Relaxation
31	Molybdenum (Mo)	IS:3025(Part-2)	<0.01	mg/l	0.07	No Relaxation
32	Nickel (as Ni)	IS:3025(Part-54)	<0.01	mg/l	0.02	No Relaxation
33	Arsenic (as As)	IS:3025(Part-37)	<0.01	mg/l	0.01	0.05
34	Poly Nuclear Aromatic Hydro Carbons	APHA6440	<0.0001	mg/l	0.0001	No Relaxation
35	Poly Chlorinated biphenyl	APHA6630	<0.0001	mg/l	0.0005	No Relaxation
36	Alkalinity	IS:3025(Part-23)	296	mg/l	200	600
37	Sulphide (as H <sub>2</sub> S)	IS:3025(Part-29)	<0.01	mg/l	0.05	No Relaxation
38	Cyanide (as CN)	IS:3025(Part-27)	<0.01	mg/l	0.05	No Relaxation
39	E.Coli	IS:1622	Absent	E.Coli/100ml	Absent	Absent
40	Coli form	IS:1622	Absent	MPN/100 ml	Absent	Absent

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**Observation:**

Analysis of results of ground water reveals the following: -

- pH varies from 7.35 to 7.85 of Study area.
- Total hardness varies from 212 mg/l to 356 mg/l of Study area
- Total dissolved solids(TDS) vary from 664 mg/l to 916 mg/l of Study area
- Chloride from 40.55 mg/l to 152.08 mg/l of Study area
- Fluoride from 0.61 mg/l to 1.39 mg/l of Study area

The ground water from all sources remains suitable for drinking purposes as all the constituents are within the limits prescribed by drinking water standards promulgated by Indian Standards IS: 10500.

**3.4.2 SURFACE WATER**

Three surface water samples were collected from the study area. The location of surface water samples is given in Table 3.4.2 (iii). The physico-chemical analysis of the these samples are given in the Table 3.4.2 (iv)

**Table 3.4.2 (iii) Surface water sampling locations**

Station No.	Location	Direction and Distance (km)
SW1	Jarar(Pond)	0.28kms towards East
SW2	Girwan(Pond)	2.34 kms towards East
SW3	Barokhar khurd(canal upstream)	2.22 kms towards North-East
SW4	Barokhar khurd (canal downstream)	1.69 kms towards North-East
SW5	Barokhar buzurg(Pond)	4.67 kms towards North

EIA/EMP CHAPTER-3- DESCRIPTION OF ENVIRONMENT

Table 3.3 (iv) Physico-chemical properties of surface water

Sampling October 2019 (SW1)

S.No	Parameter	Test Method	Results	Units	Tolerance Limit as per IS:2296				
					Class A	Class B	Class C	Class D	Class E
1	pH	IS:3025(Part-11)	7.32	-	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
2	Temperature	IS:3025(Part-09)	22.4	°C	-	-	-	-	-
3	Turbidity	IS:3025(Part-10)	5.9	NTU	-	-	-	-	-
4	Conductivity @25°C	IS:3025(Part-14)	632.2	µs/cm.	-	-	-	1000	2250
5	Total Suspended Solid	IS:3025(Part-17)	45	mg/l	-	-	-	-	-
6	Total Alkalinity (As CaCO <sub>3</sub> )	IS:3025(Part-23)	168	mg/l	-	-	-	-	-
7	Biological Oxygen Demand (Max.) (at 27°C for 3 days)	IS:3025(Part-44)	2.6	mg/l	2	3	3	-	-
8	Dissolved Oxygen (as O <sub>2</sub> ) Min.	IS:3025(Part-38)	7.8	mg/l	6	5	4	4	-
9	Calcium(as Ca)	IS:3025(Part-40)	35.20	mg/l	80	-	-	-	-
10	Magnesium(as Mg)	IS:3025(Part-46)	14.58	mg/l	24	-	-	-	-
11	Chloride(as Cl),Max	IS:3025(Part-32)	41.09	mg/l	250	-	-	-	600
12	Iron(as Fe),Max	IS:3025(Part-53)	0.098	mg/l	0.3	-	50	-	-
13	Fluoride(as F),Max	APHA-4500 F	0.22	mg/l	1.5	1.5	1.5	-	-
14	Total Dissolved Solid	IS:3025(Part-16)	395	mg/l	500	-	1500	-	2100
15	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	148.00	mg/l	300	-	-	-	-
16	Sulphate (as SO <sub>4</sub> )Max	IS:3025(Part-24)	8.74	mg/l	400	-	400	-	1000
17	Phosphate (as P)	IS:3025(Part-31)	<0.2	mg/l	-	-	-	-	-
18	Sodium (as Na)	IS:3025(Part-45)	15.9	mg/l	-	-	-	-	-
19	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.5	-	-	-	-
20	Total Chromium (as Cr)	IS:3025(Part-52)	<0.01	mg/l	0.05	0.05	0.05	-	-
21	Zinc (as Zn)	IS:3025(Part-49)	<1.0	mg/l	15	-	15	-	-
22	Potassium (as K)	IS:3025(Part-45)	8.9	mg/l	-	-	-	-	-
23	Nitrate (as NO <sub>3</sub> ),Max	IS: 3025 (Part-34)	0.74	mg/l	20	-	50	-	-
24	Cadmium (as Cd)	IS-3025(Part-41)	<0.01	mg/l	0.01	-	0.01	-	-
25	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.1	-	0.1	-	-
26	Copper (as Cu)	IS:3025(Part-42)	<0.1	mg/l	1.5	-	1.5	-	-
27	Chemical Oxygen Demand (asO <sub>2</sub> )	IS-3025(Part-58)	16.00	mg/l	-	-	-	-	-
28	Silica	IS:3025(Part-35)	5.69	mg/l	-	-	-	-	-
29	Arsenic (as As )	IS:3025(Part-37)	<0.01	mg/l	0.05	0.2	0.2	-	-
30	Total Coli Form	IS:1622	15	MPN/100ml	50	500	5000	-	-

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Sampling November 2019 (SW1)

S.No	Parameter	Test Method	Results	Units	Tolerance Limit as per IS:2296				
					Class A	Class B	Class C	Class D	Class E
1	pH	IS:3025(Part-11)	7.61	-	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
2	Temperature	IS:3025(Part-09)	20.4	°C	-	-	-	-	-
3	Turbidity	IS:3025(Part-10)	5.7	NTU	-	-	-	-	-
4	Conductivity @25°C	IS:3025(Part-14)	647.5	µs/cm.	-	-	-	1000	2250
5	Total Suspended Solid	IS:3025(Part-17)	48	mg/l	-	-	-	-	-
6	Total Alkalinity (As CaCO <sub>3</sub> )	IS:3025(Part-23)	176	mg/l	-	-	-	-	-
7	Biological Oxygen Demand (Max.) (at 27°C for 3 days)	IS:3025(Part-44)	2.9	mg/l	2	3	3	-	-
8	Dissolved Oxygen (as O <sub>2</sub> ) Min.	IS:3025(Part-38)	7.7	mg/l	6	5	4	4	-
9	Calcium(as Ca)	IS:3025(Part-40)	36.80	mg/l	80	-	-	-	-
10	Magnesium(as Mg)	IS:3025(Part-46)	13.61	mg/l	24	-	-	-	-
11	Chloride(as Cl),Max	IS:3025(Part-32)	45.01	mg/l	250	-	-	-	600
12	Iron(as Fe),Max	IS:3025(Part-53)	0.088	mg/l	0.3	-	50	-	-
13	Fluoride(as F),Max	APHA-4500 F	0.19	mg/l	1.5	1.5	1.5	-	-
14	Total Dissolved Solid	IS:3025(Part-16)	402	mg/l	500	-	1500	-	2100
15	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	148.00	mg/l	300	-	-	-	-
16	Sulphate (as SO <sub>4</sub> )Max	IS:3025(Part-24)	8.93	mg/l	400	-	400	-	1000
17	Phosphate (as P)	IS:3025(Part-31)	<0.2	mg/l	-	-	-	-	-
18	Sodium (as Na)	IS:3025(Part-45)	16.4	mg/l	-	-	-	-	-
19	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.5	-	-	-	-
20	Total Chromium (as Cr)	IS:3025(Part-52)	<0.01	mg/l	0.05	0.05	0.05	-	-
21	Zinc (as Zn)	IS:3025(Part-49)	<1.0	mg/l	15	-	15	-	-
22	Potassium (as K)	IS:3025(Part-45)	8.2	mg/l	-	-	-	-	-
23	Nitrate (as NO <sub>3</sub> ),Max	IS: 3025 (Part-34)	0.77	mg/l	20	-	50	-	-
24	Cadmium (as Cd)	IS-3025(Part-41)	<0.01	mg/l	0.01	-	0.01	-	-
25	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.1	-	0.1	-	-
26	Copper (as Cu)	IS:3025(Part-42)	<0.1	mg/l	1.5	-	1.5	-	-
27	Chemical Oxygen Demand (asO <sub>2</sub> )	IS-3025(Part-58)	19.20	mg/l	-	-	-	-	-
28	Silica	IS:3025(Part-35)	6.04	mg/l	-	-	-	-	-
29	Arsenic (as As )	IS:3025(Part-37)	<0.01	mg/l	0.05	0.2	0.2	-	-
30	Total Coli Form	IS:1622	10	MPN/100ml	50	500	5000	-	-

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Sampling December 2019 (SW1)

S.No	Parameter	Test Method	Results	Units	Tolerance Limit as per IS:2296				
					Class A	Class B	Class C	Class D	Class E
1	pH	IS:3025(Part-11)	7.19	-	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
2	Temperature	IS:3025(Part-09)	19.8	°C	-	-	-	-	-
3	Turbidity	IS:3025(Part-10)	5.9	NTU	-	-	-	-	-
4	Conductivity @25°C	IS:3025(Part-14)	606.3	µs/cm.	-	-	-	1000	2250
5	Total Suspended Solid	IS:3025(Part-17)	46	mg/l	-	-	-	-	-
6	Total Alkalinity (As CaCO <sub>3</sub> )	IS:3025(Part-23)	196	mg/l	-	-	-	-	-
7	Biological Oxygen Demand (Max.) (at 27°C for 3 days)	IS:3025(Part-44)	3	mg/l	2	3	3	-	-
8	Dissolved Oxygen (as O <sub>2</sub> ) Min.	IS:3025(Part-38)	7.5	mg/l	6	5	4	4	-
9	Calcium(as Ca)	IS:3025(Part-40)	35.20	mg/l	80	-	-	-	-
10	Magnesium(as Mg)	IS:3025(Part-46)	12.64	mg/l	24	-	-	-	-
11	Chloride(as Cl),Max	IS:3025(Part-32)	39.14	mg/l	250	-	-	-	600
12	Iron(as Fe),Max	IS:3025(Part-53)	0.088	mg/l	0.3	-	50	-	-
13	Fluoride(as F),Max	APHA-4500 F	0.23	mg/l	1.5	1.5	1.5	-	-
14	Total Dissolved Solid	IS:3025(Part-16)	382	mg/l	500	-	1500	-	2100
15	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	140.00	mg/l	300	-	-	-	-
16	Sulphate (as SO <sub>4</sub> )Max	IS:3025(Part-24)	8.54	mg/l	400	-	400	-	1000
17	Phosphate (as P)	IS:3025(Part-31)	<0.2	mg/l	-	-	-	-	-
18	Sodium (as Na)	IS:3025(Part-45)	16.0	mg/l	-	-	-	-	-
19	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.5	-	-	-	-
20	Total Chromium (as Cr)	IS:3025(Part-52)	<0.01	mg/l	0.05	0.05	0.05	-	-
21	Zinc (as Zn)	IS:3025(Part-49)	<1.0	mg/l	15	-	15	-	-
22	Potassium (as K)	IS:3025(Part-45)	8.0	mg/l	-	-	-	-	-
23	Nitrate (as NO <sub>3</sub> ),Max	IS: 3025 (Part-34)	0.78	mg/l	20	-	50	-	-
24	Cadmium (as Cd)	IS-3025(Part-41)	<0.01	mg/l	0.01	-	0.01	-	-
25	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.1	-	0.1	-	-
26	Copper (as Cu)	IS:3025(Part-42)	<0.1	mg/l	1.5	-	1.5	-	-
27	Chemical Oxygen Demand (asO <sub>2</sub> )	IS-3025(Part-58)	17.60	mg/l	-	-	-	-	-
28	Silica	IS:3025(Part-35)	5.94	mg/l	-	-	-	-	-
29	Arsenic (as As )	IS:3025(Part-37)	<0.01	mg/l	0.05	0.2	0.2	-	-
30	Total Coli Form	IS:1622	13	MPN/100ml	50	500	5000	-	-

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Sampling October 2019 (SW2)

S.No	Parameter	Test Method	Results	Units	Tolerance Limit as per IS:2296				
					Class A	Class B	Class C	Class D	Class E
1	pH	IS:3025(Part-11)	7.10	-	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
2	Temperature	IS:3025(Part-09)	21.7	°C	-	-	-	-	-
3	Turbidity	IS:3025(Part-10)	5.1	NTU	-	-	-	-	-
4	Conductivity @25°C	IS:3025(Part-14)	714.8	µs/cm.	-	-	-	1000	2250
5	Total Suspended Solid	IS:3025(Part-17)	54	mg/l	-	-	-	-	-
6	Total Alkalinity (As CaCO <sub>3</sub> )	IS:3025(Part-23)	208	mg/l	-	-	-	-	-
7	Biological Oxygen Demand (Max.) (at 27°C for 3 days)	IS:3025(Part-44)	2.8	mg/l	2	3	3	-	-
8	Dissolved Oxygen (as O <sub>2</sub> ) Min.	IS:3025(Part-38)	8.6	mg/l	6	5	4	4	-
9	Calcium(as Ca)	IS:3025(Part-40)	41.60	mg/l	80	-	-	-	-
10	Magnesium(as Mg)	IS:3025(Part-46)	24.30	mg/l	24	-	-	-	-
11	Chloride(as Cl),Max	IS:3025(Part-32)	62.62	mg/l	250	-	-	-	600
12	Iron(as Fe),Max	IS:3025(Part-53)	0.083	mg/l	0.3	-	50	-	-
13	Fluoride(as F),Max	APHA-4500 F	0.23	mg/l	1.5	1.5	1.5	-	-
14	Total Dissolved Solid	IS:3025(Part-16)	436	mg/l	500	-	1500	-	2100
15	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	204.00	mg/l	300	-	-	-	-
16	Sulphate (as SO <sub>4</sub> )Max	IS:3025(Part-24)	7.96	mg/l	400	-	400	-	1000
17	Phosphate (as P)	IS:3025(Part-31)	<0.2	mg/l	-	-	-	-	-
18	Sodium (as Na)	IS:3025(Part-45)	17.5	mg/l	-	-	-	-	-
19	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.5	-	-	-	-
20	Total Chromium (as Cr)	IS:3025(Part-52)	<0.01	mg/l	0.05	0.05	0.05	-	-
21	Zinc (as Zn)	IS:3025(Part-49)	<1.0	mg/l	15	-	15	-	-
22	Potassium (as K)	IS:3025(Part-45)	8.2	mg/l	-	-	-	-	-
23	Nitrate (as NO <sub>3</sub> ),Max	IS: 3025 (Part-34)	0.83	mg/l	20	-	50	-	-
24	Cadmium (as Cd)	IS-3025(Part-41)	<0.01	mg/l	0.01	-	0.01	-	-
25	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.1	-	0.1	-	-
26	Copper (as Cu)	IS:3025(Part-42)	<0.1	mg/l	1.5	-	1.5	-	-
27	Chemical Oxygen Demand (asO <sub>2</sub> )	IS-3025(Part-58)	22.40	mg/l	-	-	-	-	-
28	Silica	IS:3025(Part-35)	6.09	mg/l	-	-	-	-	-
29	Arsenic (as As )	IS:3025(Part-37)	<0.01	mg/l	0.05	0.2	0.2	-	-
30	Total Coli Form	IS:1622	13	MPN/100ml	50	500	5000	-	-

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Sampling November 2019 (SW2)

S.No	Parameter	Test Method	Results	Units	Tolerance Limit as per IS:2296				
					Class A	Class B	Class C	Class D	Class E
1	pH	IS:3025(Part-11)	7.54	-	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
2	Temperature	IS:3025(Part-09)	20.9	°C	-	-	-	-	-
3	Turbidity	IS:3025(Part-10)	4.9	NTU	-	-	-	-	-
4	Conductivity @25°C	IS:3025(Part-14)	658.6	µs/cm.	-	-	-	1000	2250
5	Total Suspended Solid	IS:3025(Part-17)	39	mg/l	-	-	-	-	-
6	Total Alkalinity (As CaCO <sub>3</sub> )	IS:3025(Part-23)	212	mg/l	-	-	-	-	-
7	Biological Oxygen Demand (Max.) (at 27°C for 3 days)	IS:3025(Part-44)	3.2	mg/l	2	3	3	-	-
8	Dissolved Oxygen (as O <sub>2</sub> ) Min.	IS:3025(Part-38)	8.5	mg/l	6	5	4	4	-
9	Calcium(as Ca)	IS:3025(Part-40)	33.60	mg/l	80	-	-	-	-
10	Magnesium(as Mg)	IS:3025(Part-46)	26.24	mg/l	24	-	-	-	-
11	Chloride(as Cl),Max	IS:3025(Part-32)	58.71	mg/l	250	-	-	-	600
12	Iron(as Fe),Max	IS:3025(Part-53)	0.093	mg/l	0.3	-	50	-	-
13	Fluoride(as F),Max	APHA-4500 F	0.22	mg/l	1.5	1.5	1.5	-	-
14	Total Dissolved Solid	IS:3025(Part-16)	423	mg/l	500	-	1500	-	2100
15	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	192.00	mg/l	300	-	-	-	-
16	Sulphate (as SO <sub>4</sub> )Max	IS:3025(Part-24)	8.54	mg/l	400	-	400	-	1000
17	Phosphate (as P)	IS:3025(Part-31)	<0.2	mg/l	-	-	-	-	-
18	Sodium (as Na)	IS:3025(Part-45)	17.3	mg/l	-	-	-	-	-
19	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.5	-	-	-	-
20	Total Chromium (as Cr)	IS:3025(Part-52)	<0.01	mg/l	0.05	0.05	0.05	-	-
21	Zinc (as Zn)	IS:3025(Part-49)	<1.0	mg/l	15	-	15	-	-
22	Potassium (as K)	IS:3025(Part-45)	8.3	mg/l	-	-	-	-	-
23	Nitrate (as NO <sub>3</sub> ),Max	IS: 3025 (Part-34)	0.89	mg/l	20	-	50	-	-
24	Cadmium (as Cd)	IS-3025(Part-41)	<0.01	mg/l	0.01	-	0.01	-	-
25	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.1	-	0.1	-	-
26	Copper (as Cu)	IS:3025(Part-42)	<0.1	mg/l	1.5	-	1.5	-	-
27	Chemical Oxygen Demand (asO <sub>2</sub> )	IS-3025(Part-58)	20.80	mg/l	-	-	-	-	-
28	Silica	IS:3025(Part-35)	5.99	mg/l	-	-	-	-	-
29	Arsenic (as As )	IS:3025(Part-37)	<0.01	mg/l	0.05	0.2	0.2	-	-
30	Total Coli Form	IS:1622	9	MPN/100ml	50	500	5000	-	-

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Sampling December 2019 (SW2)

S.No	Parameter	Test Method	Results	Units	Tolerance Limit as per IS:2296				
					Class A	Class B	Class C	Class D	Class E
1	pH	IS:3025(Part-11)	7.29	-	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
2	Temperature	IS:3025(Part-09)	19.6	<sup>o</sup> C	-	-	-	-	-
3	Turbidity	IS:3025(Part-10)	5	NTU	-	-	-	-	-
4	Conductivity @25°C	IS:3025(Part-14)	668.1	µs/cm.	-	-	-	1000	2250
5	Total Suspended Solid	IS:3025(Part-17)	41	mg/l	-	-	-	-	-
6	Total Alkalinity (As CaCO <sub>3</sub> )	IS:3025(Part-23)	212	mg/l	-	-	-	-	-
7	Biological Oxygen Demand (Max.) (at 27 <sup>o</sup> C for 3 days)	IS:3025(Part-44)	3.1	mg/l	2	3	3	-	-
8	Dissolved Oxygen (as O <sub>2</sub> ) Min.	IS:3025(Part-38)	8.3	mg/l	6	5	4	4	-
9	Calcium(as Ca)	IS:3025(Part-40)	32.00	mg/l	80	-	-	-	-
10	Magnesium(as Mg)	IS:3025(Part-46)	28.19	mg/l	24	-	-	-	-
11	Chloride(as Cl),Max	IS:3025(Part-32)	58.71	mg/l	250	-	-	-	600
12	Iron(as Fe),Max	IS:3025(Part-53)	0.093	mg/l	0.3	-	50	-	-
13	Fluoride(as F),Max	APHA-4500 F	0.22	mg/l	1.5	1.5	1.5	-	-
14	Total Dissolved Solid	IS:3025(Part-16)	431	mg/l	500	-	1500	-	2100
15	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	196.00	mg/l	300	-	-	-	-
16	Sulphate (as SO <sub>4</sub> )Max	IS:3025(Part-24)	7.96	mg/l	400	-	400	-	1000
17	Phosphate (as P)	IS:3025(Part-31)	<0.2	mg/l	-	-	-	-	-
18	Sodium (as Na)	IS:3025(Part-45)	17.1	mg/l	-	-	-	-	-
19	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.5	-	-	-	-
20	Total Chromium (as Cr)	IS:3025(Part-52)	<0.01	mg/l	0.05	0.05	0.05	-	-
21	Zinc (as Zn)	IS:3025(Part-49)	<1.0	mg/l	15	-	15	-	-
22	Potassium (as K)	IS:3025(Part-45)	8.6	mg/l	-	-	-	-	-
23	Nitrate (as NO <sub>3</sub> ),Max	IS: 3025 (Part-34)	1.05	mg/l	20	-	50	-	-
24	Cadmium (as Cd)	IS-3025(Part-41)	<0.01	mg/l	0.01	-	0.01	-	-
25	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.1	-	0.1	-	-
26	Copper (as Cu)	IS:3025(Part-42)	<0.1	mg/l	1.5	-	1.5	-	-
27	Chemical Oxygen Demand (asO <sub>2</sub> )	IS-3025(Part-58)	17.60	mg/l	-	-	-	-	-
28	Silica	IS:3025(Part-35)	6.24	mg/l	-	-	-	-	-
29	Arsenic (as As )	IS:3025(Part-37)	<0.01	mg/l	0.05	0.2	0.2	-	-
30	Total Coli Form	IS:1622	13	MPN/100ml	50	500	5000	-	-

EIA/EMP CHAPTER-3- DESCRIPTION OF ENVIRONMENT

Sampling October 2019 (SW3)

RESULTS									
S.No	Parameter	Test Method	Results	Units	Tolerance Limit as per IS:2296				
					Class A	Class B	Class C	Class D	Class E
1	pH	IS:3025(Part-11)	7.22	-	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
2	Temperature	IS:3025(Part-09)	22.5	°C	-	-	-	-	-
3	Turbidity	IS:3025(Part-10)	3.7	NTU	-	-	-	-	-
4	Conductivity @25°C	IS:3025(Part-14)	437.4	µs/cm.	-	-	-	1000	2250
5	Total Suspended Solid	IS:3025(Part-17)	36	mg/l	-	-	-	-	-
6	Total Alkalinity (As CaCO <sub>3</sub> )	IS:3025(Part-23)	228	mg/l	-	-	-	-	-
7	Biological Oxygen Demand (Max.) (at 27°C for 3 days)	IS:3025(Part-44)	2.9	mg/l	2	3	3	-	-
8	Dissolved Oxygen (as O <sub>2</sub> ) Min.	IS:3025(Part-38)	8.5	mg/l	6	5	4	4	-
9	Calcium(as Ca)	IS:3025(Part-40)	33.60	mg/l	80	-	-	-	-
10	Magnesium(as Mg)	IS:3025(Part-46)	15.55	mg/l	24	-	-	-	-
11	Chloride(as Cl),Max	IS:3025(Part-32)	54.79	mg/l	250	-	-	-	600
12	Iron(as Fe),Max	IS:3025(Part-53)	0.088	mg/l	0.3	-	50	-	-
13	Fluoride(as F),Max	APHA-4500 F	0.23	mg/l	1.5	1.5	1.5	-	-
14	Total Dissolved Solid	IS:3025(Part-16)	308	mg/l	500	-	1500	-	2100
15	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	148.00	mg/l	300	-	-	-	-
16	Sulphate (as SO <sub>4</sub> )Max	IS:3025(Part-24)	6.79	mg/l	400	-	400	-	1000
17	Phosphate (as P)	IS:3025(Part-31)	<0.2	mg/l	-	-	-	-	-
18	Sodium (as Na)	IS:3025(Part-45)	16.5	mg/l	-	-	-	-	-
19	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.5	-	-	-	-
20	Total Chromium (as Cr)	IS:3025(Part-52)	<0.01	mg/l	0.05	0.05	0.05	-	-
21	Zinc (as Zn)	IS:3025(Part-49)	<1.0	mg/l	15	-	15	-	-
22	Potassium (as K)	IS:3025(Part-45)	7.8	mg/l	-	-	-	-	-
23	Nitrate (as NO <sub>3</sub> ),Max	IS: 3025 (Part-34)	0.88	mg/l	20	-	50	-	-
24	Cadmium (as Cd)	IS-3025(Part-41)	<0.01	mg/l	0.01	-	0.01	-	-
25	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.1	-	0.1	-	-
26	Copper (as Cu)	IS:3025(Part-42)	<0.1	mg/l	1.5	-	1.5	-	-
27	Chemical Oxygen Demand (asO <sub>2</sub> )	IS-3025(Part-58)	17.60	mg/l	-	-	-	-	-
28	Silica	IS:3025(Part-35)	5.74	mg/l	-	-	-	-	-
29	Arsenic (as As )	IS:3025(Part-37)	<0.01	mg/l	0.05	0.2	0.2	-	-
30	Total Coli Form	IS:1622	15	MPN/100ml	50	500	5000	-	-

EIA/EMP CHAPTER-3- DESCRIPTION OF ENVIRONMENT

Sampling November 2019 (SW3)

S.No	Parameter	Test Method	Results	Units	Tolerance Limit as per IS:2296				
					Class A	Class B	Class C	Class D	Class E
1	pH	IS:3025(Part-11)	7.51	-	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
2	Temperature	IS:3025(Part-09)	21.7	°C	-	-	-	-	-
3	Turbidity	IS:3025(Part-10)	2.8	NTU	-	-	-	-	-
4	Conductivity @25°C	IS:3025(Part-14)	503.4	µs/cm	-	-	-	1000	2250
5	Total Suspended Solid	IS:3025(Part-17)	32	mg/l	-	-	-	-	-
6	Total Alkalinity (As CaCO <sub>3</sub> )	IS:3025(Part-23)	220	mg/l	-	-	-	-	-
7	Biological Oxygen Demand (Max.) (at 27°C for 3 days)	IS:3025(Part-44)	2.7	mg/l	2	3	3	-	-
8	Dissolved Oxygen (as O <sub>2</sub> ) Min.	IS:3025(Part-38)	8.5	mg/l	6	5	4	4	-
9	Calcium(as Ca)	IS:3025(Part-40)	35.20	mg/l	80	-	-	-	-
10	Magnesium(as Mg)	IS:3025(Part-46)	12.64	mg/l	24	-	-	-	-
11	Chloride(as Cl),Max	IS:3025(Part-32)	52.83	mg/l	250	-	-	-	600
12	Iron(as Fe),Max	IS:3025(Part-53)	0.079	mg/l	0.3	-	50	-	-
13	Fluoride(as F),Max	APHA-4500 F	0.23	mg/l	1.5	1.5	1.5	-	-
14	Total Dissolved Solid	IS:3025(Part-16)	331	mg/l	500	-	1500	-	2100
15	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	140.00	mg/l	300	-	-	-	-
16	Sulphate (as SO <sub>4</sub> )Max	IS:3025(Part-24)	6.41	mg/l	400	-	400	-	1000
17	Phosphate (as P)	IS:3025(Part-31)	<0.2	mg/l	-	-	-	-	-
18	Sodium (as Na)	IS:3025(Part-45)	15.8	mg/l	-	-	-	-	-
19	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.5	-	-	-	-
20	Total Chromium (as Cr)	IS:3025(Part-52)	<0.01	mg/l	0.05	0.05	0.05	-	-
21	Zinc (as Zn)	IS:3025(Part-49)	<1.0	mg/l	15	-	15	-	-
22	Potassium (as K)	IS:3025(Part-45)	6.9	mg/l	-	-	-	-	-
23	Nitrate (as NO <sub>3</sub> ),Max	IS: 3025 (Part-34)	0.87	mg/l	20	-	50	-	-
24	Cadmium (as Cd)	IS-3025(Part-41)	<0.01	mg/l	0.01	-	0.01	-	-
25	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.1	-	0.1	-	-
26	Copper (as Cu)	IS:3025(Part-42)	<0.1	mg/l	1.5	-	1.5	-	-
27	Chemical Oxygen Demand (asO <sub>2</sub> )	IS-3025(Part-58)	14.40	mg/l	-	-	-	-	-
28	Silica	IS:3025(Part-35)	5.00	mg/l	-	-	-	-	-
29	Arsenic (as As )	IS:3025(Part-37)	<0.01	mg/l	0.05	0.2	0.2	-	-
30	Total Coli Form	IS:1622	11	MPN/100ml	50	500	5000	-	-

EIA/EMP CHAPTER-3- DESCRIPTION OF ENVIRONMENT

Sampling December 2019 (SW3)

S.No	Parameter	Test Method	Results	Units	Tolerance Limit as per IS:2296				
					Class A	Class B	Class C	Class D	Class E
1	pH	IS:3025(Part-11)	7.66	-	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
2	Temperature	IS:3025(Part-09)	20.7	°C	-	-	-	-	-
3	Turbidity	IS:3025(Part-10)	2.6	NTU	-	-	-	-	-
4	Conductivity @25°C	IS:3025(Part-14)	493.2	µs/cm.	-	-	-	1000	2250
5	Total Suspended Solid	IS:3025(Part-17)	29	mg/l	-	-	-	-	-
6	Total Alkalinity (As CaCO <sub>3</sub> )	IS:3025(Part-23)	212	mg/l	-	-	-	-	-
7	Biological Oxygen Demand (Max.) (at 27°C for 3 days)	IS:3025(Part-44)	2.5	mg/l	2	3	3	-	-
8	Dissolved Oxygen (as O <sub>2</sub> ) Min.	IS:3025(Part-38)	8.3	mg/l	6	5	4	4	-
9	Calcium(as Ca)	IS:3025(Part-40)	32.00	mg/l	80	-	-	-	-
10	Magnesium(as Mg)	IS:3025(Part-46)	11.66	mg/l	24	-	-	-	-
11	Chloride(as Cl),Max	IS:3025(Part-32)	46.96	mg/l	250	-	-	-	600
12	Iron(as Fe),Max	IS:3025(Part-53)	0.069	mg/l	0.3	-	50	-	-
13	Fluoride(as F),Max	APHA-4500 F	0.20	mg/l	1.5	1.5	1.5	-	-
14	Total Dissolved Solid	IS:3025(Part-16)	315	mg/l	500	-	1500	-	2100
15	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	128.00	mg/l	300	-	-	-	-
16	Sulphate (as SO <sub>4</sub> )Max	IS:3025(Part-24)	5.63	mg/l	400	-	400	-	1000
17	Phosphate (as P)	IS:3025(Part-31)	<0.2	mg/l	-	-	-	-	-
18	Sodium (as Na)	IS:3025(Part-45)	16.2	mg/l	-	-	-	-	-
19	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.5	-	-	-	-
20	Total Chromium (as Cr)	IS:3025(Part-52)	<0.01	mg/l	0.05	0.05	0.05	-	-
21	Zinc (as Zn)	IS:3025(Part-49)	<1.0	mg/l	15	-	15	-	-
22	Potassium (as K)	IS:3025(Part-45)	6.9	mg/l	-	-	-	-	-
23	Nitrate (as NO <sub>3</sub> ),Max	IS: 3025 (Part-34)	0.82	mg/l	20	-	50	-	-
24	Cadmium (as Cd)	IS-3025(Part-41)	<0.01	mg/l	0.01	-	0.01	-	-
25	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.1	-	0.1	-	-
26	Copper (as Cu)	IS:3025(Part-42)	<0.1	mg/l	1.5	-	1.5	-	-
27	Chemical Oxygen Demand (asO <sub>2</sub> )	IS-3025(Part-58)	17.60	mg/l	-	-	-	-	-
28	Silica	IS:3025(Part-35)	5.45	mg/l	-	-	-	-	-
29	Arsenic (as As )	IS:3025(Part-37)	<0.01	mg/l	0.05	0.2	0.2	-	-
30	Total Coli Form	IS:1622	16	MPN/100ml	50	500	5000	-	-

EIA/EMP CHAPTER-3- DESCRIPTION OF ENVIRONMENT

Sampling October 2019 (SW4)

S.No	Parameter	Test Method	Results	Units	Tolerance Limit as per IS:2296				
					Class A	Class B	Class C	Class D	Class E
1	pH	IS:3025(Part-11)	7.51	-	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
2	Temperature	IS:3025(Part-09)	22.8	°C	-	-	-	-	-
3	Turbidity	IS:3025(Part-10)	4.2	NTU	-	-	-	-	-
4	Conductivity @25°C	IS:3025(Part-14)	602.7	µs/cm.	-	-	-	1000	2250
5	Total Suspended Solid	IS:3025(Part-17)	41	mg/l	-	-	-	-	-
6	Total Alkalinity (As CaCO <sub>3</sub> )	IS:3025(Part-23)	224	mg/l	-	-	-	-	-
7	Biological Oxygen Demand (Max.) (at 27°C for 3 days)	IS:3025(Part-44)	2.9	mg/l	2	3	3	-	-
8	Dissolved Oxygen (as O <sub>2</sub> ) Min.	IS:3025(Part-38)	8.4	mg/l	6	5	4	4	-
9	Calcium(as Ca)	IS:3025(Part-40)	35.20	mg/l	80	-	-	-	-
10	Magnesium(as Mg)	IS:3025(Part-46)	16.52	mg/l	24	-	-	-	-
11	Chloride(as Cl),Max	IS:3025(Part-32)	58.71	mg/l	250	-	-	-	600
12	Iron(as Fe),Max	IS:3025(Part-53)	0.093	mg/l	0.3	-	50	-	-
13	Fluoride(as F),Max	APHA-4500 F	0.23	mg/l	1.5	1.5	1.5	-	-
14	Total Dissolved Solid	IS:3025(Part-16)	374	mg/l	500	-	1500	-	2100
15	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	156.00	mg/l	300	-	-	-	-
16	Sulphate (as SO <sub>4</sub> ),Max	IS:3025(Part-24)	6.79	mg/l	400	-	400	-	1000
17	Phosphate (as P)	IS:3025(Part-31)	<0.2	mg/l	-	-	-	-	-
18	Sodium (as Na)	IS:3025(Part-45)	16.5	mg/l	-	-	-	-	-
19	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.5	-	-	-	-
20	Total Chromium (as Cr)	IS:3025(Part-52)	<0.01	mg/l	0.05	0.05	0.05	-	-
21	Zinc (as Zn)	IS:3025(Part-49)	<1.0	mg/l	15	-	15	-	-
22	Potassium (as K)	IS:3025(Part-45)	8.1	mg/l	-	-	-	-	-
23	Nitrate (as NO <sub>3</sub> ),Max	IS: 3025 (Part-34)	0.88	mg/l	20	-	50	-	-
24	Cadmium (as Cd)	IS-3025(Part-41)	<0.01	mg/l	0.01	-	0.01	-	-
25	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.1	-	0.1	-	-
26	Copper (as Cu)	IS:3025(Part-42)	<0.1	mg/l	1.5	-	1.5	-	-
27	Chemical Oxygen Demand (asO <sub>2</sub> )	IS-3025(Part-58)	20.80	mg/l	-	-	-	-	-
28	Silica	IS:3025(Part-35)	6.29	mg/l	-	-	-	-	-
29	Arsenic (as As )	IS:3025(Part-37)	<0.01	mg/l	0.05	0.2	0.2	-	-
30	Total Coli Form	IS:1622	13	MPN/100ml	50	500	5000	-	-

EIA/EMP CHAPTER-3- DESCRIPTION OF ENVIRONMENT

Sampling November 2019 (SW4)

S.No	Parameter	Test Method	Results	Units	Tolerance Limit as per IS:2296				
					Class A	Class B	Class C	Class D	Class E
1	pH	IS:3025(Part-11)	7.63	-	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
2	Temperature	IS:3025(Part-09)	21.3	°C	-	-	-	-	-
3	Turbidity	IS:3025(Part-10)	4.5	NTU	-	-	-	-	-
4	Conductivity @25°C	IS:3025(Part-14)	591.3	µs/cm.	-	-	-	1000	2250
5	Total Suspended Solid	IS:3025(Part-17)	43	mg/l	-	-	-	-	-
6	Total Alkalinity (As CaCO <sub>3</sub> )	IS:3025(Part-23)	224	mg/l	-	-	-	-	-
7	Biological Oxygen Demand (Max.) (at 27°C for 3 days)	IS:3025(Part-44)	2.7	mg/l	2	3	3	-	-
8	Dissolved Oxygen (as O <sub>2</sub> ) Min.	IS:3025(Part-38)	8.2	mg/l	6	5	4	4	-
9	Calcium(as Ca)	IS:3025(Part-40)	33.60	mg/l	80	-	-	-	-
10	Magnesium(as Mg)	IS:3025(Part-46)	15.55	mg/l	24	-	-	-	-
11	Chloride(as Cl),Max	IS:3025(Part-32)	54.79	mg/l	250	-	-	-	600
12	Iron(as Fe),Max	IS:3025(Part-53)	0.093	mg/l	0.3	-	50	-	-
13	Fluoride(as F),Max	APHA-4500 F	0.23	mg/l	1.5	1.5	1.5	-	-
14	Total Dissolved Solid	IS:3025(Part-16)	362	mg/l	500	-	1500	-	2100
15	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	148.00	mg/l	300	-	-	-	-
16	Sulphate (as SO <sub>4</sub> )Max	IS:3025(Part-24)	6.02	mg/l	400	-	400	-	1000
17	Phosphate (as P)	IS:3025(Part-31)	<0.2	mg/l	-	-	-	-	-
18	Sodium (as Na)	IS:3025(Part-45)	16.0	mg/l	-	-	-	-	-
19	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.5	-	-	-	-
20	Total Chromium (as Cr)	IS:3025(Part-52)	<0.01	mg/l	0.05	0.05	0.05	-	-
21	Zinc (as Zn)	IS:3025(Part-49)	<1.0	mg/l	15	-	15	-	-
22	Potassium (as K)	IS:3025(Part-45)	8.6	mg/l	-	-	-	-	-
23	Nitrate (as NO <sub>3</sub> ),Max	IS: 3025 (Part-34)	0.86	mg/l	20	-	50	-	-
24	Cadmium (as Cd)	IS-3025(Part-41)	<0.01	mg/l	0.01	-	0.01	-	-
25	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.1	-	0.1	-	-
26	Copper (as Cu)	IS:3025(Part-42)	<0.1	mg/l	1.5	-	1.5	-	-
27	Chemical Oxygen Demand (asO <sub>2</sub> )	IS-3025(Part-58)	19.20	mg/l	-	-	-	-	-
28	Silica	IS:3025(Part-35)	5.99	mg/l	-	-	-	-	-
29	Arsenic (as As )	IS:3025(Part-37)	<0.01	mg/l	0.05	0.2	0.2	-	-
30	Total Coli Form	IS:1622	10	MPN/100ml	50	500	5000	-	-

EIA/EMP CHAPTER-3- DESCRIPTION OF ENVIRONMENT

Sampling December 2019 (SW4)

S.No	Parameter	Test Method	Results	Units	Tolerance Limit as per IS:2296				
					Class A	Class B	Class C	Class D	Class E
1	pH	IS:3025(Part-11)	7.55	-	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
2	Temperature	IS:3025(Part-09)	20.8	°C	-	-	-	-	-
3	Turbidity	IS:3025(Part-10)	4.8	NTU	-	-	-	-	-
4	Conductivity @25°C	IS:3025(Part-14)	609.7	µs/cm.	-	-	-	1000	2250
5	Total Suspended Solid	IS:3025(Part-17)	47	mg/l	-	-	-	-	-
6	Total Alkalinity (As CaCO <sub>3</sub> )	IS:3025(Part-23)	232	mg/l	-	-	-	-	-
7	Biological Oxygen Demand (Max.) (at 27°C for 3 days)	IS:3025(Part-44)	2.8	mg/l	2	3	3	-	-
8	Dissolved Oxygen (as O <sub>2</sub> ) Min.	IS:3025(Part-38)	8.3	mg/l	6	5	4	4	-
9	Calcium(as Ca)	IS:3025(Part-40)	36.80	mg/l	80	-	-	-	-
10	Magnesium(as Mg)	IS:3025(Part-46)	15.55	mg/l	24	-	-	-	-
11	Chloride(as Cl),Max	IS:3025(Part-32)	56.75	mg/l	250	-	-	-	600
12	Iron(as Fe),Max	IS:3025(Part-53)	0.088	mg/l	0.3	-	50	-	-
13	Fluoride(as F),Max	APHA-4500 F	0.21	mg/l	1.5	1.5	1.5	-	-
14	Total Dissolved Solid	IS:3025(Part-16)	381	mg/l	500	-	1500	-	2100
15	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	156.00	mg/l	300	-	-	-	-
16	Sulphate (as SO <sub>4</sub> )Max	IS:3025(Part-24)	6.99	mg/l	400	-	400	-	1000
17	Phosphate (as P)	IS:3025(Part-31)	<0.2	mg/l	-	-	-	-	-
18	Sodium (as Na)	IS:3025(Part-45)	16.0	mg/l	-	-	-	-	-
19	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.5	-	-	-	-
20	Total Chromium (as Cr)	IS:3025(Part-52)	<0.01	mg/l	0.05	0.05	0.05	-	-
21	Zinc (as Zn)	IS:3025(Part-49)	<1.0	mg/l	15	-	15	-	-
22	Potassium (as K)	IS:3025(Part-45)	9.0	mg/l	-	-	-	-	-
23	Nitrate (as NO <sub>3</sub> ),Max	IS: 3025 (Part-34)	0.84	mg/l	20	-	50	-	-
24	Cadmium (as Cd)	IS-3025(Part-41)	<0.01	mg/l	0.01	-	0.01	-	-
25	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.1	-	0.1	-	-
26	Copper (as Cu)	IS:3025(Part-42)	<0.1	mg/l	1.5	-	1.5	-	-
27	Chemical Oxygen Demand (asO <sub>2</sub> )	IS-3025(Part-58)	19.20	mg/l	-	-	-	-	-
28	Silica	IS:3025(Part-35)	5.99	mg/l	-	-	-	-	-
29	Arsenic (as As )	IS:3025(Part-37)	<0.01	mg/l	0.05	0.2	0.2	-	-
30	Total Coli Form	IS:1622	14	MPN/100ml	50	500	5000	-	-

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Sampling October 2019 (SW5)

S.No	Parameter	Test Method	Results	Units	Tolerance Limit as per IS:2296				
					Class A	Class B	Class C	Class D	Class E
1	pH	IS:3025(Part-11)	7.82	-	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
2	Temperature	IS:3025(Part-09)	22.5	°C	-	-	-	-	-
3	Turbidity	IS:3025(Part-10)	3.7	NTU	-	-	-	-	-
4	Conductivity @25°C	IS:3025(Part-14)	437.4	µs/cm.	-	-	-	1000	2250
5	Total Suspended Solid	IS:3025(Part-17)	36	mg/l	-	-	-	-	-
6	Total Alkalinity (As CaCO <sub>3</sub> )	IS:3025(Part-23)	228	mg/l	-	-	-	-	-
7	Biological Oxygen Demand (Max.) (at 27°C for 3 days)	IS:3025(Part-44)	2.6	mg/l	2	3	3	-	-
8	Dissolved Oxygen (as O <sub>2</sub> ) Min.	IS:3025(Part-38)	8.5	mg/l	6	5	4	4	-
9	Calcium(as Ca)	IS:3025(Part-40)	33.60	mg/l	80	-	-	-	-
10	Magnesium(as Mg)	IS:3025(Part-46)	15.55	mg/l	24	-	-	-	-
11	Chloride(as Cl),Max	IS:3025(Part-32)	41.09	mg/l	250	-	-	-	600
12	Iron(as Fe),Max	IS:3025(Part-53)	0.074	mg/l	0.3	-	50	-	-
13	Fluoride(as F),Max	APHA-4500 F	0.17	mg/l	1.5	1.5	1.5	-	-
14	Total Dissolved Solid	IS:3025(Part-16)	266	mg/l	500	-	1500	-	2100
15	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	148.00	mg/l	300	-	-	-	-
16	Sulphate (as SO <sub>4</sub> )Max	IS:3025(Part-24)	6.02	mg/l	400	-	400	-	1000
17	Phosphate (as P)	IS:3025(Part-31)	<0.2	mg/l	-	-	-	-	-
18	Sodium (as Na)	IS:3025(Part-45)	16.5	mg/l	-	-	-	-	-
19	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.5	-	-	-	-
20	Total Chromium (as Cr)	IS:3025(Part-52)	<0.01	mg/l	0.05	0.05	0.05	-	-
21	Zinc (as Zn)	IS:3025(Part-49)	<1.0	mg/l	15	-	15	-	-
22	Potassium (as K)	IS:3025(Part-45)	7.8	mg/l	-	-	-	-	-
23	Nitrate (as NO <sub>3</sub> ),Max	IS: 3025 (Part-34)	0.79	mg/l	20	-	50	-	-
24	Cadmium (as Cd)	IS-3025(Part-41)	<0.01	mg/l	0.01	-	0.01	-	-
25	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.1	-	0.1	-	-
26	Copper (as Cu)	IS:3025(Part-42)	<0.1	mg/l	1.5	-	1.5	-	-
27	Chemical Oxygen Demand (asO <sub>2</sub> )	IS-3025(Part-58)	17.60	mg/l	-	-	-	-	-
28	Silica	IS:3025(Part-35)	4.95	mg/l	-	-	-	-	-
29	Arsenic (as As )	IS:3025(Part-37)	<0.01	mg/l	0.05	0.2	0.2	-	-
30	Total Coli Form	IS:1622	11	MPN/100ml	50	500	5000	-	-

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Sampling November 2019 (SW5)

S.No	Parameter	Test Method	Results	Units	Tolerance Limit as per IS:2296				
					Class A	Class B	Class C	Class D	Class E
1	pH	IS:3025(Part-11)	7.66	-	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
2	Temperature	IS:3025(Part-09)	21.7	°C	-	-	-	-	-
3	Turbidity	IS:3025(Part-10)	3.9	NTU	-	-	-	-	-
4	Conductivity @25°C	IS:3025(Part-14)	452.9	µs/cm.	-	-	-	1000	2250
5	Total Suspended Solid	IS:3025(Part-17)	33	mg/l	-	-	-	-	-
6	Total Alkalinity (As CaCO <sub>3</sub> )	IS:3025(Part-23)	220	mg/l	-	-	-	-	-
7	Biological Oxygen Demand (Max.) (at 27°C for 3 days)	IS:3025(Part-44)	2.7	mg/l	2	3	3	-	-
8	Dissolved Oxygen (as O <sub>2</sub> ) Min.	IS:3025(Part-38)	8.4	mg/l	6	5	4	4	-
9	Calcium(as Ca)	IS:3025(Part-40)	35.20	mg/l	80	-	-	-	-
10	Magnesium(as Mg)	IS:3025(Part-46)	15.55	mg/l	24	-	-	-	-
11	Chloride(as Cl),Max	IS:3025(Part-32)	39.14	mg/l	250	-	-	-	600
12	Iron(as Fe),Max	IS:3025(Part-53)	0.069	mg/l	0.3	-	50	-	-
13	Fluoride(as F),Max	APHA-4500 F	0.17	mg/l	1.5	1.5	1.5	-	-
14	Total Dissolved Solid	IS:3025(Part-16)	273	mg/l	500	-	1500	-	2100
15	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	152.00	mg/l	300	-	-	-	-
16	Sulphate (as SO <sub>4</sub> )Max.	IS:3025(Part-24)	6.41	mg/l	400	-	400	-	1000
17	Phosphate (as P)	IS:3025(Part-31)	<0.2	mg/l	-	-	-	-	-
18	Sodium (as Na)	IS:3025(Part-45)	15.4	mg/l	-	-	-	-	-
19	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.5	-	-	-	-
20	Total Chromium (as Cr)	IS:3025(Part-52)	<0.01	mg/l	0.05	0.05	0.05	-	-
21	Zinc (as Zn)	IS:3025(Part-49)	<1.0	mg/l	15	-	15	-	-
22	Potassium (as K)	IS:3025(Part-45)	8.2	mg/l	-	-	-	-	-
23	Nitrate (as NO <sub>3</sub> ),Max	IS: 3025 (Part-34)	0.87	mg/l	20	-	50	-	-
24	Cadmium (as Cd)	IS-3025(Part-41)	<0.01	mg/l	0.01	-	0.01	-	-
25	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.1	-	0.1	-	-
26	Copper (as Cu)	IS:3025(Part-42)	<0.1	mg/l	1.5	-	1.5	-	-
27	Chemical Oxygen Demand (asO <sub>2</sub> )	IS-3025(Part-58)	17.60	mg/l	-	-	-	-	-
28	Silica	IS:3025(Part-35)	5.84	mg/l	-	-	-	-	-
29	Arsenic (as As )	IS:3025(Part-37)	<0.01	mg/l	0.05	0.2	0.2	-	-
30	Total Coli Form	IS:1622	16	MPN/100ml	50	500	5000	-	-

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Sampling December 2019 (SW5)

S.No	Parameter	Test Method	Results	Units	Tolerance Limit as per IS:2296				
					Class A	Class B	Class C	Class D	Class E
1	pH	IS:3025(Part-11)	7.59	-	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
2	Temperature	IS:3025(Part-09)	19.7	°C	-	-	-	-	-
3	Turbidity	IS:3025(Part-10)	4	NTU	-	-	-	-	-
4	Conductivity @25°C	IS:3025(Part-14)	451.6	µs/cm.	-	-	-	1000	2250
5	Total Suspended Solid	IS:3025(Part-17)	37	mg/l	-	-	-	-	-
6	Total Alkalinity (As CaCO <sub>3</sub> )	IS:3025(Part-23)	224	mg/l	-	-	-	-	-
7	Biological Oxygen Demand (Max.) (at 27°C for 3 days)	IS:3025(Part-44)	2.7	mg/l	2	3	3	-	-
8	Dissolved Oxygen (as O <sub>2</sub> ) Min.	IS:3025(Part-38)	8.4	mg/l	6	5	4	4	-
9	Calcium(as Ca)	IS:3025(Part-40)	35.20	mg/l	80	-	-	-	-
10	Magnesium(as Mg)	IS:3025(Part-46)	16.52	mg/l	24	-	-	-	-
11	Chloride(as Cl),Max	IS:3025(Part-32)	43.05	mg/l	250	-	-	-	600
12	Iron(as Fe),Max	IS:3025(Part-53)	0.083	mg/l	0.3	-	50	-	-
13	Fluoride(as F),Max	APHA-4500 F	0.17	mg/l	1.5	1.5	1.5	-	-
14	Total Dissolved Solid	IS:3025(Part-16)	290	mg/l	500	-	1500	-	2100
15	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part-21)	156.00	mg/l	300	-	-	-	-
16	Sulphate (as SO <sub>4</sub> )Max	IS:3025(Part-24)	6.79	mg/l	400	-	400	-	1000
17	Phosphate (as P)	IS:3025(Part-31)	<0.2	mg/l	-	-	-	-	-
18	Sodium (as Na)	IS:3025(Part-45)	15.9	mg/l	-	-	-	-	-
19	Manganese (as Mn)	IS:3025(Part-59)	<0.1	mg/l	0.5	-	-	-	-
20	Total Chromium (as Cr)	IS:3025(Part-52)	<0.01	mg/l	0.05	0.05	0.05	-	-
21	Zinc (as Zn)	IS:3025(Part-49)	<1.0	mg/l	15	-	15	-	-
22	Potassium (as K)	IS:3025(Part-45)	8.8	mg/l	-	-	-	-	-
23	Nitrate (as NO <sub>3</sub> ),Max	IS: 3025 (Part-34)	0.84	mg/l	20	-	50	-	-
24	Cadmium (as Cd)	IS-3025(Part-41)	<0.01	mg/l	0.01	-	0.01	-	-
25	Lead ( as Pb)	IS:3025(Part-47)	<0.01	mg/l	0.1	-	0.1	-	-
26	Copper (as Cu)	IS:3025(Part-42)	<0.1	mg/l	1.5	-	1.5	-	-
27	Chemical Oxygen Demand (asO <sub>2</sub> )	IS-3025(Part-58)	16.00	mg/l	-	-	-	-	-
28	Silica	IS:3025(Part-35)	6.09	mg/l	-	-	-	-	-
29	Arsenic (as As )	IS:3025(Part-37)	<0.01	mg/l	0.05	0.2	0.2	-	-
30	Total Coli Form	IS:1622	12	MPN/100ml	50	500	5000	-	-

**Observation:**

The analysis results indicate that the pH ranges between 7.10 and 7.66. Dissolved Oxygen (DO) was observed in the range of 7.8 to 8.9 mg/l. COD values were observed to be in the range of 14.40 to 22.40 mg/l and BOD values were observed to be in the range of 2.6 to 3.2 mg/l. The Iron and Nitrate were found to be in the range of 0.088 to 0.098 mg/l and 0.74 to 1.05 mg/l respectively. Bacteriological examination of surface water samples revealed the presence of total coliform in range of 9 MPN/100 ml to 16 MPN/100 ml. Based on the results it is evident that most of the parameters of the samples comply with Category 'C' standards of CPCB indicating their suitability for drinking water source after conventional treatment and disinfection.

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**Conclusion:**

The surface water quality of the study area found agreeable range. The water quality parameter like DO, BOD and other parameters are within the range of permissible limit for irrigation, aquatic life survival and other purpose

**Surface water quality criteria for different uses  
(specified by CPCB, 1979 and the Bureau of Indian Standards, 1982)**

S. No	Water quality parameter	Characteristic of water body				
		A *	B *	C *	D *	E *
1	Dissolved Oxygen (DO) mg/l (minimum)	6	5	4	4	3
2	Biochemical Oxygen Demand (BOD), mg/l (max)	2	3	3	-	-
3	Total Coliform organisms ** MPN/100ml (max)	50 **	500	500	-	-
4	Total Dissolved Solids (TDS) mg/l (max)	500	-	1500	-	2100
5	Chlorides (as Cl <sup>-</sup> ) mg/l (max)	250	-	600	-	600
6	Colour, Hazen units (max)	-	10	300	300	-
7	Sodium Absorption Ratio (max)	-	-	-	-	20
8	Boron (as B), mg/l (max)	-	-	-	-	-
9	Sulphates (as SO <sub>4</sub> <sup>-2</sup> ), mg/l (max)	400	-	400	-	1000
10	Nitrates (as NO <sub>3</sub> <sup>-</sup> ) mg/l (max)	20	-	50	-	-
11	Free Ammonia (as NH <sub>3</sub> ) mg/l (max)	-	-	-	1.2	-
12	Conductivity at 25°C micro mhos/cm (max)	-	-	-	1000	2500
13	pH value	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.0-8.5
14	Arsenic (as As), mg/l (max)	0.05	0.2	0.2	-	-
15	Iron (as Fe), mg/l (max)	0.3	-	-	0.5	-
16	Fluoride (as F), mg/l (max)	1.5	1.5	1.5	-	-
17	Lead (as Pb), mg/l (max)	0.1	-	0.1	-	-

Note: \* Classes of water use:

- A Drinking water source without conventional treatment but after disinfection
- B Out door bathing (organised)
- C Drinking water source with conventional treatment followed by disinfection.
- D Propagation of wild life, fisheries.
- E Irrigation, industrial cooling, controlled waste disposal.

\*\* If the coliform is found to be more than the prescribed tolerance limits, the criteria for coliforms shall be satisfied if not more than 20 percent of samples show more than the tolerance limits specified and not more than 5 percent of samples show values more than 4 times the tolerance limits. There should be no visible discharge of domestic and industrial waste into class "A" waters. In case of classes "B" and "C" the discharge shall be so regulated / treated as to ensure maintenance of the stream standards.

**3.5 SOIL ENVIRONMENT**

Soil may be defined as a thin layer of earth's crust, medium for the growth of plants. The soil

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characteristics include both physical and chemical properties. The soil survey and soil samples were carried out / collected to assess the soil characteristics of the study area. Soil samples were collected from 5 locations (project site, one upstream & one downstream side) as shown in Table 3.4(i) and analyzed as per CPCB norms.

The physico-chemical characteristics of these soil samples are given in Table No. 3.4(ii).

**Table No. 3.5 (i) Description of soil sampling locations**

Station No.	Location	Distance (km)
SQ1	Jarar	0.28kms towards East
SQ 2	Jahangirabad	1.06 kms towards South
SQ 3	Girwan	2.34 kms towards East
SQ4	Barokhar buzurg	4.67 kms towards North

**Table 3.5 (ii) Physico-chemical properties of soil**

Sampling October 2019 (SQ1)

S.No	Parameter	Units	Result	Test Method
1	Texture	-	Sandy Clay Loam	IS: 2720 (part-4), 1985 Reaff:2006
	Sand	%	52.45	IS: 2720 (part-4), 1985 Reaff:2006
	Clay	%	33.12	IS: 2720 (part-4), 1985 Reaff:2006
	Silt	%	14.43	IS: 2720 (part-4), 1985 Reaff:2006
2	pH(1:5 Suspension)	-	7.28	IS: 2720 (part-26), 1987
3	Electrical Conductivity	µmhos/cm	286.5	IS: 14767
4	Potassium	mg/kg	200.79	UTRL/LAB/SOIL/SOP/01
5	Sodium	mg/kg	132.58	UTRL/LAB/SOIL/SOP/01
6	Calcium	mg/kg	4159.70	UTRL/LAB/SOIL/SOP/01
7	Magnesium	mg/kg	706.21	UTRL/LAB/SOIL/SOP/01
8	Sodium Absorption Ratio	-	0.50	UTRL/LAB/SOIL/SOP/01
9	Water Holding Capacity	%	27.80	UTRL/LAB/SOIL/SOP/01
10	Total Kjeldahl Nitrogen	mg/kg	670.18	UTRL/LAB/SOIL/SOP/01
11	Phosphorous	mg/kg	56.12	UTRL/LAB/SOIL/SOP/01
12	Bulk Density	gm/cc	1.28	IS: 2720 (part-28)
13	Organic Carbon	%	0.79	IS: 2720 (part-22)
14	Organic Matter	%	1.41	IS: 2720 (part-22)
15	Porosity	%	42.47	UTRL/LAB/SOIL/SOP/01
16	Permeability	cm/hr	3.53	IS: 2720 (part-17)

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Sampling November 2019 (SQ1)

S.No	Parameter	Units	Result	Test Method
1	Texture	-	Sandy Clay Loam	IS: 2720 (part-4), 1985 Reaff:2006
	Sand	%	49.00	IS: 2720 (part-4), 1985 Reaff:2006
	Clay	%	34.82	IS: 2720 (part-4), 1985 Reaff:2006
	Silt	%	16.18	IS: 2720 (part-4), 1985 Reaff:2006
2	pH(1:5 Suspension)	-	7.41	IS: 2720 (part-26),1987
3	Electrical Conductivity	µmhos/cm	298.3	IS: 14767
4	Potassium	mg/kg	200.02	UTRL/LAB/SOIL/SOP/01
5	Sodium	mg/kg	130.27	UTRL/LAB/SOIL/SOP/01
6	Calcium	mg/kg	4321.31	UTRL/LAB/SOIL/SOP/01
7	Magnesium	mg/kg	686.32	UTRL/LAB/SOIL/SOP/01
8	Sodium Absorption Ratio	-	0.49	UTRL/LAB/SOIL/SOP/01
9	Water Holding Capacity	%	28.00	UTRL/LAB/SOIL/SOP/01
10	Total Kjeldahl Nitrogen	mg/kg	752.00	UTRL/LAB/SOIL/SOP/01
11	Phosphorous	mg/kg	54.12	UTRL/LAB/SOIL/SOP/01
12	Bulk Density	gm/cc	1.27	IS: 2720 (part-28)
13	Organic Carbon	%	0.85	IS: 2720 (part-22)
14	Organic Matter	%	1.52	IS: 2720 (part-22)
15	Porosity	%	44.97	UTRL/LAB/SOIL/SOP/01
16	Permeability	cm/hr	3.39	IS: 2720 (part-17)

Sampling December 2019 (SQ1)

S.No	Parameter	Units	Result	Test Method
1	Texture	-	Sandy Clay Loam	IS: 2720 (part-4), 1985 Reaff:2006
	Sand	%	51.51	IS: 2720 (part-4), 1985 Reaff:2006
	Clay	%	33.78	IS: 2720 (part-4), 1985 Reaff:2006
	Silt	%	14.71	IS: 2720 (part-4), 1985 Reaff:2006
2	pH(1:5 Suspension)	-	7.66	IS: 2720 (part-26),1987
3	Electrical Conductivity	µmhos/cm	269.5	IS: 14767
4	Potassium	mg/kg	193.57	UTRL/LAB/SOIL/SOP/01
5	Sodium	mg/kg	130.17	UTRL/LAB/SOIL/SOP/01
6	Calcium	mg/kg	4159.70	UTRL/LAB/SOIL/SOP/01
7	Magnesium	mg/kg	615.09	UTRL/LAB/SOIL/SOP/01
8	Sodium Absorption Ratio	-	0.50	UTRL/LAB/SOIL/SOP/01
9	Water Holding Capacity	%	27.60	UTRL/LAB/SOIL/SOP/01
10	Total Kjeldahl Nitrogen	mg/kg	920.57	UTRL/LAB/SOIL/SOP/01
11	Phosphorous	mg/kg	56.83	UTRL/LAB/SOIL/SOP/01
12	Bulk Density	gm/cc	1.24	IS: 2720 (part-28)
13	Organic Carbon	%	0.88	IS: 2720 (part-22)
14	Organic Matter	%	1.58	IS: 2720 (part-22)
15	Porosity	%	48.75	UTRL/LAB/SOIL/SOP/01
16	Permeability	cm/hr	3.48	IS: 2720 (part-17)

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Sampling October 2019 (SQ2)

S.No	Parameter	Units	Result	Test Method
1	Texture	-	Sandy Clay	IS: 2720 (part-4), 1985 Reaff:2006
	Sand	%	45.62	IS: 2720 (part-4), 1985 Reaff:2006
	Clay	%	40.34	IS: 2720 (part-4), 1985 Reaff:2006
	Silt	%	14.04	IS: 2720 (part-4), 1985 Reaff:2006
2	pH(1:5 Suspension)	-	7.78	IS: 2720 (part-26),1987
3	Electrical Conductivity	µmhos/cm	260.8	IS: 14767
4	Potassium	mg/kg	245.40	UTRL/LAB/SOIL/SOP/01
5	Sodium	mg/kg	168.03	UTRL/LAB/SOIL/SOP/01
6	Calcium	mg/kg	5084.11	UTRL/LAB/SOIL/SOP/01
7	Magnesium	mg/kg	570.58	UTRL/LAB/SOIL/SOP/01
8	Sodium Absorption Ratio	-	0.60	UTRL/LAB/SOIL/SOP/01
9	Water Holding Capacity	%	34.63	UTRL/LAB/SOIL/SOP/01
10	Total Kjeldahl Nitrogen	mg/kg	909.46	UTRL/LAB/SOIL/SOP/01
11	Phosphorous	mg/kg	79.57	UTRL/LAB/SOIL/SOP/01
12	Bulk Density	gm/cc	1.28	IS: 2720 (part-28)
13	Organic Carbon	%	0.87	IS: 2720 (part-22)
14	Organic Matter	%	1.56	IS: 2720 (part-22)
15	Porosity	%	39.42	UTRL/LAB/SOIL/SOP/01
16	Permeability	cm/hr	3.76	IS: 2720 (part-17)

Sampling November 2019 (SQ2)

S.No	Parameter	Units	Result	Test Method
1	Texture	-	Sandy Clay	IS: 2720 (part-4), 1985 Reaff:2006
	Sand	%	48.78	IS: 2720 (part-4), 1985 Reaff:2006
	Clay	%	38.00	IS: 2720 (part-4), 1985 Reaff:2006
	Silt	%	13.22	IS: 2720 (part-4), 1985 Reaff:2006
2	pH(1:5 Suspension)	-	7.57	IS: 2720 (part-26),1987
3	Electrical Conductivity	µmhos/cm	304.8	IS: 14767
4	Potassium	mg/kg	213.75	UTRL/LAB/SOIL/SOP/01
5	Sodium	mg/kg	140.25	UTRL/LAB/SOIL/SOP/01
6	Calcium	mg/kg	4757.40	UTRL/LAB/SOIL/SOP/01
7	Magnesium	mg/kg	467.18	UTRL/LAB/SOIL/SOP/01
8	Sodium Absorption Ratio	-	0.52	UTRL/LAB/SOIL/SOP/01
9	Water Holding Capacity	%	31.13	UTRL/LAB/SOIL/SOP/01
10	Total Kjeldahl Nitrogen	mg/kg	726.71	UTRL/LAB/SOIL/SOP/01
11	Phosphorous	mg/kg	75.94	UTRL/LAB/SOIL/SOP/01
12	Bulk Density	gm/cc	1.20	IS: 2720 (part-28)
13	Organic Carbon	%	0.79	IS: 2720 (part-22)
14	Organic Matter	%	1.41	IS: 2720 (part-22)
15	Porosity	%	35.73	UTRL/LAB/SOIL/SOP/01
16	Permeability	cm/hr	3.85	IS: 2720 (part-17)

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Sampling December 2019 (SQ2)

S.No	Parameter	Units	Result	Test Method
1	Texture	-	Sandy Clay	IS: 2720 (part-4), 1985 Reaff:2006
	Sand	%	47.06	IS: 2720 (part-4), 1985 Reaff:2006
	Clay	%	39.27	IS: 2720 (part-4), 1985 Reaff:2006
	Silt	%	13.67	IS: 2720 (part-4), 1985 Reaff:2006
2	pH(1:5 Suspension)	-	7.87	IS: 2720 (part-26),1987
3	Electrical Conductivity	µmhos/cm	336.4	IS: 14767
4	Potassium	mg/kg	210.47	UTRL/LAB/SOIL/SOP/01
5	Sodium	mg/kg	136.78	UTRL/LAB/SOIL/SOP/01
6	Calcium	mg/kg	4868.22	UTRL/LAB/SOIL/SOP/01
7	Magnesium	mg/kg	419.62	UTRL/LAB/SOIL/SOP/01
8	Sodium Absorption Ratio	-	0.50	UTRL/LAB/SOIL/SOP/01
9	Water Holding Capacity	%	39.86	UTRL/LAB/SOIL/SOP/01
10	Total Kjeldahl Nitrogen	mg/kg	750.62	UTRL/LAB/SOIL/SOP/01
11	Phosphorous	mg/kg	71.93	UTRL/LAB/SOIL/SOP/01
12	Bulk Density	gm/cc	1.17	IS: 2720 (part-28)
13	Organic Carbon	%	0.80	IS: 2720 (part-22)
14	Organic Matter	%	1.42	IS: 2720 (part-22)
15	Porosity	%	35.61	UTRL/LAB/SOIL/SOP/01
16	Permeability	cm/hr	3.79	IS: 2720 (part-17)

Sampling October 2019 (SQ3)

S.No	Parameter	Units	Result	Test Method
1	Texture	-	Sandy Clay	IS: 2720 (part-4), 1985 Reaff:2006
	Sand	%	47.19	IS: 2720 (part-4), 1985 Reaff:2006
	Clay	%	35.53	IS: 2720 (part-4), 1985 Reaff:2006
	Silt	%	17.28	IS: 2720 (part-4), 1985 Reaff:2006
2	pH(1:5 Suspension)	-	7.65	IS: 2720 (part-26),1987
3	Electrical Conductivity	µmhos/cm	311.8	IS: 14767
4	Potassium	mg/kg	245.22	UTRL/LAB/SOIL/SOP/01
5	Sodium	mg/kg	111.64	UTRL/LAB/SOIL/SOP/01
6	Calcium	mg/kg	4870.37	UTRL/LAB/SOIL/SOP/01
7	Magnesium	mg/kg	894.60	UTRL/LAB/SOIL/SOP/01
8	Sodium Absorption Ratio	-	0.39	UTRL/LAB/SOIL/SOP/01
9	Water Holding Capacity	%	34.81	UTRL/LAB/SOIL/SOP/01
10	Total Kjeldahl Nitrogen	mg/kg	882.00	UTRL/LAB/SOIL/SOP/01
11	Phosphorous	mg/kg	82.63	UTRL/LAB/SOIL/SOP/01
12	Bulk Density	gm/cc	1.29	IS: 2720 (part-28)
13	Organic Carbon	%	0.88	IS: 2720 (part-22)
14	Organic Matter	%	1.57	IS: 2720 (part-22)
15	Porosity	%	43.91	UTRL/LAB/SOIL/SOP/01
16	Permeability	cm/hr	3.44	IS: 2720 (part-17)

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Sampling November 2019 (SQ3)

S.No	Parameter	Units	Result	Test Method
1	Texture	-	Sandy Clay	IS: 2720 (part-4), 1985 Reaff:2006
	Sand	%	47.84	IS: 2720 (part-4), 1985 Reaff:2006
	Clay	%	36.32	IS: 2720 (part-4), 1985 Reaff:2006
	Silt	%	15.84	IS: 2720 (part-4), 1985 Reaff:2006
2	pH(1:5 Suspension)	-	7.49	IS: 2720 (part-26),1987
3	Electrical Conductivity	µmhos/cm	326.7	IS: 14767
4	Potassium	mg/kg	255.55	UTRL/LAB/SOIL/SOP/01
5	Sodium	mg/kg	111.52	UTRL/LAB/SOIL/SOP/01
6	Calcium	mg/kg	5083.16	UTRL/LAB/SOIL/SOP/01
7	Magnesium	mg/kg	949.09	UTRL/LAB/SOIL/SOP/01
8	Sodium Absorption Ratio	-	0.38	UTRL/LAB/SOIL/SOP/01
9	Water Holding Capacity	%	33.44	UTRL/LAB/SOIL/SOP/01
10	Total Kjeldahl Nitrogen	mg/kg	762.60	UTRL/LAB/SOIL/SOP/01
11	Phosphorous	mg/kg	79.97	UTRL/LAB/SOIL/SOP/01
12	Bulk Density	gm/cc	1.27	IS: 2720 (part-28)
13	Organic Carbon	%	0.86	IS: 2720 (part-22)
14	Organic Matter	%	1.54	IS: 2720 (part-22)
15	Porosity	%	44.48	UTRL/LAB/SOIL/SOP/01
16	Permeability	cm/hr	3.28	IS: 2720 (part-17)

Note:-

Sampling December 2019 (SQ3)

S.No	Parameter	Units	Result	Test Method
1	Texture	-	Sandy Clay	IS: 2720 (part-4), 1985 Reaff:2006
	Sand	%	48.09	IS: 2720 (part-4), 1985 Reaff:2006
	Clay	%	36.14	IS: 2720 (part-4), 1985 Reaff:2006
	Silt	%	15.77	IS: 2720 (part-4), 1985 Reaff:2006
2	pH(1:5 Suspension)	-	7.41	IS: 2720 (part-26),1987
3	Electrical Conductivity	µmhos/cm	330.4	IS: 14767
4	Potassium	mg/kg	256.68	UTRL/LAB/SOIL/SOP/01
5	Sodium	mg/kg	114.18	UTRL/LAB/SOIL/SOP/01
6	Calcium	mg/kg	5145.67	UTRL/LAB/SOIL/SOP/01
7	Magnesium	mg/kg	843.02	UTRL/LAB/SOIL/SOP/01
8	Sodium Absorption Ratio	-	0.39	UTRL/LAB/SOIL/SOP/01
9	Water Holding Capacity	%	32.31	UTRL/LAB/SOIL/SOP/01
10	Total Kjeldahl Nitrogen	mg/kg	905.87	UTRL/LAB/SOIL/SOP/01
11	Phosphorous	mg/kg	81.95	UTRL/LAB/SOIL/SOP/01
12	Bulk Density	gm/cc	1.22	IS: 2720 (part-28)
13	Organic Carbon	%	0.80	IS: 2720 (part-22)
14	Organic Matter	%	1.42	IS: 2720 (part-22)
15	Porosity	%	43.80	UTRL/LAB/SOIL/SOP/01
16	Permeability	cm/hr	3.46	IS: 2720 (part-17)

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Sampling October 2019 (SQ4)

S.No	Parameter	Units	Result	Test Method
1	Texture	-	Clay Loam	IS: 2720 (part-4), 1985 Reaff:2006
	Sand	%	45.84	IS: 2720 (part-4), 1985 Reaff:2006
	Clay	%	32.16	IS: 2720 (part-4), 1985 Reaff:2006
	Silt	%	22.00	IS: 2720 (part-4), 1985 Reaff:2006
2	pH(1:5 Suspension)	-	7.33	IS: 2720 (part-26),1987
3	Electrical Conductivity	µmhos/cm	302.7	IS: 14767
4	Potassium	mg/kg	355.39	UTRL/LAB/SOIL/SOP/01
5	Sodium	mg/kg	110.58	UTRL/LAB/SOIL/SOP/01
6	Calcium	mg/kg	5270.22	UTRL/LAB/SOIL/SOP/01
7	Magnesium	mg/kg	311.48	UTRL/LAB/SOIL/SOP/01
8	Sodium Absorption Ratio	-	0.40	UTRL/LAB/SOIL/SOP/01
9	Water Holding Capacity	%	41.67	UTRL/LAB/SOIL/SOP/01
10	Total Kjeldahl Nitrogen	mg/kg	830.11	UTRL/LAB/SOIL/SOP/01
11	Phosphorous	mg/kg	69.87	UTRL/LAB/SOIL/SOP/01
12	Bulk Density	gm/cc	1.22	IS: 2720 (part-28)
13	Organic Carbon	%	0.90	IS: 2720 (part-22)
14	Organic Matter	%	1.60	IS: 2720 (part-22)
15	Porosity	%	49.18	UTRL/LAB/SOIL/SOP/01
16	Permeability	cm/hr	1.59	IS: 2720 (part-17)

Sampling November 2019 (SQ4)

S.No	Parameter	Units	Result	Test Method
1	Texture	-	Clay Loam	IS: 2720 (part-4), 1985 Reaff:2006
	Sand	%	44.51	IS: 2720 (part-4), 1985 Reaff:2006
	Clay	%	33.27	IS: 2720 (part-4), 1985 Reaff:2006
	Silt	%	22.22	IS: 2720 (part-4), 1985 Reaff:2006
2	pH(1:5 Suspension)	-	7.34	IS: 2720 (part-26),1987
3	Electrical Conductivity	µmhos/cm	309.8	IS: 14767
4	Potassium	mg/kg	350.63	UTRL/LAB/SOIL/SOP/01
5	Sodium	mg/kg	100.68	UTRL/LAB/SOIL/SOP/01
6	Calcium	mg/kg	5111.60	UTRL/LAB/SOIL/SOP/01
7	Magnesium	mg/kg	372.01	UTRL/LAB/SOIL/SOP/01
8	Sodium Absorption Ratio	-	0.37	UTRL/LAB/SOIL/SOP/01
9	Water Holding Capacity	mg/kg	32.44	UTRL/LAB/SOIL/SOP/01
10	Total Kjeldahl Nitrogen	%	111.77	UTRL/LAB/SOIL/SOP/01
11	Phosphorous	mg/kg	73.25	UTRL/LAB/SOIL/SOP/01
12	Bulk Density	gm/cc	1.24	IS: 2720 (part-28)
13	Organic Carbon	%	0.79	IS: 2720 (part-22)
14	Organic Matter	%	1.41	IS: 2720 (part-22)
15	Porosity	%	41.18	UTRL/LAB/SOIL/SOP/01
16	Permeability	cm/hr	1.48	IS: 2720 (part-17)

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Sampling December 2019 (SQ4)

S.No	Parameter	Units	Result	Test Method
1	Texture	-	Clay Loam	IS: 2720 (part-4), 1985 Reaff:2006
	Sand	%	44.81	IS: 2720 (part-4), 1985 Reaff:2006
	Clay	%	33.89	IS: 2720 (part-4), 1985 Reaff:2006
	Silt	%	21.30	IS: 2720 (part-4), 1985 Reaff:2006
2	pH(1:5 Suspension)	-	7.67	IS: 2720 (part-26),1987
3	Electrical Conductivity	µmhos/cm	329.6	IS: 14767
4	Potassium	mg/kg	368.66	UTRL/LAB/SOIL/SOP/01
5	Sodium	mg/kg	107.84	UTRL/LAB/SOIL/SOP/01
6	Calcium	mg/kg	5290.47	UTRL/LAB/SOIL/SOP/01
7	Magnesium	mg/kg	478.99	UTRL/LAB/SOIL/SOP/01
8	Sodium Absorption Ratio	-	0.38	UTRL/LAB/SOIL/SOP/01
9	Water Holding Capacity	mg/kg	35.71	UTRL/LAB/SOIL/SOP/01
10	Total Kjeldahl Nitrogen	%	104.95	UTRL/LAB/SOIL/SOP/01
11	Phosphorous	mg/kg	70.74	UTRL/LAB/SOIL/SOP/01
12	Bulk Density	gm/cc	1.24	IS: 2720 (part-28)
13	Organic Carbon	%	0.86	IS: 2720 (part-22)
14	Organic Matter	%	1.54	IS: 2720 (part-22)
15	Porosity	%	43.89	UTRL/LAB/SOIL/SOP/01
16	Permeability	cm/hr	1.54	IS: 2720 (part-17)

**Observations:**

The analysis results show that soil is basic in nature as pH value ranges from 7.28 to 7.87, Phosphorus (54.12 to 82.63 Kg/ha.) ,Potassium (193.57 mg/Kg to 355.39 mg/Kg) and Electric conductivity (260.8 mg/Kg to 330.4 mg/Kg) has been found to be in good amount in the soil samples.

**Conclusion :**

The analytical data of soil characteristic of the study area during Oct. to Dec. 2019 were observed the texture of the soil was sandy clay and sandy clay loam. The PH, water holding capacity ,organic matter and micro nutrients are within the normal level for cropping pattern.

**3.6 NOISE ENVIRONNENT**

The noise levels within the study area were recorded using Sound Level Meter and noise monitoring results were compared with the Ambient Noise Quality Standard notified under Environment Protection Act, 1986. The noise level monitoring locations are shown in Table 3.6 (i) and the levels recorded are as stated in Table 3.6 (ii).

**Table 3.6 (i) Noise quality monitoring stations**

Station Code	Name of the station	Distance from the project site	Zone/Study Area /Project Area
NQ1	Jarar	0.28kms towards East	Project Area
NQ2	Jahangirabad	1.06 kms towards South	Study Area
NQ3	Girwan	2.34 kms towards East	Study Area
NQ4	Barokhar khurd	1.69 kms towards North-East	Study Area

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NQ5	Barokhar buzurg	4.67 kms towards North	Study Area
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Table No. 3.6 (ii) Noise level status

Sampling October 2019

S.No	Location	Observed Value Leq dB (A)						Limit as per CPCB Guidelines Leq. dB(A)		Zone
		Day			Night			Day*	Night*	
		L <sub>eq</sub>	L <sub>max</sub>	L <sub>min</sub>	L <sub>eq</sub>	L <sub>max</sub>	L <sub>min</sub>			
1	Barokhar Khurd (1.69 kms North-East)	53.5	58.4	48.7	40.5	45.2	33.4	55.0	45.0	Residential
2	Barokhar Bujrug (4.67 kms North)	52.2	57.4	35.1	42.3	49.4	33.8	55.0	45.0	Residential
3	Jahangirabad (1.06 kms South)	52.8	61.5	45.2	38.6	43.7	33.7	55.0	45.0	Residential
4	Jarar (0.28kms East)	50.7	56.7	38.7	37.5	39.7	34.8	55.0	45.0	Residential
5	Girwan (2.34 kms East)	49.0	53.8	42.6	36.2	39.6	33.6	55.0	45.0	Residential
*Day Time		Leq(6.00AM TO 10.00 PM)								
*Night Time		Leq(10.00PM TO 6.00 AM)								

Sampling November 2019

S.No	Location	Observed Value Leq dB (A)						Limit as per CPCB Guidelines Leq. dB(A)		Zone
		Day			Night			Day*	Night*	
		L <sub>eq</sub>	L <sub>max</sub>	L <sub>min</sub>	L <sub>eq</sub>	L <sub>max</sub>	L <sub>min</sub>			
1	Barokhar Khurd (1.69 kms North-East)	53.3	58.6	46.8	40.6	47.3	33.2	55.0	45.0	Residential
2	Barokhar Bujrug (4.67 kms North)	53.9	58.6	40.2	41.3	48.7	32.6	55.0	45.0	Residential
3	Jahangirabad (1.06 kms South)	53.4	62.4	44.7	40.4	46.7	33.4	55.0	45.0	Residential
4	Jarar (0.28kms East)	50.1	55.7	40.5	37.1	42.8	33.5	55.0	45.0	Residential
5	Girwan (2.34 kms East)	49.2	53.8	42.1	34.7	36.8	33.2	55.0	45.0	Residential
*Day Time		Leq(6.00AM TO 10.00 PM)								
*Night Time		Leq(10.00PM TO 6.00 AM)								

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Sampling December 2019

S.No	Location	Observed Value Leq dB (A)						Limit as per CPCB Guidelines Leq. dB(A)		Zone
		Day			Night			Day*	Night*	
		L <sub>eq</sub>	L <sub>max</sub>	L <sub>min</sub>	L <sub>eq</sub>	L <sub>max</sub>	L <sub>min</sub>			
1	Barokhar Khurd (1.69 kms North-East)	53.4	58.2	47.4	39.7	43.6	34.7	55.0	45.0	Residential
2	Barokhar Bujrug (4.67 kms North)	49.5	54.1	36.8	37.9	40.4	35.1	55.0	45.0	Residential
3	Jahangirabad (1.06 kms South)	49.1	53.8	42.6	40.8	45.7	33.5	55.0	45.0	Residential
4	Jarar (0.28kms East)	48.3	51.8	38.3	37.6	39.2	35.5	55.0	45.0	Residential
5	Girwan (2.34 kms East)	49.8	54.9	38.5	38.4	40.4	35.8	55.0	45.0	Residential
*Day Time		Leq(6.00AM TO 10.00 PM)								
*Night Time		Leq(10.00PM TO 6.00 AM)								

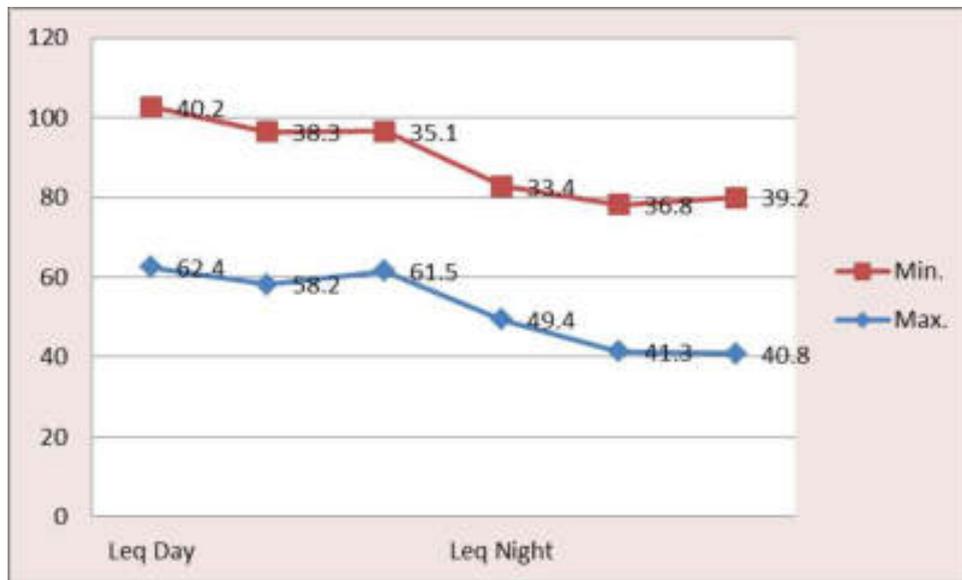


Figure 3.5 Noise level status

Results

Noise monitoring reveals that the maximum & minimum noise levels at day time were recorded as 53.9 dB(A) & 35.1 dB(A) respectively. The maximum & minimum noise levels at night time were found to be 42.63 dB(A). The minimum noise levels at night time were found to be 32.60 dB(A).

The noise levels recorded at all locations were within the NAAQS limits.

However, with suitable control measures and EMP, the noise levels will be reduced and the impacts will be minimized

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There are several other sources in the 10 km radius of study area, which contributes to the local noise level of the area. Traffic activities as well as activities in nearby villages and agricultural fields add to the ambient noise level of the area.

**Table 3.6 (iii): Ambient Noise Quality Standards in respect of Noise**

Area Code	Category of Area	Noise dB (A) Leq	
		Daytime*	Night time*
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

**Note:** Daytime from 6.00am to 10.00 pm and Night time from 10.0 0pm to 6.0

Silence zone is defined as area up to 100 meters around premises of hospitals, educational institutions and courts. Use of vehicle horns, loud speakers and bursting of crackers are banned in these zones.

**3.6 THE TRAFFIC STUDY**

The lease area is connected to NH 76 about 13.0 km towards East direction from the project site. These roads are wide enough to facilitate easy and smooth movement of heavy duty trucks.

The Detailed traffic study has been discussed under Chapter-4.

**During mine operation**

Proposed Production of mine	20000 m <sup>3</sup> /year
No. of working days	300 days
Per day Production of mine	66.67 m <sup>3</sup> /day
Per Truck capacity	12-13 trucks (Approximately)
No. of trucks deployed	Approx 5-6 trucks
Working hours per day	08 hours(During daytime only)
No. of trucks deployed/hr	Approximately 5-6 Truck/tippers
Increase in PUC/hr	5 trucks (Approximately)

At present the traffic load at highway is less than 5 trucks per hour, in particular. Due to the proposed project there will be addition in the existing trucks having the capacity of 12-13 cum load that is 5-6 trucks/hr, hence the changes will be at small level and will not affect the existing environment.

**3.7 BIOLOGICAL ENVIRONMENT**

**General vegetation of the study area:** The proposed project is to mine Building Stone, Khandas & Gitti, Boulder at Banda district of U.P. which lies between the Indo-Gangetic plain to the north and the south. Bundhelkhand region is a gently sloping upland distinguished by barren hilly terrain with sparse

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vegetation. Other rivers lying in the district are Ken River. The river water being used for Irrigation through Canal which is passing near by the project site at then distance of 2.50kms towards East. The district cover by river alluvial soil in the north and the remaining part of the district are covered by deep black and sandy red soil.

The proposed project site i.e. core area is the water channel, which has few aquatic plants only. However, the nearby areas i.e. buffer area is having different types of plants (herbs, shrubs and trees). The Banda district covered mixed variety of vegetation mainly bushes. The tress like Shishum, Neem, Mango tree and Jamun tree, Eucalyptus and Babool are also found in sufficient numbers.

**Commonly found flora in the district:-**

Dhak (*Butea monosperma*), Teak (*Tectona grandis*), Mahua (*Madhuca indica*), Babool (*Acacia nilotica*) and Tendu (*Diospyros melanoxylon*), Siris (*Albizia lebbeck*), Aam (*Mangifera indica*), Jamun (*Syzygium cumini*), Bail (*Aegle marmelos*), Tut (*Morus alba*), Bargad (*Ficus bengalensis*), Neem (*Azadirachta indica*), Peepal (*Ficus religiosa*), Safeda (*Eucalyptus umbelatus*), Sisam (*Dalbergia sissoo*), etc.

**Commonly found fauna in the district:-**

Many domestic mammal species were reported from buffer zone during the field survey. Common domestic animals like Buffalo, cow, goat etc. can be noticed in open grass fields while grazing. Small mammals like Indian palm squirrel (*Funambulus palmarum*) and field mouse (*Apodemus sylvaticus*) are noticed in vicinity of the village. Inquiry from village people regarding wild animals reveals that Monkey (*Macaca mulata*), Indian hare (*Lepus nigricollis*), Mongoose (*Herpestes edwardsii*), Jackal (*Canis aureus*), etc. are often seen in the area.

The bird population that were commonly noticed during field survey are Common teal (*Anas crecca*), Red wattled lapwing etc. House crow (*Corvus splendens*), House sparrow (*Passer domesticus*), Common Myna (*Gracula religiosa*) are of common occurrence.

The reptilians species commonly reported are Garden lizard (*Calotes versicolor*) and *Eutropis macularia* along shady places in agricultural field or where growth of bushes is noticed. Among non-poisonous snakes rat snakes (*Ptyas mucosus*) are commonly noticed in field, followed by poisonous snakes like Cobra (*Najanaja*) and Banded krait (*Bungarus multicinctus*) are occasionally encounter by the farmers.

**Commonly grown Agricultural Crops in the district:-**

Traditionally rain fed and irrigated agriculture is common. The main crops grown are rice, maize, pigeon pea, sorghum, pearl millet, moong beans during kharif and wheat, Bengal gram, green peas, rapeseed and mustard and lentil during rabi season. Sugarcane is the main cash crop. Rice-wheat cropping system is more predominant. Amongst the fruit crops, mango and guava, and amongst the vegetable crops potato, onion, brinjal, tomato, cauliflower and cabbage are important.

**Fishes & Amphibians:-**

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The fish species which are commonly found in the water bodies of district are Labeo bata (Bhangar or Bata), Gudusia chapara (Chappara or Palla), Labeo rohita (Rohu), Catla catla (Theila), etc.

Amphibians are commonly found at the places along the margin of aquatic and terrestrial systems. Some of the commonly reported species are Bufo melanostictus (common Indian toad), Euphlyctis cyanophlyctis (Indian skipper frog), Hoplobatrachus tigerinus (Indian bull frog), etc.

**Anticipated Impacts and Evaluation**

The mining activity will have insignificant affect on the existing flora and fauna. Data have been collected from various Government Departments such as forests, agriculture, fisheries, animal husbandry and various offices to establish the pre-project biological environmental conditions. There are no endangered species, wildlife sanctuary, wildlife corridors or ecosensitive area near the core zone. The purpose of the project itself is to save the flora around the project area from excessive erosion and floods. It was found that the Building Stone, Khanda, Gitti & Boulder mining activity will not have any significant impact on the biological environment of the region.

- **Mitigation Measures**

Since, there is no migratory route of birds or grazing route of domesticated animal is reported, hence there will be no impact anticipated. Mining activity will be confined upto a required depth from ground level/ water level whichever is less.

**IMPACT ON ECOLOGY OF THE AREA**

For thousands of years, Building Stone, Khanda, Gitti & Boulder has been used for domestic construction and house wares since prehistoric times, and continues to be used. Today demand for Building Stone, Khanda, Gitti & Boulder continues to increase due to increasing infrastructure. Mining operators, in conjunction with cognizant resource agencies, must work to ensure that Building Stone, Khanda, Gitti & Boulder mining is conducted in a responsible manner because excessive and unscientific mining causes the degradation of land. Building Stone, Khanda, Gitti & Boulder mining generates extra vehicle traffic, which negatively impairs the environment. Where access roads cross ecologically important areas, the local environment may be impacted.

**Mitigation measures**

As the present mining will be done in a scientific manner as mentioned before, significant adverse impacts are not predicted; however the following mitigation measure will be taken to further minimize it.

- No mining will be done near to important structure like bridges, dam and others as per mining law.

**EIA/EMP CHAPTER-3- DESCRIPTION OF ENVIRONMENT**

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- No mining will be carried out during the rainy season.
- The mining activity will employ many heavy vehicles to transport the Building Stone, Khanda, Gitti & Boulder outside the mine to desired destination. Safe site/routes having less impact will be selected for transportation, all the vehicles will be employed for transportation purpose will be PUC certified.

**CHAPTER- 4****ANTICIPATED ENVIRONMENTAL IMPACT AND MITIGATION MEASURES****4.0 GENERAL**

All development projects whether new, under modernization or renovation, do have an impact on the natural set up of the environment. This impact may be beneficial or adverse, depending on the improvement or the deterioration it brings about change in the status of air, water, land, ecology, natural systems, socio-cultural life styles and economics of the population. Depending on the nature of activities and baseline environment 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 countering or minimizing the impacts.

Keeping in mind, the environmental baseline scenario as detailed in Chapter 3 and the proposed mining activity described in Chapter 2, it is attempted to assess the likely impact and its extent on various environmental parameters and likely mitigation measures to be adopted.

**4.1 LAND ENVIRONMENT**

The Mining and allied activities involved in Building Stone (Khanda, Gitti and Boulder) Mining Project from the rocky stones on the Gata No. 2450 Khand No.-03. The clearance of overburden such as weeds and other accumulated matter like wood end crops, animal bones and those intentionally thrown garbage, other than soil, gravel and pebbles are cause of pollution and result in environmental degradation. Time takes care of it and once again gets turned to a changed ecology of the region. As the time passes it turns into a place of shelter, food and of reproduction of many life forms. The disturbance to the new form of biota and to the riparian habitat by man originated mining activities lead once again to the environmental degradation.

**Impact on Soil**

There is generation of gritty soil is negligible as the area is not covered by top soil cover hence few rejects will be developed which is used for lease boundary barrier plantation and haul road dressing.

**Impact on Land Use**

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The area is having undulating surface surrounded by barren land. The area is partially covered by alluvial soil. The proposed area and surround areas are mostly private land owned by individual. Presently the existing quarry lies in 2.0 ha area. The potential adverse impact of opencast stone mining will be in the form of change in land use pattern. So reclamation of mined out land will be given due importance as a step for sound land resource management in the form of reclaimed land and water body.

No adverse impact is anticipated on land use of buffer zone associated due to the existing stone mine project, as all the activities will be confined within the project site only. Stone mined out from the mine is being and continued to be used as boulders of different sizes for River Anti-erosion, Dam construction, embankment works etc. After crushing into different sizes of aggregates from 6mm to 63mm, the product can be used in construction and road projects.

**4.2 WATER ENVIRONMENT****4.2.1 Impact on Surface Water**

At present scenario there is no any seasonal or perennial source of water is passing through the lease area. During the rainy season, there may be accumulation of surface water, which is proposed to be pumped out to keep the working area dry and it is being utilized for dust suppression.

The stone mineral found in the area is non-toxic in nature. There will be no outside discharge of liquid effluent from the mine site. It is, therefore, apparent that there will be negligible impact of mining on the surface water regime.

The surface water quality of the canal water passing 2.50 kms towards East direction from the proposed unit. The baseline data of the water quality parameters of Canal water originates from Ken River. The other source of the surface water 2 number of the ponds approx. 1km. The quality of the water is discuss in the **Chapter-3**

**4.2.2 Impact on Ground Water**

Ground water pollution can take place only if the mining rejects contain toxic substances, which get leached by the precipitation water and percolate to the ground water table thus polluting it. Any nearby wells or other sources of water can be rendered unfit for drinking and even for industrial use.

This is not the case with this deposit as the mineral or topsoil does not contain any harmful ingredients. Moreover, stone constitutes of fairly inert and chemically non-reactive ingredients.

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It is noticed from nearby dug wells and bore wells that the ground water table is available below 30 meters of the normal surface level. As the mining operation has been proposed to be carried out much above the ground water table there would not be any adverse effect on the ground water.

The ground water available in the nearby Handpump, well, borewell is analysed and it is found within the prescribed standard of CPCB and it is also being and will be continued to be adopted the remedial measures to keep the water quality within the prescribed standard.

**4.2.3 Mitigation Measures for Water Environment**

- Adequate control measures are being and will be continued to 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-
- Garland drain will be provided at the toe of the dumps, to channelize the runoff water from dumps into the water reservoir (i.e. mined out pits) & around the active pits to restrict rainy water from entering in to the working pit.
- Retaining walls having water holes will be provided along the toe of the dumps to avoid the soil wash out & around the active pit to prevent fall of human/animal in to the working pit.
- Dumps slopes are being stabilized followed by plantation to avoid soil erosion.
- No waste water is being discharged from the mining activities.

**4.3 AIR ENVIRONMENT**

**Anticipated impacts and evaluation**

Information on air quality was studied and various modeling techniques predicted that the mining activity is not likely to affect the air quality in a significant manner. However, loading of Building Stone (Khanda, Gitti and Boulder), its transportation and unloading operations may cause some deterioration in air quality due to handling dry materials. In the present case, only wet materials will be handled, thus eliminating problems of fugitive dust. Also, the collection and lifting of minerals will be done manually without any blasting. Therefore the dust generated is likely to be insignificant as compared to mining processes involving drilling, blasting, mechanized loading etc.

**Air Modeling**

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In general, mining operations generate substantial quantities of airborne respirable dust, which may lead to the development of impairment of respiratory system of mine workers. The increasing trend of mining leads to release of huge amount of dust. These air borne dust particles, generally below 100 micron in size, are nuisance particulates and cause health hazards as an ill effect of mining activities. Extraction activities like drilling, blasting, material handling and transport are a potential source of air pollution. Therefore, a detailed study on emission sources and quantification of pollutant concentration by means of dispersion modeling is required to assess the environmental impact of a mine. On the basis of the predicted increments to air pollutant concentrations, an effective mitigation and environmental plan can be devised for sensitive areas. In case of Building Stone (Khanda, Gitti and Boulder) mining, blasting and drilling is involved activities, the impacts may also be caused by material handling and transportation activities of mostly wet Building Stone (Khanda, Gitti and Boulder) and the same are minimal.

**FUGITIVE DUST- MODELING**

Air quality modeling was done using line source model as published by USEPA “Workbook of Dispersion Modeling” by Turner, for transportation through roads and the empirical emission factor equations from USEPA. Emission factors to be used in Line source Dispersion equation is adopted from formula as given below:

$$E = k * (1.7) * (s/12) * (S/48) * (W/2.7)^{0.7} * (w/4)^{0.5} * (365-p/365) \text{ kg/VKT} \text{----- (1)}$$

Where

E = Emission Rate (kg/VKT)

k= Particle size multiplier = (0.36)

s = Silt Content of the Road surface material (%) = 10%

S = Mean Vehicle Speed (km/hr) = 20 km/hr

W=Mean Vehicle Weight (tonnes) = 10 tonnes

w= Mean number of wheels = 8

p= Number of days with at least 0.254 mm of precipitation per year = 60

f = frequency of Vehicle movement in no per hour = 2 vehicles / hour

Thus using equation (1)

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$$E = 0.61766 \text{ kg/VKT}$$

$$E = 0.0003 \text{ g/sec/m}$$

Concentration of the fugitive dust was calculated using the empirical equations for unpaved roads published by USEPA- AP42. The Concentration of the fugitive Dust is given below:

$$C = (2/\pi)^{1/2} (E / \sigma z v) \text{ Exp- } [(h^2) / (2 \sigma z^2)] \times 10^6 \text{ ----- (2)}$$

Where

C = Hourly Concentration in microgram/ m<sup>3</sup>

E = Emission Rate = 0.0003 g/sec/m

v = Wind Speed =4 m/s

h = 0 m

Modeling was done for an infinite line source assuming unpaved road. For conservative calculation wind was assumed to blow at a velocity of 4 m/s perpendicular to the road. The results for 24 hourly concentration values are given in the Fig. 4.1:

**Mitigation measures**

The only air pollution sources are the road transport network of the trucks/dumpers. The dust suppression measures like the following will be resorted:

- Water sprinkling will be done on the roads regularly. This will reduce dust emission further by 75%.
- Care will be taken to prevent spillage by covering the carrying vehicles with tarpaulin and sprinkling of water, if dry.
- Fortnightly scraping of road in order to keep the roads almost leveled. This will ensure smooth flow of vehicles and also prevent spillage.
- Overloading will be kept under check by giving prior awareness.
- Proper Tuning of vehicles to keep the gas emissions under check.
- Plantation of trees along the road sides helps to reduce the impact of dust in the nearby villages.

**4.4 NOISE ENVIRONMENT**

Day and night sound pressure levels Leq is often used to describe the community noise exposure, which includes 10 dB (A) night time penalty.

The monitored noise level during the base line period within the core zone and buffer zone has been found to be within the prescribed CPCB standards which will also be confined within the limit by undertaking more plantations within the mining area especially in the direction of habitation to act as a sound barrier.

#### **4.4.1 Impact due to Ground Vibrations**

Ground vibration, fly rock, air blast, noise, dust and fumes are the deleterious effects of blasting on environment. The explosive energy sets up a seismic wave in the ground, which can cause significant damage to structures and disturbance to human occupants. It causes major damages to the pit configuration too.

When an explosive charge is fired inside the blast hole, it is instantly converted into hot gases, which exert intense pressure on the blast hole walls. High intensity shock waves propagate radically in all directions and cause the rock particles to oscillate. This oscillation is felt as ground vibration. The proposed mining operations using deep hole drilling and blasting using delay detonators are bound to produce ground vibrations.

Ground vibration from mine blasting is expressed by amplitude, frequency and duration of blast. The variables, which influence ground vibrations, are controllable and non-controllable. The non-controllable variables include general surface terrain, type and depth of overburden and wind. Similarly, the controllable variables include type of explosives, charge per delay, delay interval, direction of blast progression, burden, spacing and specific charge and coupling ratio.

The oscillation of rock particles is called Particle Velocity and its maximum value is called Peak Particle Velocity (PPV), which is measured in millimeter per second.

As the distance increases, the PPV value is likely to reduce. The ground vibrations generated by blasting during the mining operations will be well within the standards prescribed by DGMS by controlled blasting. Ground vibrations are not likely to affect the structures in the vicinity of mine lease area.

By adopting controlled blasting, the problems will be greatly minimized at mines. The impacts are also minimized by choosing proper detonating system, optimizing total charge and charge/delay.

#### **4.4.2 Measures for Minimizing Adverse Impacts**

##### **➤ Noise Control Measures**

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- The following control measures are being and will be continued to be adopted to keep the ambient noise levels well below the limits:
- Drilling is being carried out with the help of sharp drill bits which will help in reducing noise.
- Secondary blasting is being totally avoided and Hydraulic rock breaker is being used for breaking boulders.
- Controlled blasting with proper spacing, burden, stemming and optimum charge/delay is being maintained.
- The blasting is being carried out during favorable atmospheric condition and less human activity timings;
- Minimum quantity of detonating fuse is being consumed by using alternatively Excel non-electrical initiation system;
- Proper maintenance, oiling and greasing of machines at regular intervals is being done to reduce generation of noise.
- The prime movers/diesel engines are properly maintained;
- Provision of sound insulated chambers for the workers deployed on machines (HEMM) producing higher levels of noise;
- Proper designing of plant & machinery by providing inbuilt mechanism like silencers, mufflers and enclosures for noise generating parts and shock absorbing pads at the foundation of vibrating equipment.
- Green Belt/Plantation is being developed around the mining activity area and along haul roads. The plantation minimizes propagation of noise.
- Personal Protective Equipment (PPE) like ear muffs/ear plugs is being provided to the operators of HEMM(Heavy Earth Moving Machinery) and persons working near HEMM; and
- Reducing the exposure time of workers to the higher noise levels.
- Periodical monitoring of noise will be done.

➤ **Measures to Control Ground Vibration**

The blasting operations in the mine is carried out by deep hole drilling and blasting using delay detonators, which reduce the ground vibrations. The measures that are generally followed and currently proposed for abatement of ground vibration, air blast and fly rocks are detailed below:

- Proper quantity of explosive, suitable stemming materials and appropriate delay system are being adopted to avoid overcharging and for safe blasting.
- Adequate safe distance from blasting is being maintained.

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- Blasting operations is carried out only during day time.
- The charge per delay is minimized and preferably more number of delays is used per blasts;
- During blasting, other activities in the immediate vicinity is temporarily stopped;
- Drilling parameters like overburden, depth, diameter and spacing is properly designed to give proper blast.

**4.5 BIOLOGICAL ENVIRONMENT**

**Ecological Impacts**

Mining which leads to the removal of channel substrate, re-suspension of streambed sediment and stockpiling on the streambed, will have ecological impacts. These impacts may have an effect on the direct loss of stream reserve habitat, disturbances of species attached to streambed deposits, reduced light penetration, reduced primary production, and reduced feeding opportunities.

**Table 4.1 Impact Prediction & Mitigation Measures – Biological Environment**

Environmenta l Parameter	Aspects	Potential Impact	Mitigation Measures
Biological Environment	Dust emission due to mining activity	Dust deposition on vegetation & Agriculture crop around periphery of ML area may retard the photosynthetic activities of plants subsequently may reduce the crop productivity specifically within 500m from mine lease area.	Truck will be covered. Sprinkler will be installed at crusher loading & unloading point; regular water sprinkling within the mining area and also on haulage road will be carried out.  Extensive plantation will be carried out around safety zone.  The waste material/OB will be stacked on the opposite of the sloping face of the designated location.

**Plantation along the Safety Zone**

Plantation along the periphery of the existing (nonoperational) mine developed in 0.20 Ha. By Shri Mujibuddin Siddiqui Quarry are as follows:

Sr. No.	Scientific Name	Local Name	Quantity
1.	Mangifera indica	Aam	25
2.	Tectonagrandis	Sagon	30
3.	Psidium guajava	Amrood	20
4.	Syzizium cumini	Jamun	25
<b>Total</b>			<b>100</b>

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At the end on life of mine further plantation shall be carried out in same area (0.20 Ha) and also be haul road as per mine plan. Around 100 saplings within the safety zone (7.5 m) will be planted to the end of life of mine.

**Selection of plant species with special reference**

Sr. No.	Plant species	Purpose of plantation of species
	<i>Aegle marmelos</i>	Pollution Tolerant Plants
	<i>Albizia lebbeck</i>	
	<i>Butea frondosa</i>	
	<i>Alstonia scholaris</i>	Best dust filtering capacity Plants
	<i>Ailanthus excelsa</i>	
	<i>Ficus benghalensis</i>	
	<i>Azadirachta indica</i>	Automobile Exhaust pollution Control Plants
	<i>Cassia fistula</i>	
	<i>Delonix regia</i>	
	<i>Phyllanthus emblica</i>	Medicinal value Plants
	<i>Terminalia arjuna</i>	
	<i>Azadiracta indica</i>	
	<i>Tectona grandis</i>	Economic value Plants
	<i>Pongamia pinnata</i>	
	<i>Shorea robusta</i>	
	<i>Cymbopagon martini</i>	Soil Conservation Plants
	<i>Ziziphus jujube</i>	Fruit bearing Plants
	<i>Psidium guava</i>	
	<i>Syzygium cumini</i>	
	<i>Mangifera indica</i>	
	<i>Dalbergia sisso</i>	Nitrogen Assimilation Plants
	<i>Cassia siamea</i>	
	<i>Cassia fistula</i>	Aesthetic beautification Plants
	<i>Polyalthia longifolia</i>	
	<i>Delonix regia</i>	

It is to be noted that preference will be given to indigenous plant species. Mixed plantations will be done keeping optimum spacing between the saplings.

**Impact on Local Transport Infrastructure**

After getting the EC, when the mine will be in operation stage, the excavated stone will be transported to adjacent crusher outside the lease area (50 mtr distance) where as a distance of 950 mtr (approx.) will be covered by the tippers within the mining lease area over the haul roads.

The distance covered outside the mining lease area is since only 50 mtr. Approx. and the road will be the dedicated one for exclusive use, the existing transportation infrastructure will not at all be used.

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The movement of excavated and sized stone from the crusher will be through unnamed Road approach road covering a distance of 0.35 km. along with other traffic. The incremental traffic is expected to be 4 nos. Per hour which is also expected not cause any significant impact either on existing roads or in the pollution load.

**Impact on Socio - Economic Aspects**

The existing project would create certain impacts with beneficial as well as adverse effects on the socio economic environment. The likely impacts due to mining are described below:

Impact on employment pattern Employment is main aspect for enhance the quality of life in any region. Employment opportunity is being and continued to be given to only local people in the form of skilled and unskilled labor. Mining activity will generate some indirect jobs and business opportunities as hotel, small shops kiosk etc. It will help to reduced poverty and improved living standard in the study area. It will help to improve economic condition of the study area.

**Impacts on socio-economic environment and mitigation measures**

Impact	Mitigation Measure
Due to mining and transportation of stone will generate the small shops, dhabas, garage, restaurant, vegetable shops etc. along the road and generate direct employment.	Positive Impact
Mining activity will generate direct employment by recruiting 121 people which will be employed locally and preference will be given to local people.	Positive Impact
Such shops along the roads will generate solid waste and waste water which will have adverse impact on human health.	4 nos. of Garbage bins will be provided for proper disposal of solid waste. The municipal wastewater will be disposed off into septic tanks and soak pit.
Extraction of stone resultant generation of fugitive dust cause workers of the mine to suffer from occupational hazards like skin allergies, eye and respiratory problems etc	Dust mask will be provided to the workers engaged at dust generation points like excavation and loading points. Regular water sprinkling on unpaved roads to avoid dust generation. The mined out area will be convert into water reservoir and barricade with wire fencing.
This creates serious threat to	The mining is planned in non-monsoon seasons only.

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<p>residents in the area who depend on river water for their domestic purposes.</p>	
<p>Major source of socio-health impacts of transportation will generate from truck, dust etc. Increase in accidents as a result of rash driving of dumpers carrying mineral through the roads may be possible.</p>	<p>It is proposed to plant 200 No. of local species per year with consultation of Forest department with some fruit bearing and medicinal trees, along the haul roads, outer periphery within the mining area to control the dust.</p> <p>Planning transportation routes of mined material so as to reach the nearest paved roads by shortest route. (Minimize transportation over unpaved road). Alternatively, gravelled road may be constructed between mine lease area and nearest paved road connectivity; The speed of trucks plying on the haul road should be limited to avoid generation of dust; and Covering of material during transportation on trucks to prevent spillage of stone from the trucks. The trucks will be covered by tarpaulin. Overloading will be avoided.</p> <p>Regular water sprinkling on unpaved roads to avoid dust generation during transportation.</p>

**Impact on population growth:**

The existing mining project will cause migration of outside people also in search of their food, shelter and livelihood due to which there will be positive impact on population growth of the study area.

**Impact on lifestyle:**

The study area is mainly tribal dominant. Increased economic activities in the project area can bring addictions. In the tribal areas the ethnic people may also get affected by additional addictions.

**Impact on quality of life:**

Due to mining activity study area would progress in terms of develop housing, education, medical, health, sanitation, power supply, electrification and transport in the area, which may improve the quality of life in the region. Existing project is expected to contribute improvement of quality of life in the region it may help to improve human index of the study area.

**Impact on human settlement:**

The villages and their inhabitants in the buffer zone will not be disturbed from their settlements due to the mining operations. There is no inhabitation within the lease area. Therefore neither

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villages nor any part of village or any hamlet will be disturbed during the entire life of the mine. As the mining operations will not disturb or relocate any village or settlement, no adverse impact is anticipated on any human settlement.

**Impact after mining:**

Mine pit of mining area after excavation will converted into a water pond and used as a natural water harvesting system for collection of rain water. In addition fishing activity can be performed through fisherman in water pond, it will generate employment opportunity.

**Mitigation Measures:**

In order to mitigate the adverse impact likely to arise in social, cultural and economic aspects in the surrounding region certain line of action is being and continued to be adopted related to:

Ensure that roads are properly signed, vehicles are well maintained and drivers are well trained and safety conscious.

Cohesive relation should be maintained with the concerned community so that in future any mishap may not disturb the harmony of the region.

Enhancement of community development through implementation of development programme, which will ensure the provision of basic facilities that are lacking and improvement of existing ones.

**Occupational Health (Impacts and Mitigation Measures)**

EISQ (Enzymatic Indicators Of Salt Quality) has concern and takes full responsibility for the protection of the workers against sickness, disease and injury arising out of their employment and have adopted certain principles with regard to occupational health services, like establishing and maintaining a safe and healthy working environment which will facilitate optimal physical and mental health in relation to work.

**Impacts on occupational health and safety**

<b>Impact</b>	<b>Mitigation Measure</b>
The mining of stone (minor mineral) can cause the lung disease and respiratory disorder due to dust exposure.	Dust masks will be provided as additional personal protection equipment (helmet and safety shoes) to the workers working in the dust prone area. Regular water sprinkling will be done and dust masks will be provided to the workers.
Due to noise exposure, hearing disorder may be resulted.	Ear-muffs will be provided to the workers and good maintenance of vehicles will be provided
The accident at the site due to mining operation may be anticipated.	Workers are informed, kept aware and trained about possible accidents during the mining operation and persona protective equipment's will be provided viz. gloves, safety shoes, dust mask, safety jackets, helmet etc. In addition to, the awareness about the

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	occupational health hazards due to mining activities to avoid any incident will be provided to the workers Pre- placement health check-up will be made mandatory and periodic health check-up will be done quarterly
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**The following occupational health measures shall also be adopted:-**

Identification and assessment of the risks from health hazards in the workplace;

Surveillance of the factors in the working environment and working practices which may affect workers' health, including sanitary installations, canteens and housing; and Advice on planning and organization of work, including the design of workplaces, on the choice, maintenance and condition of machinery and other equipment and on substances used in work.

**Identification of Work Related Health Hazards**

Details of the principle environmental and occupational risks that are likely to be created are given in Table 4.2.

**TABLE 4.2 WORK RELATED HEALTH HAZARDS**

Sr. No.	Hazardous Activities	Type of Hazards	Severity of Injury
1	Drilling	Exposed to high level of Noise	Hearing impairment
		Exposed to dusty environment	Dust related diseases
2	Blasting	Struck by fly rock	Serious Physical injury
		Exposed to dusty environment	Dust related diseases
		Exposed to high level noise	Hearing impairment
		Exposed to excessive vibration	
3	Loading	Struck by rolling big boulders	Serious injury, and equipment damage
		Struck by fall of objects	Serious Physical injury
4	Transportation	Accidental runaway of vehicle	Serious injury, and equipment damage
		Fall of vehicle from height while reversing	
		Exposed to high level noise	Hearing impairment
		Fire in engine due to over heating	Serious Physical injury
5	Storage of oil, lubricant	Leaks and spills	Fire & vigorous chemical reaction
6	Battery maintenance handling	Acid spillage	Acid burns
7	Use/repair of hydraulic jacks & pumps	High pressure operation	Physical injury
		Oil spillage	
		Rupture of hydraulic hoses	

**4.6 IMPACTS ON HYDROLOGY**

Impact	Mitigation Measure
The mining in the mine site area	The water table will not be intersected during mining as depth of

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may cause the ground water contamination due to intersection of the water table.	pit. Proper analysis/Monitoring will be done to check the ground and surface water quality..
Change the topography will divert the water flow.	There is no proposal of any stream modification/diversion due to this mining activity hence there will be no any impact on flow of water.

**4.7 IMPACTS ON GEOLOGY AND MITIGATION**

<b>Impact</b>	<b>Mitigation Measure</b>
Degradation of land	Adopting methods that are less wasteful, use of technologies that are user and environmentally friendly.
Degradation of stone reserves Geomorphic impacts and/ or visual intrusion.	Rehabilitation of quarries after use. Minimizing geomorphic disturbance by maximizing stone reserves through deep quarrying and avoidance of establishing small and haphazardly located quarries that contribute to environmental degradation.

**4.8 TRAFFIC ANALYSIS**

Traffic analysis is carried out by understanding the existing carrying capacity of the roads near to the project site and the connecting main roads in the area. Then depending on the capacity of the mine, the number of trucks that will be added to the present scenario will be compared to the carrying capacity.

**Table 4.3 (i): Existing Traffic Scenario & LOS**

<b>Road</b>	<b>V (Volume in PCU/hr)</b>	<b>C (Capacity in PCU/hr)</b>	<b>Existing V/C Ratio</b>	<b>LOS</b>
NH-76	75	500	0.14	B

V= Volume in PUC's/hr & C= Capacity in PUC's/ hr

The existing Level of Service (LOS) at Near Village and at highway is "A" i.e. excellent, as per classification.

<b>V/C</b>	<b>LOS</b>	<b>Performance</b>
0.0 - 0.2	A	Excellent
0.2 - 0.4	B	Very Good

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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: 106-1990

**No. of Trucks Required (maximum):**

Total capacity of mine	:	20000 m <sup>3</sup> per year
Total no. of working days	:	300 days
Building Stone, Khandas & Gitti, Boulder extracted in a day	:	66.67 cum
Building Stone, Khandas & Gitti, Boulder extracted in one truck	:	12-13 cum (approx.)
No. of truck required per day	:	Approximately 5-6 Truck/tippers

**Table 4.3 (ii): Modified Traffic Scenario & LOS**

Road	Volume(V)	Capacity©	Modified V/C Ratio	LOS
NH-76	96	900	0.21	B

**Results**

From the above analysis it can be seen that the V/C ratio is likely to change to 0.21 with LOS both being “B” which means ‘Very Good’ as per classification. So the additional load on the carrying capacity of the concerned roads is not likely to have any significant adverse effect.



**Fig. 4.1:** Map Showing Transportation Route Map

#### 4.8. STATUTORY REQUIREMENTS

It is accepted that effective resource management cannot be done in isolation. The Department therefore vigorously pursues approaches towards coordination and integration where possible, so as to lead to coordinated regulatory systems.

A regulatory system consists of both statutory and non-statutory components. In the Sectorial-specific strategy for prospecting and mining, the Department participates within an integrated environmental management system which is administered in terms of the Acts and Rules. Other Acts dealing with matters relating to the conservation and protection of the environment and which a holder of a mining authorization must also take cognizance of, include inter alia, the following:

- The Mines Act, 1952
- The Mines and Mineral (Development and Regulation) Act, 1957
- Mines Rules, 1955
- Mineral Concession Rules, 1960
- Mineral Conservation and Development Rules, 1988
- State Minor Mineral Concession Rules, U.P., 1963
- The Water (Prevention and Control of Pollution) Act, 1974
- The Air (Prevention and Control of Pollution) Act, 1981

**EIA/EMP CHAPTER-4- ANTICIPATED ENVIRONMENTAL IMPACT AND MITIGATION MEASURES**

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- The Environment (Protection) Act, 1986
- The Forest (Conservation) Act, 1980
- The Wildlife (Protection) Act, 1972

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**EIA/EMP CHAPTER-5- ENVIRONMENTAL MONITORING PROGRAMME**

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**CHAPTER- 5  
ENVIRONMENTAL MONITORING PROGRAMME**

**5.0 INTRODUCTION**

Success of any post-project environmental monitoring programme depends upon the efficiency of the organizational set up responsible for the implementation of the programme. Regular monitoring of the various environmental parameters is also necessary to evaluate the effectiveness of the management programme so that the necessary corrective measures can be taken in case there are some drawbacks in the proposed programme. Since environmental quality parameters at work zone and surrounding areas are important for maintaining sound operating practices of the project in line with conformity with environmental regulations, the post project monitoring work, therefore, forms a part of EMP.

**5.1 PROPOSED SET UP**

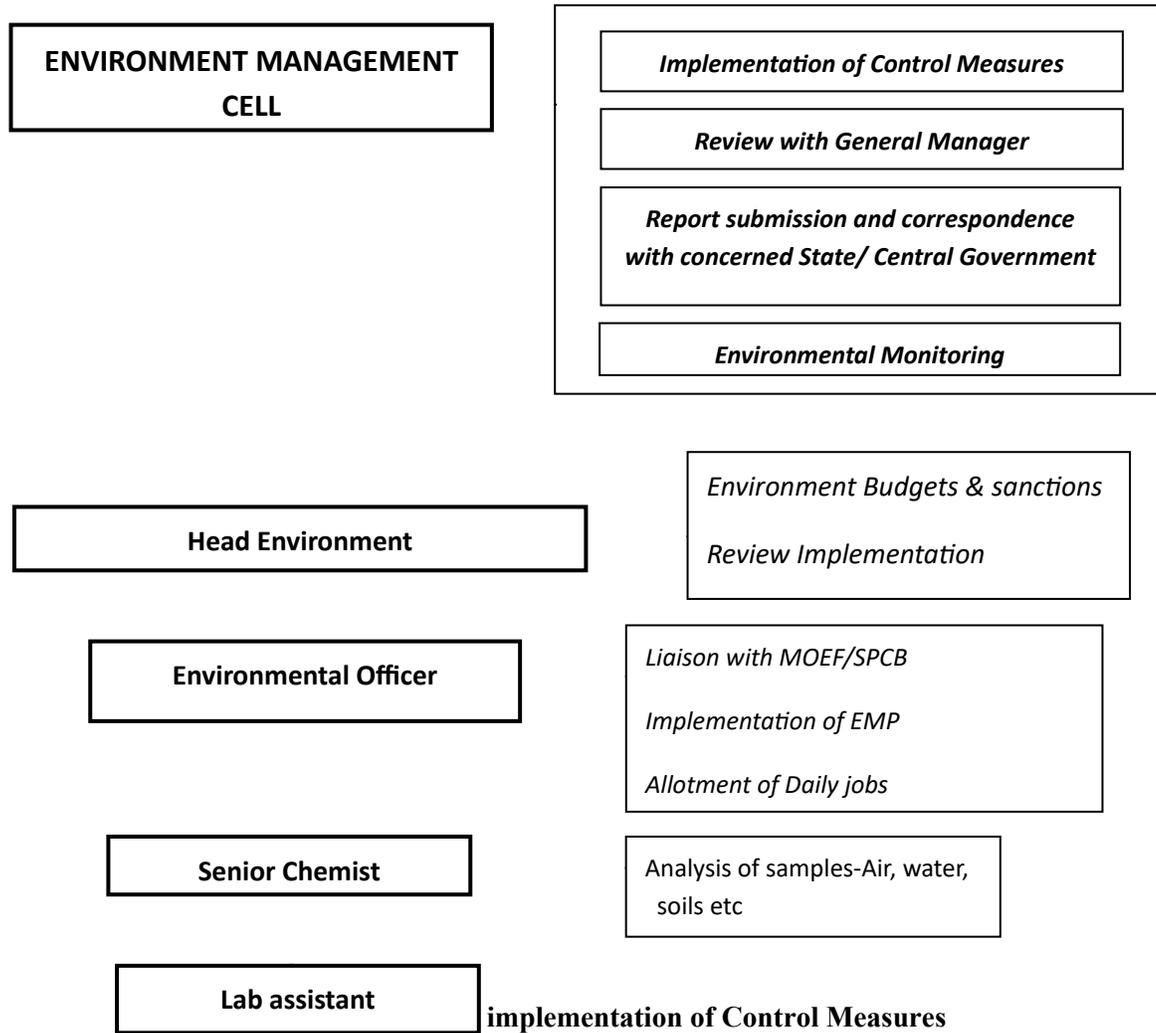
Keeping the utility of monitoring results in the implementation of the environmental management program in view, an organizational chart has been proposed, headed by General Manager as shown in Fig. 5.1.

The said team will be responsible for:

- a. Collecting water and air samples from surrounding area and work zone monitoring for pollutants.
- b. Analyzing the water and air samples.
- c. Implementing the control and protective measures.
- d. Co-coordinating the environment related activities within the project as well as with outside agencies.
- e. Collecting statistics of health of workers and population of surrounding villages.
- f. Monitoring the progress of implementation of environmental management program. Greenbelt development, etc.

The laboratory will be suitably equipped for sampling/testing for various environmental pollutants.

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**5.2 MONITORING SCHEDULE AND PARAMETERS**

**Air Quality Monitoring**

Air Quality monitoring is essential for evaluation of the effectiveness of abatement programmes and to develop appropriate control measures. The project proponent will monitor ambient air quality in and around the proposed Building Stone (Sand Stone) Mining Project at a frequency mentioned in the monitoring schedule for various parameters and take appropriate air pollution control measures in order to ensure that the concentration of PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub> and NO<sub>2</sub> are within limits.

**Water Quality monitoring**

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Water quality monitoring involves periodical assessment of quality of surface water and the ground water near the mining project. Surface water samples will be analyzed for all the parameters as per EPA, 1986 and ground water samples will be analyzed for all the parameters as per IS-10500.

**Noise Level Monitoring**

Noise level monitoring will be done for achieving the following objectives:

- a) To compare sound levels with the values specified in noise regulations
- b) To determine the need and extent of noise control measures of various noise generating sources

Noise level monitoring will be done at the work zone to assess the occupational noise exposure levels. Noise levels will also be monitored at the noise generating sources like mineral handling arrangements, vehicle movements and also nearby villages for studying the impact due to higher noise levels for taking necessary control measures at the source.

**Table 5.1 Monitoring Schedule and Parameters**

S No	Description of Parameters	Schedule and Duration of Monitoring/Execution
1	Air Quality: a) In the vicinity of the mine b) In the vicinity of the transportation Network c) Dust suppression on roads d) Scraping/ bulldozing of road to shift accumulated dust to the sides	24 hourly samples twice a week for one month in each season except monsoon season  Regularly in non- monsoon months and whenever occurrence of fugitive dust takes place  Fortnightly
2	Water Quality near or around the site: a) Surface water quality b) Ground water quality	Once in a season for 4 seasons in a year
3	Ambient Noise Level	Twice a year for two years & then once a year
4	Soil Quality	Once in two years on project monitoring area
5	Inventory of Flora(tree plantation, survival etc) & Fauna	Once in two years on project monitoring area
6	Socio-economic condition of local, population, physical survey	Once in 3 years

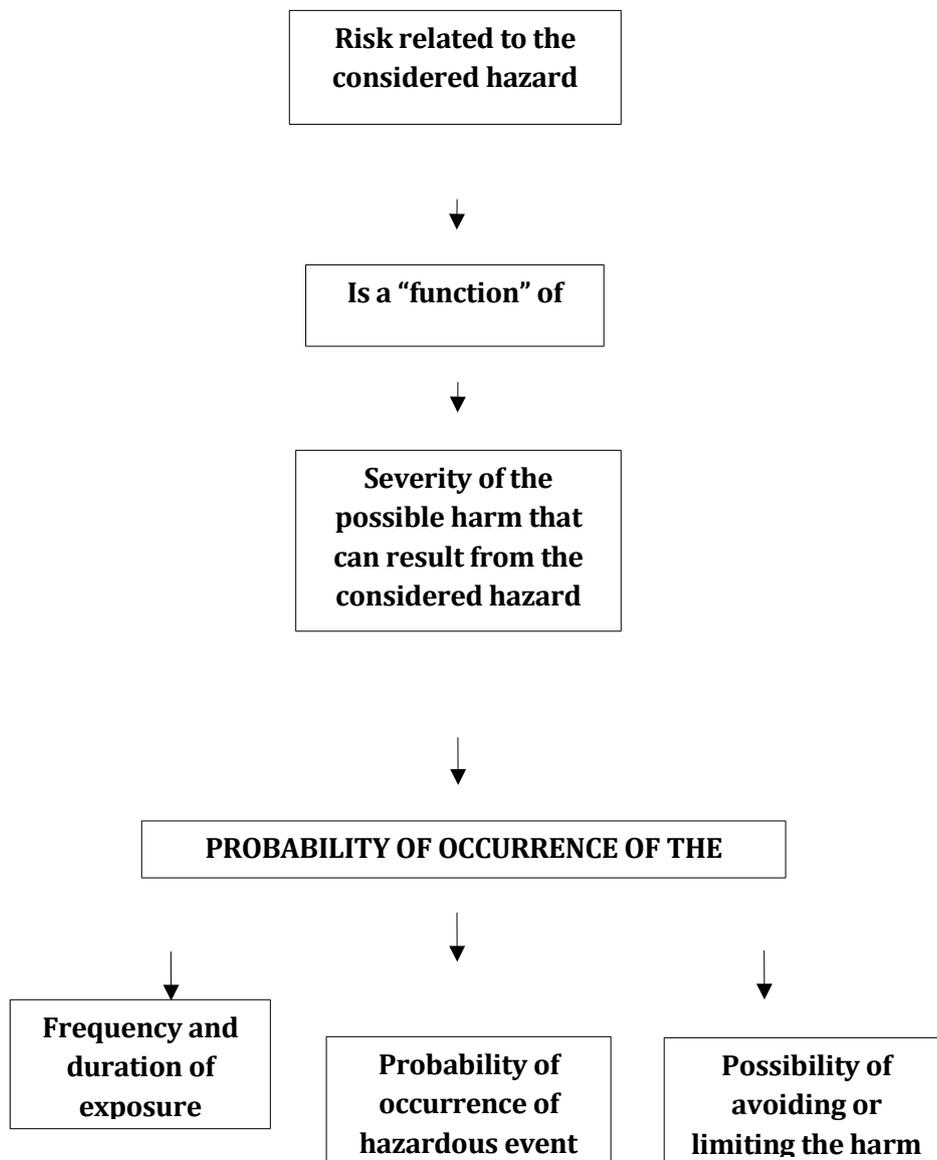
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**CHAPTER-6  
ADDITIONAL STUDIES**

**6.1 HAZARD IDENTIFICATION AND RISK ASSESSMENT METHODOLOGY**

**A) RISK**

Risk concerns the deviation of one or more results of one or more future events from their expected value.



**Tolerable risk:** Risk which is accepted in a given context based on the current values of society

**Protective measure:** The combination of risk reduction strategies taken to achieve at least the tolerable risk. Protective measures include risk reduction by inherent safety, protective devices, and personal

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**EIA/EMP CHAPTER-6- ADDITIONAL STUDIES**

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protective equipment, information for use and installation and training.

**Severity:** Severity is used for the degree of something undesirable.

**Risk Analysis:** A systematic use of available information to determine how often specified events may occur and the magnitude of their likely consequences.

**The different steps of risk assessment procedure are as given below:**

**Step I: Hazard Identification**

The purpose of hazard identification is to identify and develop a list of hazards for each job in the organization that are reasonably likely to expose people to injury, illness or disease if not effectively controlled. Workers can then be informed of these hazards and controls put in place to protect workers prior to them being exposed to the actual hazard.

**Step II: Risk Assessment**

Risk assessment is the process used to determine the likelihood that people exposed to injury, illness or disease in the workplace arising from any situation identified during the hazard identification process prior to consideration or implementation of control measures.

Risk occurs when a person is exposed to a hazard. Risk is the likelihood that exposure to a hazard will lead to injury or health issues. It is a measure of probability and potential severity of harm or loss.

**Step III: Risk Control**

Risk control is the process used to identify, develop, implement and continually review all practicable measures for eliminating or reducing the likelihood of an injury, illness or diseases in the workplace.

**Step IV: Implementation of risk controls**

All hazards that have been assessed should be dealt in order of priority in one or more of the following hierarchy of controls

The most effective methods of control are:

- i. Elimination of hazards
- ii. Substitute something safer
- iii. Use engineering/design controls
- iv. Use administrative controls such as safe work procedures
- v. Protect the workers i.e. By ensuring competence through supervision and training, etc.

Each measure must have a designated person and date assigned for the implementation of controls. This ensures that all required safety measures will be completed.

**Step V: Monitor and Review**

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Hazard identification, risk assessment and control are an on-going process. Therefore regularly review the effectiveness of your hazard assessment and control measures. Make sure that you undertake a hazard and risk assessment when there is change to the workplace including when work systems, tools, machinery or equipment changes. Provide additional supervision when the new employees with reduced skill levels or knowledge are introduced to the workplace.

**B) RISK ANALYSIS**

The risk assessment portion of the process involves three levels of site evaluation:

- a) Initial Site Evaluation,
- b) Detailed Site Evaluation,
- c) Priority Site Investigations and Recommendations.

The risk assessment criteria used for all levels of site evaluation take into account two basic factors:

- The existing site conditions
- The level of the travelling public's exposure to those conditions.

The Initial Site Evaluation and Detailed Site Evaluation both apply weighted criteria to the existing information and information obtained from one site visit. The Initial Site Evaluation subdivides the initial inventory listing of sites into 5 risk assessment site groups. The Detailed Site Evaluation risk assessment is then performed on each of the three highest risk site groups in order of the group priority level of risk. The result of the Detailed Site Evaluation process is a prioritized listing of the sites within each of the three highest risk site groups.

**Risk analysis is done for:**

- Forecasting any unwanted situation
- Estimating damage potential of such situation
- Decision making to control such situation
- Evaluating effectiveness of control measures

**C) ACCEPTABLE RISK**

Risk that is acceptable to regulatory agency and also to the public is called acceptable risk. There are no formally recognized regulatory criteria for risk to personnel in the mining industry. Individual organizations have developed criteria for employee risk and the concepts originally arising from chemical process industries and oil and gas industries. Because of the uncertainties linked with probabilistic risk analysis used for quantification of the risk levels the general guiding principle is that

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the risk be reduced to a level considered As Low as Reasonably Practicable (ALARP). It can be seen that there are three tiers:

- a. A tolerable region where risk has been shown to be negligible and comparable with everyday risks such as travel to work.
- b. A middle level where it is shown the risk has been reduced to As Low As Reasonably Practicable level and that further risk reduction is either impracticable or the cost is grossly disproportionate to the improvement gained. This is referred as the ALARP region.
- c. An intolerable region where risk cannot be justified on any grounds. The ALARP region is kept sufficiently extensive to allow for flexibility in decision making and allow for the positive management initiatives which may not be quantifiable in terms of risk reduction.

-The risk acceptability criteria are given in following table:

<b>1</b>	Risk un acceptance and must be reduced. The actions may include equipment and people or procedural measures. If risk cannot be reduced to ALARP level, operating philosophy must be fundamentally reviewed by the management.	<b>Intolerable Region</b>
<b>2</b>	Efforts must be made to reduce risk further and to as low as reasonably practicable, without expenditure that is grossly disproportionate to the benefit gained	<b>ALARP Region (As Low as Reasonably Practicable)</b>
<b>3</b>	Risk level is so low as to not require actions to reduce its magnitude further.	<b>Tolerable Region</b>

**TABLE – 6.1 Risk Likelihood Table for Guidance**

Step 1: Assess the Likelihood				Step 2: Assess the Consequences		
<b>L1</b>	Happens every time we operate	Almost Certain	Common repeating occurrence	or C1	Fatality	Catastrophic
<b>L2</b>	Happens regularly (often)	Likely	Known to have occurred "has happened"	C2	Permanent disability	Major
<b>L3</b>	Has happened (occasionally)	Possible	Could occur or "heard of it happening"	C3	Medical/ hospital or lost time	Moderate
<b>L4</b>	Happens irregularly (almost never)	Unlikely	Not likely to occur	C4	First aid or no lost time	Minor
<b>L5</b>	Improbable (never)	Rare	Practically impossible	C5	No injury	Insignificant

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A logical systematic process is usually followed during a qualitative risk assessment to identify the key risk events and to assess the consequences of the events occurring and the likelihood of their occurrence (TABLE-6.2)

Risk Rank Likelihood x Consequence	L1 Almost certain	L2 Likely	L3 Possible	L4 Unlikely	L5 Rare
C1 Catastrophic	1	2	4	7	11
C2 Major	3	5	8	12	16
C3 Moderate	6	9	13	17	20
C4 Minor	10	14	18	21	23
C5 Insignificant	15	19	22	24	25

**RISK RATING:**

- **HIGH RISK 1-6**
- **MEDIUM RISK 7-15**
- **LOW RISK 16-25**

**6.2 POTENTIAL HAZARDS & ‘ALARP’ CONDITION**

Mining and allied activities are associated with several potential hazards and risk to both the employees and the public at large. A worker in a mine should be able to work under “ALARP” conditions(as stated above), which are adequately safe and healthy. At the same time the environmental conditions should be such as not to be impair his working efficiency. This is possible only when there is adequate safety in mines.

**6.3 RISK PRIORITISATION BASED ON HAZARDS**

There are various factors, which can create unsafe working conditions/hazards in mining of minor minerals from Building Stone, Khandas & Gitti, Boulder mining

The key risk (hazard x probability) event rating associated with Building Stone, Khandas & Gitti, Boulder mining and to assess its consequences of such events occurring and the likelihood based on above Table-2 are as:-

The Risk rating of such hazards is as follows:

- Inundation / Flooding (C1 xL3=4)
- Quick Building Stone, Khandas & Gitti, Boulder Condition (C2 x L3=8)
- Drowning.(C5 xL5=25)

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- Accident due to vehicular movement.(C3 xL3=13)
- Accident during blasting, loading, transporting and dumping, etc.

## 6.4 ADDITIONAL STUDIES

### 6.4.1 Occupational Health And Safety

For any industry, where multifarious activities are involved during construction, erection, testing, commissioning, operation and maintenance; the men, materials and machines are the basic inputs. Along with the boons, industrialization generally brings several problems like occupational health and safety. Mining Industry is not an exception and above also holds good.

Therefore, proper plan and steps are required to be taken to minimize the impact of mining and for ensuring appropriate occupational health and safety during the constructional and operational phases.

### 6.4.2 Occupational Health

Occupational health needs attention during construction, operation and mine decommissioning phases. However, the problem varies both in magnitude and variety in the above phases.

- **Construction**

The occupational health problems envisaged at this stage can mainly be due to constructional accident and noise. To overcome these hazards, in addition to arrangements to reduce it within Threshold Limit Values (TLV's), necessary protective equipment will have to be supplied to workers.

In the instant case the mine is existing but non-operative and hence this phase as such is not applicable.

- **Operational**

The problem of occupational health, in the operation phase is primarily due to dust and noise which could affect breathing and hearing. The necessary personnel protective equipment will have to be given to all the workers working the dusty and noise areas. The working personnel will be given the following appropriate equipment.

- Industrial safety helmet;
- Face shield with replacement acrylic vision;
- Zero power goggles with cut type filters on both sides and blue color glasses;
- Ear muffs;
- Safety belt/line man's safety belt;
- Leather hand gloves;
- Industrial safety shoes with steel toe.
- Personal Dust Masks.

All working personnel will be medically examined as per provisions of the Mines Act. This will be in addition to the pre-employment medical examination.

### 6.4.3 Safety Plan

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It is envisaged that all safety precautions during the mining operations, posting of sufficient number of statutory officials and persons, disaster management, etc shall be undertaken, for which sufficient funds shall be provided to deal with all safety provisions. An effective organization of the mine shall be prepared and implemented as per DGM Guidelines/ Circulars.

Mining is a hazardous industry and hence, necessary measures shall be taken to prevent accident due to following anticipated hazardous/risk prone activities.

- Slope failure;
- Handling of explosives;
- Fly-rocks during blasting;
- Movement of HEMM;
- Inundation due to surface water;
- Dust hazards;
- Hazards associated with use of electricity/ Diesel Generator Sets; and
- Flooding of lower benches

**6.4.4 Statutory Rules**

Deployment of HEMM in any mine for excavation of stone / OB needs planning of various activities in confirmation with the prevailing statutory provisions as per Mines Act 1952, Metaliferous Mines Regulation 1957, various DGMS circulars & bye-laws.

All applicable statutory rules, regulations, bye-laws etc and statutory requirement related to Govt. licenses, workers compensation, insurance, etc, including minimum wage act for workers employed by the outside agency shall have to be adhered. Any other rule imposed by local/state/central authorities shall also be complied by user of HEMM equipment and then shall have to supply various protective equipment viz. helmets, shoes, safety gear for welding, working at height, electrical apparatus handling, etc. to the workmen at their cost.

**6.4.5 Safety Aspects for HEMM/Equipment and Workers**

Special precaution shall be taken in case of outsourcing the HEMM and workers in the mine. Some of the major safety aspects before outsourcing of workers & HEMM to the mine are enumerated as follows:

**(A) For Workers**

- No worker shall be deployed unless he is skilled enough to take up the designated assignment and trained at VTC;
- Records in Form- B and Form- D shall be maintained;

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- Records of vocational training certificate and driving license of operators shall be kept by HEMM outsourcing agency and shall be made readily available for inspection by management;
- No persons shall be employed unless person holds VTC certificate and management is informed. A record of it shall be maintained;
- Adequate supervision shall be maintained by qualified competent persons;
- Outside agency shall follow safety guidelines and safety instruction from project authorities;
- All drivers shall obey traffic rules prepared by the management; and
- Before deploying workers, they must be trained and briefed about safety aspects in opencast mine. However, during course of execution of the work, if any accident occurs, whether major or minor, the matter shall have to be immediately informed to the mine management so that notices of accidents in accordance of (Reg.9 of MMR 1957) and Section-23 of Mines Act, 1952 may be given and other necessary steps may be taken in accordance with the Mines Act, 1952.

**(B) For Machineries as Recommended by DGMS Circular (Tech.) 1 of 1999**

- All machineries to be deployed in mines shall be checked before deployment by competent authority;
- Regular checking of machines deployed shall be done. No unfit machine shall be deployed before the defect is rectified;
- A proper record of repair and maintenance along with inspection done by management and defect pointed out shall be maintained and signed by authorized person;
- The HEMM shall be provided with audio visual alarms, proper light for use at night and period when natural light is not sufficient. Also audio-visual alarms for reversing of HEMM shall be provided;
- RTO certificate photo copies of all vehicles shall be submitted to manager;
- Regular inspection of HEMM shall be done by the agency's mechanic as directed by the management;
- Machine manufacturers shall be asked to give risk analysis details in respect machines deployed by outside agencies;
- Suitable fire extinguishers shall be provided in every machine;
- Transport system will be deployed in such a way so as to minimize pollution in the mine and keep the environmental status as recommended under the approved EMP

## EIA/EMP CHAPTER-6- ADDITIONAL STUDIES

**6.4.6 Stability of Benches, Quarry High Walls and Spoil Dumps**

During quarry operations, it is necessary to adopt suggested mining parameters for the stability of benches, high-walls and spoil dumps. It is also mandatory to examine systematically the fencing of mine working, landslides and cracks between benches. It is required to maintain well graded and wide roads on benches keeping the width of working areas sufficient for spreading of blasted rock and movement of the mining and transport equipment.

During actual mining operation, systematic observations and regular monitoring of the condition of benches, high-wall slopes and spoil dumps shall be carried out and the dimensions shall be modified if necessary, to suit the local conditions.

**6.4.6 Precautions against Danger of Inundation from Surface Water**

- A careful assessment shall be made against the danger from surface water before the onset of rainy season. The necessary precautions shall be clearly laid down and implemented. A garland drain will be provided to drain away the surface rain water from coming into the mine. Garland drain shall be provided around working mines to course the rain water to main streams;
- Inspections for any accumulation of rain water, obstruction in normal drainage;
- Standing order for withdrawal of working persons in case of apprehended danger;
- During heavy rain, inspection of vulnerable points is essential. In case of any danger, persons are to be withdrawn to safer places;

**6.4.7 Prevention of Flooding of Equipment Deployed at Bottom Horizons**

During the heavy monsoon period, the mining operation in the lower-most benches shall be stopped. Adequate pumping capacity on the basis of historical data of maximum rainfall and distribution of rainfall has to be designed. But in case of unprecedented rainfall, machineries shall be withdrawn from lower benches temporarily and redeployed after dewatering in the lower benches again.

**6.4.8 Dust Suppression & Dilution of Exhaust Fumes**

The following measures shall be adopted for dust suppression at all quarry working places, dump, haul roads, and near other auxiliary mining operations:

- Water sprinklers shall be deployed in haul road. .
- Spraying with water on all working faces.
- While drilling holes, drills with necessary dust extraction arrangement shall be used.
- Leveling of spoil dump surface.

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- Maintaining the engine and exhaust conditioners properly, so as to keep emission gases within limits and regular checking of exhaust and recording the same.

#### 6.4.9 Fire Fighting and Fire Prevention

In addition to statutory provisions, the measures for firefighting and prevention of fires will be as follows:

- Provision of fire extinguishers and fire tenders.
- Emergency organization shall be formed to deal with emergency during fire. The organization shall have names of responsible person along with their telephone numbers. Their duties shall be clearly specified and the persons shall be properly trained. Mock – rehearsals shall be held.

#### 6.4.10 Measures during Drilling and Blasting

Following measures shall be taken while drilling and blasting operations in the quarry:

1. Drilling and blasting in quarry shall be done in accordance with the provisions of Mines Act, rules and regulations;
2. Adequate safety measures will be taken during blasting operations in the quarry so that men/machines are not affected;
3. Ground vibration due to blasting will be controlled by following:
  - Reducing the explosive charge per delay.
  - Spacing and burden are to be optimized by the blasting engineer.
  - Reducing the amount of explosive charged per blast.
  - Proper controlled rock movement during blast by using suitable initiating sequence and delay.

### 6.5 RISK ASSESSMENT AND DISASTER MANAGEMENT PLAN

Hazard analysis involves the identification and quantification of various hazards (unsafe conditions) that exist in the mines. On the other hand, risk analysis deals with the identification and quantification of risks, mining equipment and personnel are exposed to, due to accidents resulting from the hazards present in the mine.

Risk analysis follows an extensive hazard analysis. It involves the identification and assessment of risks the neighboring populations are exposed to as a result of hazards present.

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In the sections below, the identification of various hazards, probable risks, maximum credible accident analysis, and consequence analysis are addressed which gives a broad identification of risks involved. Based on the risk estimation disaster management plan has to be prepared.

The complete mining will be carried out under the management control and direction of a qualified Mine Manager holding a first class manager's certificate of competency. The DGMS have been regularly issuing standing orders, model standing orders and circulars to be followed by the mine management in case of disaster, if any. Moreover, mining staff will be sent to refresher courses from time to time to keep them alert. However, following natural/industrial hazards may occur during normal operation:

- Accident due to explosives;
- Accident due to heavy mining equipment; and
- Sabotage in case of magazine.

In order to take care of above hazard/disasters, the following control measures will be adopted:

- All safety precautions and provisions of the Mine Act, 1955, and the Mines Rules, 1955 will be strictly followed during all mining operations;
- Entry of unauthorized persons will be prohibited;
- Firefighting and first-aid provisions in the mines office complex and mining area;
- Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the employees and regular check for their use;
- Training and refresher courses for all the employees working in hazardous premises; Under mines rules all employees of mines shall have to undergo the training at a regular interval;
- Working of mine, as per approved plans and regularly updating the mine plans;
- Handling of explosives, charging and blasting will be carried out by competent persons only;
- Provision of magazine at a safe place with fencing and necessary security arrangement;
- Regular maintenance and testing of all mining equipment as per manufacturer's guidelines;
- Suppression of dust on the haulage roads;
- Adequate safety equipment will be provided at explosive magazine; and
- Increasing the awareness of safety and disaster through competitions, posters and other similar drives.

**6.5.1 Storage of explosives**

An explosive Magazine is established in an area that has provided for clear safety as per the norms of explosive department. The magazine has storing capacity about 95 kg of conventional explosives, about 750 m of detonating fuse, 7,500 m of Safety fuse and about 5000 detonators (ordinary detonators). The capacity of the magazine will be as follows.

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Class 2	Nitrate Mixture	-	95 kgs.
Class 6	Division 1 Safety fuses	-	7500 meters.
Class 6	Division 3 Detonator	-	5000 nos.
Class 6	Div 2 Detonating Fuse	-	750 m.

The magazine is as per the design laid down in Indian Explosives Rules and safety distances are maintained as per the above rules.

**Precautionary measures during blasting**

- (a) Although the mine is far away from any population, precaution will be taken to minimize nuisance caused by blasting. All necessary safety precaution is being taken in accordance with the explosive act. Precaution are also taken as per permission given under MMR 1961 106(2) (b) by Director of Mines Safety for deep hole drilling & Blasting and usage of heavy earth moving machinery.
- (b) Drilling and blasting operations will be carried on strictly as per the provision of MMR, 1961 under the strict supervision of qualified persons. For storage and issue of explosives, the relevant provisions of Indian Explosives Rules, 1983 will be followed. Blasting time is generally fixed at lunch interval or after the working shift-taking. All required precautions, like marking the danger zone with red flags, use of warning signals and providing blasting shelters etc.

**Measures to Prevent Accidents due to Trucks and Dumpers**

- All transportation within the main working area would be carried out under the direct supervision and control of the management;
- The vehicles will be maintained in good repairs and checked thoroughly at least once a week by a competent person authorized for this purpose by the management;
- Broad signs would be provided at each and every turning point specially for the guidance of the drivers ;
- To avoid dangers while reversing the vehicles, all areas as far as possible, will be made man free. and
- A statutory provision of the fence, constant education, training etc. will go a long way in reducing the incidence of such accidents.

**6.5.2 Objectives of Disaster Management Plan**

The disaster management plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this order of priorities. For effective

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**EIA/EMP CHAPTER-6- ADDITIONAL STUDIES**

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implementation of the disaster management plan, it would be widely circulated and personnel training through rehearsals/drills.

The objective of the disaster management plan is to make use of the resources of the mine and the outside services to achieve the following:

1. Effect the rescue and medical treatment of casualties;
2. Safeguard other people;
3. Minimize damage to property and the environment;
4. Initially contain and ultimately bring the incident under control;
5. Identify any dead;
6. Provide for the needs of relatives;
7. Provide authoritative information to the news media;
8. Secure the safe rehabilitation of affected area; and
9. Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the emergency.

In effect, it is to optimize operational efficiency to rescue rehabilitation and render medical help and to restore normalcy.

➤ **Emergency Organization (EO)**

It is recommended to setup an emergency organization. The Mine Manager who has control over the affairs of the mine would be heading the emergency organization. He would be designated as Site Controller and Incident Controller.

Incident Controller shall organize a team responsible for controlling the incidence. Shift In-charge would be the reporting officer, who would bring the incidence to the notice of the Incidence Controller and Site Controller.

Emergency coordinators would be appointed who would undertake the responsibilities like firefighting, rescue, rehabilitation, transport and provide essential and support services. For this purposes, Security in-charge, personnel department, essential services personnel would be engaged. All these personnel would be designated as key personnel.

## **6.6 SOCIAL IMPACT ASSESSMENT**

The impacts of the mining project on socio-economic conditions of the people of surrounding villages are assessed based on interactions with EISQ or its representatives and local population. It is anticipated

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that the existing project after start of operation will further bring following benefits to the people of the surrounding villages:

- Generation of employment and improved standard of living;
- Increased revenue to the State by way of royalty, taxes and duties;
- Superior communication and transport facilities etc.

In addition to above, due to increase in purchasing power of local habitants, there will be significant change in the socio-economic scenario of the area.

The existing project will enhance the prospects of employment. Recruitment for the unskilled and semiskilled workers for the given project will be from the nearby villages. The strengthening /development of the basic amenities viz. improvement of roads, transportation, electricity, drinking water, proper sanitation, educational institutions, medical facilities, entertainment, etc. will be carried out as far as possible and requirement through the Gram panchayat. Overall the project after start of operation will change living standards of the people and improve the socio-economic conditions of the area.

**6.7 REHABILITATION & RESETTLEMENT ASPECTS**

There is no R&R activity will be required to be undertaken since it is an existing but non operative mine without any additional land.

**6.8 SOCIAL IMPACT ASSESSMENT, REHABILITATION & RESETTLEMENT (R&R) ACTION PLAN**

There will be no resettlement or rehabilitation involved in the project being on meandering course of the river. However, a detailed Socio Economic Assessment has been performed, which is given below:

**INTRODUCTION**

In this section of the report an attempt has been made to measure Socio-economic impact of the proposed Building stone, khanda, gitti & boluder mining project at village Bari, Tehsil Mahoba, District Mahoba, Uttar Pradesh. The various attributes that have been taken into account are population composition, employment generation, occupational shift, household income, consumption pattern, ethnic issue and law & order problem. The key objective of the study is to assess possible impact of the project on socio-economic life of the people in the neighborhood known as study area.

The objectives of the socio-economic impact assessment are as follows:

- a) To collect baseline data of the study area.

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- b) To know the socio-economic status of the people living in the study area of the proposed Building stone, khanda, gitti & boluder mining project.
- c) To assess the possible impact of the project on socio-economic aspects in the study area.
- d) To measure the impact of the project on Quality of life of the people in the study area.

**APPROACH & METHODOLOGY**

- a) A mixture of both quantitative and qualitative approach has been adopted in the current socio-economic study.
- b) The study has been conducted based on primary and secondary data. While primary data has been collected through a sample survey of selected households in the study area, the secondary data has been collected from the administrative records of the Government of Uttar Pradesh, Census 2011, district hand books and from the Uttar Pradesh Government portal.
- c) The details regarding population composition, number of literates, workers, etc have been collected from secondary sources and analyzed. Also village/city/town wise details regarding amenities available in the study area have been collected from secondary sources like Census 2011, and analyzed.
- d) Two stage sampling design has been adopted to select the sampling units. The first stage units are census villages in the rural areas and towns/cities in urban areas. The ultimate stage units are households in the selected villages and towns/cities. Probability sampling has been adopted to select the sampling units.
- e) Estimation of various parameters has been made based on sample data and bottom top approach has been adopted.
- f) On the basis of a preliminary reconnaissance survey, two questionnaires were developed to make it suitable to fulfill the objectives of the study. The questionnaires contained both open ended and close ended questions
- g) The data collected during the above survey was analyzed to evaluate the prevailing socio-economic profile of the area.
- h) Based on the above data, impacts due to mining operation on the community have been assessed and recommendations for improvement have been made.

**CONCEPT & DEFINITION OF TERMS USED**

- a) **Study Area:** The study area, also known as impact area has been defined as the sum total of core area and buffer area with a radius of 10 Kilometers from the periphery of the project site. The study area includes all the land marks both natural and manmade, falling therein.

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- b) **QoL:** The Quality of Life (QoL) refers to degree to which a person enjoys the important possibilities of his/her life. The 'Possibilities' result from the opportunities and limitations, each person has in his/her life and reflect the interaction of personal and environmental factors. Enjoyment has two components: the experience of satisfaction and the possession or achievement of some characteristic.
- c) **Household:** A group of persons who normally live together and take their meals from a common kitchen are called a household. Persons living in a household may be related or unrelated or a mix of both. However, if a group of related or unrelated persons live in a house but do not take their meals from the common kitchen, then they are not part of a common household. Each such person is treated as a separate household. There may be one member households, two member households or multi-member households.
- d) **Sex Ratio:** Sex ratio is the ratio of females to males in a given population. It is expressed as 'number of females per 1000 males'.
- e) **Literates:** All persons aged 7 years and above who can both read and write with understanding in any language are taken as literate. It is not necessary for a person to have received any formal education or passed any minimum educational standard for being treated as literate. People who are blind but can read in Braille are also treated as literates.
- f) **Literacy Rate:** Literacy rate of population is defined as the percentage of literates to the total population aged 7 years and above.
- g) **Labour Force:** The labour force is the number of people employed and unemployed in a geographical entity. The size of the labour force is the sum total of persons employed and unemployed. An unemployed person is defined as a person not employed but actively seeking work. Normally, the labour force of a country consists of everyone of working age (commencing from 14 to 16 years) and below retirement (around 65 years) that are participating workers, that is people actively employed or seeking employment. People not counted under labour force are students, retired persons, stay-at home people, people in prisons, permanently disabled persons and discouraged workers.
- h) **Work:** Work is defined as participation in any economically productive activity with or without compensation, wages or profit. Such participation may be physical and/or mental in nature. Work involves not only actual work but also includes effective supervision and direction of work. The work may be part time or full time or unpaid work in a farm, family enterprise or in any other economic activity.

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- i) **Worker:** All persons engaged in 'work' are defined as workers. Persons who are engaged in cultivation of land or milk production even solely for domestic consumption are also treated as workers.
- j) **Main Workers:** Those workers who had worked for the major part of the reference period (i.e. 6 months or more in the case of a year) are termed as Main Workers.
- k) **Marginal Workers:** Those workers who did not work for the major part of the reference period (i.e. less than 6 months) are termed as Marginal Workers.
- l) **Work participation rate:** The work participation rate is the ratio between the labour force and the overall size of their cohort (national population of the same age range). In the present study the work participation rate is defined as the percentage of total workers (main and marginal) to total population.

**FINDINGS OF THE STUDY**

The field investigation has revealed that the entire study area of the proposed mining project is located in Banda district, Uttar Pradesh. The Sub-district (Tehsil) falling in the study area is Nahari. The study area comprises of 15 identified villages and there is no urban area.

**BASELINE DATA OF THE IMPACT AREA**

**Table 6.2 Demographic Particulars**

S.No.	Description	Number	Percentage to respective totals
<b>1</b>	<b>Total Population (District)</b>	<b>74861</b>	<b>100</b>
	Male	40501	54.10
	Female	34360	45.90
<b>2</b>	<b>Sex ratio (No. of females per 1000 males)</b>	<b>848</b>	
<b>3</b>	<b>Total Literates</b>	<b>41514</b>	<b>100</b>
	Male	26171	63.04
	Female	15343	36.96
<b>4</b>	<b>Over all Literacy Rate</b>		<b>66.37</b>
	Male		76.88
	Female		53.81
<b>5</b>	<b>Gender gap in literacy rate</b>		<b>23.06</b>
<b>6</b>	<b>Total Workers</b>	24050	100
	Male	18377	76.41
	Female	5673	23.59
<b>7</b>	<b>Total Main Workers</b>	<b>16706</b>	<b>100</b>
	Male	14968	89.60
	Female	1738	10.40
<b>8</b>	<b>Total Marginal Workers</b>	<b>7344</b>	<b>100</b>

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	Male	3409	46.42
	Female	3935	53.58
	<b>Total Agricultural Workers</b>	<b>12639</b>	<b>100</b>
<b>9</b>	Cultivators	5624	44.50
	Agricultural Labours	7015	55.50
	Male workers in total agricultural workers	8724	69.02
	Female workers in total agricultural workers	3915	30.98
	<b>Total Household Industrial Workers</b>	<b>583</b>	<b>100</b>
<b>10</b>	Male	489	83.88
	Female	94	16.12
<b>11</b>	<b>Total Other Workers</b>	<b>10828</b>	<b>100</b>
	Male	9164	84.63
	Female	1664	15.37

Source: Census 2011

Table 6.3 Amenities:

S.no	Amenities	Types	Units
1	Education Facilities	Primary Schools	28
		Middle schools	18
		Secondary Schools	2
		Senior Secondary Schools	1
2	Hospitals	Allopathic Hospital	3
		Ayurvedic Hospital	2
		Homeopathic Hospital	1
		Allopathic Dispensary	1
		Ayurvedic Dispensary	1
		Homeopathic Dispensary	1
		PHC	2
		PHSC	1
3	Drinking Water Facilities	Variety of purposes	
		Tap	2
		Well	19
		Tank	3
		Tubewell	19
	Hand pump		
4	Communication Facilities	Post Office	7
		Tele Phone	29
5	Transportation Facilities	Bus Service	6
		Railway Station	1
6	Banking facilities		

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		Commercial banks	4
		Cooperative banks	2
7	Power #		21

# No. of villages provided with the facilities Source: Census 2011

**DEMOGRAPHIC COMPOSITION**

**Population**

According to Census 2011, the total population of the study area is 1,74,861. As there is no urban area the entire population belongs to rural area. The overall sex ratio has been worked out to 848 females per 1000 males, which is higher than the national average of 933 females per 1000 males. Furthermore, around 17 percent of the total population belongs to Schedule Caste community and the Schedule Tribe population in the study area is very negligible as per Census 2011.

**Number of households and household size**

The entire population of the study area has been grouped into 12497 households and the average household size is 6. The household size varies between 6 and 10.

**Literacy and Literacy rate**

The total number of literates in the study area has been worked out to 12497, which is around 55.45 percent of the total population. The literacy rate of male has been worked out to 63.04 percent as against 36.96 percent for female, creating a gender gap of 23.06 percent.

**Workers and work participation rate**

The total number of working persons in the study area is 24050, which is 32.1 percent of the total population. Among the total workers 69.5 percent are main workers and the remaining 30.5 percent are marginal workers. The percentage of male in the main workers is 89.6 percent, while it is only 46.4 percent in the case of marginal workers. On the other hand, the percentage share of female in the main workers is only 10.4 percent; it is 53.6 percent in the case of marginal workers. This indicates that male dominates the main workers and female dominates the marginal workers.

The Table and the figure below indicate the categorization of workers based on occupation:

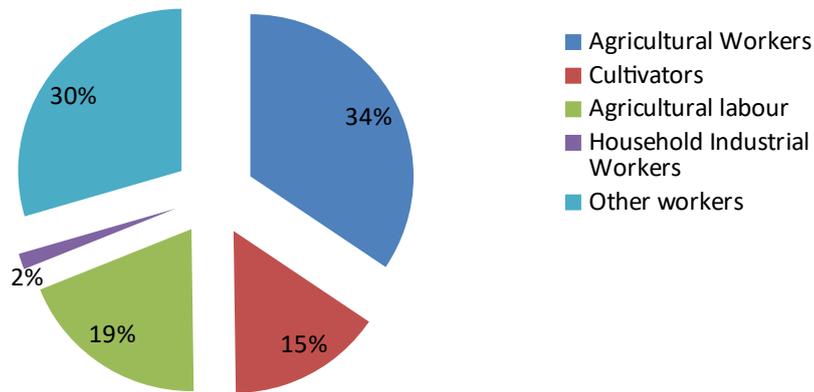
**Table 6.4: Categorization of workers on the basis of occupation**

S. No.	Worker category	Number of workers	% to total workers
(1)	(2)	(3)	(4)
1	Agricultural Workers	12639	52.55
	a) Cultivators	5624	23.38
	b) Agricultural labour	7015	29.17

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2	Household Industrial Workers	583	2.42
3	Other workers	10828	45.02
<b>Total</b>		<b>24050</b>	<b>100.0</b>

**Categorization of workers on the basis of occupation**



**Figure 6.4:** Categorization of workers on the basis of occupation

The classification of workers based on occupation reveals that 52.6 percent of the total workers are Agricultural workers. The share of cultivators in the total workers is 23.4 percent and that of Agricultural labours is 29.2 percent. Barely 4 percent of total workers are Household Industrial Workers and 45 percent are ‘Other workers’ which includes white collar workers, professional workers, shopkeepers, traders and businessmen.

**POSSIBLE IMPACT ASSESSMENT**

**Impact on population composition**

The impact of the proposed mining project on population composition will be marginal as only few skilled and managerial staff will be recruited from outside and the rest will be recruited locally. The impact will be significant if a large number of people from outside get employed in the proposed project. In that case not only the population of the study area will go up but also the skewed sex ratio may make permanent social effects like rise in exploitation of women, higher crime rate, increase in sexual diseases and depression among youth.

**Impact on employment generation**

The proposed Building Stone, Khandas & Gitti, Boulder mining project is expected to provide employment opportunities to 29 persons of which three will be skilled workers and the remaining 9 will be unskilled

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workers. It is understood that all the persons to be deployed for various mining activities will be recruited locally and there is very little scope for migration of people from outside the study area. The employment potentiality of the project is expected to ameliorate the economic condition of the families of those persons who will get employed in the proposed mining project. However, the mining project will provide seasonal employment. Further, the project will provide indirect employment to about 100 people who will be involved in segregation of extracted mining materials, crushing of boulders, petty business and service oriented industries.

**Impact on Health**

Extraction of Building Stone, Khandas & Gitti, Boulder may cause serious health risks due to dust generated. The effects will vary depending upon the nature of the dust particles, silica content in it and the size of the particles. Pneumoconiosis is an occupational lung disease often caused to miners, due to the inhalation of dust. Silica content in the Building Stone, Khandas & Gitti, Boulder may also lead to Silicosis, which is again an occupational lung disease. Miners may also suffer with occupational respiratory ailments, skin allergies etc, but the same are preventable if exposure is minimized. Further, regular health check-up of the miners is required to prevent any negative impact on their health. In the present mining project, no adverse impact on health is expected if minimum precautions are taken by the miners.

**Impact on income**

In India poverty is widespread. According to an estimate made by World Bank during 2005, 26 percent of the total Indian population falls below the International poverty Line of US\$ 1.25 a day (PPP, in nominal terms ₹ 21.6 a day in urban areas and ₹ 14.3 in rural areas). Uttar Pradesh is one of the worst poverty ridden states in India, with per capita income of Rs. 26,051. The proposed mining project at Bari is expected to provide casual employment to 42 unskilled workers and 3 skilled workers for a period of 250 days in a year. According to Department of labour, Government of Uttar Pradesh each unskilled worker is eligible to get a minimum basic wage of Rs. 150 per day. In addition they will get V.D.A amounting to Rs. 65.50 per day. Thus, the total amount an unskilled worker is expected to get is Rs.215.50 per day. Further, a semi-skilled worker will get a basic wage of Rs 164 and V.D.A amounting to Rs.74.69 making the total amount of Rs. 238.69 per day. Lastly, a skilled worker can expect to get a minimum wage of Rs. 176.54 and V.D.A amounting to Rs. 82.92 making the total amount of Rs. 259.46 per day. The impact of the proposed mining activity on household income in the study area is thus positive since it will provide employment to local people, which will result to an increase in household income of those workers who will be recruited for mining operation. However, this impact will be effective for a limited period of 250 days in a year.

**Impact on consumption pattern**

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The field survey has revealed that people in the study are poverty ridden. Increased household income may slightly change the consumption pattern of few but majority of the people will continue to be burdened with poverty.

**Impact on road development**

Movement of trucks and other vehicles to and fro the quarry is expected to increase substantially, when mining will start. The existing roads connecting the quarry with the national and state highways are mostly narrow mud roads. There will be mud slide and traffic bottle neck if these roads are not widened and their conditions are not improved by making them paved roads. Hence, there is ample scope for road development in and around the mining areas.

**Impact on law & Order**

As local people will be employed to run the quarry, no law & order problem is envisaged. It is expected that the workers will attend to their duties from their residence and return to their homes after the day's work is over. There would have been law & order problem if the workers were migrants and lived in shanties closed to the mining area. However, to meet any untoward incident one police post may be set up closed to the project area.

**6.9 SUGGESTIONS****Provision of First Aid at mining site**

Extraction of Building Stone, Khandas & Gitti, Boulder poses serious health risks due to dust. The effects vary depending on the nature of the dust particles, silica content in it and the size of the particle. To meet any emergency during extraction of the minerals from the Building Stone, Khandas & Gitti, Boulder mining and subsequent loading in the transport vehicles, provision for First Aid should be made by the project proponent. Before the affected person is reached to a doctor or health institution for necessary medical aid, the miner should be provided with First Aid.

**Tie up with the nearest PHC for medical help**

To meet the medical needs of the mine workers it is suggested that tie-ups with nearest hospital or Primary Health Center (PHC) may be made. Few beds may be exclusively reserved for the mine workers in the above health institutions. This will ensure timely medical aid to the affected persons.

**Supply of Mask, Gloves**

The mine workers are subject to respiratory diseases, muscular-skeletal and gastro-intestinal disorders and skin diseases. For protection from dust it may be made compulsory for all mine workers to wear masks and gloves while working in the mines.

**Regular health checkups**

The miners may be encouraged to undergo health checkups at regular intervals in order to protect themselves from various diseases. The health Department of UP Government must Organize Health Camps at regular intervals preferably in every quarter. Further, free medical facilities may be made available to the workers and their family members.

**Administration of Anti-venom injections**

Provision of Anti-venom therapy must be made available at the near health institution. Anti-venom injections may be administered to the mine workers in case of snake, spider and insect bites, while working in the mines.

**Special telephone number**

A special telephone number may be made available to the mine workers. In case of emergency the miners can dial the above number for medical assistance. Vehicle may be provided to the patients in short duration for shifting to the health institution.

**Special Group Insurance Scheme**

All the mine workers may be covered under a Group Insurance Scheme of LIC or any other Insurance company, if not so far.

**Distribution of Blankets and Quilts**

During winter season the mine workers may be distributed blankets and quilts free of cost.

**6.10 CONCLUSIONS**

The Building Stone, Khandas & Gitti, Boulder is one of most significant mineral contributing to the sustainable development that is “The extraction or recovery of the mineral without limiting the needs and lives of the surrounding flora, fauna and the local villagers/ people residing there as well.”

This Building Stone, Khandas & Gitti, Boulder Mining Project is being proposed by Shri Safdar Ali S/O-Late Shri Farzand Ali, R/O-Muhalla-Khunti Chauraha Aliganj, City & District-Banda (U.P.) for Building Stone, Khandas & Gitti, Boulder mine at Gata No. 2450 Khand No.-03 in Village Jarar, Tehsil Naraini & District- Banda, Uttar Pradesh within total lease Area 2.0 Ha. The proponent has applied for mining lease in the name Sadfar Ali. It has been proposed to collect approximately 20000 m<sup>3</sup>/year material (Building Stone, Khandas & Gitti, Boulder) annually.

As per the MoEF, New Delhi Gazette dated 14th September 2006 amended in December 2009 April 2011, 16 January, 2016 and 14 August, 2018, the proposed mining project is categorized as category “B1”.

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This Building Stone, Khandas & Gitti, Boulder mining project has numerous benefits not only on individual level but on a social level too i.e. this project will not only benefit the owners but directly and indirectly will also benefit the people of that region.

This will give employment to thousands of people who are the residents of the principal place of business. Since, manpower is required in every activity and processing from installation of the project to the final product and marketing. The equitable distribution of work according to the skills and potential will be done. Work given will be categorized into skilled, semi-skilled and unskilled employees. Employment preference will be given to the local villagers. The labors will be registered in the district Labor Office as per the U.P. Government Law. Also, according to the Central government policy of labors, medical insurance will be done of all the labors employed. Minimum wage, guaranteed monetary benefits under law will be ensured to the workmen. Safe, healthy, and productive work environment and welfare will be provided to the worker. Abolition of child labor and bonded labor, and rehabilitation of those will be ensured.

Zero accident, safe and productive work places will be encouraged and promoted. Temporary rest shelter, first-aid facilities along with anti-venoms, safe drinking water for the workers/miners and Arrangements for safe and healthy working conditions and facilities of community toilets shall be made available for the workers, medical camps for workers and nearby villagers shall be conducted at regular interval. Workers will be instructed with safety measures and safety equipment's will also be provided. This will provide the employment and aid in managing and surviving their livelihood, reduce the poverty of that region and will provide them a better atmosphere and a better life.

This project will also contribute in rising the economy of the state and ultimately of the nation through the taxes collected through this. This is obvious that taxes collected are used in welfare of the nation and its citizen. A sum of 3% i.e. 183600 of the total project (3340000) is also contributed as Corporate Environment Responsibility for difference welfare activities such as roads, plantation, education, sanitation, awareness campaigns, etc.

Last but not the least, this project has also its social impact on the lifestyle, life standards, thinking, personality, etc. of that place. The project will ignite the locals to use their potential and work for improving their economic condition and better life. This project can be a small step in betterment of the local people of that area.

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## CHAPTER- 7 PROJECT BENEFITS

### 7.0 GENERAL

The project is being proposed by Shri Safdar Ali S/O-Late Shri Farzand Ali, R/O-Muhalla-Khunti Chauraha Aliganj, City & District-Banda (U.P.) for Building Stone (Khanda, Gitti and Boulder) Mining Project located in Jarar. The estimated project cost is Rs. 61,20,000/-. The proponent has applied for mining lease in the name of Building Stone (khanda, Gitty, Boulder) Mining Project, over an area of 2.0 ha. at Gata No. 2450 Khand No.-03 in Village Jarar, Tehsil Naraini & District- Banda, Uttar Pradesh. It has been proposed to collect 20000 m<sup>3</sup> per year of Building Stone (Khanda, Gitti and Boulder) Mining Project annually as per LOI. As per the MOEF, New Delhi Gazette dated 14th September 2006 amended in December 2009 and April 2011, the proposed mining project is categorized as category “B1”.

### 7.1 BENEFITS OF MINING

The required quantity of stone aggregated (a mined out product of stone mining) has a very vital role in the infrastructure development of the nation along with other construction materials. Stone mining is minor mineral mining & is usually operated for small leased out area & for small leased period has therefore lot of importance & need to be carried out. There is constant demand of stone aggregate not only for making highways & roads but also in the construction industry as an ingredient of cement concrete. The existence of stone deposits is site specific & mining is to be carried at that location itself along with the crushing unit to meet the demand. Most of the stone quarries are of small magnitude & are operated for the lease period granted by the State Govt. The crushing unit is required to size the stone for different applications.

### 7.2 EMPLOYMENT

The socio-economic conditions of the surrounding villages indicate that employment generation is seasonal. The occupational activities are agriculture, cattle rearing and employment in mines but on daily wages. The mining activity will provide employment to local people which will increase socio-economic status of the area.

### 7.3 IMPROVEMENTS IN PHYSICAL AND SOCIAL INFRASTRUCTURE

The opening of the proposed project will enhance the socio-economic activities in the adjoining areas. This will result in following benefits:-

- a. Improvements in physical infrastructure.
- b. Improvements in Social Infrastructure.
- c. Increase in Employment Potential

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- d. Contribution to the Exchequer.
- e. Prevention of illegal mining.
- f. During and Post-mining enhancement of green cover.

**7.3(a) IMPROVEMENTS IN PHYSICAL INFRASTRUCTURE**

The opening of the proposed project will improve the physical infrastructure of the adjoining areas. This will include the following:-

- Improved road communication due to opening of the proposed project.
- Strengthening of existing community facilities through the Community Development Programme.
- Creation of community assets (infrastructure) like provision for drinking water, construction of school buildings, village roads/ linked roads, dispensary & health centre, community centre, market place etc.
- Awareness program and community activities, like health camps, medical aids, family welfare programs, immunization camp sports & cultural activities, plantation etc.

**7.3(b) IMPROVEMENTS IN SOCIAL INFRASTRUCTURE**

There will be some obvious changes in various environmental parameters due to mining activity. There will be positive impact in socio-economic area due to increased economic activities, creation of new employment opportunities, infrastructural development and better educational and health facilities. Lessee will also undertake awareness program and community activities like health, camps, medical aids, family welfare camps, AIDS awareness program etc.

**7.3(c) INCREASE IN EMPLOYMENT POTENTIAL:** - There is a possibility of creation of direct and indirect employment opportunities due to working of this mine.

**7.3(d) PREVENTION OF ILLEGAL MINING & CONTRIBUTION TO THE EXCHEQUER:** - Since the quarries will be leased out to successful allottees, mining operation in the state will get legalized and it will fetch income to the state exchequer.

**7.3(e) ENHANCEMENT OF GREEN COVERS**

Plantation/afforestation will be done as per program i.e. along the road sides and near civic amenities, which will be allotted by Government bodies as it is not feasible to plant trees near the mine lease area. Post plantation, the area will be regularly monitored in every season for evaluation of success rate. For selection of plant species local people will also be involved. The management will provide free saplings of fruit and other trees, etc. to local during rain for plantation.

**7.4 HEALTH**

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Periodic medical checkups as per Mines Act/ Rules and other social development and promotional activities will be undertaken. All this will lift the general health status of the residents of the area around mines.

**7.5 CORPORATE ENVIRONMENT RESPONSIBILITY**

Banda district is one of the [districts](#) of [Uttar Pradesh state](#) of [India](#) and [Banda](#) town is the district headquarters. The district occupies an area of 2884 km<sup>2</sup>. It has a population of 6,64,064 (2011 census). As of 2011 it is the least populous district of Uttar Pradesh.

One of the greatest problems faced by people is lack of efficient use of resources. Once abundant with forests and vast agricultural lands, now have very little vegetation ,because of lack water conservation schemes. Infertile terrain is also one of the major cause. Only 45% of the crop area has any access to irrigation—that too with ground water as the primary source.

Since most of the farmers are already poor and grow crops by taking loans, their inability of payback, forces them to take drastic actions. Local politicians takes advantage of illiteracy of farmers in elections. Votes are never casted on the basis of development but caste, creed or religion. Farmers are dying of debts, lands getting barren of over exploitation, uneven rainfalls, increasing poverty and literacy, Zero industrial growth, Ignorance by government, corruption has created such a deep web that could not be resolved easily.

The only way to revive this district to its glory is by proper planning at ground level, increase industry increase industrial development and providing water conservation methods on massive scale.

The nearby village does not come under township or urban areas. Since the region is rich in minerals and mainly only undulated land is found, this causes problems for farmers to grow crops and earn their livelihood. The village lives in poverty and nearly 60% of the total population is uneducated. The facility of electricity is minimal, lacks in street lights, if there is no electricity, the whole village sleeps in dark.

Lacks in educational accessory and infrastructure, poor sanitation and shortage of toilets that cause lot of problems for females and males too. There is no shelter for stray animals that destroys agricultural land of farmers.

The part of Corporate Environment Responsibility is one of the major benefits of the project as the 5% of the total cost of the project which is Rs. 183600 (4% of the total Project cost) considerably a decent amount that will purely go in the welfare of the nearby villages of the project site. This amount will aid in different sectors

Developmental activities	Cost in Rs.
Sanitation (2 Male and 2 female toilet will be made in the village)	80000

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Installation of 4 hand pump in the village	80000
5 solar Powered lights will be installed on the connecting road of the lease. (5 solar lights @ 3100/- per light)	10,000
8 Ceiling fan will be given to the primary school of the village (Ceiling fan @ 1700/- each )	13,600
CER ( 3 % of the total project cost)	1,83,600
Total	61,20,000

**CHAPTER - 8**

**ENVIRONMENTAL MANAGEMENT PLAN**

**8.0 INTRODUCTION**

To mitigate the adverse impacts which are likely to be caused due to the mining operation and overall scientific development of local habitat, environmental management plan (EMP) has been formulated and integrated with the mine planning. The details of the anticipated impacts and mitigative measures have been discussed in **Chapter 4** of this report, based on the results of present environmental conditions and environmental impact assessment. The EMP has been made considering implementation and monitoring of environmental protection measures during and after mining operations. The mitigation measures which reduce the impact have already been identified earlier in **Chapter 4**. To minimize the adverse impact, certain additional EMP is enumerated below for implementation.

**8.1 ENVIRONMENTAL MANAGEMENT PLAN (EMP)**

Proper environmental management plan is proposed for “Building Stone (Khanda, Gitti and Boulder) Mining Project to mitigate the impact during the mining operations.

- a. Building Stone (Khanda, Gitti and Boulder) Mining will be restricted up to the approved depth level by the Department of Geology and Mines Lucknow, Uttar Pradesh.
- b. No activities allowed which caused to increase pollution level during Mining operation like cooking, or burning of woods or open toilet practice will be allowed in the adjoining area.
- c. Prior to mining, short termed awareness program will be conducted for labours to make them aware to way of working.
- d. If some injury to the Person occurs, it will be informed to PMS department and First Aid treatment will be given to person at the project Site.
- e. No tree cutting, chopping, lumbering, uprooting of shrubs and herbs will be allowed.
- f. Maintenance of roads will be done from time to time.
- g. Care will be taken that noise produced during vehicles movements for carrying a. Building Stone (Khanda, Gitti and Boulder) Mining Project are within the permissible noise level.

**8.2 ENVIRONMENTAL MANAGEMENT PLAN IMPLEMENTATION**

Environmental Management Plan serves no purpose if it is not implemented with true spirit. Some loopholes in the EMP can also be detected afterwards when it is implemented and monitored. The implementation of periodically monitoring programme prepared and implemented and review the results.

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The major attributes of environment are not confined to the mining site alone. Implementation of proposed control measures and monitoring programme has an implication on the surrounding area as well as for the region. Therefore, mine management should strengthen the existing control measures as elaborated earlier in this report and monitor the efficacy of the control measures implemented within the mining area relating to the following specific areas for eco-friendly mining plan:

- a. Collection of air and water samples at strategic locations with frequency suggested and by analyzing thereof. If the parameters exceed the permissible tolerance limits, corrective regulation measure will be taken.
- b. Collection of soil samples at strategic locations once in every season and analysis thereof with regard to deleterious constituents, if any.
- c. Measurement of water level fluctuations in the nearby ponds dug wells and bore wells.
- d. Measurement of noise levels at mine site, stationary and mobile sources, and adjacent villages will be done quarterly in a year.
- e. Plantation will be done with consultation of Forest department and gram panchayat which possible and plantation made in the gram panchayat land as specified area (because the mining side no place available for plantation due to stony area. The post plantation, the area will be regularly monitored for survival of the new plantation every six months. Ensure the plantation survival rate if less than actual then replacement of the plant by new.
- f. Mine management will be in regular touch with local surrounding villages to update the various developmental schemes made by them. They will also consider any immediate requirement, which could be taken care of in near future.

The Environmental Management of Building Stone of Shri Safdar Ali hired Environmental Management from outsourcing the Environmental cell of the hired Environmental Lab as the Cell is envisaged which will be responsible for monitoring EMP and its implementation. EMC members should meet periodically to assess the progress and analyze the data collected during the month. The EMC will function as per **Fig. 5.1 (Chapter 5)** and results or environmental monitoring shared with head of the Building Stone, Crusher Unit.

EMC will be in regular touch with consulting to Unit Head Shri Safdar Ali and Environmental Management Cell coordinate with State Pollution Control Board, Indian Bureau of Mines and send them any Statutory report if required periodically. Any new regulations considered by State/Central Pollution Control Board for the industry will be taken care of by it.

**8.3 PROPOSED SET UP**

In view of monitoring results in the implementation of the environmental management program with consultation and approval by unit head Shri Safdar Ali. The said team will be responsible for:

- a. Collecting water and air samples from surrounding area and work zone monitoring for pollutants.

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- b. Analyzing the water and air samples.
- c. Implementing the control and protective measures.
- d. Co-coordinating the environment related activities within the project as well as with outside agencies.
- e. Collecting statistics of health of workers and population of surrounding villages.
- f. Monitoring the progress of implementation of environmental management program.
- g. The laboratory will be suitably equipped for sampling/testing for various environmental pollutants.

**8.4 BUDGET ALLOCATION FOR EMP IMPLEMENTATION**

Annual budget for EMP is very essential for successful implementation of EMP. As there are no pollution control systems, no capital cost of Pollution Control systems are envisaged. Costs will be annual operating costs as given below. The fund allocated will not be diverted for any other purposes and the top management will be responsible for this. The budget will take into consideration the following expenses:

- a. Field cost for monitoring of parameters.
- b. Cost of any defined outsourcing
- c. Cost of chemicals, consumables and transport for data generation
- d. Man power cost for environmental cell
- e. Any other cost as per EC condition.

**Table 8.1 Cost of EMP**

Sr. No.	Environment Management Plan (EMP)	Cost Estimation	Total Cost (Rs.)
<b>a.</b>	Plantation		
<b>i)</b>	No of plants (@95 Rs. / sapling)	100 saplings × @95 Rs. / sapling)	9500
<b>ii)</b>	Tree Guard (@1500/- per unit)		2,10,000
<b>b.</b>	Water Demand for plantation (@100saplings ×4 litres of water× twice per day = 800 ltrs.)	(800ltrs. Per day x 300 (working days) x ( 1.1Rs. /L)	264000
<b>c.</b>	Measure for prevention & control of soil erosion and management of silt shall be undertaken. Protection of dump against erosion, if any, shall be carried out with geo-textile matting or other material.		20000
<b>d.</b>	Sprinkling on haulage route for dust suppression (600 m length × 6 m width × 1 litres of water per m <sup>2</sup> /2 times a day=7.2KLD (Rs. 1100 for per KLD of water/day)	Rs. 1100×7.2 KLD of water/day x 300 (working days)	2376000
<b>e.</b>	Cost of monitoring of air	-	2,50,000

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	quality(PM <sub>10</sub> ,PM <sub>2.5</sub> ,NO <sub>x</sub> ,SO <sub>2</sub> ), water quality(ground water and surface water),soil quality and ambient noise level		
<b>f.</b>	Cost for environmental cell	<ul style="list-style-type: none"> <li>• Environmental Engineer: 1</li> <li>• Gardener :3</li> </ul>	400000
<b>g.</b>	Fund for COVID-19		50000
<b>Total</b>			<b>2849700</b>

**8.5 MONITORING SCHEDULE AND ACTIVITIES**

To evaluate the effectiveness of environmental management program regular monitoring of the important environmental activities to be monitored are shown in Table. **5.1. (Chapter 5).**

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## CHAPTER - 9

## EXECUTIVE SUMMARY

## 9.1 INTRODUCTION OF PROJECT &amp; PROPONENT

The project is being proposed by Shri Safdar Ali Ali S/O-Late Shri Farzand Ali, R/O-Muhalla-Khunti Chauraha Aliganj, City & District-Banda (U.P.) for Building Stone (Khanda, Gitti and Boulder) Mining Project located in Jarar. The estimated project cost is Rs. 4160000/-. The proponent has applied for mining lease in the name of Building Stone (khanda, Gitty, Boulder) Mining Project, over an area of 2.0 ha. at Gata No. 2450 Khand No.-03 in Village Jarar, Tehsil Naraini & District- Banda, Uttar Pradesh. It has been proposed to collect 20000 m<sup>3</sup> per year of Building Stone (Khanda, Gitti and Boulder) Mining Project annually as per LOI. As per the MOEF, New Delhi Gazette dated 14th September 2006 amended in December 2009 and April 2011, the proposed mining project is categorized as category "B1".

## 9.2 LOCATION

The mining area is located in Gata No. 2450 Khand No.-03 in Village Jarar, Tehsil Naraini & District-Banda, Uttar Pradesh. The mining lease / proposed project area falls in Survey of India Toposheet No. 63C/7. The mine lease area is located between as follows:

Project Site co-ordinates	Points. No.	Latitude	Longitude
	A	25° 18' 56.05"N	80° 21' 37.59"E
	B	25° 18' 55.32" N	80° 21' 38.98" E
	C	25° 18' 58.86" N	80° 21' 46.28" E
	D	25° 19' 1.48" N	80° 21' 44.13" E
	E	25° 18' 58.58" N	80° 21' 38.69" E
	F	25° 18' 57.21" N	80° 21' 39.20" E
<b>Minerals of mine</b>	Building Stone, Khandas & Gitti, Boulder Mining Project Mining Project		
<b>Nearest Railway Station</b>	Banda about 18.0 Km North direction		
<b>Nearest Airport</b>	Chakeri, Kanpur about 121.0 km in North direction.		
<b>Nearest Highway/State Highway</b>	NH 76 about 13.0 km towards East direction from the project site.		

## 9.3 MINING PROCESS

**The procedure of Building Stone (Khanda, Gitty, Boulder) Mining Project process are:**

**Proposed Mining Method:** The proposed mining method will include the following steps:

It shall be opencast semi-mechanized mine. To meet required production wagon drilling with deep hole blasting shall be carried out. The blasted material will be handled with excavator & loaded into

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dumpers. The height & width of bench shall be kept 6m with face slopes 70°. Secondary blasting with jackhammer drilling shall be carried out if required.

Indicate quantum of development & tonnage & grade of production expected pit wide as in table below:

Year	Overburden (cum)	ROM Gitty, Khanda, Boulder (cum)	Saleable Gitty, Khanda, Boulder (cum)	Sub grade mineral	Mineral reject	Ore to overburden ratio
1st	Nil	20000	20000	Nil	Nil	Nil
2nd	Nil	20000	20000	Nil	Nil	Nil
3rd	Nil	20000	20000	Nil	Nil	Nil
4th	Nil	20000	20000	Nil	Nil	Nil
5th	Nil	20000	20000	Nil	Nil	Nil
Total		0	100000			

**Drilling:**

The drilling will be done with the help of compressor and jackhammer. In this mine the diameter of hole will be 32-34 mm and depth of hole will be kept from 0.8m to 3.3m in a single hole.

**Blasting:**

The hole will be blasted by using ANFO.

{“Ammonium Nitrate Fuel Oil Explosive (ANFO)” means an explosive mixture of ammonium nitrate and fuel oil which is not cap sensitive, but does not include emulsion or slurry explosive or site mixed explosive (SME)}

**Loading and Transportation:**

Loading of stone block will be done with help of the winch and crane at both face and on truck. Small stone block (patis) is loaded in truck with the help of Excavator. The trucks will be used for transportation of stone block and Khandas from mine site to destination.

*{Note:-Blasting shall be carried out after the permission of District Magistrate, Banda (U.P.) and Directorate General of Mines Safety, Gwalior (U.P)}*

*Blasting shall be done under the supervision of blaster and necessary preventive measures shall be taken as per the guidelines of Directorate General of Mines Safety, Gwalior (U.P)}*

**No. of Trucks Required (maximum):**

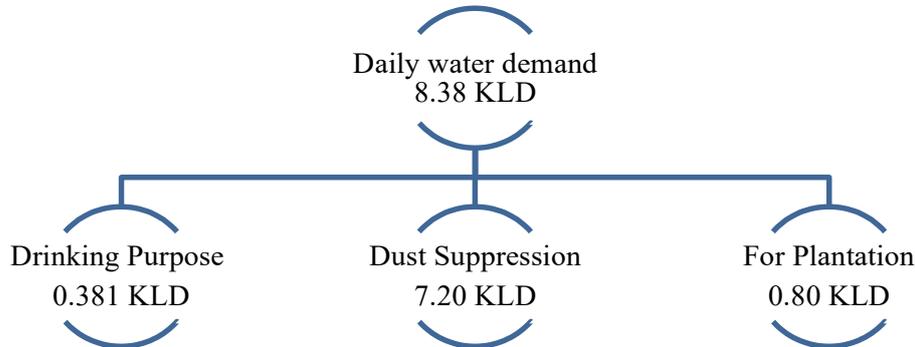
Total capacity of mine	:	20000 m <sup>3</sup> per year
Total no. of working days	:	300 days
Building Stone, Khandas & Gitti, Boulder extracted in a day	:	66.67 cum
Building Stone, Khandas & Gitti, Boulder extracted in one truck	:	12-13 cum (approx.)
No. of truck required per day	:	Approximately 5-6 Truck/tippers

**9.4 WATER SUPPLY**

In the Building Stone, Khandas & Gitti, Boulder projects there is as such no need of water to carry out operations. Water will be required for drinking purpose and dust suppression. The number of working people is 28 so the water required for drinking purpose for the workers will be around 0.38 KLD, for

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Plantation will be 0.80 KLD & for the dust suppression will be 7.20 KLD, making the total water requirement will be around 8.38 KLD. This water will be supplied from the nearby area.



### 9.5 BASE LINE DATA

This section contains the description of baseline studies of the 10 km radius of the area surrounding “Building Stone, Khandas & Gitti, Boulder Mining Project” at Gata No. 2450 Khand No.-03 in Village Jarar , Tehsil Naraini & District- Banda, Uttar Pradesh. The site analysis for Air, Water, Noise, Soil, Ecology and Biodiversity and Socio-Economy is already under process and the description given below is the secondary data such that public hearing could be conducted as soon as possible to avert the delay of the project. The intimation of EIA study as required in B1 Category of Building Stone, Khandas & Gitti, Boulder Mining Project is already been done at the Director & Secretary (SEAC), Directorate of Environment, govt. of U.P, the Regional Officer, Regional Pollution Control Board, District Banda, Uttar Pradesh and District Magistrate District Banda, Uttar Pradesh. The data collected has been used to understand the existing environment scenario around the proposed mining project against which the potential impacts of the project can be assessed.

Environmental data has been collected in relation to proposed mining for. :-

- (a) Air
- (b) Noise
- (c) Water
- (d) Soil
- (e) Ecology and Biodiversity
- (f) Socio-economy

**Table 9.1: BASELINE ENVIRONMENTAL STATUS**

Attribute	Baseline status
<b>Ambient Air Quality</b>	Ambient Air Quality Monitoring reveals that the maximum & minimum concentrations of PM10 for all the AQ5 monitoring stations were found to be ranging between 79.65 µg/m <sup>3</sup> and 61.45

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	<p>µg/m<sup>3</sup> and the maximum &amp; minimum concentrations of PM 2.5 for all the AQ5 monitoring stations were found to be ranging between 41.28 µg/m<sup>3</sup> and 31.47 µg/m<sup>3</sup>.</p> <p>As far as the gaseous pollutants SO<sub>2</sub> and NO<sub>2</sub> are concerned, the prescribed CPCB limit of 80 µg/m<sup>3</sup> for residential and rural area has never surpassed at any station. The maximum concentration of SO<sub>2</sub> was found at AQ2 with a value 14.65 µg/m<sup>3</sup> and minimum at AQ4 with a value 8.12 µg/m<sup>3</sup>. The maximum concentrations of NO<sub>2</sub> were found at AQ3 with a value 27.54 µg/m<sup>3</sup> and minimum at AQ5 with a value 20.78 µg/m<sup>3</sup></p>
<b>Noise Levels</b>	<p>Noise monitoring reveals that the maximum &amp; minimum noise levels at day time were recorded as 53.9B(A) &amp; 35.1 dB(A) respectively. The maximum &amp; minimum noise levels at night time were found to be 42.63 dB(A). The minimum noise levels at night time were found to be 32.60 dB(A).</p> <p>The noise levels recorded at all locations were within the NAAQS limits.</p> <p>However, with suitable control measures and EMP, the noise levels will be reduced and the impacts will be minimized</p> <p>There are several other sources in the 10 km radius of study area, which contributes to the local noise level of the area. Traffic activities as well as activities in nearby villages and agricultural fields add to the ambient noise level of the area.</p>
<b>Water Quality</b>	<p>Analysis of results of <b>ground water</b> reveals the following: -</p> <ul style="list-style-type: none"> <li>• pH varies from 7.35 to 7.85 of Study area.</li> <li>• Total hardness varies from 212 mg/l to 356 mg/l of Study area</li> <li>• Total dissolved solids(TDS) vary from 664 mg/l to 916 mg/l of Study area</li> <li>• Chloride from 40.55 mg/l to 152.08 mg/l of Study area</li> <li>• Fluoride from 0.61 mg/l to 1.39 mg/l of Study area</li> </ul> <p>The ground water from all sources remains suitable for drinking purposes as all the constituents are within the limits prescribed by drinking water standards promulgated by Indian Standards IS: 1050.</p>

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	<p><b>Surface water-</b></p> <p>The analysis results indicate that the pH ranges between 7.10 and 7.66. Dissolved Oxygen (DO) was observed in the range of 7.8 to 8.9 mg/l. COD values were observed to be in the range of 14.40 to 22.40 mg/l and BOD values were observed to be in the range of 2.6 to 3.2 mg/l. The Iron and Nitrate were found to be in the range of 0.088 to 0.098 mg/l and 0.74 to 1.05 mg/l respectively. Bacteriological examination of surface water samples revealed the presence of total coliform in range of 9 MPN/100 ml to 16 MPN/100 ml. Based on the results it is evident that most of the parameters of the samples comply with Category 'C' standards of CPCB indicating their suitability for drinking water source after conventional treatment and disinfection.</p>
<b>Soil Quality</b>	<p>The analysis results show that soil is basic in nature as pH value ranges from 7.28 to 7.87, Phosphorus (54.12 to 82.63 Kg/ha.) ,Potassium (193.57 mg/Kg to 355.39 mg/Kg) and Electric conductivity (260.8 mg/Kg to 330.4 mg/Kg) has been found to be in good amount in the soil samples.</p>
<b>Ecology and Bio-diversity</b>	<p>There are no Ecologically Sensitive Areas present in the study area.</p>
<b>Socio-economy</b>	<p>Building Stone (Khanda, Gitty Boulder) Mining Project at Gata No. 2450 Khand No.-03 in Village Jarar , Tehsil Naraini &amp; District-Banda, Uttar Pradesh.</p> <p>Will throw opportunities to local people for both direct and indirect employment.</p> <p>The study area is still lacking in education, health, housing, water, electricity etc. It is expected that same will improve to a great extent due to proposed mining project and associated industrial and business activities.</p>

**9.6 BIOLOGICAL ENVIRONMENT**

The proposed project is to mine Building Stone (Khanda, Gitty Boulder) Mining Project at Banda district of U.P. Biological diversity comprises the variability of genus, species and ecosystems and is very crucial for maintaining the basic processes on which the life depends. Broadly it can be divided in two types i.e. the floral biodiversity and faunal biodiversity. It is a key to the sustainable development as it not only provides the food, fodder, medicine products of commercial and noncommercial use but also provides essential environmental services (Air, water quality, soil fertility, pest & disease control etc). Biological components are one of the most important constituent of our environment. They are the

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integral part of our life as they provide raw materials for livelihoods, trade, medicines and industrial development. Their conservation and sustainable use is very much essential in today’s developmental process. Developmental processes are today’s demand and cannot be stopped as such. It has been observed in past that most of our developmental process cost our environment. In order to keep them unaffected or minimum affected while our developmental activity, it is always necessary to know the background of the area from biological point of view. After getting such information we can estimate the impact on the environment by the proposed activities and mitigate them. Similar approach has been adopted for conducting the Biological Environment study for the proposed Project.

**General vegetation of the study area:** The proposed project is to mine Building Stone, Khandas & Gitti, Boulder at Banda district of U.P. which lies between the Indo-Gangetic plain to the north and the south. Bundhelkhand region is a gently sloping upland distinguished by barren hilly terrain with sparse vegetation. Other rivers lying in the district are Ken River. The river water being used for Irrigation through Canal which is passing near by the project site at then distance of 2.50 kms towards East. The district cover by river alluvial soil in the north and the remaining part of the district are covered by deep black and sandy red soil.

The proposed project site i.e. core area is the water channel, which has few aquatic plants only. However, the nearby areas i.e. buffer area is having different types of plants (herbs, shrubs and trees). The Banda district covered mixed variety of vegetation mainly bushes. The tress like Shishum, Neem, Mango tree and Jamun tree, Eucalyptus and Babool are also found in sufficient numbers.

**Commonly found flora in the district:-** Dhak (*Butea monosperma*), Teak (*Tectona grandis*), Mahua (*Madhuca indica*), Babool (*Acacia nilotica*) and Tendu (*Diospyros melanoxylon*), Siris (*Albizia lebbeck*), Aam (*Mangifera indica*), Jamun (*Syzygium cumini*), Bail (*Aegle marmelos*), Tut (*Morus alba*), Bargad (*Ficus bengalensis*), Neem (*Azadirachta indica*), Peepal (*Ficus religiosa*), Safeda (*Eucalyptus umbelatus*), Sisam (*Dalbergia sissoo*), etc.

**Commonly found fauna in the district:-** Many domestic mammal species were reported from buffer zone during the field survey. Common domestic animals like Buffalo, cow, goat etc. can be noticed in open grass fields while grazing. Small mammals like Indian palm squirrel (*Funambulus palmarum*) and field mouse (*Apodemus sylvaticus*) are noticed in vicinity of the village. Inquiry from village people regarding wild animals reveals that Monkey (*Macaca mulata*), Indian hare (*Lepus nigricollis*), Mongoose (*Herpestes edwardsii*), Jackal (*Canis aureus*), etc. are often seen in the area.

**Table 9.2 Anticipated impact and mitigation measures for biological environment**

Impact predicted	Suggestive measures
Disturbance to free movement / living of wild fauna viz. Birds, Reptiles etc.	<ul style="list-style-type: none"> <li>• If birds are noticed crossing the core zone, they will not be disturbed at all;</li> <li>• Labourers will not be allowed to discards food, plastic</li> </ul>

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	<p>etc., which can attract animals/birds near the core site;</p> <ul style="list-style-type: none"> <li>• Only low polluting vehicles having PUC will be allowed for carrying mining materials.</li> <li>• Noise level will be maintained within permissible limit (silent zone 50 dB(A) during day time or residential zone 55 dB(A)) as per noise pollution (regulation and control), rules, 2000, of CPCB norms</li> </ul>
Disturbance of riparian ecosystem/wetlands	<ul style="list-style-type: none"> <li>• The riparian ecosystem or the wetlands will not be destroyed by the mine owners</li> </ul>
Monitoring of upstream and downstream water quality	<ul style="list-style-type: none"> <li>• Water quality will be monitored from upstream and downstream area to assess the impact on water quality and plankton. The mining activity will be controlled to maintain the clean water conditions.</li> </ul>

**Table 9.3 ANTICIPATED ENVIRONMENTAL IMPACTS AND ACTION PLAN PROPOSED FOR MITIGATION**

<b>Environmental Component</b>	<b>Project Activities</b>	<b>Impacts</b>	<b>Action Plan Proposed</b>
Air Quality	Drilling and Blasting	Dust (SPM) and gases (NOx) are produced during drilling and blasting operations	<p>Use of dust aprons on drilling equipment and adopting wet drilling methods.</p> <p>Limited blasting during adverse weather conditions.</p> <p>Optimized confinement of blasting charges.</p> <p>Development of greenbelt.</p>
	Overburden removal, extraction of stone, Loading / unloading of overburden and stone, disposal of overburden at dump site within ML area	Increase in SPM levels in ambient air due to dust generation and NOx concentration levels in ambient air due to vehicular emissions.	<p>Exposed area will be limited to the minimum required for mining operations.</p> <p>Installation of spray systems for dust suppression at dumping yards and stockpiles.</p> <p>Minimization of drop distance for all materials-handling process through appropriate design of operations.</p>
	Transportation of overburden and stone within ML area	Increase in SPM level due to dust generation and NOx concentration levels in ambient air due to vehicular emissions.	<p>Regular watering of haul and access roads using dedicated water trucks.</p> <p>Maintenance of vehicle.</p> <p>Haul roads will be clearly defined using marker posts so that vehicle traffic are controlled in the area.</p> <p>Roads no longer required will be re-vegetated as soon as possible.</p>

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			Haul roads to be maintained by surface grading to minimize excessive road surface wearing.
	General equipment operations	Elevated SPM and NOx concentrations in ambient air.	Regular maintenance of all equipment to minimize particulate matter emissions from diesel engines.
	All activities	Excessive occupational exposures to airborne particulate matter.	Occupational exposures to air pollutants will be assessed at regular intervals. Where exposures exceed the permissible limits, appropriate engineered controls, management measures or, as a last resort, the provision of personal protective equipment will be implemented.
Noise Levels and Ground Vibrations	Blasting	High impulsive noise levels, overpressure and ground vibrations impacts and noise related community annoyance	Prior to commencement of normal blasting operations (if required), a series of trial blasts will be undertaken to facilitate accurate prediction of impacts from normal blasting. This will require monitoring of overpressure and ground vibration in at least two locations surrounding the mine. The monitoring will continue throughout the duration of the blasting program. Where monitoring determines a significant impact, blast designs may need to be modified and scheduled to occur during non-enhancing weather conditions.
	General activities including machine operations and transportation of overburden and stone within the ML area.	Increase in noise levels occupational hazard due to noise exposures and increase in ambient noise levels.	An analysis of measured noise levels, meteorological parameters, and site operations will be undertaken to determine the risk of excessive noise impacts during operations. A detailed review of noise emissions and impacts from project activities will be carried out at regular intervals during the project life.  Occupational noise exposures will be assessed. Where LAeq (8 hour) noise exposures have the potential to exceed 85 dB(A), mitigation through engineered noise controls, management measures or, as a last resort, through the provision of personal protective equipment will be implemented.  Regular noise monitoring will be carried-out.  Procedures to document and act upon community complaints will be implemented.
Water			Mining will not intersect water table.

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Resources and Quality		<p>Changes to hydraulic regime.</p> <p>Deterioration in surface/ground water quality of receiving body.</p>	<p>Garland drains will be constructed to divert the surface water so as not to enter the mine. Diverted water will be joined to the nearest water course so that there is hardly any change to hydraulic regime.</p> <p>Mine water will be collected in the mine sump which will act as settling tank and then discharged to the surface.</p>
	<p>Water required for mine (dust suppression systems, workshop, domestic facilities and greenbelt development) and domestic consumption at colony</p>	<p>Depletion of natural resource.</p> <p>Reduction in groundwater availability for domestic and for irrigation purposes.</p> <p>Changes to hydraulic regime.</p>	<p>Mine sump water will be utilized for industrial purpose in the mine as far as possible.</p> <p>Water conservation methods will be practiced.</p> <p>Rainwater collection and reuse system will be implemented.</p> <p>The volumes of water supplied to the site through extraction from dug bore wells will be monitored to ensure drawdown do not affect adjacent water users.</p>
Hydrogeology and Drainage pattern	<p>Mining activities</p>	<p>May change regional hydrology and drainage pattern of the area.</p>	<p>Garland drains will be constructed all around the mine to lead the surface water to the nearest water course so that there is hardly any change to Hydrogeology and drainage pattern.</p>
Land use and Soil Characteristics	<p>Commencement of Mining operations.</p>	<p>Existing landuse of the core zone will alter.</p> <p>Impact due to clearing of existing plantations in the mining area.</p> <p>Impact due to settling of air borne dust.</p> <p>Land degradation due to disposal of solid wastes.</p> <p>Exposure of top soils to wind and water erosion.</p>	<p>Prior to each phase of mining, update and implement the relevant EMP to include phase-specific control and mitigation measures.</p> <p>Vegetation clearance to occur immediately prior to soil and overburden stripping.</p> <p>Install diversion drains and sediment fences prior to starting earthworks</p> <p>Minimize the area and time of ground disturbance by progressively rehabilitating disturbed areas</p> <p>Dust suppression on exposed areas using water trucks and automatic sprinkling systems</p> <p>Contour overburden dumps to minimize erosion</p>
Flora and Fauna	<p>Mine development and</p>	<p>Displacement or loss of existing</p>	<p>Disturbed areas will be stabilized as soon as possible. Locally native species will</p>

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	operations	fauna. Loss of vegetation	be used in landscaping works for non-hardstand areas. Compact fencing around mine area will be provided to obstruct unusual entry of animals
Environmental Pollution, Health, Safety	Overall Mining operation	Annoyance, sleep disturbance, and health impacts from noise emissions that exceed the safe limits.  Community annoyance from dust deposition. Potential for risk of harm to personnel and the local community.  Contamination of land and water through inappropriate disposal of waste products, including sewage and hazardous wastes. This may result in adverse impacts on surface water users.	Implementation of noise and fugitive dust emission controls and management measures.  Implementation of water quality management, conservation and control measures.  Development of an emergency response plan that includes installation of emergency response equipment to combat events such as fire. All personnel required to handle hazardous materials will be provided with personal protective equipment suitable for the hazardous material being handled. On-site first aid facilities will be provided and employees will be extended to the local community in emergencies.
Socio-economic Aspects	Mining operations	Increase in employment opportunities both direct and indirect thereby increasing economic status of people of the region.	Increase of direct employment will be progressive during operational phase of project whereas there will also be financial improvement to the local population who are engaged and would engaged himself in the services to the transport sectors because of increased transportation vehicle and meeting the allied facilities such as eatries and vehicle repairing outlets.

**9.7 LAND ENVIRONMENT**

This section includes the study of natural features like topography, climate etc. Land use/ Land cover map.

**Topography**

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The district largely consists of irregular uplands with outcrops of rocks intermingling mostly with lowlands, frequently under water during rainy season. The Baghein River traverses the district from south-west to north-east. The tract lying to the right of the river is intersected by numerous smaller river and rivulets, but to its left is a flat expanse, most part of which is made up of Mar and Kabar soils, eroded and converted into ravines along the banks of the rivers Ken and the Yamuna.

**Rainfall & Climate:**

The average annual rainfall is 902.00 mm. The climate is typical subtropical penetrated by long and intense summers. About 80% of the annual rainfall is received from south-west monsoon. May is the hottest month with mercury shooting upto 47.0°C. With the advance of monsoon by mid-June, temperature starts decreasing. January is usually the coldest month with temperature going upto 5.8°C. The relative humidity is highest in August about 85% and lowest in April.

**Impact on Land Use**

The area is having undulating surface surrounded by agricultural and barren land. The area is partially covered by alluvial soil. An old working pit is present in NW of the area. The proposed area and surround areas are mostly private land owned by individual. Presently the existing quarry lies in 1.21 ha area.

The potential adverse impact of opencast stone mining will be in the form of change in land use pattern. So reclamation of mined out land will be given due importance as a step for sound land resource management in the form of reclaimed land and water body.

No adverse impact is anticipated on land use of buffer zone associated due to the existing stone mine project, as all the activities will be confined within the project site only. Stone mined out from the mine is being and continued to be used as boulders of different sizes for Dam construction, embankment works etc. After crushing into different sizes of aggregates from 6mm to 63mm, the product can be used in construction and road projects.

**9.8 WATER ENVIRONMENT****9.8.1 Impact on Surface Water**

At present scenario there is no any seasonal or perennial source of water is passing through the lease area. During the rainy season, there may be accumulation of surface water, which is proposed to be pumped out to keep the working area dry and it is being utilized for dust suppression.

The stone mineral found in the area is non-toxic in nature. There will be no outside discharge of liquid effluent from the mine site. It is, therefore, apparent that there will be negligible impact of mining on the surface water regime.

**9.8.2 Impact on Ground Water**

Ground water pollution can take place only if the mining rejects contain toxic substances, which get

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leached by the precipitation water and percolate to the ground water table thus polluting it. Any nearby wells or other sources of water can be rendered unfit for drinking and even for industrial use.

This is not the case with this deposit as the mineral or topsoil does not contain any harmful ingredients. Moreover, stone constitutes of fairly inert and chemically non-reactive ingredients.

It is noticed from nearby dug wells and bore wells that the ground water table is available below 30 meters of the normal surface level. As the mining operation has been proposed to be carried out much above the ground water table there would not be any adverse effect on the ground water.

The ground water available in the nearby well, borewell is analysed and it is found within the prescribed standard of CPCB and it is also being and will be continued to be adopted the remedial measures to keep the water quality within the prescribed standard.

**9.8.3 Mitigation Measures for Water Environment**

- Adequate control measures are being and will be continued to 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 Garland drain will be provided at the toe of the dumps, to channelize the runoff water from dumps into the water reservoir (i.e. mined out pits) & around the active pits to restrict rainy water from entering in to the working pit.
- Retaining walls having water holes will be provided along the toe of the dumps to avoid the soil wash out & around the active pit to prevent fall of human/animal in to the working pit.
- Dumps slopes are being stabilized followed by plantation to avoid soil erosion.
- No waste water is being discharged from the mining activities.

**9.9 AIR ENVIRONMENT****Anticipated impacts and evaluation**

Information on air quality was studied and various modeling techniques predicted that the mining activity is not likely to affect the air quality in a significant manner. However, loading of Building Stone, Khandas & Gitti, Boulder, its transportation and unloading operations may cause some deterioration in air quality due to handling dry materials. In the present case, only wet materials will be handled, thus eliminating problems of fugitive dust. Also, the collection and lifting of minerals will be done manually without any blasting. Therefore the dust generated is likely to be insignificant as compared to mining processes involving drilling, blasting, mechanized loading etc.

**Air Modeling**

In general, mining operations generate substantial quantities of airborne respirable dust, which may lead to the development of respirable diseases in mine workers. The increasing trend of mining leads to

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release of huge amount of dust. These air borne dust particles, generally below 100 micron in size, are nuisance particulates and cause health hazards as an ill effect of mining activities. Extraction activities like drilling, blasting, material handling and transport are a potential source of air pollution. Therefore, a detailed study on emission sources and quantification of pollutant concentration by means of dispersion modeling is required to assess the environmental impact of a mine. On the basis of the predicted increments to air pollutant concentrations, an effective mitigation and environmental plan can be devised for sensitive areas. In case of Building Stone, Khandas & Gitti, Boulder mining, as there is no blasting and drilling activities, the impacts may only be caused by material handling and transportation activities of mostly wet Building Stone, Khandas & Gitti, Boulder and the same are minimal.

**FUGITIVE DUST- MODELING**

Air quality modeling was done using line source model as published by USEPA “Workbook of Dispersion Modeling” by Turner, for transportation through roads and the empirical emission factor equations from USEPA. Emission factors to be used in Line source Dispersion equation is adopted from formula as given below:

$$E = k * (1.7) * (s/12) * (S/48) * (W/2.7)^{0.7} * (w/4)^{0.5} * (365-p/365) \text{ kg/VKT} \text{----- (1)}$$

Where

E = Emission Rate (kg/VKT)

k= Particle size multiplier = (0.36)

s = Silt Content of the Road surface material (%) = 10%

S = Mean Vehicle Speed (km/hr) = 20 km/hr

W=Mean Vehicle Weight (tonnes) = 10 tonnes

w= Mean number of wheels = 8

p= Number of days with at least 0.254 mm of precipitation per year = 60

f = frequency of Vehicle movement in no per hour = 2 vehicles / hour

Thus using equation (1)

$$E = 0.61766 \text{ kg/VKT}$$

$$E = 0.0003 \text{ g/sec/m}$$

Concentration of the fugitive dust was calculated using the empirical equations for unpaved roads published by USEPA- AP42. The Concentration of the fugitive Dust is given below:

$$C = (2/\pi)^{1/2} (E / \sigma_z v) \text{ Exp-} [(h^2) / (2 \sigma_z^2)] \times 10^6 \text{----- (2)}$$

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Where

C = Hourly Concentration in microgram/ m<sup>3</sup>

E = Emission Rate = 0.0003 g/sec/m

v = Wind Speed =4 m/s

h = 0 m

Modeling was done for an infinite line source assuming unpaved road. For conservative calculation wind was assumed to blow at a velocity of 4 m/s perpendicular to the road. The results for 24 hourly concentration values are given in the Fig. 4.1:

**Mitigation measures**

The only air pollution sources are the road transport network of the trucks/dumpers. The dust suppression measures like the following will be resorted:

- Water sprinkling will be done on the roads regularly. This will reduce dust emission further by 75%.
- Care will be taken to prevent spillage by covering the carrying vehicles with tarpaulin and sprinkling of water, if dry.
- Fortnightly scraping of road in order to keep the roads almost leveled. This will ensure smooth flow of vehicles and also prevent spillage.
- Overloading will be kept under check by giving prior awareness.
- Proper Tuning of vehicles to keep the gas emissions under check.
- Plantation of trees along the road sides helps to reduce the impact of dust in the nearby villages.

**9.10 NOISE ENVIRONMENT**

Day and night sound pressure levels  $L_{eq}$  is often used to describe the community noise exposure, which includes 10 dB (A) night time penalty.

The monitored noise level during the base line period within the core zone and buffer zone has been found to be within the prescribed CPCB standards which will also be confined within the limit by undertaking more plantations within the mining area especially in the direction of habitation to act as a sound barrier.

**9.10.1 Impact due to Ground Vibrations**

Ground vibration, fly rock, air blast, noise, dust and fumes are the deleterious effects of blasting on environment. The explosive energy sets up a seismic wave in the ground, which can cause significant damage to structures and disturbance to human occupants. It causes major damages to the pit configuration too.

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When an explosive charge is fired inside the blast hole, it is instantly converted into hot gases, which exert intense pressure on the blast hole walls. High intensity shock waves propagate radically in all directions and cause the rock particles to oscillate. This oscillation is felt as ground vibration. The proposed mining operations using deep hole drilling and blasting using delay detonators are bound to produce ground vibrations.

Ground vibration from mine blasting is expressed by amplitude, frequency and duration of blast. The variables, which influence ground vibrations, are controllable and non-controllable. The non-controllable variables include general surface terrain, type and depth of overburden and wind. Similarly, the controllable variables include type of explosives, charge per delay, delay interval, direction of blast progression, burden, spacing and specific charge and coupling ratio.

The oscillation of rock particles is called Particle Velocity and its maximum value is called Peak Particle Velocity (PPV), which is measured in millimeter per second.

As the distance increases, the PPV value is likely to reduce. The ground vibrations generated by blasting during the mining operations will be well within the standards prescribed by DGMS by controlled blasting. Ground vibrations are not likely to affect the structures in the vicinity of mine lease area.

By adopting controlled blasting, the problems will be greatly minimized at mines. The impacts are also minimized by choosing proper detonating system, optimizing total charge and charge/delay.

### **9.10.2 Measures for Minimizing Adverse Impacts**

#### **➤ Noise Control Measures**

- The following control measures are being and will be continued to be adopted to keep the ambient noise levels well below the limits:
- Drilling is being carried out with the help of sharp drill bits which will help in reducing noise.
- Secondary blasting is being totally avoided and Hydraulic rock breaker is being used for breaking boulders.
- Controlled blasting with proper spacing, burden, stemming and optimum charge/delay is being maintained.
- The blasting is being carried out during favorable atmospheric condition and less human activity timings;
- Minimum quantity of detonating fuse is being consumed by using alternatively Excel non-electrical initiation system;
- Proper maintenance, oiling and greasing of machines at regular intervals is being done to reduce generation of noise.
- The prime movers/diesel engines are properly maintained;

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- Provision of sound insulated chambers for the workers deployed on machines (HEMM) producing higher levels of noise;
- Proper designing of plant & machinery by providing inbuilt mechanism like silencers, mufflers and enclosures for noise generating parts and shock absorbing pads at the foundation of vibrating equipment.
- Green Belt/Plantation is being developed around the mining activity area and along haul roads. The plantation minimizes propagation of noise.
- Personal Protective Equipment (PPE) like ear muffs/ear plugs is being provided to the operators of HEMM and persons working near HEMM; and
- Reducing the exposure time of workers to the higher noise levels.
- Periodical monitoring of noise will be done.

**➤ Measures to Control Ground Vibration**

The blasting operations in the mine is carried out by deep hole drilling and blasting using delay detonators, which reduce the ground vibrations. The measures that are generally followed and currently proposed for abatement of ground vibration, air blast and fly rocks are detailed below:

- Proper quantity of explosive, suitable stemming materials and appropriate delay system are being adopted to avoid overcharging and for safe blasting.
- Adequate safe distance from blasting is being maintained.
- Blasting operations is carried out only during day time.
- The charge per delay is minimized and preferably more number of delays is used per blasts;
- During blasting, other activities in the immediate vicinity is temporarily stopped;
- Drilling parameters like overburden, depth, diameter and spacing is properly designed to give proper blast.

**9.11 TRAFFIC ANALYSIS**

The lease area is connected to State Highway No. 49 about 1.0 km towards west direction from the project site. These roads are wide enough to facilitate easy and smooth movement of heavy duty trucks. The Detailed traffic study has been discussed under **Chapter 4**.

**9.12 SOCIO-ECONOMIC ENVIRONMENT**

The implementation of the Building Stone (Khanda, Gitty, Boulder) Mining Project will generate both direct and indirect employment. Besides, it will provide a check on existing system of mining operation. Since the quarries will be allotted on lease basis, mining operation will be legally valid and it will bring income to the state exchequer. The project will also provide impetus to industrialization of the area. Where transfer of boulders into bajri is necessary crushing units will come up. It is expected that

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intending entrepreneurs will venture to set up micro and small scale units in the near future making the area a mixed society, dependent on industry, trade and business. At present agriculture is the main occupation of the people as more than half of the population depends on it. With the implementation of the proposed mining project the occupational pattern of the people in the area will change making more people engaged in industrial and business activities rather in agriculture. Thus there will be a gradual shifting of population from agriculture to mining and industry. Further, the mining and industrial activities in the area may lead to rapid increase in population and thereby urbanization. Due to urbanization of the area, employment opportunities will further increase.

**9.13 ENVIRONMENTAL MANAGEMENT PLAN (EMP)**

Proper environmental management plan are proposed for “Building Stone, Khandas & Gitti, Boulder Mining Project” to mitigate the impact during the mining operation.

- a. Proper blasting pattern will be followed by the blasters for effective rock fragmentation and generation of minimal fine dust to open atmosphere.
- b. Regular water sprinkling at dust emanating sources viz., drilling, blasting and transportation through haulage roads, etc. will be carried out.
- c. Periodic maintenance of transport vehicles and equipment will be carried out to check emission levels.
- d. Greenbelt will be developed that will act as a pollution sink.
- e. Overloading of trucks will be avoided and carrying the rocks in covered trucks will be taken up to minimize pollution level.

**9.14 ENVIRONMENTAL MANAGEMENT PLAN IMPLEMENTATION**

Environmental Management Plan serves no purpose if it is not implemented with true spirit. Some loopholes in the EMP can also be detected afterwards when it is implanted and monitored. Thus, an implementation and monitoring programme has to be prepared.

The major attributes of environment are not confined to the mining site alone. Implementation of proposed control measures and monitoring programme has an implication on the surrounding area as well as for the region. Therefore, mine management will strengthen the existing control measures as elaborated earlier in this report and monitor the efficacy of the control measures implemented within the mining area relating to the following specific areas for eco-friendly mining:

- a. Collection of air and water samples at strategic locations with frequency suggested and by analyzing thereof. If the parameters exceed the permissible tolerance limits, corrective regulation measure will be taken.

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- b. Collection of soil samples at strategic locations once in every two years and analysis thereof with regard to deleterious constituents, if any.
- c. Measurement of water level fluctuations in the nearby ponds dug wells and bore wells.
- d. Measurement of noise levels at mine site, stationary and mobile sources, and adjacent villages will be done in every six months for first two years, thereafter once a year.
- e. Plantation/afforestation will be done as per program i.e. road sides and near civic amenities, which will be allotted by Government bodies. Post plantation, the area will be regularly monitored in every two years for evaluation of success rate. For selection of plant species local people will also be involved.

**9.15 BUDGET ALLOCATION FOR EMP IMPLEMENTATION**

**Table 9.4 COST OF EMP**

Sr. No.	Environment Management Plan (EMP)	Cost Estimation	Total Cost (Rs.)
<b>a.</b>	Plantation		
<b>i)</b>	No of plants @95 Rs. / sapling)	100 saplings × @95 Rs. / sapling)	9500
<b>ii)</b>	Tree Guard (@1500/- per unit)		2,10,000
<b>b.</b>	Water Demand for plantation (@100saplings ×4 litres of water× twice per day = 800 ltrs.)	(800ltrs. Per day x 300 (working days) x ( 1.1Rs. /L)	264000
<b>c.</b>	Measure for prevention & control of soil erosion and management of silt shall be undertaken. Protection of dump against erosion, if any, shall be carried out with geo-textile matting or other material.	-	20000
<b>d.</b>	Sprinkling on haulage route for dust suppression (600 m length × 6 m width × 1 litres of water per m <sup>2</sup> /2 times a day=7.2KLD (Rs. 1100 for per KLD of water/day)	Rs. 1100×7.2 KLD of water/day x 300 (working days)	2376000
<b>e.</b>	Cost of monitoring of air quality(PM <sub>10</sub> ,PM <sub>2.5</sub> ,NO <sub>x</sub> ,SO <sub>2</sub> ), water quality(ground water and surface water),soil quality and ambient noise level	-	2,50,000
<b>f.</b>	Cost for environmental cell	<ul style="list-style-type: none"> <li>• Environmental Engineer: 1</li> <li>• Gardener :3</li> </ul>	400000
<b>g.</b>	Fund for COVID-19		50000
<b>Total</b>			<b>2849700</b>

**9.16 MONITORING SCHEDULE AND PARAMETERS:**

**Table 9.5 Monitoring Schedule and Parameters**

S No	Description of Parameters	Schedule and Duration of Monitoring/Execution
1	Air Quality: a) In the vicinity of the mine b) In the vicinity of the transportation Network c) Dust suppression on roads  d) Scraping/ bulldozing of road to shift accumulated dust to the sides	24 hourly samples twice a week for one month in each season except monsoon season  Regularly in non- monsoon months and whenever occurrence of fugitive dust takes place Fortnightly
2	Water Quality near or around the site: a) Surface water quality b) Ground water quality	Once in a season for 4 seasons in a year
3	Ambient Noise Level	Twice a year for two years & then once a year
4	Soil Quality	Once in two years on project monitoring area
5	Inventory of Flora(tree plantation, survival etc) & Fauna	Once in two years on project monitoring area
6	Socio-economic condition of local, population, physical survey	Once in 3 years

**9.17 BENEFITS OF MINING**

- i. Generating useful economic resource for construction.
- ii. Generating employment.
- iii. Improvement in socio economic conditions of the people of the study area.
- iv. Improvements in physical infrastructure.
- v. Improvements in Social Infrastructure.
- vi. Increase in Employment Potential.
- vii. Contribution to the Exchequer.
- viii. Prevention of illegal mining.
- ix. During and Post-mining enhancement of green cover.

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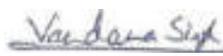
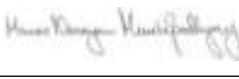
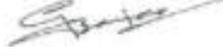
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CHAPTER- 10

DISCLOSURE OF ENVIRONMENTAL CONSULTANTS

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Functional area experts:

S. No.	Functional areas	Name of the expert/s	Signature and date
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2	WP*	Dr. Jatin K Srivastava	
3	SHW*	Mr. Vikas Pandey	
4	SE*	Dr. Vandana Singh	
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10	NV*	Dr. Jatin K Srivastava	
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*Declaration*

*I declare that above mentioned experts coordinated the preparation of EIA/EMP under the supervision of Dr. Jatin Kumar Srivastava. For any details one may contact me as a Director of Environmental Research and Analysis Lucknow.*

*A. K. Tripathi*

*(Director)*

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National Accreditation Board  
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(Member - International Accreditation Forum & Pacific Accreditation Cooperation)



QCI/NABET/ENV/ACO/20/1335

June 03, 2020

To

**Environmental Research and Analysis, Lucknow**  
Flat No- 203, Second floor, Yash Silver Height,  
Opposite site Badshah Nagar Railway station,  
Mahanagar, Lucknow (U.P.) -226006

Sub.: Extension of Validity of Accreditation till 02 September, 2020 - regarding

Dear Sir/Madam

In view of the outbreak of Corona Virus (COVID-19) and subsequent lockdown declared for its control vide order dated 24th March 2020, issued by Ministry of Home Affairs, Govt. of India, NABET hereby extends the Validity of your Accreditation till 02 September, 2020.

As soon as, NABET office opens/resumes its operation necessary action regarding issuance of certificate/extension of validity letters / other may be initiated, therefore, ACO to ensure their complete application with NABET, if applicable.

Meanwhile, you may enclose this with your EIA reports along with the certificate/validity letter. The EAC/SEIAA/SEAC/Other are hereby requested to consider the same as a valid document for the preparation of EIA/EMP report.

With best regards.

Sd/-  
(A K Jha)  
Sr. Director, NABET

**NABET**

**EIA/EMP CHAPTER-11- CONCLUSION OF THE PROJECT**

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**CHAPTER-11**

**CONCLUSION OF THE PROJECT**

**1.0 INTRODUCTION**

The Building Stone, Gitty, Khanda, Boluder Mining is one of most significant mineral contributing to the sustainable development that is “The extraction or recovery of the mineral without limiting the needs and lives of the surrounding flora, fauna and the local villagers/ people residing there as well.”

Shri Safdar Ali S/O-Late Shri Farzand Ali, R/O-Muhalla-Khunti Chauraha, Aliganj, City & District-Banda (U.P.) for Building Stone, Gitty, Khanda, Boluder mine at Gata No. 2450 Khand No.-03, Village Jarar, Tehsil Naraini & District- Banda, Uttar Pradesh. within total lease Area 2.0 Ha. The proponent has applied for mining lease in the name Safdar Ali It has been proposed to collect approximately 20000 m<sup>3</sup>/year material Building Stone, Gitty, Khanda, Boluder Mine annually.

As per the MoEF, New Delhi Gazette dated 14th September 2006 amended in December 2009 April 2011, 16 January, 2016 and 14 August, 2018, the proposed mining project is categorized as category “B1”.

This Building Stone, Gitty, Khanda, Boluder Mining Project has numerous benefits not only on individual level but on a social level too i.e. this project will not only benefit the owners but directly and indirectly will also benefit the people of that region.

This will give employment to thousands of people who are the residents of the principal place of business. Since, manpower is required in every activity and processing from installation of the project to the final product and marketing. The equitable distribution of work according to the skills and potential will be done. Work given will be categorized into skilled, semi-skilled and unskilled employees. Employment preference will be given to the local villagers. The labors will be registered in the district Labor Office as per the U.P. Government Law. Also, according to the Central government policy of labors, medical insurance will be done of all the labors employed. Minimum wage, guaranteed monetary benefits under law will be ensured to the workmen. Safe, healthy, and productive work environment and welfare will be provided to the worker. Abolition of child labor and bonded labor, and rehabilitation of those will be ensured.

Zero accident, safe and productive work places will be encouraged and promoted. Temporary rest shelter, first-aid facilities along with anti-venoms, safe drinking water for the workers/miners and

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Arrangements for safe and healthy working conditions and facilities of community toilets shall be made available for the workers, medical camps for workers and nearby villagers shall be conducted at regular interval. Workers will be instructed with safety measures and safety equipment's will also be provided.

This will provide the employment and aid in managing and surviving their livelihood, reduce the poverty of that region and will provide them a better atmosphere and a better life.

This project will also contribute in rising the economy of the state and ultimately of the nation through the taxes collected through this. This is obvious that taxes collected are used in welfare of the nation and its citizen. A sum of Rs. 183600 (3% of the total Project cost 6120000/-) is also contributed as Corporate Environment Responsibility for difference welfare activities such as roads, plantation, education, sanitation, awareness campaigns, etc.

Last but not the least, this project has also its social impact on the lifestyle, life standards, thinking, personality, etc. of that place. The project will ignite the locals to use their potential and work for improving their economic condition and better life. This project can be a small step in betterment of the local people of that area.