ENVIRONMENTAL IMPACT ASSESSMENT
&
ENVIRONMENTAL MANAGEMENT PLAN

FOR ENVIRONMENTAL CLEARANCE
OF

BHATAUTI SAND STONE (BALLAST/GITTI) MINING

PROJECT (PLOT NO-2061 (1 A & 8)
AT
Village: Bhatauti, Tehsil: Meja, District: Allahabad, State: Uttar Pradesh
Area: 6.07 Ha, Proposed Capacity: 5, 62,500 TPA

FINAL REPORT

PROJECT PROPONENT :

M/s D K ASSOCIATE

Environment Consultant :

COGNIZANCE RESEARCH INDIA PVT LTD

(Accredited by QCI/NABET)
Gt-20, Sector-117, Noida, U.P
Website: http://www.cognizanceindia.com

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Chapter-1

Introduction

1.0 Permeable

Environmental Impact Assessment (EIA) is a decision making tool, in the hands of 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. This process has been envisioned and set in motion by the Ministry of Environment and Forests for sustainable development and the final decision is arrived at only, when those who matter are made known of the salient features of the project being envisaged close to them and their opinion has been sought in a widely advertised Public Hearing Event under the chairmanship of the district authorities so that public could also express their opinion freely, without favor and fear.

Environmental Impact Assessment report is prepared to comply with the Terms of Reference (TOR) received from SEAC, U.P under EIA notification of the MoEF dated 14th September, 2006 as amended on 1st December 2009, 4th April, 2011, 13th December 2012, 13th March 2013, 9th September 2013, 28th February 2014 and 25th June 2014 and also the EIA Guidance Manual for Mining of Minerals (Feb, 2010) of MoEF, Govt. of India, for seeking environmental clearance for mining of Gitti patthar & Boulder in the applied mining lease area measuring 6.07 hectares (15 Acre) falling under category "B1". The lease area lies near Village: Bhatauti, Tehsil: Meja, District: Allahabad, Uttar Pradesh.

1.1 IDENTIFICATION OF PROJECT & PROJECT PROPONENT

Name of the Project – Bhatauti Gitti, Patthar & Boulder Mining project

Location of the Project- Village-Bhatauti, Tehsil-Meja, Dist.-Allahabad Uttar-Pradesh

Identification of project proponent

The project has been proposed by M/S D.K. Associates (Mohd. Afzal Partners) S/o Late Abdul Rasheed R/o Millat Nagar, Obra, Sonebhadra (UP), consent for lease has been given in favor of M/s D.K. Associates vide letter no. 315/khnan/2016-17 dated 25.05.2016 to grant lease deed with condition.

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

Letter by District Magistrate has been issued by state government to M/s D.K.Associates, Obra,Soanbhadra, vide letter no. 315/khnana-2016-17 dated 25/05/2016 Copy of letter is enclosed as **Annexure No. II**.

The proposed project is to mine Gitti , Patthar and Boulder from the lease area. The mining lease has been granted to M/S D.K. Associate, Khasra no. 2061, Khand no.– 1A, 8 over an area of 6.07 Ha at Village: Bhatauti, Tehsil: Meja, District: Allahabad, Uttar Pradesh. The expected project cost of the mine is Rs. 45 lakhs; the with average production of 2,25,000 m3/annum (5,62,500 TPA). As per the EIA notification of the MoEF dated 14th September, 2006 as amended on 1st December 2009, 4th April, 2011, 13th December 2012, 13th March 2013, 9th September 2013, 28th February 2014 and 25th June 2014 & 15th January 2016 the proposed mining project is categorized as category 'B1' project. The EIA-EMP report is prepared as per the ToR granted under the EIA Notification. Further 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 proposed operation including identification and Assessment of impact on the environment.

Table No. 1.1 Detail Of the Project

S. No.	Particulars	Details
A.	Nature & Size of the Project	Bhatauti Gitti, Patthar & boulder (ML Area– 6.07 Ha.) Production capacity 5,62,500 TPA
B.	Location	
Name of Village		Bhatauti
Tehsil		Meja
District		Allahabad
State		Uttar Pradesh
Coordinates		Latitudes 25° 9'1.74"N Longitudes 82° 2'5.94"E
Toposheet No.		63K/4
Gata No.		Khand No. 1A & 8
C.	Mine Lease Area Details	
	Lease Area	6.07 Ha (Cluster Area 50.586 Ha)
	Type of Land	Government Land
	Topography	Undulating
	Site Elevation Range	Highest: Approx. 108 m AMSL Lowest: Approx: 107 m AMSL

	Detail of other Lease area	

Khand No.	Area (in Acre)
1B	20.00
2A	20.00
3	20.00
2B	10.00
64	10.00
69	10.00
70	10.00
72	5.00
2/1	5.00
Total	**110 Acre**

D.	Cost Details	
	Cost of the project	Rs 45.0 Lakhs
	Cost for EMP	Capital cost 6.75 lakh and Recurring cost 6.65 lakh.
	Cost of CER	Rs 2.25 lakh
E.	Details of Environmental Setting	
	Ecological Sensitive Areas (National Park, Wild Life Sanctuary, Biosphere Reserve, Reserve/ Protected Forest etc.) within 10 km distance	There is no National Park, Wild Life Sanctuary, and Biosphere Reserve within 10 KM distance from the lease area. Only Reserve Forests and Dense Mix Jungle are present in the

SN	Particulars	Distance from the ML Boundary (in km) & Direction from the ML

1. Mundpela RF approx. 3 km SW Direction
2. Chandhas RF approx. 4 km SE Direction
3. Basehra RF approx.7.5 km SE Direction

	Water Bodies	1 Tons River approx.3.0 km NW Direction
	Nearest City	Kanpur at a distance of 78 km towards ENE direction.

	Nearest Railway Station	Meja Road Railway Station (About 10 km in NE direction)
	Nearest National Highway	NH-76 (About 11.00 km in NE direction).
	Nearest Airport	Allahabad Airport (About 44.5 km in NW direction).
	Seismic Zone	As per the 2002 Bureau of Indian Standards (BIS) map, Madhya Pradesh also falls in Zones III.

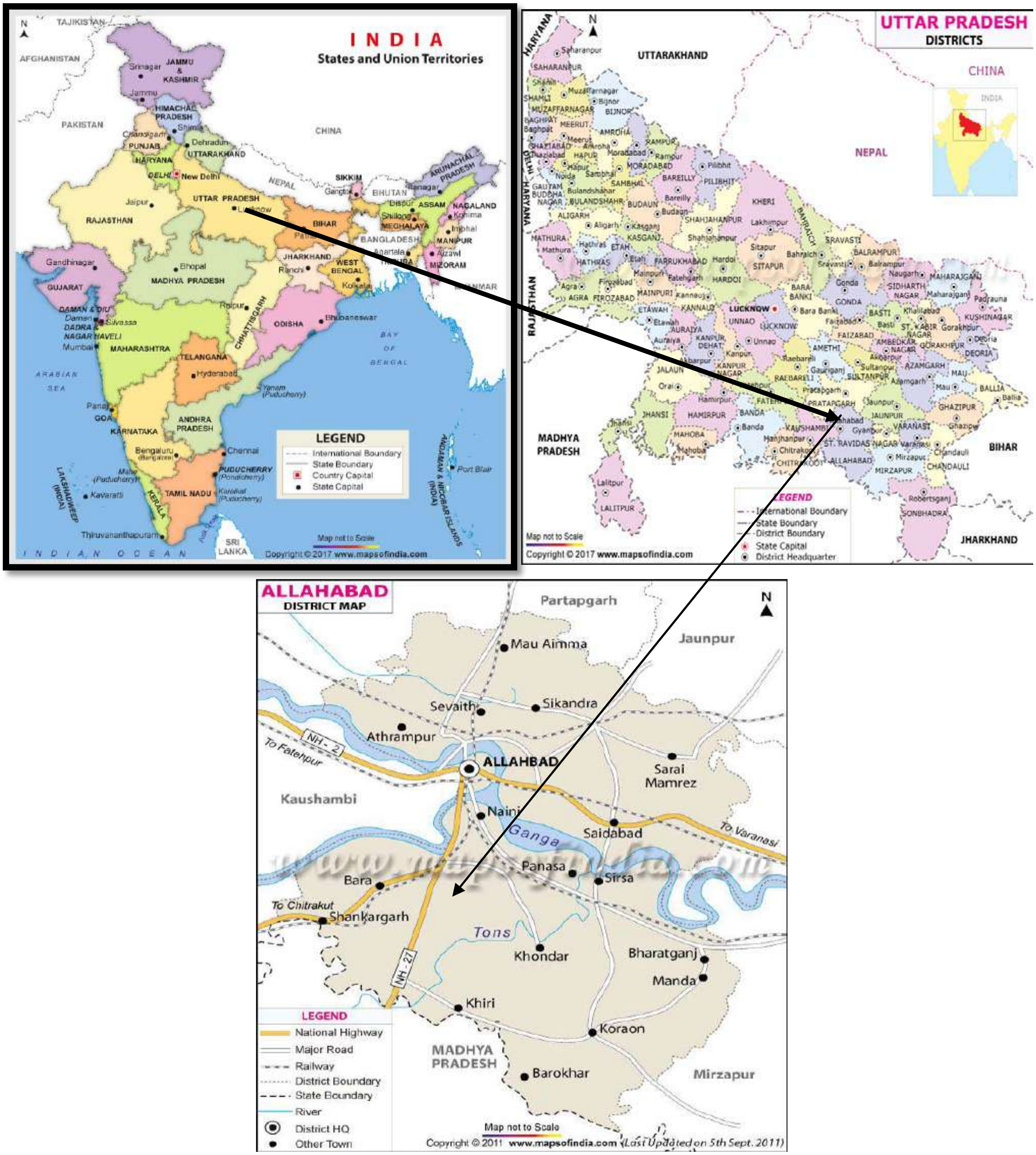

Figure-1.1 –Project Location

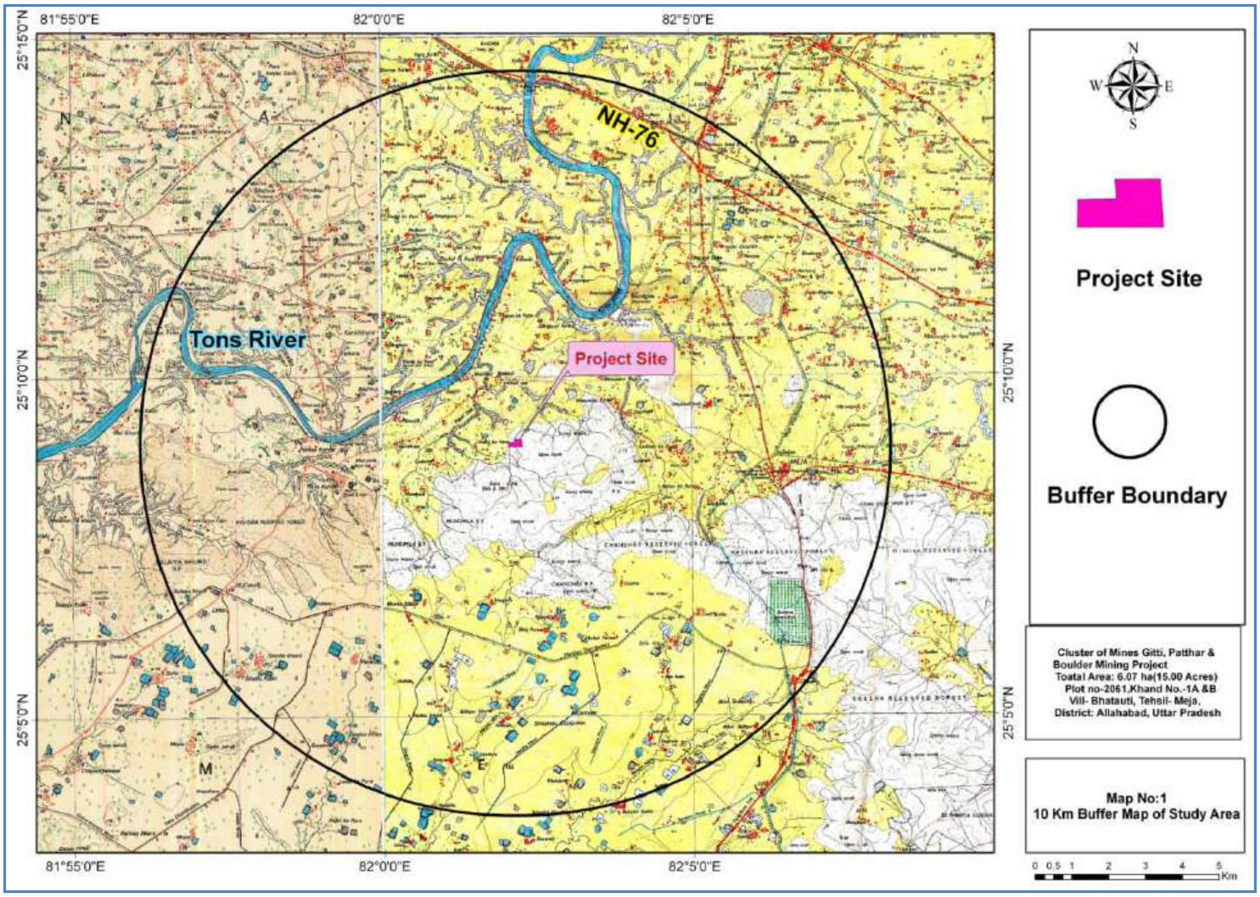

Figure-1.2 10 km Study area

Project's Importance to the country and the region

This project operation will provide employment to the people residing in vicinity as about 300 days will be generated annually and approximately 31 people may be benefited directly and indirectly by the project.

The project involves extraction of Gitti Patthar & Boulders used for various constructional activities. Thus it is expected that the proposed mining project would improve the supply of construction material making a positive impact on the infrastructural projects like construction of roads, buildings, bridges etc in the state.

1.3 REGULATORY COMPLIANCES & APPLICABLE LAWS/REGULATIONS

a) There is no legal case against the project and project proponent.

b) There is no national park / Sanctuary notified under the Wildlife Protection Act in the study area.

1.4 SCOPE OF THE STUDY

In line with the Terms of Reference (TOR) prescribed by SEIAA, Uttar Pradesh, 573/parya/SEAC/3770/2017 dated 12th Dec 2018 attached as Annexure-I, the area comprising 10 km radius around the proposed mine lease boundary is considered as the study area. The EIA/EMP report has been prepared following the TGM of mining published in February 2010. The detailed studies have been conducted as per prescribed TOR. The study area map is shown in Figure-1.2.

The scope of study broadly covered:

- Literature review and collection of data relevant to the study area;
- Establish the baseline environmental aspects in and around the proposed project;
- Identify various existing pollution loads due to various mining activities;
- Predict incremental levels of pollutants in the study area due to the proposed operations;
- Evaluate the predicted impacts on various environmental attributes in the study area by using scientifically developed and widely accepted environmental impact assessment methodologies;
- Prepare a Environment Management Plan (EMP) outlining the measures for improving the environmental quality; and

Identify critical environmental attributes that are required to be monitored in the post-project scenario

Point Wise Compliance for TOR

S.No.	TOR	Compliance
1	All pages of technical documents/EIA/EMP etc. should be signed by the consultants and project proponent both.	All pages of technical documents/EIA/EMP etc. are signed by the consultants and project proponent.
2	Copy of all the analysis reports signed by analyst approved by NABL or MoEF&CC shall annexed with the EIA report and original analysis reports should be presented at the time of Presentation.	Copy of all the analysis reports signed by analyst approved by NABL or MoEF&CC
3	MOU signed between the project proponent and the consultants should be submitted.	MOU signed between the project proponent and the consultants is being submitted with EIA report.
4	Over burden plan should be submitted.	The entire lease area is stony having no soil cover therefore generation of waste and soil will be nil.
5	The TOR shall be valid strictly for the annual production/yearly production as given in the approved mining plans of the respective proposal.	About 2,25,000 m^3 per annum or 5,62,500 TPA (as per LOI) of sand will be excavated.
6	Certificate from mining officer that there is no other mining area exist within 500 m periphery.	There are another Nine mines of total area 44.52 ha (Khand No. 1B, 2A, 3, 2B, 64, 69, 70, 72, 2/1) exists within 500 m from the periphery of the mine site. Certificate from mining officer is attached as **Annexure III.**

7	CSR cost to be calculated for individual lease	About 2.25 lakh has been proposed for CER activities.
8	An intimation regarding conducting the monitoring to be sent to concerned District Magistrate and State Pollution Control Board Office.	An intimation regarding conducting the monitoring has been sent to concern District Magistrate to conduct monitoring.
9	The lab conducting the analysis should be authenticate and registered.	The lab conduction the analysis is authenticated and registered.
10	Public hearing to be conducted as per EIA notification, 2006.	Public Hearing was conducted on 09/01/2019 at Tehsil- Meja, District-Prayagraj under the chairmanship of Additional District Magistrate Hamirpur. PH proceedings are attached at **Annexure VIII.**
11	A copy of the document in support of the fact that the proponent is the rightful lessee of the mine should be given.	A copy of Lease deed in support of the fact that the proponent is the rightful lessee of the mine is attached as **Annexure-II.**
12	Approved mining plans for all the mining projects.	Copy of approved mining plan is attached as **Annexure- IV.**
13	All documents including approved mine plan, EIA and public hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management and mining technology and should be in the name of lessee. The mine plan should be take in to account the condition of the mine lease, if any, in terms of distance to be left un-	The lease area, mining technology in EIA Report and Mining Lease are compatible with each other and are in name of Lessee alone. Copy of approved mining plan has been attached as **Annexure- IV** & Khasra map is attached as **Annexure-V.** Public Hearing has been conducted on 09/01/2019 at Tehsil- Meja, District-Prayagraj. PH proceedings are attached at **Annexure VI.**

	worked from the river flowing nearby.	
14	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc should be for the life of the mine / lease period.	The 10 km zone from periphery of the lease has been considered as the study area. The Buffer map of the study area is given as **Map No. 1** in section II. All the details in the EIA report. The details of mining & production, waste is given in Chapter II.
15	Land use of the study area should be described delineating forest area, agricultural land, grazing land, wildlife sanctuary and national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated.	Land use pattern of 10 km from the periphery of the lease area has been prepared and incorporated as **Map No.4**, Chapter III.
16	Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted.	Land use of the study area delineating forest area, agricultural land, grazing land, water bodies, human settlements, and other ecological features etc has been incorporated in Chapter III of EIA/EMP Report. There is no significant infect due to the change land use.
17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife 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 Wildlife Warden. Necessary clearance, if any, as may be applicable to such projects	There are no National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves (existing as well as proposed) within 10 km of the mine lease area. Map no I

	due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the State Wildlife Department/Chief Wildlife Warden under Wildlife (Protection) Act, 1972 and copy furnished.	
18	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. Details of flora and fauna, duly authenticated, separately for core and buffer zones should be furnished based on primary field survey, clearly indicating the Schedule of the fauna present.	Detailed biological study of core zone and buffer zone within 10 km radius of the periphery of the mine lease has been carried out for the project. The same has been incorporated in Chapter III of the report. Five schedule-II fauna species found within the buffer zone. Duly authenticated details of flora and fauna will be provided along with Final EIA.
19	Impact of change of land use should be given.	The impact on the land form on physiography will be limited to the modification of the slope. The impact during next five years is limited as benches will be formed on the already degraded land. Besides these benches, roads will also modify the physiography. Details are given in Chapter II.
20	Impact of mining on the hydrology of the area including water flow in 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.	During mining, it will be ensured that excavation will be done up to a depth of 18 meter (total of 4 benches in 5 year) bgl or above ground water table whichever comes first. No river/stream passes through or in close aproximity of the mine site.

21	R & R plan/compensation details for the Project Affected People 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, need based sample survey, family-wise, should be undertaken to assess their requirements and action programmes prepared accordingly, integrating the sectoral programmes of line departments of the State Government.	There are no inhabited areas in the allotted mine area, therefore no R&R Plan is proposed. However compensation will be paid to the land owner in case of private land in line with govt. scheme.
22	02 km kachha haul road to be made motorable, submit plan.	Haul road will be made motor able and will be maintained on regular basis.
23	One season (non-monsoon) primary baseline data on ambient air quality ($PM_{2.5}$, PM_{10}, SO_2 and NOx), water quality, noise level, soil and flora and fauna shall be collected and the AAQ data so collected presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be justified. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM_{1O}, particularly for free silica, should be given.	Base line study was carried out for one (non-monsoon) season from March'2018 to May, 2018. Details are provided in Chapter III of this EIA/EMP Report. The locations of the monitoring stations were decided on the basis of prevailing micro-meteorological conditions (Wind direction & wind speed) of the study area. The wind rose has been given in Chapter III of EIA/EMP Report. One location has been selected in downwind direction within 500 m from the lease boundary. Date wise collected baseline AAQ data is attached as **Annexure VII.** The location of the monitoring sites has been shown in **Map No 5** in Chapter III.

24	There should be at least monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM 10 particularly for free silica should be given.	Details of monitoring location of site have been given in table 3.3 (ii) of section 3.3 of chapter 3.
25	Air quality for modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality Contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map. The impact of stone crusher nearby should also be taken into account.	Air quality modeling has been carried out for prediction of impact of the project on the air quality of the area. Line Source Model (published by USEPA) has been used taking into account impact of movement of vehicles Details are incorporated in Chapter IV of the EIA/EMP Report. The windrose showing pre-dominant wind direction has been indicated in Chapter III of the EIA/EMP Report. There is no stone Crusher Unit in vicinity of the project site.
26	The water requirement for the project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.	The total water requirement for the project will around 2.5 KLD. The break-up for water is given in Chapter II of the EIA/EMP Report.
27	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	The total water requirement for the project will around 2.5 KLD which will be procured from

28	Details of water conservation measures proposed to be adopted in the Project should be given.	There will be no backfill rainwater will be collected in the pit at two end of mining outside of mine lease area which will increase the water holding capacity & help in recharging of ground water.
29	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.	There will be no impact of the project on the ground water quality as the mining will not intercept dug ground water No streams or river storm in proximity of the site therefore, the project would not affect surface water.
30	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.	The mining will not intercept the ground water.
31	Details of first order stream, if any passing through the lease area and modification/ diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	No stream flows through the lease area. Therefore no modification/diversion is required for the above project.

<table>
<tr><td>32</td><td>Details of rainwater harvesting proposed in the Project, if any, should be provided.</td><td>No artificial rainwater harvesting is proposed for the present project.</td></tr>
<tr><td>33</td><td>Information on reduced levels site elevation, working depth, groundwater table etc. below natural suface level should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.</td><td>
<table>
<tr><td>Site elevation</td><td>Highest: Approx. 108 m AMSL
Lowest: Approx: 107m AMSL</td></tr>
<tr><td>Working depth</td><td>18 m (benches of 4 for five year)</td></tr>
<tr><td colspan="2">Groundwater depth</td></tr>
<tr><td>Pre-monsoon</td><td>3m-15m bgl</td></tr>
<tr><td>Post-monsoon</td><td>1.45m-13m bgl</td></tr>
</table>
Source: CGWB, Allahabad

Surface geological plan of the lease area are attached with the report as Annexure II (A & B)</td></tr>
<tr><td>34</td><td>Quantity of solid waste generated to be estimated and details for its disposal and management should be provided. The quality, volume and methodology planed for removal and utilization (preferably concurrently) of top soil should be indicated. Details of backfilling proposed, if any, should be given. It may b clearly indicated that out of the total waste generated during the mine life, how much quantity would be backfilled and how much quantity would be disposed off in the form of external dump (number of dumps, their height, terraces etc.</td><td>No waste or top soil shall be generated during mining activities; therefore no separate provision is required for stacking of top soil & waste materials.</td></tr>
</table>

	to be brought out).	
35	The reclamation plan, post mine land use and progressive Greenbelt Development Plan shall be prepared in a tabular form (prescribed format) and submitted.	Details are given in Chapter II. Details regarding post mining landuse given in Chapter II there will be no reclamation and no plantation / green belt at the mine site.
36	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered.	There will be an increase of 188 trippers in the existing traffic per day. The impact due to this has been detailed in Chapter IV of the EIA/EMP Report.
37	Details of the infrastructure facilities to be provided to the mine workers should be included in the EIA report.	A temporary rest shelter will be provided for the workers near to the site with provisions of water, first aid facility, protective equipments, etc. Details are given in Chapter II of the EIA/EMP Report.
38	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	Conceptual plan attached as annexure II(d)
39	Phase-wise plan of plantation and compensatory afforestation should be	Plantation will be carried out of the mine lease

	charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given.	area. Details area given in chapter II
40	Occupational Health impacts of the 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 schedules should be incorporated in the EMP. Special attention should be in view of the stone crusher nearby	Occupational health impact is expected due to fugitive dust emission as a result of movement of vehicles. However appropriate mitigation measures for air pollution control has been proposed (given in Chapter IV of the report). Each labour will undergo pre-placement medical examination. Thereafter periodical heath check up will be arranged as stated in the Chapter VIII of the report.
41	Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	Socio-economic significance provided to the local community i.e. to the nearby villagers is given in Chapter VIII of the EIA/EMP Report.
42	Detailed environmental management plan to mitigate the environmental impacts which, should inter-alia should include the impact due to change of land use, due to loss of agricultural and grazing land, if any, occupational health impacts besides other impacts of the Project. It should also take into account the impacts due to stone crusher nearby and also provide for preventing the	The detailed environmental management plan to mitigate the environmental impacts has been mentioned in Chapter IX of the EIA/EMP Report.

<table>
<tr><td></td><td>silt from going into the river.</td><td></td></tr>
<tr><td>43</td><td>Risk assessment and disaster management plan due to inundation of mine as a result of its location close to the river should also be examined and addressed.</td><td>The mine lease area is located on a stony waste land away from Tones river. Possibility of inundation of mine is less. Detailed points regarding risk assessment and disaster management plan are discussed in Chapter VI.</td></tr>
<tr><td>44</td><td>Public hearing points raised and commitment of the project proponent on the same along with time bound action plan to Implement the same should be provided.</td><td>Public Hearing has been conducted on 09/01/2019 at Meja Tehsil District- Prayagraj under the chairmanship of Additional District Magistrate Prayagraj. Public hearing points raised and commitment of the project proponent has been given in section 7.1 of chapter 7 & PH proceedings are attached at Annexure VI.</td></tr>
<tr><td>45</td><td>Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the project should be given.</td><td>There is no litigation pending against the project. LOI, & Mining lease have been attached as annexure in support of this.</td></tr>
<tr><td>46</td><td>The cost of the project (capital cost and recurring cost) as well as the cost towards implementation of EMP should clearly be spelt out.</td><td>Proposed EMP cost of the project is 6.75 lakh & recurring cost is Rs 6.65 lakh. Details has been given in section 9.5 of chapter 9 of the EIA report.</td></tr>
<tr><td>47</td><td>Present position of distance of railway lines, national highway including culverts and bridges, Reservoir, Lake, Canal, Road including culverts & bridges, soil conservation works, nursery plantation, check dams, water supply schemes &</td><td>
<table>
<tr><th>Site detail</th><th>Distance/ direction</th></tr>
<tr><td>Nearest Railway Station</td><td>Meja road Railway Station at a distance of 10.0 km towards NE direction</td></tr>
<tr><td>Nearest Highway</td><td>NH 71 is approx. 11.0 km towards NE direction.</td></tr>
</table>
</td></tr>
</table>

	irrigation systems, water sources such as springs, infiltration galleries, percolation wells, hand pumps, tube wells and existing flood control/protection work should be included and indicated in location map.	<table><tr><td>Nearest water reservoir</td><td>Tons River approx. 3.0 km towards NW.</td></tr></table> Buffer Map showing the aforesaid location is attached as **Map No 1**.
48	Proponent should submit attested photocopy of the sanction of mining lease by the state Government.	The project has been proposed by M/S D.K. Asociates (Mohd. Afzal Partners) S/o Late Abdul Rasheed R/o Millat Nagar, Obra, Sonebhadra (UP), consent for lease has been given in favor of M/s D.K. Associates vide letter no. 315/khanan/2016-17 dated 25.05.2016 to grant lease deed with condition.
49	The company will have a well laid down Environment Policy approved by its Board of Directors and it may be detailed in the EIA report.	Yes, this project is proposed by a private owner, a Corporate Environmental policy will be framed and will be attached with Final EIA report.
50	The environment Policy must prescribe for standard operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/conditions and it may be detailed in the EIA.	Yes, the environmental policy will prescribed to provide for standard operating procedure to bring into focus any deviation/violation of the environmental or forest norms/conditions.
51	The hierarchical system or administrative order of the company to deal with the environmental issues and for ensuring compliance with EC conditions and details of system may be given.	Details given in Chapter VII.

52	The company must have a 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. This reporting mechanism should be detailed in the EIA report.	The Environmental Management Cell will be made in charge for reporting non compliances/violations of Environmental norms to the Owner.

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Chapter-2

Project Description

2.1 GENERAL

The Environmental Impact Assessment report has been prepared in terms of EIA notification of the MoEF dated 14-9-2006, as amended on 1st Dec 2009, 4th April 2011 and 15th January 2016 and the EIA Guideline Manual for Mining of Minerals (Feb, 2010) of MoEF, Govt. of India, for seeking environmental clearance for mining in the existing area of Giti Patthar & Booulders mining lease measuring 6.07 (total cluster area 50.5854 ha) hectares falling under category "B". This report has been prepared for assessing the environmental impacts on the study area (10km radius around the project site) due to the proposed mining activity.

Name of the lessee - M/S D.K. Asociates (Mohd. Afzal Partners)

S/o Late Abdul Rasheed

Address of the Lessee- R/o Millat Nagar, Obra, Sonebhadra (UP)

2.1 DESCRIPTION OF THE PROJECT

The proposed project is an opencast semi- mechanized mining project, where mining of Giti Patthar & Booulders will be done. The estimated project cost of the mine is Rs 45 Lakhs with average production of 5,62,500 TPA (2,25,000 m3/annum). The project has been proposed by M/S D.K. Asociates (Mohd. Afzal Partners) S/o Late Abdul Rasheed R/o Millat Nagar, Obra, Sonebhadra (UP), consent for lease has been given in favor of M/s D.K. Associates vide letter no. 315/khanan/2016-17 dated 25.05.2016 to grant lease deed with condition.

Mining will be proposed for Gata no. 2061, Khand No. 1A , 8 over an area of 6.07 Ha (15 Acre) at Village: Bhatauti, Tehsil: Meja, District: Allahabad, Uttar Pradesh.

2.2 NEED FOR THE PROJECT

Achieving a huge infrastructure as being envisaged by Government of India particularly in road and housing sector requires basic building materials. Stone, ballast & *Gitti* are primary building material required for the purpose. The mining activities of this kind are the backbone of all construction and infrastructure projects. Raw material for construction is provided by the mining of this nature.

2.3 LOCATION DETAILS

The mining area is located in Village: Bhatauti, Tehsil: Meja, District: Allahabad, Uttar Pradesh. The mining lease / proposed project area falls in Survey of India Toposheet No. 63K/4. The mine lease area is located between:

Latitudes 25° 9'1.74"N

Longitudes 82°2'5.94"E

Nearest Railway Station : Meja Roaad railway Station, approx 10 km. towards NE direction.

Nearest Airport : Allahabad Airport is approx 44.5 km. towards NW direction.

Nearest Highway : NH-76, approx 11.0 km. towards NE direction.

2.4 LEASE HOLD AREA

The entire lease hold area of 6.07 Ha (15 Acre) lies in village Bhatauti of Allahabad District, Uttar Pradesh. The breakup of the existing land use for ancillary feature around the mining area is given below:-

Table 2.1 Land Use Pattern

Sr. No.	Land use	Agriculture land (ha)	Forest Land (ha)	Waste land (ha)	Grazing Land (ha)
1	Mining pits Quarry	-	-	-	-
2	Approach Road	-	-	-	-
3	Dumps	-	-	-	-
4	Office, Resht Shelter etc.	-	-	-	-
5	Balance undisturbed land	-	-	6.07	-
	Total	-	-	6.07	-

2.5 PHYSIOGRAPHY

The area lies in survey of India's Topo-sheet No. 63K/4. The area is dominated by boulder outcrops of kaimur plateau. No seasonal & perennial & drainage exists within the lease area. Due to past mining the lease area degraded by mining pit & depth of pit varies 5m to 6m. The highest and lowest point in the leasehold is 107.50mRL towards south direction and 271.38mRL towards north direction.

2.6 DRAINAGE PATTERN

Rivers of the Allahabad district namely Yamuna, Tons, Sai and Varuna belongs to main drainage system of the Ganga. Dendritic drainage pattern is the most common features in the district which is the structurally controlled. Streams upto the fifth order are encountered in the district. The strong network of canal as well as ground water is source of irrigation. Total length of canal is 2211 km which irrigates 125568 hectare area under cultivation. Drainage map has been attached as map II in section 2.

In future most of the lease area may convert into pits so there is possibility of rain water to get accumulated, therefore garland drains of 0.50m x 0.50m will be made to prevent water from entering the mine during rainy season. However the water accumulated in the mine pits during rainy season will be pumped out and after required analysis will be used for green belt development. There will be no ground water problem or seepages as the work will be confined to a shallow depth and also the water table in this area is far below the surface. Hence, there will be no discharge of mine water.

2.7 GEOLOGY

The district is mainly characterized with Ganga, Yamuna alluvial plain and Vindhyan Plateau. G.S.I. (2001) has identified the following geomorphic features. 1. Active Flood Plain: It is quite localized and confined only to the river system.

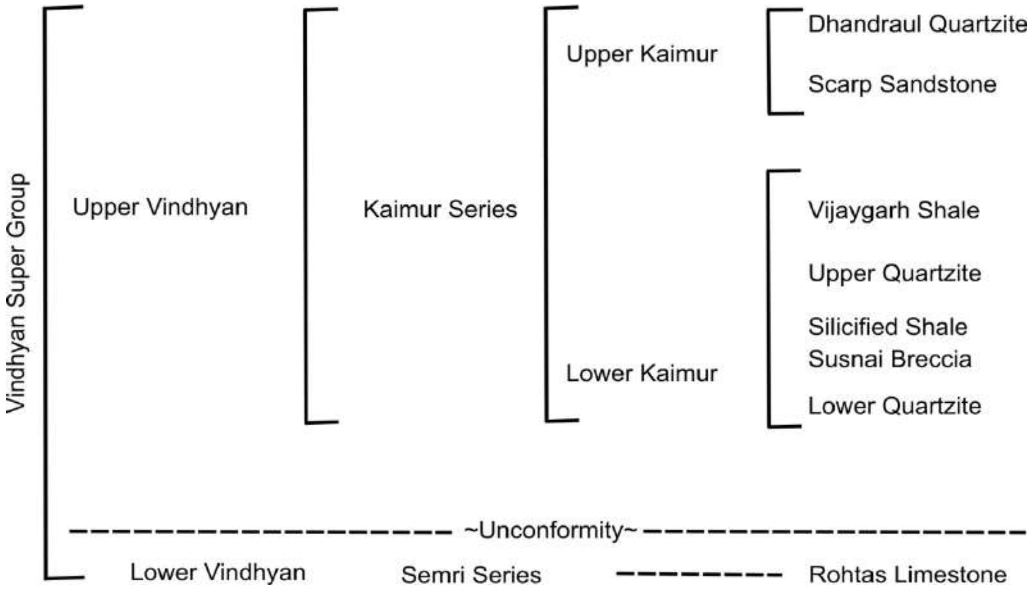
2. Older Alluvial Plain: It is characterized by depositional and erosional terraces found in patches along the active plain.

3. Rocky Surface (Denudational hills): These are prominent in trans Yamuna area formed mainly of quartzitic nature. The Active Alluvial Plain is of low relief characterized by thick deposition of clay, kankar, sand and gravel. The master slope of Trans Ganga is towards east or south east, with the altitude ranging from 89.30 mamsl-93.57 masl. Older Alluvial Plain lies along river Ganga. It is less pronounced in trans Yamuna area. The Denudational hills are quite prominent in Trans Yamuna area and in Shankargarh, Koraon, Meja and Manda in particular. Geologically the district is characterized by Quaternary alluvium and Vindhyan Plateau. The age of these formations range from Protterozoic to Recent. Quartzite of Kaimur group forms the basement in the area which is unconformably overlain by Quaternary alluvium. Subsurface geology of the district has been inferred on the basis of borehole data. It is observed that surface lithological behavior is quite different in Trans Ganga and Trans Yamuna area. The alluvium as classified Younger and Older one. Older alluvium is again classified into two subdivision i) Banda Older alluvium ii) Varanasi Alluvium. Sub-surface geological characters of hard rock area is quite distinct than Trans Ganga area.

Source: cgwb.gov

2.7.1 REGIONAL GEOLOGY

The sand stone of applied area belongs to upper part of Kaimur Plateau. Regional Geology of the area is given below:



2.7.2 GEOLOGY OF THE AREA:

The sand stone of area is full grained, massive in colour & gently dipping. Colour variation is observed in some place. The upper layer shows signs of weathering. Two sets of joints are prominent within area & areas bel

Joints	Direction	Degree
J1	305N	30
J2	240N	60

2.7.2 LOCAL GEOLOGY

The area is dominated by medium to fine grained, granite boulders. It usually occurs as boulder concentrations dark grey in colors with porphyritic texture. Vein lets of quartz are also seen with the deposit. The upper layer shows signs of weatherings. Three joints pattern are seen with in lease area as below:

The thin section studies (photomicrograph) shows feldspars with polysynthetic twinning under cross Nicolas and quartz showing spectrum of colors at different R.I., under Gypsum plate. At few places alteration of feldspar is noticed. The existence of accessory minerals such as biotitic, hornblende is less.

2.8 RESERVES

The reserve estimation has been done by cross-sectional method. Two cross-sections at an interval of 222m to 240m are drawn. The surface areas of cross-sections are multiplied by the cross-sectional strike influence to get the volume.

GEOLOGICAL RESERVES:

The geological reserves estimated by cross-sectional method can be categorized in to three classes:

a) Proved Reserves(111):

All the Quantities of Gitti, Patthar & Boulder occurring 20m below surface ground has been considered as under proved category.

b) Probable Reserve (122):

A 10 m. zone below the proved reserve zone is considered as Probable Reserves.

c) Inferred Mineral Resources(333):

All quantities of Gitti Patthar/Boulder occurring 5m below probable zone has been considered Inferred Mineral Resources. The detailed categorized table of proved & probable and Inferred Mineral Resources is shown Table 2.2

Summary of Geological reserves is as below:

Table: 2.2 Geological Reserve

Category of Resource	Total Capacity (Cum)	Total Capacity (Tonnes)
Proved	1194240	2985600
Probable	597120	1492800

Possible	298560	746400
Total	2089920	**5224800**

MINEABLE RESERVE:

Benches of height & width 6m have been drawn in geological sections to calculate the mineable reserves. The area of each bench level has been calculated & multiplied by strike influence to get the volume. The mineable reserve is given in Table No. 2.3

Table 2.3 Mineable Reserve

Bench Level (mRL)	Quantities of Minerals (CUM)	Quantities of Minerals (tonnes)
105	328560	821400
99	292128	730320
93	257424	643560
87	224448	561120
81	193200	483000
75	163680	409200
Total	**1459440**	**3648600**

2.9 PROPOSED METHOD OF MINING

It shall be opencast semi-mechanized mine. To meet required production wagon drill hole with deep hole blasting shall be carried out. The blasted materials will be handled with excavator & loaded into dumpers. The height & width of bench shall be kept 6m with face slopes 70^0 . 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:

Table 2.4 Production Detail

Year	ROM Stone/Gitti/ Boulder (cum)	Production(Cum)
1	225000	225000

2	225000	225000
3	225000	225000
4	225000	225000
5	225000	225000
Total	**1125000**	**1125000**

1st Year (2015-16):

The mining faces will be open from top to downward and advanced towards north, north- east, and north-west directions. 225000 cum (562500 TPA) quantities of Gitt, Boulders khandas shall be exploited from benches 105mRL. Approach road having width 6.0m & gradient 1:16 shall be provided to connect each mining faces for transportation of mineral. Face length, face advancement width, height & exploitaion of minerals.

2nd Year (2016-17):

The mining faces will be advanced towards north, north- east, and north-west directions. Bench 105mRL shall be flattened & all quantities of Gitti Patthar and Boulders shall be exploited from bench. A new bench 99mRL shall be opened in box cut like manner & advanced in all direction. Approach road having width 6.0m & gradient 1:16 shall be provided to connect each mining faces for transportation of mineral. Face length, face advancement width, height.

3rd Year (2017-18):

The mining faces will be advanced north, north- east, and north-west directions. Bench 105mRL shall be reached its ultimate pit limit while bench 99mRL shall be flattened & all quantities of Gitti, Pattthar and Boulders shall be exploited from bench. A new bench 93.0mRL shall be opened and advanced in all directions. Approach road having width 6.0m & gradient 1:16 shall be provided to connect each mining faces for transportation of mineral. Face length, face advancement width, height

4th Year (2018-19):

During this year, mining faces will be advanced towards north east, east & south-east directions. Bench 99mRL shall be reached its ultimate pit limit while bench 93 mRL shall be flattened & all quantities of Gitti, Patthar, Boulders shall be exploited. A new bench 87mRL shall be opened and advanced in all directions. Approach road having width 6.0m & gradient 1:16 shall be provided to connect each mining faces for transportation of mineral. Face length, face advancement width, height

5th Year (2019-20):

The mining faces will be opened and advanced towards north east, east & south-east directions. Bench 93mRL shall be reached its ultimate pit limit & bench 87.0mRL shall be flattened & all quantities of Gitti, Pattthar and Boulders shall be exploited. A new bench 81mRL shall be opened & advanced in all directions. Approach road having width 6.0m & gradient 1:16 shall be provided to connect each mining faces for transportation of mineral. Face length, face advancement width, height.

2.9.2: DRILLING & BLASTING

Drilling of vertical holes is proposed for extraction of rock to control the problem of toes, a provision of 10% sub-grade drilling has been made. Blasting is required to dislodge sand stone rock.

The diameter of blast holes is generally governed by the bench height. The larger the diameter of the hole, the more will be the burden and spacing, which in turn will yield bigger size boulders in the blasted mass. If the shovel size is already fixed, as is the case in this mine, and the boulders are too big for the shovel to load, secondary drilling and blasting for reducing the size of such boulder will have to be increased. On the contrary, the smaller the hole diameter, lesser would be the burden and spacing of holes which means more meterage of drilling for the same excavation. Accordingly for the 6m high benches adopted of drilling for the same excavation. Accordingly for the 6m high benches adopted for this mine, the diameter of blast holes is proposed 100 mm.

Drilling is being carried out with 34" dia jack hammer drill rids & blasting material is explosive. The blasted material broken by manually up to sized 2ft & loaded into tippers manually dispatch to crusher plant which is about 1.5km away from mine site. Mining is being carried thought the formation of one bench. The height of bench was kept 2m width of benches was kept 3.0m with face slope 60o. Approach road having width 5 m & gradient 1:16 was provided to mining faces from the transportation of mineral.

Precaution during Drilling & blasting:

1. Stemming should be strong and of adequate length and not then 1/3rd length of the hole. This will check blow outs.
2. Blasting should be done, if feasible, once blasting of larger rounds, infrequently can be better supervised, causing reduction in nuisances, further the villagers provided less frequently, will itself lead to reduction in the number of complaints.
3. Before electric firing, the circuit will be tested by an approved tester.
4. To prevent risk of injury to anybody by flying pieces of Gitty after blast, muffle blasting will be adopted. In this practice the mouth of the shot and some distance around it will be covered by steel sheets, weighted by sant bags, old sleepers etc. This will prevent the broken rock from flying out.
5. All the precautions suggested in MMR 1961 specially as specified from Regulation 162 to Regulation 168 shall be adhered.

2.9.3: LOADING/TRANSPORT

The broken stone will be handled with excavator & loaded into dumpers & transported to crusher plant for making aggregate.

2.10 POST MINING LAND USE:

The land use at present, at the end of plan period & at the end of conceptual period is given below:

Table 2.5 Post Mining Land Pattern

Sl. No	Head	At the end of plan period (ha)	At the end of conceptual period of mine (ha.)
a)	Mining and Existing pits	5.36	5.36
b)	Waste dumps	Nil	Nil
c)	Road	0.002	Nil
d)	Infrastructure Facilities	Nil	Nil
e)	Afforestation	Nil	Nil
f)	Balance undisturbed land	0.708	0.71
	Total	6.07	6.07

Mining will be done unto 82mRL. After completion of mining the outer periphery of mining pit shall be fenced. During plan period & by the end of conceptual period no waste shall be generated. All quantities of *Gitti*, Patthar and Boulders to be exploited shall be used for making aggregates. Therefore it is not possible to rehabilitate the mined out benches. The mined out pit shall remain open & rain water will accumulate in the pits. A water body in the area will be boon to local people for improving their life style.

2.11 CONCEPTUAL MINING PLAN

One pit will be developed during conceptual periods & dimension of pit will be 370m long, 145m wide & 36m deep. The depth of will be confirming to 81mRL. The height of benches shall be kept 6.0 m, width of benches shall be kept 6.0m & slope of fences shall be kept 70 deg. 334440 cum of Gitti, Pattthar and Boulders shall be generated during conceptual period. Exposures of Gitty exists with in the entire lease area therefore generation of waste shall be nil. Therefore no such proposal of rehabilitation of benches has been envisaged.

2.10.1: ANTICIPATED LIFE OF THE MINE

It isis fresh grant case of mining lease and ining operations yet to be commenced. The total mineable reserves are 1459440 cum & with average rate of production of 225000 cum of Gitti, Patthar, Boulders, at the end of second year, the expected life of mine comes about $6^{1/2}$ years.

2.10.3: Nature of waste

Waste material from mining comprises of soil and quarry waste. It is proposed to dump all the quarry waste on a 7.5 m wide bench with dump width of 0.5 m and height of 1.5 m, so that waste generated does not fall down along the gradient. It shall be used for backfilling. Soil will be spread over old dump and backfilled area after mining. Plantation will be done progressively over the backfilled areas.

2.11 UTILITIES

2.11.1 Water

The water required is mainly for dust suppression, green belt development and drinking during mining operations. The total requirement will be 2.595 KLD. Out of total requirement, water for dust suppression and green belt development will be taken from the bore well situated inside the mine lease area, while for drinking purpose water is brought from the hand pumps and wells in the nearby village and stored in pitchers.

Table 2.7 Water Requirement

S.No.	Purpose	Water Requirement(KLD)	Source
1.	Domestic and Drinking	1.395	Handpump & Well
2.	Dust Suppression	1.2	Borewell/surface water
Total		**2.595**	

2.11.2 Power

No power consumption will be there, as mine will work only in day time.

2.11.3 Infrastructure

The site services like temporary rest shelter, first aid box, domestic water facilities and septic tanks will be provided to workers at the mine site.

2.11.4 Manpower

As per the proposed production the total manpower requirement will be limited to a specific number of miners. However, the number of unskilled labour may increase/decrease depending on the quantum of overburden removal. The lessee will employ around 31 skilled and unskilled workers for removal of overburden, quarry cleaning and road repairing, etc. which includes the following

Table 2.8 Manpower Requirement

Mines manager/mining engineer (Full time)	1
Mines mate / Blaster	1
Skilled	
Drivers	14
Loader operator	1
Excavator operator	2
Supervisor	1

Wagon Drill Operator	2
Time Keeper	1
Office Assistant/ Dispatch Supervisor	1
Semiskilled	
Compressed Operator	2
Unskilled	
Piece rated workers	5
Total	**31**

2.12 USE OF MINERAL

The end products of the mining will be used for the construction of buildings, dams, bridges, tunnels and roads. Some of the extracted mineral is sold to the local people. There is no probability of finding mineral other than sandstone and boulder in the mining lease area.

2.13 MINERAL BENEFICIATION

As per requirement it is sent to the crusher plant situated outside the mine lease area where it is further resized and segregated into different sizes with the help of crusher, roller and conveyor belt. After resizing the product is loaded into the trucks and sent to destined places.

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Chapter-3

Baseline Environmental Studies

3.0 INTRODUCTION

This section contains the description of baseline studies of the 10 km radius of the area surrounding Village: Bhatauti, Tehsil: Meja, District: Allahabad, 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.

The proposed project is an opencast semi- mechanized mining project, where mining of Giti Patthar & Booulders will be done. The estimated project cost of the mine is Rs 45 Lakhs with average production of 5,62,500 TPA (2,25,000 m3/annum). The project has been proposed by M/S D.K. Asociates (Mohd. Afzal Partners) S/o Late Abdul Rasheed R/o Millat Nagar, Obra, Sonebhadra (UP), consent for lease has been given in favor of M/s D.K. Associates vide letter no. 315/khanan/2016-17 dated 25.05.2016 to grant lease deed with condition.

Mining will be proposed for Gata no. 2061, Khand No. 1A , 8 over an area of 6.07 Ha (15 Acre) at Village: Bhatauti, Tehsil: Meja, District: Allahabad, Uttar Pradesh.

3.1 BASELINE DATA

3.1.1 LAND ENVIRONMENT

Land-Use/land cover pattern of the study area delineating all the features has been studied through satellite imagery. The lease area is located on a hill where mining of this type is already going on. The slope of the area is from east to west. The surrounding area consists of any thick vegetation except for patched agricultural lands.

The land use for cluster of mines of the study area is tabulated below and land use map is attached as **Map no.3.**

Table 3.1 (i): Land Use cover of the project study area

S. No.	Description	Area in Hectares	% share in total area
1.	Settlements	553.64	1.65
2.	Water bodies	399.35	1.25
3.	River	431.17	1.30
4.	River with Dry Channel	247.17	0.75
5.	Open Land	270.94	0.85
6.	Scrub/Stony Waste	5765.67	16.93

7.	Vegetation	332.27	0.97
8.	Agricultural Land	26044.68	76.6
Total		**34044.89**	**100**

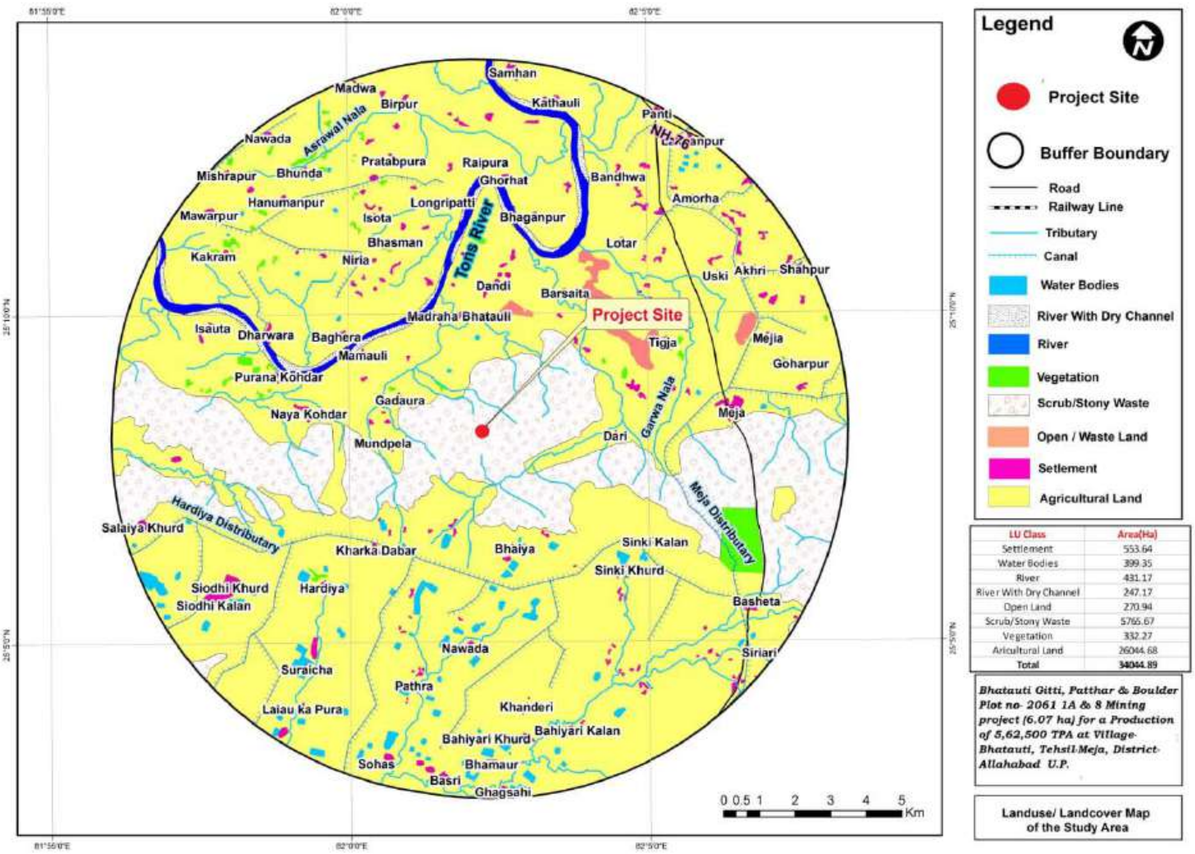

Fig No. 3.1(a), Land Use covers of the project study area

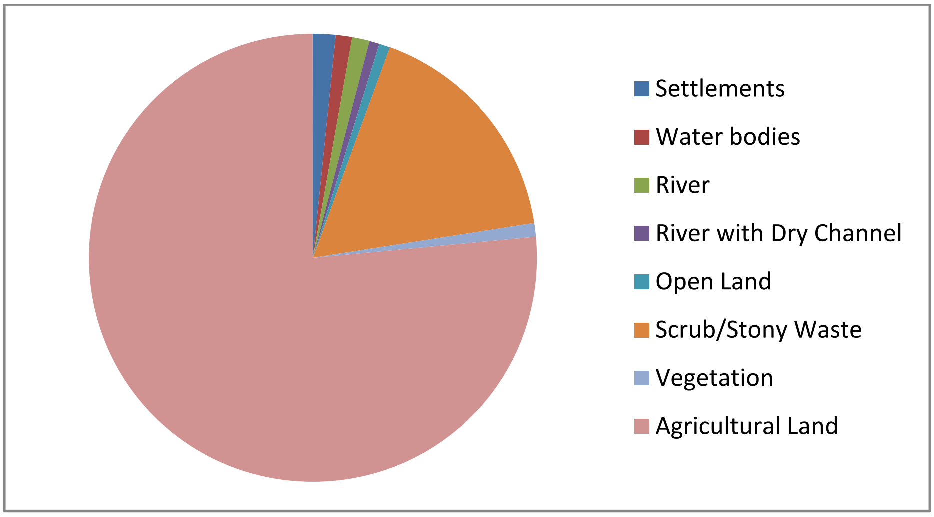

Fig No. 3.1(b), Land Use covers of the project study area

There will be no diversion or modification of any land use due to the mining activity.

3.1.2 AIR ENVIRONMENT

Ambient air quality monitoring stations were selected primarily on the basis of surface influence, demographic influence and meteorological influence. 24 hourly monitoring was carried out for SO_2, NO_2, PM_{10} & $PM_{2.5}$ twice a week at each station. This study was done during pre monsoon season for a period of 3 months (March'2018 to May, 2018).

a. Site-specific meteorological data

Month	Wind Speed (kmph)			Temperature (oC)			Relative Humidity (%)			Rain Fall * (mm)		
	Mean	**Max.**	**% of calm**	**Mean (Dry Bulb)**	**Highest**	**Lowest**	**Mean**	**Highest**	**Lowest**	**Total**	**24-hours Highest**	**No. of rainy days**
March, 18	--	29	93	33	38.3	11.6	--	94	6	0	0	0
April, 18	-	28	53.3	21.6	40.5	17.7	--	94	4	0.2	0.12	2
May, 18	--			32.2	45.5	21.1	--	94	4	0.48	0.35	4

b. Wind Rose Diagram

Fig No. 3.2 Windrose Diagram

3.2 Method of 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 below:

Table 3.2: Methods adopted for PM_{10}, $PM_{2.5}$, SO_2, and NO_2

Parameters	Technique	Technical Protocol	Minimum Detectable Limit
$PM_{2.5}$	Gravimetric method	CPCB Guideline Vol. I May' 2011	5 (µg/m^3)
PM_{10}	Gravimetric method	IS 5182 (Part-XXIII)	5 (µg/m^3)
Sulphur Dioxide	Improved West and Gaeke	IS-5182 (Part-II)	5 (µg/m^3)
Nitrogen Dioxide	Modified Jacob & Hochheiser	IS-5182 (Part-VI)	6 (µg/m^3)

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:

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 monitoring locations are marked in **Map No. 4.**

The ambient air quality data were collected to find the existing GLC. The data is given in Table No. 3.1 (iv).

Table 3.3 (I) Ambient Air Quality Monitoring Stations

S.No.	Location	Station name	Distance (approx.) & direction from the lease area (km)		Zone (Core/ Buffer)
1.	**AQ1**	Gadevara	3 Km	SW	Buffer zone
2.	**AQ2**	Meja Khas	5.5 Km	E	Buffer zone
3.	**AQ3**	Konan	6 Km	N	Buffer zone
4.	**AQ4**	Chandhas	4 Km	S	Buffer zone
5.	**AQ5**	Project Site	-	-	Core zone

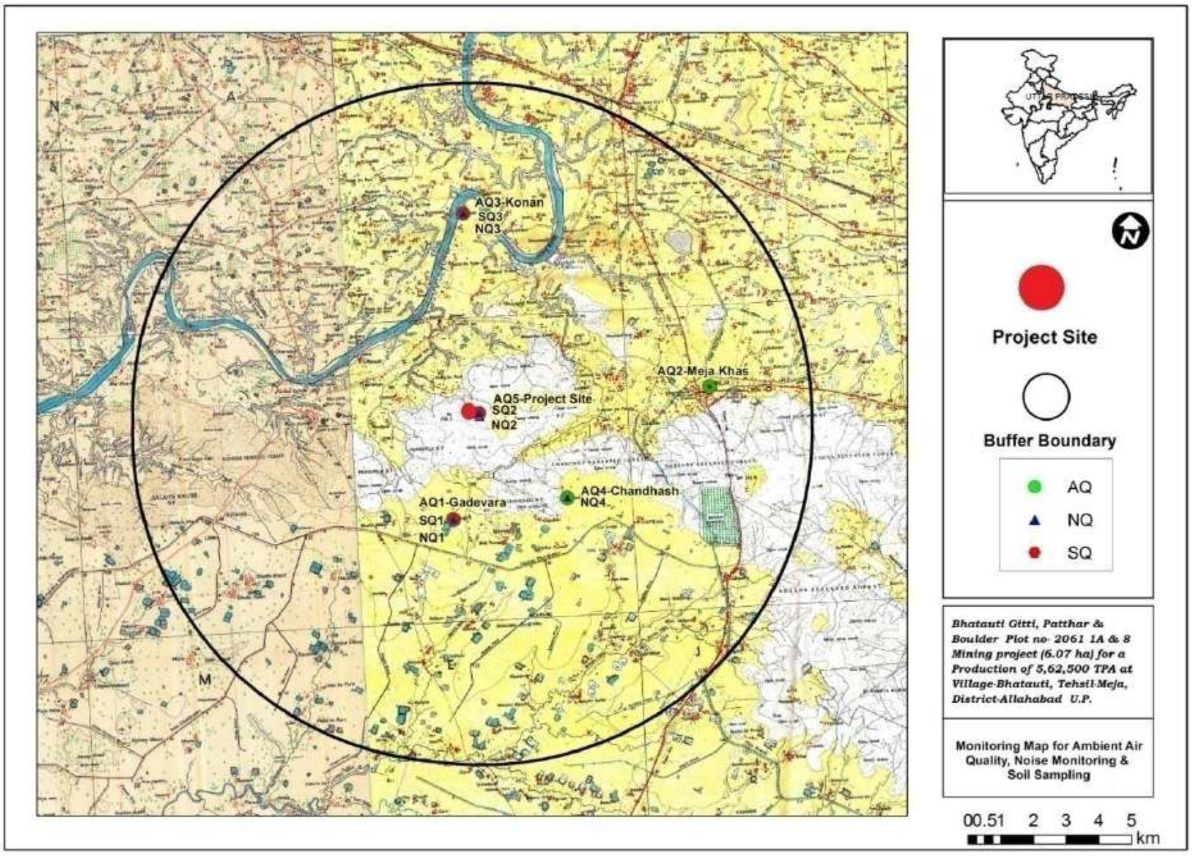

Fig. no. 3.3, Air, Noise, Soil Quality Monitoring Stations Map

Table 3.3 (ii): Ambient Air Quality & Free Silica Status

Site	Particulars	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	SO_2 (µg/m³)	NO_2 (µg/m³)	Free Silica
AQ1 (Gadevara) (24 Observations)	Minimum	38.14	65.36	5.58	11.64	1.02
	Maximum	51.64	73.57	10.26	16.31	1.82
	Average	45.13	68.98	7.92	14.45	1.46
	98th Percentile*	51.64	72.51	10.26	16.31	1.77
AQ2 (Meja Khas) (24 Observations)	Minimum	38.25	62.35	7.55	14.64	0.79
	Maximum	47.57	71.25	12.12	20.23	1.74
	Average	43.71	67.13	9.24	16.61	1.11
	98th Percentile*	47.57	70.33	12.06	19.53	1.56
AQ3 (Konan) (24 Observations)	Minimum	38.96	60.67	5.58	11.64	1.02
	Maximum	48.19	69.14	10.26	16.31	1.82
	Average	42.50	65.18	7.92	14.45	1.46
	98th Percentile*	48.19	68.73	10.26	16.31	1.77
AQ4 (Chandhas) (24 Observations)	Minimum	38.36	60.14	8.32	14.63	0.70
	Maximum	47.52	69.25	12.12	20.23	1.47
	Average	42.46	64.17	10.20	17.33	1.04
	98th Percentile*	47.52	67.93	12.06	20.23	1.37
AQ5 (Project Site) (24 Observations)	Minimum	38.25	60.25	8.21	12.36	1.12
	Maximum	48.54	68.89	12.12	22.23	2.14
	Average	44.70	64.49	10.14	16.69	1.67
	98th Percentile*	48.54	67.70	12.07	21.31	2.07
CPCB Standards (µg/m³)		**60**	**100**	**80**	**80**	**-**

*** Note:** The 98th percentile is calculated statistically only to compare with NAAQ standards of short terms values.

BDL: Below Detectable Limit

Observations:

Ambient Air Quality Monitoring reveals that the maximum & minimum concentrations of $PM_{2.5}$ for all the 5 AQ monitoring stations were found to be 51.64 µg/m³ and 38.14 µg/m³, respectively. The maximum & minimum concentrations of PM_{10} for all the 5 AQ monitoring stations were found to be 73.57 µg/m^3 and 60.14 µg/m^3, respectively.

As far as the gaseous pollutants SO_2 and NO_x are concerned, the prescribed CPCB limit of 80 µg/m^3 and 100 µg/m^3 for residential and rural areas has never surpassed at any station. The maximum & minimum concentrations of SO_2 were found to be 12.12 µg/m^3 & less than 5.58 µg/m^3 respectively. The maximum & minimum concentrations of NO_x were found to be 21.31 µg/m^3 & 11.64µg/m^3 respectively.

Free SiO_2 (in µg/m^3):

The standard for Respirable dust is 3 µg /m^3 for 8 hour of working period where free silica content should not exceed 5% as prescribed by Directorate General of Mines Safety.

3.1.3 WATER ENVIRONMENT

a) Ground water

Three water samples were collected from the study area. The physico-chemical analysis of the water samples is given in the Table 3.1 (vi).

The Ground water sampling locations are marked in **Map No. 5**

Table 3.3 (iii)

Ground water sampling locations

Station No.	Location	Approx. Distance (km)	Direction	Core zone/ Buffer zone
GW1	Gadevara	SW	2.5 Km	Study area
GW2	Bhasunder Mijhali	N	1.5 Km	Study area
GW3	Meja Khas	E	5.5 Km	Study area

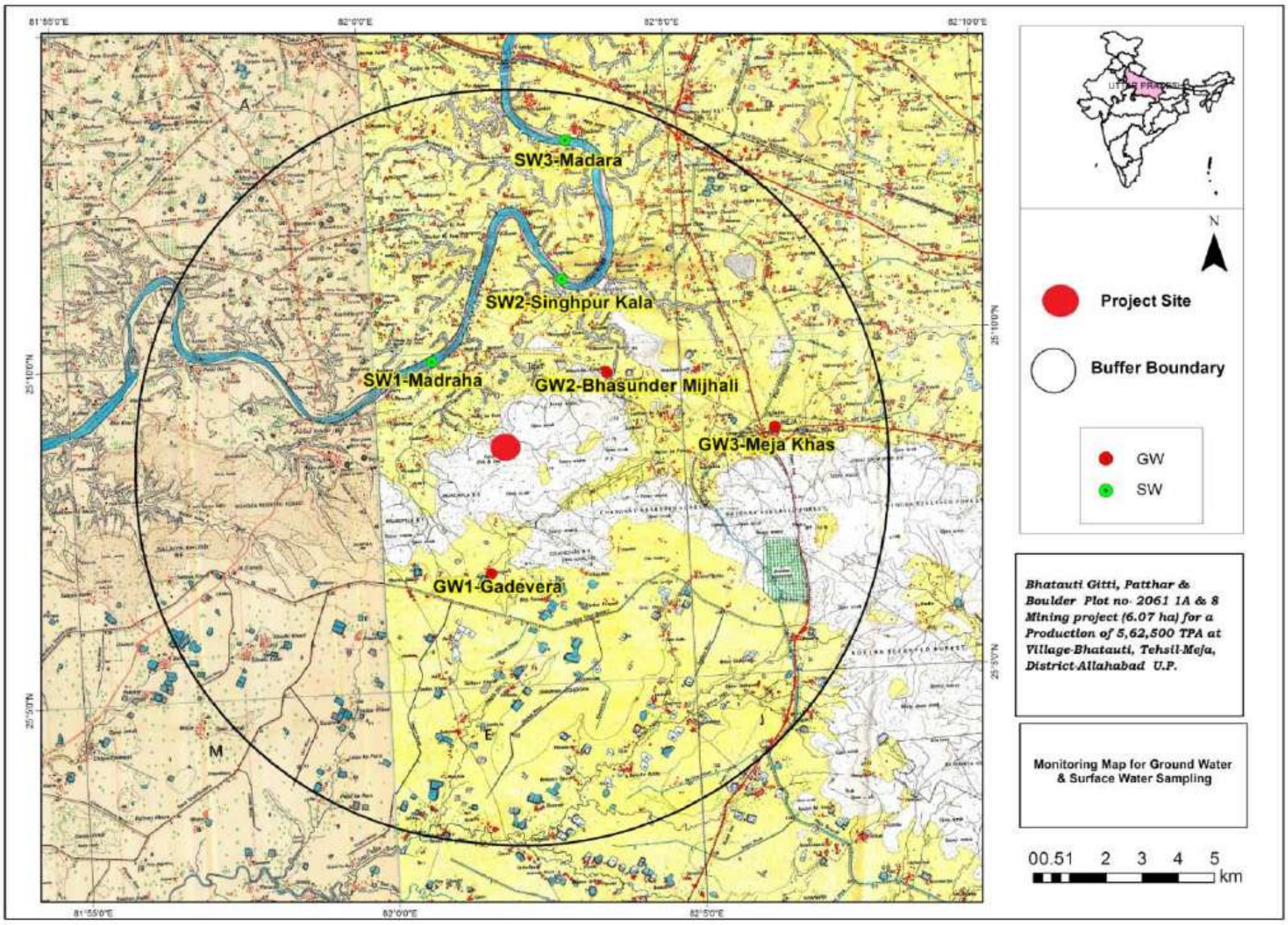

Fig. No. 3.3, Ground and Surface Monitoring Stations Map

Table 3.1 (iv) Physico-chemical properties of ground water

S.No	Parameter	**Limit (as per IS:10500:2012)**		Unit	**GW1 (Gadevara)**	**GW2 (Bhasunder Mijhali)**	**GW3 (Meja Khas)**
		Desirable Limit	**Permissible Limit**				
1	Colour	5	15	Hazen	<5	<5	<5
2	Odour	Agreeable	Agreeable	-	Agreeable	Agreeable	Agreeable
3	Taste	Agreeable	Agreeable	-	Agreeable	Agreeable	Agreeable
4	Turbidity	1	5	NTU	<1	<1	<1
5	pH	6.5-8.5	No Relaxation	-	7.51	7.62	7.75
6	Total Hardness (as CaCO3)	200	600	mg/l	325	345	315
7	Iron (as Fe)	0.3	No Relaxation	mg/l	0.11	0.12	0.09
8	Chlorides (as Cl)	250	1000	mg/l	112	121	98
9	Fluoride (as F)	1	1.5	mg/l	0.4	0.4	0.5
10	TDS	500	2000	mg/l	576	632	534
11	Calcium(as Ca2+)	75	200	mg/l	78	82	75
12	Magnesium (as Mg2+)	30	100	mg/l	31	33	30
13	Copper (as Cu)	0.05	1.5	mg/l	<0.01	<0.01	<0.01
14	Manganese(as Mn)	0.1	0.3	mg/l	0.05	0.06	0.04
15	Sulphate (as SO4)	200	400	mg/l	42	56	38
16	Nitrate(as NO3)	45	No Relaxation	mg/l	3.2	3.8	2.8
17	Phenolic Compounds (as C6H5OH)	0.001	0.002	mg/l	<0.001	<0.001	<0.001
18	Mercury (as Hg)	0.001	No Relaxation	mg/l	<0.001	<0.001	<0.001
19	Cadmium (as Cd)	0.003	No Relaxation	mg/l	<0.01	<0.01	<0.01
20	Selenium (as Se)	0.01	No Relaxation	mg/l	<0.01	<0.01	<0.01
21	Arsenic (as As)	0.01	0.05	mg/l	<0.01	<0.01	<0.01
22	Cyanide (as CN)	0.05	No Relaxation	mg/l	<0.01	<0.01	<0.01
23	Lead (as Pb)	0.01	No Relaxation	mg/l	<0.01	<0.01	<0.01
24	Zinc (as Zn)	5	15	mg/l	0.04	0.05	0.03
25	Anionic Detergent (as MBAS)	0.2	1	mg/l	<0.01	<0.01	<0.01
26	Chromium (as Cr6+)	0.05	No Relaxation	mg/l	<0.01	<0.01	<0.01
27	Mineral oil	0.5	No Relaxation	mg/l	<0.1	<0.1	<0.1
28	Alkalinity (as CaCO3)	200	600	mg/l	280	295	270
29	Aluminum (as Al)	0.03	0.2	mg/l	<0.02	<0.02	<0.02
30	Boron (as B)	0.5	1	mg/l	0.2	0.2	0.1
	Bacteriological Parameter						
1	Total Coliform	Shall not be detectable		MPN/100ml	Not Detected (<2)	Not Detected (<2)	Not Detected (<2)
2	E.coli	Shall not be detectable		E.coli /100ml	Absent	Absent	Absent

ND: Not Detectable

Table 3.1 Physico-chemical properties of ground water at village (November)

S.No	Parameter	Limit (as per IS:10500:2012)		Unit	GW1 (Gadevara)	GW2 (Bhasunder Mijhali)	GW3 (Meja Khas)
		Desirable Limit	**Permissible Limit**				
1	Colour	5	15	Hazen	<5	<5	<5
2	Odour	Agreeable	Agreeable	-	Agreeable	Agreeable	Agreeable
3	Taste	Agreeable	Agreeable	-	Agreeable	Agreeable	Agreeable
4	Turbidity	1	5	NTU	<1	<1	<1
5	pH	6.5-8.5	No Relaxation	-	7.21	7.28	7.46
6	Total Hardness (as CaCO3)	200	600	mg/l	305	317	310
7	Iron (as Fe)	0.3	No Relaxation	mg/l	0.10	0.11	0.08
8	Chlorides (as Cl)	250	1000	mg/l	110	117	95
9	Fluoride (as F)	1	1.5	mg/l	0.3	0.5	0.4
10	TDS	500	2000	mg/l	570	628	529
11	Calcium(as Ca2+)	75	200	mg/l	74	79	71
12	Magnesium (as Mg2+)	30	100	mg/l	28	30	27
13	Copper (as Cu)	0.05	1.5	mg/l	<0.01	<0.01	<0.01
14	Manganese(as Mn)	0.1	0.3	mg/l	0.04	0.05	0.03
15	Sulphate (as SO4)	200	400	mg/l	38	51	35
16	Nitrate(as NO3)	45	No Relaxation	mg/l	3.0	3.4	2.2
17	Phenolic Compounds (as C6H5OH)	0.001	0.002	mg/l	<0.001	<0.001	<0.001
18	Mercury (as Hg)	0.001	No Relaxation	mg/l	<0.001	<0.001	<0.001
19	Cadmium (as Cd)	0.003	No Relaxation	mg/l	<0.01	<0.01	<0.01
20	Selenium (as Se)	0.01	No Relaxation	mg/l	<0.01	<0.01	<0.01
21	Arsenic (as As)	0.01	0.05	mg/l	<0.01	<0.01	<0.01
22	Cyanide (as CN)	0.05	No Relaxation	mg/l	<0.01	<0.01	<0.01
23	Lead (as Pb)	0.01	No Relaxation	mg/l	<0.01	<0.01	<0.01
24	Zinc (as Zn)	5	15	mg/l	0.04	0.05	0.03
25	Anionic Detergent (as MBAS)	0.2	1	mg/l	<0.01	<0.01	<0.01
26	Chromium (as Cr6+)	0.05	No Relaxation	mg/l	<0.01	<0.01	<0.01
27	Mineral oil	0.5	No Relaxation	mg/l	<0.1	<0.1	<0.1
28	Alkalinity (as CaCO3)	200	600	mg/l	272	289	265
29	Aluminum (as Al)	0.03	0.2	mg/l	<0.02	<0.02	<0.02
30	Boron (as B)	0.5	1	mg/l	0.2	0.2	0.1
	Bacteriological Parameter						
1	Total Coliform	Shall not be detectable		MPN/100ml	Not Detected (<2)	Not Detected (<2)	Not Detected (<2)
2	E.coli	Shall not be detectable		E.coli /100ml	Absent	Absent	Absent

ND: Not Detectable

Table 3.1 (ix) Physico-chemical properties of ground water at (December)

S.No	Parameter	Limit (as per IS:10500:2012)		Unit	GW1 (Gadevara)	GW2 (Bhasunder Mijhali)	GW3 (Meja Khas)
		Desirable Limit	Permissible Limit				
1	Colour	5	15	Hazen	<5	<5	<5
2	Odour	Agreeable	Agreeable	-	Agreeable	Agreeable	Agreeable
3	Taste	Agreeable	Agreeable	-	Agreeable	Agreeable	Agreeable
4	Turbidity	1	5	NTU	<1	<1	<1
5	pH	6.5-8.5	No Relaxation	-	7.48	7.32	7.65
6	Total Hardness (as CaCO3)	200	600	mg/l	331	352	322
7	Iron (as Fe)	0.3	No Relaxation	mg/l	0.12	0.13	0.10
8	Chlorides (as Cl)	250	1000	mg/l	117	124	102
9	Fluoride (as F)	1	1.5	mg/l	0.6	0.5	0.4
10	TDS	500	2000	mg/l	582	639	536
11	Calcium(as Ca2+)	75	200	mg/l	83	86	81
12	Magnesium (as Mg2+)	30	100	mg/l	34	38	32
13	Copper (as Cu)	0.05	1.5	mg/l	<0.01	<0.01	<0.01
14	Manganese(as Mn)	0.1	0.3	mg/l	0.04	0.05	0.03
15	Sulphate (as SO4)	200	400	mg/l	46	59	42
16	Nitrate(as NO3)	45	No Relaxation	mg/l	3.8	4.3	3.2
17	Phenolic Compounds (as C6H5OH)	0.001	0.002	mg/l	<0.001	<0.001	<0.001
18	Mercury (as Hg)	0.001	No Relaxation	mg/l	<0.001	<0.001	<0.001
19	Cadmium (as Cd)	0.003	No Relaxation	mg/l	<0.01	<0.01	<0.01
20	Selenium (as Se)	0.01	No Relaxation	mg/l	<0.01	<0.01	<0.01
21	Arsenic (as As)	0.01	0.05	mg/l	<0.01	<0.01	<0.01
22	Cyanide (as CN)	0.05	No Relaxation	mg/l	<0.01	<0.01	<0.01
23	Lead (as Pb)	0.01	No Relaxation	mg/l	<0.01	<0.01	<0.01
24	Zinc (as Zn)	5	15	mg/l	0.05	0.06	0.04
25	Anionic Detergent (as MBAS)	0.2	1	mg/l	<0.01	<0.01	<0.01
26	Chromium (as Cr6+)	0.05	No Relaxation	mg/l	<0.01	<0.01	<0.01
27	Mineral oil	0.5	No Relaxation	mg/l	<0.1	<0.1	<0.1
28	Alkalinity (as CaCO3)	200	600	mg/l	286	304	281
29	Aluminum (as Al)	0.03	0.2	mg/l	<0.02	<0.02	<0.02
30	Boron (as B)	0.5	1	mg/l	0.2	0.2	0.1
	Bacteriological Parameter						
1	Total Coliform	Shall not be detectable		MPN/100ml	Not Detected (<2)	Not Detected (<2)	Not Detected (<2)
2	E.coli	Shall not be detectable		E.coli /100ml	Absent	Absent	Absent

ND: Not Detectable

Analysis results of ground water in the study area reveal the following: -

- pH varies from 7.75 to 7.21.
- Total hardness varies from 352 to 305 mg/l.
- Total dissolved solids vary from 639 mg/l to 536 mg/l.

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.

Fluorides and nitrates are within the permissible limits. Most of the parameters in ground water sources are well within the permissible limits as per IS: 10500-1991, Drinking Water Standards.

b) Surface water

The surface water samples have been collected River Tones from which the project site is at a distance of 3Km. All sampling locations are marked in **Map No. 5.** The Physico -chemical analysis of the water samples is given in the Table 3.1 (xi).

Table 3.3 (v) Surface water sampling locations

Station No.	Location	Direction	Distance (km)	Core Zone/Buffer Zone
SW1	Madraha	NW	4 Km	Study area
SW2	Singhpur Kala	N	3 Km	Study area
SW3	Madara	N	7 Km	Study area

Table 3.3 (vi) Physico-chemical properties of surface water (March)

SURFACE WATER QUALITY STUDY					
S.No.	**Parameter**	**Unit**	**S.W. 1 (Madraha)**	**SW 2 (Singhpur Kala)**	**SW 3 (Madara)**
			Study area	Study area	Study area
1	pH	-	7.10	7.22	7.35
2	Dissolved Oxygen	mg/l	7.3	7.1	6.8
3	BOD(3Daysat27°C)	mg/l	2.5	2.8	3.2
4	Free Ammonia(as N)	mg/l	<0.1	<0.1	<0.1
5	Sodium Adsorption Ratio	-	0.53	0.62	0.65
6	Boron	mg/l	0.1	0.2	0.3
7	Conductivity	µmhos/cm	341	391	412
8	Temperature	(°C)	22.5	23.6	23.8
9	Turbidity	NTU	4	6	6
10	Magnesium Hardness(asCaCO3)	mg/l	52	54	59
11	Total Alkalinity (asCaCO3)	mg/l	112	119	121
12	Chloride (as Cl)	mg/l	31	35	39
13	Sulphate (as SO_4)	mg/l	19	25	28
14	Nitrate(as NO3)	mg/l	0.3	0.4	0.6
15	Fluoride(as F)	mg/l	0.5	0.6	0.5
16	Sodium (as Na)	mg/l	19	19	22
17	Potassium(as K)	mg/l	2.4	2.5	2.6
18	TKN (as N)	mg/l	0.5	0.6	0.5
19	Total Phosphorous (as P)	mg/l	0.05	0.06	0.07
20	COD	mg/l	13	15	18
21	Phenolic compounds (asC_6H_5OH)	mg/l	<0.001	<0.001	<0.001
22	Lead (as Pb)	mg/l	<0.01	<0.01	<0.01
23	Iron (as Fe)	mg/l	0.13	0.16	0.11
24	Cadmium (as Cd)	mg/l	<0.001	<0.001	<0.001
25	Zinc (as Zn)	mg/l	0.06	0.07	0.08
26	Arsenic (as As)	mg/l	<0.01	<0.01	<0.01
27	Mercury (as Hg)	mg/l	<0.001	<0.001	<0.001
28	Chromium (as Cr)	mg/l	<0.01	<0.01	<0.01
29	Nickel (as Ni)	mg/l	<0.01	<0.01	<0.01
30	TDS	mg/l	211	235	251
Bacteriological Parameters					

1	Total Coliform	MPN/100ml	600	900	700
2	Faecal Coliform	MPN/100ml	200	320	260

Table 3.3 (xiii) Physico-chemical properties of surface water (November)

SURFACE WATER QUALITY STUDY					
S.No.	**Parameter**	**Unit**	**S.W. 1 (Madraha)**	**SW 2 (Singhpur Kala)**	**SW 3 (Madara)**
			Study area	Study area	Study area
1	pH	-	7.68	7.62	7.65
2	Dissolved Oxygen	mg/l	6.8	6.5	6.3
3	BOD(3Daysat27°C)	mg/l	2.3	2.5	2.7
4	Free Ammonia(as N)	mg/l	<0.1	<0.1	<0.1
5	Sodium Adsorption Ratio	-	0.46	0.59	0.61
6	Boron	mg/l	0.2	0.2	0.2
7	Conductivity	µmhos/cm	335	383	407
8	Temperature	(°C)	22.3	23.4	23.2
9	Turbidity	NTU	5	5	7
10	Magnesium Hardness(asCaCO3)	mg/l	47	51	54
11	Total Alkalinity (asCaCO3)	mg/l	105	112	115
12	Chloride (as Cl)	mg/l	25	31	34
13	Sulphate (as SO_4)	mg/l	15	20	23
14	Nitrate(as NO3)	mg/l	0.4	0.5	0.7
15	Fluoride(as F)	mg/l	0.5	0.6	0.5
16	Sodium (as Na)	mg/l	12	16	17
17	Potassium(as K)	mg/l	2.1	2.2	2.4
18	TKN (as N)	mg/l	0.4	0.5	0.7
19	Total Phosphorous (as P)	mg/l	0.06	0.07	0.08
20	COD	mg/l	10	12	14
21	Phenolic compounds (asC_6H_5OH)	mg/l	<0.001	<0.001	<0.001
22	Lead (as Pb)	mg/l	<0.01	<0.01	<0.01
23	Iron (as Fe)	mg/l	0.11	0.14	0.09
24	Cadmium (as Cd)	mg/l	<0.001	<0.001	<0.001
25	Zinc (as Zn)	mg/l	0.05	0.06	0.07
26	Arsenic (as As)	mg/l	<0.01	<0.01	<0.01
27	Mercury (as Hg)	mg/l	<0.001	<0.001	<0.001
28	Chromium (as Cr)	mg/l	<0.01	<0.01	<0.01
29	Nickel (as Ni)	mg/l	<0.01	<0.01	<0.01
30	TDS	mg/l	204	231	245
Bacteriological Parameters					
1	Total Coliform	MPN/100ml	600	900	700

2	Faecal Coliform	MPN/100ml	200	320	260

Table 3.3 (xiv) Physico-chemical properties of surface water (December)

SURFACE WATER QUALITY STUDY					
S.No.	**Parameter**	**Unit**	**S.W. 1 (Madraha)**	**SW 2 (Singhpur Kala)**	**SW 3 (Madara)**
			Study area	Study area	Study area
1	pH	-	7.68	7.62	7.65
2	Dissolved Oxygen	mg/l	6.8	6.5	6.3
3	BOD(3Daysat27°C)	mg/l	2.3	2.5	2.7
4	Free Ammonia(as N)	mg/l	<0.1	<0.1	<0.1
5	Sodium Adsorption Ratio	-	0.46	0.59	0.61
6	Boron	mg/l	0.2	0.2	0.2
7	Conductivity	µmhos/cm	335	383	407
8	Temperature	(°C)	22.3	23.4	23.2
9	Turbidity	NTU	5	5	7
10	Magnesium Hardness(asCaCO3)	mg/l	47	51	54
11	Total Alkalinity (asCaCO3)	mg/l	105	112	115
12	Chloride (as Cl)	mg/l	25	31	34
13	Sulphate (as SO_4)	mg/l	15	20	23
14	Nitrate(as NO3)	mg/l	0.4	0.5	0.7
15	Fluoride(as F)	mg/l	0.5	0.6	0.5
16	Sodium (as Na)	mg/l	12	16	17
17	Potassium(as K)	mg/l	2.1	2.2	2.4
18	TKN (as N)	mg/l	0.4	0.5	0.7
19	Total Phosphorous (as P)	mg/l	0.06	0.07	0.08
20	COD	mg/l	10	12	14
21	Phenolic compounds (asC_6H_5OH)	mg/l	<0.001	<0.001	<0.001
22	Lead (as Pb)	mg/l	<0.01	<0.01	<0.01
23	Iron (as Fe)	mg/l	0.11	0.14	0.09
24	Cadmium (as Cd)	mg/l	<0.001	<0.001	<0.001
25	Zinc (as Zn)	mg/l	0.05	0.06	0.07
26	Arsenic (as As)	mg/l	<0.01	<0.01	<0.01
27	Mercury (as Hg)	mg/l	<0.001	<0.001	<0.001
28	Chromium (as Cr)	mg/l	<0.01	<0.01	<0.01
29	Nickel (as Ni)	mg/l	<0.01	<0.01	<0.01
30	TDS	mg/l	204	231	245
Bacteriological Parameters					
1	Total Coliform	MPN/100ml	600	900	700

2	Faecal Coliform	MPN/100ml	200	320	260

Observation: From March'2018 to May, 2018

The analysis results indicate that the pH ranges between 7.68 and 7.10.

Dissolved Oxygen (DO) was observed in the range of 7.3 to 6.3 mg/l against the minimum requirement of 4 mg/l. BOD values were observed to be in the range of 3.2-2.3 mg/l.

The chlorides and Sulphates were found to be in the range of 39-25 mg/l and 28-15 mg/l respectively.

Bacteriological examination of surface water samples revealed the presence of total coliform in range of 900 MPN/100 ml to 600 MPN/100 ml against the limit of 5000 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 with con-ventional treatment followed by disinfection.

3.1.4 SOIL ENVIRONMENT

Soil may be defined as a thin layer of earth's crust, a medium for the growth of plants. The soil characteristics include both physical and chemical properties. The soil survey and soil sample were carried out / collected to assess the soil characteristics of the study area. Soil samples were collected from 3 locations & analyzed as per CPCB norms. The soil sampling locations are marked in **Map No. 4.** The physico-chemical characteristic of these soil samples is given in Table No. 3.1 (xvi).

Table No. 3.3 (vii) Description of soil sampling locations

Station No.	Location	Approx. Distance (km)	Direction	Core Zone/Buffer Zone
SQ1	Gadevara	3 Km	SW	Buffer Zone
SQ2	Project Site	-	-	Core Zone
SQ3	Konan	6 Km	N	Buffer Zone

Table 3.3 (viii) Physico-chemical properties of soil (March to May, 2018)

S.No	Parameter	Unit	SQ-1	SQ-2	SQ-3
1	Texture	-	**Gadevara**	**Project Site**	**Konan**
	Sand	%	50.4	54.2	56.8
	Silt	%	28.5	24.6	20.1
	Clay	%	21.1	21.2	23.1
2	pH	-	7.82	7.49	7.32
3	Electrical Conductivity	µmhos/cm	395	265	459
4	Cation exchange capacity	meq/100 gm	14.35	13.2	12.54
5	Exchangeable Potassium	meq/100 gm	0.27	0.23	0.19
6	Exchangeable Sodium	meq/100 gm	0.58	0.51	0.48
7	Exchangeable Calcium	meq/100 gm	9.85	9.16	8.96
8	Exchangeable Magnesium	meq/100 gm	3.65	3.27	2.91
9	Sodium Absorption Ratio	-	0.71	0.65	0.62
10	Water Holding Capacity	%	28.3	27.6	26.8
11	Porosity	%	35.2	36.7	37.2
12	Permeability	cm/hrs	1.8	1.9	2.0
13	Total kjehdahl Nitrogen	%	0.046	0.039	0.036
14	Phosphorus(Olsen's)	mg/kg	8.9	7.2	5.8
15	Organic Matter	%	0.34	0.30	0.28
16	Bulk Density	gm/cc	1.34	1.32	1.30

Observations: From March to May

Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 7.82 to 7.32, which shows that the soil is alkaline in nature. Potassium is found to be from 0.27 meq/100 gm to 0.19 meq/100 gm. The water holding capacity is found in between 28.3% to 26.8 %.

3.1.5 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 levels recorded are as stated in Table 3.1 (xii). The noise level monitoring locations are marked in **Map No. 4.**

Table 3.3 (ix): Noise quality monitoring stations

S. No.	Location	Station Name	Approx. Distance (km)	Direction	Zone (Core/ Buffer)
1.	NQ1	Gadevara	3 km	SW	Buffer zone
2.	NQ2	Project Site	-	-	Core Zone
3.	NQ3	Kona	4 km	N	Buffer zone
4.	NQ4	Chandhash	4Km	S	Buffer zone

Table No. 3.1 (x): Noise level status

Noise Quality data March, 2018						
S.No.	Locations	ZONE	LIMIT (as per CPCB Guidelines),Leq		RESULT (Leq)	
			DAY*	NIGHT*	DAY*	NIGHT*
1	NQ-1 (Gadevara)	Residential Zone	55	45	51.2	40.3
2	NQ-2 (Project Site)	Industrial Zone (Project Site)	75	70	54.3	43.8
3	NQ-3 (Kona)	Residential Zone	55	45	50.7	39.8
4	NQ-4 (Chandhash)	Silence zone	50	40	48.4	37.9

* Day Time Leq in dB(A) (6.00AM TO 10.00PM)
* Night Time Leq in dB(A) (10.00PM TO 6.00AM)

Results: From March to May.

Noise monitoring reveals that the maximum & minimum noise levels at day time were recorded as 54.3 dB(A) & 48.4 dB(A) respectively. The maximum & minimum noise levels at night time were found to be 43.8 dB (A) & 37.9 dB(A) respectively.

There are several sources in the 10 km radius of study area, which contributes to the local noise level of the area. On the commencement of the project, the sound from traffic activities will add to the ambient noise level of the area. This will be kept under check by taking proper suggestive measures.

There are several sources in the 10 km radius of study area, which contributes to the local noise level of the area. On the commencement of the project, the sound from traffic activities will add to the ambient noise level of the area. This will be kept under check by taking proper suggestive measures.

3.3 BIOLOGICAL ENVIRONMENT

Biological components are one of the most important constituent of our environment. They are the 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.

Methodology for Floral & Faunal study:

Detailed survey was conducted to evaluate floral and faunal composition of the study area. Primary data on floral and faunal composition was recorded during site visit and secondary data was collected from the Forest department and published relevant literatures to get the correct picture of the study area. Inventory of flora and fauna is prepared on the basis of collected data. Forest type and vegetation of the study area is discussed on the basis of plant species recorded from the area.

Study Area

Uttar Pradesh is physiographically divided in to three regions i.e. Northern Tarai region, middle plains of Ganga and southern Vindhyan plateau. To its south and southeast is the Bagelkhand region,To its east is middle Ganges valley of North India, or Purvanchal,To its southwest is the Bundelkhand region, to its north and northeast is the Awadh region and to its west along with Kaushambi it forms the part of Doab i.e the Lower Doab region.In the North district Pratapgarh, in the south Rewa (M.P.), in the east Sant Ravi Das Nagar and in the west kaushambhi districts are located.The land of the Allahabad district that falls between the Ganges and Yamuna is just like the rest of Doab, fertile but not too moist, and is especially suitable for the cultivation of wheat. The non-Doabi (southern and eastern) part of the district, are somewhat similar to those of adjoining Bundelkhand and Bagelkhand regions: dry and rocky. Allahabad features the typical version of a humid subtropical climate that is common to cities in north-central India. Allahabad experiences three seasons: hot dry summer, cool dry winter and warm humid monsoon. The summer season lasts from April to June with the maximum temperatures ranging from 40°C (104°F) to 45°C (113 °F). Monsoon begins in early July and lasts till September. The winter season lasts from December to February.

Rivers

The Ganga and The Yamuna are the main rivers of the district. The plain area of the district is situated in between Ganga and Yamuna so these rivers play a very pivotal role in the agriculture of the district.

Flora of the Core Zone

The core zone comprises of barren stony waste land, where mining operation is proposed. The trees on the mining site are naturally occurring but are very few in number. Most among them are weeds. No ecologically sensitive plant species has been reported from this area. The faunal variety is rather poor. Mammalian fauna is almost restricted to domestic species like cattle, dogs, cats etc. Bird species also do not exhibit much diversity. Local birds are noticed crossing over the banks in search of food. No fixed pattern in migratory behavior is noticed.

Flora of the Buffer Zone

Buffer zone of the proposed project is mainly agricultural land. The flora of buffer zone comprises of plants growing on the edges of agricultural land, village woodlots and trees planted along the roads. Many tree species are planted in the area because of their usefulness, economic and aesthetic values. Many important species such as Neem (Azadirachta indica), Sisam (Dalbergia sissoo), Terminalia tomentosa (T. elliptica), and Khair (Acacia catechu)with other associated tree species like Dhak, Palash (Butea monosperma), Bombax ceiba, Aegle marmelos, Adina cordifolia, Syzigium cumini, Azadirachta indica, etc. The Gangetic plain is also characterized by tall grasses like Saccharum spontaneum, and Vetiveria zizanioides. In waste land and along the road side weeds like Argemone mexicana, Cannabis sativa, Cenchrus ciliaris, Heteropogoncontortus, Parthenium hysterosphorus, etc. are very common.

Agricultural Crops

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, guava and mango, and amongst the vegetable crops potato, onion, brinjal, tomato, cauliflower and cabbage are grown.

Fauna Reported in Core zone:

During the faunal survey in the area no wildlife corridor or movement of animals was recorded from proposed project area. No established habitats of any mammals or birds are noticed in river bed and along the banks. No bird’s habitats like nesting, breeding and forging patterns are noticed in the core zone. Local birds are noticed crossing over the banks in search of food. No fixed pattern in migratory behavior is noticed.

Fauna reported in Buffer zone:

Many domesticated mammal species are 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 (Apodemussylvaticus) are noticed in vicinity of the village. Inquiry from village people regarding wild animals reveals that monkey (Macacamulata), Indian hare (Lepusnigricollis), fruits bat (Pteropusconspicillatus), mongoose (Herpestes edwardsii), jackal (Canisaureus), etc. are often seen in the area.

The bird population consists of Common teal (Anascrecca), White throated kingfisher (Halcyon smyrnensis), Pied kingfisher (Cerylerudis), Red wattled lapwing etc are noticed. House crow (Corvus splendens), House sparrow (Passer domesticus), Common hill Myna (Gracula religiosa), Red-rumped Swallow (Cecropis daurica), Hoopoe (Upupa epopsceylonensis) 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 (Naja naja) and Banded krait (Bungarus multicinctus) are occasionally encounter by the farmers.

Table 3.4 (i)

Flora of the Study Area

S.N.	Botanical Name	Common Name	Family Name
TREES			
1.	*Acacia nilotica* (Willd)	Babool	Fabaceae
2.	*Acacia catechu*	khair	Fabaceae
3.	*Adina cordifolia*	Haldu	Rubiaceae
4.	*Aegle marmelos*	Bael,	Rutaceas
5.	*Albizia lebbeck* (Bensh)	Kala Siras	Fabaceae
6.	*Azadirachta indica A.* (Juss)	Neem	Meliaceae
7.	*Bombax ceiba*	Semal	Bombacaceae
8.	*Butea monosperma* (Lamk.) Taub.	Dhak	Fabaceae
9.	*Dalbergia sissoo* (Roxb)	Shisham	Fabaceae

S.N.	Botanical Name	Common Name	Family Name
10.	*Ficus benghalensis*	Bargad	Moraceae
11.	*Ficus religiosa* (Linn)	Pipal	Moraceae
12.	*Flacourtia indica* (Eurm.F) Merr.	Kakar	Salicaceae
13.	*Pithecellobium dulce*(Benth)	Jalebi	Fabaceae
14.	*Shorea robusta*	Sal	Dipterocarpaceae
15.	*Syzigium cumini*	Jamun	Myrtaceae
16.	*Terminalia tomentosa*W. & A.	Arjun	Combretaceae
17.	*Terminalia bellirica*	behera	Combretaceae
18.	*Toona ciliata* (Roen).	Tun	Meliaceae
19.	*Ziziphus xylopyra* (Retz.) Willd.	Ghont	Rhamnaceae
HERBS AND SHRUBS			
1.	*Achyranthes aspera.*	Chirchita	Amaranthaceae
2.	*Berberis* spp.	Kinjora	Berberidaceae
3.	*Calotropis procera* R.Br.	Aak	Apocynaceae
4.	*Capparis deciduas* (Forsk) Edgw.	Kareel	Brassicaceae
5.	*Cassia alata*(Linn).	Dadmari	Fabaceae
6.	*Cassia occidentalis* (Linn).	Chakunda	Fabaceae
7.	*Clerodendron viscosum* (Vent)	Bhat	Verbenaceae
8.	*Lantana camara* (Linn)	Kuri	Verbenaceae
9.	*Ocimum sanctum* (Linn)	Tulasi	Lamiaceae
10.	*Smilax prolifera*	Ramdaton	Liliaceae
11.	*Zizyphusnummularia*(Surm.f.)W.& A.	Kharbair	Rhamnaceae
CLIMBERS			
1.	*Asparagus racemosus* (Willd)	Satawar	Asparagaceae
2.	*Caesalpinia decapetala*	Alai	Fabaceae
3.	*Coccinea indica* W. & A.	Kundaru	Rubiaceae
4.	*Combretumdecandrum*(Roxb)	Kali bel	Combretaceae
5.	*Cryptostegiagrandiflora*(Roxb.) R.Br.	Chabukchari	Apocynaceae
6.	*Cymbopogon martini* (Roxb.)	Mahur	Poaceae
7.	*Phragmiteskarka*(Trin)	Beensa	Poaceae
8.	*Smilax prolifera* (Roxb)	Ramdatun	Smilacaceae
9.	*Vitis repanda* W. & A	Panibel	Vitaceae
10.	*Zizyhpus oeonoplia*(Mill).	Makoha	Rhamnaceae
GRASSES			
1.	*Cenchrus ciliaris* (Linn).	Anjan	Poaceae
2.	*Chrysopogon fulvus*	Kush	Poaceae
3.	*Cymbopogon martini* (Roxb)	Saidar	Poaceae
4.	*Cynodon dactylon* (Linn.) Perp.	Dub	Poaceae
5.	*Desmostachya bipinnata* (Stapf).	Dab	Poaceae
6.	*Imperata cylindrica* (Linn) P.Beauv	Siru	Poaceae
7.	*Saccharum munja* (Roxb) Jesweit.	Mung	Poaceae
8.	*Saccharum spontaneum* (Linn)	Kansa	Poaceae

S.N.	Botanical Name	Common Name	Family Name
9.	*Sehima nervosum* (Rotti) Stapf.	Sain/Seta	Poaceae
10.	*Setariaglauca*(Linn.) P. Beauv.	Vindra	Poaceae
11.	*Sporbolusmarginatus*(Hochst). ex. A. Rich.	Usari	Poaceae
12.	*Vetiveria zizanioides* (Linn) Nash	Khas	Poaceae
	BAMBOO		
1.	*Dendrocalamus strictus* (Roxb)	Bans	Poaceae
2.	*Bambusa arundinacea*(Willd)	Burma	Poaceae
PARASITES			
1.	*Cuscuta reflexa*	Akashbel	Convulvaceae

Table 3.4 (ii)
Fauna of the Study Area

S.No.	Scientific name	Common name	Schedule
		MAMMALS	
1.	*Funambulus pennati*	Striped Squirrel	IV
2.	*Bandicotabengalensis*	Indian Mole-rat	V
3.	*Rattusrattus*	House Rat	V
4.	*Musmusculus*	House Mouse	V
5.	*Lepusnigricollis*	Indian Hare	IV
6.	*Macacamulatta*	Rhesus	II
7.	*Presbytis entellus*	Common Langoor	II
		BIRDS	
8.	*Eudynamysscolopacea*	Koel	IV
9.	*Francolinusfrancolinus*	Black Partridge	IV
10.	*Gallus gallus*	Red Jungle Fowl	IV
11.	*Coturnixcoromandelica*	Rain Quail	IV
12.	*Coturnixcoturnix*	Common Quail	IV
13.	*Streptopelia decaocta*	Ring Dove	IV
14.	*Psittacula krameri*	Rose ringed Parakeet	IV
15.	*Strixaluco*	Tony Wood Owl	IV
16.	*Glaucidiumbrodiei*	Pygmy Owlet	IV
17.	*Cerylelugubris*	Kingfisher	IV
18.	*Upupa epops*	Hoopoe	IV
19.	*Megalaimazeylanica*	Green Barbet	IV
20.	*Hirundorustica*	Common Swallow	IV
21.	*Acridotheres tristis*	Indian Myna	IV
22.	*Corvus splendens*	House Crow	V
23.	*Hypsipetesmadagascariensis*	Black Bulbul	IV
24.	*Monticolacinclorhynchus*	Blue headed Rock Thrush	IV
25.	*Pomatorhinuserythrogenys*	Rusty cheeked Babbler	IV

S.No.	Scientific name	Common name	Schedule
26.	*Passer domesticus*	House Sparrow	IV
27.	*Estrildaformosa*	Green Munia	IV
28.	*Lonchurastriata*	White Backed Munia	IV
29.	*Lonchuramalabarica*	White Throated Munia	IV
30.	*Ploceus benghalensis*	Black-breasted Weaver Bird	IV
31.	*Ploceusmanyar*	Streaked Weaver Bird	IV
32.	*Phalacrocoraxniger*	Little Cormorant	IV
33.	*Anseranser*	Greylag goose	IV
34.	*Ardea alba*	Large Egret	IV
35.	*Porphyrioporphyrio*	Purple Murhan	IV
	REPTILES		
36.	*Hemidactylus sp.*	House lizard	IV
37.	*Calotes versicolor*	Common garden lizard	IV
38.	*Naja naja*	Indian cobra	II
39.	*Bungarus caerulens*	Indian Krait	II
40.	*Ptyas mucosus*	Rat snake	II
	AMPHIBIANS		
41.	*Bufo melanostictus*	Common Toad	IV
42.	*Ranatigrina*	India bull frog	IV
43.	*Polypedates maculates*	India tree frog	IV
44.	*Bufo stomaticus*	Skipping frog	IV

FISHES

S.No.	Scientific Name	Common Name
1.	*Mastacembelus*(Lacep.)	Baiyan
2.	*Garragotyla*(Gray.)	Bhangera/Gotyala
3.	*Notopterus notopterus*	Battu
4.	*Catla catla*	Theila
5.	*N.rupicolainglishi*	Gadera/Gunther
6.	*N.botia*(Ham.)	Gadera/Gunther
7.	*Lepidocephalichthysguntea*(Ham.)	Gadera/Gunther
8.	*Cirrhinusmrigala*	Mrigal
9.	*Labeo rohita*	Rohu

3.4 SOCIO ECONOMIC & ITS BASELINE DATA:

In this section of the report an attempt has been made to measure Socio-economic impact of the proposed Stone, Boulder & *gitti* mine at village-Bhatauti, Tehsil-Meza, District-Allahabad, 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

b) To know the socio-economic status of the people living in the study area of the proposed 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 mixture of both quantitative and qualitative approach has been adopted in the current socio-economic study.

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.

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.

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.

Estimation of various parameters has been made based on sample data and bottom top approach has been adopted.

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

The data collected during the above survey was analyzed to evaluate the prevailing socio-economic profile of the area.

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.

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.

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

Study Area

The field investigation has revealed that the entire study area of the proposed mining project is located at village: Bhatauti, Tehsil: Meza, district Allahabad in Uttar Pradesh. The Sub-district (Tehsil) falling in the study area is Meza. The study area comprises of 102 villages and there is no urban area. For the Socio-Economic Study we covered 46 villages coming under 5 km radius. Details are mentioned below.

3.4.1 BASELINE DATA OF THE IMPACT AREA

Table 3.5 Demographic Particulars

Description	Number	%
Total Population	71838	100
Males	37285	51.90
Females	54553	48.10
Sex ratio (No. of females per 1000 males)	927	
Total Literates	39429	100
Male	24237	61.47
Female	15192	38.53
Total Literacy Rate	54.89	
Male	65.00	
Female	43.97	
Gender gap in literacy rate	21.04	
Total Workers	**24498**	**100**
Male	16136	65.87
Female	8362	34.13
Total Main Workers	14493	100
Male	10502	72.46
Female	3991	27.54
Total Marginal Workers	10005	100

Male	5634	56.31
Female	4371	43.69
Total Agricultural Workers	14616	100
Cultivators	6391	43.73
Agricultural Labours	8225	56.27
Male workers in total agricultural workers	9423	64.47
Female workers in total agricultural workers	5193	35.53
Total Household Industrial Workers	2071	100
Male	960	46.35
Female	1111	53.65
Total Other Workers	7811	100
Male	5753	73.65
Female	2058	26.35

Source: Census 2011

S. No.	Amenities	Types	Number
1	**Educational Institutions**		
		Primary School	85
		Middle school	35
		Secondary School	7
		Senior Secondary	7
		Adult literacy centre	7
		Other Schools	4
2	**Health Institutions**	Allopathic Hospital	0
		Ayurvedic Hospital	0
		Homeopathic Hospital	0
		Allopathic Dispensary	0
		Health Centre	0

		Registered Medical	4
		Community Health Workers	25
		Maternity & Child welfare	4
3	**Drinking Water #**	Well	98
		Tank	21
		Tube well	18
		tap	42
		Hand pump	102
4	**Communication Facilities**	Post Office	14
		Telephone	39
5	**Transport Facilities#**	Bus Service	1
		Railway Service	4
6	**Banking facilities**	Commercial bank	36
		Cooperative bank	1
			37
7	**Power #**		191
		Domestic Power	70
		Power for Agricultural use	56
		Power for other use	37
		Power for all use	28

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

3.5 DEMOGRAPHIC COMPOSITION

Population

According to Census 2011, the total population of the study area is 71838. As there is no urban area the entire population belongs to rural area. The overall sex ratio has been worked out to 927 females per 1000 males, which is much lower than the national average of 933 females per 1000 males. Furthermore, around 21.16 percent of the total population belongs to Schedule Caste community and the Schedule Tribe population in the study area is very negligible (0.35%) as per Census 2011.

Number of households and household size

The entire population of the study area (5km radius) has been grouped into 11010 households and the average household size is 7. The household size varies between 5 and 8.

Literacy and Literacy rate

The total number of literates in the study area has been worked out around 54.89 percent of the total population. The literacy rate of male has been worked out to 65.00 percent as against 43.97 percent for female, creating a gender gap in literacy of 21.04 percent.

Workers and work participation rate

The total number of workers in the study area is 24498, which is 34.10 percent of the total population. Among the total workers 57.7percent are main workers and the remaining 13.93percent are marginal workers. The percentage of male in the main workers is 72.46percent, while it is only 56.31percent in the case of marginal workers. On the other hand, the percentage share of female in the main workers is only 27.54percent; it is 43.69percent in the case of marginal workers. This indicates that male dominates the both main workers and the marginal workers.

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

Table 3.6: 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	14616	59.66
a)	Cultivators	6391	26.09
b)	Agricultural labour	8225	33.57
2	Household Industrial Workers	2071	8.45
3	Other workers	7811	31.88
Total		**24498**	**100.00**

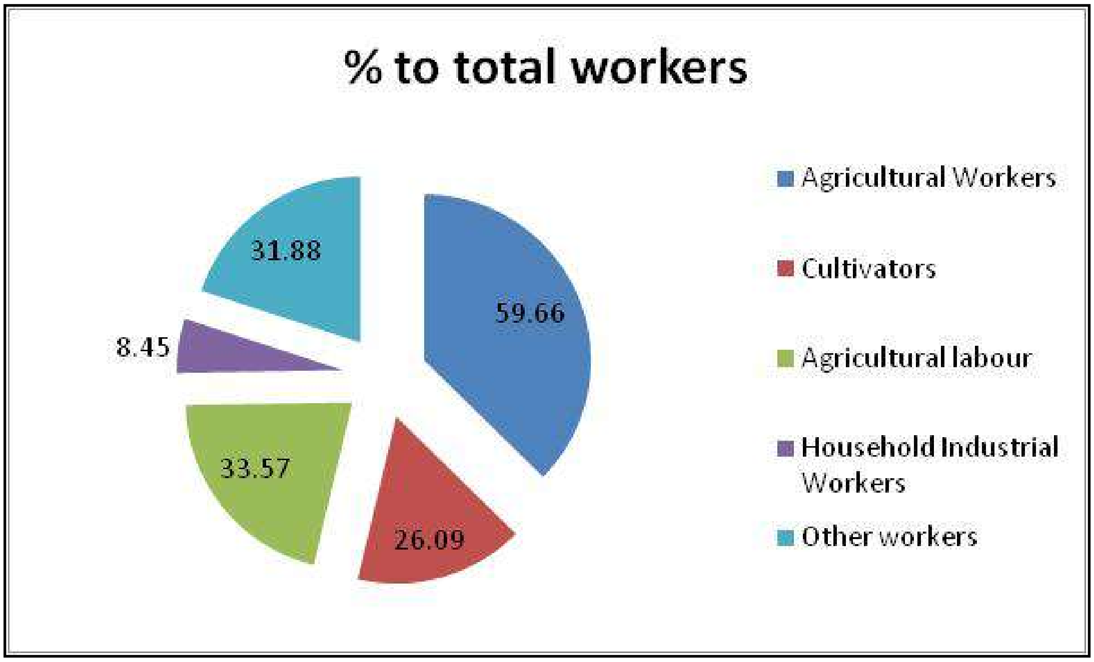

Figure 3.10: Categorization of workers on the basis of occupation

The share of cultivators in the total workers is 26.09 percent and that of Agricultural labours is 33.57 percent. Barely 8.45 percent of total workers are Household Industrial Workers and 31.88 percent are 'Other workers' which includes white collar workers, professional workers, shopkeepers, traders and businessmen.

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Chapter-4

Anticipated Environmental Impacts And Mitigation Measures

4.0 GENERAL

All industrial and/or development projects are likely to 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 paid attention to in the Environmental Management Plan for countering or minimizing the impacts.

Keeping in mind, the environmental baseline scenario as detailed in Section III and the proposed mining activity described in Section II, 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

Various components of land environment have been identified for study of impact of the mine operations. Details of the same are given below:

4.1.1 Solid waste generation and management

No waste or top soil shall be generated during mining activities. All the quantities of ballast/*Gitty* to be exploited shall be sending to crusher plant outside the area to crusher plant outside the area. Therefore generation of waste shall be nil & no proposal has been envisaged for its separate dumping.

4.1.2 Impact on land use & reclamation of mined out areas

The area likely to be degraded due to quarrying, pitting & roads. The impact on the land form or physiography will be limited to the modification of the slope. The impact during next five years is limited as benches will be formed on the already degrade land.

Beside these benches, roads will also modify the physiography.

The impact on land use will also be limited. The various modifications due to mining allied & activities during next five years are given below.

Table No. 4.1 Post Mining Land Use Pattern

Activity	Area Occupied (Ha.) During next five years	At the end of conceptual period (ha)
Mining and Existing pits	5.36	5.36
Waste dumps	Nil	Nil
Road	0.002	Nil
Infrastructure facilities	Nil	Nil
Afforestation	Nil	Nil
Balance undisturbed land	0.708	0.71
Total	6.07	6.07

4.2 WATER ENVIRONMENT

Damage in the water body, depends on its assimilative capacity. To find out assimilative capacity of receiving water body, water samples were collected from different groundwater and surface water sources. The study indicates that assimilative capacity of the River water bodies still exists, but effective measures shall be taken to check water pollution. To find out the effect on ground water an extensive hydro-geological study has been conducted and from the study it can be safely concluded that there is no noticeable adverse effect on surrounding ground water resource due to mining. The mining activity does not require water.

Mining of Gitti, Patthar, & Boulders does not have any significant impact on the water quality and parameters as the mining does not intercept with the ground water level.

In this project, it is not proposed to divert or truncate any stream. No proposal is envisaged for pumping of water from the river. There will not be any adverse impact on surface hydrology and ground water regime due to this project. The contractor will adhere to all guidelines and rules for proper and scientific method of mining during the period of extracting the Gitti, Patthar, & Boulders Thus, the project activities shall not have any adverse affect on the physical components of the environment and therefore may not have any effect on the recharge of ground waters or affect the water quality.

4.3 AIR ENVIRONMENT

Anticipated impacts and evaluation

There is no source of air pollution as no boiler, DG Set or furnace is there. Only source of air pollution is re-suspension dust from drilling, blasting, mechanized loading and the movement of dumpers/trucks to and from the mining site.

Emission of fugitive dust is envisaged due to:

i. Mining Activities includes excavation and lifting of minerals, drilling, blasting, mechanized loading etc.

ii. Transportation of minerals will be done by road using trucks. Fugitive dust emission is expected from the transportation of trucks on the haul roads. Evaluation of fugitive dust emission has been done by using line source model as given below:

As the distance inside the mine lease area is minimal and path being boulder laid, no such problem is witnessed.

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 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 which involve 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 access 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 stone, ballast & *gitti* mining the major impacts are caused by material handling and transportation activities. Drilling & Blasting will be done only if required and is for a very short duration. So, it will not have any significant effect on Air Pollution.

FUGITIVE DUST- MODELING

Air quality modeling was done using line source model as published by **USEPA "Emission Factor Documentation for AP-42", in** section 13.2.2, for transportation though unpaved roads. Emission factors to be used in Line source dispersion equation is adopted from formula as given below:

$E=k * (s/12)^a * (W/3)^b /(M/0.2^c)$ …………………………(1)

Where

E = Emission Rate (lb/VMT)

s = Surface material Silt Content (%) = 10%

W=Mean Vehicle Weight (tonnes) = 35 tonnes

M= Surface material moisture content (%) = 2.5%

K, a, b & c are empirical constants with values given as below:

Constant	PM_{10}
k	2.6
a	0.8
b	0.4
c	0.3

Thus for vehicles of 35 tonners, the Emission Rate using equation **(1)** is**:**

E = 1.06873 lb/VMT

E = 0.000670 g/s/m

Concentration of the fugitive dust was calculated using the formula given in "Workbook of Dispersion Modeling" by Turner. The Concentration of the fugitive Dust is given below:

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

Where

C = Hourly Concentration in microgram/ m^3

E = Emission Rate = 0.0025 g/s/m

υ = 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:

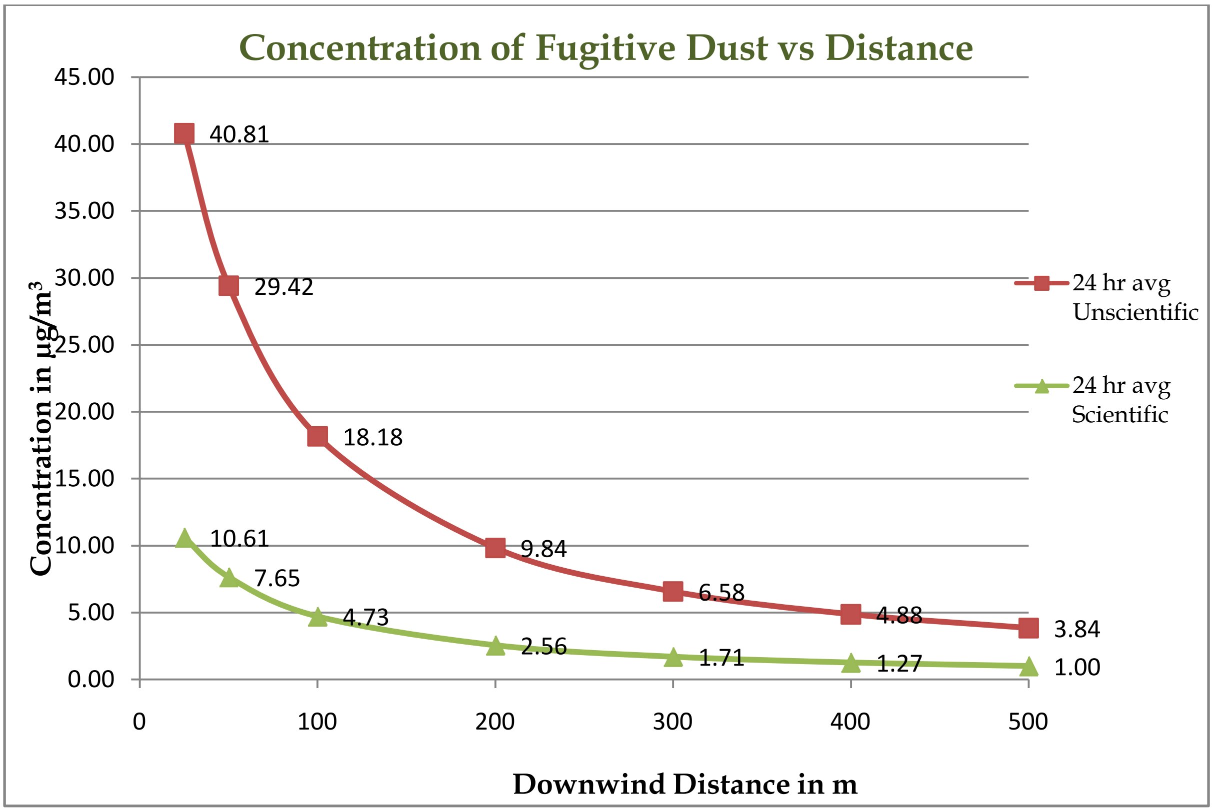

Fig.4.1 Graph showing Concentration of Fugitive dust vs Distance

It is observed that the ground level concentration (GLC) decreases from 40.81 µg/m^3 at 25 m to 3.84 µg/m^3 at 500 m from the centre line of the road. These values have been predicted for a dry unpaved road in an uncontrolled scenario. However, the GLC at 25 m will further reduce down to 10.61 µg/$m^3$and 1.00 µg/m^3 at 500 m a controlled scenario i.e. through water sprinkling.

Mitigation measures

The mitigation measures like the following will be resorted:

- Water sprinkling will be done on the haul roads twice in a day. This will reduce dust emission further by 74% (*Ref. Haul road dust control by WR REED & JA Organiscak*).
- Speed limits will be enforced to reduce airborne fugitive dust from vehicular traffic.

- Spillage from the trucks will be prevented by covering tarpaulin over the trucks.
- Deploying PUC certified vehicles to reduce their emissions.
- Proper tuning of vehicles to keep the gas emissions under check.
- Monitoring to ensure compliance with emission limits would be carried out during operation.
- Plantation activities will be done along the barrier zone and which will reduce the impact of dust in the nearby villages.

4.4 NOISE ENVIRONMENT

Impact on environment

Noise generated at the mine is due to semi-mechanized mining operations, drilling, blasting, mechanized loading and truck transportation activities. The noise generated by the mining activity dissipates within the mine. There is no major impact of the mining activity on the nearby villages. However, pronounced effect of above noise levels is felt only near the active working area.

The noise level in the working environment are compared with the standards prescribed by Occupational Safety and Health Administration (OSHA-USA) which has been adopted and enforced by the Govt. of India through model rules framed under Factories Act, 1980 and CPCB 2000 norms. The summary of the permissible exposures in cases of continuous noise as per above rules is given below:

Table 4.2: Noise impact

Total time of exposure per day in hour	Sound pressure dB(A)	Remarks
(1)	**(2)**	**(3)**
8.0	90	No exposure in excess of 115 dB(A) is permissible
6.0	92	--
4.0	95	For any period of exposure falling in between any figure and lower figure as indicated in
3.0	97	
2.0	100	

1 ½	102	column (1), the permissible sound is to be determined by extrapolation or proportionate scale.
1	105	
¾	107	
½	110	
¼	115	

Noise at lower levels (sound pressure) is quite acceptable and does not have any bad effect on human beings, but when it is abnormally high- it incurs some maleficent effects.

In this case the impact of noise on the nearby settlements is negligible as they are far located from the mine workings.

a. Mitigation measures

i. On-site

a) Blasting only if required will be done by a licenced blaster.

b) Maintenance of Machinery: Regular maintenance of machinery will keep the generated noise level below the minimum prescribed limit i.e. not exceeding 90 dB (A) at a distance of 2 m from the machine. All machines will be as per stipulated standards and will be used at their optimum capacity.

c) Trained Operators: Only trained operators will be allowed to operate machines during mining to reduce any chance of safety failures.

d) Vegetation: Plantation of trees along the barrier zone will be done to dampen the noise, if possible.

e) Hearing Protection: All the miners will be provided with Personal Protective Equipments such as ear-muffs.

f) Phasing out the old and worn out trucks.

ii. Off-site

The off-site receptors are not significantly affected as they are located far away from the mine site. But some disturbances due to vehicle movement cannot be avoided. Plantation will be done along the barrier zone and roadsides etc. which will more or less dampen the off-site noise level.

4.5 BIOLOGICAL ENVIRONMENT

Impacts on Biodiversity

Present data have been collected through direct inventory as well as 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, faunal migratory routes or eco-sensitive area near the whole study area. For this, mine owner planted a good roadside plantation along both side of the mine road.

Impacts on agriculture

The area around the mine lease area is all barren and no agriculture activity is going on atleast 2-3 km away from the mine site. Therefore no significant impact on the agriculture around the project site is expected.

Impacts on aquatic ecology

Mining activities may result in affecting the riverine ecology by polluting the river water. But in this case, river lies almost 4km away from mine site and also nothing is being discharged into the river. However, indiscriminate fishing by labourers etc. may reduce fish stock availability for commercial and sport fishermen. Thus, it is recommended that adequate surveillance measures are implemented during project operation phase to ameliorate such impacts.

Mitigation Measures

There is a requirement to establish a stable ecosystem with both ecological and economic returns. Minimization of soil erosion and dust pollution enhances the aesthetic value of the core and the buffer zone. To achieve this, it is planned to increase the area of green cover of plantation and green belts activities. The basic objectives of plantations are as follows:

- Improvement of Soil quality,
- Quick vegetative cover to check soil erosion,
- Improvement in mining site stability,
- Conservation of biological diversity of plants, birds and animals,
- As dust receptor and dust filter, this is likely to be produced during mining.
- If birds are noticed crossing the core zone, they will not be disturbed at all;

- Labors will not be allowed to discards food, plastic etc., which can attract animals/birds near the core site;
- Only low polluting vehicles having PUC will be allowed for carrying mining materials.
- Noise level will be maintained within permissible limit (silent zone-50dB (A) during day time or residential zone 55dB (A)) as per noise pollution (regulation and control), rules, 2000, CPCB norms.

4.6 TRAFFIC ANALYSIS

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

During Mine operation for cluster of mines

Proposed Capacity of mine/annum : 562500 TPA
No. of working days : 300 days
Proposed Capacity of mine/day : 1875 TPD
Trucks/Trippers Capacity : 10 tonnes
No. of tractor trolleys deployed/day : 187.5 trippers/dumper
Increase in PCU/day : 188*3= 564

Existing and Modified Traffic Scenario & LOS

Road	V	C	Existing V/C Ratio	LOS
Existing near NH-76 intersection	470	15,000	0.03	A
Modified near NH-76 intersection	1034	15,000	0.06	A

Source: IRC 64-1990

V= Volume of Vehicles in PCU's/day & C= Capacity of Highway in PCU's/ day

V/C	LOS	Performance

0.0 - 0.2	A	Excellent
0.2 - 0.4	B	Very Good
0.4 - 0.6	C	Good / Average / Fair
0.6 - 0.8	D	Poor
0.8 - 1.0	E	Very Poor

Reference: ENVIS Technical Report, IISc, Bangalore

Results

From the above analysis it can be seen that the V/C ratio for cluster of mines is likely to change to 0.03 & 0.06 with LOS being "A" & "A" which is 'excellent, & 'excellent' as per classification. So the additional load on the carrying capacity of the concerned roads is not likely to have any adverse affect.

4.7 OVERALL QUALITATIVE AND QUANTITATIVE IMPACT MATRIX

Table 4.4 (i): Qualitative Matrix

	Nature of Likely Impacts								
	Adverse					Beneficial			
	ST	LT	R	IR	L	ST	LT	SI	N
Air Quality	√				√				
Surface Water Quality	√				√				
Ground Water	*	*	*	*	*				
Land Environment	√			√	√				
Noise	√				√				
Soil	√	*	*	√	*				
Forests					√				
Flora & Fauna	√			√	√				
Agriculture					√				
Socio Economic							√	√	

ST: Short Term LT: Long Term R: Reversible IR: Irreversible

L: Local SI: Significant N: Neutral *: Negligible

Table 4.4 (ii): Quantitative Matrix

Items	With Project		Without Project
	With EMP	Without EMP	
Air Quality	-2	-8	-6
Surface Water Quality	-2	-4	0
Ground Water	0	-6	0
Land Environment	+8	-2	-8
Noise	-2	-6	-4
Flora	+8	-2	-8
Fauna	-2	-6	0
Agriculture	0	0	0
Socio Economic	+8	+4	0
Total	+16	-30	-26

4.8 STATUATORY REQUIREMENTS

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
- Metalliferrous Mines Regulations 1961
- Mineral Conservation and Development Rules, 1988
- State Minor Mineral Concession Rules, 1963
- The Water (Prevention and Control of Pollution) Act, 1974
- The Air (Prevention and Control of Pollution) Act, 1981
- The Environment (Protection) Act, 1986
- The Forest (Conservation) Act, 1980
- The Wildlife (Protection) Act, 1972

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Chapter-5

Analysis of Alternative Technology & Site

5.0 ANALYSIS OF ALTERNATIVE TECHNOLOGY AND SITE

5.1 Site alternatives under consideration

Presence of limestone for commercial exploitation has been identified based on the result of geological investigations and exploration carried out by the Geological Survey of India (GSI).

The mining projects are site specific as such alternate sites were not considered.

5.2 Analysis of alternative technology

5.2.1 Choice of method of mining

Factors in the choice of an actual mining method for a given deposit are deposit characteristics, percentage recovery, requirement of health and safety and environmental concerns, production, scheduling scope of mechanization and automation, workforce requirements wage rates, and land reclamation, operating and capital cost estimates. The selection of the mining method (development and extraction) is a key decision to be made in the opening up of a mine.

Surface or open pit mining is used for large, near-surface mineral deposits. Mineral is drilled, blasted, loaded into trucks, and hauled to a facility where it is crushed and ground to a uniform size for further processing. Surface mining requires the removal and disposal of layers of top soil and underlying rock commonly called the overburden. Mining must be planned so that the combine of mining processing and reclaiming the land is taken up concurrently.

The opencast mining method will be adopted because of the following reasons:

- The opencast mining operations ensure higher mineral conservation.
- Low stripping ratio.

The method used for mining is efficient for limestone mining, so no alternative mining method is proposed.

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Chapter-6

Environmental Monitoring Programme

CHAPTER-VI

ENVIRONMENTAL MONITORING PROGRAMME

6.0 INTRODUCTION

Regular monitoring of the various environmental parameters is 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 conformity with environmental regulations, the post project monitoring work forms part of Environmental Monitoring Program.

Environmental Monitoring Program will be implemented once the project activity commences. Environmental monitoring program includes (i) environmental surveillance, (ii) analysis & interpretation of data, (iii) preparation of reports to support environmental management system and (iv) organizational set up responsible for the implementation of the programme.

6.1 ENVIRONMENTAL MONITORING AND REPORTING PROCEDURE

Monitoring shall confirm that commitments are being met. This may take the form of direct measurement and recording of quantitative information, such as amounts and concentrations of discharges and wastes, for measurement against corporate or statutory standards, consent limits or targets. It may also require measurement of ambient environmental quality in the vicinity of a site using ecological/biological, physical and chemical indicators. Monitoring may include socio-economic interaction, through local liaison activities or even assessment of complaints.

The preventive approach to environment management may also require monitoring of process inputs, for example, type and method used, resource consumption, equipment and pollution control performance etc.

The key aims of environment monitoring are:

1. To ensure that results/conditions are as forecast during the planning stage, and where they are not, to pinpoint the cause and implement action to remedy the situation.

2. To verify the evaluations made during the planning process, in particular with risk and impact assessments and standard & target setting and to measure operational and process efficiency.
3. Monitoring will also be required to meet compliance with statutory and corporate requirements.
4. Finally, monitoring results provide the basis for auditing i.e. to identify unexpected changes.

6.2 MONITORING METHODOLOGIES AND PARAMETERS

Air Quality Monitoring

Air Quality monitoring is essential for evaluation of the effectiveness of abatement programmes and to develop appropriate control measures. Suspended Particulate Matter (SPM), Sulphur Dioxide (SO_2) and Nitrogen Dioxide (NO_2) will be monitored at the workplace i.e. core zone. The methodology proposed for is shown below:

Parameters	Technique	Technical Protocol
$PM_{2.5}$	Gravimetric method	**CPCB Guideline Vol. I May' 2011**
PM_{10}	Gravimetric method	**IS 5182 (Part-XXIII)**
Sulphur Dioxide	Improved West and Gaeke	**IS-5182 (Part-II)**
Nitrogen Dioxide	Modified Jacob & Hochheiser	**IS-5182 (Part-VI)**

Water Quality monitoring

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
- Ground water samples will be analyzed for all the parameters as per IS-10500.

Soil Quality monitoring

The soil quality monitoring is carried out to assess the soil characteristic. The soil quality will be analyzed as per CPCB norms.

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 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 at the nearest village for studying the impact due to higher noise levels for taking necessary control measures at the source.

Socio-economic Survey

Socio economic condition will be monitored to assess the demographic particulars of the area including the impacts on the social & economical condition on the residents nearby.

Plantation monitoring programme

Plantation monitoring will be done to ensure survival & growth rate of plantations.

6.3 MONITORING SCHEDULE

The schedule has been shown below for the parameters proposed for monitoring.

S.No.	Description of Parameters	Schedule of Monitoring
1	Air Quality	24 hourly samples twice a week in each season except monsoon
2	Water Quality (Surface & Groundwater)	Once a season for 4 seasons in a year
3	Soil Quality	Once in a year in project area
4	Noise Level	Twice a year for first two years & then once a year

5	Socio-economic Condition	Once in 3 years
6	Plantation monitoring	Once in a season

6.4 MONITORING SCHEDULE - IMPLEMENTATION

An implementation programme has been prepared as it serves no purpose if it is not implemented in letter and spirit.

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:

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 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 and to assess if mining has got any impact on it or not.
d) Measurement of noise levels at mine site, stationary and mobile sources, and adjacent villages will be done twice a year for first two years and thereafter once a year.
e) Post plantation, the area will be regularly monitored in every season for evaluation of success rate. For selection of plant species local people should also be involved.

An Environmental Management Cell (EMC) 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.

6.5 BUDGET ALLOCATION FOR MONITORING

The EMC will be responsible to carry on the monitoring. Budget allotment has also been proposed for the same:

Table No. 6.1 Budget Allocation For Monitoring

S. No.	Description	Cost to be incurred (in lakhs/annum)
1	Air Quality	0.6
2	Water Quality (Surface & Groundwater)	0.5
3	Soil Quality	0.4
4	Noise Level	0.3
5	Socio-economic Condition	0.4
6	Plantation monitoring	0.3
TOTAL		**2.5**

6.6 REPORTING SCHEDULES OF THE MONITORING DATA

It is proposed that voluntary reporting of environmental performance with reference to the EMP should be undertaken. The environmental monitoring cell shall co-ordinate all monitoring programmes at site to furnish the data to the State regulatory agencies regularly in respect of the stipulated prior environmental clearance terms and conditions.

The proponent shall prominently advertise in the newspapers indicating that the project has been accorded environmental clearance and also the details of website where it is displayed.

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Chapter-7

Additional Studies

7.0 PUBLIC CONSULTATION

As per the appendix IV of EIA Notification 2006 & ToR issued by SEIAA UP, public Hearing/consultation was held on 09/01/2019 under the chairmanship of Additional District Magistrate Prayagraj. In Public Hearing local persons participate & raise their issues & concern in the environmental impacts of the project. Proper video recording was done for this meeting.

The Public Hearing was arranged by the Regional office of State Pollution Control Board (SPCB).

Table no.-7.1, Public Hearing Detail

Particular	Description
Advertisement for Public Hearing ➢ Date of Advertisement in Newspapers ➢ Name of Newspapers	07/12/2018, Hindustan Times, Dainik Jagran
Date of Public Hearing	09th January, 2019
Venue	At Village-Bhatauti, Tehsil-Meja, District-Allahabad
Members	• Shri Vinay Singh, Additional District Magistrate, • Shri R.K. Singh, Regional Officer UPPCB.

PHOTOS OF PUBLIC HEARING


(क्षेत्रफल 6.07 ,हेक्टेयर,15 एकड़)
गॉव- भटौती,तहसील: मेजा,जिला-इलाबाद, उत्तर प्रदेश में
दिनांक-09.01.2019
सौजन्य से- क्षेत्रीय कार्यालय, उत्तर प्रदेश प्रदूषण नियंत्रण बोर्ड,
इलाहाबाद प्रयागराज

Details of Action Plan for the Issues Rose during the Public Hearing

Sr. No	Name	Questions asked by Citizens/ Members	Reply by Consultant/ ADM/RO	Action Plan
01	Shri Pintu, Village-Bhatauti	He asked that whether after start of project whether employment will be provided or not. What action will be taken for the development of village? What measures will be adopted for the suppression of dust.	Project proponent said that employment will be given to the local labors of the vicinity area on priority basis. Development works like facilities of drinking water, solar light along road, primary health centre, construction of community toilets, installation of hand pump, arrangement of books for students etc. will be done in village. water sprinkling will be done to suppress dust particles at mine site.	About 6.75 lakh has been kept as EMP cost which will be used for Water Sprinkling & Green belt development.
2	Shri Gajendra Mishra, Village-Bhatauti	He asked that after start of project local people will get employment or not?	Proponent agreed to provide employment to the local villagers accordingly to the vicinity area on priority basis.	Proponent agreed to provide employment to 31 the local labors.
03	Mod. Rizwan, village-Bhasundar	He said that we faces much problems due to dust particles during emitting mining process, what measures will be adopted for the suppression of dust	Proponent replied that water sprinkling will be done on regular basis to suppress dust particles at mine site & plantation will be done at site so that villagers do not face problems.	About 6.75 lakh has been kept as EMP cost which will be used for Water Sprinkling & Green belt development.
04	Shri Arjun Prasad Kushwaha , village-Sukath	He suggested that to reduce dust emission plantation should be done on huge basis to suppress dust particles.	Proponent replied that water sprinkling will be done on regular basis to suppress dust particles at mine site & plantation will be done on huge basis to suppress dust particles	About 6.75 lakh has been kept as EMP cost which will be used for Water Sprinkling & Green belt development.

05	Shri Kripa Shankar Mishra Village-Bhatauti	He suggested that mining should be done only during day time not in night time & employment should be provided to the local villagers of the vicinity area on priority basis.	Proponent replied that mining will be done only during day time. Proponent will provide employment to the local villagers of the vicinity area on priority basis.	---

7.1 RISK ASSESSMENT

Human health and Environmental risk from developmental activities is mainly due to occurrence of some accident consisting of an event or sequence of events like explosion, fire and toxic hazards. Risk analysis provides a numerical measure of the risk that a particular facility poses to the public. It begins with the identification of probable hazardous events at an operational area and categorization as per the predetermined criteria. The consequences of major events or accidents are calculated for different combinations of weather conditions to stimulate worst possible scenario.

These predictions of consequences are combined to provide numerical measures of the risk for the entire facility. Risk assessment should be done on the basis of past accident analysis at similar projects, previous judgments and expertise in the field of risk analysis especially in accident analysis.

7.2 DISASTER MANAGEMENT AND RISK ASSESSMENT:

Maximum depth of working has been concentrated 18m (average) from the ground level & height of benches will be kept 5m to 6m. There is no problem of ground water/ surface water. No causes of disaster have been apprehended during mining activity, but possibility of disaster cannot be ruled out. Therefore all the statutory precautions shall be undertaken into account as per mines act.1952, mines rules 1955, MMR 1961.

Disaster management plan is comprehensive and structured system for ensuring the prevention of risks/ disasters involved. The principles used to priorities work are as follows.

- Priority must be given to human safety and health, where it is seriously threatened.
- Acute problem must be addressed before long – term problem.
- Measures affecting a large population must be given priority over measures benefiting a smaller number of people.

A major emergency in a mine is one that may cause injury or loss to the workers engaged in the mining and allied operations. Therefore the first action under the disaster management is the identification of risks involved and their priorities. From this risk assessment the identified are as below:

1 Use of explosives and the blasting operations, inducing vibrations due to blasting.

2. Slope Failures in open pit.

3. Solid waste generation, their disposal and rehabilitation.

4. Proper training on the use of equipments.

5. Development of green barrier to contain air and noise pollution.

Each parameter is discussed below:

1. **Use of explosive and the blasting operation**:

   The firm has a magazine. Dirking and blasting will be undertaken periodically and gelatin will be used for blasting.

2. **Slope failures:**

   The mining is proposed from top level and gradually advance towards lower levels. Height of benches will be kept 6.0m. In that case chances of slope will be negligible. However considering for steeper slope failure studies will be undertaken in future.

3. **Solid waste generation, their disposal and rehabilitation:**

   Soil shall be generated during course of mining & stacked separately. No waste shall be generated therefore no proposal & management.

4. **Proper training on the use of equipments:**

   Machineries will be employed in the mine. Vocational training programme will be organize in every in every week to train the workers about mine workings & operating the machines.

5. **Development of Green belt :**

   The green belt development programme will help in:

- Prevention of dust (leaves acting as a sink) and screening noise.
- Maintaining ecological balance.
- Increasing as the tic value. Plantation will be under taken towards the North West slope the area.

Care and Maintenance during temporary Discontinuance:

At the time of temporary discontinuance of mine, notice of Directorate General of Mine safety as well to district administration. All precautionary steps shall be taken into account in respect of care & maintenance.

7.3 RISK ABATEMENT

The following precautionary measures shall be taken to prevent any accident

- Elimination of the source of hazard
- Substitution of hazardous process and materials by those which are less hazardous
- Geographical/ physical isolation of hazards from vulnerable communities
- Use of engineering controls to reduce the health risk
- Adoption of safe working practices such as regular equipment maintenance
- Use of Personal Protective Equipment should be mandatory
- Top edge of opencast workings shall be kept properly fenced
- Quarrying shall be done from top downwards. No overhang will be allowed.
- Special attention and requisite provisions shall be taken while working in areas of geological weakness like existence of slip, fault etc.
- Regular dressing of bench sides to ensure safety of workers employed within 5m or working face.
- Provision of safety belt or rope while persons are at work at the quarry sides or benches from where there are chances of falling down for more than 1.8m.
- Spoil banks not to be retained by artificial means at an angle of repose in excess of its natural angle.
- Drafting and implementation of preventive maintenance schedule for various kinds of machinery deployed in opencast workings.
- Provision of maintenance of properly laid haul roads with parapet wall fencing or guards and road signs at strategic points.
- Transportation of sandstone within mine workings by vehicles under the direction, supervision and control of Mine Management only.
- Proper maintenance of vehicles and weekly examination by an engineer and daily examination by a competent person.
- Training and retraining (at specified interval) of the machinery operators.

- Use of controlled blasting techniques. 500 m radius danger zone to be followed strictly.
- Provision of blasting shelters – properly constructed and maintained.
- Adequate maintenance of electrical equipments.
- Adequate illumination after daylight.

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Chapter-8

Project Benefits

8.0 GENERAL

The execution of the project, bring overall improvement in the locality, neighborhood and the State by bringing industry, roads, employment and hence improving living standard and economic growth.

8.1 PHYSICAL BENIFITS

The opening of the proposed project will enhance the following physical infrastructure facilities in the adjoining areas.

a. **Road Transport:** There will be improved road communication due to the proposed project and maintenance will also be done time to time.
b. **Market:** Generating useful economic resource for construction. Excavated mineral will provide a good market opportunity.
c. **Enhancement of green cover:** As a part of reclamation plan, plantation will be carried along the river banks or along the road sides or near the civic amenities.
a. **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, as a part of corporate social responsibility.

8.2 SOCIAL BENEFITS

a) **Increase in Employment** Potential due to the project activity. Employment opportunities will increase both directly as well indirectly.
b) **Contribution to the Exchequer** as the saleable minerals will be given royalty. 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.
c) **Increased Health related activities**: Healthcare promotional activities will be undertaken. Pre-placement & and Periodic medical checkups will be done, which will lift the general health status of the residents of the area. Health camps, medical aids, family welfare programs, immunization camp sports will be arranged.

S. No.	Activities recommended for communities level services	Tentative cost (Lakh Rs)
1	Assistance to set up a temporary health center during the lease tenure.	**0.5**
2	Provide free health checkups & medicines to the nearby villagers of the project site.	**0.4**
3	Awareness campaigns regarding health issues in the nearby villages.	**0.5**

d) **Educational attainments**: Educational activities will be promoted by the lessee. Awareness program will be arranged covering basic issues related to primary level education, environment, health and hygiene etc.

e) **Strengthening of existing community** facilities through the Community Development Programme.

8.3 ENVIRONMENTAL BENEFITS

ENHANCEMENT OF GREEN COVER

Plantation/afforestation will be done as per program in the 7.5 m barrier zone along the periphery of mine lease during the 5 year mining period. plantation will also be undertaken outside the lease area around crusher plant. 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.

The management will provide free saplings of fruit and other trees, etc. to local during rain for plantation. This will increase the consciousness in workers and near-by villagers for greenery. Fruit trees can contribute towards their financial gains.

8.1 CORPORATE ENVIRONMENTAL RESPONSIBILITY

SI. No.	Activity	Capital Cost (in Rs.)
1	Provide drinking water facility in Bhatauti villages and schools by constructing water tanks at schools and	50000
2	Solar lamp distribution	40000
3	Construction of Ladies Toilets	60000
4	Educational support & sanitary facilities in schools for poor students	75000
TOTAL		**2,25,000**

All the activities will be as per the local need & list of beneficiaries will be submitted with compliance.

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Chapter-9

Environment Management Plan

9.0 INTRODUCTION

To mitigate the adverse impact which may be caused due to the mining operations 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 Section IV of this report, based on the results of present environmental conditions and environmental impact assessment. The EMP has therefore 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 this report. To minimize the adverse impact, certain additional EMP is enumerated below for implementation.

Environmental Management Plan (EMP) is aimed at mitigating the possible adverse impact of a project and for ensuring to maintain the existing environmental quality. The EMP converses all aspects of planning & operation of the project, which are relevant to environment. It is essential to implement the EMP right from the planning stage and then continuing it throughout the operation stage. Therefore the main objective of the EMP is to identify the project specific activities that would have to be considered for investigation of the significant adverse impacts and the mitigation measures required. The specific measures that shall be put to practice to minimize the impact on the environment are discussed below:

9.1 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Proper environmental management plan is proposed for Bhatauti Gata No-2061 Khand No. 1A, 8.Gitti, Patthar, & Boulders Mine project to mitigate the impact during the mining operation.

- No overburden or loose sediments will be kept in the vicinity of the working benches.
- The possibility of the project activity contributing to the pollution of watercourses of the region or to the ground water regime is so less that this does not significantly constitute an area of concern.
- Construction of well-compacted roads.
- Regular water spraying on haul roads and waste dumps by tankers.
- Provision of dust collectors for the drilling & crusher machines

- Controlled blasting (if any required)
- Supply of personal protective equipments like dust masks, earplugs, helmets, safety boots etc. for the miners.
- Plantation of wide leaf trees, creepers, tall grasses around quarry sites, waste dumps, road and other surrounding barren zones.
- Proper and regular maintenance of vehicles, compressors and jack hammers.
- Provision of supplying earplugs for jackhammer drillers and crusher operators.
- Care should be taken that noise produced during vehicles movement for carrying sandstone and boulder is within the permissible noise level.
- Carrying of blasting (if any) only during daytime (not during cloudy weather and when strong wind is blowing towards residential areas). Blasting will be carried out with limited explosives at a time so that the noise generation can be well maintained within the prescribed limits.
- Provision of Green Belt (thick foliage) along the lease boundary and road.
- Strict observance of the provisions of Acts, Rules and Regulations in respect of safety both by management and the workers.
- Proper planning and designing of work in order to reduce the risk of hazards.
- Specific instructions and supervisions of working where danger due to fall of side (overhanging, undercutting of bench, fall of objects from higher benches/places is apprehended).
- Training of work persons and the officials.
- Since the haul road will be of considerable length, due importance will be given in the construction of road. The width of road will be maintained more than thrice the width of the vehicle. A code of traffic rules will be implemented.
- A code of practices for tipping in stock piles/dumping of overburden at dump yard and loading point will be implemented.
- In respect of contract work, safety code for contractors and workers will be implemented.

- They will be allowed to work under strict supervision of statutory person/officials only after they will impart training at vocational training centers. All personal protective equipments will be supplied to them.
- A code of practice for fighting fire will be implemented.
- Competent persons like fitters, mechanics will be imparted with special attention to project impact.
- Provision of pit safety committee meeting every month (20th day) to discuss the safety of the mines and the persons employed.
- Celebration of annual mines safety week and environmental week in order to develop safety awareness amongst employees.
- Pre joining medical checkup shall be done and regular health check up in 6 monthly intervals is planned for the employees.
- Care will be taken that no cooking, or burning of woods will be allowed in the adjoining area.
- If some causality or injury to animal occurs, it should be informed to forest department and proper treatment should be given.
- Corridor movement of wild mammals (If exists) should be avoided

9.2 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 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 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:

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 year and analysis thereof with regard to deleterious constituents, if any.
c) The effectiveness of drainage system depends upon proper cleaning of all drains provided in the surrounding of mine area. Any blockage due to siltation or loose material will be checked at least once in a month.
d) Measurement of water level fluctuations in the nearby ponds, dug wells and bore wells.
e) Measurement of noise levels at mine site, stationary and mobile sources, and adjacent villages will be done in every quarter of the year.
f) Plantation/afforestation as should be done as per program. Regular watering of plant and fencing to protect them from cattle/goats has to be provided. Post plantation, the area will be regularly monitored in every season for evaluation of success rate. For selection of plant species local people should also be involved.

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.

Mine management will be in regular touch with State Pollution Control Board and Indian Bureau of Mines and send them annual progress report. Any new regulations considered by State/Central Pollution Control Board for the industry will be taken care of.

9.3 ENVIRONMENTAL MANAGEMENT CELL (EMC)

To implement the EMP, a structured Environment Management Cell (EMC) which includes plant manager and representative of consultants interwoven with the existing management system is there. A comprehensive environmental monitoring program as laid down by State Pollution Control Board is followed.

All the above observations will be complied and documented by the EMC to serve the following purposes:

- Identification of any environmental problems that are occurring in the area.
- Initiating or providing solution to those problems through designed channels and verification of the implementation status.
- Controlling activities inside the project, until the environmental problem has been corrected.
- Suitably responding to emergency situations.

9.4 BUDGET ALLOCATION FOR EMP IMPLEMENTATION

Annual budget for EMP is very essential for successful implementation of EMP. 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 capital and operating expenses:

1. Capital cost for installing pollution control systems.
2. Field cost for monitoring of parameters.
3. Cost of any defined outsourcing
4. Cost of chemicals, consumables and transport for data generation
5. Man power cost for environmental cell
6. Any other cost as per EC condition.

Table 9.1 Cost of EMP

Sl. No	Description	Measures	Capital Cost (Rs. In lakhs)	Recurring Cost(in lakhs/annum)
1	Environmental Monitoring	Monitoring in the vicinity of the mine.	5.0	3.0
2	Fugitive dust suppression	• Water Sprinkling	-	2.5
3	Plantation	Outside of lease area, settlements & roadsides	1.5	1.0
4	Solid Wastes	Food waste/ plastic waste disposed by the labours should	0.25	0.15

		be planned.		
Total			**6.75**	**6.65**

9.5 MONITORING SCHEDULE AND PARAMETERS

To evaluate the effectiveness of environmental management program regular monitoring of the important environmental parameters to be monitored are shown in Table 6.1 (chapter VI).

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Chapter-10

Summary and Conclusion

10.0 INTRODUCTION OF PROJECT & PROPONENT

The proposed project is an opencast semi- mechanized mining project, where mining of Giti Patthar & Booulders will be done. The estimated project cost of the mine is Rs 45 Lakhs with average production of 5,62,500 TPA (2,25,000 m3/annum). The project has been proposed by M/S D.K. Asociates (Mohd. Afzal Partners) S/o Late Abdul Rasheed R/o Millat Nagar, Obra, Sonebhadra (UP), consent for lease has been given in favor of M/s D.K. Associates vide letter no. 315/khanan/2016-17 dated 25.05.2016 to grant lease deed with condition.

The proposed project is to mine Sandstone Gitti, Patthar, & Boulders from the lease area and the estimated project cost is Rs. 45 Lakhs. The mining lease has been granted to M/S D.K. Associates, Gata No-2061 Khand No. 1A,8 over an area of 6.07 Ha at Village: Bhatauti, Tehsil: Meja, District: Allahabad, Uttar Pradesh. The average production of 2, 25,000 m^3/annum (5, 62,500 TPA).

As per the MoEF, New Delhi Gazette dated 14th September, 2006 as amended on 1st December 2009, 4th April, 2011, 13th December 2012, 13th March 2013, 9th September 2013, 28th February 2014 and 25th June 2014, the proposed mining project is categorized as category 'B' project.

10.1 LOCATION

The mine area is located in Village: Bhatauti, Tehsil: Meja, District: Allahabad, Uttar Pradesh. The mining lease / proposed project area falls in Survey of India Toposheet No. 63K/4. The co-ordinates of the mine lease area are:

Coordinates	Latitudes 25° 9'1.74"N
	Longitudes 82° 2'5.94"E
Nearest RS	Meja Road railway station (About 10 Km In NE Direction.)
Nearest Airport	Allahabad airport (About 44.5 Km In NW Direction)
Nearest Highway	NH-76 (about 9.5 km in NE direction) Koraon-Meja Link Road (about 9.0 km in E direction)

10.2 RESERVES

All the quantities of Gitti, Patthar & Boulder occurring 70m below surface ground has been considered as under proved category.

Category wise updated reserves with grade are as follows:

Classification	Code	Quantity (Cum)
A) Mineral Reserves		
1) Proved Mineral Reserve	111	1194240
2) Probable Mineral Reserve	122	597120
3) Inferred Mineral Resources	333	298560
TOTAL		**2089920**

10.3 MINING PROCESS

The project is confined to extraction of Stone Gitti, Patthar and Boulders (Sandstone) from the lease area by semi-mechanized opencast method. The operation is carried out in a semi-mechanized manner. Stone Ballast/Khanda (Sandstone) will be broken using Pick-axes, Hammers, Crowbars etc. For proper sizing, sandstone will be further broken into smaller pieces as per the requirement and will be stacked in the nearby places with the help of tractors, trippers, excavators etc. From these stack yards it will be sent to the destined places. Drilling and blasting will be done as per requirement.

Proposed mining will be done in an eco-friendly, systematic and scientific manner. The maximum bench height will be 6 m and the width of working benches will be kept 6 m so that there will be sufficient space for working labour and for transportation of sandstone. Quarry approach roads will be maintained properly, having a width of 3 m with a gradient of 1 in 16. Initially mining will be done with the help of Jack hammer and pick-axes.

10.4 WATER DEMAND

The water required is mainly for dust suppression, green belt development and drinking purpose during mining operations. The total water requirement will be 2.5 KLD; which will be met from the handpump and well in the nearby village and bore-well situated within the mine lease area.

S.No.	Purpose	Water Requirement(KLD)
1.	Domestic Use	1.395
2.	Dust Suppression	1.2
Total		**2.595**

10.5 BASE LINE DATA

This section contains the description of baseline studies of the 10 km radius of the area surrounding "Bhatauti Gata No-2061 Khand – 1A, 8 Stone Gitti Patthar and Boulders (Sandstone) Mine", Village: Bhatauti, Tehsil: Meja, Allahabad, 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 10.1: BASELINE ENVIRONMENTAL STATUS

Attribute	Baseline status
Ambient Air Quality	**March'2018 to May, 2018** Ambient Air Quality Monitoring reveals that the maximum & minimum concentrations of $PM_{2.5}$ for all the 5 AQ monitoring stations were found to be 51.64 µg/m^3 and 38.14 µg/m^3, respectively. The maximum & minimum concentrations of PM_{10} for all the 5 AQ monitoring stations were found to be 73.57 µg/m^3 and 6014 µg/m^3, respectively.

	As far as the gaseous pollutants SO_2 and NO_x are concerned, the prescribed CPCB limit of 80 µg/m^3 and 100 µg/m^3 for residential and rural areas has never surpassed at any station. The maximum & minimum concentrations of SO_2 were found to be 12.12 µg/m^3 & less than 5.58 µg/m^3 respectively. The maximum & minimum concentrations of NO_x were found to be 21.31 µg/m^3 & 11.64µg/m^3 respectively.
Noise Levels	Noise monitoring was carried out at four locations. The results of the monitoring program indicated that both the daytime and night time levels of noise were well within the prescribed limits of NAAQS, at all the four locations monitored.
Water Quality	3 Groundwater samples and 3 surface water samples were analyzed and concluded that: 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. From the surface water analysis it is evident that most of the parameters of the samples comply with 'Category C' standards of CPCB Drinking water source with con-ventional treatment followed by disinfection.
Soil Quality	**Observations: From March'2018 to May, 2018** Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 7.82 to 7.32, which shows that the soil is alkaline in nature. Potassium is found to be from 0.27 meq/100 gm to 0.19 meq/100 gm. The water holding capacity is found in between 28.3% to 26.8 %.
Ecology and Biodiversity	There are no Ecologically Sensitive Areas present in the study area, but many reserved forests surround the project area. Chandhas RF, Basehara RF:, Mundpela RF, Mindra RF, Salaiya Khurd RF:
Traffic analysis	From the above analysis it can be seen that the V/C ratio for cluster of mines is likely to change to 0.031 & 0.06 with LOS being "A" & "A" which is 'excellent, & 'excellent' as per classification. So the additional load on the carrying capacity of the concerned roads is not likely to have any adverse affect as per classification of ENVIS Technical Report, IISc, Bangalore.

ANTICIPATED ENVIRONMENTAL IMPACT AND MITIGATION MEASURES

10.6 BIOLOGICAL ENVIRONMENT

FLORA

Flora of the Core Zone

The core zone comprises of barren stony waste land, where mining operation is proposed. The flora on the mining site are naturally occurring but are very few in number. Most among them are weeds. No ecologically sensitive plant species has been reported from this area. The faunal variety is rather poor.

Flora of the Buffer Zone

Buffer zone of the proposed project is mainly agricultural land. The flora of buffer zone comprises of plants growing on the edges of agricultural land, village woodlots and trees planted along the roads. Many important species such as Neem (*Azadirachtaindica*), Sisam (*Dalbergiasissoo*),*Terminaliatomentosa (T. elliptica)*, and Khair (*Acacia catechu*)with other associated tree species like Dhak, Palash (*Buteamonosperma*), *Bombaxceiba*, *Aeglemarmelos, Adina cordifolia, Syzigiumcumini, Azadirachtaindica*, etc.

Agricultural Crops

Traditionally rain fed and irrigated agriculture is common. The main crops grown are rice, maize, pigeon pea, sorghum, pearl millet, moong beans during kharifand wheat, Bengal gram, green peas, rapeseed and mustard and lentil during rabiseason. Sugarcane is the main cash crop. Rice–wheat cropping system is more predominant.

Fauna

Fauna Reported in Core zone:

During the faunal survey in the area no wildlife corridor or movement of animals was recorded from proposed project area. No established habitats of any mammals or birds are noticed along the banks. No bird’s habitats like nesting, breeding and forging patterns are noticed in the core zone.

Fauna reported in Buffer zone:

Many domesticated mammal species are 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 (*Funambuluspalmarum*) and field mouse (*Apodemussylvaticus*) are noticed in vicinity of the village. Inquiry from village people regarding wild animals reveals that monkey (*Macacamulata*), Indian hare (*Lepusnigricollis*), fruits bat (*Pteropusconspicillatus*), mongoose (*Herpestesedwardsii*), jackal (*Canisaureus*), etc. are often seen in the area.

The bird population consists of Common teal (*Anascrecca*), White throated kingfisher (*Halcyon smyrnensis*), Pied kingfisher (*Cerylerudis*), Red wattled lapwing, House crow (*Corvussplendens*), House sparrow (*Passer domesticus*), Common hill Myna (*Graculareligiosa*), Red-rumped Swallow (*Cecropisdaurica*), Hoopoe (*Upupaepopsceylonensis*) etc are noticed.
The reptilians species commonly reported are Garden lizard (*Calotesversicolor*), *Eutropismacularia*, rat snakes (*Ptyasmucosus*), Cobra (*Najanaja*) and Banded krait (*Bungarusmulticinctus*) etc.

Impacts on Biodiversity

Present data have been collected through direct inventory as well as 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, faunal migratory routes or eco-sensitive area near the whole study area. There may be disturbance to free movement / living of fauna viz. Birds, Reptiles etc. For this, mine owner planted a good roadside plantation along both side of the mine road.

Impacts on agriculture

The area around the mine lease area is all barren and no agriculture activity is going on. Therefore no significant impact on the agriculture around the project site is expected.

Impacts on aquatic ecology

Mining activities may result in affecting the riverine ecology by polluting the river water. But in this case, river flows almost 3km away from mine site and also nothing is being discharged into the river. However, indiscriminate fishing by labourers etc. may reduce fish stock availability for commercial and sport fishermen. Thus, it is recommended that adequate surveillance measures are implemented during project operation phase to ameliorate such impacts.

Mitigation Measures

There is a requirement to establish a stable ecosystem with both ecological and economic returns. Minimization of soil erosion and dust pollution enhances the aesthetic value of the core and the buffer zone. To achieve this, it is planned to increase the area of green cover of plantation and green belts activities. The basic objectives of plantations are as follows:

- Improvement of Soil quality,
- Quick vegetative cover to check soil erosion,
- Improvement in mining site stability,
- Conservation of biological diversity of plants, birds and animals,
- As dust receptor and dust filter, this is likely to be produced during mining.
- If birds are noticed crossing the core zone, they will not be disturbed at all;
- Labors will not be allowed to discards food, plastic etc., which can attract animals/birds near the core site;
- Only low polluting vehicles having PUC will be allowed for carrying mining materials.
- Noise level will be maintained within permissible limit (silent zone-50dB (A) during day time or residential zone 55dB (A)) as per noise pollution (regulation and control), rules, 2000, CPCB norms.

10.7 LAND ENVIRONMENT

Various components of land environment have been identified for study of impact of the mine operations. Details of the same are given below:

Solid waste generation and management

No waste or top soil shall be generated during mining activities. All the quantities of gitty to be exploited shall be sending to crusher plant outside the area to crusher plant outside the area. Therefore generation of waste shall be nil & no proposal has been envisaged for its separate dumping.

Impact on land use & reclamation of mined out areas

Opencast mining activities may alter the landscape of the lease area and also cause some disturbance to the surface features of the surrounding areas. Of the entire lease area of 36.82 ha (91 acre) ha, about 31.466 ha will be utilized for Quarry mining for cluster of mines and the mining pit quarry will be of 5.354 ha (for cluster of mine).

The post mining land use pattern of the mine lease area of Bhatauti Stone Ballast/*gitti* (Gitti, patthar, khandas, and boulder) Mine is given below:

TABLE 10.2: LANDUSE PATTERN OF THE MINE AREA FOCLUSTER OF MINE (HECTARES)

S. No.	Description	Area in Hectares	% share in total area
1.	Settlements	553.64	1.65
2.	Water bodies	399.35	1.25
3.	River	431.17	1.30
4.	River with Dry Channel	247.17	0.75
5.	Open Land	270.94	0.85
6.	Scrub/Stony Waste	5765.67	16.93
7.	Vegetation	332.27	0.97
8.	Agricultural Land	26044.68	76.6
Total		**34044.89**	**100**

As the mineral is non-replenishable, the excavated area at the end of mine life will be converted into an open benched pit which will be used as water collecting pond. The measures to be taken are likely to bring forth positive impact on the core zone landscape. The aesthetic environment of the core zone will have a positive impact by the time mining ceases in the area with proposed green belt development.

10.8 AIR ENVIRONMENT

Anticipated impacts and evaluation

Information on air quality was studied and various modelling techniques predicted that the mining activity will not affect the air quality in a significant manner. In mining operations, loading, transportation and unloading operations may cause deterioration in air quality due to handling dry materials. In the present case, from the Air modelling results it is anticipated that the incremental pollution will remain within the limit and becomes insignificant outside the mine lease area. Also, the blasting is not prescribed and will be only done in the utmost requirement and that too for a very short duration of mere significance.

Mitigation measures

The only air pollution sources are the road transport network of the trucks. The dust suppression measures like water spraying will be done on the roads. Utmost care will be taken to prevent spillage from the trucks. Overloading will be prevented. Plantation activities along the roads will also reduce the impact of dust in the nearby villages.

10.9 WATER ENVIRONMENT

To find out the effect on ground water an extensive hydro-geological study has been conducted and from the study it can be safely concluded that there is no noticeable effect on surrounding ground water resource due to mining.

Mining of Gitti, Patthar, Khandas, and boulder does not have any significant impact on the water quality and parameters as the mining does not intercept with the ground water level.

In this project, it is not proposed to divert or truncate any stream. No proposal is envisaged for pumping of water from the river. There will not be any adverse impact on surface hydrology and ground water regime due to this project. The contractor will adhere to all guidelines and rules for proper and scientific method of mining during the period of extracting the Gitti, Patthar, Khandas, and boulder. Thus, the project activities shall not have any adverse affect on the physical components of the environment and therefore may not have any effect on the recharge of ground waters or affect the water quality.

10.10 NOISE ENVIRONMENT

Anticipated impacts and evaluation

Noise generated at the mine is due to semi-mechanized mining operations and truck transportation activities. The noise generated by the mining activity dissipates within the mine.

There is no major impact of the mining activity on the nearby villages. However, pronounced effect of above noise levels is felt only near the active working area.

Noise at lower levels (sound pressure) is quite acceptable and does not have any bad effect on human beings, but when it is abnormally high- it incurs some maleficent effects.

In this case the impact of noise on the nearby settlements is negligible as they are far located from the mine workings.

Mitigation measures

On-site

a) Blasting only if required will be done by a licensed blaster.

b) Maintenance of Machinery: Regular maintenance of machinery will keep the generated noise level below the minimum prescribed limit i.e. not exceeding 90 dB (A) at a distance of 2 m from the machine. All machines will be as per stipulated standards and will be used at their optimum capacity.

c) Trained Operators: Only trained operators will be allowed to operate machines during mining to reduce any chance of safety failures.

d) Vegetation: Plantation will be carried in the outer portion of the lease area.

e) Hearing Protection: All the miners will be provided with Personal Protective equipments such as ear-muffs.

f) Phasing out the old and worn out trucks.

Off-site

The off-site receptors are not significantly affected as they are located far away from the mine site. But some disturbances due to vehicle movement cannot be avoided. Plantation will be done along the roadsides, civic amenities, etc. which will more or less dampen the off-site noise level.

10.11 TRAFFIC ANALYSIS

From the above analysis it can be seen that the V/C ratio for cluster of mines is likely to change to 0.031 & 0.06 with LOS being “A” & “B” which is ‘excellent, & ‘Excellent’ as per classification. So the additional load on the carrying capacity of the concerned roads is not likely to have any adverse affect as per classification of ENVIS Technical Report, IISc, Bangalore.

SOCIO-ECONOMIC ENVIRONMENT

The implementation of the Bhatauti Gitti, patthar, khandas and boulder mining project will throw opportunities to local people for both direct and indirect employment. Since the quarries will be leased out to successful allottees, Gitti, Patthar, Khandas, and boulder mining operation in the state will get legalized and it will fetch income to the state exchequer. The project will also provide impetus to industrialization of the area. 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.

10.12 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Proper environmental management plan is proposed for Bhatauti Gitti, patthar, khandas (Plot no-2061, khand: 1A & 8, to mitigate the impact during the mining operation.

- No overburden or loose sediments will be kept in the working benches particularly during monsoon months.
- The possibility of the project activity contributing to the pollution of watercourses of the region or to the ground water regime is so less that this does not significantly constitute an area of concern.
- Construction of well-compacted roads.
- Regular water spraying on haul roads and waste dumps by tankers.
- Provision of dust collectors for the drilling & crusher machines.
- Controlled blasting (if any).
- Supply of personal protective equipments like dust masks, earplugs, helmets, safety boots etc. for the miners.
- Plantation of wide leaf trees, creepers, tall grasses around quarry sites, waste dumps, road and other surrounding barren zones.
- Proper and regular maintenance of vehicles, compressors and jack hammers.

- Provision of supplying earplugs for jackhammer drillers and crusher operators.
- Care should be taken that noise produced during vehicles movement for carrying Gitti, Patthar, Khandas, and boulder is within the permissible noise level.
- Carrying of blasting (if any) only during daytime (not during cloudy weather and when strong wind is blowing towards residential areas). Blasting will be carried out with limited explosives at a time so that the noise generation can be well maintained with the prescribed limits.
- Provision of Green Belt (thick foliage) along the lease boundary and road.
- Strict observance of the provisions of Acts, Rules and Regulations in respect of safety both by management and the workers.
- Proper planning and designing of work in order to reduce the risk of hazards.
- Specific instructions and supervisions of working where danger due to fall of side (overhanging, undercutting of bench, fall of objects from higher benches/places is apprehended).
- Training of work persons and the officials.
- Since the haul road will be of considerable length, due importance will be given in the construction of road. The width of road will be maintained more than thrice the width of the vehicle. A code of traffic rules will be implemented.
- A code of practices for tipping in stock piles/dumping of overburden at dump yard and loading point will be implemented.
- In respect of contract work, safety code for contractors and workers will be implemented.
- They will be allowed to work under strict supervision of statutory person/officials only after they will impart training at vocational training centres. All personal protective equipments will be supplied to them.
- A code of practice for fighting fire will be implemented.
- Competent persons like fitters, mechanics will impart with special attention to project impact.
- The safe handling of materials while attending to repairs, maintenance of HEMM.
- Provision of pit safety committee meeting every month (20th day) to discuss the safety of the mines and the persons employed.

- Celebration of annual mines safety week and environmental week in order to develop safety awareness amongst employees.
- Pre joining medical check up shall be done and regular health check up in 6 monthly intervals is planned for the employees.
- Care will be taken that no cooking, or burning of woods will be allowed in the adjoining area.
- If some causality or injury to animal occurs, it should be informed to forest department and proper treatment should be given.
- Corridor movement of wild mammals (If exists) should be avoided.

10.13 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 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:

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 year and analysis thereof with regard to deleterious constituents, if any.
c) The effectiveness of drainage system depends upon proper cleaning of all drains provided in the surrounding of mine area. Any blockage due to siltation or loose material will be checked at least once in a month.
d) Measurement of water level fluctuations in the nearby ponds, dug wells and bore wells.

e) Measurement of noise levels at mine site, stationary and mobile sources, and adjacent villages will be done in every quarter of the year.

f) Plantation/afforestation as should be done as per program. Regular watering of plant and fencing to protect them from cattle/goats has to be provided. Post plantation, the area will be regularly monitored in every season for evaluation of success rate. For selection of plant species local people should also be involved.

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.

Mine management will be in regular touch with State Pollution Control Board and Indian Bureau of Mines and send them annual progress report. Any new regulations considered by State/Central Pollution Control Board for the industry will be taken care of.

10.3 Cost of EMP for Bhatauti Plot no-2061 1A & 8,

Sl. No	Description	Measures	Capital Cost (Rs. In lakhs)	Recurring Cost(in lakhs/annum)
1	Environmental Monitoring	Monitoring in the vicinity of the mine.	5.0	3.0
2	Fugitive dust suppression	• Water Sprinkling	-	2.5
3	Plantation	Outside of lease area, settlements & roadsides	1.5	1.0
4	Solid Wastes	Food waste/ plastic waste disposed by the labours should be planned.	0.25	0.15
Total			**6.75**	**6.65**

10.15 MONITORING SCHEDULE AND PARAMETERS

Table 10.4: Monitoring Schedule and Parameters

S.No.	Description of Parameters	Schedule and Duration of Monitoring
1	**Air Quality** **a)**In the vicinity of the mine **b)**In the vicinity of the transportation network	24 hourly samples twice a week for one month in each season except monsoon season.
2	**Water Quality** **a)**Water quality of surface and groundwater around the site **b)**Drinking water must conform to drinking water standards	Once in a season for 4 season in a year.
3	Ambient Noise Level	Twice in a year for couple of years & then once in a year.
4	Soil Quality	Once in two years on project monitoring area.
5	Inventory of Flora(tree plantation, survival etc)	Once in two years on project monitoring area.
6	Socio-economic condition of local, population, physical survey	Once in 3 or 4 years.

10.16 BENEFIT OF MINING

PHYSICAL BENIFITS

The opening of the proposed project will enhance the following physical infrastructure facilities in the adjoining areas.

a. **Road Transport:** There will be improved road communication due to the proposed project and maintenance will also be done time to time.

b. **Market:** Generating useful economic resource for construction. Excavated mineral will provide a good market opportunity.

c. **Enhancement of green cover:** As a part of reclamation plan, plantation will be carried along the river banks or along the road sides or near the civic amenities.

a. **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, as a part of corporate social responsibility.

SOCIAL BENEFITS

a) **Increase in Employment** Potential due to the project activity. Employment opportunities will increase both directly as well indirectly.

b) **Contribution to the Exchequer** as the saleable minerals will be given royalty. 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.

c) **Increased Health related activities**: Healthcare promotional activities will be undertaken. Pre-placement & and Periodic medical checkups will be done, which will lift the general health status of the residents of the area. Health camps, medical aids, family welfare programs, immunization camp sports will be arranged.

S. No.	Activities recommended for communities level services	Tentative cost (Lakh Rs)
1	Assistance to set up a temporary health center during the lease tenure.	**0.5**
2	Provide free health checkups & medicines to the nearby villagers of the project site.	**0.4**
3	Awareness campaigns regarding health issues in the nearby villages.	**0.5**

d) **Educational attainments**: Educational activities will be promoted by the lessee. Awareness program will be arranged covering basic issues related to primary level education, environment, health and hygiene etc.

e) **Strengthening of existing community** facilities through the Community Development Programme.

ENVIRONMENTAL BENEFITS

ENHANCEMENT OF GREEN COVER

Plantation/afforestation will be done as per program in the 7.5 m barrier zone along the periphery of mine lease during the 5 year mining period. 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.

The management will provide free saplings of fruit and other trees, etc. to local during rain for plantation. This will increase the consciousness in workers and near-by villagers for greenery. Fruit trees can contribute towards their financial gains.

10.17 CORPORATE SOCIAL RESPONSIBILITY

CORPORATE ENVIRONMENTAL RESPONSIBILITY

SI. No.	Activity	Capital Cost (in Rs.)
1	Provide drinking water facility in Bhatauti villages and schools by constructing water tanks at schools and	50000
2	Solar lamp distribution	40000
3	Construction of Ladies Toilets	60000
4	Educational support & sanitary facilities in schools for poor students	75000
TOTAL		**2,25,000**

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Chapter-11

Disclosure of Consultants

CONSULTANTS ENGAGED

The consultant engaged for the preparation of the EIA/EMP of the project is M/s Cognizance Research India Private Ltd. The information about the company with address is as follows:

Basic Information about the Consultant Engaged is as follows stated below:

Name of the Consultant	Cognizance Research India Private Ltd.
Address	GT-20, Sector – 117, Noida -201301 – U.P
Credentials	Accredited by QCI/NABET

Personnel involved in the preparation of EIA/EMP report are stated below:

Sr. No.	Name	EC/FAE	Details
01	Mr. Nimish Singhvi	EC	EIA Coordinator for A category (Mining of minerals opencast).
02	Mr. Nimish Singhvi	FAE	AP, SHW & GEOLOGY
03	Mr. Vineet Pandey	FAE	SE
04	Mr. Rahul Kumar	FAE	AQ & WP
05	Mr. Partha Pratim Maji	FAE	EB
06	Mr. PM Jain	FAE	NV & RH
07	Dr.P Radhakrishna Moorthy	FAE	HG & LU

(Mohd. Afzal)

Accreditation Certificate of the Consultant Engaged:

QCI

NABET

Quality Council of India

National Accreditation Board for
Education & Training

CERTIFICATE OF ACCREDITATION

This is to certify that

M/s Cognizance Research India Private Limited., Noida

is hereby accorded accreditation under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations (Version 3)

Scope of Accreditation:

Sl. No.	Name of the Sector	Cat.
1	Mining of minerals including opencast / underground mining	A
2	Coal washeries	A
3	Mineral beneficiation	A
4	Highways	B
5	Building and construction projects	B
6	Townships and Area development projects	B

Name of approved EIA Coordinators and Functional Area Experts are mentioned in IAAC minutes published on website dated Feb 24, 2016 and Mar 02, 2016.

Accreditation to the above is subject to the EIA reports being prepared by the experts (EIA Coordinators and Functional area Expert) mentioned in the above minutes and compliance to the Terms and Conditions of Accreditation.

Certificate No: NABET/ EIA/1619/ IA 006

Valid Up to: Jan 31, 2019
(Subject to continual compliance to NABET scheme)

C.E.O
NABET

<u>Consultant Contact Details:</u>

Cognizance Research India Private Ltd.

Address – GT – 20, Sec – 117, Noida – 201301

Mobile no. - +8377871554, 8826287364

Email id – info@cognizanceindia.com, cognizanceresearchindia@gmail.com

Website – www.cognizanceindia.com