BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,

Principal Bench, New Delhi

Original Application No. 23/2017 (EZ)

With

Original Application No. 776/2018

Syed Arshad Nasar — Applicant(s)

Vs.

Union of India — Respondent(s)

With

Ramchandra Chaurasia — Applicant(s)

Vs.

State of Jharkhand — Respondent(s)

Index

Sr. No.	Particulars	Page No.
1.	**Compliance Report** in compliance to the Hon'ble NGT order dated 12.03.2021 in OA No. 23/2017 (EZ), Syed Arshad Nasar Vs. Union of India With OA No. 776/2018, Ramchandra Chaurasia Vs. State of Jharkhand.	
2.	**Annexure-A-1:** A copy of Hon'ble NGT order dated 12.03.2021.	
3.	**Annexure-A-2:** A copy of Interim Joint Committee Report.	
4.	**Annexure-A-3:** A copy of the Minutes of meeting held on 30.10.2021 and 03.11.2021 on review of carrying capacity assessment status in compliance to Hon'ble NGT order dated 12.03.2021.	

(S. K. Gupta)
Scientist E
Central Pollution Control Board,
Parivesh Bhawan, East Arjun Nagar,
Delhi- 110032.

Date: 09.12.2021
Place: Delhi

Compliance Report in the matter of Syed Arshad Nasar Vs Union of India With Ramchandra Chaurasia Vs State of Jharkhand With Pradeep Kumar Singh v. State of Jharkhand (O.A. No. 23/2017/EZ with O.A. No 776/2018/PB with OA No. 373/2019/PB)

1. The Hon'ble NGT in the order dated 12.03.2021has directed as follows:-

   "Preventive measures to control pollution are not being taken inspite of repeated show cause notices remaining uncomplied. We note that CPCB submitted report dated 06.07.2020 in O.A. No. 1016/2019, UtkarshPanwar vs. Central Pollution Control Board &Ors., about the carrying capacity of the NCR to sustain the number of brick kilns and siting criteria including inter se distance. The joint Committee may take into account the pattern followed in the said report, while preparing the report in the present case. The joint Committee may also make recommendations on the subject of assessment of compensation taking into account the cost of restoration for the damage caused and its apportionment among the violators."

   The copy of the order dated 12.03.2021 is annexed and marked as ***Annexure "A-1"***

2. In compliance to the above order the Central Pollution Control Board, Regional Directorate (hereinafter referred to as "CPCB, RD, Kolkata"), being the nodal agency has prepared a detailed inspection format for Stone Crusher as well as Stone Mine and verification format for the inspecting team. It was requested tothe District Task Force Committee (hereinafter referred to as "DTF Committee")to investigate the

Environmental Management Status of all the Stone Mines and Crusher in the Sahebganj District as per the format provided by CPCB, RD, Kolkata.

3. The inspection format of the Environmental Management Status of Stone Crushers and Mines consist of the information related to name of the unit along with the address, location (lat- long), lease hold area, distance from nearby village/highway, production capacity. It also consists of the Regulatory Compliance Status (w.r.t to Air Act 1981 and the Water Act 1974 & Authorization under the Hazardous and other Waste Management and Transboundary Movement Rules), Process Details, Source and availability of water. Apart from these the Status of Emission Control System of individual process for stone crushing such as hauling, crushing, screening, conveying, storage and transportation was also required to be provided for stone crushers. Similar information was also required to be provided for stone mining activities (mining method and process: drilling, blasting, excavation, hauling, unloading and transportation). The status of Wind Breaking Wall, and Green Belt were also required to be provided in the inspection sheet.

4. With reference to the above, the inspection of the all the Stone Mines andStone Crushers was carried out by the DTFCommittee from 11.02.2020 to 16.02.2021 as per the formats provided by CPCB, RD Kolkata. The summary as well as inspection report of all the Stone Mines and Stone Crushers was submitted by District Magistrate (DM), Sahebganj.

5. In compliance to the Hon’ble NGT order, re-assessment of the above information was carried out by CPCB, RD Kolkata for all the units to

provide a brief Environmental Management Status to Hon'ble NGT. The status of existing emission control system of the stone mine and crushing units was derived. Its adequacy with respect to the recommended emission control system was also assessed.

The brief highlights are as follow:

i. It was found that most of the crusher units lack in providing proper pollution control devices to combat the air pollution.

ii. Even if some emission control systems (such as single water tap, covered screen, wind breaking wall are provided in some crushers) its implementation status is very poor.

iii. None of the stone mines are equipped with proper pollution control devices.

This indicates that immediate action is needed to curb the particulate matter. The action taken against units responsible for air pollution is not at all effective.

The detailed observations have been provided in the Interim Joint Committee Report.

Copy of the Interim Joint Committee Report is annexed and marked as ***Annexure "A-2".***

6. An Interim Joint Committee Report has been prepared by CPCB, RD-Kolkata based on the information provided by Jharkhand State Pollution Control Board (hereinafter referred to as "JSPCB"), Centre for Environment and Energy Development (hereinafter referred to as "CEED"), Delhi, information of specific units acquired through the joint

inspection carried out by DTF Committee and the recommendations received from all the committee members and concerned authorities.

The report includes Background of the Study, Process Details of the Stone Mining and Crushing, Regulatory Status of the Stone Mines and Crushers, Environmental Pollution Status (Source of Air Pollution, Air Pollution Trend, Present Status of Environmental Management practices adopted by the units, Carrying Capacity Assessment, Local Pollution Hot Spots,Assessment of Environmental Compensation, Action Taken and Recommendations.

The detailed observations and recommendations have been provided in the Interim Joint Committee Report.

7. The carrying capacity study carried out by CEED, Delhi is reviewed by the Joint Committee via a virtual meeting held on 30.10.2021 & 03.11.2021.

   Copy of the Minutes of Meeting held on 30.10.2021 and 03.11.2021 is annexed and marked as ***Annexure "A-3".***

   It was observed that analysis carried out by CEED, Delhi, is based on the formulae recommended by Hon'ble NGT in its order dated 12.03.2021 for Delhi, which is a land locked area. However, Sahebganj has different topography, it's a hilly area and is bounded by river Ganga in one of its boundaries. Moreover, Ventilation Coefficient should also be considered while calculating the carrying capacity. Therefore, the recommended formulae for calculating carrying capacity assessment of Delhi is not applicable for Sahebganj area.

8. Therefore, it is recommended that the Carrying Capacity assessment should be more scientifically conducted by CEED, Delhi. The Ventilation

Coefficient, topography of hills and river side should also be considered while calculating the carrying capacity.

9. Since the order given by the Hon'ble NGT is in March 2021, therefore, the critical months/period such as Dec-Jan should be taken into consideration for accurate estimation of carrying capacity.

10. The present report submitted by CEED, Delhi on Air Pollution Inventory, Air Pollution Trend as well as Carrying Capacity is based on secondary data and info collected from different department. So, the present status is indicative, therefore it is required to make assessment of the actual situation.

11. The final comprehensive Joint Committee Report, which is to be submitted before the Hon'ble NGT should be more comprehensive and scientific. Since the order given by Hon'ble NGT is in March 2021 for estimation of carrying capacity, therefore, the critical months/period such as Dec-Jan should be taken into consideration for accurate estimation of carrying capacity. Since, the studies reveal that there is only 3 months of concern and the prediction is based on satellite-based data. Therefore, in absences of any ground-based monitoring data during the predicted critical season, it is proposed that a detail ground-based air quality data for the period Nov – Feb be carried out to establish the factual status and assess the scientific study based supporting cum carrying capacity of the region and work out the requirement to comply with the order of the Hon'ble NGT dated 12.03.2021

12. In view of the above, it is submitted that this may be treated as Interim Report of the Joint Committee and extension of time period for submission of final report by the committee to comply with the requirement arising from the Hon'ble NGT order dated 12.03.2021

may be given. During this period, field level study for primary data collection (DEC – FEB), and based on the same, carrying capacity-based outcome will be prepared and submitted to Hon'ble NGT, by 1st week of April 2022.

13. Therefore, owing to the present situation and for carrying out all the above-mentioned work which is one of the foremost important aspects for preparation of the comprehensive Report in this matter, it is the humble submission of the Joint Committee before the Hon'ble NGT that an extension of time period till 1st week of April 2022 may be granted for submission of the Final Comprehensive Report before the Hon'ble NGT.

14. Hence, this Compliance Report is submitted in compliance of the Hon'ble NGT directions.

Item Nos. 01 to 03 Court No. 1

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

(By Video Conferencing)

Original Application No. 23/2017 (EZ)

(With reports dated 29.01.2021 & 10.03.2021)

Syed Arshad Nasar Applicant

Versus

Union of India & Ors. Respondent(s)

WITH

Original Application No. 776/2018

Ramchandra Chaurasia Applicant

Versus

State of Jharkhand Respondent

WITH

Original Application No. 373/2019

Pradeep Kumar Singh Applicant

Versus

State of Jharkhand Respondent

Date of hearing: 12.03.2021

CORAM: HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON'BLE MR. JUSTICE SHEO KUMAR SINGH, JUDICIAL MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER

Respondent: Mr. Mukesh Kumar, Advocate for CPCB
Mr. Kumar Anurag Singh, Advocate for JSPCB

ORDER

1. All the three matters relate to enforcement of environmental norms in the operation of quarrying and crushing units in Rajmahal hills of the Vindhya Mountains, District Sahebganj, Jharkhand and are being taken

up in continuation of order dated 23.09.2020. In last order, the Tribunal noted that the area is rich in mineral resources. The mining companies or other entities are indulging in indiscriminate mining and operating stone crushers without due regard to the environmental norms. In this process, the hills are blown up. To remedy the problem, the Tribunal passed several orders in the last three years, including prohibiting illegal mining and non-compliant stone crushing activities vide order dated 06.07.2017, followed by order dated 17.04.2018.

2. Finally, a Committee was constituted comprising (a) Senior Scientist/ Engineer form CPCB; (b) Regional Office, EZ, MoEF&CC, Bhubneswar and, (c) Experts from SEIAA and Jharkhand State PCB to undertake study and give a report as follows: -

> ***"i) Undertake Carrying Capacity Assessment of the area viz-a-viz stone mines and stone crushing units.***
>
> ***ii) Undertake Ambient Air Quality Assessment in atleast 10 representative locations of the area.***
>
> ***iii) Assess (a) the pollution control devices of the stone mining and stone crushing units in the area and the environmental damage caused and (b) the cost of restoration of such damage.***
>
> ***iv) Any other relevant studies cognate to the above.***
>
> ***In undertaking the task, the Committee may co-opt expert/experts from any institution identified by it."***

3. The Tribunal noted vide order dated 07.05.2019 that the State PCB had failed to take adequate remedial action against illegal mining and crusher units and also failed to realize Environmental Compensation on 'Polluter Pays' principle. The Committee constituted by the Tribunal filed its report in O.A. 23/2017 (EZ) finding wide scale flouting of norms and also recommended that only compliant mining should be allowed

purported the Bio-diversity of the area. On 11.09.2019, the Member Secretary, State PCB appeared in person and made a statement that there are 407 stone crushers and 300 stone mines. The specific detail of non-conforming stone crushers and mines were directed to be complied. Further, as per information given by the Member Secretary, 508 units had applied for Consent to Operate out of which 445 had been granted and the case of 24 had been rejected, while in the case of 39, applications for grant of Consent to Operate were under consideration. 293 stone crusher units and stone mining units had been found to be non-compliant during the inspections between 11.11.2019 to 17.11.2019 and, therefore, show cause notices had been issued. 106 units had been imposed with interim environmental compensations. Total environmental compensation of ₹6,33,57,000/- had been imposed by the State PCB cumulatively on the stone mines and stone crusher units out of which ₹2,36,25,000/- was upon 55 stone mines and ₹3,97,32,000/- against 141 stone crushing units. The District Task Force had demolished 34 illegal crusher units and sealed and demolished another 107 where illegal storage, processing and dispatch of minerals were being indulged in. 70 such illegal processing units (stone crushers) had been sealed and demolished. Apart from lodging FIRs, further 47 numbers of illegal stone crushers were also sealed and demolished as observed during the inspection undertaken on January, 2019.

4. Vide order dated 05.12.2019, the Tribunal observed:-

> *"18. Upon consideration of the entire facts and circumstances borne out of the record of O.A. No. 23/2017/EZ and O.A. No. 776/2018,* ***it is more than evident that the State machinery and the regulatory authorities had allowed a free run to the operation of mines and crusher units resulting in the present sordid condition****. Even after the present cases were filed, they had been reluctant in dealing with the matters as directed by the Tribunal. They had to be perforce made to discharge their responsibilities and*

perform the duties. The actions taken by them are as a result of repeated orders passed by the Tribunal from time to time. ***The reports filed by the regulatory authorities are found to be far from satisfactory, mutually conflicting, bereft of clarity and inconsistent****.* ***The Member Secretary, State PCB who had appeared before the Tribunal was unable to answer questions put by the Tribunal and chose to be adamant in not furnishing the requisite information with clarity. As would be quite apparent from what had been noted earlier, the State PCB and the District authorities including the District Mining Officer did not appear to be clear as to how many stone mines and stone crusher units are in operation. The Member Secretary was also unable to answer on the distance maintained between the stone crusher units as well as the individual leases granted for stone mines. Taking the figure provided by the Member Secretary on 11.09.2019, there are more than 407 stone crushers and 300 stone mines operating in the area notwithstanding the fact that actual figures have not been provided as admittedly detailed inventorization of all such units have not been undertaken thus far****.*

19. ***The photographs placed before us by the Applicant demonstrate an alarming situation where hills had been found to have been flattened due to mining out of the stones****. The terms of reference which had been referred to the Committee vide order dated 19.01.2019 have also not been considered by the Committee so far except to give general recommendations in the report filed through the CPCB on 30.04.2019.*

20. As regards undertaking carrying capacity assessment, ambient air quality assessment and effectiveness of pollution control devices, it has been stated in a note of the Committee as follows:

> ***"Regarding Carrying Capacity Assessment, Ambient Air Quality Assessment and effectiveness of Pollution Control Devices is a study of one year to arrive at a certain conclusion. This in-depth study requires 'Secondary Data Base' of at least last five years and one 'Primary Data Base' to arrive at a meaningful conclusion through 'Time Series' analysis. Already in the World Bank project-National Ganga River Basin Authority (NGRBA) a project on industrial monitoring and assessment is given to Jadavpur University. Considering the gravity, similar study may be awarded to Department of Environmental Engineering, Jadavpur University or any other reputed Institute."***

We find the observation of the Committee to be unreasonable and an attempt to delay the entire process.

21. ***The Member Secretary instead of answering the questions upfront chose to hedge around to deflect the questions posed to him. Considering the obvious ineptitude of the Member Secretary, option before this Tribunal is either to take coercive measures for failure and negligence of the***

Member Secretary or to require the Chief Secretary to look into the matter and take decision whether such important office as Member Secretary, State PCB should be headed by any other suitable, technically sound person with the ability of effective environmental governance. Such decision may be taken at the earliest so that public service functions assigned to such high office are discharged in a responsible manner."

5. Finally, the Tribunal directed as follows:-

"26. We direct the Committee constituted vide order dated 22.01.2019 to place before us a table giving the details of the stone mines and the stone crushers separately containing the following particulars:

a) Name of the mines and crusher units and its locational depiction on the map of appropriate scale.

b) Dates of grant of Consent to Establish, Consent to Operate and, also Environmental Clearance (EC) in respect of stone mines. The area of stone mines and distance with adjoining mine(s) may clearly be stated.

c) Adequacy of pollution control devices of stone cruising units.

d) Details of individual violations of conditions of EC/Consent to Operate w.r.t. mining units and details of violation of Consent to Operate w.r.t. Stone Crushing units.

e) Action taken against those which do not have EC and Consent to Operate and against those which have violated the conditions of EC/Consent to Operate w.r.t. mining units.

f) The amount of environmental compensation assessed and recovered along with the individual computation sheets indicating period of default."

6. The matter was last considered on 23.09.2020 in light of report of the joint Committee filed on 21.09.2020 and also report of the Member Secretary. The Tribunal, on consideration, found that situation was deteriorating on account of failure of the statutory regulator in taking adequate action. Possibility of concerned officers colluding with the law violators was not ruled out. Compensation assessed was inadequate and was not being recovered. Further, there was a need for a scientific action plan being prepared after relevant study by an Expert Committee which

was accordingly constituted. The extracts from the said order are as follows:-

> *"7. We have perused the report and heard the Member Secretary who is present in person. The report gives details of some of the crushing units and mining units inspected. All the crushing units and mines have not been inspected. In respect of the units inspected, the observations are as follows:-*
>
> ***"A brief description of the mines and crushers and inspected by committee members on 16.01.2020.***
>
> *The committee members visited the crushers and Mines in Bakudi. Details of inspected mines and crushers are given in table B & A respectively. Details of violations of the EC & CTO conditions in inspected mines and CTO conditions of the inspected crushers are provided in table 7 photo no. 1 to 20 is also provided in annexure for depiction of the conditions prevailing in mines &crushers.* ***Most of the crushers violated the rules of EC and CTO. No boundary wall or metal sheet was found in the boundary but Jial Das unit these were present. Scanty plantation in all the unit. Presence and effectiveness of pollution control equipments especially water sprayers were present but their implementation is poor . Stone mines visited in Bakudi Sahebganj by the committee and revealed that almost all the mines bench height and width was not proper. Unscientific and unsystematic mining was being done in all mines visited . Haul roads were kutcha inadequate arrangement for water spraying on haul road.***
>
> ***A brief description of the mines and crushers and inspected by committee members on 17.01.2020.***
>
> ***I.*** *The committee members visited Mundli area in Mizrachowki, Sahebganj district. There were large number of crushers (approx 40-50 crushers) in that area (see photos 31 to 35).* ***Most of the crushers had no boundary wall or metal sheet boundary around their periphery (see photo 31 to 34).There was no plantation around the crushing units (see photo 31 to 35) except in a very few. The trees in the area were laden with dust. Roads were full of trucks (see photo 31 &32). Human habitation was not far away and appeared to be in impact zone of these crushers (see photo 31&34). There was mining activities carried out in the hills adjacent to these crusher units (see photo 32&33). Most of the crushers were not running and no officials/staff were present to explain the measures taken to comply the CTO conditions. Therefore presence and effectiveness of pollution control equipments especially water sprayers could not be ascertained.***
>
> *One of the crusher units of M/s Maa Vaishnavi Stone works was visited. The crusher owners & staff were present and showed the status of compliance of CTO conditions. Water*

sprayers on some of the crusher transfer points in their unit were provided but they were not able to prevent dust emissions while running of crusher (see photos 24 & 25). Some plantations had been done (see photo 26 & 27). It was instructed to grow more plants/trees around the crusher periphery in all sides. ***On one side metal sheet boundary has been provided but its height was not adequate (see photo 26). Rainwater harvesting/Groundwater recharge arrangements were not provided in the unit****. Some workers of the crushers units were provided dust mask and helmet (see photo 28).*

A large number of crushers in Mundli, Mirzachaouki would have many adverse impacts on the environment of the area that are enumerated below:

a) Dust pollution and subsequently adverse impact on health of workers and nearby population (habitations & dwellings were not very far from the crusher area, see photo 31&34).

b) There was no large water tank, water storage area in the crusher premises. Generally crusher units withdraw groundwater for water spraying, etc and therefore groundwater resources of the area may get depleted.

c) Due to very large number of vehicles the roads gets chocked, traffic jams occurs i.e. roads are not wide for such high traffic load vehicular emissions also add to air pollution. Besides such large number of vehicles plying on road at night also may lead to noise pollution in the area and other sleep related problems.

II. *Some stone mines were also visited in Mundli & Bhutha Mauza in Mirzachouki by committee members on 17.01.2020. Details of mines are given in table B above Some of the observations are as given below:*

i. In almost all the mines bench height and width was not proper. Bench height was very high compared to the loading equipment posing danger to man and machinery *(see photo 21,22,29,30,37 & 38).* ***Unsystematic, unscientific mining was being done in all mines visited.***

ii. Environmental & pollution control measures were inadequate or not followed such as:Sump/ rainwater storage area was not provided and if provided in one or two mines the sump is very small & water in them would finish within 1-3 months of end of rainy season(see photo 21). Haul roads were Kutcha and inadequate arrangement for water spraying on haul roads was done. Overburden/

waste material was also dumped improperly. Mine plan/drawing sections were not made available so it was difficult to ascertain whether the O/B dump is within the lease area or outside. O/B was dumped without any catch drain, siltation ponds & retaining wall in its periphery (see photo36,40,44,45). No grassing and vegetation on O/B dump was done (see photo 36,40,44,45). There was no separate dump for top soil storage.

iii. ***There was one illegal mine approximately 300 to 400 m from the Mines of M/s Star India Mines as reported by DMO, Sahebganj (see photo 43) where O/B was dumped improperly without catch drains, retaining wall.***

III. *One of the crusher (of M/s Tarkershwar Jaiswal) could be observed from the hills of Bhutha Mauza. The waste material which was used to fill & make the* ***landfill was very improper thrown and lead to destruction of green belt in the surrounding, in fact the land fill was destroying the green belt in periphery (see photo 43). In the further low lying side there were two ponds and silt of O/B materials from mines and the M/s Tarkeshwar Jaiswal crusher would flow into these ponds in rainy season.***

IV. *The committee members visited Kirtania, Mirzachowki where again there was a large number of crushers).* ***Due to such large number of crushers there were numerous trucks moving, standing in the area which resulted in traffic jams, air pollution, noise pollution, etc. The details of mines and crushers inspected in this area in Mirzachowki is given in table A & B. Mining was done in hills. In almost all the mines bench height and width was not proper Bench height was very high compared to the loading equipment posing danger to man and machinery. Unsystematic, unscientific mining was being done, sump/ rainwater storage area was not provided and if provided (in one mine of CTS industries ltd.) the sump is small & water in them would finish within 3-4 months of rainy season. Haul roads were Kutcha and there was no arrangement for water spraying on haul roads. Overburden water material was also dumped im-properly. Mine plan/drawing sections were not made available so it was difficult to ascertain whether the O/B dumped is within the lease area or outside. O/B was dumped without any catch drain, siltation ponds & retaining wall in its periphery (see photo 63,67). No grassing and vegetation on O/B dump was done (see photo 63,67). There was no separate dump for top soil storage. Illegal mines of Md. Yashin was visited (see photo 55&56) in***

Belbhadri Mauza (details in table B). Illegal Mines adjacent to mine of M/s S.S Blackstone can also be seen(see photo 66). District Mining Officials & JSPCB members were not aware of the person responsible for illegal mining at that place (i.e adjacent to M/s S.S Blackstone Mine in Belbhadri Mouza). Thick dust layers seen on the floor of the Crusher units (see photo 54,62) would lead to dust propagation wherever wind blows. Housekeeping should be improved & floor should be cleared of dust regularly.

V. ***One important point of observation at that place at other places in Sahebganj district was that crushers are established on the hill, hill slopes and therefore they are at higher altitude. The metal sheet used for boundary in the periphery become useless since it is in the lower portion of these crushers & therefore useless in control in propagation of dust to far areas.***

Crushers should be located in the bottom of the hills, in low altitude or else the brick wall should be high enough to prevent the dust from propagation to flung areas.

VI. ***Objectionable location of crusher resulting in close cluster causing accumulation of pollution in excess of carrying capacity. Such close clusters of stone crusher should not be established in the first place , if at all necessary or unavoidable ,prior EIA with appropriate EMP is essential.***

<u>A brief description of the mines and crushers and inspected by committee members on 18.01.2020.</u>

I. *Some crushers were observed adjacent to the road in the Badi Kodarjana,Pratapganj, Dt: Sahenganj(see table 9 and see photo 68to 76). The crushers were within a distance of 50-100 m from the road. A railway line was also seen within 75-125m from the above crushers(68,72,76). Crushers were not running during inspection. One old fort was observed within 100-200 distance from one the crushing unit(see photo 76). Trees near these crushers were laden with dust (see photo 71,73 & 74).* ***There was no wall/metal sheet at the boundary of these crushers. No/negligible plantation was observed in the periphery of these crushers. Other details of these crusher units are given in table 9 District Mining officer & Regional Officer JSPCB informed that these crushers were sealed and FIR has been lodged against these crushers. Since these were illegal units, action had been taken on these crusher units (see table 9). However, during inspection it was observed that all the equipments & installations were in place & the crushers were***

operational before inspections. *At some crushers the water was warm in tanks, DG set was in place in some other, etc. which indicated that even though action had been taken by district administration the crushers units have not stopped working implying that the closure action taken by authority has not been fully effective.*

II. *The committee member visited the Hill in Sundre Mauza. On the way to the hill one small mine pit was observed (see photo 77). DMO Sahebganj informed that it was on illegal mines. (see table above for lat,long) On the top of hill two legal mines of Shri Patru Singh & Shri Ramsewak Tiwary were observed (see table above).* ***Scientific & systematic mining was not observed in these mines*** *(see photo 79,81,82 &83). Bench height was too high which posed danger to men and machinery. Bench width was not proper/very less/ negligible.There was no storage of water in the mines for water sprinkling to minimize/control dust emissions.* ***Green belt development was not done. Overburden/waste material was dumped without any Catch drain, siltation ponds & retaining wall in its periphery. No grassing & vegetation on O/B dump was done. There was no dump for top soil storage. No water tanker or fixed water sprinklers was observed for water sprinkling system for control of dust emissions. Roads were kutcha roads. Mine plan/drawing/sections were not made available so it was difficult to ascertain whether the O/B dump is within the lease area or outside.***

Near the mines of Shri Ram Sewak Tiwary O/B material/waste was thrown over a natural nala flowing in the hills (see photo 84& 85). Even though water was passing through the waste material but it carried silt with it and ultimately silt would reach the main drainage system/river of the area. *Below the hills there was a large lake (see photo86). Mines projects there should follow the conditions of EC and CTO so as to prevent pollutions in the lakes/rivers nearby.*

On the hills near Sundre Mauza there were illegal mining also being carried out (see photo 87& 89). DMO, Sahebganj informed that action has been taken on the owners of some of the illegal mines (see table 8). *At one place of illegal mines different people mined different portions of the hills adjacent to each other (see photo 89) without any systematic & scientific approach. Between the low lying areas of two hills there was a local nala (jharna) as reported by some local people (see photo 88) but it had turned dry due to mining in the hills. The committee members also observed signs of many illegal mining operations that were carried out on that hill and tried to approach those portions for closer look. However at one place a truck blocked the road (see photo 91) and the members had to*

return from that place since driver of the truck could not be found and the truck covered the whole road.

III. *The committee members visited some illegal crushers near Mirzachowki Railway station (approx 0.5 km to 1 km from Mirzachowki Railway Station).* ***There were a 12-14 different crushers units at that place (see photo 92 &93). DMO Sahebganj informed that 12 crushers at that location (Bartalla in Mirzachawki) had been sealed and FIR lodged vide letter no. 551 dated 11.5.2019 on 01.03.2019 in Mirzachawki P.S but once again the user agency have made it operational violating the closure.***

An enlistment of environmental protection and pollution control measures, norms and good practices meant for stone crushers in Sahebganj, which have not been followed in general.

1. *Location of crusher point.* ***Crushers should be located in the bottom of the hills, in low altitude or else the brick wall should be high enough to prevent the dust from propagation to far flung areas.***

2. *Mostly the crusher units that were visited have installed some water spraying arrangements but the sprayers were ineffective. Dust emissions took place when the crushers were in running conditions. Some of the measures that can be taken up for minimizing the dust emissions are:*

    a. ***Fogging/Misting arrangement at the hopper (where trucks unload the large stones) and other transfer points/loading/unloading points should be installed.*** *Although the system is bit expensive than general water sprayers it is very effective method for dust control. Also* ***consumption of water would be considerably reduced through the use of this system.***
    b. ***Use of G.I water pipes instead of plastic pipes that break with the rocks/boulders.***
    c. ***Mist guns should be kept/utilised*** *in the crusher area so that even after fogging, water spraying some dust generates & emission occurs there mist guns suppress them.*
    d. *Roads should be made pucca within the crusher premises & the approach road from mine to crushers should also be made pucca.*
    e. ***Availability of enough water for water spraying/sprinkling should be ensured. Large storage tanks may be constructed within the crusher area, Rainwater harvesting measures, accumulation of rainwater must be done so that there is no/negligible dependency on the groundwater, local rivers.***

3. *Green belt development should be done in and around the crusher area.*
4. *CGWB/State Ground Water Board should be consulted and measures taken for groundwater recharge/rainwater harvesting.*
5. *Housekeeping should be done regularly, layers of dust should not be allowed to accumulate on floor of the crusher premises.*
6. *Almost in all the premises of Crushers there is a hug accumulation of fines very small size crushed stones, huge dumps of such fines/ fine chips could be observed at many places (see photos 5,15,35,54).* ***The dumps of these fines/fine chips are very steep and there can be slope failures posing risk to man & machinery, etc. If the demand of those fines/fine chips in the market is very less/negligible they can be used for backfilling in the nearby mines. This can prove to be win-win situation for both mine owners and crusher owners.***
7. *JSPCB has made PM10 analyzers mandatory for the crushing units. It is recommended that stringent action including closure should be taken on these units that don't install PM10 analysers within one month/stipulated time given by JSPCB. JSPCB has given show cause to 340 Crushers during the month of November 2019 after their inspections.* ***After that Environmental Compensation have also be done on many crusher units in November 2019. Still during inspections on 16, 17, 18 Jan 2020 most of the CTO conditions are partially complied or are not complied. In such a case units can be given closure notice after hearing.***
8. ***JSPCB should not give CTE/CTO to large number of crushers in an area*** *(for example Mundli (30-40 crushers), Kirtania (more than 60 crushers) without proper carrying capacity study, cluster EIA-EMP (either by JSPCB or by Project proponents in the cluster).*
9. *Mass awareness program should be conducted by JSPCB & District Administration explaining the adverse effects of dust on the lungs, human body, irreversible nature of diseases like silicosis, etc. Local people, workers, crushers owners should be the target audience of such mass awareness program. Awareness program should also include best practices/techniques to control dust in crushers with photographs, scarcity of groundwater & methods to recharge it, greenbelt development & their use.*
10. ***Some of the illegal units in which action has been taken by district administration have again started to operate as was observed during inspection. It is recommended that for such illegal units demolition of crusher units & other penalties levied be done.***

<u>An enlistment of environmental protection and pollution control measures,norms and good practices meant for stone mines in Sahebganj, which have not been followed in general</u>

1. *Mines should strictly follow mine plans. Bench height, width should be as per the mine plan approved. In any*

case bench height should not be more than boom height of the loading equipment. Bench width should not be less than the bench height.In almost all the mines bench height was more than stipulated posing danger to man & machinery. DGMS (Directorate ***General of Mines Safety)*** *should look into the matter and actions may be taken for not following the Metal Mining regulations, Mine Rules, DGMS guidelines.*

2. ***Pillars should be installed to demarcate the mine boundary.*** *No O/B or waste material should be dumped outside the lease boundary.* ***Surface plan/drawing/sections should be made available to the inspecting officers*** *(DMO, JSPCB, MoEFCC, DGMS, etc.) by mine owners during inspections*
3. *Catch drains, siltation ponds, retaining walls in the periphery of O/B dumps should be made. Grassing and vegetation on the O/B dumps should also be done.*
4. *Sump/lower portion in a mine where rainwater can be stored in plenty so that it caters to all seasons should be made and water stored in it. This accumulated rainwater could be used for water sprinkling on haul roads & other places in mines and also used for green belt development, etc.*
5. ***At least two water tankers should be kept in the mines. A log book of water tanker should be filled/maintained mentioning registration number, running hours, kilometer reading, place of water sprinkling, shift wise. Log book of water tanker should be signed by competent person in the mine. Copy of log book should be sent with six-monthly compliance reports.***
6. *Green belt development should be done in and around the mine.*
7. *Approach roads to and from the mine should be made black top.*
8. *Top soil should be stored on a site as submitted on the mine plan.*
9. *Backfilling should be practiced as per the approved mine plan.* ***Mine owners should keep in view that mine closures have to be done as per the progressive & final closure plan. DMO should also keep in mind that mine closure is extremely important aspect for sustainable and environment friendly mining and ensure that it takes place*** *as provided in mine plan.*
10. ***The committee member visited Mundli, Bakudi, Sundre,etc. and observed that most mines were in the hills & were located near to each other. Mine leases were given adjacent to other/adjoning mine which means hill may be excavated altogether at one go(see table B and map. Fig 1). A decision may be taken by State Government/ District administration after discussion with experts in environment,ecology, as to whether mining is essential in the hills . If mining in hills is very essential the mine lease should be so given that***

mining is done in one portion of mine, mine operated, mine closure plan implemented and then other lease adjacent to previous mine lease executed. In such a manner the hills may not plundered haphazardly and DMO also can ensure implementation of mine plan/mine closure plan effectively.

11. ***Mass awareness program should be made including knowledge about mine plans, mine safety rules (involving DGMS), affect of dust on workers & local, affect of silt on nearby rivers/nallas, depletion of groundwater resource, systematic & scientific mining, etc., targeting mine owners and works, local people. JSPCB, DMO should conduct such awareness program taking the help of Indian Bureau of Mines and Directorate General of Mines safety. Model Mines following the condition of EC& CTO may be developed in all the tehsils where mining activity is taking place. Capacity enhancement of District mining officials and JSPCB RO should be done (both quantitatively & qualitatively) to ensure the implementation of conditions of EC& CTO.***

All the above stipulations are generally provided in EC & CTO but they were not found to be implemented in any of the mines visited by committee members. JSPCB has issued show case notices to111 Mines in Sahebganj District. Also they have charged Environmental Compensation to Mines. But still the conditions of EC&CTO are not complied as can be seen from tables (B) and photos annexed with this report."

8. Apart from the above report, the State PCB has filed an undated report under the heading 'Additional information for the Hon'ble Tribunal w.r.t. the measures taken by the Jharkhand State Pollution Control Board for curbing the air pollution caused by the stone mines/crushers in Sahebganj district' which states that Source Apportionment Study, Carrying Capacity Assessment and preparation of Clean Air Action Plan for Sahebganj district has been awarded to Centre for Environment and Energy Development (CEED), New Delhi. The preliminary Clean Air Action Plan for Sahebganj district has been submitted by them and the final report is expected by January 2021. It is further stated that total Environmental Compensation of INR 6,33,57,000/- had been imposed by JSPCB cumulatively on the stone mines and stone crusher units out of which INR 2,36,25,000/- was upon 55 stone mines and INR 3,97,32,000/- against 141 stone crushing units. An Environmental Compensation amounting to INR 1,66,71,000/- has been collected by JSPCB cumulatively from the stone mines and stone crusher units. Due to Covid-19 pandemic the Occupiers have requested for some extra time to deposit the Environmental Compensation. Accordingly, time has been granted till December, 2020 with a clause that interest as per

the guidelines of CPCB will be charged on the Units till the deposition of the Compensation to the Board.

9. From the above, it is patent that the violation of environmental norms is rampant and in spite of orders passed by the Tribunal in the last three years, the situation has only deteriorated on account of failure of the statutory regulator in taking adequate action. The State PCB appears either to be in collusion or incompetent in performing its duties of taking stringent action against rampant violation of law. The damage to the environment and public health cannot be brushed aside and effective measures are required to be taken for realizing the guaranteed Fundamental Right to clean environment which is part of Right to life. The Tribunal has to enforce the principle of "Sustainable Development", the "Precautionary Principle" and the "Polluter Pays" principle under Section 20 read with Section 15 of the National Green Tribunal Act, 2010. The environmental compensation assessed is highly inadequate, in spite of the parameters being clearly laid down, the State PCB has chosen to assess compensation equal to violation on or before 30 days though violation is more than three years in flagrant violation of the mandate of 'Polluter Pays' principle, to the benefit of the law violators. Thus, there is patent incompetence and /or collusion which needs to be looked into at appropriate level. If situation is not remedied, the State itself may have to be held accountable for causing huge loss to the environment. The loss apparently is to the extent of hundreds of crores. The agency hired is not shown to be having requisite credentials. The exercise falls short of the requirements. Such exercise must be done with the involvement of CPCB

10. In view of above, to enforce the rule of law and for protection of environment and public health, we are of the view that a scientific action plan is required to be prepared after in-depth study of the problem with a clear road map. For this purpose, ***we constitute a four-member Committee to be headed by an officer of the rank of Joint Secretary in the MoEF&CC, Government of India. The other three members will be the nominees of Indian Institute of Technology (IIT), Dhanbad, a Senior Officer of CPCB and Secretary Environment, Government of Jharkhand.*** *The State PCB and the District Magistrate, Sahebganj will provide all logistic support to the Committee to undertake their task. It will be open to the Committee to co-opt any other Expert or Institution and to conduct the proceedings in such manner as may be found viable. CPCB will be the nodal agency for compliance. First meeting of the Committee may be held within one month. Restoration plan and mode of execution may also be proposed. The report may be furnished within three months by e-mail at judicial-ngt@gov.in preferably in the form of searchable PDF/ OCR Support PDF and not in the form of Image PDF.*

11. There is a need to examine as to how many stone crushers and mining units can be allowed and subject to what special conditions, having regard to the existing scenario already noted and to what extent the existing activities need to be regulated. It is made clear that in the light of joint Committee and observations of the Tribunal, with a view to protect environment, the State PCB must perform its duties of maintaining necessary vigil and close polluting activities not complying with the norms and permit them only when norms are

achieved. The 'Polluter Pays' principle should be implemented effectively having regard to the cost of restoration, extent of damage and the deterrent element. The Chief Secretary may in light of the above observation to take steps to revamp the State PCB and file his own affidavit of compliance, failing which this Tribunal may have to take stringent action for enforcing the law."

7. Accordingly, report dated 29.01.2021 has been filed by the State PCB *inter-alia* as follows:

"3. In the meanwhile, after the last order of the Hon'ble Tribunal, 170 Units (Mines/Crusher) has been inspected by the Board. A Third and final show cause has been issued to the non- complying Units with a condition that if they don't comply with the conditions of the CTO/EC(as applicable) then a closure direction will be issued to them with immediate effect and Environmental Compensation will be levied.

4. To curb down the pollution and to ensure the compliances of the directions issued by Hon'ble NGT, a Monitoring Committee has been notified vide Notification no. 3001 dated 30.09.2020 by the Forest Environment & Climate Change Dept., Govt. of Jharkhand under the chairmanship of the Secretary, Urban Development & Housing Department. (The copy of Notification no. 3001 dated 30.09.2020 is enclosed as Annexure - 2).

5. A total of Seventeen stone crushing units has been issued a show cause notice in light of the report of the Deputy Commissioner, Sahebganj and if found non complaint then closure direction would be issued.

6. The District Mining Task Force, Sahebganj including Regional Officer, Dumka, JSPCB as a member, have conducted rigorous inspections against all the units involved in illegal mining, storage and transportation. However, RR against 125 defaulters have been lodged by the Task Force from Jan-19 till Dec-2020.

7. The Deputy Commissioner, Sahebganj has directed the Executive Engineer, Electric Supply Circle, Sahebganj not to provide electrical connectivity to the Stone Crushers which are not having valid CTO and Dealers Licence (Mining). Moreover he has also provided a list of Sixty Nine such Units which were illegal and has directed to disconnect their electric supply."

8. A report has also been filed by the CPCB dated 10.03.2021 on behalf of the joint Committee mentioning the steps taken so far and seeking three months' time for filing comprehensive report. The concluding part of the report reads as follows:

"The final comprehensive joint committee report, which is to be submitted to Hon''ble NGT is proposed to consist of the restoration plan and minimum infrastructural requirements for control and abatement of pollution at sources along with compliance of regulatory provisions. A comprehensive clean air action plan, inventory of the activities along with compliance verification of individual units w.r.t. EC & CTO will also be submitted after compilation of all such information. It will also include action taken against the individual stone mines/ crushers with invalid EC and CTO, amount of environmental compensation imposed, environmental management status and field visit report of the committee members.

The study carried out by CEED, Delhi as well as inspection of the stone mines and crushers by DMTF Sahebganj for verification of environmental management status got delayed due to the CoVID-19 situation. The outcomes of these reports are required to prepare the final comprehensive joint committee report. Therefore, ***the committee requests Hon'ble NGT to grant three months time for submission of the comprehensive joint committee report*** *considering the quantum of field."*

9. While we propose to give time sought by the Committee, we find that the action taken by the State PCB continues to be inadequate. Preventive measures to control pollution are not being taken inspite of repeated show cause notices remaining uncomplied. We note that CPCB submitted report dated 06.07.2020 in *O.A. No. 1016/2019, Utkarsh Panwar vs. Central Pollution Control Board & Ors.*, about the carrying capacity of the NCR to sustain the number of brick kilns and siting criteria including *inter-se* distance. The joint Committee may take into account the pattern followed in the said report, while preparing the report in the present case. The joint Committee may also make recommendations on the subject of assessment of compensation taking into account the cost of restoration for the damage caused and its apportionment among the violators.

10. The report may be furnished on or before 30.06.2021 by e-mail at judicial-ngt@gov.in preferably in the form of searchable PDF/ OCR Support PDF and not in the form of Image PDF. A copy of the report be

placed on the website of the CPCB simultaneously for response, if any, of the stake holders on or before 15.07.2021.

List for further consideration on 03.08.2021.

Adarsh Kumar Goel, CP

S.K. Singh, JM

Dr. Nagin Nanda, EM

March 12, 2021
Original Application No. 23/2017 (EZ)
SN

Annexure A-2

INTERIM REPORT OF THE JOINT COMMITTEE

-Constituted by-

HON'BLE NATIONAL GREEN TRIBUNAL

Order dated 23.9.2020 & 12.03.2021
(OA No. 23/2017 (EZ), OA No. 776/2018, OA No. 373/2019)

in the matter of

Syed Arshad Nasar Vs Union of India

with

Ramchandra Chaurasia Vs State of Jharkhand

-PREPARED BY-

JOINT COMMITTEE OF MoEF&CC, Govt of Jharkhand, IIT (ISM), Dhanbad, CEED - Delhi & CPCB

Contents

List of Table

List of Figures

Joint Committee Report

in the matter of

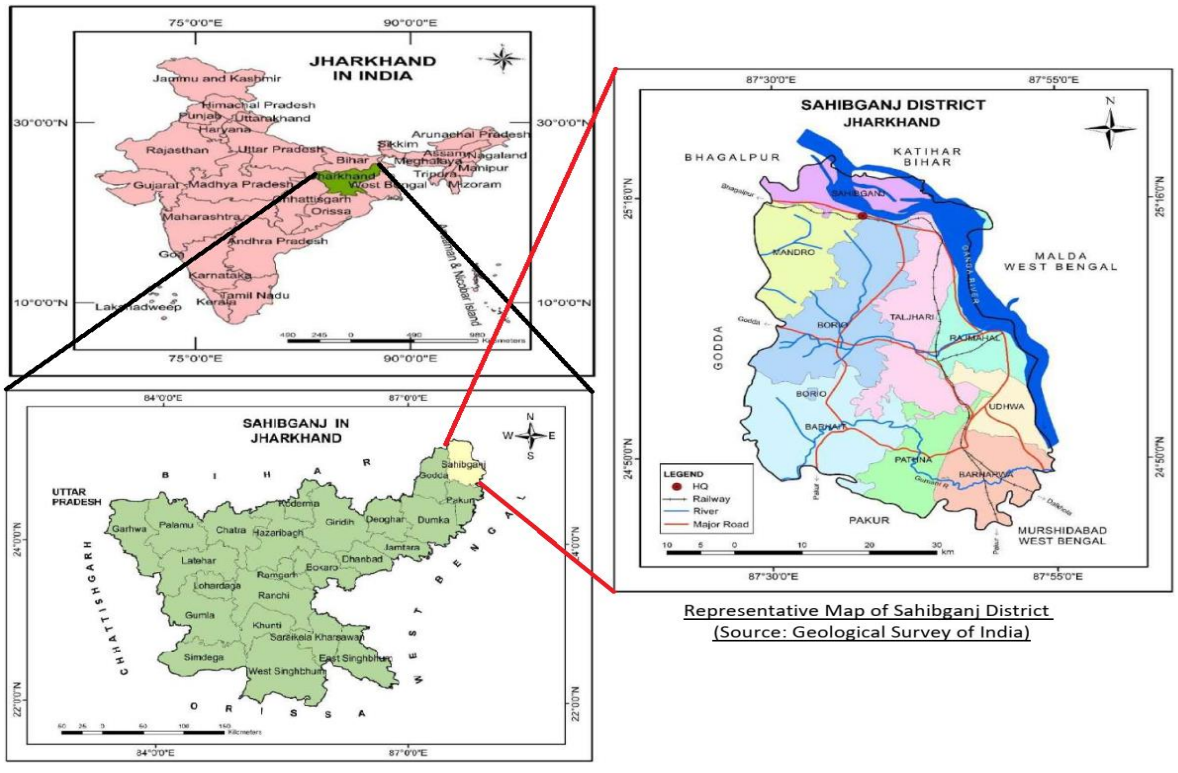
Syed Arshad Nasar Vs **Union of India** with **Ramchandra Chaurasia** Vs **State of Jharkhand**

(NGT order dt. 12.03.2021 in O.A. No. 23/2017(EZ) with O.A. No 776/2018)

1.0 Introduction

I. With reference to matter of Syed Arshad Nasar (Applicant) Vs Union of India (Respondent) (O.A. No. 23/2017), Ramchandra Chaurasia (Applicant) Vs State of Jharkhand (Respondent) (O.A. No. 776/2018) and Pradeep Kumar Singh (Applicant) Vs State of Jharkhand (Respondent) (O.A. No. 373/2019), Hon'ble NGT passed several orders relating to enforcement of environmental norms in the operation of quarrying and crushing units in Rajmahal hills of the Vindhya Mountains, District Sahebganj, Jharkhand.

II. Sahebganj district is one of the twenty-four districts of Jharkhand state, India, which is located in the north eastern most tip of Jharkhand State. The district is divided into two subdivions: Sahebganj subdivision and Rajmahal subdivision. It is further subdivided into nine Community development blocks:: Sahebganj, Mandro, Borio, Barhait; in Sahebganj subdivision and Taljhari, Rajmahal, Udhwa, Pathna, Barharwa in Rajmahal subdivision (Fig.1).The district is situated roughly between 25° 50' 00" North and 24° 42' 52" North latitude and 87° 27' 35" East and 87° 53' 56" East longitude, having an area of 1599 km^2.



Representative Map of Sahibganj District
(Source: Geological Survey of India)

Fig. 1 Representative Map of Sahebganj District

III. The area is rich in minerals such as Coal, China Clay, Bentonite, Black Stone, Sand Stone, Silica Sand, Quartz, Kaolin, Flint Stone. The Rajmahal Hills are the source of building and road stones. Therefore, the companies/industries in this area are associate with the excavation of the stone minerals, further crushed the stones and manufacture stone chips.

IV. There are 9 blocks in Sahebganj district, out of which mining and stone crushing activities are prevalent in 7 blocks. As per the Jharkhand Pollution Control Board (JSPCB) the area records 229 stone crushers and 142 stone mines at present.

2.0 Hon'ble NGT Order: Chronology of Events

I. Hon'ble NGT in order dated 23.09.2020 constituted a committee to enforce the rule of law and for protection of environment and public health in Sahebganj area:-

> "*....a four-member Committee to be headed by an officer of the rank of Joint Secretary in the MoEF&CC, Government of India. The other three members will be the nominees of Indian Institute of Technology (IIT), Dhanbad, a Senior Officer of CPCB and Secretary Environment, Government of Jharkhand. The State PCB and the District Magistrate, Sahebganj will provide all logistic support to the Committee to undertake their task. It will be open to the Committee to co-opt any other Expert or Institution and to conduct the proceedings in such manner as may be found viable. CPCB will be the nodal agency for compliance*."

II. Accordingly, four-member committee was constituted:

a) Joint Secretary, MoEF&CC, GoI. (Chairman of the Committee)

b) Nominees of Indian Institute of Technology (IIT), Dhanbad (Committee Member)

c) Senior officer of CPCB (Nodal Agency & Committee Member)

d) Secretary Environment, Government of Jharkhand (Committee Member)

III. The committee co-opted Principle investigator (P.I) of the study "Source Apportionment Study, Carrying Capacity Assessment and Clean Air Action Plan" from Centre for Environment and Energy Development (CEED), Delhi and Sri. Sundeep, Scientist F, Ministry of Environment Forest & Climate Change, as expert member to the committee.

IV. The committee had 3 meetings and a progressive report mentioning the steps taken so far, in compliance to the Hon'ble NGT order 23.09.2020 was submitted through CPCB on 10.03.2021.

V. Hon'ble NGT vide its order dated. 12.03.2021 directed as under

> "*Preventive measures to control pollution are not being taken inspite of repeated show cause notices remaining uncomplied. We note that CPCB submitted report dated 06.07.2020 in O.A. No. 1016/2019, Utkarsh Panwar vs. Central Pollution Control Board & Ors., about the carrying capacity of the NCR to sustain the number of brick kilns and siting criteria including inter se distance. The joint Committee may take into account the pattern followed in the said report, while preparing the report in the present case. The joint Committee may also make recommendations on the subject*

of assessment of compensation taking into account the cost of restoration for the damage caused and its apportionment among the violators."

VI. The activities taken by Joint Committee is chronologically presented in Table 1:

Table 1 Activities undertaken by the Joint Committee formed in compliance to Hon'ble NGT Order

Sl No	Date	Event
1	23.09.2020	Issue of Hon'ble NGT Order
2.	13.10.2020	Formation of Four Member Joint Committee
3.	12.11.2020	1st Joint Committee Meeting Co-opted Sri. Sundeep. Scientist F, MoEF&CC as expert member to the committee
4.	30.12.2020	2nd Joint Committee Meeting
5.	15.01.2021	Co-opted the P.I of the study "Source Apportionment Study, Carrying Capacity Assessment and Clean Air Action Plan" from Centre for Environment and Energy Development (CEED), Delhi, as a member of the committee.
6.	01.02.2021	3rd Joint Committee Meeting
7	11.02.2020-16.02.2021	Inspection of the Stone Mines and Stone Crushers in Sahebganj by the District Task Force committee (DTC) members.
8.	10.03.2021	Progressive report in compliance to the Hon'ble NGT order 23.09.2020 was submitted by CPCB dated 10.03.2021 on behalf of the joint committee mentioning the steps taken so far.
9.	12.03.2021	Issue of Hon'ble NGT Order
10.	21.09.2021	4th Joint Committee Meeting
11	30.10.2021 & 3.11.2021	Joint Committee Meeting to Review the Carrying Capacity Assessment carried out by CEED, Delhi A gap analysis on information was assessed
12	11.11.2021	Joint Committee Meeting for finalization of the interim report for submission to Hon'ble NGT

3.0 Stone Mining and Crushing Process Details

I. The stones are mined from the proposed minable blocks identified based on the geological studies through field observation. The area is enriched in various forms of rocks and minerals that can be used for construction activities. These includes Granite Gneiss/Migmatite (present in Sahebganj block); Basalt - Rajmahal Formation (present in Rajmahal Trap- Basalt are found in Mandro, Borio, Barhait, Pathna, Taljhari Blocks.); Sandstone & Shale (found in Barhait Block); Quartz (found in almost every block of Sahebganj District); Bentonite (found in Taljhari Block in Ranga, Pokharia and

Manoharpur village); Flint (found in Khorbanni, Bisunpur village in Rajmahahal Block, Dudhkol village in Taljhari Block); China Clay (found in Rajmahal block) (*as per District Survey Report of Sahebganj-**Annexure 1***)

II. The demand of main raw material in this area is of Granite Gneiss, Basalt, which is used for infrastructural activities such as road, building, railways are by Govt. of India & PSUs. Therefore, these rocks are excavated through open cast mining procedure through drilling and blasting. Then these are transported to the crushing units for sizing of the stone lumps into specified and market / process acceptable sizes.

III. The process flow diagram of a typical stone crusher unit is depicted in Fig. 2. The current practice of stone mining and crushing operation in Sahebganj is depicted in Fig. 3

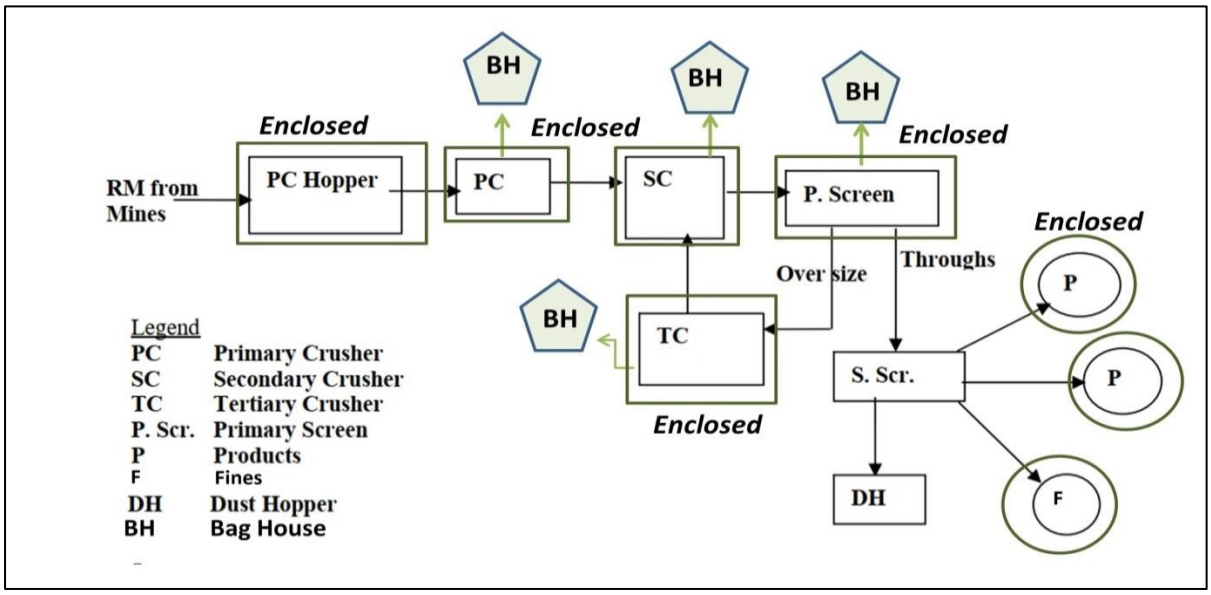


Fig. 2 Process Flow Diagram of a Stone Crusher Unit

i. Most of the stone crushers source the raw material generally from small hillocks, open-cast mines, river bed situated in the local region of Mandro and Pathna as they are the major clusters.

ii. The modus operandi for mining of stones varies from manual excavations to automated blasting and mechanical excavations. The drilling is done mostly manually or by mechanical means.

iii. The mined stones are transported to the crusher sites using a variety of vehicles such as trucks and dumpers. These are dumped in the crushing unit sites for further processing.

iv. Most of the crusher units process stone from quarries for producing different grades of stone and crushed sand (40mm, 20mm, 10mm, crushed sand, stone dust etc.) using crushing, screening and shaping activities.

v. The materials are taken into primary crushing units with discharge opening ranging from 1.5 to 4 inch. Various types of crushers are used in the stone crushing industry

such as Jaw Crushers such as double toggle crusher, single toggle crusher and single toggle jaw crusher, Roller Crushers, Cone Crushers, Impactor, Rotopactor etc.

vi. The crushing is followed by screening operation, which is used for segregation of fine and over-sized materials. The over-sized stones are again transferred to secondary crushers for further crushing. Further the same process repeats and the oversized stones are feed to tertiary crusher for final crushing of the stones. The secondary and tertiary crushing application either of Jaw, cone, roller, Impactor or Rotopoctor type crushers are used. Often washing of the materials is done as part of screening.

vii. The screening in between the crushing operation separates the different group of products of different sizes. The over-sized stones separated by the screen in between two crushers are conveyed to the succeeding crusher. Screening is to two type i.e, course screen (Grizzlies, Vibratory Screens, Revolving Screens or Shaking Screens and fine screen (Vibrating screens, Shaking Screens).

viii. The undersized/segregated materials (as product or fines) are discharged through a chute on the conveyer belt, which connected from one to the subsequent crusher. The product / fines is either stored as stock pile or directly loaded onto trucks and dumpers and transported to outside markets.

Fig. 3 Representative Images of Current Practice from various Sites in Mandro, Taljhari & Pathna in Sahebganj (*Source: CEED Report*)

4.0 Regulatory Status of the Stone Mines and Crushers

I. The district has 27 potential blocks with a total area of 36601 Ha and 77764.27 Million ton of mineral reserve as per the "District Survey Report of Sahebganj" provided by District Environment Impact Assessment Authority (DEIAA) ***(Annexure 1).*** (Table 2).

II. The district has many stone mines and also excavates minor minerals such as Black stone, Kaolin, China clay etc. As per the letter provided by Jharkhand State Pollution Control Board (JSPCB) via letter Ref no. B-1949, dated 09.11.2021 ***(Annexure 2)***, number of stone mining lease operating with Consent to Operate (CTO) is as follow (Table 3)

Table 2 Details of the mining blocks and calculated reserve

Sl No.	Name of Block	No. of Potential Blocks identified	Total Area (Ha)	Calculated Reserve in Million Tons
1	Barhait	6	6410	12451.53
2	Taljhari	4	9791	22558.05
3	Borio	4	7582	17678.95
4	Mandra	4	10228	20787.12
5	Pathna	4	2466	2357.62
6	Barharwa	3	41	9.18
7	Rajmahal	2	83	21.81
Total			**36601**	**77764.26667**
8	Udhwa	Nil	Has not considered due to existence of Bird Sanctuary	
9	Sahebganj	Nil	Has not considered due to presence of Ganga river in the north and north-east and habitation area	

Table 3 Details of Stone Mines

Stone Mine	Number of Units
Number of units with valid CTO	**142**
Number of units for which the CTO is under process	0

III. The status of CTO as on 09.11.2021 provided by Jharkhand State Pollution Control Board via letter Ref no. B-1949, dated 09.11.2021 (***Annexure 2)*** are as follow (Table 4)

Table 4. Details of Stone Crushers

Stone Crushers	Number of Units
Number of units with valid CTO	**299**
Number of units for which the CTO is under process	0

5.0 Environmental Pollution Status of Sahebganj

5.1 Source of Air Pollution

I. As per the Hon'ble NGT order regarding the ambient air quality assessment and carrying capacity assessment, Jharkhand State Pollution Control Board (JSPCB) has awarded the study to Centre for Environment and Energy Development (CEED), New Delhi. In compliance to the order, JSPCB has submitted the report of the study "*Environment Management of Stone Mines & Crusher Industry in Sahebganj*", carried out by CEED, Delhi to CPCB, RD Kolkata on 06. 11.2021 (***Annexure 3).*** A detailed study on the prevailing situation of Stone Mines and Crusher activities in Sahebganj was carried out with an aim to understand the key factors attributing to the rise of air pollution and bring out far reaching solutions to clean the environment.

II. As per the report submitted by CEED, Delhi, the source apportionment of Sahebganj is estimated based on the information gathered from primary and secondary sources. Primary research consisted of surveys on vehicular emissions and traffic assessment, and the data obtained through a set of questionnaires developed for key government departments and agencies regarding their respective contribution to the emissions. In addition to these, regular meetings and interactions with the concerned department representatives were also held to get required info and insights.

III. The report of the CEED, Delhi detailed that the source profile of Sahebganj city indicates that domestic sector and open burning contributes 29.2% and 24.9%. Whereas transportation and road dust contribute 20.1% and 19.9% respectively and construction contributes 5.9%, followed by Eateries (1.4%). However, the source classification at *the* district level shows a major contribution from the construction activities (30.5%) followed by domestic cooking (22.9%), and road dust which is contributing 18.5% to the total pollution load. Movement of vehicles and industries in the district contributes to 17.2% and 7.5% respectively. The source of air pollution is depicted in Fig. 4.

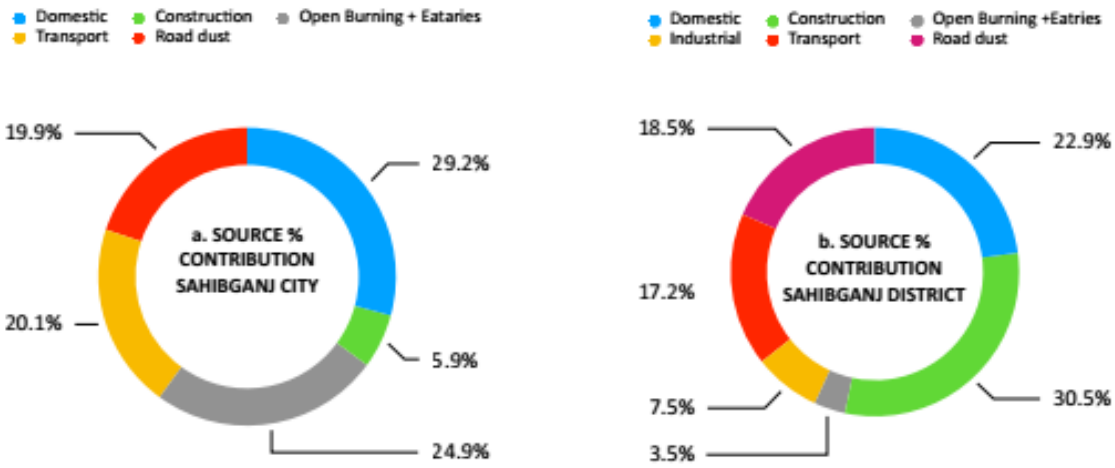


Fig. 4 Source Profile of Sahebganj (a. City & b. District) (*Source: CEED Report*)

IV. Hence, it is observed and concluded by CEED, Delhi that extensive stone mining and crusher operations are among many notable anthropogenic activities in terms of the quantity of fugitive dust and aerosol emissions in Sahebganj. The road dust is composed of dust from multiple sources, including wind transported mineral dust from mines and tailings as well as uncovered truck leakage and unpaved roads. Collectively, these are then distributed via wind and traffic activities, making them an important source of particulate matter in the region.

V. Apart from the CEED, observation, it is also observed that the apart from the ***industrial source (including stone mining and crushing) (7.5%), road dust (18.5%), transportation (17.2%), and construction (30.5%) are the allied activities related to stone mining and crushing. These contribute a significant amount of PM 10 in the area. These observations are based on Satellite based air quality data, which is required to be validated. However, the satellite-based data has provided a preliminary assessment of indicative critical period.***

VI. *The study is based on information collected from various government departments to arrive on a conclusion for sources of pollution. However, the study requires further field validation and monitored data of all seasons such as Monsoon, Summer and Winter to understand the exact sources of pollution. Even, proper dust characterization for identification of elemental composition is required to confirm the domestic and industrial source of pollution. Apart from this, field verification of the report is required to validate the satellite data.*

VII. The results inferred the following observations:

1. Industrial sources including stone mining and crusher operations are one of the most notable industrial (anthropogenic) activities in terms of the quantity of dust and aerosol emissions ***(7.5%)*** in Sahebganj. The source of pollutants from the stone mining and crushing activities are broadly categorized as process source and pollution (Table 5).

Table 5. Pollution Sources due to Stone Mining and Crushing Activities

Sl. No	Activity	Process Source	Fugitive Dust Source
1	Mining	Drilling	Blasting
			Loading and Hauling
2	Transportation	N/A	Haul Roads
3	Stone Crushing	Crushing	Stock Piles
		Screening	Conveying
		Conveying Transfer Points	

i. **Mining Operation:** The drilling, blasting, excavation, loading and hauling are the primary source of pollutant in the mining operation.

ii. **Transportation through Haul Roads:** The movement of heavy vehicles for transportation of the stones from mines to crushers led to fugitive dust emission.

iii. **Crushing Operation:** The primary (Jaw Crushers), secondary and tertiary crushers used for crushing of stoned mines into desirable size generates a huge amount of particulate matter. The emissions are recorded more at the crusher feed and discharge points.

iv. **Screening Operation:** The agitation of dry stone in the screening operation emits dust. The screening after tertiary crushing produces higher emissions than the screening of coarse sizes after primary and secondary screening.

v. **Conveying:** The transportation of the material from one point to another emits a huge amount of dust. The transfer points include transfers from a conveyor on to another, into a hopper and on to a storage pile.

vi. Apart from these operations, **the storage of the materials in the stock pile** and **transportation of finished product** also contribute to the pollution.

2. Road dust is another major source of pollution in the area. The road dust found in Sahebganj is composed of dust from multiple sources, including wind transported mineral dust from mines and tailings as well as uncovered trucks leakage. Collectively, these are then

distributed via wind and traffic activity, making them an important source of particulate matter in the region. The suspended road dust is mainly due to fugitive emissions from mining and crushing activities prevalent in the district.

VIII. ***The total contribution of pollution from stone mining and crushers in the Sahebganj is 7.5% of total PM 10 in the area. However, the allied activities related to stone mining and crushing such as road dust, transportation and construction contributes 18.5%, 17.2% and 30.45% respectively of the total PM 10. This signifies that the major portion of the PM 10 in the area is contributed from the stone mining – crushing and allied activities. Such activities are localized and are cluster based.***(*Comprehensive Industry Document, Series: COINDS/78/2007-08, CPCB*).

5.2 Air Pollution Trend

I. The air pollution trend was carried out by CEED, Delhi to assess the level of pollution that without violating the standards in the district (***Annexure 3***). It was determined by the '**Exceedance Factor Method**' based on the ***satellite data (Aerosol optical depth)*** and ground based measurements (regular monitoring) of the PM 2.5. An Exceedance Factor (EF) is the "proportion of the yearly average concentration of a pollutant and its particular standard".

The equation for calculating the Exceedance Factor (eq. I) is below:

$$Exceedance\ Factor\ (EF) = \frac{(yearly\ average\ concentration\ of\ the\ pollutant)}{(yearly\ standard\ for\ the\ particular\ pollutant} \quad \text{.....(I)}$$

II. The air quality has been classified into four broad categories based on an EF is tabulated in Table 6.

Table 6. Categorization of Air Quality based on Exceedance Factor (EF)

Sl No	Category	Classification	Particulars
i.	Critical pollution (C)	EF is above 1.5	**Not meeting the standards**
ii.	High pollution (H)	EF is between 1.0–1.5	
iii.	Moderate pollution (M)	EF between 0.5–1.0	**Meeting the standards as of now but likely to exceed the standards in future if pollution continues to increase and it is not controlled**
iv.	Low pollution (L)	EF is below 0.	**Clean air quality**

III. The Exceedance value was calculated based on PM 2.5 in the area. **The area witnessed the Exceedance value within 1.6 to 2.3 in all consecutive years (*from 2000 to 2019)*** (Table 7)**.**

Table 7. Assessment of Exceedance Factor for the year 2000-2019

Year	EF	CATEGORY		Year	EF	CATEGORY
2000	1.6	Critital		2010	2.0	Critital
2001	1.9	Critital		2011	2.1	Critital
2002	1.8	Critital		2012	2.3	Critital

2003	1.9	Critital		2013	2.1	Critital
2004	1.9	Critital		2014	2.3	Critital
2005	1.9	Critital		2015	2.1	Critital
2006	2.0	Critital		2016	2.0	Critital
2007	1.9	Critital		2017	2.0	Critital
2008	1.9	Critital		2018	2.3	Critital
2009	2.1	Critital		2019	2.0	Critital

IV. In the last five years the exceedance factor remains between 1.5 - 2, in the year 2015, the value is 1.9, followed by 2.0 for the year 2016, 1.8 for 2017, 2.0 for the year 2018, and 1.7 for 2019. **This depicts that the EF crosses the critical level of 1.5 for all the years** (Fig. 5).

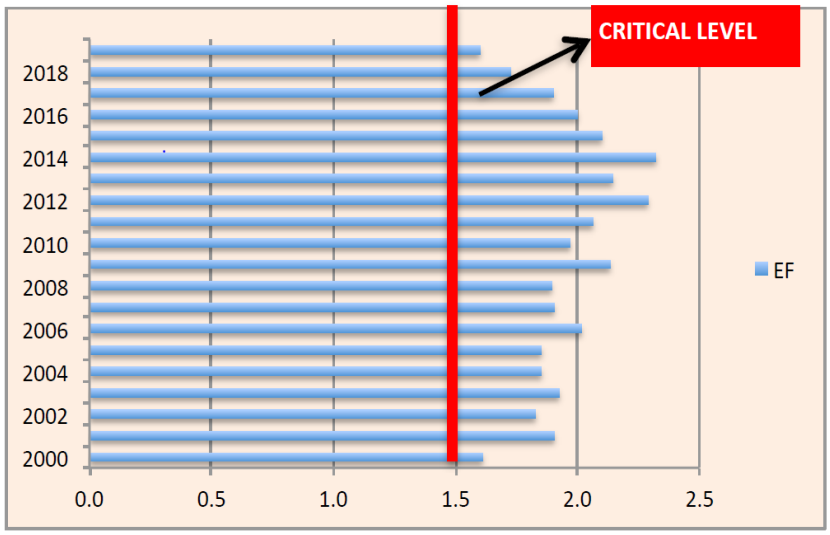


Fig. 5 Exceedance Factor of PM2.5 in Sahebganj (2000-2019) *(*Source: CEED Report*)*

V. Since, the EF for the considered timeline was beyond the critical value, therefore, it reflects that the concentration of PM 2.5 was also higher for all the years in the study area. For the year 2015, the average annual concentration of PM2.5 was 84ųg/m^3, followed by 80ųg/ m^3 in 2016, 76 ųg/m^3 in 2017, 69.1 ųg/m^3 in 2018 and 64 ųg/m^3 in 2019.

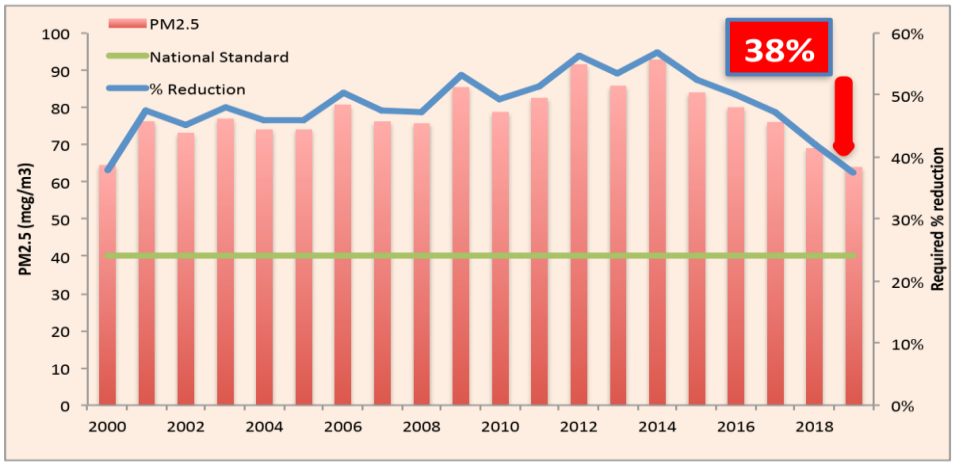


Fig. 6 Annual trend of PM2.5 and % reduction required (*Source:CEED Analysis*)

VI. Even, to understand the monthly variation in air pollution in the district, CEED, Delhi has computed the monthly mean of PM2.5 during 2015-2019 (Fig. 7).

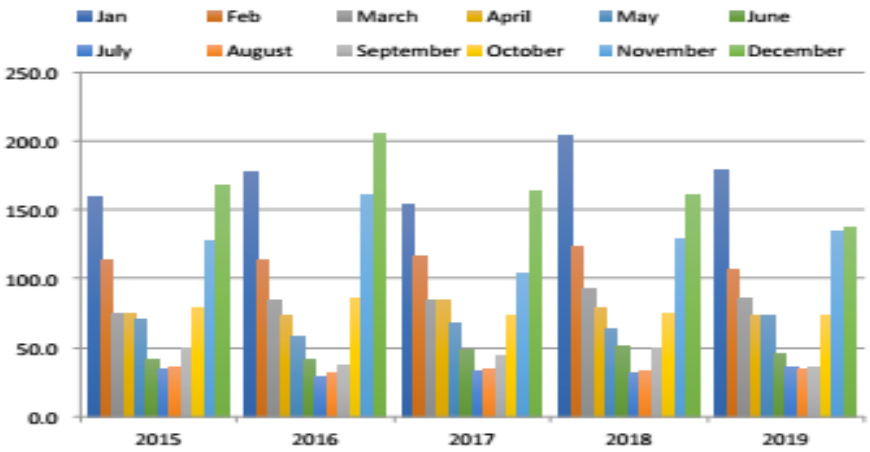


Fig. 7 Monthly trend of PM 2.5 for year 2015-2019 (*Source:CEED Analysis*)

VII. As per the analysis of the CEED, Delhi the monthly average data of PM2.5 (Fig. 7), the Sahebganj air quality can be divided into three phases viz, the period of clean air quality (from May to September) and polluted period (November to February). November, December, January and February were the months when the district has generally seen the worst air quality, the monthly average of these four months is generally found to be between around 100 -200 ug/m^3 whereas between May and September, the concentration of PM 2.5 has been found to be generally within safe limits. March, April and October can be seen as a transitional period, when the concentration is slightly above the national standard, but below the concentration noted between November–February.

VIII. This type of variation mainly takes place due to seasonal effects when during winter month's vertical winds and high pressure prevails on the ground which results in the concentration of pollutants at the surface for a more extended period and so recording the high pollution levels.

IX. Moreover, the Air Quality Index (AQI) affirmed that due to various control and administrative measures the air quality of the area is improving from high of 180 in 2015, 167 in 2016, 153 in 2017, 130 in 2018 to 113 in 2019 (Fig. 8).

The air quality in the district has shown a declining trend, especially in the last five years (2015-2019).

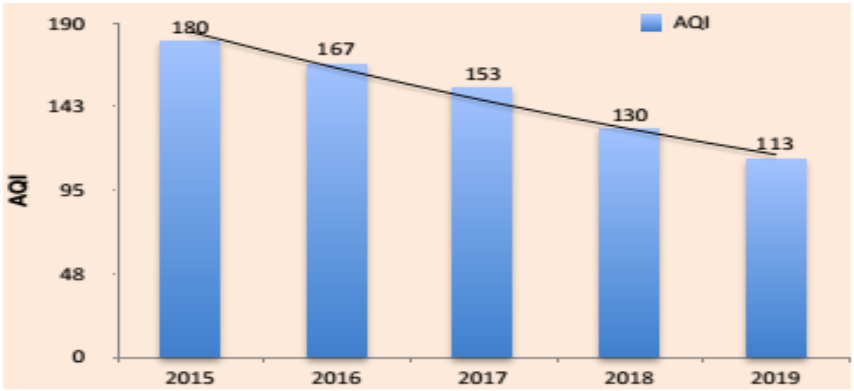


Fig. 8 Annual Air Quality Index (AQI) noted in 2015-2019 (Source: CEED Analysis)

X. As reported by CEED, Delhi, ***Annexure 3***, the potential reduction in pollution can be attributed to two main reasons: the first may be attributed to the corrective measures taken by the state government, JSPCB and the district administration, for example the closure of 304 mines (Data of Dept of Mines & Geology, GoI, as on 07.07.2021) and other enforcement measures such as the covering of trucks carrying mining materials, sustainable mining practices, etc. Second, other factors that have significant impacts on the dispersion and dilution of pollutants are meteorological parameters such as atmospheric wind speed, wind direction, relative humidity, rainfall and temperature.

XI. The topography of Sahebganj with hilly regions and plateau landscapes also creates a nice ventilation process locally. However, a systematic evaluation of the relationship between pollutant concentrations and meteorological conditions is a prerequisite to understand the trend, although it is beyond the scope of this study thus a further analysis and validation is recommended. During field survey and visit, it has been observed that the air pollution in Sahebganj is more concentrated in clusters, where stone crushers are located, rather than in overall city or district.

XII. Apart from the PM 2.5 analysis, PM 10 concentration was also monitored in and around the mines for the year 2020 (Fig. 9). The air quality monitoring stations were installed at Mandhan Mines, M/s Maa Ambika Mines, Bhagwan Stones and Maa Ambika traders (old). The 24-hour concentrations of PM10 at all monitoring stations in year 2020 were recorded within the national standard (100 ug/m^3). Based on the data monitored in these stations, **the annual average concentration of PM10 is noted as 42 mcg/m^3, which is below the national standard of 60 mcg/m^3**.

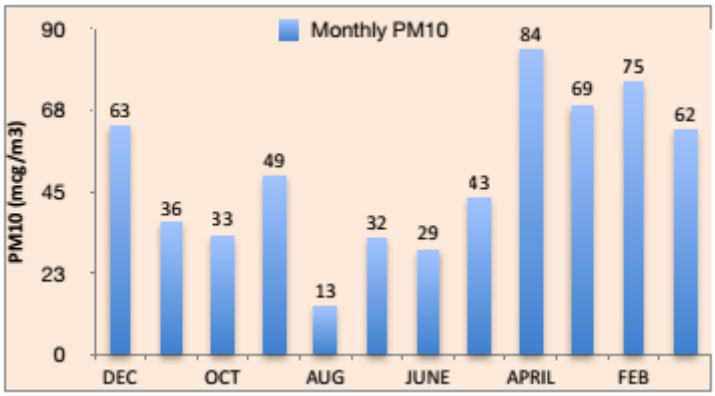


Fig. 9 Monthly mean concentration of PM10 in 2020 (Source: CEED Analysis)

5.3. Present Status of Environmental Management practices adopted by units

I. The verification of the present status with respect to the environmental management plan adopted in the stone crushers and mines was done by the Sahebganj District Task Force committee (DTC) members. The format for assessment of environmental management plan adopted in the individual crusher and mines was provided by CPCB, RD Kolkata. Based on the format, a detailed joint inspection of the stone crushers has been conducted by Sahebganj DTC members from date 11.02.2020 to 16.02.2021. The committee members

visited all stone crushers and mines to assess the environmental management plan adopted in the crushing units. Further, the assessment of environmental management for the stone crusher units was done by CPCB, ERD Kolkata on the basis of inspection report of the individual units provided by JSPCB. The detailed observation is provided below.

5.3.1 Stone Crushers

I. The assessment of environmental management for the stone crusher units was done by CPCB, ERD Kolkata on the basis of inspection reports of all the individual units provided by JSPCB (Table 8) is tabulated as below:

Table 8. Environmental Status of the Stone Crushers in the Sahebganj District

Sl No	**Process**	**Recommended Emission Control System**	**Existing Emission Control System Status**		**Adequacy** ****(w.r.t. recommended emission control system)***
			Type	**Implementation Status**	
1	Hauling from Mines to Crushers	1. Water Sprinkling 2. Treatment with Surface Agents 3. Soil Stabilization 4. Paving 5. Traffic Control 6. Covered HEMM	Tanker	16%	Inadequate
2	Feeding to Crusher	1. Enclosed hopper 2. Sprinklers	Single Water Tap	<1%	Inadequate
			Tanker	10%	
3	Primary Crusher	1. Enclosed 1. Wet Dust Suppression System (Series of Scientifically designed Sprinklers) 2. Capturing and venting emission to a control device as: i. Fabric Filter ii. Bag House	Single Water Tap	38%	Inadequate
			Single Water Tap with Covered Conveyer	2%	
			Three Water Tap	<1%	
4	Secondary Crusher	1. Wet Dust Suppression System (Series of Scientifically designed Sprinklers) 2. Capturing and venting emission to a control device as: i. Fabric Filter ii. Bag House	Single Water Tap	16%	Inadequate

Sl No	Process	Recommended Emission Control System	Existing Emission Control System Status		Adequacy *(w.r.t. recommended emission control system)*
			Type	Implementation Status	
5	Tertiary Crusher	1. Wet Dust Suppression System (Series of Scientifically designed Sprinklers) 2. Capturing and venting emission to a control device as: i. Fabric Filter ii. Bag House	Single Water Tap	14%	Inadequate
6	Screening after Primary Crushing	1. Covered Screens 2. Wet Dust Suppression System (Series of Scientifically designed Sprinklers) 3. Capturing and venting emission to a control device as: i. Fabric Filter ii. Bag House	Single Water Tap	20%	Inadequate
			Covered Screen	3%	
			Single Water Tap with Screen Covered	16%	
7	Screening after Secondary Crushing	1. Covered Screens 2. Wet Dust Suppression System (Series of 3. Scientifically designed Sprinklers) 4. Capturing and venting emission to a control device as: i. Fabric Filter ii. Bag House	Single Water Tap	13%	Inadequate
			Covered Screen	<1%	
8	Screening after Tertiary Crushing	1. Covered Screens 2. Wet Dust Suppression System (Series of Scientifically designed Sprinklers) 3. Capturing and venting emission to a control device as: i. Fabric Filter ii. Bag House	Single Water Tap	13%	Inadequate
			Covered Screen	<1%	
9	Conveyer Belt	1. Covered	Single Water Tap	34%	Inadequate

Sl No	Process	Recommended Emission Control System	Existing Emission Control System Status		Adequacy *(w.r.t. recommended emission control system)*
			Type	**Implementation Status**	
	(Screen to Product Stock Pile)	2. Wet-dust suppression (Series of Scientifically designed Sprinklers)	Covered	<1%	
			Covered with Single Water Tap	3%	
10	Conveyer Belt (Screen to Fine Stock Pile)	1. Covered 2. Wet-dust suppression (Series of Scientifically designed Sprinklers)	Single Water Tap	29%	Inadequate
			Covered	<1%	
			Covered with Single Water Tap	2%	
11	Transfer Points	1. Wet Dust Suppression System (Series of Scientifically designed Sprinklers)	Single Water Tap	29%	Inadequate
			Mist Canon Gun	<1%	
12	Storage (Products)	1. Water Wetting 2. Surface active agents 3. Covering 4. Wind-breaks	Covered	<1%	Inadequate
13	Storage (Fines)	1. Water Wetting 2. Surface active agents 3. Covering 4. Wind-breaks	Covered	<1%	Inadequate
14	Others	1. Wind Breaking Wall (Altitude should be greater than the crusher units)	Four Sided	2%	Inadequate
			Three Sided	20%	
			Two Sided	17%	
			One Sided	11%	
			No Boundary Wall	50%	
		2. Green Belt	-	-	Inadequate

**The recommended emission control system are referred from Comprehensive Industry Document, Stone Crusher by CPCB (Series: COINDS/78/2007-08)*

5.3.2 Major findings of the field survey on Stone crushers:

I. The crushers are situated at a distance of approximately or greater than 100 m from the nearby village or highway. Major findings of the field survey are as follows:

1. The crusher units are not equipped with proper emission control system such as bag house or fabric filter combat the air pollution.

2. The crusher units which have installed the basic pollution control system but the systems installed to control the pollution are inadequate and need to be improved.

3. Out of the crusher units inspected, very few units (<2% of the units) have enclosed crushers, <3% of units have covered conveyer belt with single water tap as sprinklers, <16% of units have primary screen covered with single water tap as sprinklers.
4. Less than 38% of the total units has installed single water tap as the sprinkler system, which are ineffective to control the pollution.
5. The product and fine pile are kept uncovered, which will lead to dust emission. Even, less than 1% of the units out of the crushers unit inspected have covered product and fine stock piles.
6. The height of the wind braking wall constructed across the crushing units are less than the height of the crushers. Therefore, these wind breaking wall are not effective against the control of dust emission. Even, the green belt has very scare number of plantation.

II. ***Therefore, the emission control devices implemented in the crushing units are inadequate to control the pollution. A systematic time bound control measures needs to be implemented for effective results.***

5.3.3 Stone Mines

I. The District Task Force Committee (DTC) members, Sahebganj visited all mines to access the environmental status during 11.02.2020 to 16.02.2021. The mines were at a distance of approximately 500 m from the nearby village. The Environmental Status of the Stone Mines in the Sahebganj District based on the report are tabulated below (Table 9):

Table 9. Environmental Status of the Stone Mines in the Sahebganj District

Sl No	Process	Recommended Emission Control System	Existing Emission Control System	Adequacy
1	Drilling	1. Liquid Injection (Water/ wetting agent)	No Facilities	Inadequate
2	Blasting	1. Controlled Basting (use of millisecond delay detonators) 2. at a specific time 3. optimization of use of explosive energy 4. use of 'water ampoules' during blasing 5. Over charging of blast holes should be avoided	No Facilities	Inadequate
3	Excavation	1. Water Sprinkling	No Facilities	Inadequate
4	Hauling	1. Water Sprinkling 2. Treatment with Surface Agents 3. Soil Stabilization 4. Paving 5. Traffic Control 6. Covered HEMM	No Facilities	Inadequate
5	Product Storage	1. Water Wetting 2. Surface active agents 3. Covering	Uncovered	Inadequate

Sl No	Process	Recommended Emission Control System	Existing Emission Control System	Adequacy
6	OB/Waste Storage	4. Water Wetting 5. Surface active agents 6. Covering	Unscientific & Uncovered	Inadequate
7	Transportation of Stone	1. Water Sprinkling 2. Treatment with Surface Agents 3. Soil Stabilization 4. Paving 5. Traffic Control 6. Covered HEMM	Uncovered Vehicles	Inadequate
8	Others	1. Green Belt	-	Inadequate

**The recommended emission control system are referred from Comprehensive Industry Document, Stone Crusher by CPCB (Series: COINDS/78/2007-08)*

5.3.4 Major findings of the field survey on mines

I. Major findings of the field survey of the stone quarry are as follows:

1. Almost all the mines bench height and width were found not proper.
2. Unscientific and unsystematic mining were being done in all mines.
3. Environmental & pollution control measures were found inadequate or not followed such as: No Sump / rainwater storage arrangement, however, few the mines has very small capacity of sump where water would finish within 1-3 months after the rainy season.
4. Haul roads were found Kutcha and inadequate arrangement for water spraying on haul roads were observed.
5. Overburden / waste materials were also dumped improperly. Mine plan/drawing sections were not made available so it was difficult to ascertain whether the O/B dump is within the lease area or outside.
6. O/B was dumped without any catch drain, siltation ponds & retaining wall in its periphery.
7. No grassing and vegetation on O/B dump were done.
8. There was no separate dump for top soil storage.
9. No future plan for mine reclamation/ closure.

6.0 Assessment of Carrying Capacity by CEED

I. Pursuant to the order of Hon'ble NGT as below:

"We note that CPCB submitted report dated 06.07.2020 in O.A. No. 1016/2019, Utkarsh Panwar vs. Central Pollution Control Board & Ors., about the carrying capacity of the NCR to sustain the number of brick kilns and siting criteria including interse distance. The joint Committee may take into account the pattern followed in the said report, while preparing the report in the present case."

The assessment of carrying capacity conducted by CEED, Delhi, with an aim to understand how much pollution can be assimilated without violating the standards in the district leading to an appropriate environment management plan for sustainable mining/crushing in the district. The estimation of monthly assimilative capacity, total pollution load with respect to PM10 and supportive capacity was computed to quantify the carrying capacity (i.e. upper limit of emissions a region can take without infringing permitted pollutant standards) ***(Annexure 3).***

II. The estimation process used in this study is based on the formulae recommended by the National Green Tribunal (NGT) report for determining the district-wise carrying capacity in NCR districts of Haryana, Uttar Pradesh and Rajasthan with reference to the Order of Hon'ble NGT dated 17/ 03/ 2020 (in the matter of O.A. No. 1016 of 2019; Utkarsh Panwar Vs. CPCB &Ors).

III. The district wise carrying capacity has been evaluated using the monthly average PM10 concentrations.

IV. The following components were derived in order to assess the carrying capacity (eq. II-IV) of Sahebganj:

i. Estimation of total existing PM10

Definition: The load of pollution in a given amount of air mainly released by anthropogenic emissions.

$$Total\ estimated\ load\ of\ particulate\ matter\ PM\ 10\ during\ a\ particular\ month = Total\ Volume\ of\ Air\ during\ a\ particular\ month\ in\ Km^3 \times Average\ PM10\ Concentration\ of\ Ambient\ Air\ for\ a\ particular\ month\ in\ Kg/Km^3 \quad \ldots\ldots\ldots\ldots\ldots\ (II)$$

ii. Estimation of Assimilative Carrying Capacity

Definition: It is defined as the maximum load of pollutants that can be added without compromise of its resources and major impact

$$Assimilative\ Carrying\ Capacity = Total\ Volume\ of\ Air\ in\ as\ district\ during\ a\ particular\ month\ in\ Km^3 \times NAAQS\ of\ Particulate\ Matter\ (PM\ 10)(100) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots(III)$$

iii. Estimation of Supportive Carrying Capacity

Definition: The difference between the maximum allowable concentration for a given area and the present average concentration in that region is the supportive carrying capacity.

$$Supportive\ Carrying\ Capacity = Assimilative\ Carrying\ Capacity - Total\ Estimation\ Load \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots(IV)$$

V. *The PM 10 concentration used for computing the carrying capacity has been evaluated using the average PM 10 concentrations and the mixing height parameters were taken from the global meteorological data processed by urban emissions.*

VI. The PM 10 and mixing height used in the study by CEED is as follow (Table 10)

Table 10 Extrapolated Monthly PM 10 concentration and mixing height in Sahebganj

Month	PM10 (mcg/m^3)	Mixing Height (Km)
Jan	73	0.2
Feb	44	0.3
March	35	0.5
April	30	0.6
May	30	0.6
June	18	0.7
July	15	0.5
August	14	0.4
September	15	0.4
October	30	0.3
November	55	0.2
December	56	0.2

VII. ***The carrying capacity is estimated based on the PM Value required to keep ambient air quality at (i) Satisfactory level (100 mcg/m^3) and (ii) Good level (60 mcg/m^3) for the year 2019.*** The analysis carried out by CEED, Delhi is reported as follow:

i. Carrying Capacity Estimation based on PM Value required to keep ambient air quality at Satisfactory level (100 ug/m^3)

The carrying capacity is estimated by using the eq. II-IV is summarised as follow (Table 11)

Table 11 Total Estimation Load, Assimilative Capacity and Supportive Carrying Capacity in Sahebganj

Month	Total Estimated load (kg)	Assimilative Capacity (kg)	Supportive Capacity (kg)	% Supportive Capacity
January	31,503	42,901	11,398	26.57
February	30,945	70,937	39,991	56.38
March	33,725	96,094	62,369	64.90
April	38,000	1,25,929	87,928	69.82
May	40,143	1,33,391	93,249	69.91
June	25,688	1,40,162	1,14,475	81.67
July	14,981	1,01,499	86,518	85.24
August	12,211	86,576	74,366	85.90
September	11,825	80,113	68,288	85.24
October	18,577	62,584	44,006	70.32
November	27,453	49,895	22,442	44.98
December	25,419	45,253	19,834	43.83

**Based on the PM Value required to keep ambient air quality as 'Good' Level*

The analysis by CEED, Delhi showed that %supportive capacity has positive value, which states that the existing stone mining and crushing activities may be permitted to operate. Even, as per CEED, Delhi it indicates that the district has some capacity to accommodate few more activities, but there are some blocks, Mandro, Taljhari and Pathna Mundli and Kirtania of Mirzachowki , which have been identified as a local hot spot of pollution based on satellite mapping and ground evidence.

For the base year 2019, the supportive capacity (kg) in the district area is estimated to be 11398.3, 39991.2, 62369, 87928.4, 93248.6, 114474.8, 86517.6, 74365.7, 68287.9, 44006.3, 22441.7 and 19834.4 kg in the month of January, February, March, April, May, June, July, August, September, October, November and December respectively (Fig. 10)

As per the estimation of CEED, Delhi, the supportive carrying capacity is very low during months of November, December and January. It is moderate in the months of February, March, April and May; while it is sufficient in rest of the year e.g. July, August and September.

The month which has relatively higher supportive carrying capacity is due to meteorological parameters where the mixing height plays a major role.

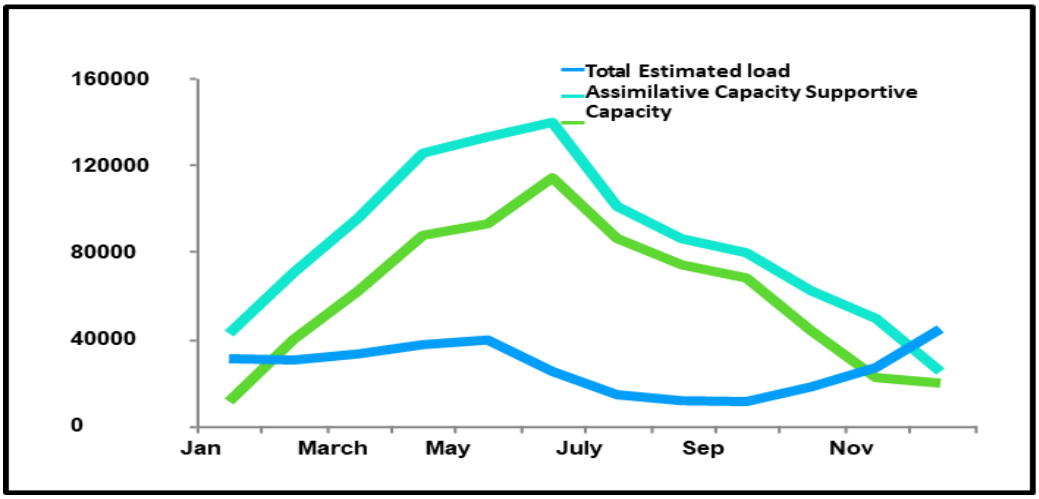


Fig. 10 Month wise Estimated load (kg), assimilative capacity and Supportive capacity (Source: CEED Report)

Based on the supportive carrying capacity of Sahebganj, three categories have been estimated (Table 12). This is done with the intention of indicating the months where the environment has the maximum pollution assimilation capacity.

Table 12 Categorization of the supportive carrying capacity of Sahebganj

Value (kg)	Category
Less than 40,000	Very low Supporting Capacity
40,001- 80,000	Moderate Supporting Capacity
80,001-1,20,000	Sufficient Supporting Capacity

The distribution of the supportive carrying capacity for the months in the assessed year 2019 is shown in Fig. 11.

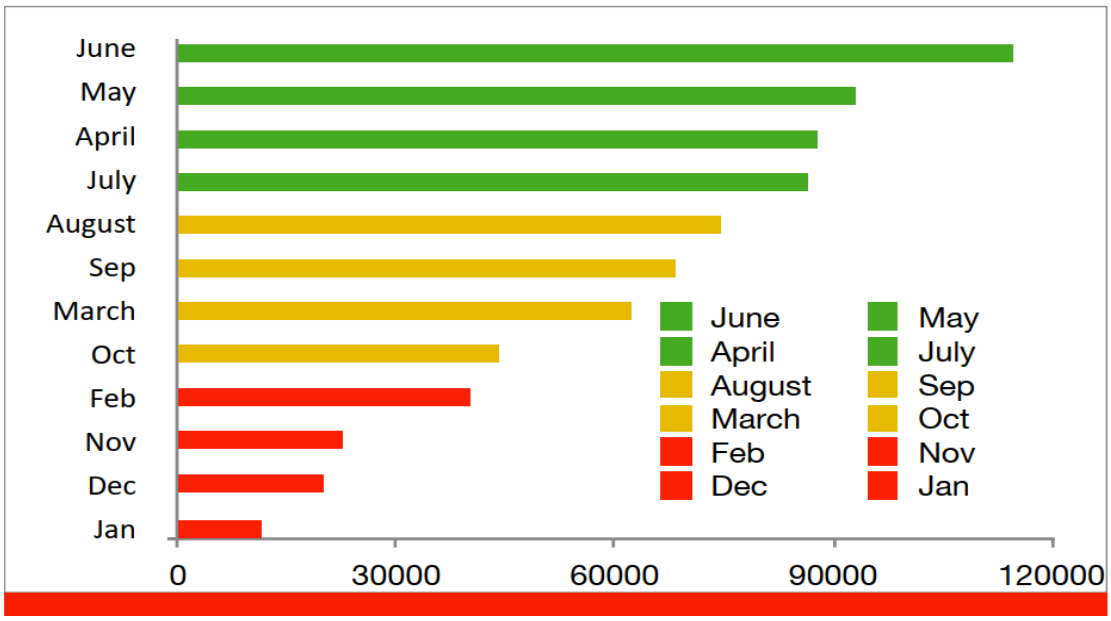


Fig. 11 Month wise distribution based on carrying capacity (kg) *(*Source: CEED Report*)*

ii. Carrying Capacity Estimation based on PM Value required to keep ambient air quality at Good level (60 mcg/m^3)

The carrying capacity is estimated by using the eq. II-IV is summarised as follow (Table 13) for the year 2019

Table 13 Total Estimation Load, Assimilative Capacity and Supportive Carrying Capacity in Sahebganj

Month	Total Estimated Load (kg)	Assimilative Capacity (kg)	Supportive Capacity (kg)
January	31,503	25,741	-5,762
February	30,945	42,562	11,617
March	33,725	57,657	23,932
April	38,000	75,557	37,557
May	40,143	80,035	39,892
June	25,688	84,097	58,409
July	14,981	60,899	45,918
August	12,211	51,946	39,735
September	11,825	48,068	36,243
October	18,577	37,550	18,973
November	27,453	29,937	2,484
December	45,253	27,152	-18,101

*Based on the PM Value required to keep ambient air quality as 'Good' Level

Figure 12 presents comparative carrying capacity assessment both at 'Satisfactory' and 'Good' level.

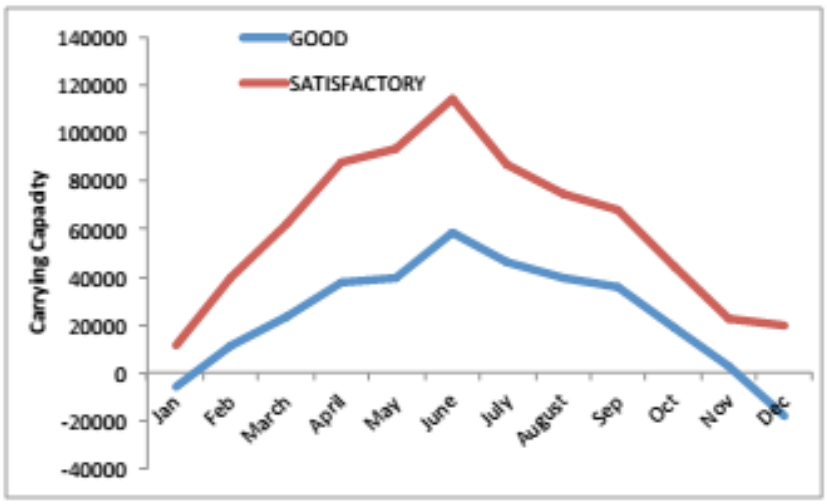


Fig. 12 Comparative Carrying Capacity for maintaining air quality at 'Good' & 'Satisfactory' level

As reported by CEED, Delhi, carrying capacity analysis done at parameters of 'Satisfactory' (100 ug/m^3) and 'Good' (60 ug/m^3) level, a positive carrying capacity has been observed in Sahebganj. However, at the same time the carrying capacity assessment of Sahebganj also indicates towards effective control measures between November and January, when the carrying capacity slightly moves towards borderline.

VIII. Observation

i. The analysis carried out by CEED, Delhi, is based on the formulae recommended by Hon'ble NGT in its order dated 12.03.2021 for Delhi, which is a land locked area. However, Sahebganj has different topography, it's a hilly area and is bounded by river Ganga in one of its boundaries. Moreover, Ventilation Coefficient should also be considered while calculating the carrying capacity. Therefore, the recommended formulae for calculating carrying capacity assessment of Delhi is more on conservative side whereas there is sufficient scope for further enhancement in assimilating capacity, after consideration of local topography, meteorological condition and ventilation index available due to open land towards north due to River Ganga Sahebganj area.

ii. Even, the study indicates that the carrying capacity (Positive Supportive Carrying Capacity) is available in the district. However, the area is not meeting the National Ambient Air Quality (NAAQ) Standard as mentioned in the air pollution trend study.

This may be attributed to the cluster /hotspot areas of concern whereas the overall habitation and other area are having better air quality. A grid based air quality monitoring data will provide more insight in devising micro and macro strategies for air pollution management in Sahebganj.

IX. ***It is recommended that grid-based air quality monitoring is required to suffice the findings of arising out of the Carrying Capacity assessment conducted by CEED, Delhi. Present study is based on Satellite based data which has higher resolution and in absences of validated emission factor used for prediction of air quality in Satellite basaed study, micro and macro level environment planning may not be useful. Further, field data specially for critical months/period such as Dec-Jan should be taken into consideration for accurate estimation.***

7.0 Local Pollution Hot Spots

I. As reported by CEED, Delhi (***Annexure 3)***, there are 9 blocks in Sahebganj district, out of which mining and stone crushing activities are prevalent in 7 blocks. While observing air quality and the presence of multiple crushing and mining units, ***Pathna and Mandro have been seemed to be the most affected and have been identified as local pollution control locations*** (Table 14, Fig.13). The District Survey Report has also identified that Pathna, Mandro and Taljhari blocks has maximum mineral reserve, making new units more likely to be established, resulting in further deterioration of air quality. Apart from these, as per the field visit of earlier committee, a large number of stone mining and crushing activities are also concentrated Mundli and Kirtania of Mirzachowki. Therefore, it is also considered as hot spot considering the level of air and noise pollution in these areas.

Table 14 Major clusters of the stone works

Mouza name	Block name	No. of mines and crushing units
Belbhadri	Mandro	16
Mundli	Mandro	18
Borna	Pathna	12
Nimgachi	Mandro	12
Jokmari	Mandro	11
Mariku	Mandro	9
Pipaljori	Barharwa	9
Demba	Mandro	7
Gudwa	Taljhari	7
Ambadiha	Mandro	6
Choti Bhagiamari	Taljhari	6
Mahadeobaran	Mandro	6
Chota Lohanda	Borio	5

Fig. 13 Local pollution hot spots in Sahebganj *(*Source: CEED Report*)*

8.0 Assessment of Environmental Compensation

I. Purusant to the order of Hon'ble NGT as below:

> "*The joint Committee may also make recommendations on the subject of assessment of compensation taking into account the cost of restoration for the damage caused and its apportionment among the violators*"

II. An Environmental Compensation Assessment was carried out by CEED, Delhi in consultation with JSPCB ***(Annexure 4)***.

III. The formulae proposed by CEED, Delhi for calculation of the Environmental Compensation is as follow:

$$\boldsymbol{EC = PI * R * S * LF * NCF}$$

where,

EC = Environmental Compensation

PI = Pollution Index of Industrial Sector

N = Number of days of violation to be assessed by DMTF and JSPCB taking into account in compliance status of CTO condition

R = A factor in Rupees for EC

S = Factor for scale of operation

LF = Location factor

NCF = Non - compliance Factor

IV. **PI** is a number from 0 to 100 and its increasing value denotes the increasing degree of pollution hazard from the industrial sector. It is suggested that the average pollution index of 80, 50 and 30 may be taken for calculating the Environmental Compensation for Red, Orange and Green categories of industries respectively. Stone crusher units fall under the red category.

V. **N** is the number of days for which violation took place is the period between the day of violation observed/due date of direction's compliance and the day of compliance verified by JSPCB. It should be assessed by DMTF and JSPCB taking into account in compliance status of CTO condition.

VI. **R** is a factor in Rupees, which may be a minimum of 100 and maximum of 500. It is suggested that R value for stone crusher and mining for non-compliance of stipulated conditions/norms may be considered as Rs. 150 and Rs. 100 respectively.

VII. **S** could be based on small/medium/large industry categorization, which may be 0.5 for micro or small, 1.0 for medium and 1.5 for large units.

VIII. **LF** is based on the population of the city/town and location of the industrial unit. For the industrial unit located within municipal boundary or up to 10 km distance from the municipal boundary of the city/town, following factors (LF) may be used:

Sl No	Population (Million)	Location Factor (LF)
1	1 to <5	1.25
2	5 to <10	1.5
3	10 and above	2.0

IX. **NCF** is a Non- Compliance Factor depends on the value of complying score. Higher the complying score, more is the NCF. NCF is multiplied to the calculated EC. Non-compliance factor is given as:

Complying Score	**Non- Compliance Factor**
1- 10	0.5
11 – 20	0.75
20 – 30	1.0
More than 30	1.5

i. The complying score is designed by CEED, Delhi based on the degree of weightage. A degree of weightage has been allocated by CEED, Delhi against each of processes depending on its effectiveness to control or suppress the dust emissions and other pollutants.

ii. The degree of weightage of a control technique is the measure of its significance in the ensure control process. A stone crusher unit must adopt at least 80% of the control measures to avoid EC.

iii. Alternatively, a certain score could be allotted to each process and the Stone Crusher Unit must have the minimum score to avoid EC.

iv. EC will be calculated based on the above formula per day from the day of inspection unit it meets the minimum score/percent to avoid EC. The maximum weightage assigned to the Control Techniques proposed by CEED, Delhi is tabulated in Table 15

Table 15 Maximum Weightage assigned to Control Techniques proposed by CEED, Delhi

Sl No	**Pollution Control Technique**	**Weightage**
1	Meeting all the sting criteria specified by JSPCB	8
2	SPM concentra5on should be less than 600 µg/m^3 at a distance of 3-10 m	18
3	Dust control techniques (Only one can be assigned)	
3.1	Combination of wet and dry dust suppression system, OR	28
3.2	Enclosure of crusher, screen and conveyor belts and then venting it to a control device (Dry dust collection system), OR	15
3.3.	Sprinkling at all the crusher feed and transfer points as per model crusher plan (Wet dust suppression system), OR	5
3.4	Only enclosure structures (without control devices)	5
4	Emission control technique from Haul roads (Only one can be assigned)	
4.1	Paving, OR	8
4.2	Water sprinkling at regular intervals/ Soil stabilisation	5
5	Green Belt development around the periphery (@100 trees per acre of land)	9

6	Height of Wind breaking structures must be greater than height of stockpiles	8
7	Regular Cleaning of equipment	4
8	Boundary Wall height of at least 10 m all around the site periphery	5
9	Loaded trucks should be covered with tarpaulin while transportation	3
10	Rainwater Harvesting system cum ground water recharge unit	9

The maximum score that can be awarded is 100.

v. ***In order to avoid the environmental compensation, the occupier must comply with 80 percent of the above-listed control techniques i.e., an aggregate score of 80.***

vi. The inspecting official is allowed to deduct scores on the basis of incomplete or ineffective or insufficient application of control technique.

vii. **Therefore, the complying score is calculated by the difference between minimum score required (i.e. 80) and the score obtained.** The higher value of complying score implies the lesser compliance with control measures as listed in the Table 15.

9.0 Overall Observations

1. As per the JSPCB letter Ref B-1949 dated 09.11.2021 **(*Annexure 2*)**

I. **142 Stone Mining Lease** are found to be **operated with valid CTO** from the Board as on 09.11.2021. The details of the mining lease are provided in *Annexure 2*.

II. **299 Stone Crushers** are **operating with valid CTO** in the district as on 09.11.2021 The details of the Stone Crushers are provided in *Annexure 2*.

2. As per CEED, Reoprt on "*Environment Management of Stone Mines & Crusher Industry in Sahebganj*" (Submitted by JSPCB to CPCB, RD Kolkata on 27.08.2021) ***(Annexure 3)***

I. As per CEED, Report on "*Environment Management of Stone Mines & Crusher Industry in Sahebganj, CEED has assessed the carrying capacity (using PM 10 concentration) and PM 2.5 concentration by using the Aerosol Optical Depth (AOD) data*

II. Based on CEED carrying capacity report it is estimated that ***the total contribution of pollution from stone mining and crushers in the Sahebganj is 7.5% of total PM 10 in the area. However, the allied activities related to stone mining and crushing such as road dust, transportation and construction contributes 18.5%, 17.2% and 30.45% respectively of the total PM 10. This signifies that the major portion of the PM 10 in the area is contributed from the stone mining – crushing and allied activities***

III. *The estimation of air pollution inventory is based on information collected from various government departments to arrive on a conclusion for sources of pollution. However, the air pollution inventory requires further field validation and monitored data of all the seasons such as Monsoon, Summer and Winter to understand the exact sources of pollution. Even, proper dust characterization for identification of elemental composition is required to confirm the domestic and industrial source of pollution.* ***Apart from this, field verification of the report is required to validate the satellite data.***

IV. The detailed carrying capacity study carried out by CEED, Delhi through the use of data from different agencies indicates that the ***area has positive carrying capacity in annual terms. Therefore***, it has recommended that the ***existing stone mining and crushing activities may be permitted to operate. Even, as per CEED, Delhi, it indicates that the district has some capacity to accommodate few more activities, but there are some blocks, Mandro, Taljhari and Pathna,*** **Mundli and Kirtania of Mirzachowki.** ***which have been identified as a local hot spots of pollution due to poor management of environmental concerns by the stone crushers/mines.***

However, the area is not meeting the National Ambient Air Quality (NAAQ) Standard as mentioned in the air pollution trend study. Therefore, a field based air quality monitoring is mandatory and requires to be carried out in critical season specially during Nov – Jan, when the predicted supportive capacity are negative Such field based monitoring data based on the hotspot / high intensity grids will help in preparation of corrective measures including a sustainable environmental management plan.

The analysis carried out by CEED, Delhi, is based on the formulae recommended by Hon'ble NGT in its order dated 12.03.2021 for Delhi, which is a land locked area. However, Sahebganj has different topography, it's a hilly area and is bounded by river Ganga in one of its boundaries. Moreover, Ventilation Coefficient should also be considered while calculating the carrying capacity. Therefore, a grid based supporting capacity has to be assessed and based on the findings the cumulative supporting capacity of the region shall be assessed by integrating the outcome of each grid based study. **The critical months/period such as Dec-Jan should be taken into consideration for scientific study based estimation.**

Therefore, it is proposed that Hon'ble NGT may consider to provide some more time (3 months) for conducting the air quality studies in ensuing winter season to work out the critical supporting capacity of the region and accordingly rationalize the emission sources. The final report will be submitted in 1st week of April 2022.

V. The AQI and the PM concertation, as per the CEED-Carrying Capacity report suggests, that there is decreasing trend of air pollutants and corresponding AQI.

VI. Few pictures of some good practices adopted in crusher units in Sahebganj and other areas are presented in **Annexure B**.

3. As per the joint inspection reports provided by Sahebganj District Task Force committee

I. Joint inspection of the stone crushers and stone mines by DTC members from 11.02.2020 to 16.02.2021, it is observed that the present pollution control measures adopted/installed at the emission sources in Stone crusher or mines are either inadequate or not appropriate to cumulative meet the national air quality standard in cluster or at individual level. The units need to improve on the existing pollution control measures by way of upgradation, adopting better technologies and operational practices.

II. The ***PM 10 of the area evaluated is mainly attributed to the non-operational/ in-effective sprinklers/ tankers, non-maintenance of the HEMMs, non-enclosed crushers, un-covered conveyer belts, uncovered raw/product stock piles, in-significant wind breaking walls/green belts, and poor house-keeping activities. The contribution of pollution from stone and crusher industries can be brought under control, if all the specified measures are implemented.***

III. Therefore, it is recommended that the ***units which are operating with valid CTO should also stringently check/install their proper emission control devices and follow proper environmental norms. If the units with valid EC & CTO are not complying proper pollution control norms, then these should be closed by the concerned authorities.***

IV. ***Field validations of the results are required to confirm the environmental status of the Sahebganj area. It is proposed a district level task force shall be constituted and a checklist of the minimum required Pollution control measures and its operational parameters shall be monitoring on regular frequency and in case of non-compliance financial / penal provision shall be imposed by the committee.***

10.0. Action Taken

1. Action Taken by District Task Force (DTF)

I. The district task force (DTF) has already taken action against the illegally operated stone mines, stone crushers, storage and transportation. As per the letter No 1074/M, dated 1.11.2021 ***(Annexure 5)*** of District Commissioner, the DMTF has taken the following actions from 1st Jan 2021 to till date:

i. lodged FIR - 16

ii. sized trucks & tractor - 26

iii. demolished and sealed crushers - 4

iv. sealed Boats – 2

v. Person Arrested – 29

vi. Illegal Mining-JCB Equipment – 8

vii. Penalty recovered – 18.75 lakh

II. Apart from these, Request letter has been sent to Member Secretary JSPCB, Ranchi vide letter no 1269 dated 24.11.2020 ***(Annexure 6)*** for cancellation CTO's of units operating within Railway sides and Road Side. The units are in the process of dismantling and presently non-operational.

III. Direction given to Ex Engineer Electricity Division, Sahebganj vide letter no 1270 dated 24.11.2020 ***(Annexure 7)*** for disconnection of Illegal Crushing Plank and not to give any new connection to crushing unit without CTE/CO. This is monitored at the level of District Commissioner and the DTC

IV. Letter sent to DRM, Malda vide letter no 1056 dated 31.08.2021 ***(Annexure 8)*** to shifting of Loading Rack Point within Municipal Area, i.e. Sahebganj Railway siding and Sahebganj Goods sheds Siding.

V. Monthly Task Force meeting is conducting on regular basis. The Proceeding of District Task Force Meeting held on dated 07.09.2021 and ATR with photograph and newspaper cutting is annexed as ***Annexure 9***

2. Action Taken by Jharkhand State Pollution Control Board (JSPCB)

JSPCB has taken strict actions against the non-complying units as following (as per *JSPCB letter B-167, dated 29.1.2021* (**Annexure 10**), *B-925, dated 28.07.2021 (**Annexure 11**)* and *B-20, dated 16.04.2019* **(Annexure 12)**

I. No fresh CTE is being accorded in the Sahebganj district till the result of Carrying Capacity Study in obtained

II. CTO of the Crushers/mines are being renewed only when the units are found compliant.

III. A committee was appointed by the Board to conduct an inspection for verification of CTO compliance. All the units were inspected between 02.11.2020 to 07.11.2020 by the Committee and a show cause notice was issued on site to the defaulters

IV. As the compliance status was not found fully satisfactorily so a second show cause notice was issued to the non-compliant Units.

V. Lastly a third and **final show cause was issued against the one hundred seventy non - compliant stone crushing units** and they were **given one month time to file their reply which was till 02/03/2021.** The reply was analyzed and 29 Units which were found non-compliant were issued closure directions.

VI. To curb down the pollution and to ensure the compliances of the directions issued by Hon'ble NGT, a Monitoring Committee has been notified vide Notification no. 3001 dated 30.09.2020 by the Forest Environment & Climate Change Dept.,Govt.of Jharkhand under the chairmanship of the Secretary, Urban Development & Housing Department

VII. The Deputy Commissioner, Sahebganj vide his letter no 269/M, dated 24/11/2020 informed that in the meeting of the District Task Force (Mining) held on 18/11/2020, a decision has been taken that the CTE/CTO issued to the Stone Crushers situated within 100 meters from NH/SH shall be revoked, so that the

compliance of the Hon'ble NGT directions may be done. In light of the above, Closure direction was also issued to 13 Units which were near to the NH/SH/Railway line.

VIII. The District Mining Task Force, Sahebganj including Regional Officer, Dumka, JSPCB as a member, have conducted rigorous inspections against all the units involved in illegal mining, storage and transportation. However, FIR against 125 defaulters have been lodged by the Task Force from Jan-19 till Dec-2020.

IX. The Deputy Commissioner, Sahebganj has directed the Executive Engineer, Electric Supply Circle, Sahebganj not to provide electrical connectivity to the Stone Crushers which are not having valid CTO and Dealers Licence (Mining). Moreover he has also provided a list of Sixty Nine such Units which were illegal and has directed to disconnect their electric supply.

X. JSPCB has mandated to install Online PM10 Analyzers in all major air polluting industries such as Railway sidings, Stone crushers with capacity more than 500 TPD. Till date eight units have installed online PM10 Analyzers with connectivity to JSPCB's Server.

XI. In light of the inspection, show cause was issued to the non-complying units and **Rs.6,33,57,000.00/-** has been imposed as **Environment Compensation,** out of which **Rs. 2,47,38,000 /- has been recovered till now,** as stated by JSPCB on **28.07.2021 (**JSPCB letter B-925, dated 28.07.2021-***Annexure 11***)**.

XII. The crushing units are directed to carry out the crushing operations in a covered section with proper pollution control equipment

XIII. The crushing units are directed to adopt Fogging/Misting/Sprinkling arrangement at the hopper (where trucks unload the large stones) and other transfer points/loading/unloading points. Consumption of water would be considerable reduced through the use of this system.

XIV. The crushing units are directed to use G.I water pipes instead of the plastic pipes.

XV. The crushing units are directed to make pucca road within the crusher premises.

XVI. The crushing units are directed to install the boundary wall of 10 ft. height around the crusher premises.

XVII. All stone crushers having capacity above 500 TPD or more than 10000 CFT/Day will have to install the certified PM 10 analyzer with on-site display and online connectivity to JSPCB server.

11.0 Recommendations

Based on the above observations, findings and key issues of the area it is recommended as follows:

I. 142 stone mines and 299 stone crushers with valid CTO are only allowed to operate in the district as per the list provided by JSPCB via letter Ref No. B-1949, dated 9.11.2021

(***Annexure 2***). Other stone mines and crushers, which are not listed by JSPCB should be allowed to operate only after obtaining consent from JSPCB.

II. The stone mines and crushers which have valid CTE, but do not comply to the stipulated condition in CTO issued by JSPCB or mining authority as the case may be, shall not be allowed to operate unless they are found complying with the conditions as per rule.

III. A district level monitoring committee (DMC) headed by District Commissioner, may be constituted to ensure that the measures, as per the conditions imposed by JSPCB through consent to operate for stone crushers and mines are in operation/complied on sustainable basis. DMC should review the progress every six month

IV. Hotspot Cluster to be identified and based on the scientific studies, and accordingly, micro level time bound environment management action plan shall be prepared and implemented. This should be monitored by District Monitoring Committee.

V. A cluster management committee comprising of all the industrial units in the cluster shall be constituted and held responsible for implementation of cluster specific action plan in time bound manner. Failure to comply will result in combined failure and all units will be closed till cluster / individual corrective measures as per the cluster action plan is not complied.

VI. The impact of stone crushers and mines are zone specific or area specific. These zones should be contoured as cluster or individual basis and cluster specific action plan should be prepared in agreement with the finding of carrying capacity and activities should be control or regulated as per the assimilating capacity of the cluster/zone.

VII. The sitting of the stone mines and crushers with respect to the nearby human settlement, highways etc. should comply the criteria specified by JSPCB ***(Annexure A)***.

VIII. The crushing units in case on stone crushers should be placed in a covered section with proper pollution control equipment.

IX. Conveyor belts should be covered /enclosed to avoid fugitive emission, without side gaps, in enclosure and belts.

X. The crushed stones or finished products should be stored in silo or the height of finished goods should be kept lower than the height of wind breaking walls. Strong structural base and framing should be provided for wind breaking wall to withstand in strong wind conditions. The height of the stockpile should always be kept lower than the height of the wind breaking wall. The wall can be erected radially with a screen as center point. In addition, proper sprinkling arrangement should be provided all around the stock piles.

XI. The dusts collected in bag house, which are of more than 5 um size have market value. The dust should be collected in bags and should be sold. The unit should not be allowed to dispose the collected materials as solid waste. In case, disposal of such waste is necessary, adequate facility for disposal with earmarked area and proper designed disposal pit duly approved by SPCB should be made by the unit.

XII. Proper house-keeping should be maintained for the crushing units placed in the covered section. Layers of dust should not be allowed to accumulate on floor of the crusher premises. Scrapers could be utilized for dust accumulation at a place which can be disposed subsequently.

XIII. JSPCB to ensure compliance of its order as mandate to all stone crushers having capacity above 500 TPD or more than 10000 CFT/Day to install the certified PM 10 analyzer with on-site display and online connectivity to JSPCB server ***(Annexure 12)*.**

XIV. ***General Guidelines for Abatement of Pollution (enclosed as Annexure A***) shall be adopted and implemented as preventive measure to control the pollution in the area.

XV. In order to have real time data of pollutants mainly PM10, PM2.5 and meteorological variation, it is recommended to have continuous monitoring of air quality. CAAQMS be installed as per the guidelines and the data so generated shall be managed and disseminated to Public, by JSPCB. Funding may be generated through Environmental compensation fund collected by JSPCB as per the guidelines approved by Hon'ble NGT or any other means.

XVI. JSPCB should develop an online dashboard and an app to properly observe and disseminate the levels of pollution in real time for general awareness and take informed decision by the local administration and or JSPCB.

XVII. There has to be a new policy to allow stone dust generated from the mines and crusher activities to be used as sand in the building and construction material which will resolve its proper disposal and will also prevent it from merging with the water of the Ganges and other water bodies.

XVIII. There should be specific measures to reclaim the land of closed and abandoned mines. A proper plan to regain greenery and vegetation should be in place to reduce further land degradation.

XIX. The haul roads within the mines/industry premises as well as city and district roads which cater to the transportation of the products from the stone crushers or mines shall be appropriately managed to ensure that resuspension of dust is minimize and also the carrying capacity of these roads as per the traffic in the region.

XX. Separate action plan should be prepared by the Divisional Railway Manager (DRM), Sahebganj for the railway sliding to mitigate the environmental pollution in the area and submitted to district administration and JSPCB with 6 months times for its effective implementation after approval.

XXI. The local administration shall work out for development of by-pass road to avoid the movement of Heavy vehicles /stone loaded vehicles etc. through city area/densely habitats in the region.

XXII. Movement of heavy vehicles or stone carrying vehicles shall continued to be monitored trucks by District transport authority for compliance of covering of truck and movement through city area/dense Habitats during peak traffic periods and preferable allowed to be move during 10.00 PM TO 6 AM.

XXIII. JSPCB and CEED should carryout the grid-based monitoring of the study area to estimate the carrying and supporting capacity of the region. Based on the findings, a protocol may be derived to regulate the emission sources.

XXIV. EC as proposed at section 8 of this report may be imposed to the non-complying units by JSPCB

XXV. As the carrying capacity study carried out by CEED, Delhi is based on formulae recommended by Hon'ble NGT in its order dated 12.03.2021 for Delhi, which is a land locked area. However, Sahebganj has different topography, it's a hilly area and is bounded by river Ganga in one of its boundaries., which is different from the topography of Delhi. The studies reveal that there is only 3 months of concern and the prediction is based on satellite-based data. Therefore, in absences of any ground-based monitoring data during the predicted critical season, it is proposed that a detail ground-based air quality data for the period Nov – Feb be carried out to establish the factual status and assess the scientific study based supporting cum carrying capacity of the region and work out the requirement to comply with the order of Hon'ble NGT dt. 12.03.2021

XXVI. It is humbly submitted that an extension of time period for submission of final report by the committee to comply with the requirement arising from the Hon'ble NGT order dated 12.03.2021 may be given. During this period, field level study for primary data collection (DEC – FEB), and based on the same, carrying capacity-based outcome will be prepared and submitted to Hon'ble NGT, by 1st week of April 2022.

Annexure-A

General Guidelines for Abatement of Pollution

A. Preventive Measures for Crushers

The pollution can be reduced if it is controlled at the source by taking adequate pollution abatement measures, preventive planning and protective strategies. The measures that can be taken to reduce emission from the crushing units are as follow:

1. The crushers shall not be allowed to be installed or operate within the limits of
    a. 500 m from any habitat (above 800 nos of dwellers/160 nos of houses) & No house within 100 m
    b. 250 m from forest land
    c. 1000 m from wildlife sancutury/ National Park
    d. 100 m from National or State Highways
    e. 50 m from Railway Line
    f. 200 m from River

(Annexure 13)

2. The Pollution Control Equipment's should be implemented at the crushing units according to the capacity:
    a. Sprinkler operation for the small crushing units (<25TPH)
    b. Sprinkler operation and bag house implementation in the medium (25-100 TPH) and large (>100 TPH) crushing units.
3. The crushing units should be placed in a covered section made by G.I / M.S sheets with proper pollution control equipment.
4. Mostly the crusher units that were visited / inspected by last committee have installed some water spraying arrangements as **single water tap**, which were ineffective. Dust emissions took place when the crushers were in running conditions. Some of the measures that can be taken up for minimizing the dust emissions are:
    a. The scientifically designed sprinklers with adequate hydraulic pressure should be interlocked with the crushers and the screens. The sprinklers should be in adequate number to maintain a water curtain along the periphery of the process units. To avoid muddy condition, necessary arrangement should be made to operate alternate sprinklers at 10 -15 minutes interval. The height of sprinklers should be in the range of 5 -7 meters with 360 degree dispersion of water.
    b. Mist guns should be kept/ utilized in the crusher area so that even after fogging, water spraying some dust generates & emission occurs there mist guns suppress them.
    c. Fogging/Misting arrangement at the hopper (where trucks unload the large stones) and other transfer points/loading/unloading points should be installed.

Consumption of water would be considerably reduced through the use of this system.

d. Use of G.I water pipes instead of plastic pipes that break with the rocks/boulders.
e. Roads should be made paved within the crusher premises & the approach road from mine to crushers should also be made paved.
f. Availability of enough water for water spraying/sprinkling should be ensured. Large storage tanks may be constructed within the crusher area, Rainwater harvesting measures, accumulation of rainwater must be done so that there is no/negligible dependency on the groundwater, local rivers.

5. Dust Control Equipment's like Multi-cyclones & Bag filter if applicable as per EC.

   The dusts collected in bag house, which are of more than 5 um size have market value. The dust should be collected in bags and should be sold. The unit should not be allowed to dispose the collected materials as solid waste. In case, disposal of such waste is necessary, adequate facility for disposal with earmarked area and proper designed disposal pit duly approved by SPCB should be made by the unit.

   As a part of dry type control measures, the sufficient capacity of extraction and pressure drop across the system would be required to be provided by installing an induced draft fan of sufficient capacity

6. Proper house-keeping should be maintained for the crushing units placed in the covered section. Layers of dust should not be allowed to accumulate on floor of the crusher premises. Scrapers could be utilized for dust accumulation at a place which can be disposed subsequently.

7. The crushed stones or finished products should be stored in silo or the height of finished goods should be kept lower than the height of wind breaking walls. Strong structural base and framing should be provided for wind breaking wall to withstand in strong wind conditions. The height of the stockpile should always be kept lower than the height of the wind breaking wall. The wall can be erected radially with a screen as center point. In addition, proper sprinkling arrangement should be provided all around the stock piles.

8. Avoid long term storage of fines/fine chips in for of dump. They must be send back to mines/mining companies for filling of voids/already exhausted pits.

9. All the conveyor belts should be covered by G.I / M.S sheets from nod to nod points adequately without side gaps in enclosure and belts.

10. Boundary wall along the lease boundary

11. The connecting roads between the units should be metalled /pucca to avoid the dust emission.

12. Wheel washing system can be designed at the vehicle entry/exit point.

13. All the trucks & dumpers should have proper cover so that fugitive dust from loaded material can be entrapped at source itself.

14. All units should have a scientifically designed Rain Water Harvesting system which may be either of storage or ground water recharging type. Units desired to have storage type to ensure proper and hygienic storage of water and its suitable use.
15. Green belt development area along the periphery with minimum for 3 - 5 rows of trees and creepers (vegetation curtain) should be provided to arrest the fugitive dust movement. The unit should maintain the record of plantations such as number of trees planted, date when planted, type of trees and rate of their growth annually.
16. Used Oil generated from the DG Sets and other machinery/vehicles forms part of Hazardous Waste and should be regulated as per the provision of HW (MH&TBM) Rules 2008. All such units should be asked to take authorization for management of such waste as per the provision of the Rules.
17. The stack height of the DG sets should be as per the guidelines of CPCB
18. Mass awareness program should be conducted by JSPCB & District Administration explaining the adverse effects of dust on the lungs, human body, irreversible nature of diseases like silicosis, etc. Local people, workers, crushers owners should be the target audience of such mass awareness program. Awareness program should also include best practices/techniques to control dust in crushers with photographs, scarcity of groundwater & methods to recharge it, greenbelt development & their use.

B. Preventive Measures for Mines

1. The drilling machine should have following specifications to control the dust generation:
    a. leakage free
    b. equipped with wet drilling arrangement and sharp drill bits.
    c. Must have adequate dust catchment or air filtration systems
2. Blasting should be carried out as:
    a. Controlled blasting: use of millisecond delay detonators
    b. at a specific time
    c. optimization of use of explosive energy
    d. use of ‘water ampoules’ during blasing
    e. Over charging of blast holes should be avoided
3. Mines should strictly follow mine plans.
4. Transportation emits a huge amount of particulate matter, which can be reduced by
    a. Overloading of dumpers should be avoided to prevent spillage on the roads
    b. Stone carrying trucks should be covered.
    c. The emissions from the diesel engines of the machinery can be controlled by proper maintenance and monitoring of machines.
5. The haul roads should be kept wide, leveled, compacted and properly maintained.
6. Approach roads to and from the mine should be made black top

7. Regular Compaction and grading of haul roads to clear accumulation of loose material.
8. At least two water tankers should be kept in the mines. A log book of water tanker should be filled/maintained mentioning registration number, running hours, kilometer reading, place of water sprinkling, shift wise. Log book of water tanker should be signed by competent person in the mine. Copy of log book should be sent with six-monthly compliance reports.
9. Water sprinklers should be installed at regular interval to supress dust. Fixed nozzle type water spraying system as only truck operated spraying system (tankers) were only observed at some places during inspection.
10. Separate storage of top soil.
11. Storage of the overburden and the stones should be covered and maintained as follow:
    a. Catch drain, siltation ponds & retaining wall around the periphery of dumps.
    b. Covering of top soils as temporary measures and plantation of herbaceous species if kept for prolonged time.
12. Retain as much native vegetation as possible throughout the quarry's operation. Root structures help maintain soil stability, while tall vegetation-particulary trees-can act as a filter.
13. Green belt development should be done in and around the mine. Avenue plantation along the roads should be done.
14. Ground water recharge by all units through rain water harvesting. Sump/lower portion in a mine where rainwater can be stored in plenty so that it caters to all seasons should be made and water stored in it. This accumulated rainwater could be used for water sprinkling on haul roads & other places in mines and also used for green belt development, etc.
15. The mined out pits should be converted into the water reservoir at the end of mine life. This will help in recharging the groundwater table by acting as a water harvesting structure.
16. Periodic analysis of the mine pit water and groundwater should be undertaken.
17. No untreated water in open drain and surface water bodies
18. Backfilling should be practiced as per the approved mine plan. Mine owners should keep in view that mine closures have to be done as per the progressive & final closure plan. DMO should also keep in mind that mine closure is extremely important aspect for sustainable and environment friendly mining and ensure that it takes place as provided in mine plan.
19. Issue of personnel protectors to each workers such as Mask and Ear Plug
20. Yearly medical checkup of all workers – implanted by District Medical Officer –Monitored by District Industry department and mining department for respective units.
21. Mass awareness program should be made including knowledge about mine plans, mine safety rules (involving DGMS), effect of dust on workers & local, effect of silt on nearby rivers/nallas, depletion of groundwater resource, systematic & scientific mining, etc., targeting mine owners and works, local people. JSPCB, DMO should conduct such

awareness program taking the help of Indian Bureau of Mines and Directorate General of Mines safety. Model Mines following the condition of EC&CTO may be developed in all the tehsils where mining activity is taking place. Capacity enhancement of District mining officials and JSPCB RO should be done (both quantitatively & qualitatively) to ensure the implementation of conditions of EC& CTO.

C. Preventive Measures for Transportation

1. Covered Transportation
2. Overloading should be avoided
3. Time Bound Transportation mainly in night hours
4. Feasibility study for separate road for industry transportation
5. Road maintenance by Public works department (Fund may be generated by group of industry in terms of District Mineral Fund)- Internal pucca or metalled roads are required for the movement of trucks and vehicles with regular road cleaning.
6. Water sprinkling along the Road network through DMF by fixed sprinklers.
7. Road side Planation through DMF – Monitored and implemented by District Forest Department

D. Preventive Measures for Common Area in each cluster

1. No open dumping outside the lease area.
2. Road dust and spillage should be removed.
3. No untreated water in open drain and surface water bodies
4. Periodic monitoring of water level in the area

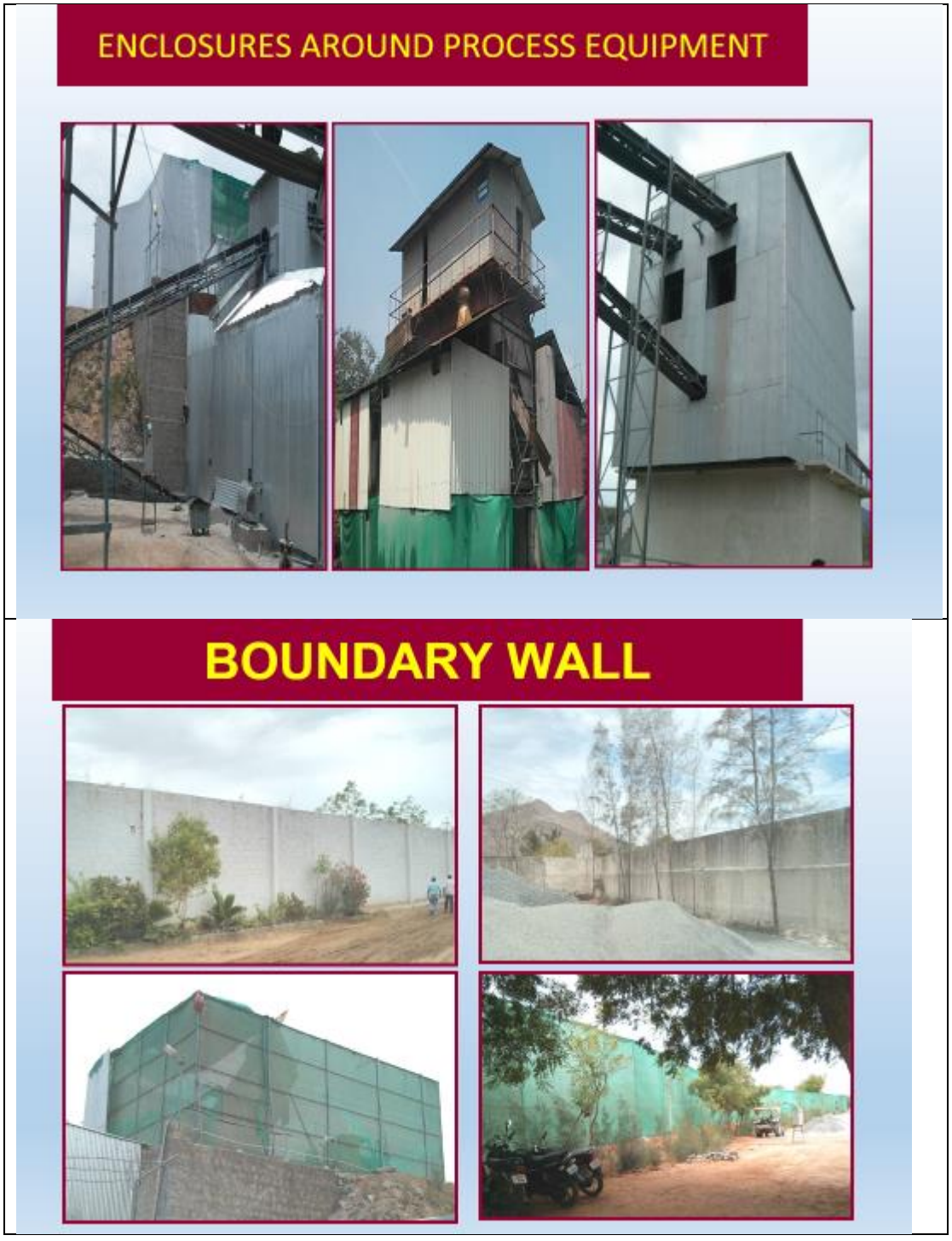
Annexure - B

Some Glimpse of Best Practices

1. A representative visuals of some good practices adopted in crusher units in Sahebganj
(Source: CEED Report)




2. Representative visuals of some good practices adopted in crusher units in other areas



WATER SPRINKLERS IN CRUSHING OPERATION

WATER SPRINKLING

STOCKPILES

HAULAGE ROADS

SPRIKLERS ALONG ROAD SIDE

Photo : Photo of plantations in rows

Photo: Photo of retaining wall at the toe of OB dump

Photo: Photo of grader/scraper used for leveling, Cleaning of road

Photo: Photo of catch drain around OB dump

Photo: Photos of rain gun for suppression of dust near a crusher.

Annexure - 1

श्री संदीप सिंह (भा0प्र0से0), अध्यक्ष DEIAA–सह–उपायुक्त, साहेबगंज की अध्यक्षता में दिनांक–25.08.2018 को DSR के संबंध में DEIAA एवं DSR के गठित सदस्यों के साथ की गई संयुक्त बैठक की कार्यवाही :–

01.उपस्थिति : –

पंजी के अनुसार।

02.कार्यवाही संख्या 01 : –

सर्वप्रथम अध्यक्ष DEIAA–सह–उपायुक्त, साहेबगंज द्वारा बैठक में आये DEIAA एवं DSR के सदस्यों का स्वागत करते हुए बैठक की कार्यवाही प्रारम्भ करते हुए Sathi Planners Pvt. Ltd. को साहेबगंज जिले के लघु खनिज (बालू घाटों को छोड़कर) का तैयार किये गये जिला सर्वेक्षण प्रतिवेदन (DSR) का Presentataion देने का निदेश दिया गया है।

03.कार्यवाही संख्या 02 : –

Sathi Planners Pvt. Ltd. के द्वारा साहेबगंज जिले के DSR का Presentataion दिया गया है।

04.कार्यवाही संख्या 03 : –

Presentataion के दौरान जिला सर्वेक्षण प्रतिवेदन (DSR) के संबंध में प्राप्त मार्गदर्शन के आलोक में विभिन्न बिन्दुओं पर विस्तार से चर्चा की गई :–

सर्वसम्मति से DSR को स्वीकृति देते हुए निम्नलिखित निर्णय लिये गये:–

1. DSR को अविलम्ब NIC Sahibganj के website (sahibganj.nic.in) पर अपलोड कर दिया जाय।
2. जिला जन–सम्पर्क पदाधिकारी, साहेबगंज द्वारा इस संबंध में एक प्रेस विज्ञप्ति दो मुख्य समाचार–पत्रों में प्रकाशित करा दी जाय कि "साहेबगंज के लघु खनिजों से संबंधित DSR NIC Sahibganj के website (sahibganj.nic.in) पर अपलोड कर दिया गया है, अगर किन्हीं व्यक्ति को कोई आपत्ति हो तो इस संबंध में वे अपना आपत्ति 21 दिनों के अन्दर अपनी आपत्ति जिला खनन कार्यालय अथवा DEIAA कार्यालय में दे सकते हैं।"
3. DSR की एक–एक प्रति (Hard Copy) DEIAA कार्यालय, साहेबगंज/वन प्रमण्डल कार्यालय, साहेबगंज/जिला खनन कार्यालय, साहेबगंज में उपलब्ध रहेगी, ताकि इच्छुक व्यक्ति कार्यालय अवधि में उसका अवलोकन कर सके।

अन्त में धन्यवाद ज्ञापन के साथ बैठक की कार्यवाही समाप्त की गई।

डॉ0 बी0 के0 तिवारी सदस्य DEIAA, साहेबगंज।	सदस्य सचिव DEIAA, –सह– अनुमण्डल पदाधिकारी, साहेबगंज।	सदस्य DEIAA, –सह– वन प्रमंडल पदाधिकारी, साहेबगंज।	अध्यक्ष DEIAA, –सह– उपायुक्त, साहेबगंज।

ज्ञापांक–224–/ DEIAA, साहेबगंज,दिनांक– 25/08/18

प्रतिलिपि–सभी संबंधित पदाधिकारी, DEIAA एवं DSR के सदस्यों को सूचनार्थ एवं आवश्यक कार्रवाई हेतु प्रेषित।

प्रतिलिपि–जिला जन सम्पर्क पदाधिकारी, साहेबगंज को सूचनार्थ एवं अविलम्ब आवश्यक कार्रवाई हेतु प्रेषित।

प्रतिलिपि–उपायुक्त–सह–अध्यक्ष, DEIAA, साहेबगंज को सूचनार्थ एवं आवश्यक कार्रवाई हेतु प्रेषित।

सदस्य सचिव DEIAA,
–सह–
अनुमण्डल पदाधिकारी,
साहेबगंज।

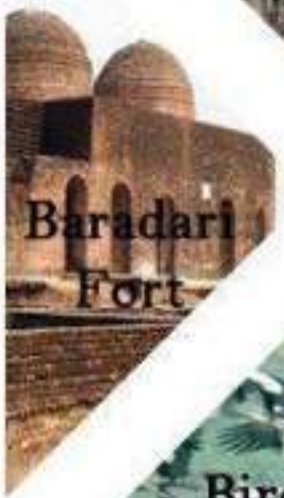
District Survey Report

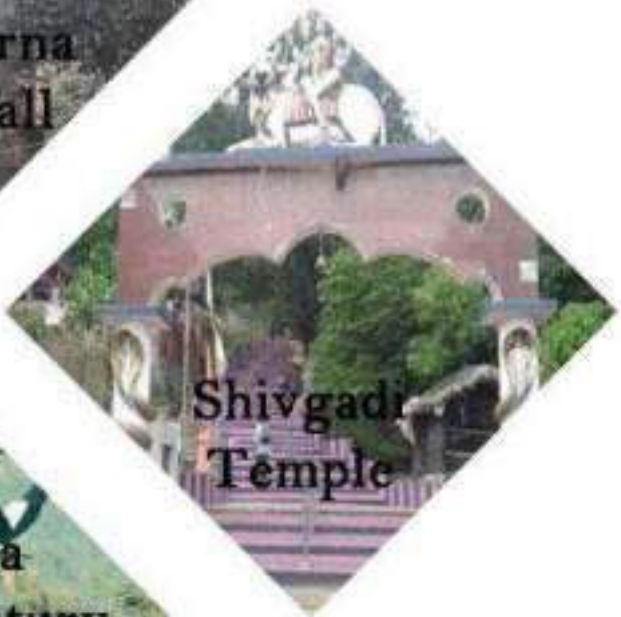
Of Minor Minerals
(Other Than Sand Mining)

Sahibganj District

Prepared by DEIAA, Sahibganj
Govt. of Jharkhand

Prepared in accordance with
Para 7 (iii) of S.O.141 (E)
Dated 15th January 2016 as ammended
on S.O. 3611 (E) Dated 25th July, 2018 of
Ministry of Environment, Forest
and Climate Change Notification.





District Mining Officer

Executive Engineer, Road.

Executive Engineer, Minor Irrigation.

Dy. Dir. Geology

Member Secretary DEIAA/S.D.O.

Divisional Forest Officer

Dr. B.K. Tiwary
Expert Member,DEIAA

APPROVED

Dy. Commissioner/Chairman DEIAA, Sahibganj

CONTENT

Acknowledgment

In pursuance of MOEF&CC Notification S.O. 141(E) dated 5th Jan 20L6, District Environment lmpact Assessment Authority (DEIAA) & District level Expert Appraisal Committee (DEAC) has been formed for Category -B2 Minor Minerals having area less than or equal to 5 ha.

ln line with above guideline Chief Secretary of Government of Jharkhand issued a letter to all Deputy Commissioner's Vide letter No. -1874/Cs dated 0L-08-20L7 & Notification No. Khani(vivid) -67/20L7/L905 dated L6-08-20L7 by Secretary, Department of Industries, Mines & Geology, Government of Jharkhand, to prepare a District Survey Report for all minor minerals as per guideline of sustainable Sand Mining guidelines with the assistance of lrrigation department (Minor), Forest department, Mining & Geology Departments. The District Survey Report (DSR) for sand had already been prepared and submitted to the Government.

The District Survey Report of Minor Mineral (Other than Sand) is prepared in accordance with Para 7 (iii) of S.O. 141 (E) Dated 15th January, 2016 as amended on S.O. 3611 (E) Dated 25th July, 2018 of Ministry of Environment, Forest And Climate Change Notification.

Considering the extent of deposit of stone in Sahibganj, it is very difficult to prepare DSR in a very short while with the available resources. The effort made by the DEIAA committee to engage outside party for compiling the departmental information & Field data to M/S Sathi Planners Pvt. Ltd, Ranchi and with the constant support from Forest Department Sahibganj, Mining Office Sahibganj, Executive Engineers from road and Minor irrigation to prepare this DSR in short while is commendable. This is an interim report prepared to meet the requirement of minor minerals for the state and same shall be reviewed time to time to updated the data bank of DSR.

It is clear from the report that most of the existing operative mines are having a lease period up to year 2022 to 2025 and the livelihood of Sahibganj district is dependent on mining and its related industries.

Hence, it is recommended to initiate the process of auctioning in accordance with the existing rules/laws to meet the requirement of stone for the state and earn the revenue and support the livelihood of Sahibganj District, even after the 2025.

I wish that DEIAA will make all the efforts to complete the DSR in all respect in near future.

With Warm Regards

Dy. Commissioner/ Chairman DEIAA, Sahibganj

PREAMBLE

Prior to the formation of Jharkhand Minor Mineral Concession Rule 2004, (JMMCR -2004) the mining operation for minor mineral were carried out in unscientific manner. Identifying this fact in exercise of power, Conferred by Section 15 by Mines and Minerals (Development and Regulation) Act 1957 as amended in 2015 and all other powers enabling it in that behalf, the industry Mines & Geology Department, Govt. of Jharkhand framed the aforementioned rule, which has been amended with period of times in the year 2007, 2010, 2014, 2015 and 2017.

Keeping in view of experience gained in period of one decade, the MOEF&CC came out with Environmental Impact Assessment Notification S.O.-1533(E) dated 14th Sept.2006. It has been made mandatory to obtain environmental clearance for different kinds of development projects as listed in Scheduled -1 of notification.

Further, pursuance of the order of Hon'ble Supreme Court Petition (C) No. 19628-19629 of 2009, dated 27th Feb. 2012 In the matter of Deepak Kumar etc., Vs State of Haryana and others etc., prior environmental clearance has now become mandatory for Mining of Minor Minerals irrespective of the area of Mining Lease.

And also in view of the Hon'ble National Green Tribunal, order dated the 13th Jan.2015 the matter regarding Sand, Brick earth, & burrowed earth cutting for Road Construction has to take prior E.C. For Mining Lease irrespective of the fact that whether the area involved is more or less than 5 hectares. They also suggested to make a policy on E.C for sand including other minor minerals mining lease in cluster.

In pursuance MOEF&CC Notification S.O. 141(E) dated 15th Jan. 2016, District Environment Impact Assessment Authority (DEIAA) & District level Expert Appraisal Committee (DEAC) has been formed for Category –B2 Minor Minerals having area less than or equal to 5 ha.

MOEF&CC in consultation with State Government has prepared Guidelines on Sustainable Sand Mining & other Minor minerals mining in 2016, detailing the provisions on Environmental Clearance for cluster. Creation of District Environmental Impact Assessment Authority (DEIAA) & proper monitoring of Minor Minerals Mining using Information Technology to track the mineral out material from source to destination.

DEAC will scrutinize and recommend the prior environmental clearance of Mining of Minor Mineral to DEIAA on basis of District Survey report. This will model and guiding document which is a compendium of available mineral resources, geographical setup, environmental and ecological set up of the district and replenishment of minerals and is based on data of various departments, published reports, Journal and websites. The District Survey report will form the basis for application for environmental clearance, preparation of reports and appraisal of projects. District Survey Reports are to be reviewed once in every five years as per statue, however this is an interim report, which will be updated at regular intervals.

In line with above guideline Chief Secretary of Government of Jharkhand issued a letter to all Deputy Commissioner's Vide letter No. -1874/Cs dated 01-08-2017 & Notification No.

Khani(vivid) -67/2017/1905 dated 16-08-2017 by Secretary Government Department of Industries, Mines & Geology, Government of Jharkhand, to prepare a District Survey Report as per guideline of sustainable Sand & Minor Mineral Mining guidelines with the assistance of Irrigation department (Minor), Forest department , Mining & Geology Departments, considering the recent amendment S.O. 3611 (E) dated 25th July, 2018.

The Main objective of the preparation of District Survey Report is to ensure the following:-

1. Identification of Mineral Resources in the district.
2. Identification of areas of minor minerals having the potential where mining can be allowed. And
3. Identification of area and proximity to infrastructure and installations where mining should be prohibited.

1. INTRODUCTION

SAHIBGANJ AT A GLANCE:-

1.1 Location and Geographical Area

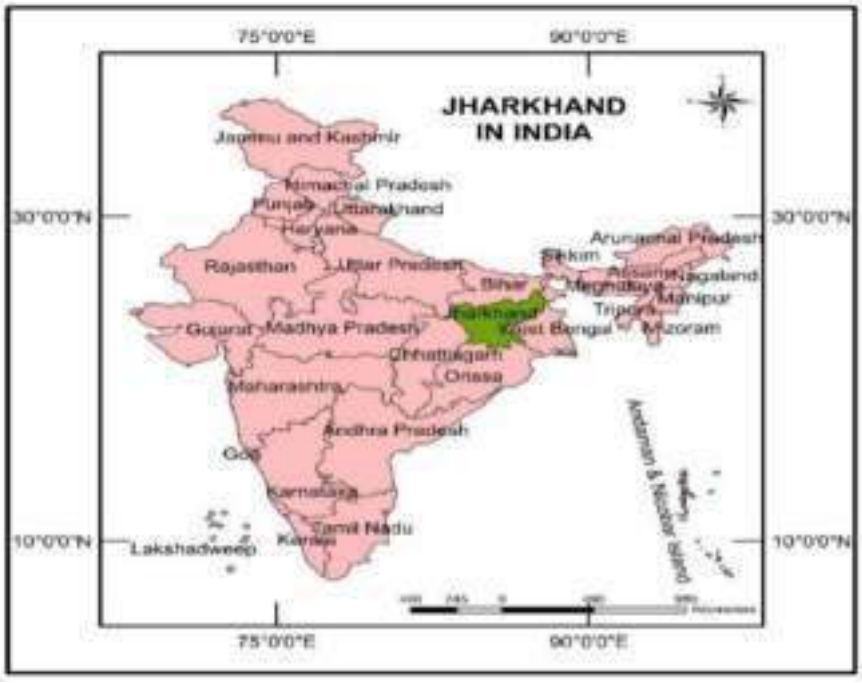
Sahibganj district is one of the twenty-four districts of Jharkhand state, India, and Sahibganj is the administrative headquarters of this district. The district is located in the north eastern most tip of Jharkhand State. Sahibganj district is bounded by the river Ganges and Katihar district of Bihar in the north on the south Pakur district of Jharkhand, on the east by Maldah and Murshidabad district of West Bengal and on the west by Godda district. The district is situated roughly between 25° 50' 00" North and 24° 42' 52" North latitude and 87° 27' 35" East and 87° 53' 56" East longitude, having an area of 1599 km^2. The district covers Survey of India toposheets nos. **72 O/ 7, 72 O/ 8, 72 O/ 11, 72 O/ 12, 72 O/ 16, 72 P/5, 72 P/ 9, 72 P/10, 72 P/13 and 72 P/14.** The district has a total population of 1,150,567 with a population density of 558/km^2 having sex ratio of 952 (Census 2011).

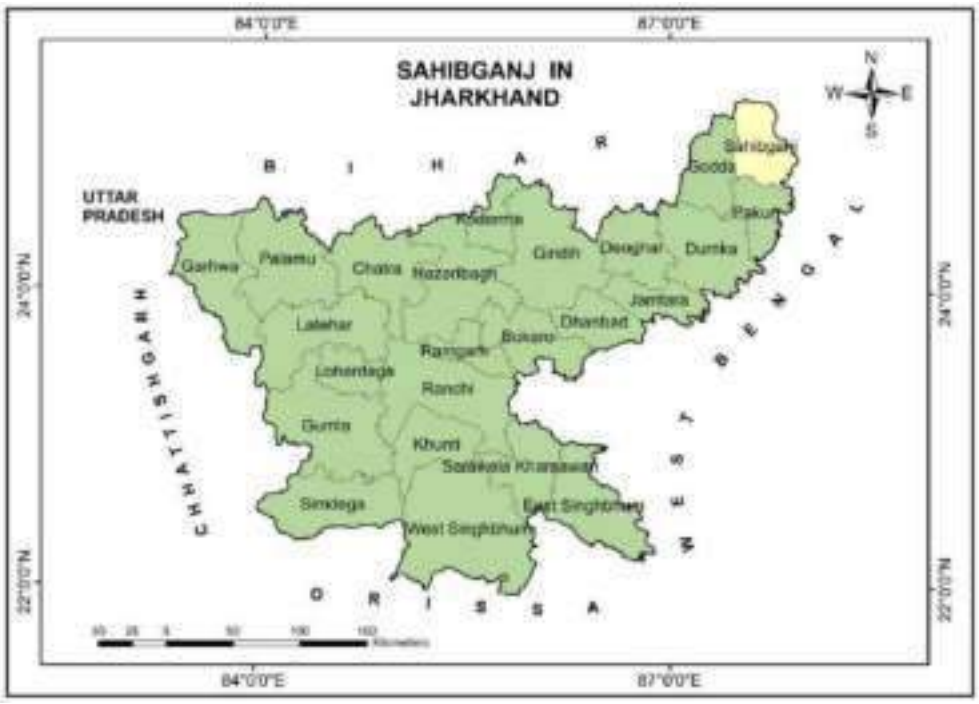
1.2 Administrative Units:-

The district is divided into two subdivions: **Sahibganj** subdivision and **Rajmahal** subdivision. It is further subdivided into nine Community development blocks: (Sahibganj subdivision) **Sahibganj, Mandro, Borio, Barhait;** (Rajmahal subdivision) **Taljhari, Rajmahal, Udhwa, Pathna** and **Barharwa**. The district has 6 Census Towns and 1,813 Villages (Inhabited-1,349 & Uninhabited-464). Moti Jharna Waterfall, Shivgadi Temple, Udhwa Bird Sanctury and National Fossil Park are some of the important historical monuments of Sahibganj district.

1.3 Connectivity facilities in Sahibganj District:-

The area is approachable by train from Bhagalpur (Bihar) and Dhanbad (Jharkhand) via West Bengal by north-south running Howrah-Bhagalpur loop of Eastern Railway. The district can be approached from all sides by a network of metaled road. The National Highway 33 passes through the district. Nearest airport is Bagdogra Airport (Siliguri), approximately at a distance of 173 km.



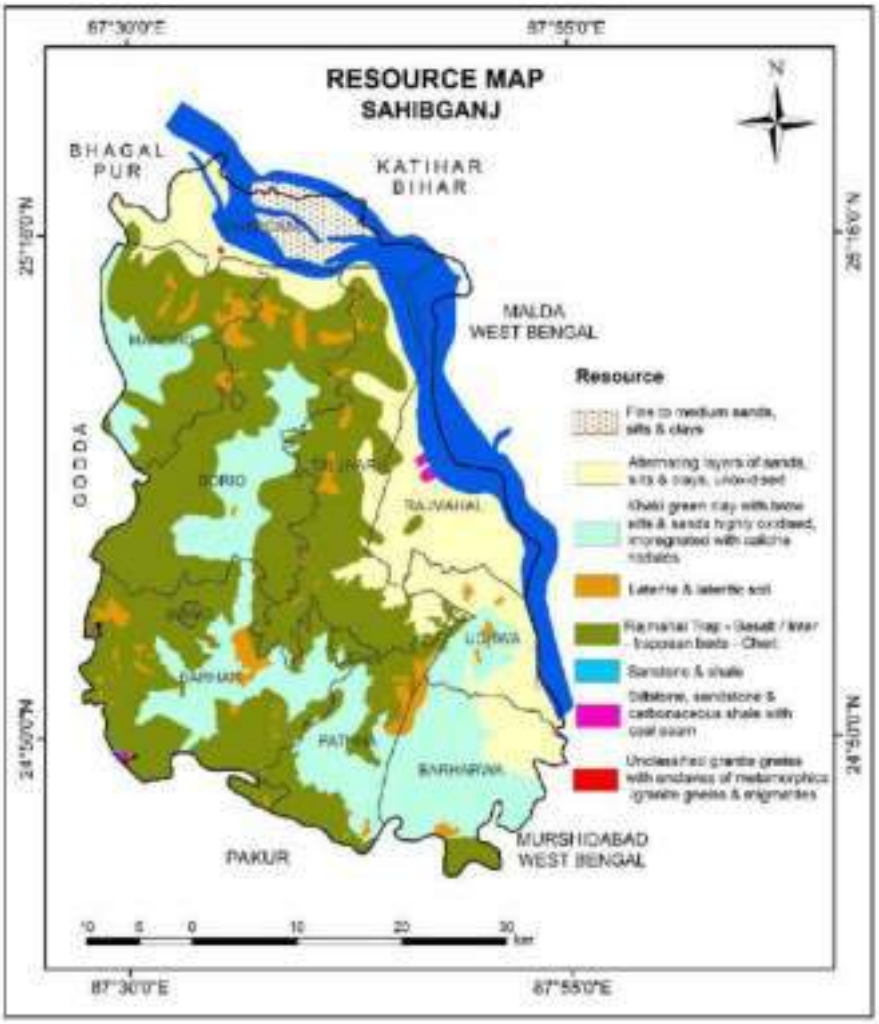


Map showing Location of Sahibganj District In Jharkhand

Representative Map of Sahibganj District (Source: Geological Survey of India)

2. OVERVIEW OF MINING ACTIVITY IN THE DISTRICT

Mainly the following minerals are found in the district: Coal, China Clay, Bentonite, Black Stone, Sand Stone, Silica Sand, Quartz, Kaolin, Flint Stone.



Representative Resource Map (Source: Geological Survey of India)

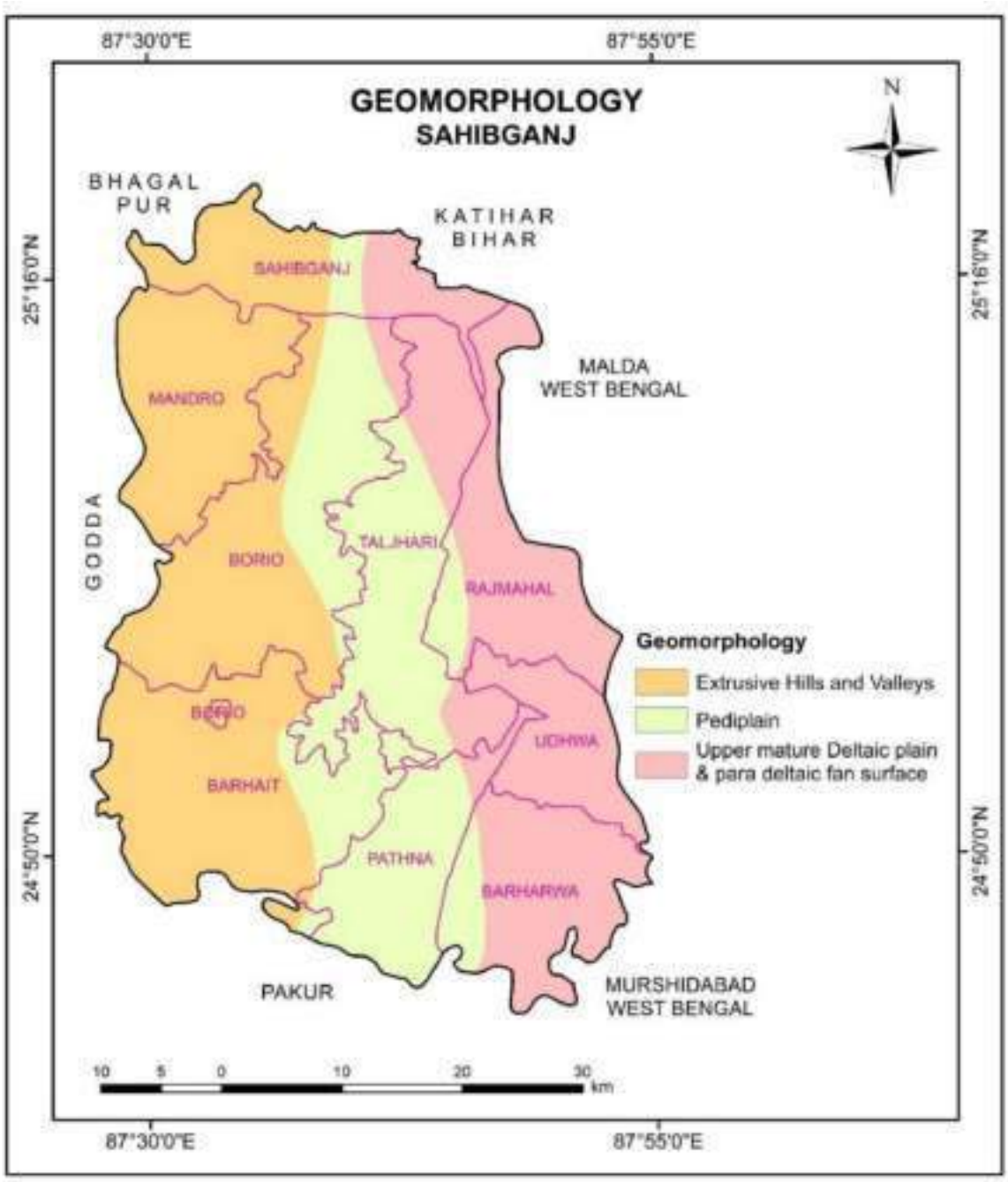
There are 120 operating stone mines and 282 non-operating mines and 3 operative china clay and flint mines presently (August 2018), in the district. This district provides approximately 5000 employment in the Mineral based industries, such as Fly Ash Bricks, Kiln Bricks, Mineral Grinding specially soap stone & Quartz, De-Hydrated Lime etc., which involvs investment of approx. Rs. 809.97 Lakh. The Rajmahal Hills are the source of building and road stones. Most of the quarrying is done by the side of the loop line of the Eastern Railway. Kaolin is found near Mangal Hat in Rajmahal subdivision. Bentonite is also available in some places, used as “Multani Mitti” and has great scope of export to other parts of the state of Jharkhand.

3. GENERAL PROFILE OF THE DISTRICT

3.1 River System

The river Ganges forming the northern boundary of the district enters into it along the north – west corner and flow eastward upto Sakrigali. Here it takes a turn to the south and then forward forming the eastern boundary of the district upto a little beyond Radhanagar in Rajmahal sub division. The other rivers of the district are Gumani and Morang. The river Gumani flows SW to NE direction upto Barhait then it turn to east direction. The river Morang flows from north to south direction and join river Gumani near Barhait. The drainage pattern of the district is dendritic. All these rivers are seasonal in nature except the river Ganges.

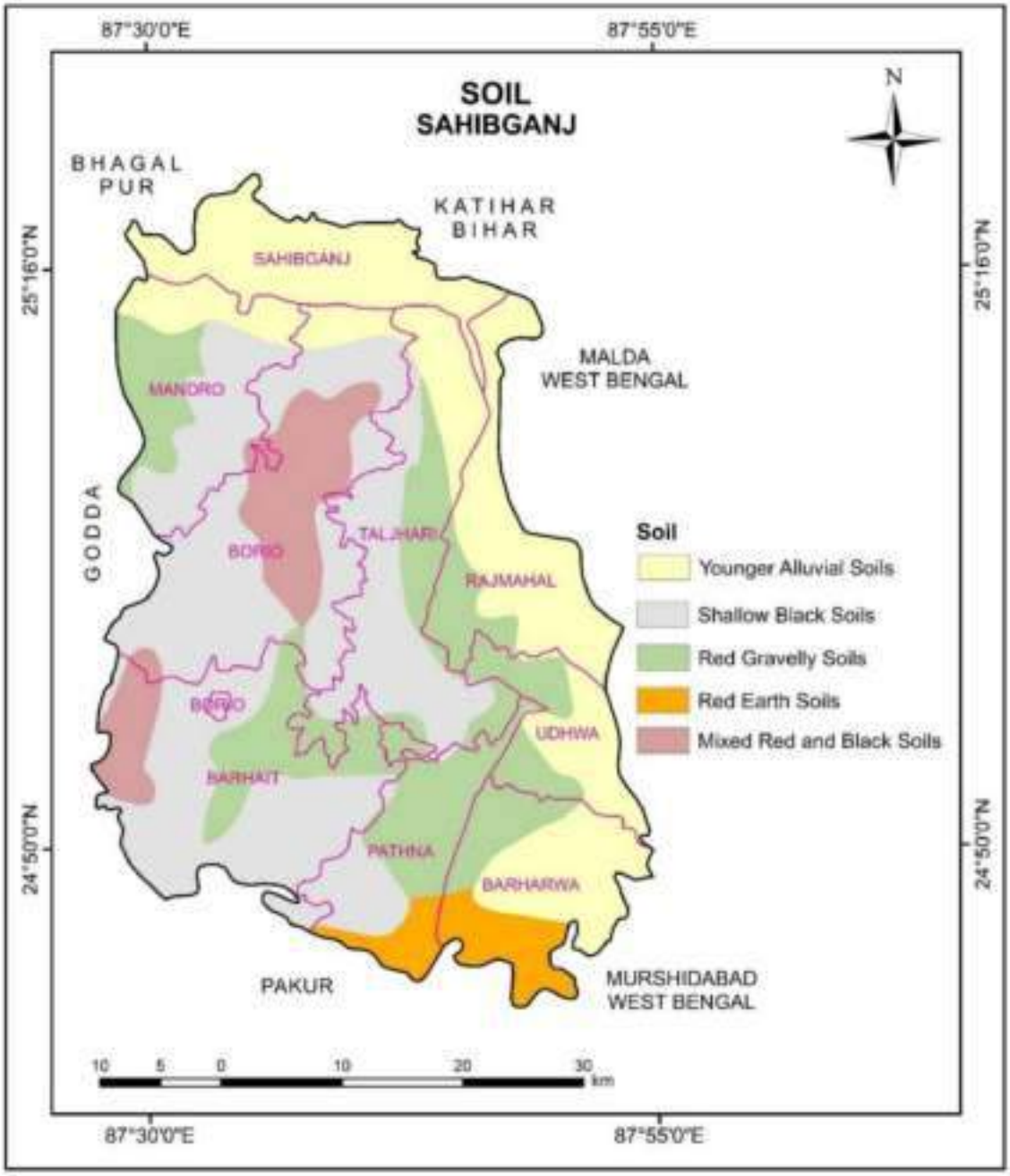
3.2 Geomorphology



(Soruce: Geological Survey of India)

Major part of the district is characterized by undulating topography covered by basaltic flows of Rajmahal Trap. The district is mainly drained by the rivers Ganges, Gumani and Morang. All there rivers are seasonal in nature except the river Ganges. The river Gumani and Morang contribute to the major surface run – off during monsoon. The main geomorphological features of the district are scarp on the northern part of the area, flat alluvial terrain in the eastern fringe of the district and resistant lava plateau of Rajmahal which rises above the general level and occupies major part of the district. The general evaluation of the hills and plateaus varies from 57 to 375 m above msl.

3.3 Soil:



(Soruce: Geological Survey of India)

The major soil type of the district is the Rajmahal type soil which derived from basaltic lava. These soils are black in colour, very fertile and restricted to Rajmahal lava areas. The other soil type of the district are red soil, eroded scarp soil, foothill soils, Tal soil and alluvial soil. The red soils are light to medium and are red to yellow or light grey in colour. The eroded scarp soil occurs in transverse section of dissected, descending scarp land at various altitude of upland. The yellowish red foothill soils occur in the eastern fringe of the district. The Tal soil is found in the back water belt of the Ganga around Barharwa when the rain water remains stagnant in the rainy season. The clayey loam type alluvial soil occurs near Sahebganj plains.

3.4 Physiography

Hilly terrains and extensive verdant landscapes is the main feature of Sahibganj. Based on the land resource and geographical condition, the district can be broadly sub-divided into two parts, i.e. the slopes and hills of this region which mainly forms the forested area and a part of Damin-I-Koh. The major blocks forming a part of this category are Borio, Pathna, Mandro, Taljhari and Barhait, blocks with major inhabitants being the Santhal Tribes, Mal Paharia clan and other Paharia Tribes. The Barharwa block, Udhwa block and the famous Rajmahal hills forms the second type of geographical division consists of plain land with multiple uplands, depression and ridges.

3.5 Demography

Census - 2011	
Total population	1,150,567
Male Population	5,89,391
Female Population	5,61,176
Rural Population	9,90,901
Urban Population	1,59,666
SC Population	72,341
ST Population	3,08,343
Population Growth	24.01%
Area Sq. Km	1599.00
Density/km2	558

Proportion to Jharkhand Population	3.49%
Sex Ratio (Per 1000)	952
Child Sex Ratio (0-6 Age)	960
Average Literacy	42 %
Male Literacy	49 %
Female Literacy	35 %
Total Child Population (0 - 6) Years	2,21,955
Male Population (0-6 Age)	1,13,220
Female Population (0-6 Age)	1,08,735
Literates	4,83,263
Male Literates	2,87,303
Female Literates	195,960
Child Proportion (0-6 Age)	19.29%
Boys Proportion (0-6 Age)	19.21%
Girls Proportion (0-6 Age)	19.38%

Source: Census Data, 2011

3.6 Forest

Total area covered under forest in Sahibganj district is about 767440 Acres or 30882 hectares, which is mostly barren. Owing to large scale unscrupulous felling the region once known for its thick and extensive forests is now bereft of much of its jungle wealth. The Forest department has under taken afforestation of these areas to some extent.

The most common tree found in the district is sal (Shorea robusta). Some teak of inferior variety is also found. Some tree found are jackfruit, murga, simal, bamboos, asan and satsal. Sal and simal logs and jackfruit are exported in large quantities to the neighboring districts and also to the places outside Jharkhand. Stray cattle are a common site in the district.

District-wise Forest Cover Area in Jharkhand (Area in Km^2)

		2011 Assessment						
District	**Geographical Area Km^2**	**Very Dense Forest**	**Moder-ate. Dense Forest**	**Open Forest**	**Total**	**Percent of GA**	**Change**	**Scrub**
Bokaro	1,929	64	244	252	560	29.03	0	48
Chatra	3,732	251	863	663	1,777	47.62	-5	15
Deoghar	2,479	0	84	85	169	6.82	0	5
Dhanbad	2,996	0	50	155	205	6.84	0	17
Dumka	6,212	0	314	323	637	10.25	0	58
Garhwa	4,092	124	406	835	1,365	33.36	0	55
Giridih	4,963	98	422	344	864	17.41	10	8
Godda	2,110	15	268	116	399	18.91	0	25
Gumla	9,077	324	919	1,414	2,657	29.27	0	33
Hazaribagh	5,998	272	626	1,164	2,062	34.38	9	44
Koderma	1,435	68	321	207	596	41.53	-4	0
Lohardaga	1,491	174	219	110	503	33.74	0	10
Pakur	1,571	3	172	108	283	18.01	0	19
Palamu	8,657	529	1,809	1,189	3,527	40.74	0	88
West Singhbhum	9,907	453	1,559	1,829	3,841	38.77	6	81
East Singhbhum	3,533	53	621	404	1,078	30.51	67	38
Ranchi	7,698	141	684	1,079	1,904	24.73	0	67
Sahebganj	**1,834**	**21**	**336**	**193**	**550**	**29.99**	**0**	**72**
Grand Total	**79,714**	**2,590**	**9,917**	**10,470**	**22,977**	**28.82**	**83**	**683**

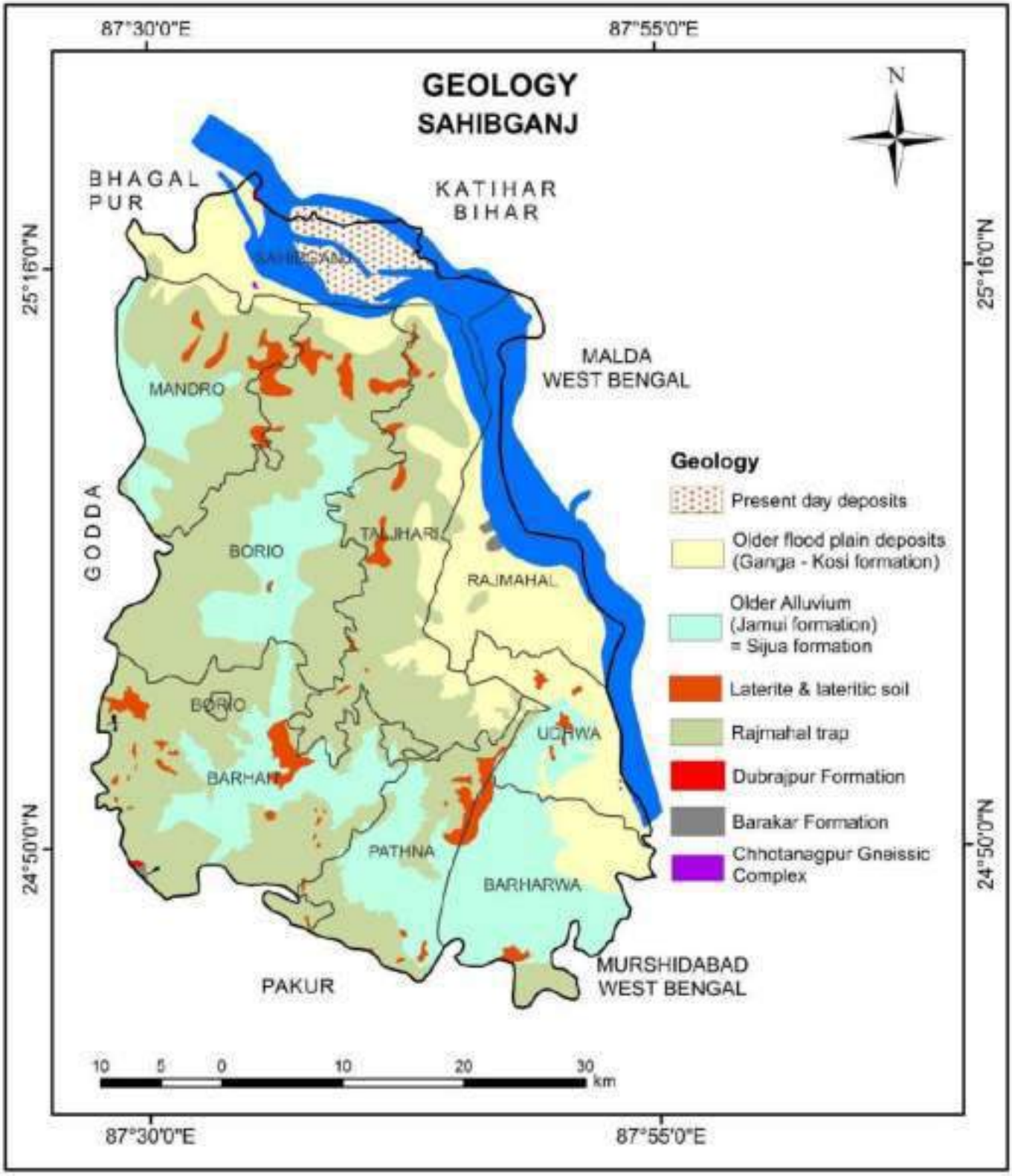
(Source: India state of forest report 2011-Jharkhand)

4. GEOLOGY OF THE DISTRICT

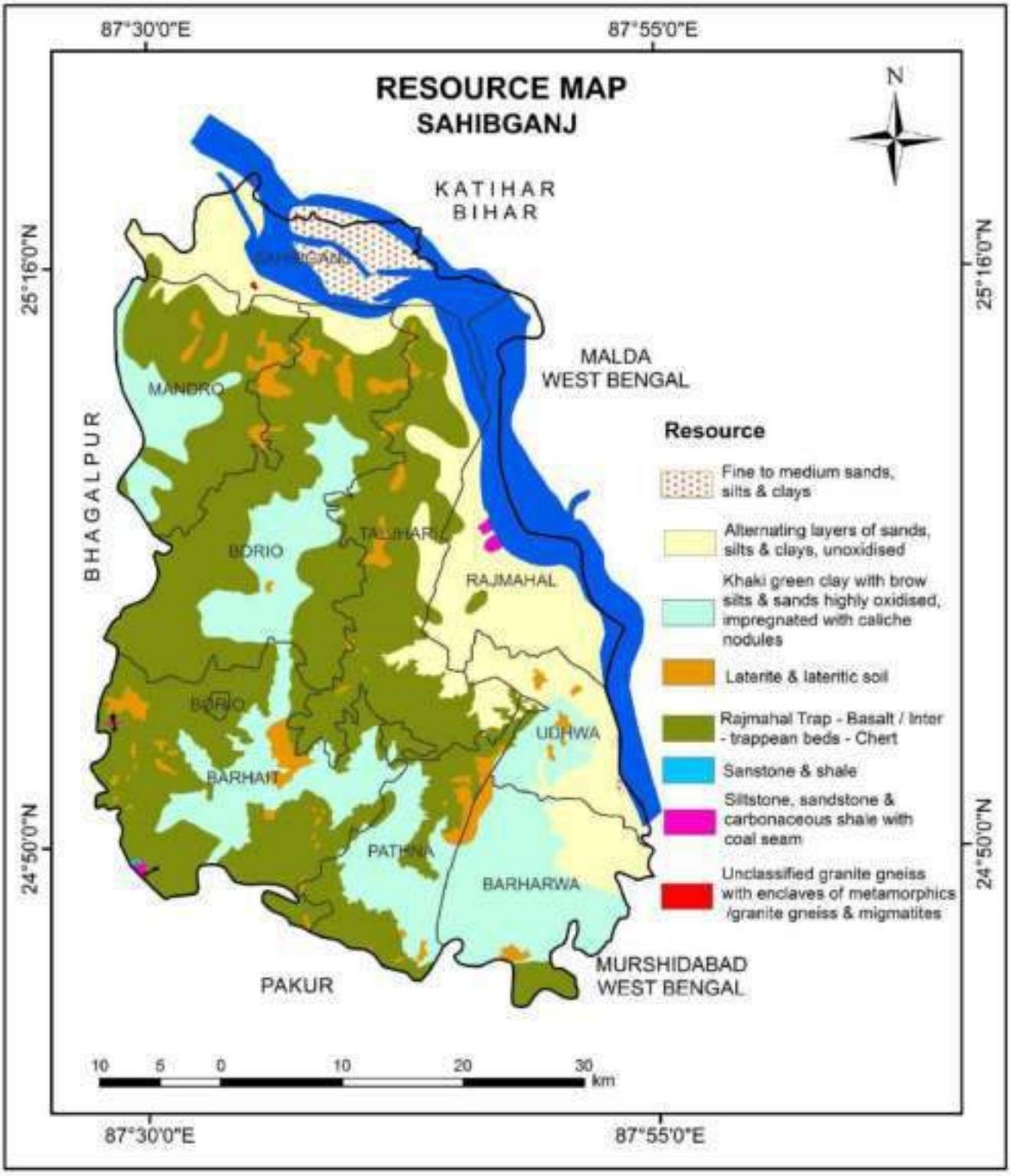
The major part of the district is represented by Rajmahal traps (volcanics) having a huge thickness of lava flows It has been observed that at least seven successive flows of basin in the area each flow ranging in thickness between 20m to 75m. The rocks are basaltic lava ranging in thickness from 450m to 550m. In basalt the intratrapeans are represented by tuffs, claystones and siltstone. Some of the rocks are silisified and porcelenide with quartz, Agate and Chalcedony. These intratrapeans are 40m thick. The rocks are of Jurassic to Cretaceous age. Radiometric age of these rocks varies from 11.8 to 70 million years. These rocks are extended for 125Km in Sahibganj near the river Ganges Patchy occurrences of Chhotanagpur granite gneissic complex associated with granite gneiss and migmatites and Barakar formation of Gondwana super group consisting of siltstone, sandstone and carbonaceous shale with coal seam are found to occur. In the western sector of the district. A continuous band of older alluvium with clay impregnated with caliches nodules is very much conspicuous in the eastern part of the area. In the eastern and northern margin of the area recent alluvium of the Ganga fringes the older rocks which is constituted by sands, silt and clays.

The generalised stratigraphic succession of the area, established by GSI is as follows :-

AGE	FORMATION	LITHOLOGY
Recent Quarternary / Tertiary	Alluvial undifferentiated surfacial depth	Loose soil, silt & clay, laterites, lateritic soil, lateritic gravel with petrified wood & china clay
Middle Jurassic to lower creataceous	Unconformity Rajmahal Traps and intertrappeans	Flow of basalt and intertrappean sediments (sandstone, shale etc)
Lower Jurassic (Upper Triassic)	Unconformity Dubrajpur	Conglomerates, coarse to medium grained sand stone, grey siltstone, molted shale and thin coal bands.
Lower Permian	Unconformity Barakar	Coarse to medium grained sand stone, carbonaceous shale & c coal seam, greenish sandstone, siltstone, green shale.
Upper Carboniferous to lower Permian (Permocarboniferous)	Talchir	Granites and granitoids gneiss, pegmatite quartz veins and metabasic dykes.
Precambrian	Metamorphics	---------

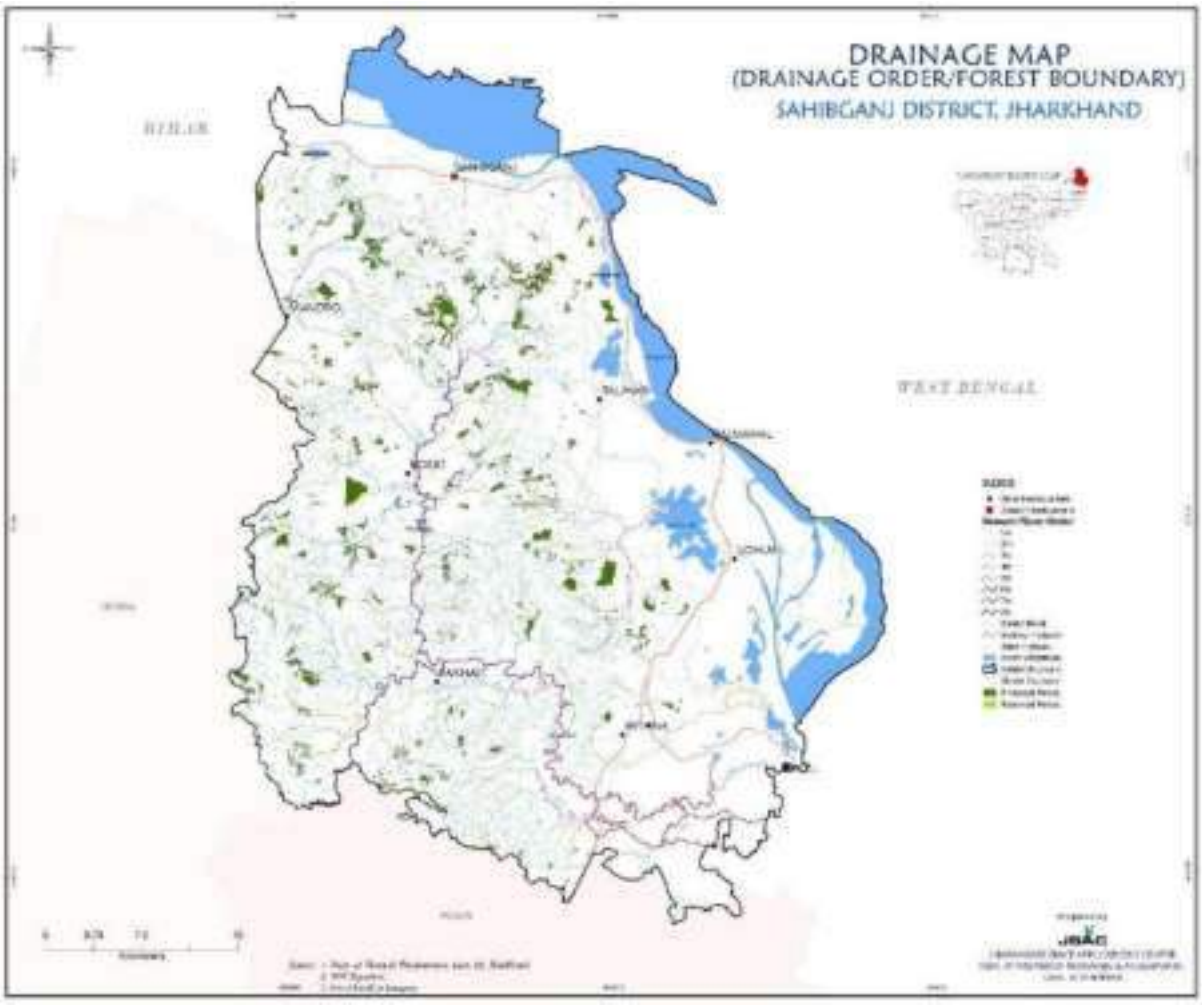


(Soruce: Geological Survey of India)



(Soruce: Geological Survey of India)

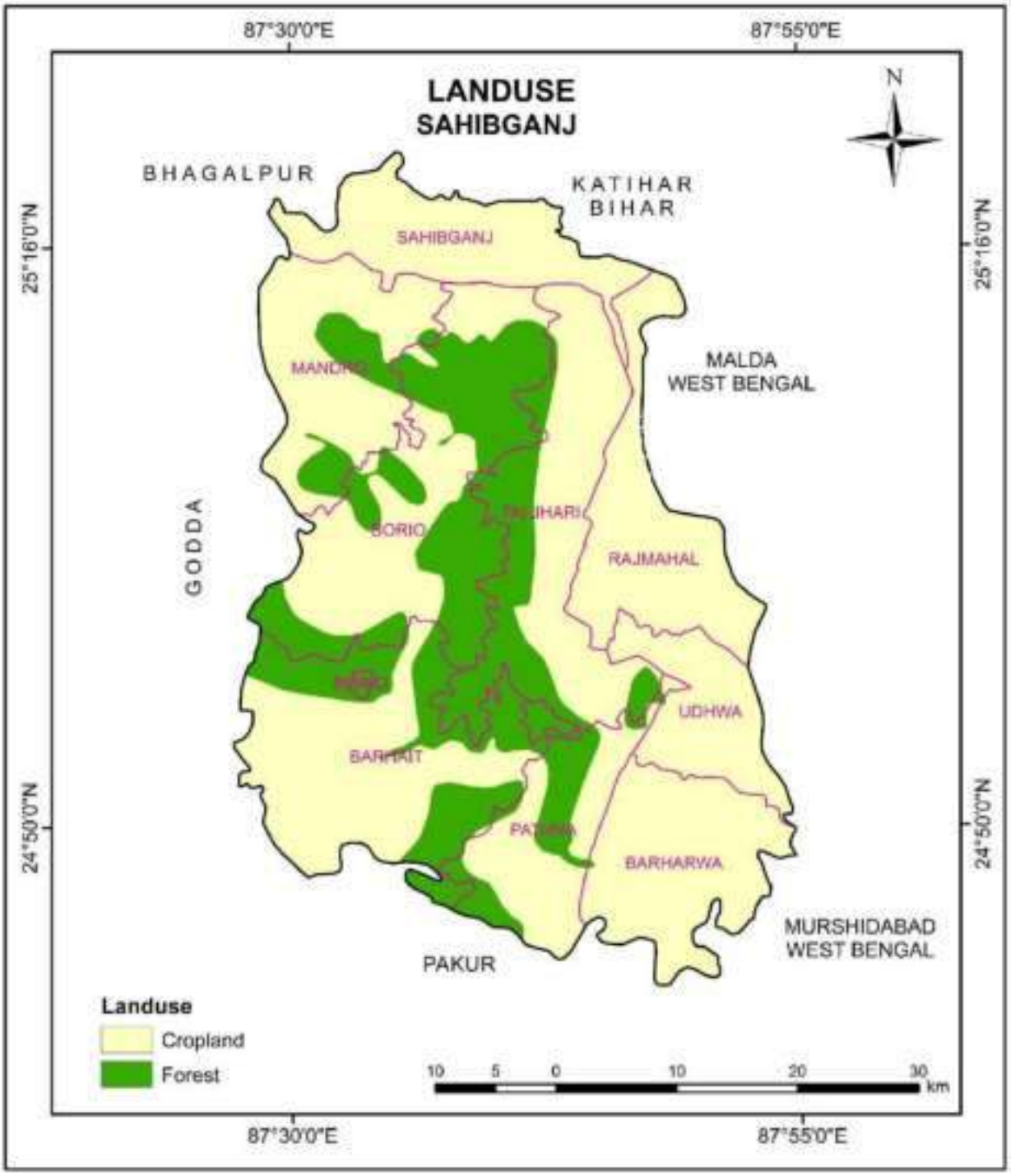
5. DRAINAGE OF IRRIGATION PATTERN



Paddy and maize are important crops grown in the district. Linseed, groundnuts, sweet potatoes and khesari are other crops grown widely in Rajmahal and its adjoining areas. Irrigational facilities are not adequate in this district. The most common source is the dug well, but this is not a very dependable source of irrigation. The major part of the district being rocky in nature, it is difficult to dig wells. The undulating nature of land makes it possible to store rain water by bunding. Apart from being dependent upon rains, these are by no means adequate. The result is that failure of rains invariably involves failure of crops except in small pockets.

IRRIGATION BY DIFFERENT SOURCES (Areas and Number of Structures)	**Nos.**	**Area(Ha)**
Dugwell	1361	906
Tube wells /Bore wells	187	672
Tanks / Ponds	133	225
Canals	Nil	-
Other Sources	797	1261
Net irrigated area		
Gross irrigated area (Ha)		3066

6. LAND UTILIZATION PATTERN IN THE DISTRICT



(Soruce: Geological Survey of India)

LAND USE (Sq Km.)	
a) Forest area:	427.4
b) Net area sown:	414.6
c) Cultivable area:	473.10

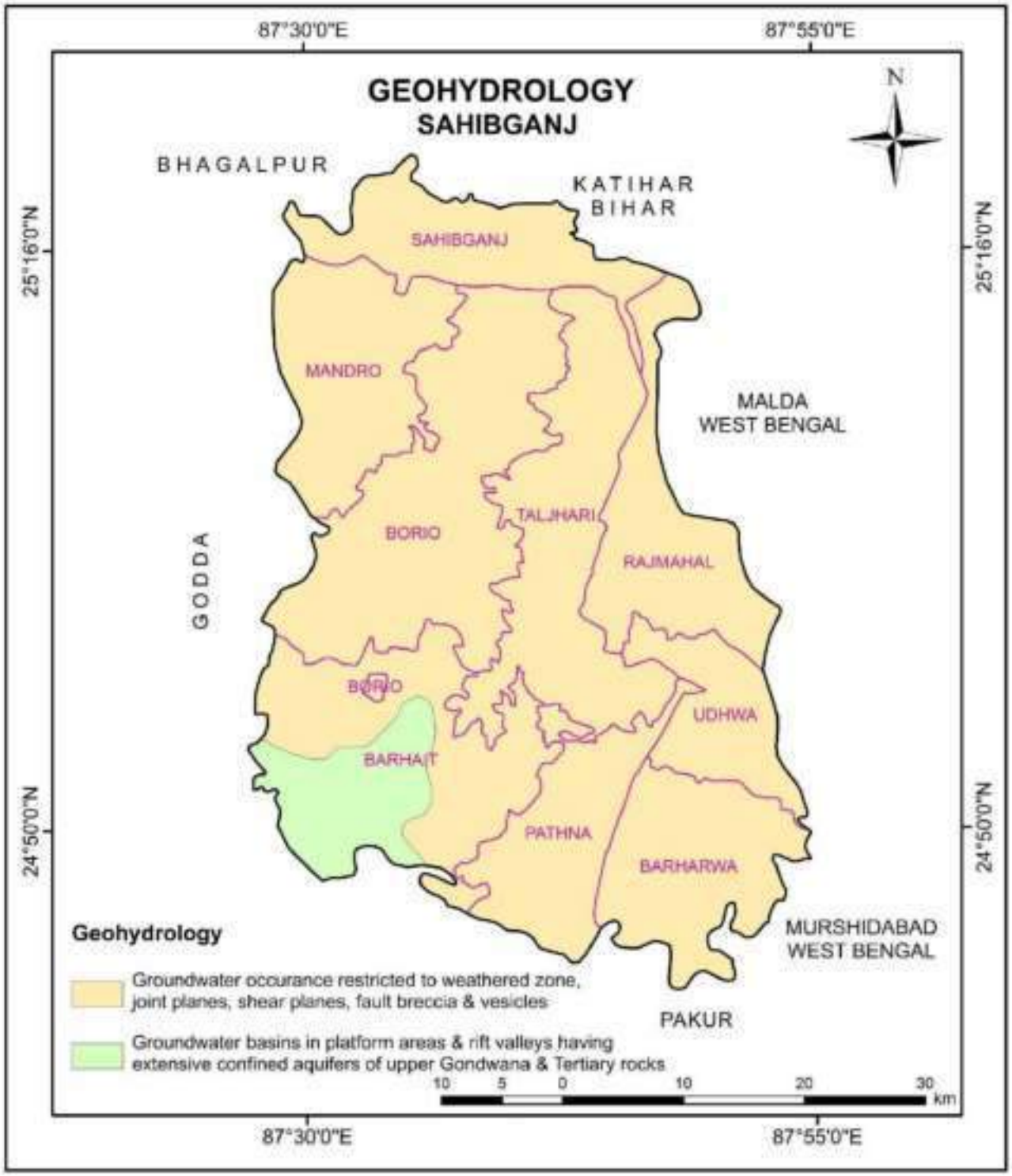
A large part of the district is hilly. The vast tract of land enclosed between hill ranges. The region on the bank of the Ganges is fertile and richly cultivated. The Ganges, Gumani and Bansloi rivers flow through this region. This area has plenty of fertile lands and is richly cultivated.

	Sahibganj	Jharkhand
1. Forest	21.18 %	29.2 %
2. Net sown area	22.85 %	22.7 %
3. Barren and unculturable waste	7.77 %	7.2 %
4. Non agricultural use	8.04 %	9.9 %
5. Orchards	1.46 %	
6. Pasture	1.39 %	2.5 %
7. Culturable wasteland	3.25 %	3.5 %
8. Current and other fallow	34.06 %	25.0 %

Source: Fertilizer and Agriculture Statistics, Eastern Region (2003-2004)

7. SURFACE WATER AND GROUND WATER SCENARIO OF THE DISTRICT

7.1 Hydrogeology



(Soruce: Geological Survey of India)

Rajmahal Trap is the major rock type in the district. The other geological formations of the district are alluvium and Laterite.
The alluvium occurs in the northern and eastern boundary of the district, which is composed mainly of sand and sub ordinate clay. Laterites are mainly of insitu origin and have been formed by sub-aerial eroson of underlying basalts under favorable climatic conditions. Laterites provide a productive ground water reservoir due to its very good porous and permeable in nature.
Rajmahal traps having a large thickness of basaltic lava flows occurs in the major part of the district. The different units of the lava flows are the main water bearing horizons in basaltic formation. The basic properties such as the ability to receive recharge, holding capacity of water to take into storage and transmit it as ground water by gravity are different for different litho units of the trappean flows. The massive basaltic unit is hard and compact in nature with negligible primary porosity and permeability. But the process of weathering and development of secondary porosity such as joints and fractures makes it to act as good ground water reservoir. The vesicular units have abundant vesicles that contribute towards hydrogeological properties and thus have high degree of porosity and permeability to serve as potential aquifers. The ground water occurs in near surface in weathered, joined and fractured basalts zone under water table conditions. The water bearing zone occurring between depths of 15-40 m are either interflow weathered shear zones and directly connected to shallow aquifer in widely spaced major joints and fractures and forms semi confined aquifer. Below the depth of 40 m, where the fracture porosity is insignificant, the weathered flow contacts are completely cut-off from lower aquifer on account of intervening high impermeable massive basalts and intertrappean beds and thus give rise to confining conditions.

Exploratory wells:

To understand the sub – surface geology, identify the various water bearing horizons including their depth, thickness and compute the hydraulic characteristics such as transmissivity and storativity of the aquifers, exploratory drilling programme was carried out by Central Ground Water Board during AAP 1982 – 83 and 05 exploratory wells and 04 observtion wells were drilled in the district. In addition, 3 exploratory wells and one observation well drilled during 2012. The depth of exploratory wells ranges between 44.20 to 100.00 mbgl. The static water level of these exploratory wells varies from 5.53 to 9.30 mbgl. The Transmissivity value varies from 32.30 to 176.00 m2/ day while the Storativity value varies from 07.00 X 10-5 to 07.70 X 10-5. The detail of exploratory wells drilled by Central Ground Water Board in Sahebganj district is given in table – 2.

7.2 Depth to Water Level: -

There are eight numbers of permanent observation well (HNS) of Central Ground Water Board is located in the district for monitoring of ground water regime. During the year 2012, the pre monsoon depth to water level was monitored between 4.60 to 12.00 mbgl. while the post monsoon water level observed between 2.85 to 7.93 mbgl. The pre monsoon and post monsoon depth to water level maps (2012) of the district prepared and shown in Figure 1 and 2 respectively.

7.3 Seasonal Fluctuation: -

From the pre monsoon and post monsoon depth to water level data collected during May 2012 and November 2012 respectively, water level fluctuation were computed for all the HNS located in the district. The water level fluctuation of the district varies from 0.28 to 9.15 m.

7.4 Long term water level trend: -

Water level of an area depends upon various factors like the storage of ground water development and variation in rainfall over a long period, recharge from rainfall and different sources. Central Ground Water Board has established eight National Hyrdograph Stations (NHS) for the study of water level behavior in the district. The water level data of each station has been analyzed. Pre monsoon and post monsoon long term water level trend has been calculated for the period of 2002 – 2011 (Table 4). The long term water level trend is showing rising trend between 0.006 – 0.530 m/year, 0.116 – 0.274 m/ year and 0.086 – 0.264 m/ year for pre monsoon, post monsoon and all season respectively. Similarly, the long term water level trend is showing falling trend between 0.018 – 0.404 m/year, 0.026 – 0.561 m/year and 0.018 – 0.413 m/ year for pre monsoon, post monsoon and all period respectively. About 37.5% of NHS showing rising trend of ground water while 25% of NHS showing falling trend for pre and post monsoon period. Similarly, about 37.50% of NHS shows rising trend and rest 62. 50% show declining trend for all seasons.

7.5 Ground Water Resources

Based on the recommendation of the Ground Water Estimation Committee – 1997 (GEC – 1997), block wise the ground water resource assessment has been carried out for all the blocks of the district. The net ground water availability of the district is 11613.70 ham. The gross ground water draft for all uses of the district is 2606.09 ham. The average stage of ground water development in the district is 22.44 %. All blocks of the district are falling under “Safe” category. The stage of ground water development varies from 8.20% to 46.26% (Table – 6, Fig. 4). The net ground water availability for future irrigation development for the district is 8513.63 ham. The State of Development map is shown in Figure 4.

7.6 Ground Water Quality

To evaluate the quality of ground water, samples have been collected from 5 representative HNS during the May – 2011. These samples were analyzed to assess the chemical quality of ground water and its suitability for drinking and irrigation purposes. The samples represent the quality of phreatic zone or the shallow zone. The ground water samples were analysed for major chemical constituents by using standard procedure at chemical laboratory in CGWB, MER, Patna. Analysed results are given in Table 5.

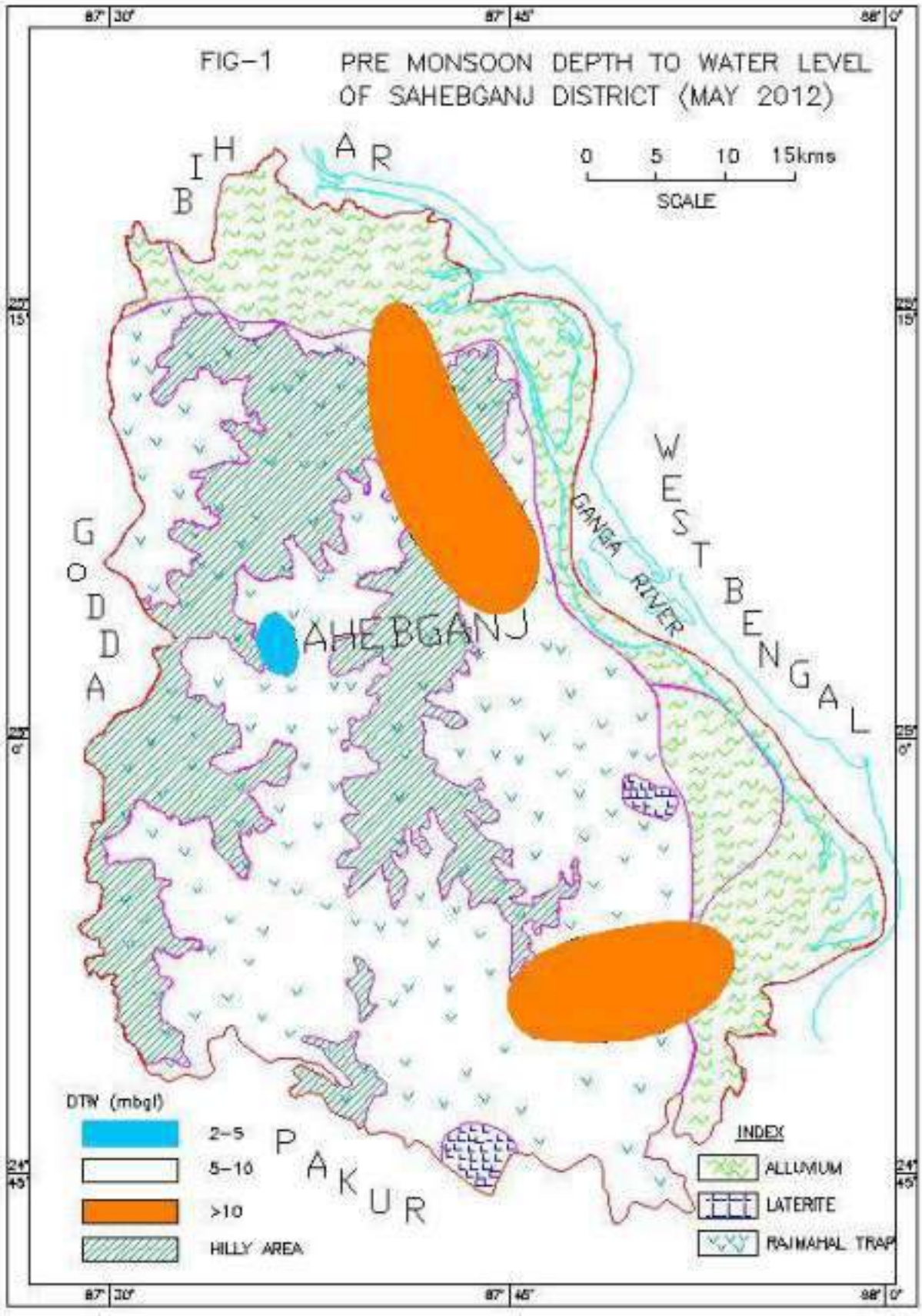
The results of ground water samples were analyzed in accordance with the standard (ISI – 1993) for drinking purpose. In general the quality of ground water in the phreatic aquifer is suitable for drinking and irrigation purpose except few samples, which shows nitrate concentration more than permissible limit. The EC value ranges from 193 – 1687 micro Siemens/cm at 250c.

During the Ground Water Management Studies (AAP 2006 – 07), 60 acidified samples were collected form Gangetic alluvium of the district for the study of Arsenic in ground water. As per

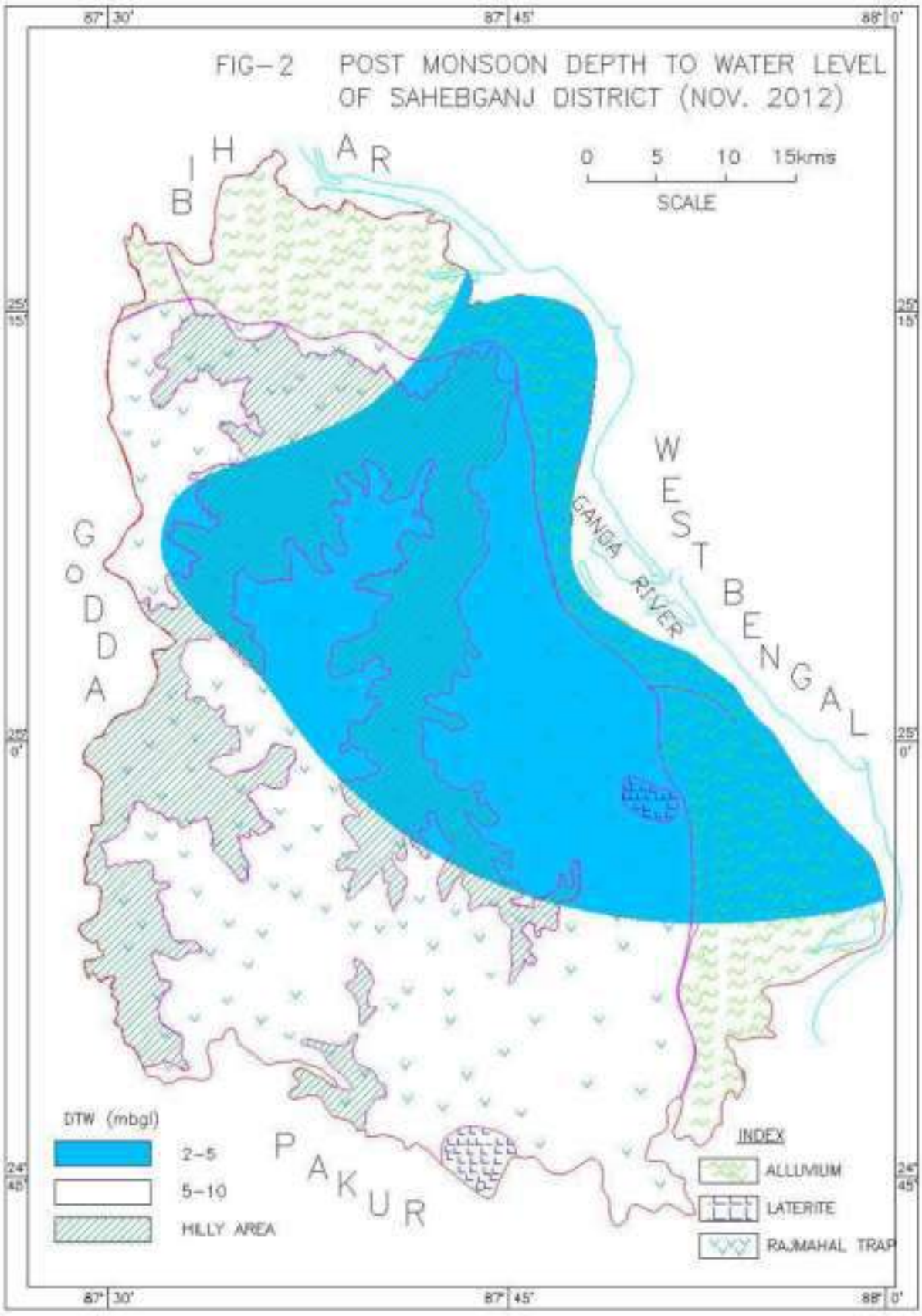
the analytical results of these samples, the Arsenic concentration is found more than 50 ppb in 20% of the samples and in 16.66% of the samples Arsenic value ranges between 10 – 50 ppb.

7.7 Status of Ground Water Development

There is sufficient scope for ground water development through shallow as wells deep bore wells. State Govt. department has been constructed a large number of bore wells to mitigate the drinking water problem in the district. Central Ground Water Board has drilled 8 exploratory wells 5 observation wells in the district. The depth of bore wells ranges between 44.20 – 200.00 mbgl. The yield of bore wells ranges from 1.08 to 30.00 m^3/hr. The Transmissivity and Storativity value ranges from 32.30 to 176.00 m^2/day and 01.40 x 10-4to 07.30 x 10-5 respectively (Table 2). The stage of ground water development of the district is only 22.44%.



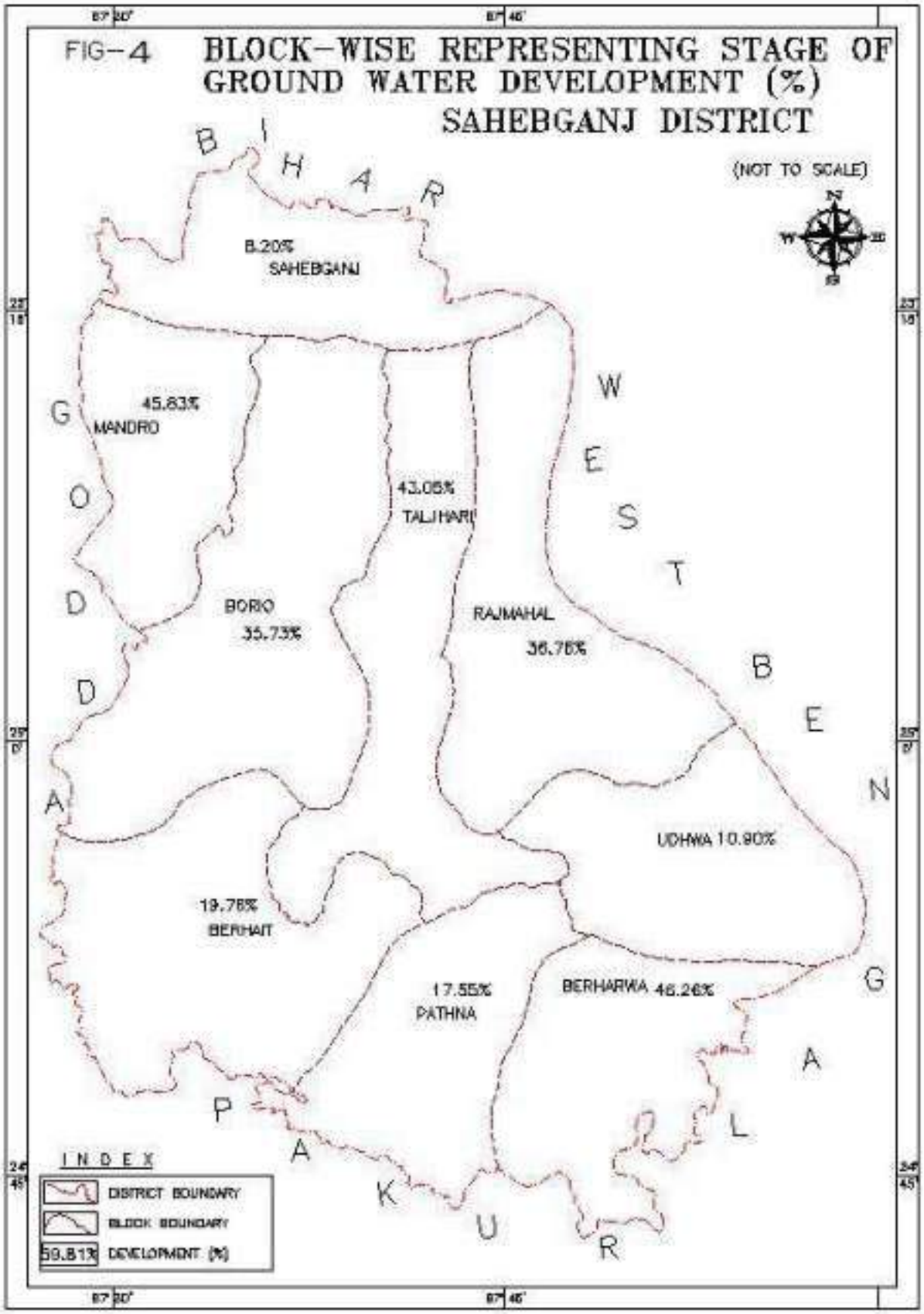
Map Showing Pre-Monsoon Depth of Water Level of Sahibganj District
(Soruce: Central Ground Water Board Report)



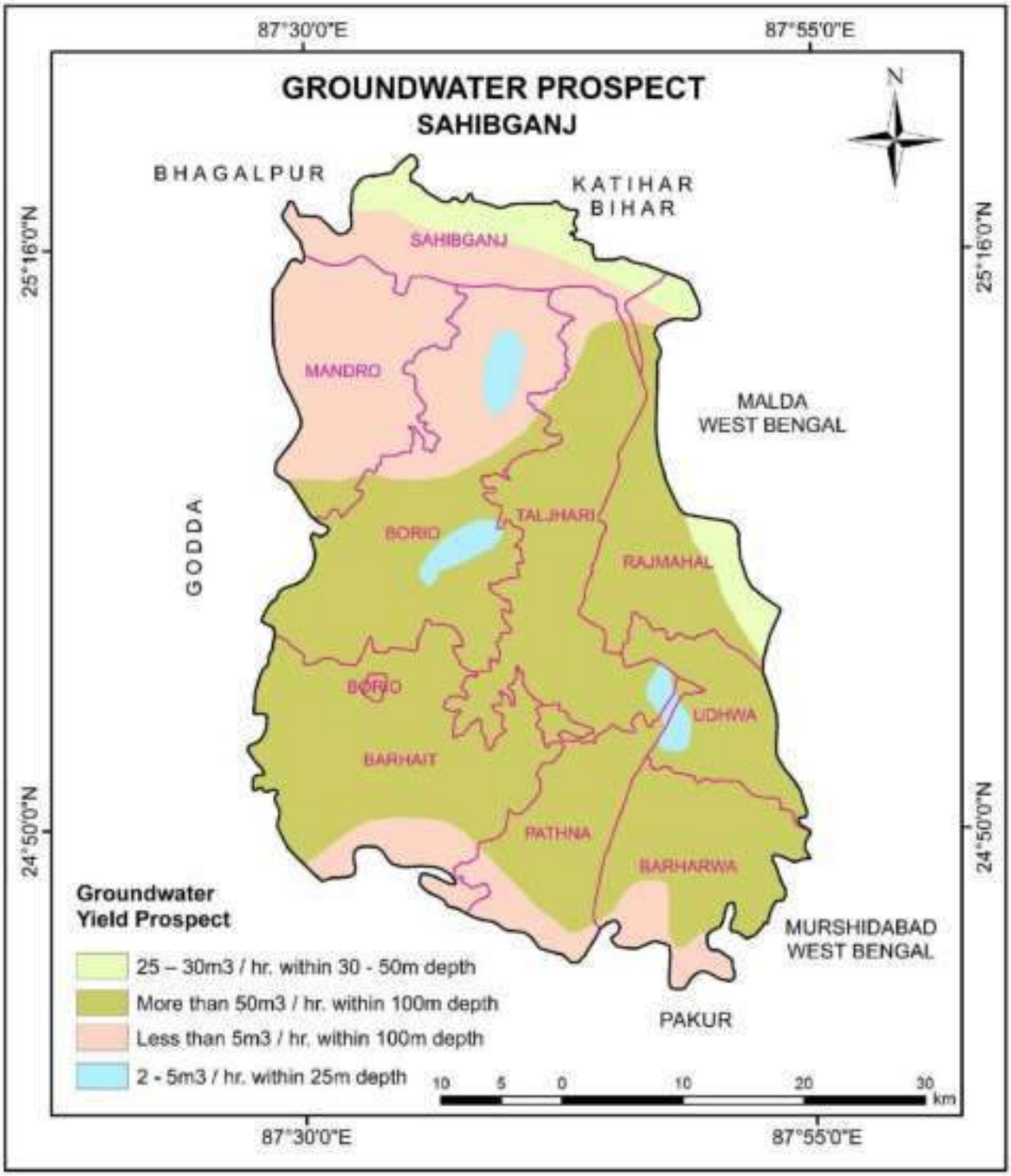
Map Showing Post-Monsoon Depth of Water Level of Sahibganj District

(Soruce: Central Ground Water Board Report)

(Soruce: Central Ground Water Board Report)



(Soruce: Central Ground Water Board Report)



(Soruce: Geological Survey of India)

7.8 Ground Water Development

Dug wells and shallow to medium depth (upto 50 m) bore wells are the main ground water extraction structures in the area to meet the increasing demand of domestic water supply and irrigation. The overall stage of ground water development of the district is 22.44% only. Thus, there is sufficient scope for development of ground water through dug wells, shallow and medium deep bore wells.

Construction of dug cum bore well structure is also suitable for enhancing the yield of dug wells, which will be coast effective. The ground water development varies in different places depending on the availability of favorable potential zones / aquifer. For the construction of ground water structures, knowledge of the local as well as regional hydrogeological condition of the area is necessary.

Ground water potential available for future development, considering the present ground water draft has been worked out as per norms of Ground Water Estimation Committee – 1997 (GEC – 1997) and the details of ground water recharge, net annual ground water availability, annual draft, net ground water balance and stage of ground water development has been assessed.

7.9 Water Conservation and Artificial Recharge

In view of the increasing thrust on development of ground water resources, there is urgent need to augment the depleting ground water resources. This gets augmented through natural recharge and can be augmented in an increased scale through artificial recharge. From hydrogeological point of view, rain water conservation is needed to arrest decline in ground water levels and to improve ground water quality by dilution. The construction of water conservation structures, artificial recharge structures, depends on the topographic features, hydrological and hydrogeological conditions of the area. From this point of view, the Sahebganj district may be divided into two parts – 1) the hard rock area i.e. basaltic terrain is undulating topographic setting with hills is suitable for check dam, gabion structures, percolation tank, contour bunding and trenching 2) the alluvial area is suitable for recharge shaft and percolation tank.

7.10 Ground Water Related Issue and Problems

The Arsenic concentration has been found more than permissible limits in some villages like Hazipur Bihta, Dihari, Bari Kudarjana, Nadhi Dera, Reza Nagar, Baluadiara and Chanan of Sahebganj block.

Awareness and Training Activity

THE MASS AWARENESS PROGRAMME (MAP) BY CGWB - Nil

Participation in Exhibition, Mela, Fair etc. - Nil

Presentation and Lecture deliver in public forum / Radio / T.V / Institution of repute / Grassroots association / NGO / Academic institution etc. – Nil

7.11 Area Notified by CGWB

As per the ground water resource assessment report of Jharkhand state, all blocks of the district fall under the safe category. Thus, the authority has not been notified any of the blocks.

7.12 RECOMMENDATION:-

1. Flouride concentration in ground water (bore well) exceeds the permissible limits in/around villages Dharampur Morh, Amrapara, Bannawgram, Dhekiduba, Jatang

Khakhsa and Rajdaha. In fluorideaffected area, the ground water must be used after deflouridation through fluoride removal plants. Alternative source may be identified. The existing fluoride affected sources may be sealed.

2. Nitrate concentration in shallow aquifer (dug well) is found more than permissible limit in/around villages Bannawgram (Pakuria Block), Kairachhatar (Maheshpur Block) and Litipara (Litipara Block). The bore well may be a better alternate option for the drinking water purposes for the above villages.
3. The exploration data indicates the poor percentage of successful bore wells in the district. Thus the geophysical surveys may be adopted for selection of suitable sites for ground water exploration.
4. In order to conserve run – off water during monsoon, the water conservation and recharge structure may be constructed in and around Barharwa, Berhait, Borio, Sahebganj and Sakrigali villages where the long term (2002 – 2011) water level trend shows declining trend during post monsoon.

DETAILS OF EXLPORATORY WELLS DRILLED BY CGWB IN SAHEBGANJ DISTRICT

Sr. No	Location/ Block	Depth Drilled (mbgl)	Length of casing pipe/ Depth const. (m)	Static Water Level (mbgl)	Dis-charge (m^3/hr)	Draw-down (m)	Specific Capacity (m^3/hr/m)	Trans-missivity (m^2/day)	Storativity
1	Barharwa	100.00	44.70	9.30	51.60	8.92	5.78	176.00	01.40 X 10^{-4}
	OW	90.70	--	--	--	--	--	--	--
2	Barhait	90.65	16.00	7.65	21.10	15.34	1.70	44.00	--
	OW	100.00	--	--	--	--	--	--	--
3	Borio	75.00	14.20	5.53	21.00	9.65	2.17	32.30	07.00 X 10^{-5}
	OW	44.20	--	--	--	--	--	--	--
4	Rajmahal	74.45	24.30	6.90	6.12	3.67	1.66	88.00	07.30 X 10^{-5}
	OW	74.45	--	--	--	--	--	--	--
5	Sahebganj	54.15	--	Abandoned					
6	Borio	200.00	29.70	Abandoned					
7	Mandro	200.00	32.00	Abandoned					
8	Taljhari	200.00	31.00	7.92	47.88	25.14	1.90	12.00	--

	OW	200.00	32.00	7.84	47.88	11.76	4.07	17.50	01.25 X 10^{-3}

DEPTH TO WATER LEVEL OF EXISTING HYDROGRAPH NETWORK STATIONS OF SAHEBGANJ DISTRICT (2012)

Sr. No.	Location	Depth to water level (mbgl)			
		May 2012	Aug. 2012	Nov. 2012	Jan. 2013
1	Sahenganj	10.00	8.52	7.93	8.00
2	Rajmahal	6.00	4.45	3.00	5.22
3	Taljhari	12.00	2.25	2.85	4.81
4	Berhait	9.00	8.20	7.63	8.15
5	Barharwa	10.80	7.20	5.55	6.08
6	Borio	4.60	4.45	4.32	4.38
7	Mandro	6.90	1.60	5.08	3.55
8	Sakrigali	7.10	7.70	4.09	4.62

LONG TERM WATER LEVEL TREND FOR EXISTING HYDROGRAPH NETWORK STATIONS IN SAHEBGANJ DISTRICT (2002 – 2011)

Sl. No.	Location	Pre monsoon trend (m/year)		Post monsoon trend (m/year)		All period trend (m/year)	
		Rise	Fall	Rise	Fall	Rise	Fall
1	**Barhrwa**	**0.006**	**--**	**--**	**0.115**	**--**	**0.036**
2	**Barhait**	**--**	**0.018**	**--**	**0.561**	**--**	**0.270**
3	**Borio**	**0.530**	**--**	**--**	**0.026**	**0.201**	**--**
4	**Mandro**	**--**	**--**	**--**	**--**	**0.260**	**--**
5	**Rajmahal**	**--**	**0.404**	**0.116**	**--**	**--**	**0.104**
6	**Sahebganj**	**--**	**0.379**	**--**	**0.387**	**--**	**0.413**
7	**Sakrigali**	**--**	**0.072**	**--**	**0.058**	**--**	**0.018**
8	**Taljhari**	**0.484**	**--**	**0.274**	**--**	**0.086**	**--**

CHEMICAL ANALYSIS RESULT OF WATER SAMPLES COLLECTED FROM SELECTED HYDROGRAPH NETWORK STATIONS OF SAHEBGANJ DISTRICT (May 2011)

Well No.	Location	Block	EC in micro siemens/ cm at 25°c	pH	TH as CaCO3	Ca	Mg	Na	K	HCO3	Cl
						← mg / l →					
1	Rajmahal	Rajmahal	1667	8.32	360	68	46.2	126	140	442.8	109.89
2	Berhait	Berhait	313	8.22	30	4	4.9	30	38	98.40	14.18
3	Barharwa	Barharwa	193	8.28	45	16	1.21	17	3.2	98.40	14.18
4	Borio	Borio	1687	8.30	380	60	55.9	124	87	221.4	439.58
5	Sakrigali	Taljhari	1404	8.14	260	48	34	187	6.5	332.1	166.61

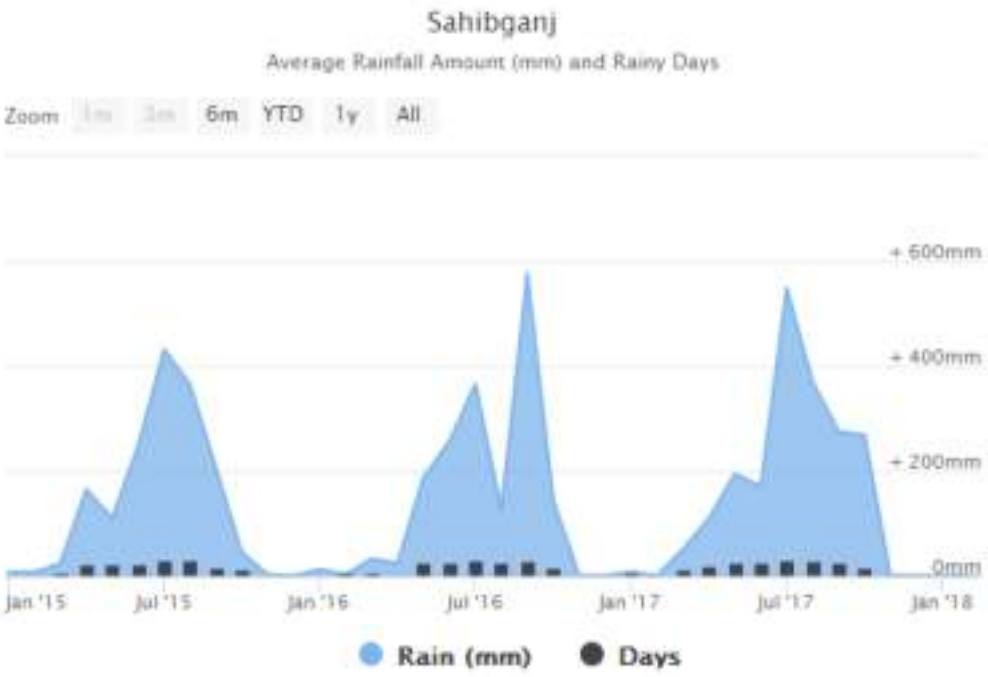
DETAILS OF GROUND WATER RESOURCES AND STAGE OF GROUND WATER DEVELOPMENT OF SAHEBGANJ DISTRICT AS ON 31st MARCH 2009 (in hectare meters)

Sr. No.	Assessment Unit/ District	Net Annual Ground Water Availability	Gross Ground Water Draft for Irrigation	Gross Ground Water Draft for Domestic and Industrial water Supply	Gross Ground Water Draft for all Uses (10+11)	Allocation for Domestic and Industrial Requirement supply upto next 25 years	Net Ground Water Availability for future irrigation development (9 – 12 – 13)	Stage of Ground Water Development (12/9)*100 (%)	Categorisation for future ground water development (safe/ critical/ over - exploited)
1	2	9	10	11	12	13	14	15	11
1	Sahebganj	2365.41	25.056	168.99	194.05	225.30	2115.06	8.20	Safe
2	Mandro	462.87	111.36	100.79	212.15	217.14	1194.18	45.83	Safe
3	Borio	787.12	142.912	138.31	281.23	459.81	1785.75	35.73	Safe
4	Taljhari	386.78	58.464	108.06	166.52	144.06	184.26	43.05	Safe
5	Rajmahal	747.22	68.316	206.37	274.69	275.14	403.76	36.76	Safe
6	Udhwa	1978.59	31.552	219.49	251.04	292.62	906.10	10.90	Safe
7	Pathna	1292.89	112.752	114.19	226.94	1027.90	1219.05	17.55	Safe
8	Barharwa	1334.42	375.512	241.82	617.33	322.40	636.51	46.26	Safe
9	Barhait	1934.22	197.664	184.48	382.14	245.95	1490.60	19.76	Safe
	Total	**11613.70**	**1123.59**	**1482.50**	**2606.09**	**1976.48**	**8513.63**	**22.44**	

8. RAINFALL OF THE DISTRICT AND CLIMATE CONDITION

8.1 Monthwise rainfall:

The driest month is December. There is on average 1 mm of precipitation in December. In July, the precipitation reaches its peak, with an average of 323 mm.

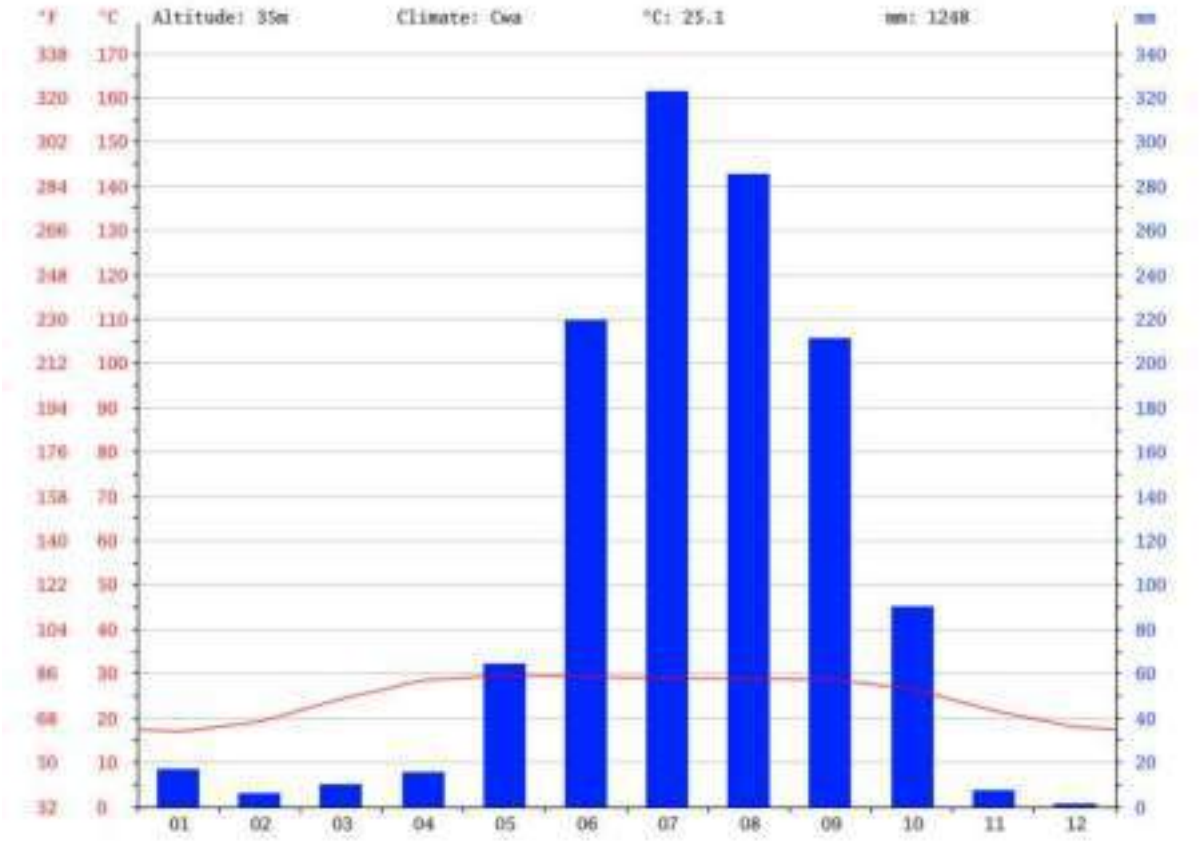


Year		2012	2013	2014	2015	2016
Sl. No.	Month	Avg(mm)	Avg(mm)	Avg(mm)	Avg(mm)	Avg(mm)
1	Jan	381.80	0.00	2.00	12.40	6.40
2	Feb	217.00	8.60	62.80	12.80	0.00
3	Mar	415.40	0.30	2.00	11.60	8.40
4	Apr	0.00	14.20	29.60	112.20	12.60
5	May	168.40	180.80	312.60	120.20	66.60
6	Jun	210.20	331.40	160.00	425.20	240.60
7	Jul	365.60	188.40	508.00	397.40	317.80
8	Aug	381.80	419.20	107.20	397.40	162.80
9	Sep	217.00	237.20	198.60	162.00	310.20
10	Oct	415.40	210.80	30.60	28.00	19.60
11	Nov	0.00	0.00	0.00	0.00	0.00
12	Dec	0.00	0.00	0.00	0.00	0.00

(Source: Indian Meteorological Department)

The Indian Meteorological Department, Nagpur, vide letter No. NAGPUR RMC/CS-312, dated 18th January, 2016 has provided the period of Rainy Season viz. Normal dates of Onset and Withdrawal of South West Monsoon over India as state-wise. The duration for the period is 10th June to 15th October.

8.2 Climate



Climograph – Sahibganj

The driest month is December. There is 1 mm of precipitation in December. In July, the precipitation reaches its peak, with an average of 323 mm. The district is characterized by humid to sub-humid climate. During summer the hot spell prevails from March to middle of June. Rainy season started from middle of June to end to September. Winter starts from the middle of November and continues till the end of February. With an average of 29.7 °C, May is the warmest month. At 16.9 °C on average, January is the coldest month of the year.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	16.9	19.2	24.3	28.5	29.7	29.3	29	28.9	28.7	26.6	21.7	18
Min. Temperature (°C)	9.4	11.6	16.2	21	24.1	25.4	26	26	25.4	21.9	14.8	10.5
Max. Temperature (°C)	24.4	26.8	32.4	36.1	35.4	33.3	32	31.8	32.1	31.4	28.6	25.5
Avg. Temperature (°F)	62.4	66.6	75.7	83.3	85.5	84.7	84.2	84.0	83.7	79.9	71.1	64.4
Min. Temperature (°F)	48.9	52.9	61.2	69.8	75.4	77.7	78.8	78.8	77.7	71.4	58.6	50.9
Max. Temperature (°F)	75.9	80.2	90.3	97.0	95.7	91.9	89.6	89.2	89.8	88.5	83.5	77.9
Precipitation / Rainfall (mm)	17	6	10	15	64	219	323	285	211	90	7	1

Source: Indian Meteorological Department

9. DETAILS OF MINING LEASE IN THE DISTRICT

9.1 List of Mines in operation in the district-

(Source: http://www.jharkhandminerals.gov.in, List as on 03/08/2018)

Sl#	Lessee Name	Location	Mineral
1	ABDUL RAJJAK	BOARNA	STONE
2	AKASH ALI	MALITOK	STONE
3	BHAGWAN STONE WORKS	BORNA	STONE
4	BIHAR BENTONITE SUPPLY CO	BANAPARA AND MOTIYANI	STONE (CHIPS), STONE DUST, STONE
5	BIHAR BENTONITE SUPPLY CO	BARA BANAPARA	STONE
6	BIKASH STONE WORKS	BUNDABEDO BARAGHATI	STONE
7	BUDHAWA PAHARIA	MUNDLI	STONE, STONE (CHIPS), STONE DUST
8	KAISHER RABBANI	BARHAIT	SAND
9	MD JAHID ABBAS	DHATAPARA AND FATEHPUR	STONE
10	MD SAMIM ALAM	GANGOPARA BEDO	STONE
11	MD. MOJIBUR REHMAN	BORNA	STONE
12	MD. TAUKIR ALAM	BORNA	STONE
13	MS R.P SINGH STONE WORKS	BANSKOLA	STONE
14	MS ABBAS AND SONS	DHAMDHAMIA	STONE
15	MS ADARSH GROUP	JOKMARI	STONE
16	MS ANSARI STONE WORK	GANGOPARA BEDO	STONE
17	MS AYACHI ENTERPRISES	GILAMARI	STONE
18	MS B.B.A STONE WORKS	TALMI	STONE
19	MS BABA PROJECT PVT.LTD	PACHRUKHI	STONE
20	MS BAGRANJBALI STONE WORKS	GANGOPARA MAKO	STONE
21	MS BAJRANG BALI STONE WORKS	GANGOPARA MACO AND BEDO	STONE
22	MS BANDANA STONE WORKS	LOHANDA MACO	STONE
23	MS BHAGWAN STONE WORKS	BORNA	STONE
24	MS BHAGWAN STONE WORKS	BORNA	STONE
25	MS BHAI BHAI STONE WORKS	BANSPAHAR	STONE
26	MS BIHAR BENTONITE SUPPLY CO	CHALPAHAR AND PATNIBONA	STONE, STONE (CHIPS), STONE DUST
27	MS BLACK STONE WORKS	DESHPOKHRIA AND AMJHOR	STONE
28	MS BOBY STONE WORKS	GADAITUNGI	STONE
29	MS CTS INDUSTRIES LTD	CHOTA DAMINBHITA	STONE, STONE (CHIPS), STONE DUST

30	MS CTS INDUSTRIES LTD	JOKMARI MAHADEGANJ	STONE, STONE (CHIPS), STONE DUST
31	MS DALMIA AGENCIES PVT.LTD.	KASBA	CHINACLAY, SILICA SAND, SANDSTONE
32	MS DEV BLACK STONE WORKS	BORNA	STONE
33	MS DOKNIA STONE WORKS	CHAPANDE	STONE
34	MS DOKNIA STONE WORKS	CHAPANDE	STONE
35	MS G.D.STONE COMPANY	TELO	STONE
36	MS GANGA STONE WORKS	TELO	STONE
37	MS GHOSH STONE WORKS	GANGOPARA BEDO	STONE, STONE (CHIPS), STONE DUST
38	MS HARILAL AJOY AND CO.	GODAITUNGI	STONE (CHIPS), STONE DUST, STONE
39	MS HARILAL AJOY AND CO.	PATANIBONA AND CHAWKIPAHAR	STONE
40	MS HARILAL AJOY AND COMPANY	PATNIBONA	STONE
41	MS HARILAL AJOY AND COMPANY	GADAITUNGI	STONE
42	MS HILL MOVEMENT	GUDWA	STONE, STONE (CHIPS), STONE DUST
43	MS HINDUSTHAN INDUSTRIES AND MINING CORPORATION	BAKUDIH	STONE, STONE DUST
44	MS JAI BAGRANG WALEE STONE WORKS	GUDWA	STONE
45	MS JAI MAA BHAGWATI STONE WORKS	BELBHADRI	STONE
46	MS JIAL DAS COMPENY	PAKTURI	STONE, STONE (CHIPS), STONE DUST
47	MS JIAL DAS AND CO	PAKTURI	STONE, STONE (CHIPS), STONE DUST
48	MS JINDAL STONE WORKS	LOHANDA BEDO	STONE
49	MS K.P. AND G. SONS	AAMDANDA	STONE
50	MS KARAMBI STONE WORKS	KARAMBI	STONE, STONE (CHIPS), STONE DUST
51	MS KWALITY STONE PRODUCT	DHATPARA AND FATHPUR	STONE
52	MS MAA AMBA STONE WORKS	DEMBA	STONE
53	MS MAA BASNAVI STONE WORKS	MUNDLI	STONE
54	MS MAA CHINAMASTIKA STIL INDIA PVT LTD	CHAGJO AND BUNDA BARAGHATI	STONE
55	MS MAA DURGE STONE WORKS	GILAMARI	STONE
56	MS MAA GAYATRI STONE WORKS	BAKUDIH	STONE

57	MS MAA KALIKA STONE WORKS	AMBADE	STONE
58	MS MAA R.K. CONSTRUCTION	BASKO	STONE
59	MS MAA VAISHNAVI STONE WORKS	MUNDLI	STONE
60	MS MAHAVEER ENGICONS PVT LTD	DEMBA	STONE
61	MS MAYUR MACHINE PVT LTD	MOTIJHARNA	STONE, STONE (CHIPS), STONE DUST
62	MS MD ALAM AND BROTHER	GODIATUNGI	STONE
63	MS MINERAL INDIA	GUDWA	STONE
64	MS MIRA PAHAR STONE MINES	MIRAPARA	STONE
65	MS MOHAN AND SANJAY STONE WORKS	GUDWA	STONE
66	MS NARSINGH LAGHIR	PATNIBONA	STONE, STONE DUST, STONE (CHIPS)
67	MS NEHA BLACK STONE WORKS	GANGOPARA BEDO	STONE
68	MS NETURAL MINING AND CONSTRUCTION PVT LTD	GANGOPARA BEDO	STONE
69	MS PATNIBONA STONE QUARRY	PATNIBONA	STONE
70	MS PIXI STONE WORK	SUNDRE	STONE
71	MS PRATIK STONE WORKS	GILAMARI	STONE
72	MS RAJA MINERAL AND COMAPNY	SEDPUR BUJRUG	CHINACLAY, SANDSTONE
73	MS RAJAN STONE WORKS	BORNA	STONE
74	MS RAJAN STONE WORKS	BORNA	STONE
75	MS RATAN BLACK STONE	SAHIBGANJ TOWN	STONE
76	MS S S BLACK STONE WORKS	MIRZACHOUKI	STONE
77	MS S.S. ENTERPRESES	BORNA	STONE
78	MS SHAH STONE	BARA PANCHKULI	STONE
79	MS SHAKTI STONE WORKS	SAHEBGANJ	STONE
80	MS SHIV INDRA PATHOR UDOGE	CHATROGOGA	STONE, STONE (CHIPS), STONE DUST
81	MS SHIV SHAKTI STONE WORK	BARHARWA	STONE
82	MS SHIV SHAKTI STONE WORKS	BORNA	STONE
83	MS SINGH STONE WORKS	BUNDAMOCO	STONE
84	MS SIYRAM ENTERPRISES	MARIKUTI,DESIPOKHARIA	STONE
85	MS SRI RAM STONE WORKS	PAKRIA	STONE
86	MS STANDARD MERCANTILE COMPANY M D PVT LTD	RAIBAZAR	CHINACLAY, SILICA SAND, SANDSTONE, QUARTZ
87	MS STAR INDIA INDUSTRIES	CHOTA DAMINBHITA	STONE

88	MS STAR INDIA MINING MINERALS	MIRZACHOUKI	STONE, STONE (CHIPS)
89	MS SWASTIK MINERAL AGENCY	TALJHARI	STONE
90	MS SWASTIK MINERAL AGENCY	KARIGONIA	STONE, STONE (CHIPS), STONE DUST
91	MS SWASTIK MINERAL AGENCY	CHALPAHAR	STONE
92	MS USHA STONE WORKS	LOHANDA MAKO	STONE
93	MS VANSLA GRANITE	CHALPAHAR	STONE
94	MS VANSLA GRANITE	PATNIBONA AND CHALPHAHAR	STONE
95	MS VEESHNAV STONE WORKS	DAMIN BHITA	STONE
96	MS VIDHYARTHI STONE WORKS	GADWA	STONE
97	MS YASHRAJ BLACK STONE WORKS	DEMBA, MAHADEVGANJ	STONE
98	MS ZEON EARTH MINERAL RESOURCE PVT LTD	BANSHPAHAR,RANGA	STONE, STONE (CHIPS), STONE DUST
99	NAJRUL HAQU	DAHUJOR	SAND
100	NETINCON MARKETING PVT LTD	AMBADE	STONE
101	RAMESH KUMAR DOKANIA	IDPE	STONE
102	RIPLEY AND COMPANY STEVEDORING AND HANDING PVT LTD	AMBADE,BADE,IDPE	STONE
103	SAHIN RABANI	BERHET	SAND
104	SAHIN RABBANI	GOPLADIH	SAND
105	SHREE SHANKAR AND CO	BAKUDI	STONE
106	SHRI SATYNATH SAH	BINDARI BANDAR KOLA	STONE
107	SMT MIRU SOREN	BORNA	STONE
108	SMT NAJNIN BIBI	MARGARO	STONE
109	SOMNATH GHOSH	PATHARIA	STONE
110	SRI CHAMAN TULSYAN	JOKMARI	STONE
111	SRI CHANDRESWAR PRASAD SINHA	KORDAR	STONE
112	SRI KRISHNA KUMAR SAHA	BORNA	STONE
113	SRI KRISHNA KUMAR SAHA	CHAPANDEY	STONE
114	SRI KRISHNA KUMAR SAHA	BORNA	STONE
115	SRI MADAN KANT	KIROKURIA	STONE
116	SRI MANOJ KUMAR SAH	MUNDLI	STONE
117	SRI RAM SAWARE TIWARI	DAMINBHITA	STONE
118	SRI SHANKAR KUMAR	BORNA	STONE
119	SRI TARKESHWAR JAISHWAL	MUNDLI	STONE
120	SWASTIK MINERAL AGENCEY	PATNIBONA AND CHALPHAHAR	STONE, STONE (CHIPS), STONE DUST

9.2 List of Mines not in operation in the district -

(Source: http://www.jharkhandminerals.gov.in, List as on 03/08/2018)

Sl#	Lessee Name	Location	Mineral
1	SRI HIRALAL BHGAT	NA	STONE
2	ABDUL FATTAH AND SUNITA MURMU	CHOTA PANCHRUKHI	STONE
3	ABDUL KADIR	FATEHPUR	STONE
4	ASERA KHATUN	NA	STONE
5	BHAGWAN STONE WORKS	BORNA	STONE
6	GOOLAM KEEWARIYA BISHWAS	NA	STONE
7	JHARKHAND STATE MINERAL DEVELOPMENT CORP. LTD.	CHANDOLA	STONE
8	JHARKHAND STATE MINERAL DEVELOPMENT CORP. LTD.	SIMALGODA	STONE
9	KRISHNA STONE WORKS	AMBADE	STONE
10	M.S C.S.R. CONS.	BINDRI BANDARKOLA	STONE
11	M/ MAA KALI STONE WORKS	NA	STONE
12	M/S A.D. STONE WORK	NA	STONE
13	M/S A.K. BHGAT & R.K.BHGAT	NA	STONE
14	M/S A.R.J STONE WORK	NA	STONE
15	M/S AADERSH STONE WORKS	NA	STONE
16	M/S AANANDMAY STONE WORK	NA	STONE
17	M/S AARYAN STONE WORKS	NA	STONE
18	M/S AMBA STONE WORKS	NA	STONE
19	M/S ANBARUL HAK	NA	STONE
20	M/S ANSARI STONE WORK	NA	STONE
21	M/S ASHOKA ENGINIYARING STONE	NA	STONE
22	M/S B.S.M.D.C	NA	STONE
23	M/S BADAL STONE WORKS	NA	STONE
24	M/S BINA STONE WORKS	NA	STONE
25	M/S BIRSA MUNDA STONE MINES	NA	STONE
26	M/S BISHWKARMA MARCHENT	NA	STONE
27	M/S BLACK STONE WORKS	NA	STONE
28	M/S D. & BHGAT & COMPANY	NA	STONE
29	M/S D.T.C. MINRALS PVT.	NA	STONE
30	M/S DEV STONE WORK	NA	STONE
31	M/S DEV STONE WORKS	NA	STONE
32	M/S DURGA STONE WORKS	NA	STONE
33	M/S F.A. STONE	NA	STONE
34	M/S G.H. STONE WORKS	NA	STONE
35	M/S GANGA & KUMAR STONE WORKS	NA	STONE
36	M/S GOOURI STONE WORKS	NA	STONE
37	M/S GOPE STONE WORKS	NA	STONE
38	M/S GURUDEV STONE WORKS	NA	STONE
39	M/S HIND STONE WORK	NA	STONE

40	M/S HINDUSTAN CONS. COMPANY LIMITED	NA	STONE
41	M/S HINDUSTAN CONS. COMPANY LIMITED	NA	STONE
42	M/S HINDUSTHAN STONE WORKS	NA	STONE
43	M/S JAGDAMBA STONE WORKS	NA	STONE
44	M/S JAI BAJRANG BALI STONE WORKS	NA	STONE
45	M/S JAI JHARKHAND STONE WORKS	NA	STONE
46	M/S JAI MAA BHAWANI STONE WORK	NA	STONE
47	M/S JAI MAA TARA STONE WORKS	NA	STONE
48	M/S JAI MATA DI STONE WORKS	NA	STONE
49	M/S JAI MATA DI STONE WORKS	NA	STONE
50	M/S K.G.N. STONE WORKS	NA	STONE
51	M/S K.G.N. STONE WORKS	NA	STONE
52	M/S KAMALUDDEN	NA	STONE
53	M/S KAMALUDDEN	NA	STONE
54	M/S KARAN STONE WORKS	NA	STONE
55	M/S KHAWAJA STONE WORKS	NA	STONE
56	M/S KOHINOOR STONE WORKS	NA	STONE
57	M/S KOSHALYA STONE WORK	NA	STONE
58	M/S KRISHNA STONE WORKS	NA	STONE
59	M/S LAKSHMI STONE WORKS	NA	STONE
60	M/S M. ALAM & BROTHERS	NA	STONE
61	M/S MAA BHAGWATI STONE WORKS	NA	STONE
62	M/S MAA BINDVASHNI STONE WORK	NA	STONE
63	M/S MAA KALI STONE WORKS	NA	STONE
64	M/S MAA KALI STONE WORKS	NA	STONE
65	M/S MAA KALIKA STONE WORK	NA	STONE
66	M/S MAA PADMINI STONE WORK	NA	STONE
67	M/S MAA SADHNA STONE WORKS	NA	STONE
68	M/S MAA STONE WORKS	NA	STONE
69	M/S MAA STONE WORKS	NA	STONE
70	M/S MAA TARA STONE WORKS	NA	STONE
71	M/S MAA TARA STONE WORKS	NA	STONE
72	M/S MADINA STONE WORKS	NA	STONE
73	M/S MAMTA STONE WORK	NA	STONE
74	M/S MANISH KUMAR BROTHERS	NA	STONE
75	M/S MAYA STONE WORKS	NA	STONE
76	M/S MUMTAZ STONE WORKS	NA	STONE
77	M/S NARSINGH LAGDHIR	NA	STONE
78	M/S NILKANTH PATHER UDDOGE	NA	STONE
79	M/S NURANI & BROTHER	NA	STONE
80	M/S OM SHANTI STONE WORKS	NA	STONE
81	M/S OM STONE WORKS	NA	STONE
82	M/S OM STONE WORKS	NA	STONE

83	M/S PANDEY STONE WORKS	NA	STONE
84	M/S PARWATI STONE WORKS	NA	STONE
85	M/S PATNIBONA STONE KYAVARI	NA	STONE
86	M/S PATNIBONA STONE KYAVARI	NA	STONE
87	M/S PUJA STONE WORKS	NA	STONE
88	M/S PUSPANJALI STONE WORK	NA	STONE
89	M/S RAJA INRAL & COMPANY	NA	STONE
90	M/S RAJMAHAL STONE COMPENY	NA	STONE
91	M/S RAM JANKI STONE WORKS	NA	STONE
92	M/S RAM RAHIM STONE WORKS	NA	STONE
93	M/S S K TEKRIWAL & SRI VEER KUMAR TEKRIWAL	NA	STONE
94	M/S S.D. ENTERPRISES	NA	STONE
95	M/S S.P. STONE WORKS	NA	STONE
96	M/S S.P. STONE WORKS	NA	STONE
97	M/S S.S STONE WORKS	NA	STONE
98	M/S S.S STONE WORKS	NA	STONE
99	M/S S.S. STONE WORKS	NA	STONE
100	M/S SADHBHAWANA STONE WORKS	NA	STONE
101	M/S SANJAY MAINING & MINRAL	NA	STONE
102	M/S SARASWATI STONE WORK	NA	STONE
103	M/S SHIV BINOD & COMPANY	NA	STONE
104	M/S SHIV STONE WORKS	NA	STONE
105	M/S SHIV STONE WORKS	NA	STONE
106	M/S SHIVA STONE WORKS	NA	STONE
107	M/S SHIVAM STONE WORKS	NA	STONE
108	M/S SHOBHA TREDERS	NA	STONE
109	M/S SRI SANT STONE WORKS	NA	STONE
110	M/S STAR STONE WORKS	NA	STONE
111	M/S SUNNY STONE WORK	NA	STONE
112	M/S SWASTI STONE CHIPS	NA	STONE
113	M/S TAJ STONE WORKS	NA	STONE
114	M/S TAZ STONE WORKS	NA	STONE
115	M/S UNIK STONE MATERIARL	NA	STONE
116	M/S URMILA STONE WORKS	NA	STONE
117	M/S VIDHAYATHARI STONE WORKS	NA	STONE
118	M/S VIDHYARTHI STONE WORKS	NA	STONE
119	M/S YESRAJ BLACK STONE	NA	STONE
120	M/S YESRAJ BLACK STONE	NA	STONE
121	M/S- AATMA STONE WORKS	NA	STONE
122	M/S- BABA PROJECTS PRA. LTD.	NA	STONE
123	M/S- BLACK DAIMOND STONE WORKS	NA	STONE
124	M/S- BLACK DAIMOND STONE WORKS	NA	STONE
125	M/S- LAKHI STONE WORKS	NA	STONE

126	M/S- OM NAMHA SHIWAY STONE WORKS	NA	STONE
127	M/S- R.D. SINGH & D. N. SINGH CO.	NA	STONE
128	M/S- RAM STONE WORKS	NA	STONE
129	M/S-NAJIR	NA	STONE
130	M/S-NAJIR	NA	STONE
131	M/S-NEHAL STONE WORKS	NA	STONE
132	MD IQBAL	DHATAPARA	STONE
133	MD YASHIN ANSARI	NA	STONE
134	MD. FARSAD	NA	STONE
135	MD. JAHID ANSARI	NA	STONE
136	MD. MEENUL ANSARI	NA	STONE
137	MD. SAMIRUDDIN	NA	STONE
138	MD. VIHID SEKH	NA	STONE
139	MD. VIHID SEKH	NA	STONE
140	MD.GULAM ALI	NA	STONE
141	MD.GULAM ALI	NA	STONE
142	MD.IBRAHIM	NA	STONE
143	MD.JAFAR	NA	STONE
144	MS ABHI STONE WORKS	ROHRE	STONE
145	MS ABHISHEK STONE WORKS	TELO	STONE
146	MS ALFA MINING CORPORATION	CHAPANDEY	STONE
147	MS ALOK STONE WORKS	MANOHARPUR	STONE
148	MS ASTHA STONE WORKS	PATNIBONA	STONE
149	MS BABA PROJECT PVT LTD	CHATROGOGA	STONE
150	MS BAJRANG STONE	CHUBE	STONE
151	MS BIHAR BENTONITE SUPPLY CO	PATNIBONA	STONE
152	MS BIHAR BENTONITE SUPPLY CO	BARA BANAPARA	STONE
153	MS FARUK SEKH	MAYURKOLA	STONE
154	MS HANS STONE WORKS	BORNA	STONE
155	MS HINDUSTAN STONE BUILD	CHAPANDEY AND KUNDI	STONE
156	MS JAI BAJRANG WALEE STONE WORKS	SAKRIGALI	STONE
157	MS JAI MAA TARA STONE WORKS	BORNA	STONE
158	MS JHARKHAND MINRALRS	MIRAPARA	STONE
159	MS JIAL DAS AND CO	PAKTURI	STONE
160	MS KARAMBI STONE WORKS	KARAMBI	STONE
161	MS KOHITUR MAINING	MIRAPARA	STONE
162	MS MAA DURGE STONE WORKS	GILAMARI	STONE
163	MS MAA DURGE STONE WORKS	GILAMARI	STONE
164	MS MAA DURGE STONE WORKS	JOKMARI	STONE
165	MS MAA JAMNI STONE WORKS	JAMNI	STONE
166	MS MAA RAKSHA KALI STONE WORKS	MALITOK	STONE
167	MS MAA TARA STONE WORKS	GUDAITUNGI	STONE
168	MS MAHADEV BLACK STONE CO	KORDRA	STONE
169	MS MAHARANI STONE WORKS	DEMBA	STONE

170	MS MAHAVEER ENGICONS PVT LTD	DEMBA	STONE
171	MS MINAKSHI STONE WORKS	DEMBA	STONE
172	MS P.L. STONE WORKS	GHOGHI MAKO	STONE
173	MS PAHARIA STONE WORKS	NA	STONE
174	MS PRIYA MINRAL	CHENGDO	STONE
175	MS R P SHARMA AND SONS	CHAPANDEY	STONE
176	MS S S BLACK STONE WORKS	MIRZACHOUKI	STONE
177	MS SHIV SHAKTI STONE WORKS	BORNA	STONE
178	MS SHIV SHAKTI STONE WORKS	BORNA	STONE
179	MS SHIV STONE WORKS	GANGOPARA BEDO	STONE
180	MS SINGH STONE WORKS	BUNDAMOCO	STONE
181	MS SKY STONE WORKS	MAYURKOLA	STONE
182	MS SRASWATI STONE WORKS	KIROKURIA	STONE
183	MS TRIDEV STONE WORKS	BEKCHURI	STONE
184	MS VIDHYARTHI STONE WORKS	GADWA	STONE
185	RAJESH KUMAR JAISWAL	MUNDLI	STONE
186	SEKH MD SIRAJ	BORNA	STONE, STONE (CHIPS), STONE DUST
187	SHARVSRI ASTHA STONE WORKS	NA	STONE
188	SHREE SHANKAR AND CO	BAKUDI	STONE
189	SHREE SHANKAR AND CO	BAKUDI	STONE
190	SHRI ANUPAM KUMAR	NA	STONE
191	SHRI ARUN KUMAR SAW	NA	STONE
192	SHRI BANSHIDHAR YADAV	NA	STONE
193	SHRI GAURABH KUMAR CHODHRY	NA	STONE
194	SHRI GAUTAM KUMAR SINGH	NA	STONE
195	SHRI RAM KISHUN MANDAL	NA	STONE
196	SHRI SUNIL KUMAR SINGH	NA	STONE
197	SHRI VEDANAND PANDEY	NA	STONE
198	SMT JEFSIN KISKU	NA	STONE
199	SMT. LAKSHMI DEVI	NA	STONE
200	SMT. PUNAM KUMARI	NA	STONE
201	SMT. SUSANA HEMBREM	NA	STONE
202	SMT. TALAMAY MURMU	NA	STONE
203	SRI ABHISHEK KUMSR CHOUDHARY	NA	STONE
204	SRI AMARNATH YADAV	NA	STONE
205	SRI AMARNATH YADAV	NA	STONE
206	SRI ANIL KUMAR	NA	STONE
207	SRI ANIL KUMAR	NA	STONE
208	SRI ANIL YADAV & OTHER	NA	STONE
209	SRI ARJUN YADAV	KIROKURIA	STONE
210	SRI ASHOK YADAV	NA	STONE
211	SRI ASHOK YADAV	NA	STONE
212	SRI ASHOK YADAV	NA	STONE

213	SRI AWAD KISHOR RAM	NA	STONE
214	SRI BASHUDEV RAY & OTHER	NA	STONE
215	SRI BASHUKI NATH YADAV AND YOGESH PRASAD YADAV	BARE PARTE	STONE
216	SRI BIJAY KUMAR	NA	STONE
217	SRI BIKRAM YADAV	NA	STONE
218	SRI BIMAL KUMAR SINHA	NA	STONE
219	SRI BIMAL KUMAR SINHA	NA	STONE
220	SRI BINOD BIHARI RANJAN	NA	STONE
221	SRI BINOD KUMAR JAISHWAL	NA	STONE
222	SRI CHATURANAND PANDEY	JOKMARI	STONE
223	SRI DHRMA PAHARIA, & OTHERS	NA	STONE
224	SRI DIGAMBAR KARMKAR	NA	STONE
225	SRI GANESH PRASAD YADAV	NA	STONE
226	SRI GOBHARDAN MANDAL	NA	STONE
227	SRI HARE NATH GUPTA	NA	STONE
228	SRI HARERAM YADAV	NA	STONE
229	SRI KAMAL KISHOR KUAR SAH	NA	STONE
230	SRI KAMLESHWARI MANDAL	NA	STONE
231	SRI KEDAR NATH MUKHARJI	NA	STONE
232	SRI KEDAR NATH MUKHARJI	NA	STONE
233	SRI KISHOR KUMAR	NA	STONE
234	SRI KISHOR KUMAR	NA	STONE
235	SRI KUMAR ABHISEKH	NA	STONE
236	SRI KUNDAN KUMAR	NA	STONE
237	SRI LAKHAN PANDIT	NA	STONE
238	SRI LALAN SINGH	NA	STONE
239	SRI LALAN SINGH AND DILIP TIWARI	CHENGDO	STONE
240	SRI MADAN KANT	KIROKURIA	STONE
241	SRI MADAN KANT	NA	STONE
242	SRI MAHESH MAHTO	NA	STONE
243	SRI MANIKANT MANDAL	NA	STONE
244	SRI MANOJ KUMAR YADAV	NA	STONE
245	SRI MANOJ KUMAR YADAV	NA	STONE
246	SRI MATLA HANSDA	NA	STONE
247	SRI MOHAN YADAV & OTHER	NA	STONE
248	SRI MUKESH YADAV	NA	STONE
249	SRI MUSHRAF HUSHEN	NA	STONE
250	SRI NIKHIL YADAV	NA	STONE
251	SRI PAWAN CHIRANIA	NA	STONE
252	SRI PINTU KUMAR SINGH & OTHER	NA	STONE
253	SRI PINTU KUMAR SINGH & OTHER	NA	STONE
254	SRI PINTU KUMAR SINGH & OTHER	NA	STONE
255	SRI PRADHAN MURMU & OTHER	NA	STONE
256	SRI R.P SINGH	NA	STONE

257	SRI RAJENDRA PRASAD CHODHARY	NA	STONE
258	SRI RAJESH CHIRANIYA	NA	STONE
259	SRI RAJESH CHIRANIYA AND OTHER	NA	STONE
260	SRI RAKESH KUMAR SINGH	NA	STONE
261	SRI RAKESH KUMAR SINHA	NA	STONE
262	SRI RAKESH KUMAR SINHA	NA	STONE
263	SRI RAM DEO MANDAL	NA	STONE
264	SRI RAMPHAL CHOUDHARY	DEMBA	STONE
265	SRI RAVI SHANKAR SINHA	NA	STONE
266	SRI SANJEEV KUMAR DEV	NA	STONE
267	SRI SANJHLA MURMU	NA	STONE
268	SRI SESH NATH YADAV	NA	STONE
269	SRI SHAMBHU NATH BHGAT	NA	STONE
270	SRI SHANKAR AND COMPANY	BAKUDIH	STONE, STONE (CHIPS), STONE DUST
271	SRI SHYAMAL KUMAR DAS	AMBADE	STONE
272	SRI SUNIL KUMAR	NA	STONE
273	SRI SUNIL KUMAR BHGAT	NA	STONE
274	SRI SUNIL KUMAR YADAV	NA	STONE
275	SRI SUNIL KUMAR YADAV	NA	STONE
276	SRI SURYA KUMAR MALTO	NA	STONE
277	SRI TARKESHWAR JAISWAL AND OTHERS	DAMDA DAMIN BHITA	STONE
278	SRI TERKESHWAR KUMAR JAISHWAL	NA	STONE
279	USMAN SEKH	DHATAPARA	STONE
280	VIKRAM PRATAP	BAKUDI	STONE
281	VIKRAM PRATAP	BAKUDI	STONE
282	VIKRAM PRATAP	BAKUDI	STONE

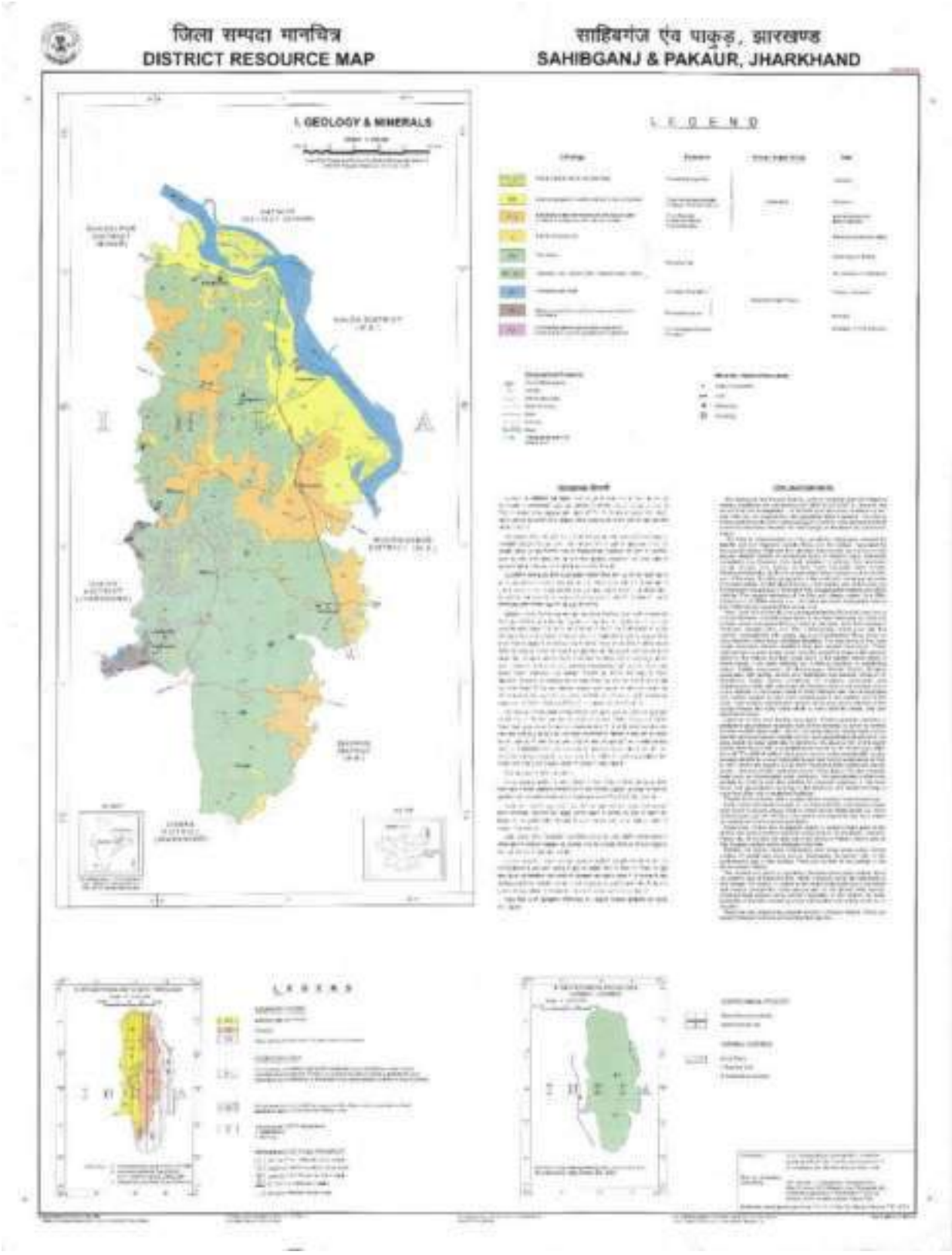
10. DETAIL OF ROYALTY OR REVENUE RECEIVED IN LAST THREE YEARS

Sl. No.	Year	Amount (Lakh)
1	2015-16	4105.85
2	2016-17	5151.78
3	2017-18	6865.04

11. DETAIL OF PRODUCTION OF MINOR MINERALS IN LAST THREE YEARS

Sl. No.	Year	Production (cft.)
1	2015-16	118,019,586
2	2016-17	140,699,287
3	2017-18	195,042,738

12. MINERAL MAP OF THE DISTRICT



13. LIST OF LETTER OF INTENT (LOI) HOLDERS IN THE DISTRICT ALONG WITH ITS VALIDITY

(Source: Department of Mines, Sahibganj)

Sl. No.	Name of the Mineral	Name of the Lessee	Address & Contact No. of Letter of Intent Holder	Letter of Intent Grant Order No. & date	Area of Mning lease to be allotted	Validity of LoI	Use (Captive/ Non-Captive)	Location of the Mining lease (Latitude & Longitude)

14. TOTAL MINERAL RESERVE AVAILABLE IN THE DISTRICT

Sahibganj district is basically occupied by volcanic rock in general and basaltic rock in particular, where no mining activity has taken place, was selected for study and suitable area for mining has been selected along the running hill ranges, which may be considered as plateau with shrubs and bushes and may or may not be in forest area as per the field observation and toposheet. Selecting the area, we have also considered the approach of the proposed projects with some modification and alteration. It is proposed that the areas identified can be sub-divided into suitable blocks for mining operation, but not less than 5 hectare. It will always be better if bigger blocks in the range of 25 to 50 hectare is made in such cases losses of minerals will be reasonably less, keeping in view of conservation of mineral.

Parametres considered :

(i) These blocks were identified based on geological studies through field observation.

(ii) Mineable resource was calculated by considering 60% of recovery factor, by Cross Sectional Method. Actual reserve may vary based on detail prospectig.

(iiI) Area calculated as per GPS co-ordinates and information obtained from local people. Land detail need to be verified from revenue record.

(iv) Since this is an interim report, as per the present requirement of minerals, more such blocks need to be identified and the data should be updated periodically, after certain intervals to update the data bank of DSR.

Sl. No.	Name of Block	No. of Potential Blocks identified	Total Area (Ha)	Calculated Reserve in Million Tton
1	Barhait	6	6410	14251.53
2	Taljhari	4	9791	22558.05
3	Borio	4	7582	17678.95
4	Mandro	4	10228	20787.12
5	Pathna	4	2466	2457.62
6	Barharwa	3	41	9.18129492
7	Rajmahal	2	83	21.81537444
	Total	**27**	**36601**	**77764.26667**
8	Udhwa	NIL	Has not been considered due to existence of Bird Sanctuary	
9	Sahibganj	NIL	Has not been considered due to presence of Ganges river in the north and north-east and habilitation area.	

Block - Barhait

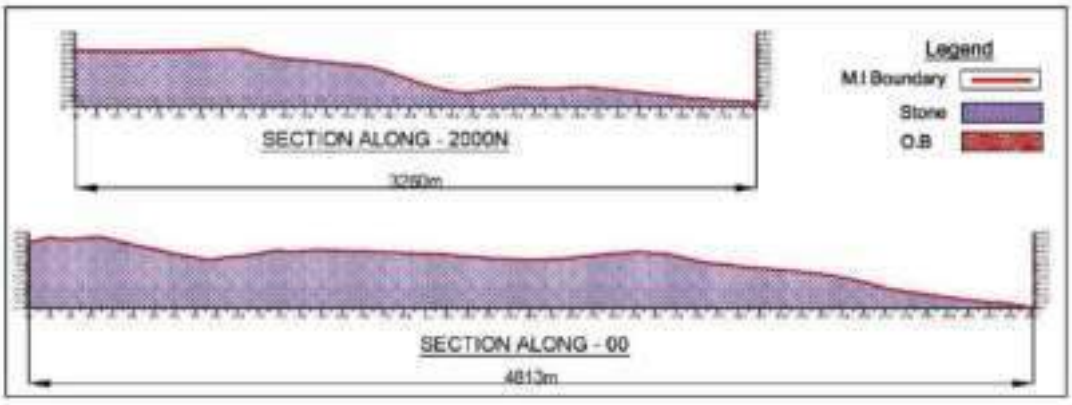
Image showing the Potential Area (Block – A, Mineral - Basalt) As Per KML Data

Sl no	Latitude	Longitude
1	24°55'26.67"N	87°28'7.61"E
2	24°54'58.39"N	87°30'0.03"E
3	24°53'17.07"N	87°30'35.42"E
4	24°52'57.78"N	87°31'45.03"E
5	24°52'20.99"N	87°31'30.96"E
6	24°52'56.09"N	87°29'48.42"E

Sl no	Latitude	Longitude
7	24°52'33.13"N	87°29'40.01"E
8	24°52'48.93"N	87°28'4.61"E
9	24°53'8.68"N	87°28'5.41"E
10	24°53'37.13"N	87°27'30.45"E
11	24°54'27.06"N	87°28'11.30"E

Villages lying inside the potential area:

Chaperi, Davgoda, Telabita, Madgi, Chitrgoda, Godamo, Orgamoga, Bedo Basko, Jabrojoka, Jokachitrgoda, Jabrojoka, Jani, Garia, Jokamakamo, Bedo Makaro, Talmi, Bedo Mako, Murgo, Chalpahar, Pusre, Mrikuti, Masbera, Dugu, Barauidali, Banspahar, Bajrat , Tori, Jita, Bandkolo, Chualalo, Mirkajok, Guti, Kapasbera.



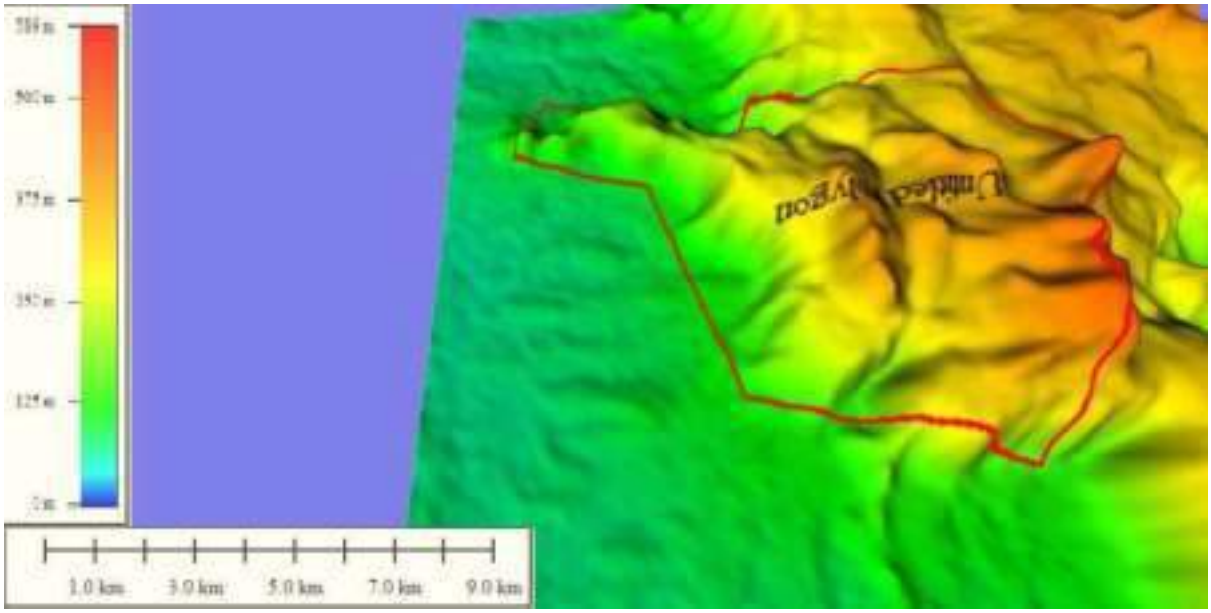


Image showing 3D Topographic view of the Potential Area

Volume of Potential Area - A, Block - Barhait, Area 2043 Hectare								
Section Proved 437 TO 97	**Cross sectional area of O.B in sqm**	**Total Cross Sectional area in sqm**	**Influence Length m**	**Total Volume of O.B in Cum situ (B)**	**Total Volume in Cum situ (A)**	**Total Volume of Stone Cum situ (A-B)**	**Recovery 60% in m cum situ**	**Million tons of Stone**
2000N	13164	504913.00	1700	22378800	858352100.00	835973300.00	2262.31608	6108.25
0.00	19400	1031315.00	2900	56260000	2990813500.00	2934553500.00		
Total				**78638800**	**3849165600.00**	**3770526800.00**		

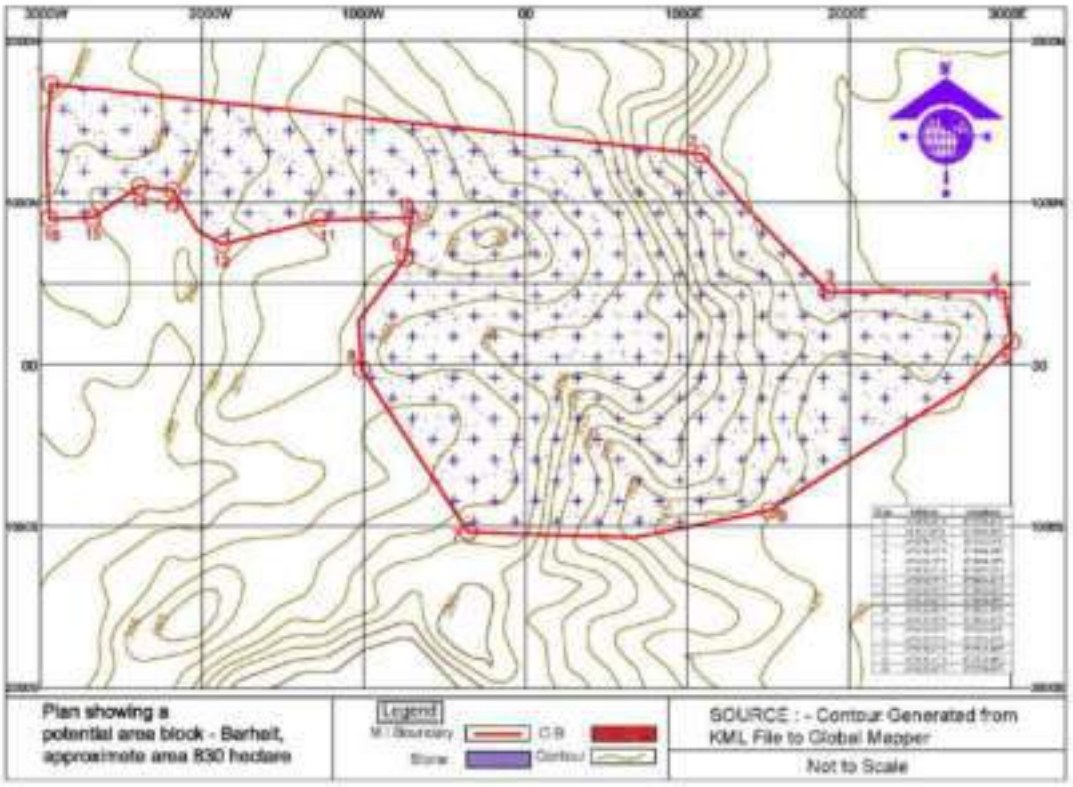
Image showing the Potential Area (Block – B, Mineral - Basalt) As Per KML Data

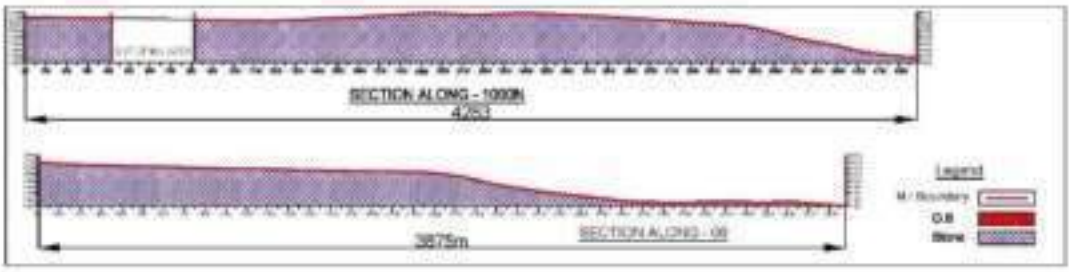
Sl no	Latitude	Longitude
1	24°52'20.04"N	87°27'26.31"E
2	24°52'5.39"N	87°29'43.34"E
3	24°51'36.71"N	87°30'9.34"E
4	24°51'36.20"N	87°30'46.30"E
5	24°51'25.70"N	87°30'48.19"E
6	24°50'50.71"N	87°29'57.25"E
7	24°50'45.74"N	87°28'54.01"E
8	24°51'20.19"N	87°28'31.55"E

Sl no	Latitude	Longitude
9	24°51'43.65"N	87°28'40.90"E
10	24°51'52.06"N	87°28'42.03"E
11	24°51'51.58"N	87°28'22.91"E
12	24°51'46.50"N	87°28'2.36"E
13	24°51'57.72"N	87°27'52.02"E
14	24°51'58.61"N	87°27'45.08"E
15	24°51'52.14"N	87°27'35.06"E
16	24°51'51.85"N	87°27'26.04"E

List of villages falling under the potential area

Mare, Tatakkuria, Pagri, Makamati, Tokjari, Kaldgoda, Adro, Lakmi, Jokahan, Rohni, Tamli, Jokhan, Mangu Sevn, Janbedo, Ketermao, Jaribedo, Jaribedo, Godapuli, Chhuchi.


Plan showing a
potential area block - Barhait,
approximate area 830 hectare
Legend
SOURCE : - Contour Generated from
KML File to Global Mapper
Not to Scale


SECTION ALONG - 1000N
4253
3875m
Legend

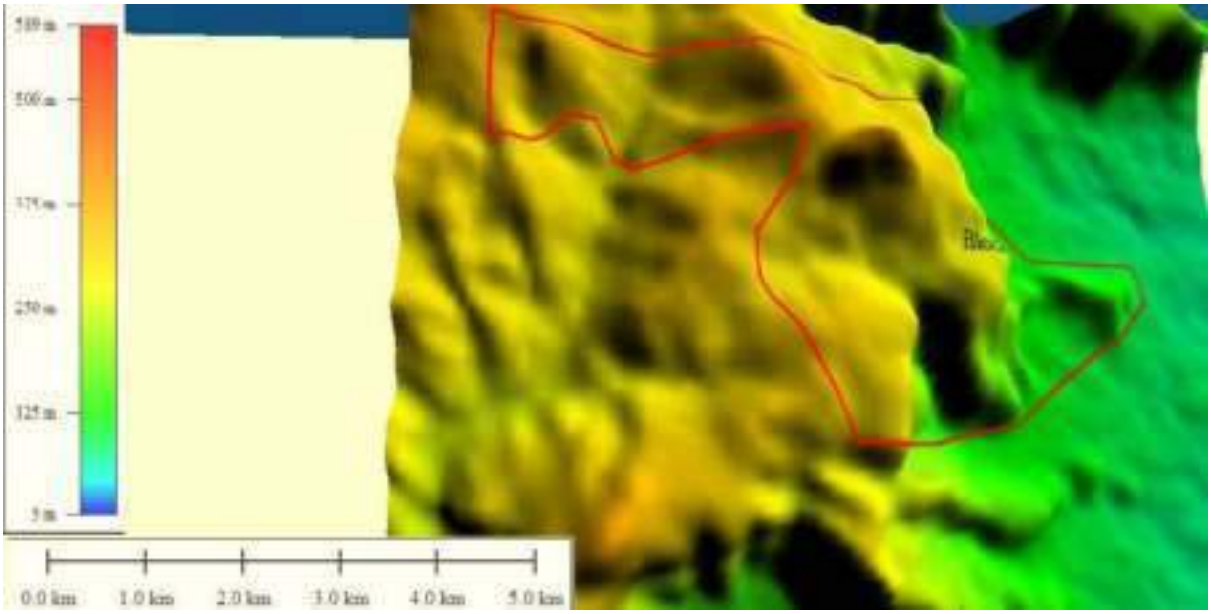


Image showing 3D Topographic view of the Potential Area

Volume of Potential Area - B, Block - Barhait, Area 830 Hectare								
Section Proved 325 TO 105	**Cross sectional area of O.B in sqm**	**Total Cross Sectional area in sqm**	**Influence Length m**	**Total Volume of O.B in Cum situ (B)**	**Total Volume in Cum situ (A)**	**Total Volume of Stone Cum situ (A-B)**	**Recovery 60% in m cum situ**	**Million tons of Stone**
1000N	27914	721304.00	1100	30705400	793434400.00	762729000.00	839.8857984	2267.69
0.00	15447	419686.00	1576	24344472	661425136.00	637080664.00		
Total				**55049872**	**1454859536.00**	**1399809664.00**		

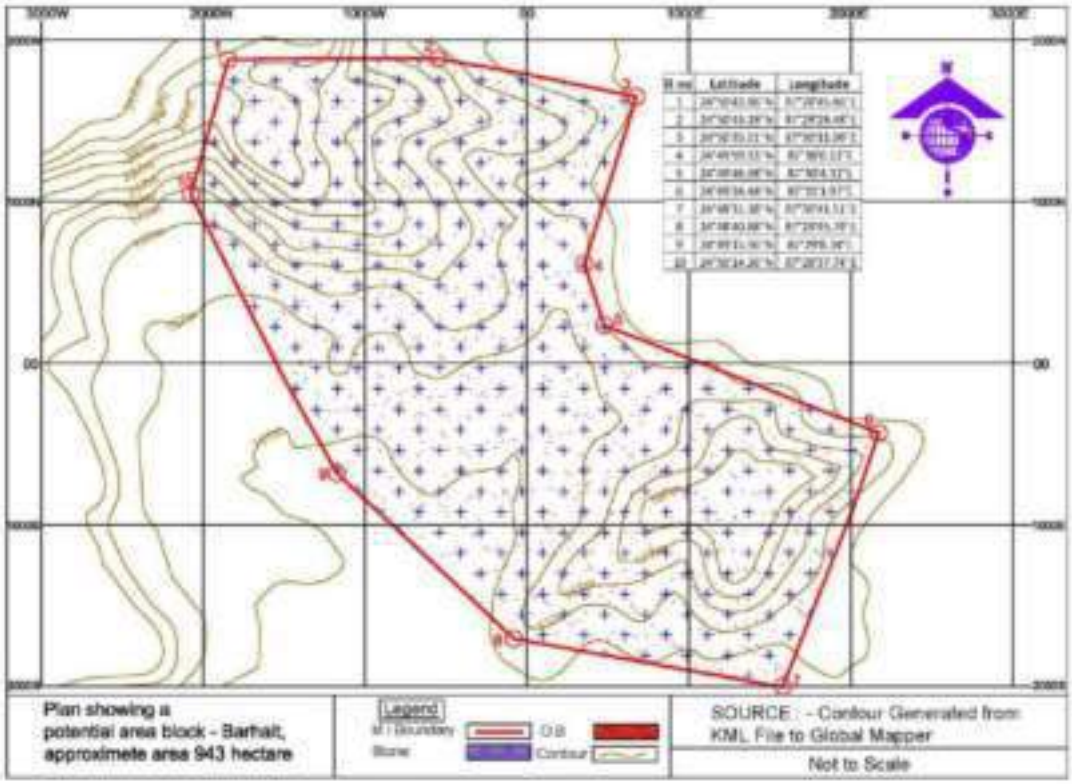
Image showing the Potential Area (Block – C, Mineral – Basalt & Granite Gneiss) As Per KML Data

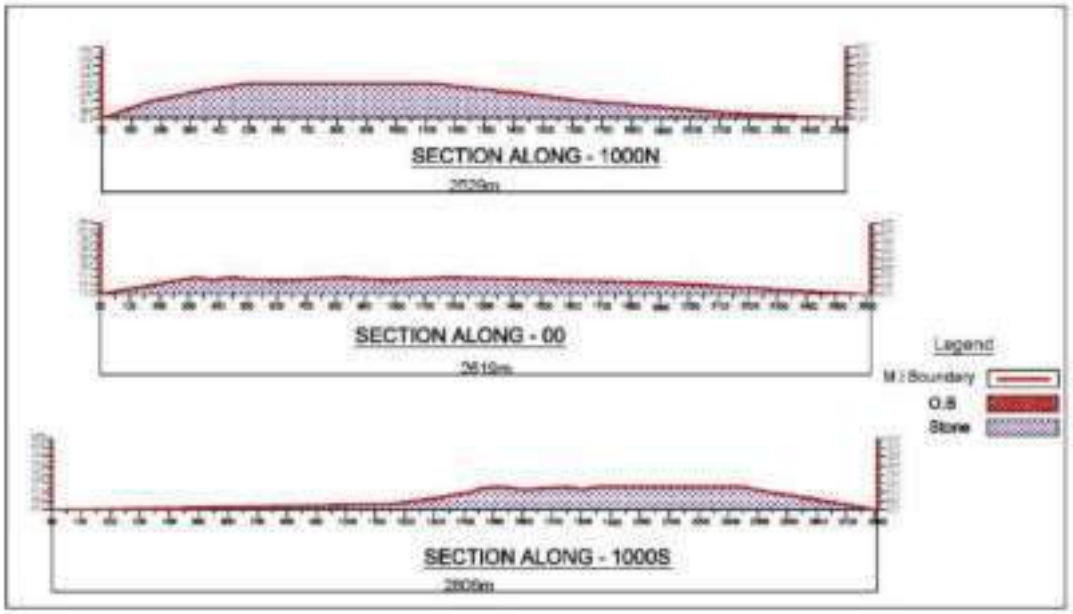
Sl no	Latitude	Longitude
1	24°50'42.86"N	87°28'45.46"E
2	24°50'43.19"N	87°29'29.48"E
3	24°50'35.01"N	87°30'11.09"E
4	24°49'59.93"N	87°30'0.11"E
5	24°49'46.98"N	87°30'4.31"E

Sl no	Latitude	Longitude
6	24°49'24.44"N	87°31'1.97"E
7	24°48'31.18"N	87°30'41.51"E
8	24°48'40.88"N	87°29'45.79"E
9	24°49'15.96"N	87°29'8.34"E
10	24°50'14.26"N	87°28'37.74"E

List of villages falling under the potential area

Chhuchi, Jarl, Godapuli, Kamchi, Kosapuchi, Litipara, Kusma, Meter, Garapuchi, Mugdi, Rajapani.


Plan showing a
potential area block - Barhait,
approximete area 943 hectare
Legend
SOURCE : - Contour Generated from
KML File to Global Mapper
Not to Scale


SECTION ALONG - 1000N
SECTION ALONG - 00
SECTION ALONG - 1000S
Legend
M : Boundary
O.B
Stone

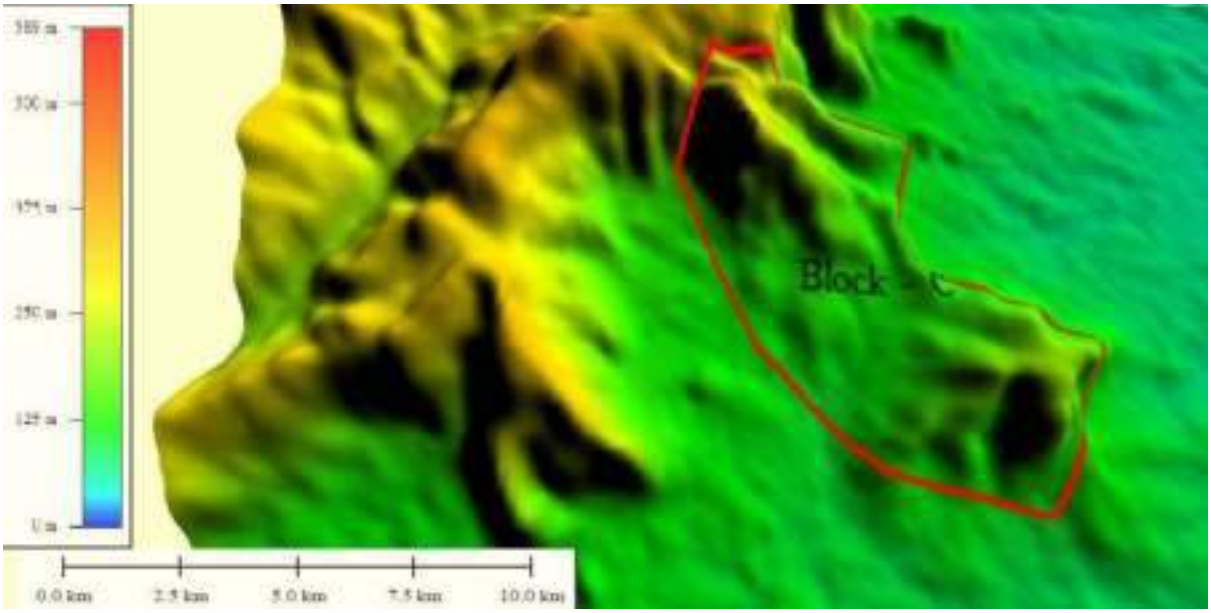


Image showing 3D Topographic view of the Potential Area

Volume of Potential Area - C, Block - Barhait, Area 943 Hectare								
Section Proved 325 TO 105	**Cross sectional area of O.B in sqm**	**Total Cross Sectional area in sqm**	**Influence Length m**	**Total Volume of O.B in Cum situ (B)**	**Total Volume in Cum situ (A)**	**Total Volume of Stone Cum situ (A-B)**	**Recovery 60% in m cum situ**	**Million tons of Stone**
1000N	10010	169564.00	1400	14014000	237389600.00	223375600.00	262.42332	708.54
0.00	10383	98178.00	1000	10383000	98178000.00	87795000.00		
1000S	10785	100929.00	1400	15099000	141300600.00	126201600.00		
Total				**39496000**	**476868200.00**	**437372200.00**		

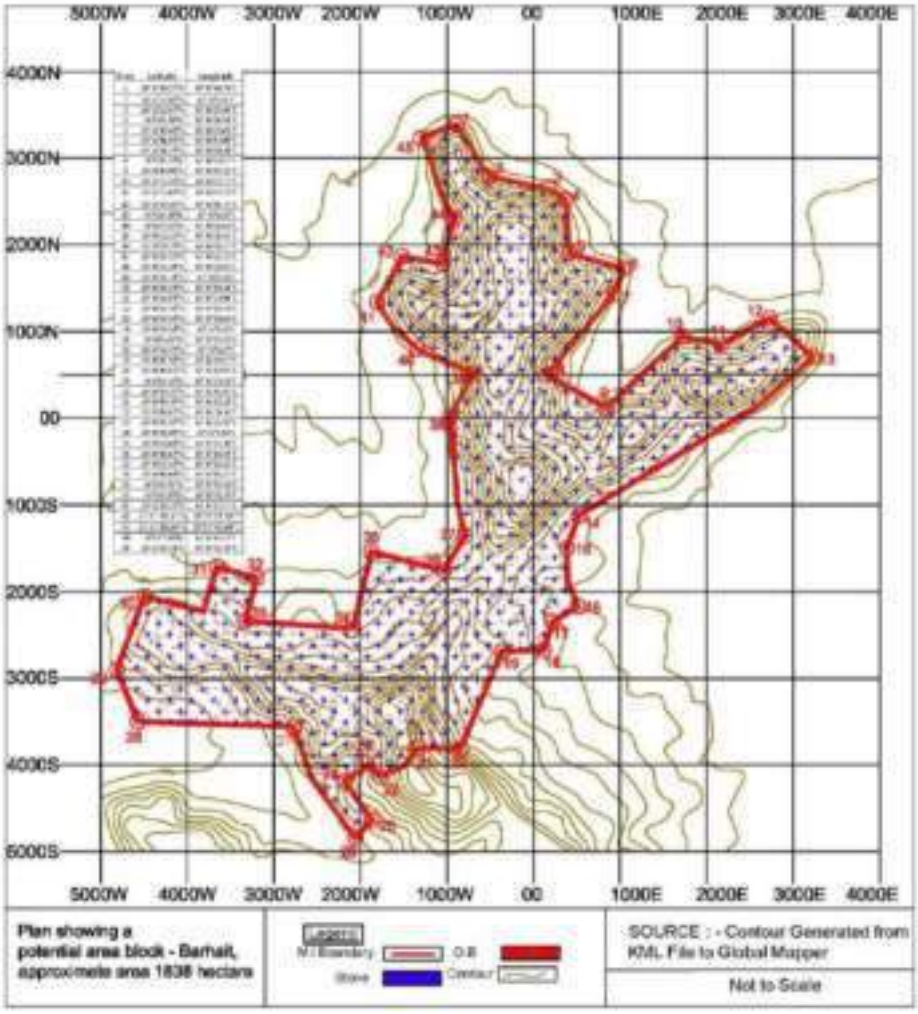
Image showing the Potential Area (Block – D, Mineral - Basalt) As Per KML Data

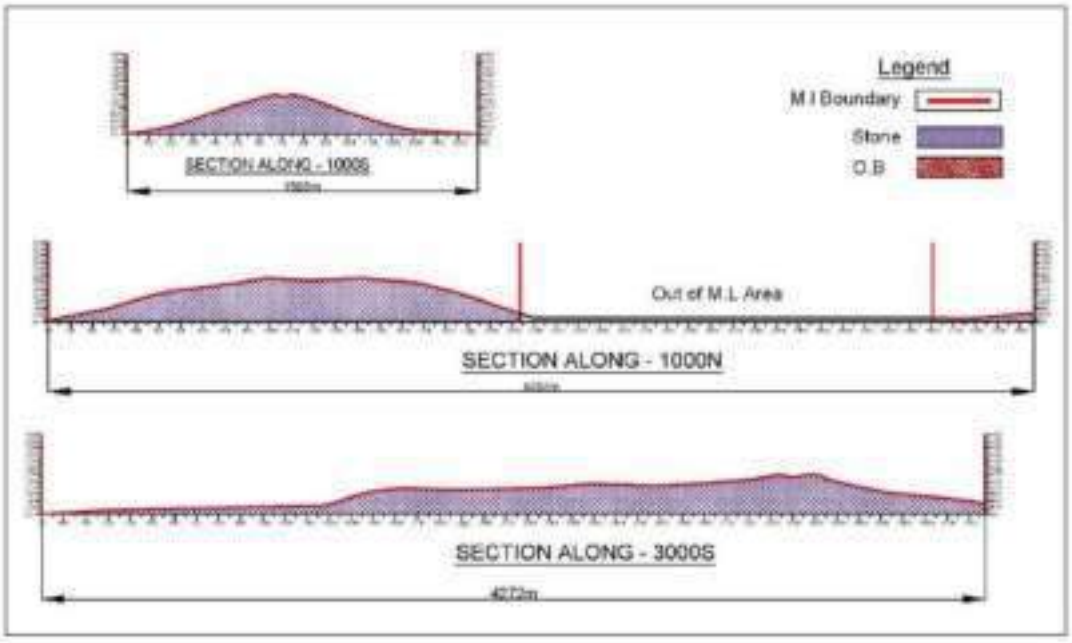
Sl no	Latitude	Longitude
1	24°52'38.27"N	87°37'48.74"E
2	24°52'17.80"N	87°38'1.61"E
3	24°52'12.87"N	87°38'25.09"E
4	24°52'8.74"N	87°38'31.58"E
5	24°51'47.60"N	87°38'33.02"E
6	24°51'41.93"N	87°38'54.00"E
7	24°51'31.74"N	87°38'50.30"E
8	24°51'0.20"N	87°38'24.17"E
9	24°50'47.05"N	87°38'47.12"E
10	24°51'15.19"N	87°39'17.21"E
11	24°51'12.03"N	87°39'32.13"E
12	24°51'22.40"N	87°39'51.72"E
13	24°51'6.98"N	87°40'8.52"E
14	24°50'4.96"N	87°38'36.64"E
15	24°49'52.22"N	87°38'31.91"E
16	24°49'29.25"N	87°38'36.41"E
17	24°49'23.32"N	87°38'26.51"E
18	24°49'12.28"N	87°38'22.91"E
19	24°49'11.78"N	87°38'6.59"E
20	24°48'33.14"N	87°37'50.18"E
21	24°48'33.94"N	87°37'34.08"E
22	24°48'22.58"N	87°37'18.79"E

Sl no	Latitude	Longitude
23	24°48'27.24"N	87°37'14.64"E
24	24°48'20.58"N	87°37'4.90"E
25	24°48'5.65"N	87°37'15.55"E
26	24°47'58.55"N	87°37'8.67"E
27	24°48'42.18"N	87°36'44.51"E
28	24°48'44.13"N	87°35'43.93"E
29	24°49'4.56"N	87°35'35.36"E
30	24°49'33.31"N	87°35'45.93"E
31	24°49'44.75"N	87°36'14.15"E
32	24°49'40.83"N	87°36'30.16"E
33	24°49'23.50"N	87°36'25.91"E
34	24°49'20.85"N	87°37'7.40"E
35	24°49'50.66"N	87°37'15.10"E
36	24°49'43.63"N	87°37'43.35"E
37	24°49'57.23"N	87°37'52.23"E
38	24°50'44.04"N	87°37'46.42"E
39	24°51'0.71"N	87°37'55.34"E
40	24°51'8.77"N	87°37'35.39"E
41	24°51'28.23"N	87°37'17.57"E
42	4°51'46.41"N	87°37'27.33"E
43	4°51'43.64"N	87°37'43.44"E
44	24°52'1.18"N	87°37'47.51"E
45	24°52'33.24"N	87°37'35.35"E

List of villages falling under the potential area

Bedo Torpata, Margro, Daldalipahar, Lakiapata, Chapri, Koskera, Badegoda, Nandurgodadedo, Kangarogoda, Padri, Gumo, Chhotapatharchapri, Jamripahar, Karamtokpahar, Bara patharchapri, Badegoda Maqo, Jamri Pahar, Maklith, Chhotachapta Pahar, Amarpura Maqo, Bara Chura Pahar, Kocklo, Dalwa, Chailako, Danbita Bedo, Saharajdhab, Chimn, Tulmi, Tetulbhita, Bich Maqo, DudhianiJarpahar, Bara Dalupoahar, Dabra.





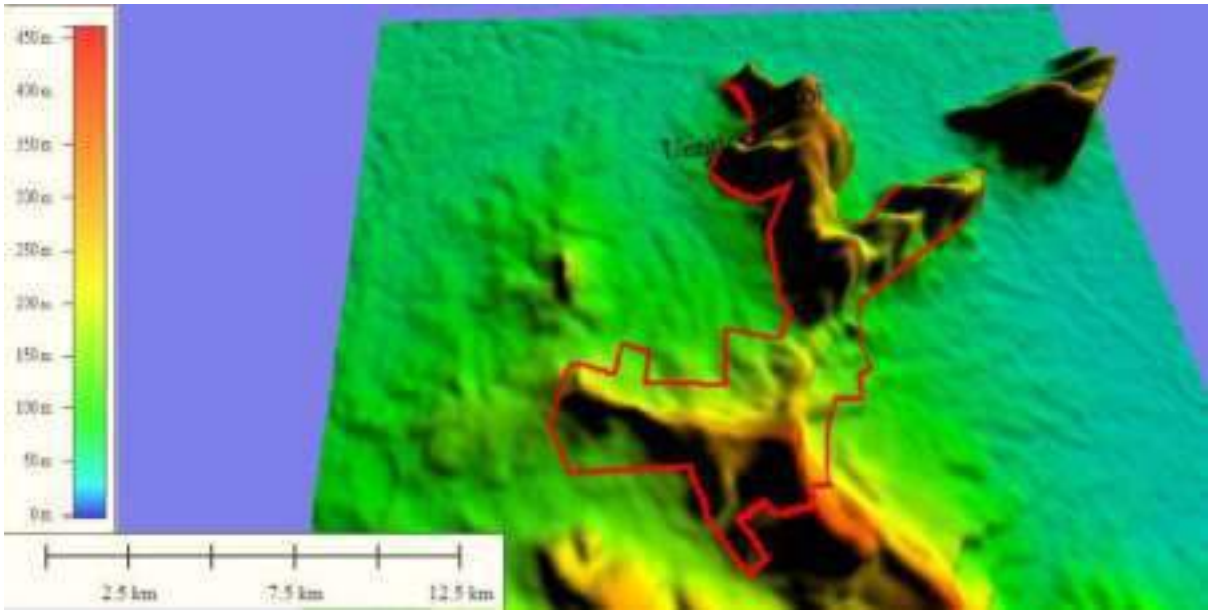


Image showing 3D Topographic view of the Potential Area

Volume of Potential Area - D, Block - Barhait, Area 1838 Hectare								
Section Proved 297 TO 97	**Cross sectional area of O.B in sqm**	**Total Cross Sectional area in sqm**	**Influence Length m**	**Total Volume of O.B in Cum situ (B)**	**Total Volume in Cum situ (A)**	**Total Volume of Stone Cum situ (A-B)**	**Recovery 60% in m cum situ**	**Million tons of Stone**
1000S	6417	118474.00	1500	9625500	177711000.00	168085500.00	1378.0113	3720.63
1000N	10565	297850.00	2400	25356000	714840000.00	689484000.00		
3000S	17094	376873.00	4000	68376000	1507492000.00	1439116000.00		
Total				**103357500**	**2400043000.00**	**2296685500.00**		

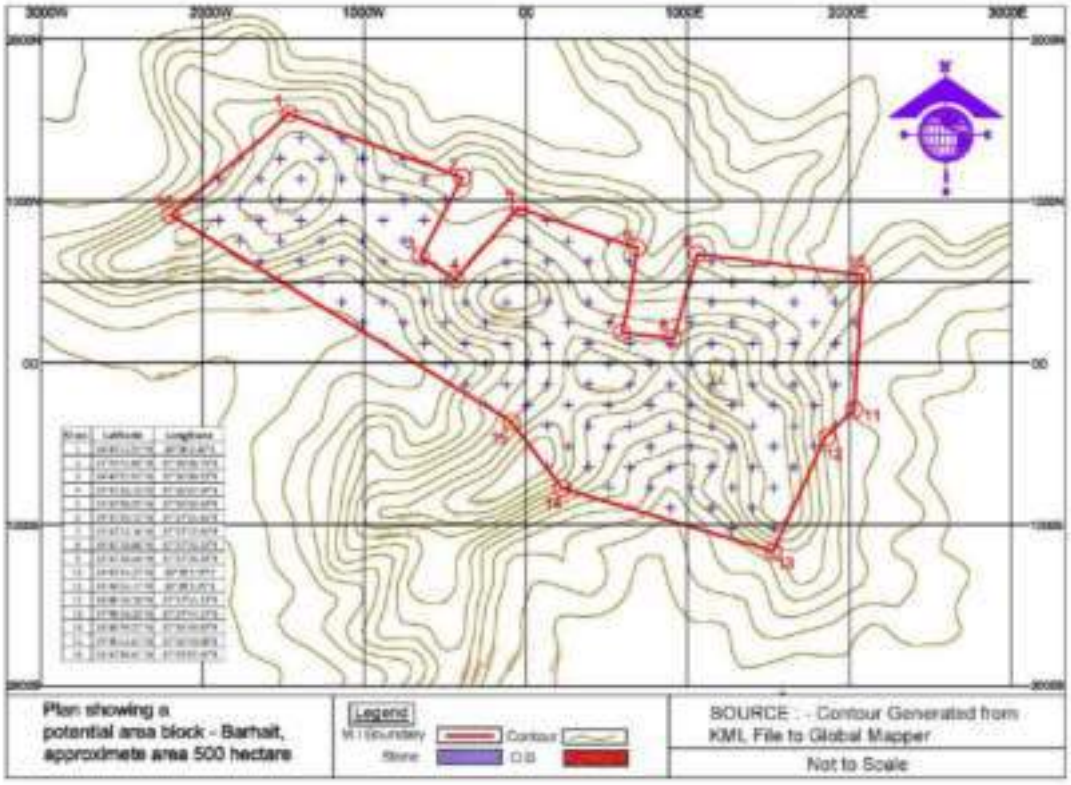
Image showing the Potential Area (Block – E, Mineral – Basalt & Granite Gneiss) As Per KML Data

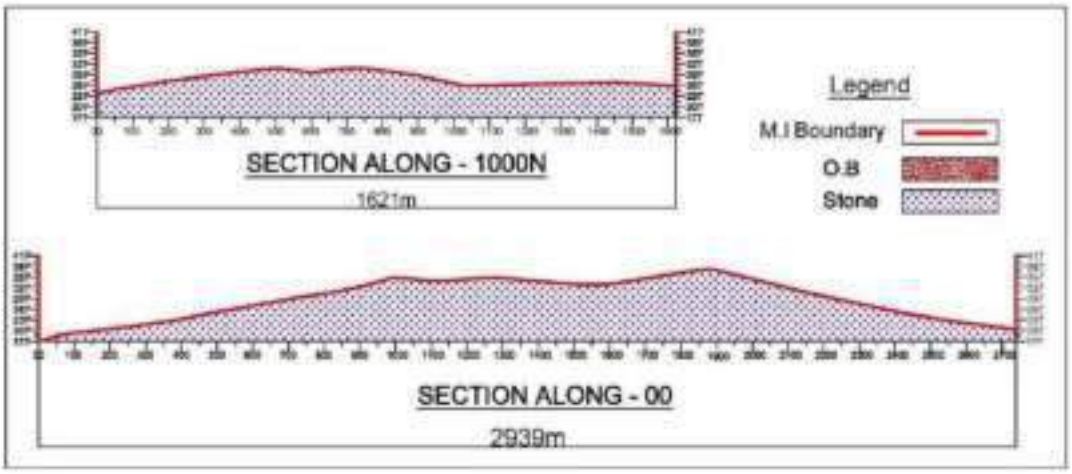
Sl no	Latitude	Longitude
1	24°47'57.97"N	87°36'2.26"E
2	24°47'44.60"N	87°36'38.79"E
3	24°47'27.97"N	87°36'30.13"E
4	24°47'23.13"N	87°36'37.34"E
5	24°47'38.35"N	87°36'50.53"E
6	24°47'29.72"N	87°37'15.66"E
7	24°47'12.16"N	87°37'12.34"E
8	24°47'10.88"N	87°37'23.23"E

Sl no	Latitude	Longitude
9	24°47'28.44"N	87°37'28.33"E
10	24°47'24.23"N	87°38'2.99"E
11	24°46'55.77"N	87°38'1.25"E
12	24°46'50.18"N	87°37'55.13"E
13	24°46'26.20"N	87°37'44.17"E
14	24°46'39.27"N	87°36'59.87"E
15	24°46'53.61"N	87°36'49.08"E
16	24°47'36.61"N	87°35'37.67"E

List of villages lying under the potential area:

Jampata, Maskepu, Chuki Bedo, Tetul Tola, Chuki Maqo, Gora Kepu, Kotparte, Uparmargo, Pakeri, Chevo, Nirbita Bedo, Tori, Karrobasa, Hajarpura, Margo pahar.


3000W
2000W
1000W
00
1000E
2000E
3000E
Plan showing a potential area block - Barhait, approximate area 500 hectare
Legend
Contour
O.B
SOURCE : - Contour Generated from KML File to Global Mapper
Not to Scale


SECTION ALONG - 1000N
1621m
Legend
M.I Boundary
O.B
Stone
SECTION ALONG - 00
2939m

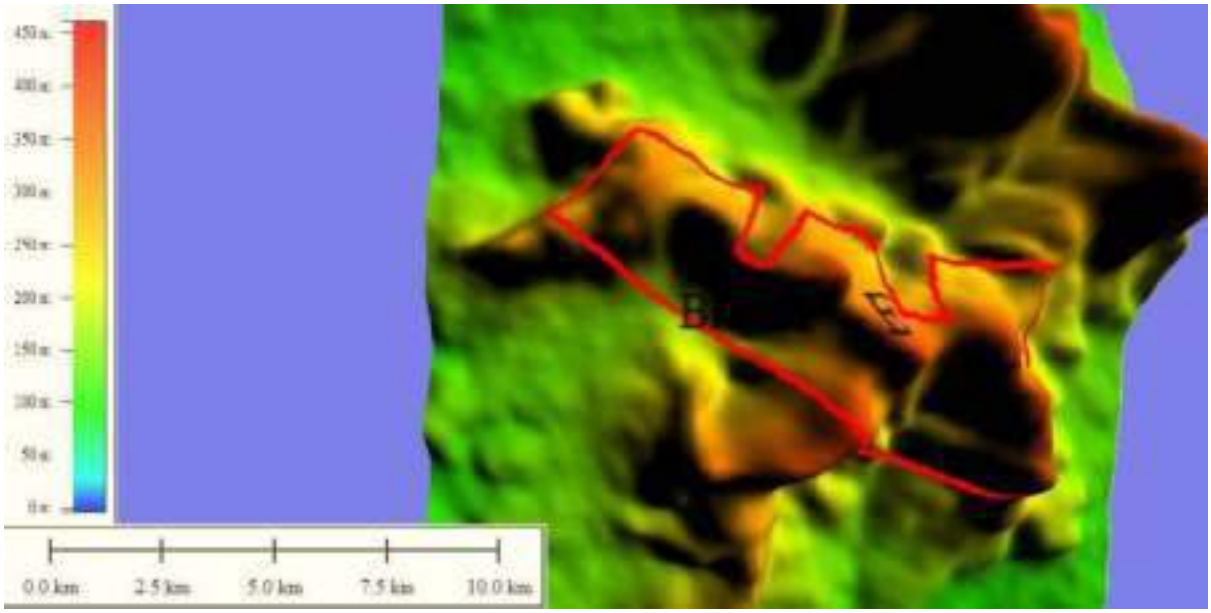


Image showing 3D Topographic view of the Potential Area

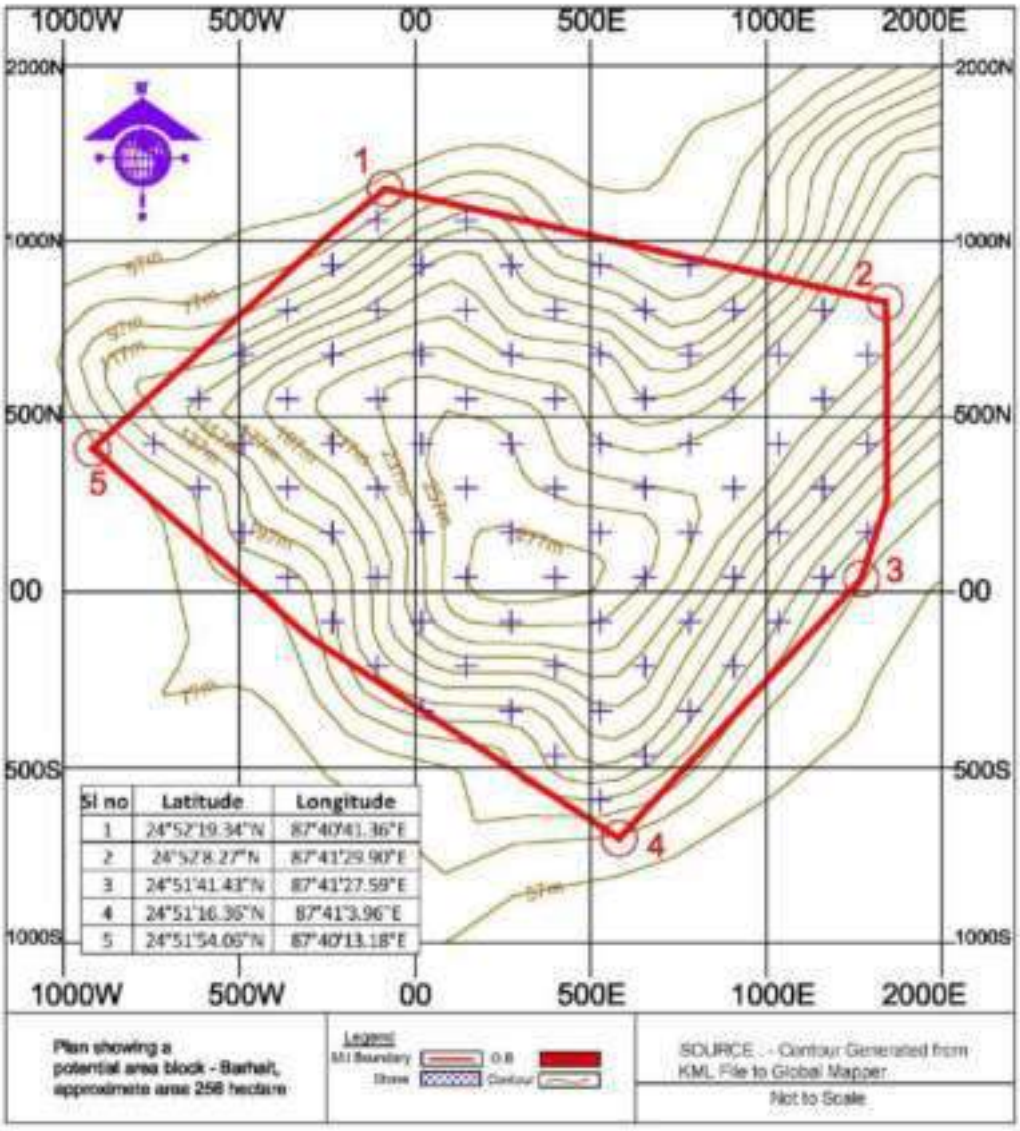
Volume of Potential Area - E, Block - Barhait, Area 500 Hectare								
Section Proved 377 TO 177	**Cross sectional area of O.B in sqm**	**Total Cross Sectional area in sqm**	**Influence Length m**	**Total Volume of O.B in Cum situ (B)**	**Total Volume in Cum situ (A)**	**Total Volume of Stone Cum situ (A-B)**	**Recovery 60% in m cum situ**	**Million tons of Stone**
1000N	6534	170113.00	1000	6534000	170113000.00	163579000.00	303.21996	818.69
0.00	11088	321804.00	1100	12196800	353984400.00	341787600.00		
Total				**18730800**	**524097400.00**	**505366600.00**		

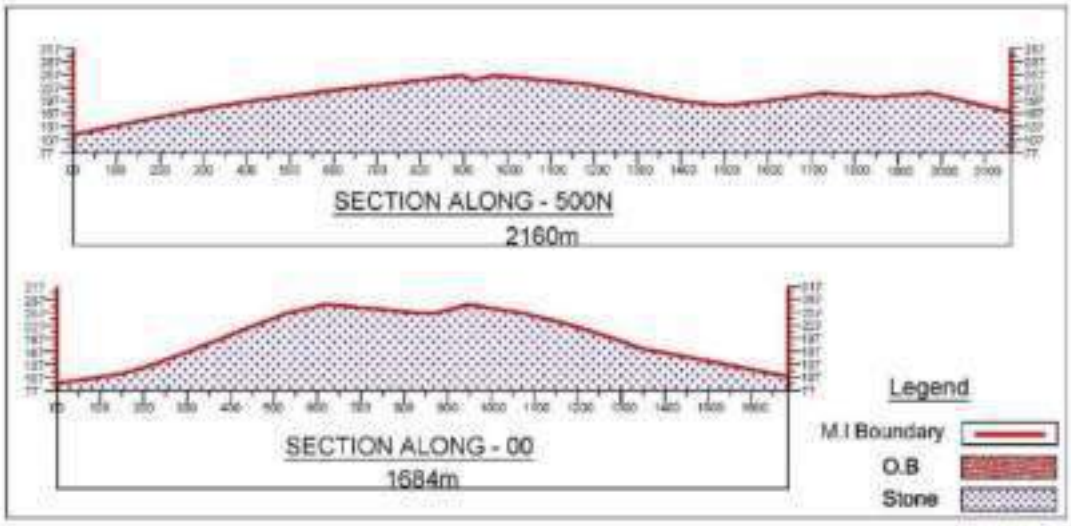
Image showing the Potential Area (Block – F, Mineral - Basalt) As Per KML Data

Sl no	Latitude	Longitude
1	24°52'19.34"N	87°40'41.36"E
2	24°52'8.27"N	87°41'29.90"E
3	24°51'41.43"N	87°41'27.59"E
4	24°51'16.36"N	87°41'3.96"E
5	24°51'54.06"N	87°40'13.18"E

List of villages falling under the potential area:

Chhota Eichkani, Kargopahar, Bara Bichkhani, Chhota Bichkhani, Banspahar, Bara Panchkuli.


1000W
500W
00
500E
1000E
2000E
2000N
1000N
500N
00
500S
1000S
1
2
3
4
5
Sl no | Latitude | Longitude
1 | 24°52'19.34"N | 87°40'41.36"E
2 | 24°52'8.27"N | 87°41'29.90"E
3 | 24°51'41.43"N | 87°41'27.59"E
4 | 24°51'16.35"N | 87°41'3.96"E
5 | 24°51'54.05"N | 87°40'13.18"E
Plan showing a potential area block - Barhait, approximate area 256 hectare
Legend
M.I Boundary
O.B
Stone
Contour
SOURCE : - Contour Generated from KML File to Global Mapper
Not to Scale


SECTION ALONG - 500N
2160m
SECTION ALONG - 00
1684m
Legend
M.I Boundary
O.B
Stone

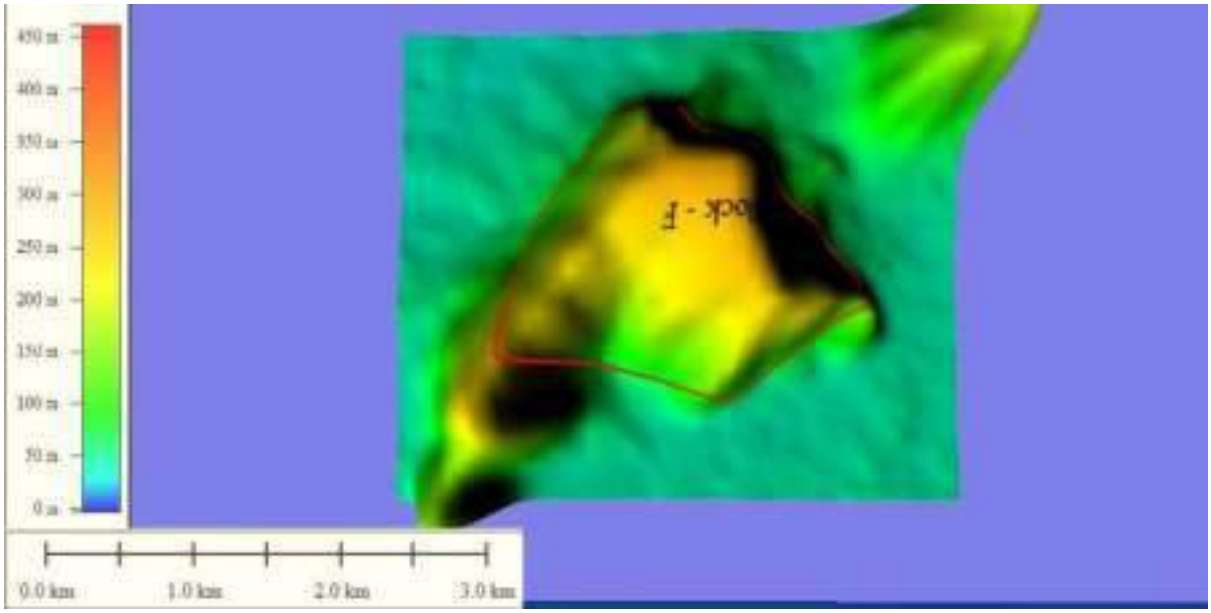


Image showing 3D Topographic view of the Potential Area

Volume of Potential Area - F, Block - Barhait, Area 256 Hectare								
Section Proved277 TO 77	**Cross sectional area of O.B in sqm**	**Total Cross Sectional area in sqm**	**Influence Length m**	**Total Volume of O.B in Cum situ (B)**	**Total Volume in Cum situ (A)**	**Total Volume of Stone Cum situ (A-B)**	**Recovery 60% in m cum situ**	**Million tons of Stone**
500.00	8750	273687.00	650	5687500	177896550.00	172209050.00	232.49271	627.73
0.00	6946	202654.00	1100	7640600	222919400.00	215278800.00		
Total				**13328100**	**400815950.00**	**387487850.00**		

Block - Taljhari

Image showing the Potential Area (Block – A, Mineral - Basalt) As Per KML Data

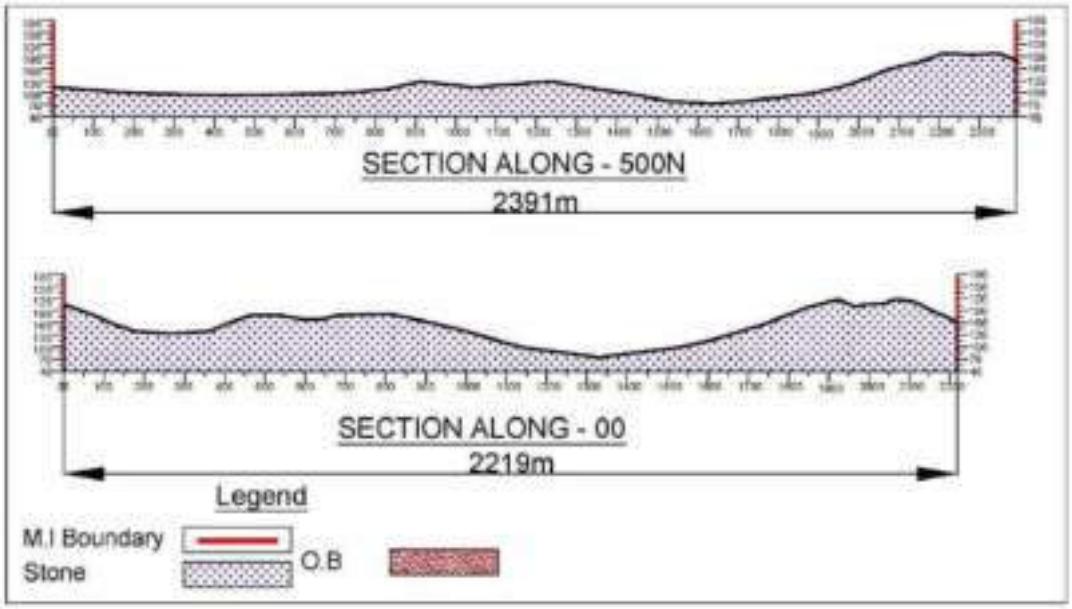
Sl no	Latitude	Longitude
1	25°14'7.00"N	87°42'18.75"E
2	25°14'1.09"N	87°42'38.39"E
3	25°14'15.77"N	87°42'58.65"E
4	25°14'15.98"N	87°43'22.15"E
5	25°13'9.65"N	87°43'33.67"E

Sl no	Latitude	Longitude
6	25°13'6.06"N	87°43'5.53"E
7	25°13'16.42"N	87°42'35.52"E
8	25°13'29.07"N	87°42'11.17"E
9	25°13'47.78"N	87°42'6.35"E
10	25°14'2.08"N	87°42'11.10"E

List of villages falling under the potential area:

Chota Bhagimari, Korokuriya, Badi Bhogiamari, Baraparte, Chongro, Godwa, Jamni


1500W
1000W
500W
00
500E
1000E
Plan showing a potential area block - Talihari, approximate area 382 hectare
Legend
M.I Boundary
O.B
Stone
SOURCE : - Contour Generated from KML File to Global Mapper
Not to Scale


SECTION ALONG - 500N
2391m
SECTION ALONG - 00
2219m
Legend
M.I Boundary
Stone
O.B

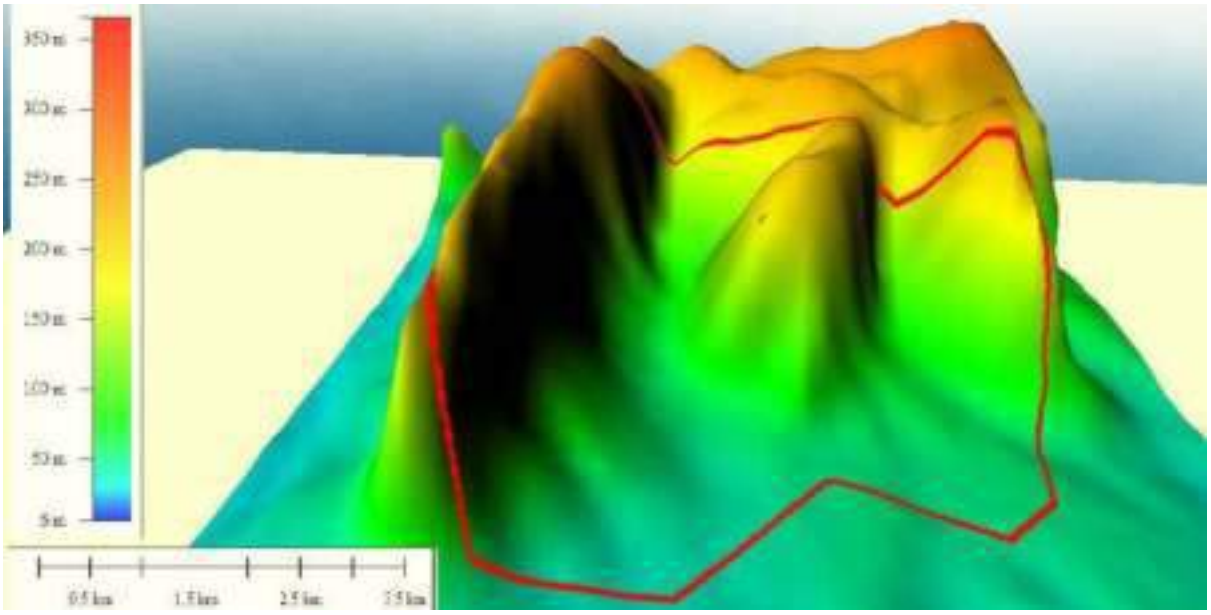


Image showing 3D Topographic view of the Potential Area

Volume of Potential Area - A, Block - Taljhari, Area 382 Hectare								
Section Proved 246 TO 46	**Cross sectional area of O.B in sqm**	**Total Cross Sectional area in sqm**	**Influence Length m**	**Total Volume of O.B in Cum situ (B)**	**Total Volume in Cum situ (A)**	**Total Volume of Stone Cum situ (A-B)**	**Recovery 60% in m cum situ**	**Million tons of Stone**
500N	9686	172275.00	925	8959550	159354375.00	150394825.00	243.207735	656.66
0.00	9170	240944.00	1100	10087000	265038400.00	254951400.00		
Total				**19046550**	**424392775.00**	**405346225.00**		

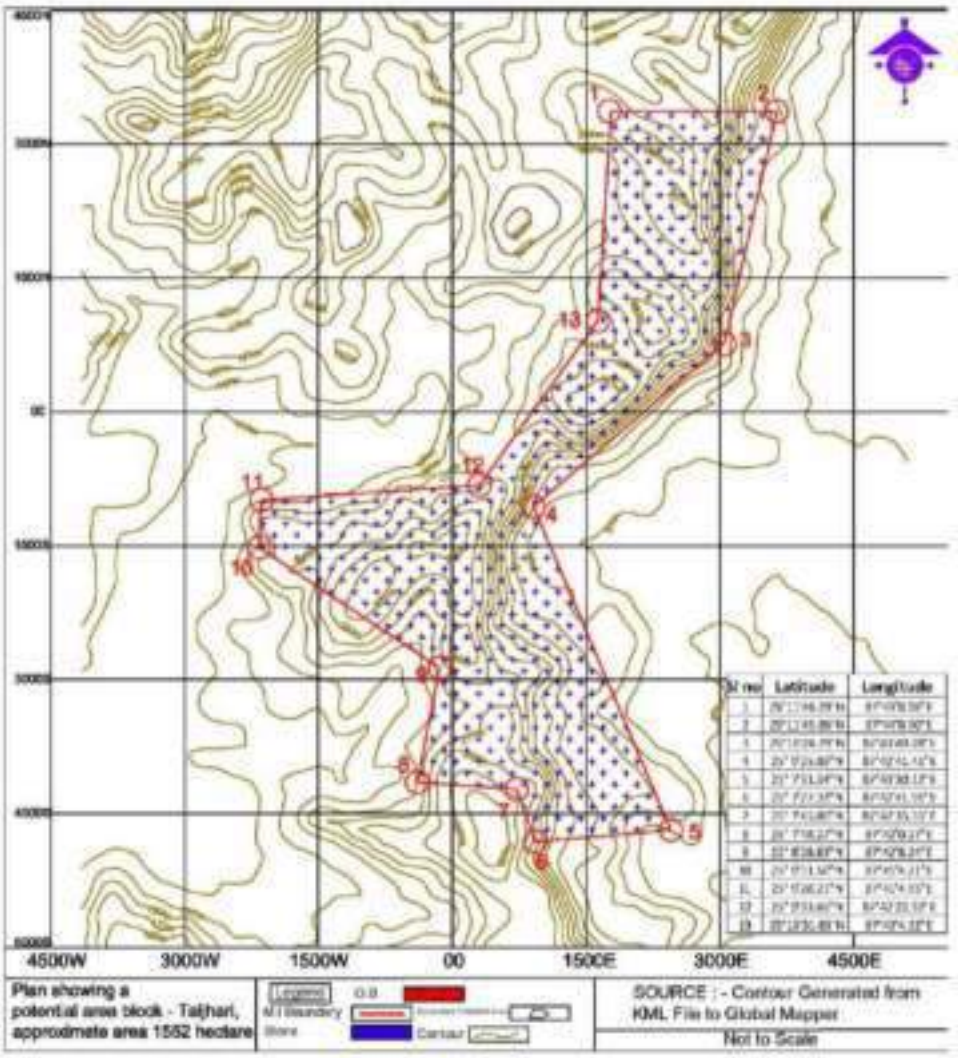
Image showing the Potential Area (Block – B, Mineral - Basalt) As Per KML Data

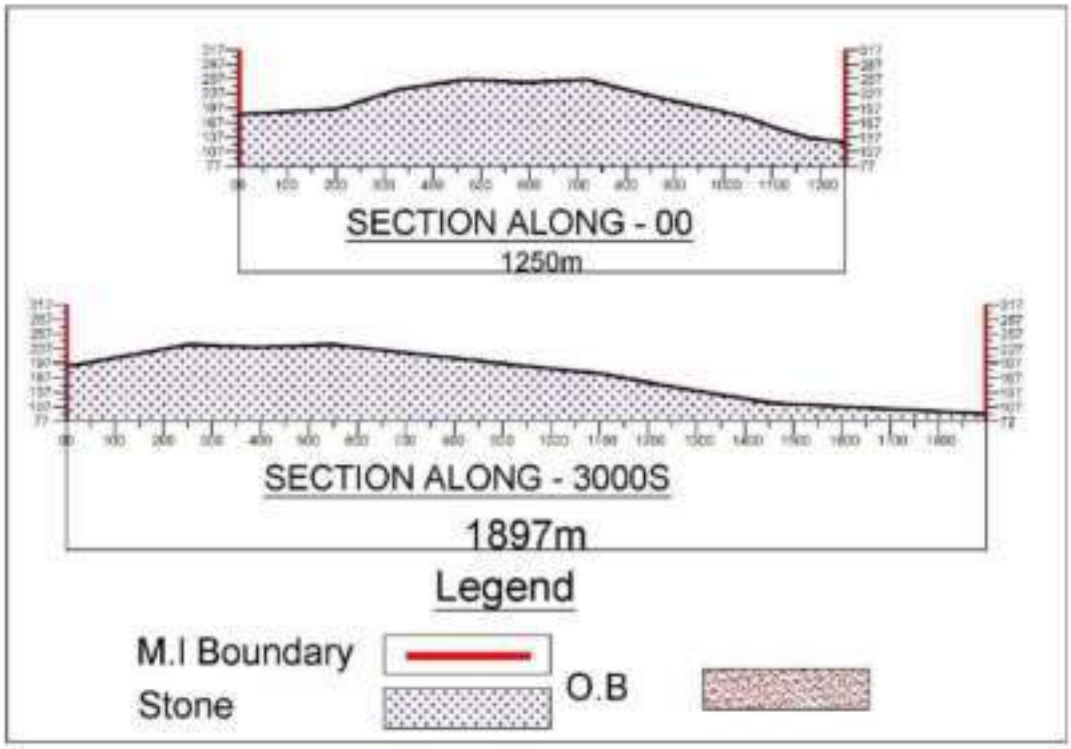
Sl no	Latitude	Longitude
1	25°11'46.29"N	87°43'8.98"E
2	25°11'45.86"N	87°44'8.00"E
3	25°10'24.29"N	87°43'49.28"E
4	25° 9'25.86"N	87°42'41.41"E
5	25° 7'31.34"N	87°43'30.12"E
6	25° 7'27.33"N	87°42'41.91"E
7	25° 7'45.80"N	87°42'35.55"E

Sl no	Latitude	Longitude
8	25° 7'48.27"N	87°42'0.27"E
9	25° 8'28.83"N	87°42'8.24"E
10	25° 9'11.50"N	87°41'4.21"E
11	25° 9'28.21"N	87°41'4.95"E
12	25° 9'33.66"N	87°42'22.32"E
13	25°10'31.83"N	87°43'4.32"E

List of villages falling under the potential area:

Saura, Banji, Kaldi Bita, Chamdi Mago, Chamdi Bedo, Behra, Danga, Joya, Kakbita (Jhapsi), Ghoghi, Goga, Jamba, Kasari, Chatkihi, Bademe, Kachori Bedo, Kachori Mago, Muri, Kalhajhor, Joya, Ambori.


4500W
3000W
1500W
00
1500E
3000E
4500E
Plan showing a potential area block - Taljhari, approximate area 1552 hectare
SOURCE : - Contour Generated from KML File to Global Mapper
Not to Scale


SECTION ALONG - 00
1250m
SECTION ALONG - 3000S
1897m
Legend
M.I Boundary
Stone
O.B

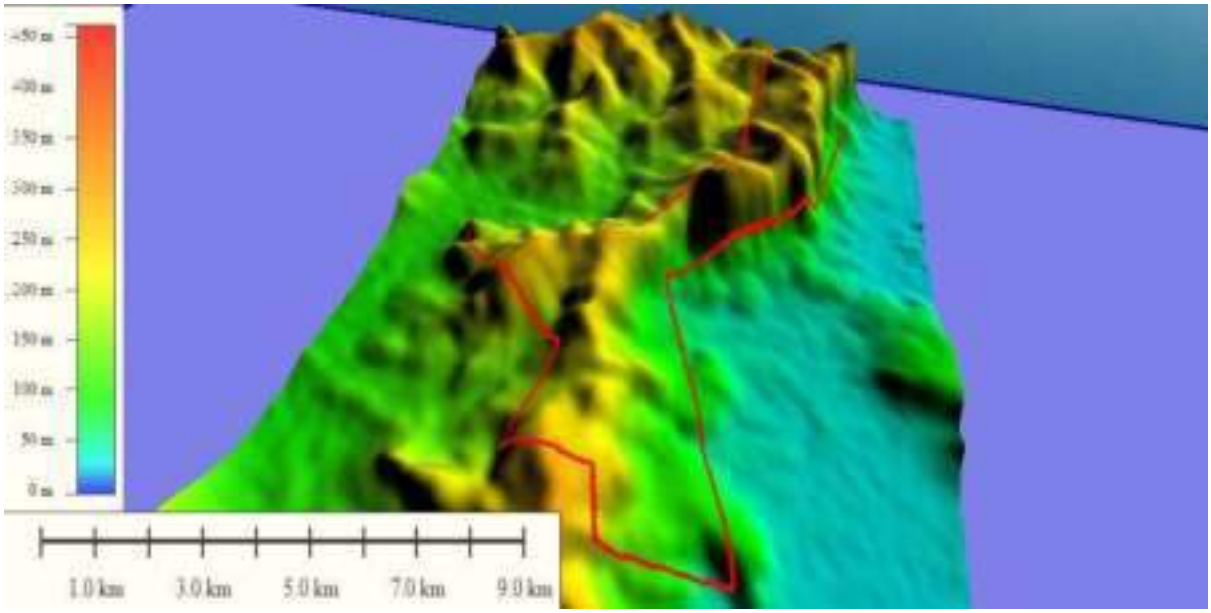


Image showing 3D Topographic view of the Potential Area

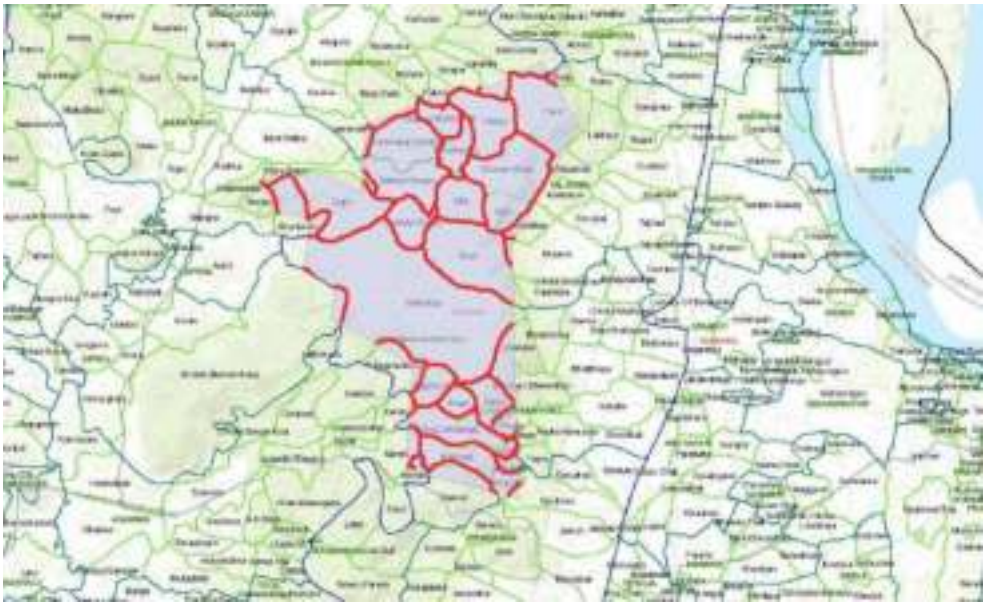
Volume of Potential Area - B, Block - Taljhari, Area 1342 Hectare

Section Proved 265 TO 85	Cross sectional area of O.B in sqm	Total Cross Sectional area in sqm	Influence Length m	Total Volume of O.B in Cum situ (B)	Total Volume in Cum situ (A)	Total Volume of Stone Cum situ (A-B)	Recovery 60% in m cum situ	Million tons of Stone
0.00	5101	164622.00	3600	18363600	592639200.00	574275600.00	847.5804	2288.47
3000S	7640	182298.00	4800	36672000	875030400.00	838358400.00		
Total				**55035600**	**1467669600.00**	**1412634000.00**		

Image showing the Potential Area (Block – C, Mineral - Basalt) As Per KML Data

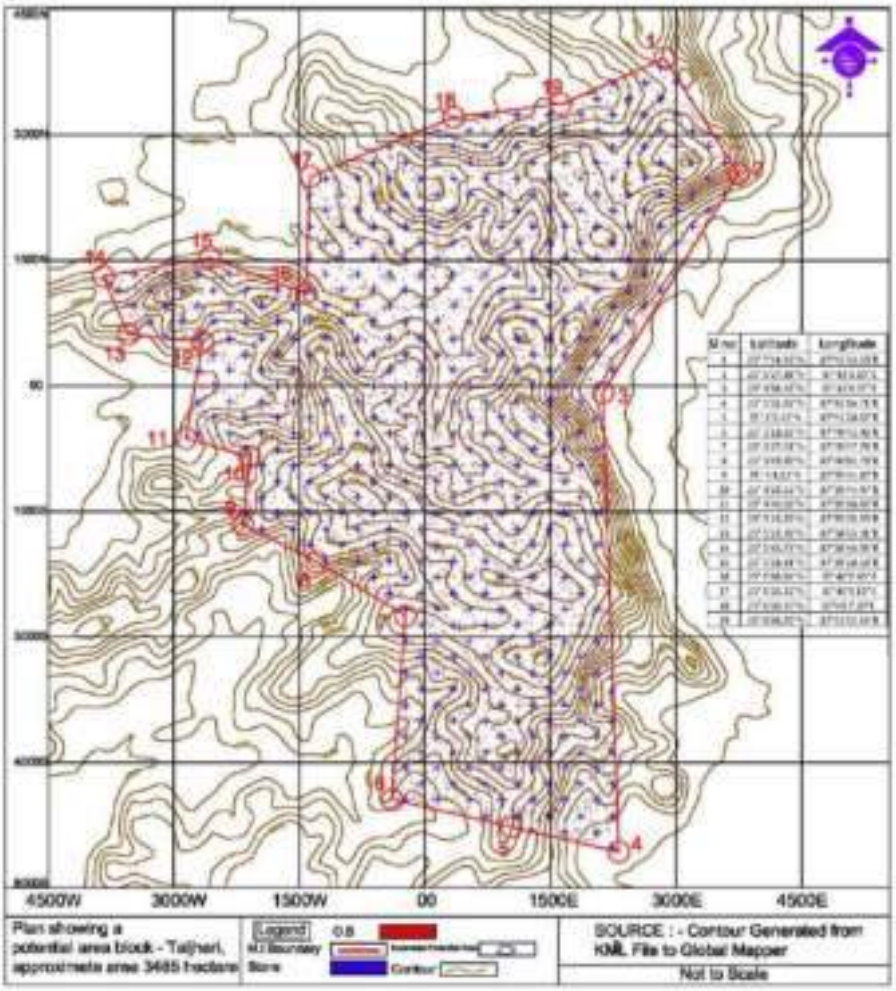
Sl no	Latitude	Longitude
1	25° 7'14.43"N	87°42'33.13"E
2	25° 6'27.38"N	87°43'3.20"E
3	25° 4'58.45"N	87°42'8.07"E
4	25° 1'51.82"N	87°42'14.71"E
5	25° 2'2.42"N	87°41'28.67"E
6	25° 2'13.23"N	87°40'42.43"E
7	25° 3'27.91"N	87°40'47.78"E
8	25° 3'49.90"N	87°40'11.73"E
9	25° 4'4.82"N	87°39'41.87"E
10	25° 4'32.53"N	87°39'44.47"E

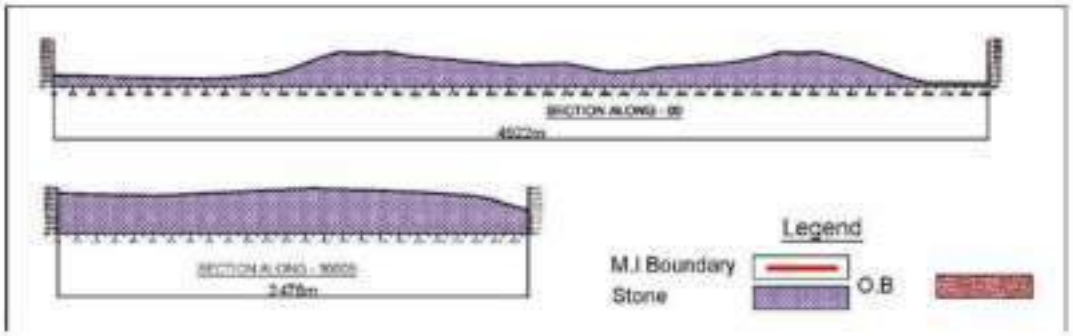
Sl no	Latitude	Longitude
11	25° 4'40.00"N	87°39'18.62"E
12	25° 5'19.20"N	87°39'25.55"E
13	25° 5'22.26"N	87°38'55.31"E
14	25° 5'45.73"N	87°38'44.94"E
15	25° 5'53.31"N	87°39'28.53"E
16	25° 5'38.84"N	87°40'7.40"E
17	25° 6'26.22"N	87°40'9.10"E
18	25° 6'50.43"N	87°41'7.28"E
19	25° 6'56.20"N	87°41'52.54"E



List of villages falling under the potential area:

Pusru, Pakri, Badhua, Darwasi Bedo, Botri, Gila, Boga, Telabani Khaplo, Digra, Batbanga, Bagcha Mago, Bagcha Bedo, Jilkur, Katikewa, Tetaria, Balko, Chamdi, Mundli, Kerojoi, Kundo, Hathikhuta, Masbera, Gordhoa.





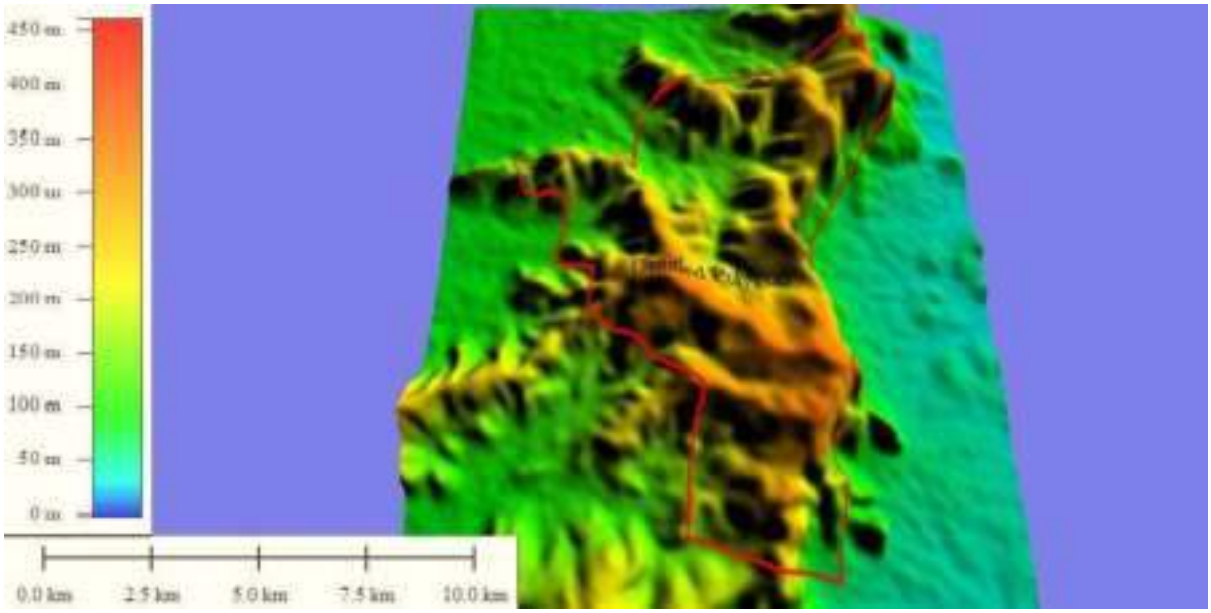


Image showing 3D Topographic view of the Potential Area

Volume of Potential Area - C, Block - Taljhari, Area 3485 Hectare								
Section Proved 277 TO 97	**Cross sectional area of O.B in sqm**	**Total Cross Sectional area in sqm**	**Influence Length m**	**Total Volume of O.B in Cum situ (B)**	**Total Volume in Cum situ (A)**	**Total Volume of Stone Cum situ (A-B)**	**Recovery 60% in m cum situ**	**Million tons of Stone**
0.00	19909	477448.00	4800	95563200	2291750400.00	2196187200.00	3349.53288	9043.74
3000S	9962	515390.00	6700	66745400	3453113000.00	3386367600.00		
Total				**162308600**	**5744863400.00**	**5582554800.00**		

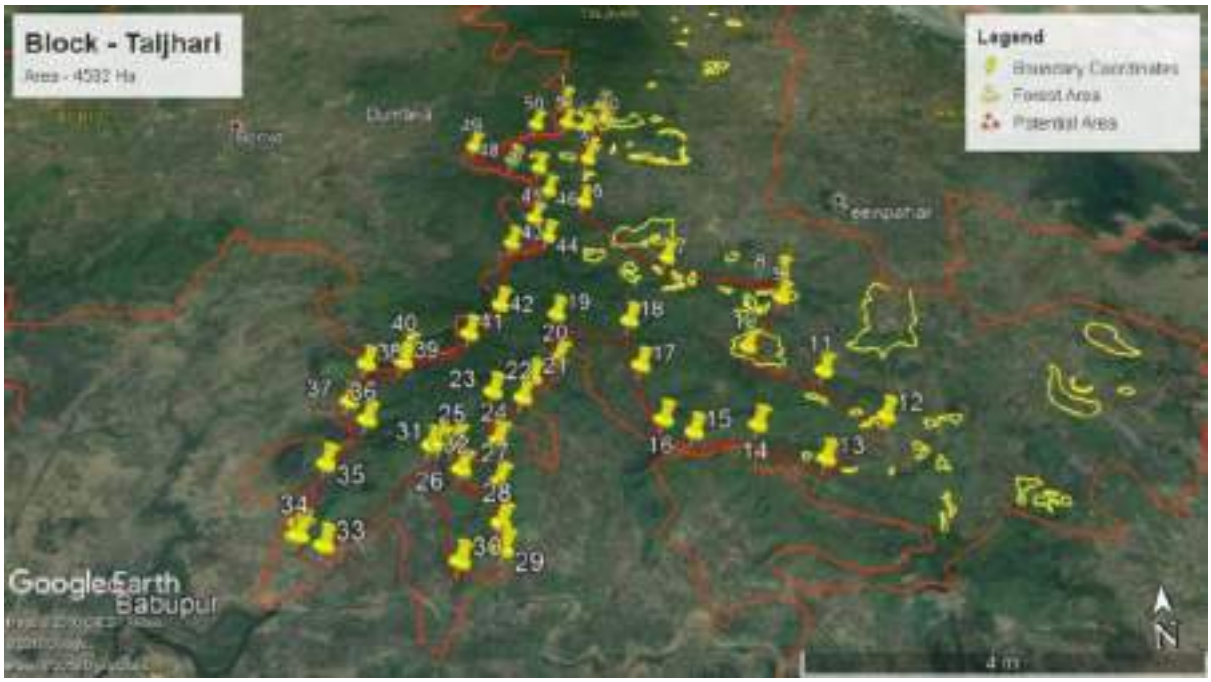


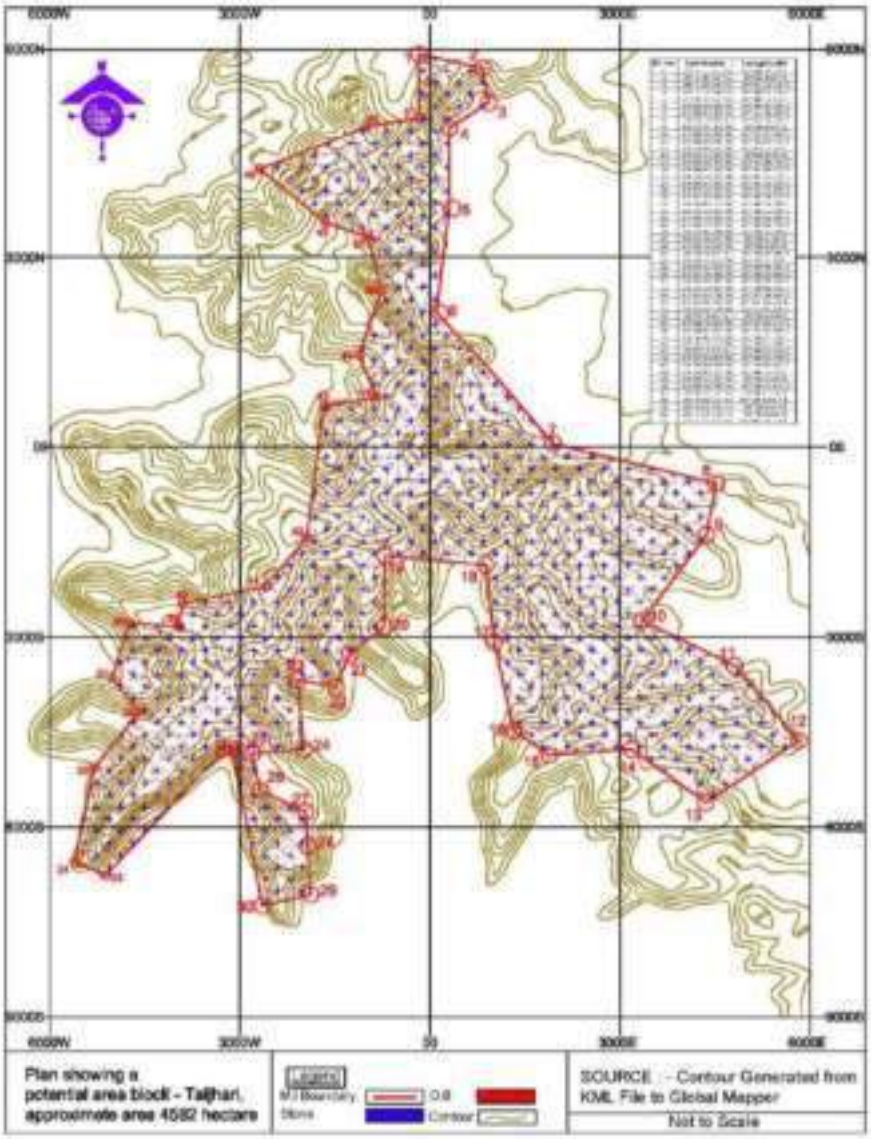
Image showing the Potential Area (Block – D, Mineral – Basalt & Granite Gneiss) As Per KML Data

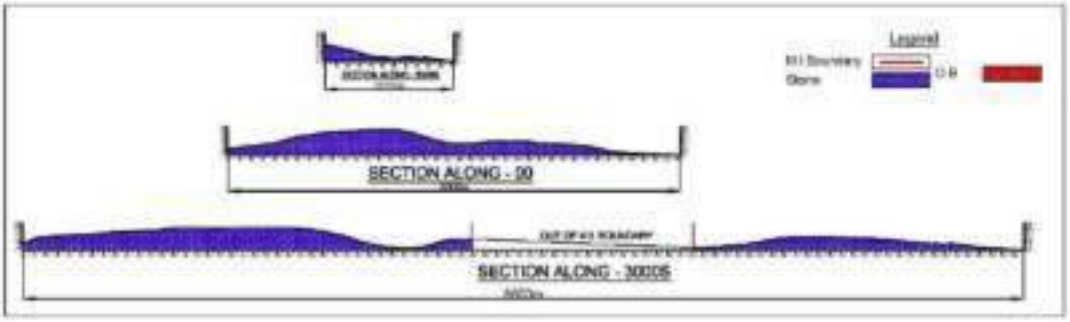
Sl no	Latitude	Longitude
1	25° 1'53.16"N	87°40'34.74"E
2	25° 1'45.87"N	87°41'8.97"E
3	25° 1'27.22"N	87°41'12.11"E
4	25° 1'13.84"N	87°40'51.25"E
5	25° 0'30.67"N	87°40'51.16"E
6	4°59'34.58"N	87°40'44.09"E
7	4°58'24.33"N	87°41'46.69"E
8	24°58'2.88"N	87°43'14.26"E
9	24°57'35.33"N	87°43'9.07"E
10	24°56'49.33"N	87°42'34.50"E
11	24°56'25.02"N	87°43'24.72"E
12	24°55'44.89"N	87°43'58.56"E
13	24°55'11.86"N	87°43'8.76"E
14	24°55'40.44"N	87°42'28.72"E
15	24°55'37.16"N	87°41'44.72"E
16	24°55'50.38"N	87°41'25.72"E
17	24°56'37.62"N	87°41'15.10"E
18	24°57'19.09"N	87°41'10.66"E
19	24°57'24.39"N	87°40'16.47"E
20	24°56'45.73"N	87°40'16.09"E
21	24°56'30.82"N	87°39'57.49"E
22	24°56'13.63"N	87°39'50.09"E
23	24°56'17.57"N	87°39'29.70"E
24	24°55'40.24"N	87°39'32.98"E
25	24°55'38.05"N	87°39'5.39"E

Sl no	Latitude	Longitude
26	24°55'18.09"N	87°39'9.84"E
27	24°55'6.54"N	87°39'34.05"E
28	24°54'39.00"N	87°39'35.49"E
29	24°54'22.54"N	87°39'36.63"E
30	24°54'16.48"N	87°39'10.85"E
31	24°55'38.26"N	87°38'55.38"E
32	24°55'38.42"N	87°38'48.90"E
33	24°54'32.78"N	87°37'46.58"E
34	24°54'39.78"N	87°37'30.13"E
35	24°55'30.14"N	87°37'40.41"E
36	24°56'0.41"N	87°38'4.44"E
37	24°56'18.60"N	87°37'50.14"E
38	24°56'47.87"N	87°37'59.46"E
39	24°56'46.29"N	87°38'25.74"E
40	24°56'58.58"N	87°38'27.89"E
41	24°57'7.73"N	87°39'12.24"E
42	24°57'33.84"N	87°39'34.70"E
43	24°58'44.64"N	87°39'43.47"E
44	24°58'48.90"N	87°40'12.18"E
45	24°59'12.05"N	87°40'2.43"E
46	24°59'45.78"N	87°40'14.54"E
47	25° 0'15.51"N	87°40'7.31"E
48	25° 0'22.65"N	87°39'44.67"E
49	25° 0'51.55"N	87°39'9.54"E
50	25° 1'14.14"N	87°40'6.52"E
51	25° 1'19.29"N	87°40'34.73"E

List of villages falling under the potential area:

Guti, Talmi, Pachare, Mansbera, Pathargama, Chota Bansjuri, Makwara, Kongabera, Chaudharia Bishunpur, Makbargi Khuta, Davgoda, Sajni Bedo, Chaugaria, Dhangona, Kuchla, Mahuatanr, Chamdi, Telotok, Amlonde, Manskepu, Baga (Pakaria), Basko, Lokani Mako, Lokani Bedo, Banapara, Chakopara, Bara Bathani, Malibita, Edri, Chua Bedo, Dawana, Chabitok, Bera Bans Pahar, Gambari, Kerwa, Rohra, Ursapahar, Garhduara, Partu Pahar, Haldi Pahar, Chengbita (Nagarbita), Salgachi, Galgachhi, Ketekbera.


Plan showing a
potential area block - Taljhari,
approximate area 4582 hectare
SOURCE : - Contour Generated from
KML File to Global Mapper
Not to Scale


Legend
SECTION ALONG - DD
SECTION ALONG - XXXX

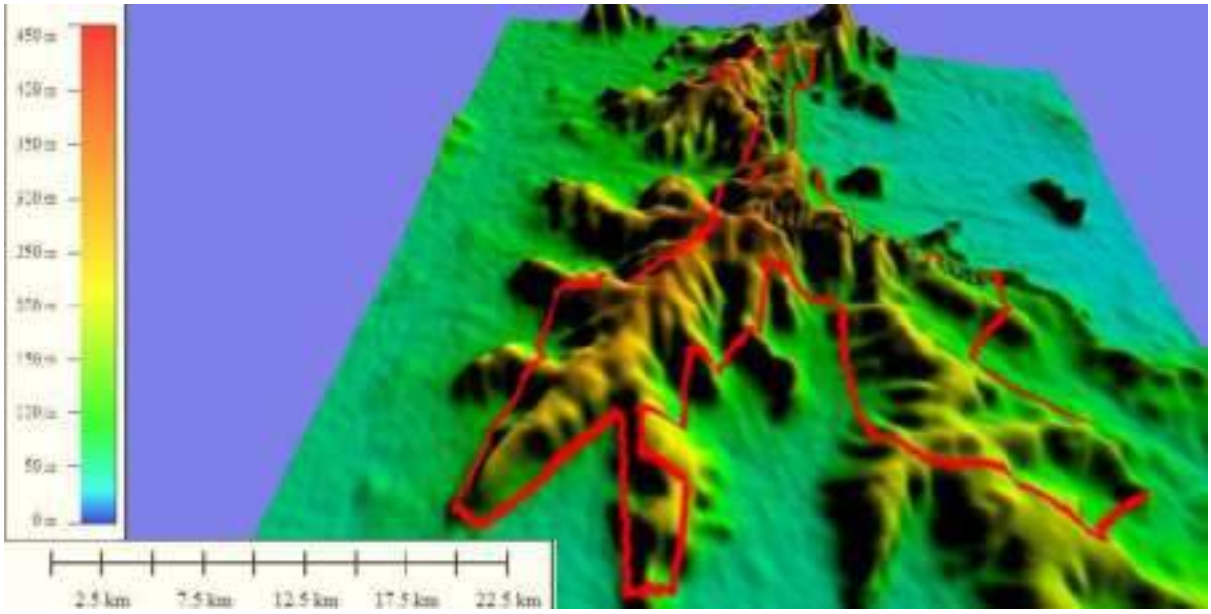


Image showing 3D Topographic view of the Potential Area

Volume of Potential Area - D, Block - Taljhari, Area 4582 Hectare								
Section Proved 317 TO 97	**Cross sectional area of O.B in sqm**	**Total Cross Sectional area in sqm**	**Influence Length m**	**Total Volume of O.B in Cum situ (B)**	**Total Volume in Cum situ (A)**	**Total Volume of Stone Cum situ (A-B)**	**Recovery 60% in m cum situ**	**Million tons of Stone**
3000N	4515	56621.00	3100	13996500	175525100.00	161528600.00	3914.51016	10569.18
0.00	15769	429919.00	3000	47307000	1289757000.00	1242450000.00		
3000S	27290	709984.00	7500	204675000	5324880000.00	5120205000.00		
Total				**265978500**	**6790162100.00**	**6524183600.00**		

Block - Borio

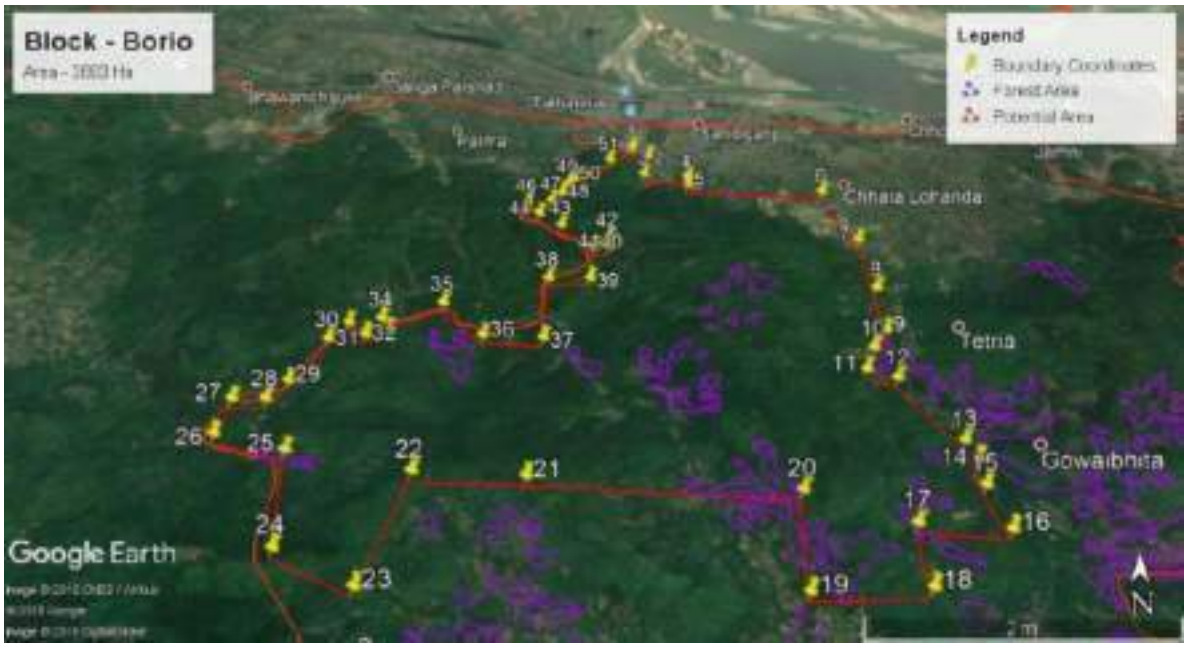


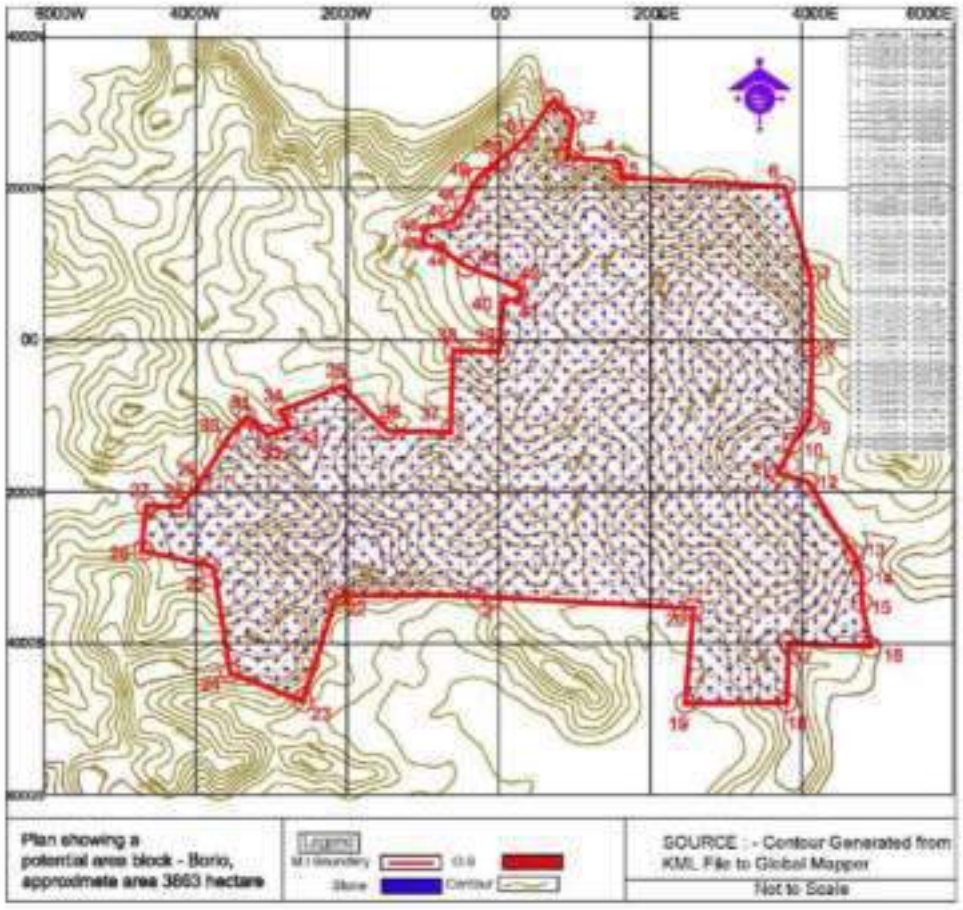
Image showing the Potential Area (Block – A, Mineral - Basalt) As Per KML Data

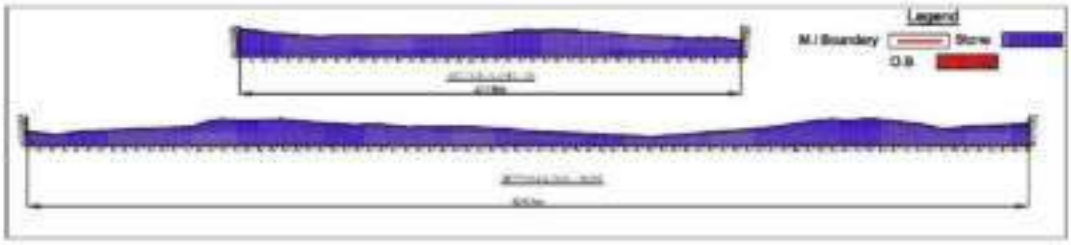
Sl no	Latitude	Longitude
1	25°13'52.77"N	87°38'1.27"E
2	25°13'45.14"N	87°38'10.16"E
3	25°13'27.23"N	87°38'7.14"E
4	25°13'25.11"N	87°38'31.29"E
5	25°13'18.20"N	87°38'31.51"E
6	25°13'14.00"N	87°39'45.30"E
7	25°12'33.41"N	87°39'57.03"E
8	25°11'55.03"N	87°39'57.63"E
9	25°11'28.56"N	87°39'56.65"E
10	25°11'18.68"N	87°39'48.86"E
11	25°11'5.18"N	87°39'42.54"E
12	25°11'1.34"N	87°39'56.02"E
13	25°10'28.31"N	87°40'16.93"E
14	25°10'19.65"N	87°40'20.07"E
15	25°10'7.46"N	87°40'19.91"E
16	25° 9'47.22"N	87°40'24.25"E
17	25° 9'48.96"N	87°39'46.99"E
18	25° 9'22.31"N	87°39'46.30"E
19	25° 9'22.09"N	87°39'0.53"E
20	25°10'4.54"N	87°39'4.40"E
21	25°10'10.63"N	87°37'10.92"E
22	25°10'10.24"N	87°36'24.18"E
23	25° 9'22.83"N	87°36'8.90"E
24	25° 9'35.67"N	87°35'36.15"E
25	25°10'23.19"N	87°35'28.73"E

Sl no	Latitude	Longitude
26	25°10'30.64"N	87°34'56.53"E
27	25°10'50.69"N	87°34'58.31"E
28	25°10'50.59"N	87°35'13.54"E
29	25°10'59.55"N	87°35'21.53"E
30	25°11'21.77"N	87°35'35.47"E
31	25°11'30.36"N	87°35'43.73"E
32	25°11'22.45"N	87°35'53.06"E
33	25°11'26.25"N	87°36'2.84"E
34	25°11'33.43"N	87°35'58.55"E
35	25°11'44.38"N	87°36'26.40"E
36	25°11'24.25"N	87°36'47.12"E
37	25°11'23.82"N	87°37'15.12"E
38	25°12'0.36"N	87°37'16.52"E
39	25°11'59.97"N	87°37'36.88"E
40	25°12'23.20"N	87°37'38.97"E
41	25°12'23.19"N	87°37'46.64"E
42	25°12'29.30"N	87°37'46.15"E
43	25°12'38.33"N	87°37'21.82"E
44	25°12'46.59"N	87°37'10.09"E
45	25°12'48.04"N	87°37'2.27"E
46	25°12'55.24"N	87°37'3.41"E
47	25°12'58.58"N	87°37'16.17"E
48	25°13'5.65"N	87°37'21.47"E
49	25°13'13.98"N	87°37'24.88"E
50	25°13'17.96"N	87°37'27.57"E
51	25°13'34.99"N	87°37'47.70"E

List of villages falling under the potential area:

Dorme, Kanri, Ladonri, Rpldih, Adore Bedo, Adore Mago, Gaude, Dule, Dapanmi, Jokani, Dhuliani, Chiharpari, Nargang, Khairsol, Gowaibhita, Tetria, Damdama, Mir, Ghogi, Lohanda Bedo, Lohanda Mako, Durgatola, Belra, Bijria, Bara Panchgarh Pahar, Panchgarh, Chapa, Sidhari, Daugoda, Gogi Bedo, Bagduma, Lachmi, Podiaha, Phulpahari, Gaude, Naugachi, Roldih, Banskola.





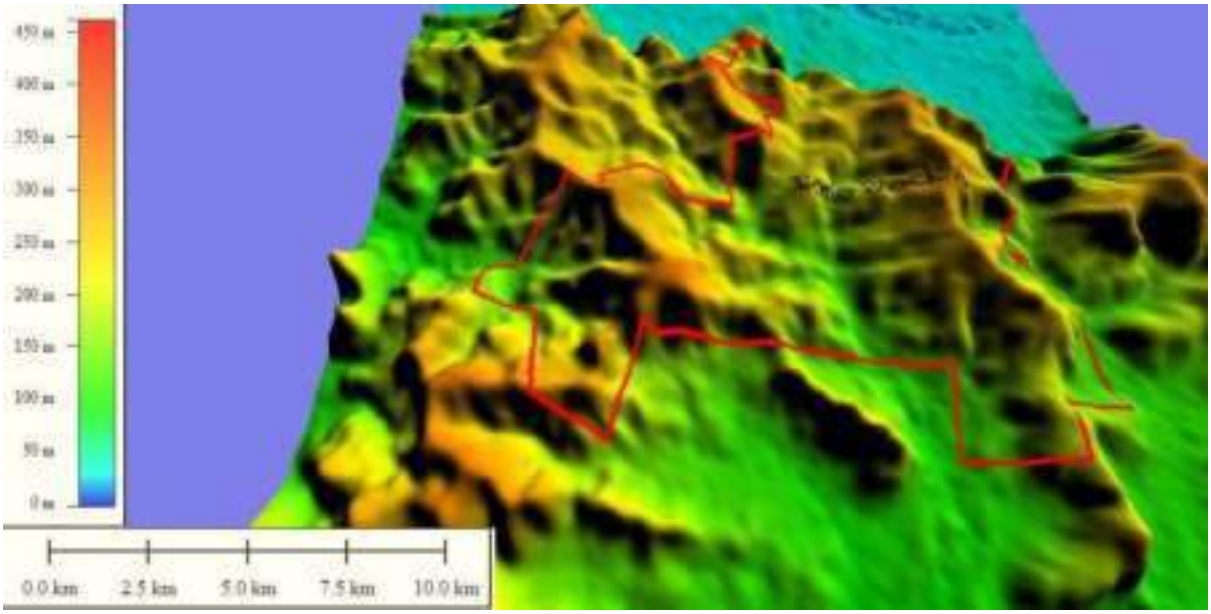


Image showing 3D Topographic view of the Potential Area

Volume of Potential Area - A, Block - Broio, Area 3863 Hectare								
Section Proved 237 TO 57	**Cross sectional area of O.B in sqm**	**Total Cross Sectional area in sqm**	**Influence Length m**	**Total Volume of O.B in Cum situ (B)**	**Total Volume in Cum situ (A)**	**Total Volume of Stone Cum situ (A-B)**	**Recovery 60% in m cum situ**	**Million tons of Stone**
0.00	16519	744491.00	2400	39645600	1786778400.00	1747132800.00	4163.3175	11240.96
2000S	33005	1240384.00	4300	141921500	5333651200.00	5191729700.00		
Total				**181567100**	**7120429600.00**	**6938862500.00**		

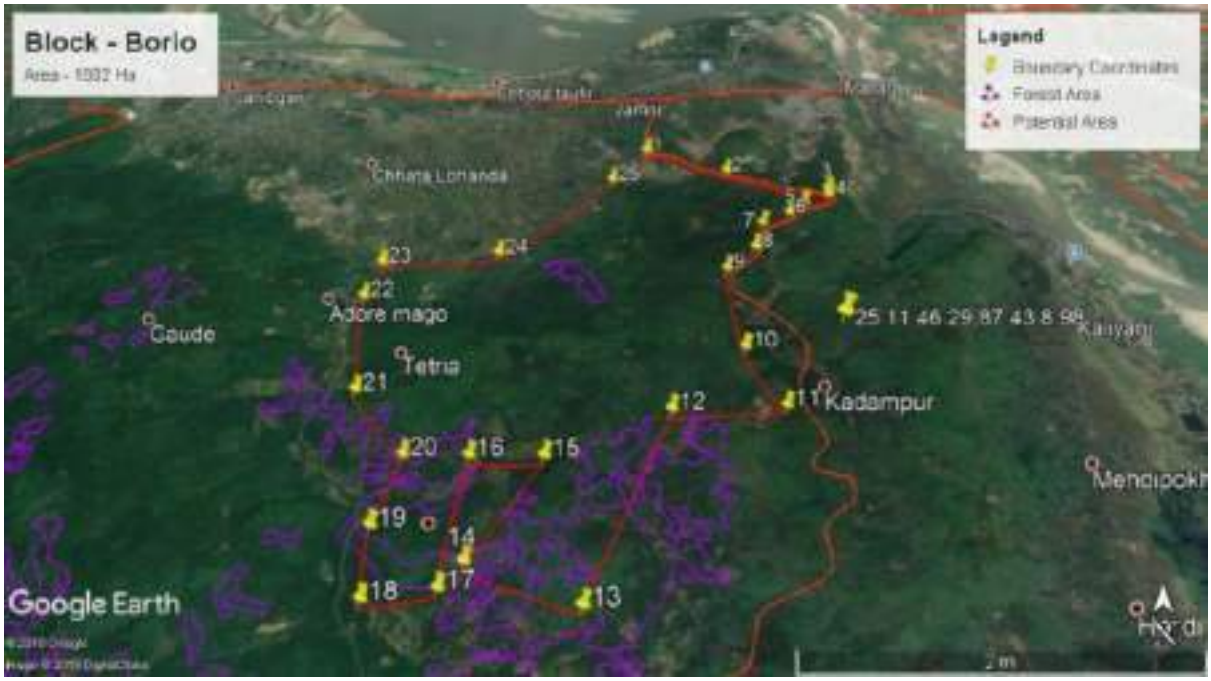


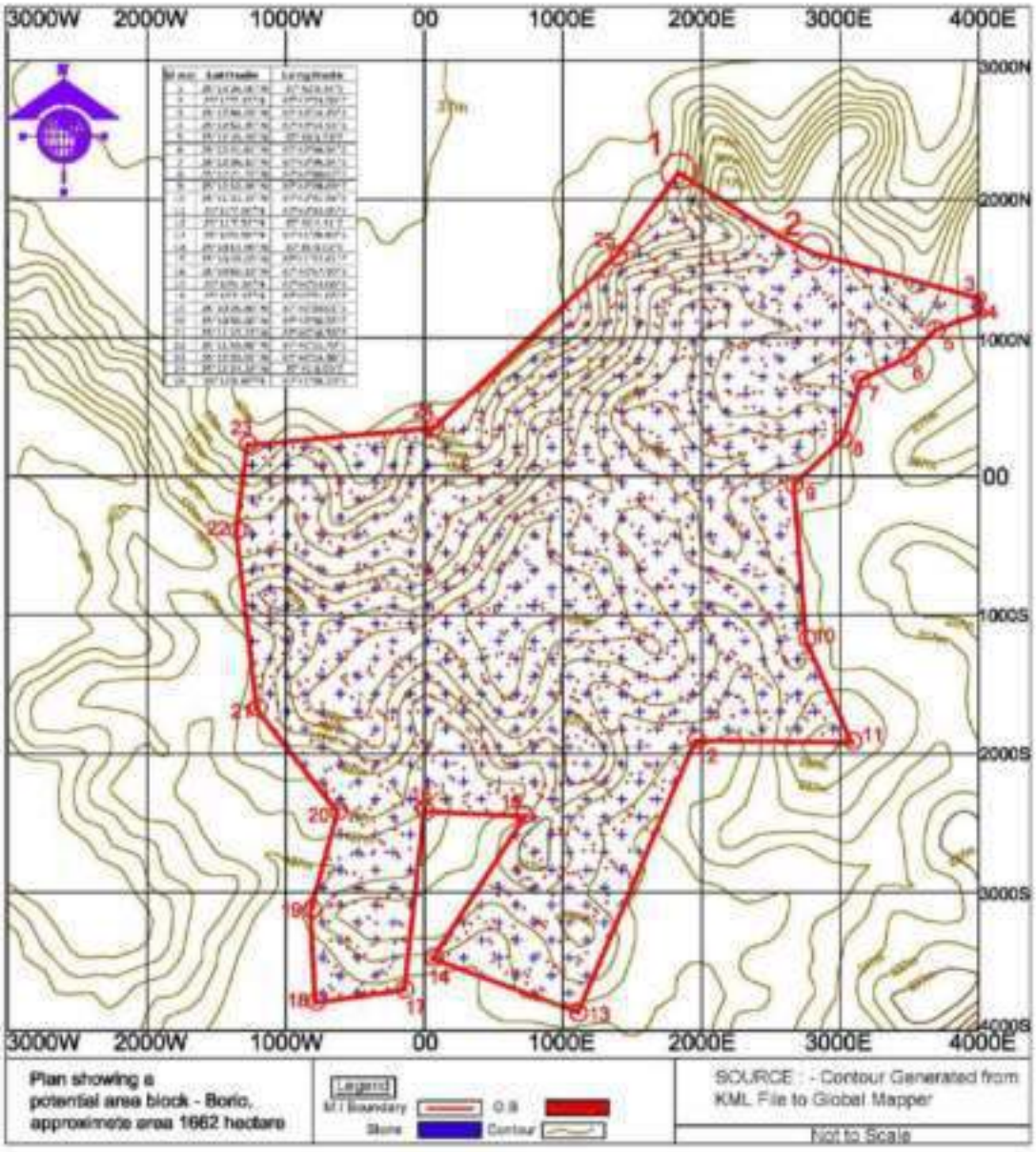
Image showing the Potential Area (Block – B, Mineral - Basalt) As Per KML Data

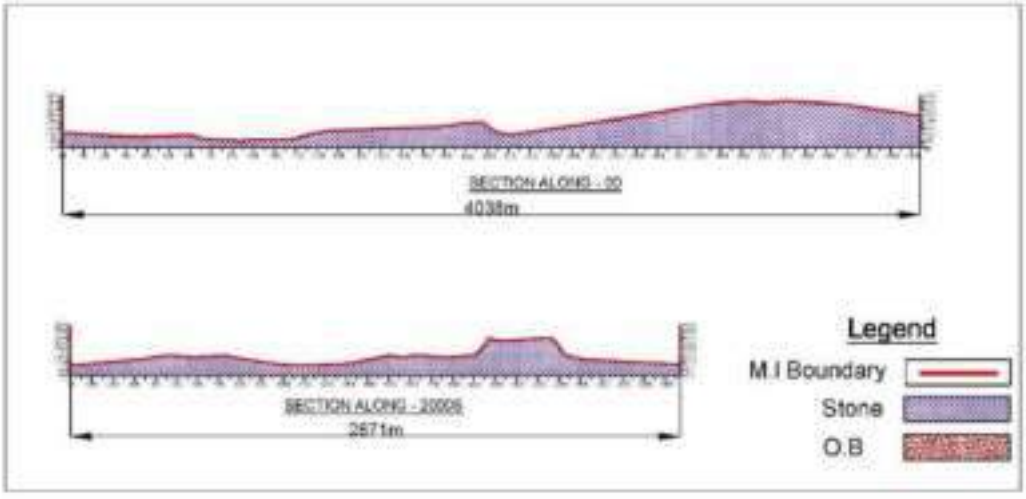
Sl no	Latitude	Longitude
1	25°13'26.90"N	87°42'0.34"E
2	25°13'7.15"N	87°42'33.58"E
3	25°12'56.03"N	87°43'14.29"E
4	25°12'52.39"N	87°43'14.53"E
5	25°12'48.48"N	87°43'3.53"E
6	25°12'41.61"N	87°42'56.54"E
7	25°12'36.10"N	87°42'45.24"E
8	25°12'21.72"N	87°42'40.67"E
9	25°12'10.39"N	87°42'28.69"E
10	25°11'32.27"N	87°42'31.58"E
11	25°11'7.05"N	87°42'42.85"E
12	25°11'7.53"N	87°42'4.41"E
13	25°10'0.85"N	87°41'35.69"E

Sl no	Latitude	Longitude
14	25°10'13.99"N	87°41'0.02"E
15	25°10'49.03"N	87°41'22.61"E
16	25°10'50.18"N	87°40'57.89"E
17	25°10'6.26"N	87°40'53.06"E
18	25°10'3.15"N	87°40'31.05"E
19	25°10'25.88"N	87°40'30.01"E
20	25°10'50.00"N	87°40'36.55"E
21	25°11'15.22"N	87°40'16.78"E
22	25°11'58.82"N	87°40'11.70"E
23	25°12'20.01"N	87°40'14.36"E
24	25°12'24.22"N	87°41'0.09"E
25	25°13'6.69"N	87°41'45.19"E

List of villages falling under the potential area:

Nirapara, Baraparte, Chongro, Diari, Phuljhari, Jhingani, Mira, Barapagaro, Saharbera, Pangdo, Adremago, Tetria, Parte Mago, Asanbani, Sarsa, Aurbata, Sihli, Gowaibhita, Durgatola.





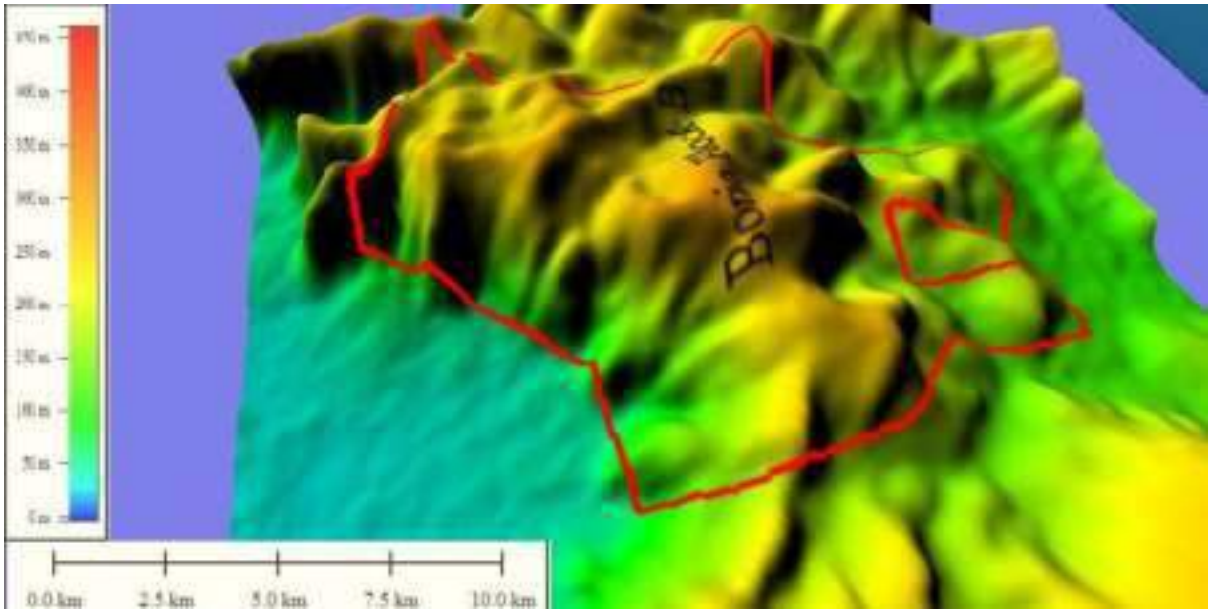


Image showing 3D Topographic view of the Potential Area

Volume of Potential Area - B, Block - Broio, Area 1662 Hectare								
Section Proved 237 TO 57	**Cross sectional area of O.B in sqm**	**Total Cross Sectional area in sqm**	**Influence Length m**	**Total Volume of O.B in Cum situ (B)**	**Total Volume in Cum situ (A)**	**Total Volume of Stone Cum situ (A-B)**	**Recovery 60% in m cum situ**	**Million tons of Stone**
0.00	16326	447808	2200	35917200	985177600.00	949260400.00	1073.2704	2897.83
2000S	11863	245064.00	3600	42706800	882230400.00	839523600.00		
Total				**78624000**	**1867408000.00**	**1788784000.00**		

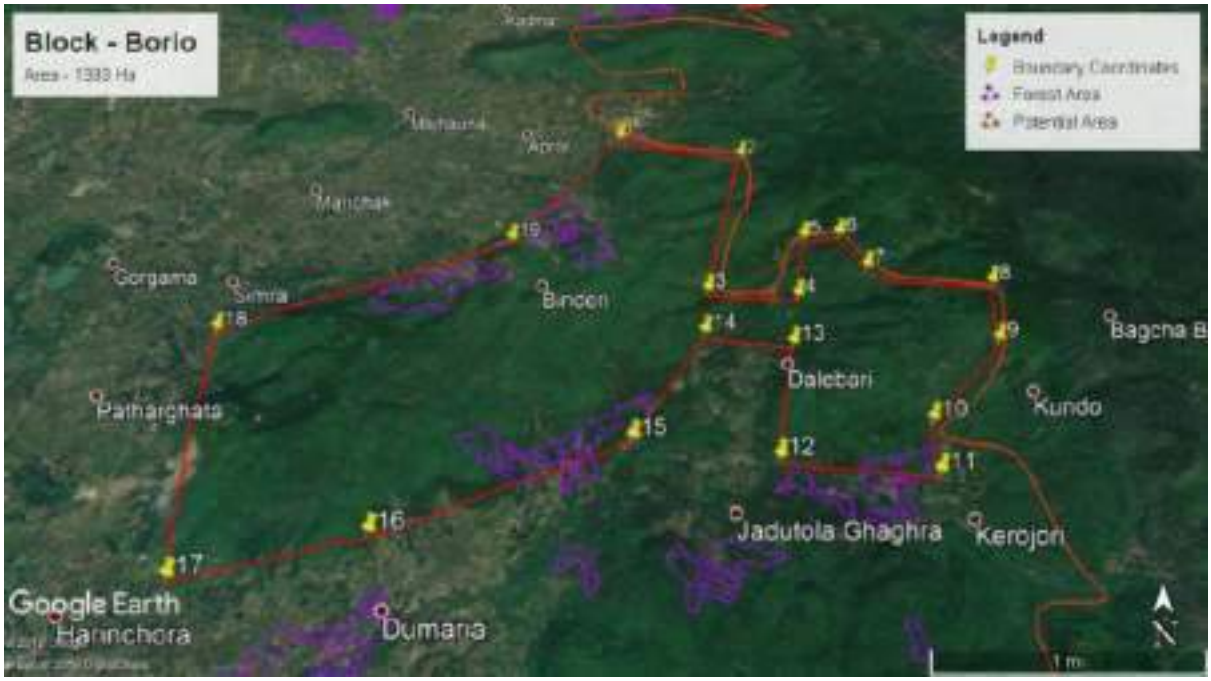


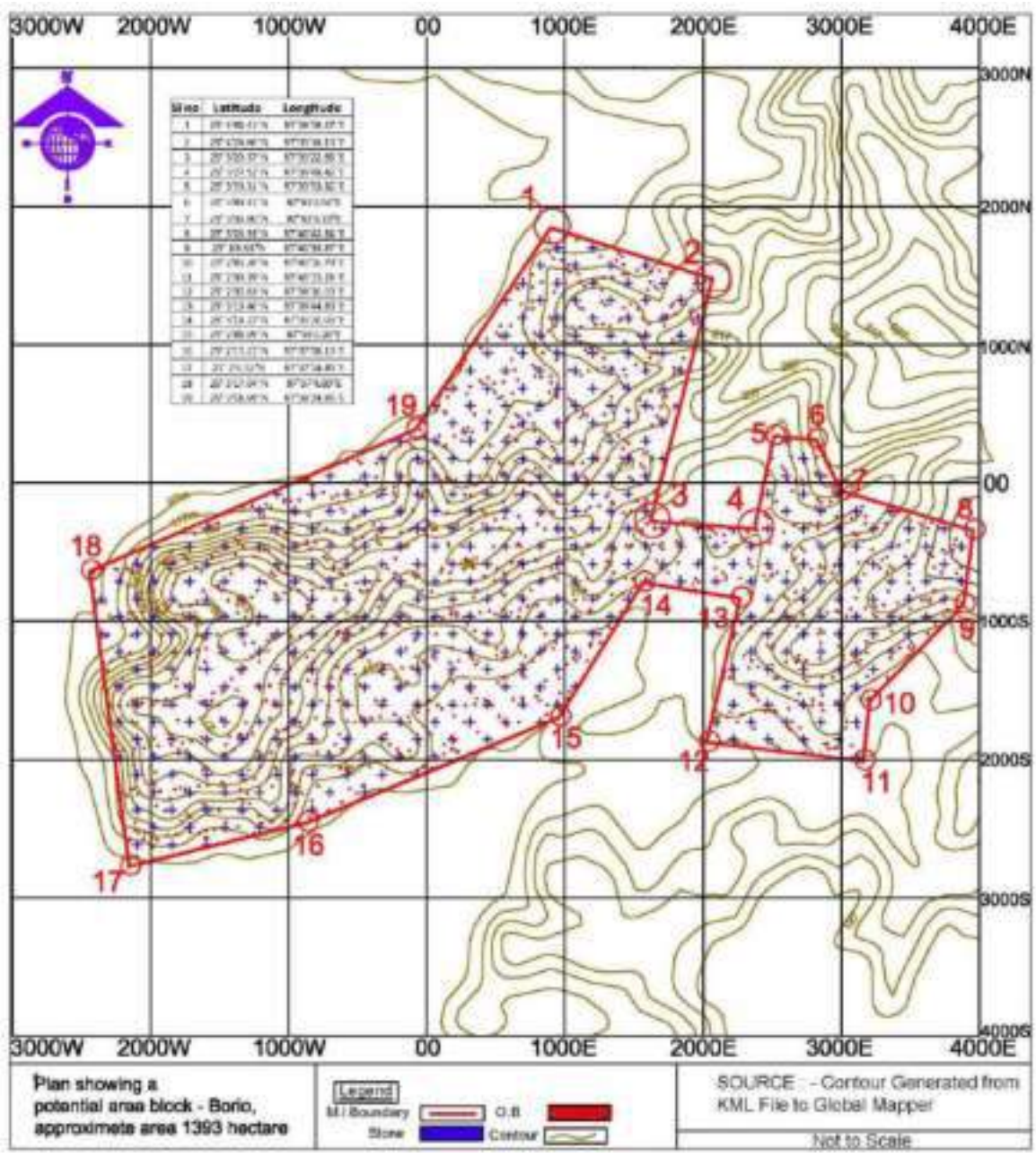
Image showing the Potential Area (Block – C, Mineral - Basalt) As Per KML Data

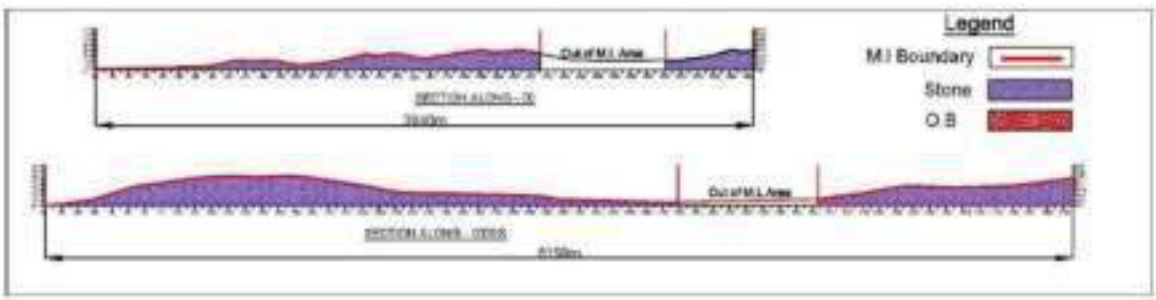
Sl no	Latitude	Longitude
1	25° 4'41.41"N	87°38'58.27"E
2	25° 4'28.86"N	87°39'38.13"E
3	25° 3'29.37"N	87°39'22.85"E
4	25° 3'27.52"N	87°39'48.42"E
5	25° 3'50.31"N	87°39'53.32"E
6	25° 3'49.41"N	87°40'3.54"E
7	25° 3'36.86"N	87°40'9.73"E
8	25° 3'26.93"N	87°40'42.31"E
9	25° 3'8.93"N	87°40'39.87"E
10	25° 2'45.20"N	87°40'16.79"E

Sl no	Latitude	Longitude
11	25° 2'30.39"N	87°40'15.24"E
12	25° 2'35.03"N	87°39'36.63"E
13	25° 3'10.40"N	87°39'44.80"E
14	25° 3'14.27"N	87°39'20.93"E
15	25° 2'41.09"N	87°39'0.26"E
16	25° 2'15.21"N	87°37'58.13"E
17	25° 2'4.52"N	87°37'14.45"E
18	25° 3'17.04"N	87°37'4.69"E
19	25° 3'51.69"N	87°38'24.85"E

List of villages falling under the potential area:

Aprol, Binderi, Hathikhuta, Bagcha Maqo, Dalebari, Dalabaripahar, Kundo, Hatikhuta, Chhota bandar Kola, Simra.





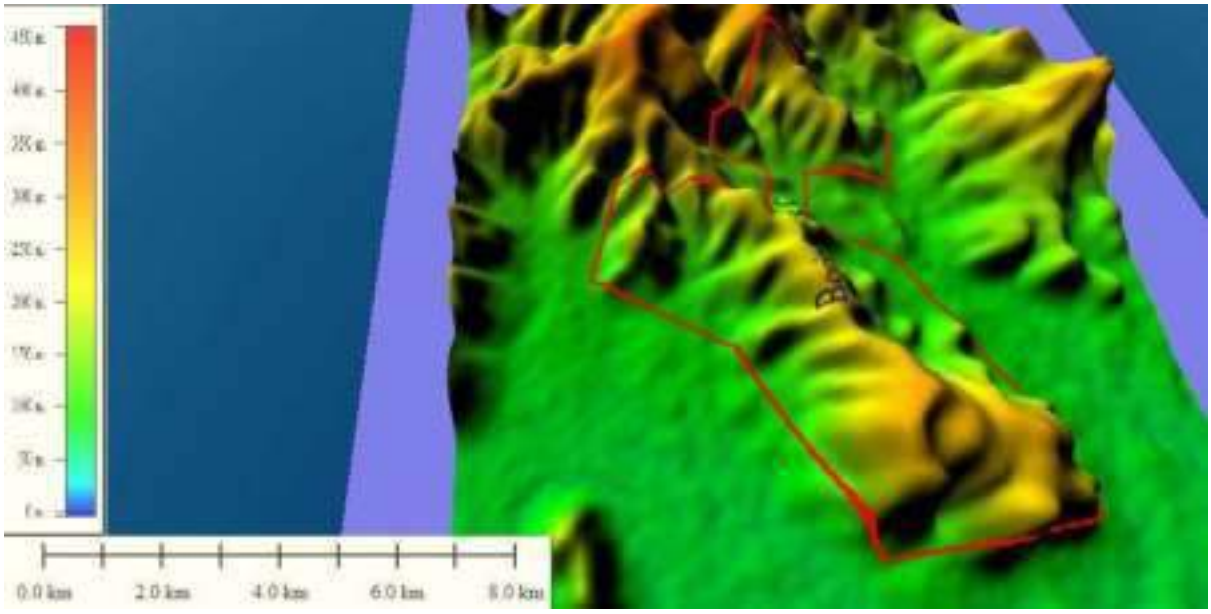


Image showing 3D Topographic view of the Potential Area

Volume of Potential Area - C, Block - Broio, Area 1393 Hectare								
Section Proved 277 TO 97	**Cross sectional area of O.B in sqm**	**Total Cross Sectional area in sqm**	**Influence Length m**	**Total Volume of O.B in Cum situ (B)**	**Total Volume in Cum situ (A)**	**Total Volume of Stone Cum situ (A-B)**	**Recovery 60% in m cum situ**	**Million tons of Stone**
0.00	12891	196380	1600	20625600	314208000.00	293582400.00	853.38576	2304.14
1000S	21361	491664.00	2400	51266400	1179993600.00	1128727200.00		
Total				**71892000**	**1494201600.00**	**1422309600.00**		

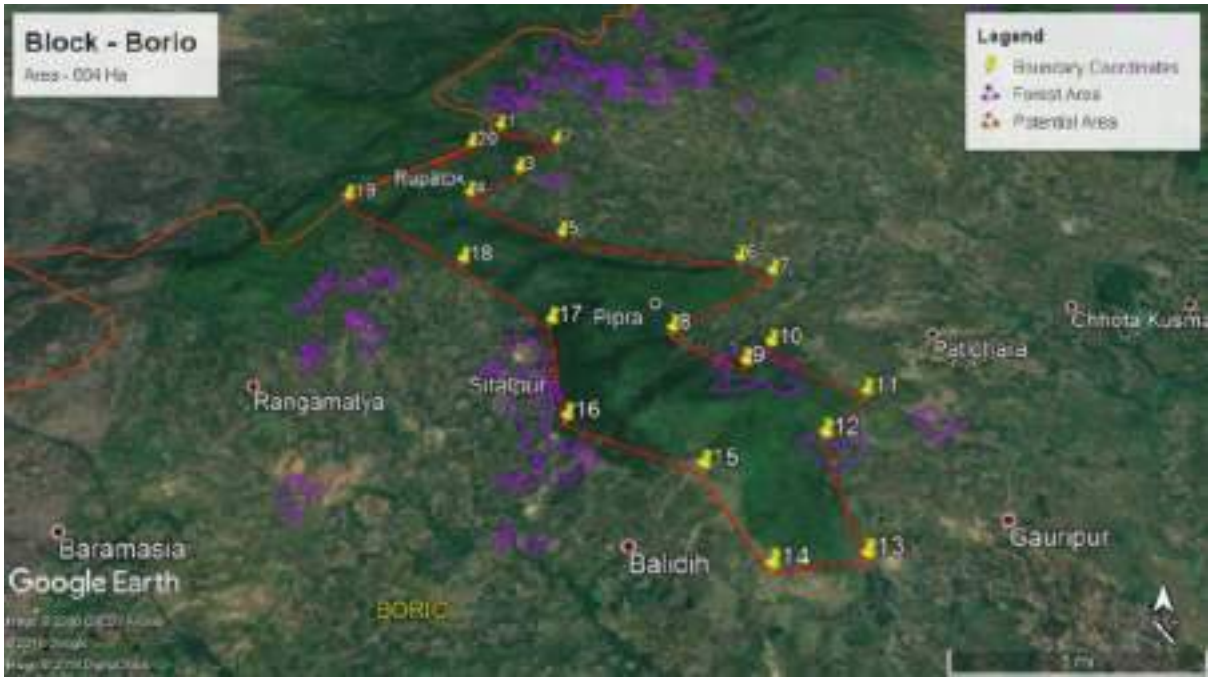


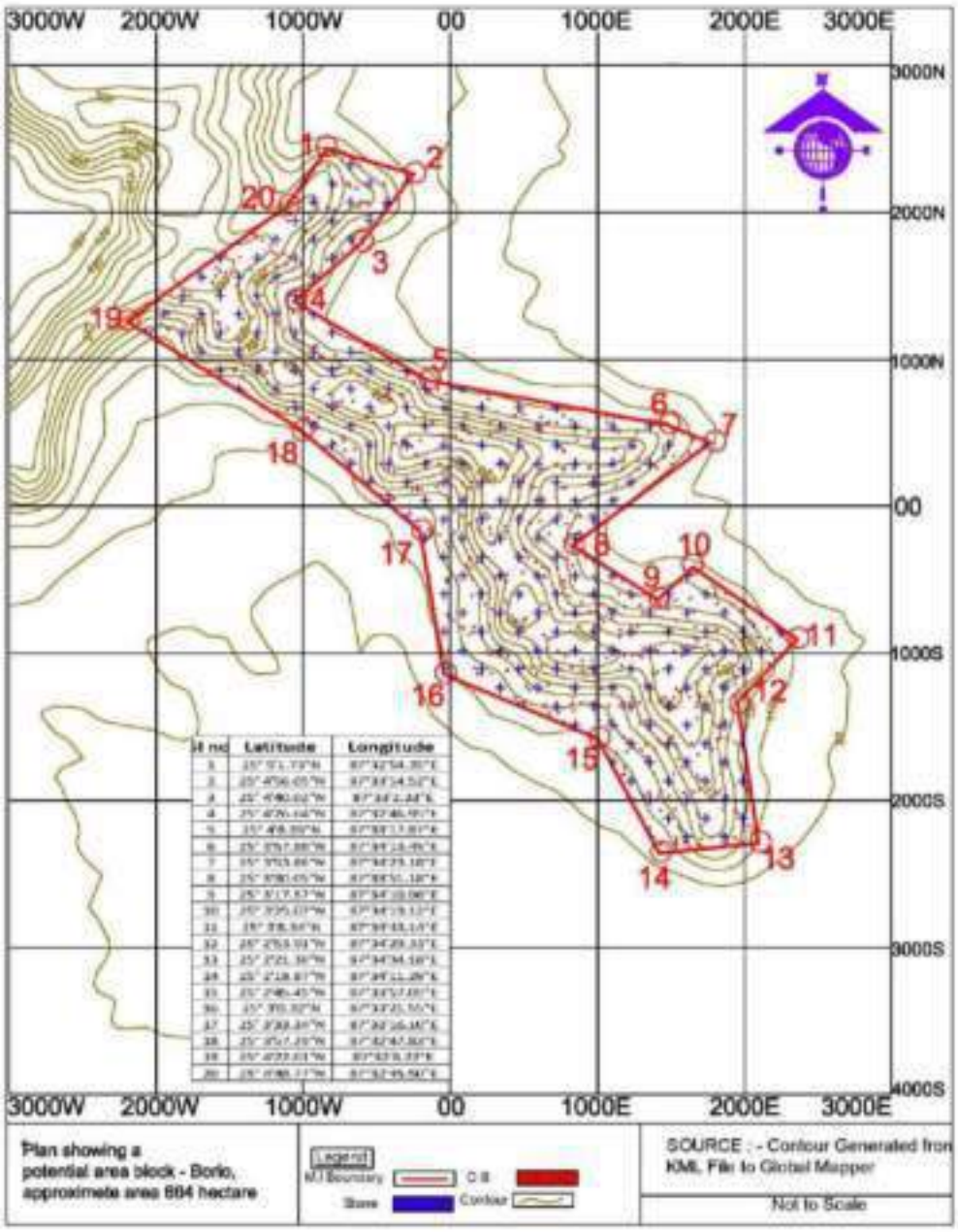
Image showing the Potential Area (Block – D, Mineral - Basalt) As Per KML Data

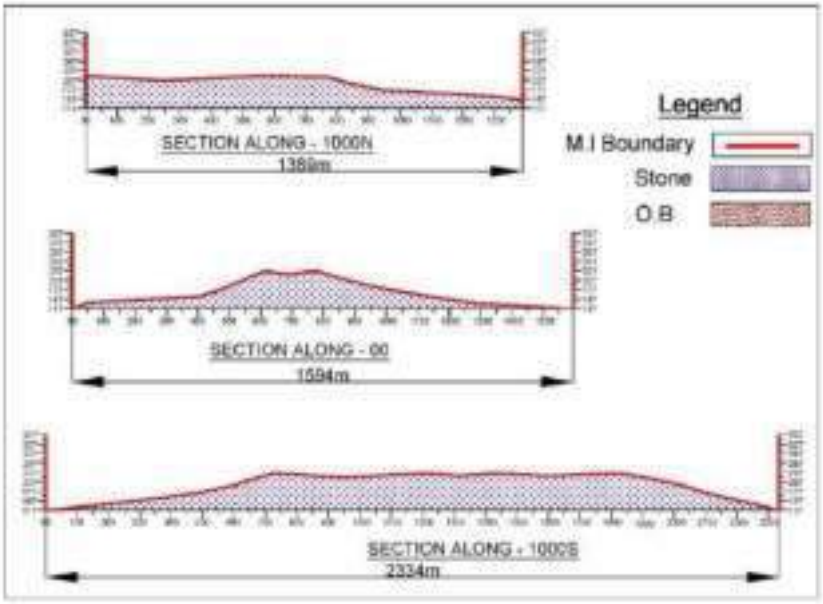
Sl no	Latitude	Longitude
1	25° 5'1.73"N	87°32'54.35"E
2	25° 4'56.05"N	87°33'14.52"E
3	25° 4'40.02"N	87°33'2.33"E
4	25° 4'26.64"N	87°32'46.95"E
5	25° 4'8.33"N	87°33'17.87"E
6	25° 3'57.88"N	87°34'13.45"E
7	25° 3'53.86"N	87°34'23.18"E
8	25° 3'30.05"N	87°33'51.18"E
9	25° 3'17.57"N	87°34'10.96"E
10	25° 3'25.07"N	87°34'19.12"E

Sl no	Latitude	Longitude
11	25° 3'8.34"N	87°34'43.14"E
12	25° 2'53.91"N	87°34'29.33"E
13	25° 2'21.30"N	87°34'34.18"E
14	25° 2'18.87"N	87°34'11.29"E
15	25° 2'45.45"N	87°33'57.05"E
16	25° 3'0.32"N	87°33'21.55"E
17	25° 3'33.34"N	87°33'16.10"E
18	25° 3'57.29"N	87°32'47.83"E
19	25° 4'22.01"N	87°32'8.22"E
20	25° 4'48.77"N	87°32'45.50"E

List of villages falling under the potential area:

Karambi, Rupatok, Mahwari Bedo, Daugoda, Gidakole, Pipra, Pertoki, Chitrtoke, Danware, Demchake, Rangmatia, Sitalpur, Bishunpur.


3000W
2000W
1000W
00
1000E
2000E
3000E
3000N
2000N
1000N
00
1000S
2000S
3000S
4000S
Latitude
Longitude
Plan showing a potential area block - Borlo, approximate area 694 hectare
Legend
M.I Boundary
O.B
Stone
Contour
SOURCE : - Contour Generated from KML File in Global Mapper
Not to Scale


SECTION ALONG - 1000N
1389m
SECTION ALONG - 00
1594m
SECTION ALONG - 1000S
2334m
Legend
M.I Boundary
Stone
O.B

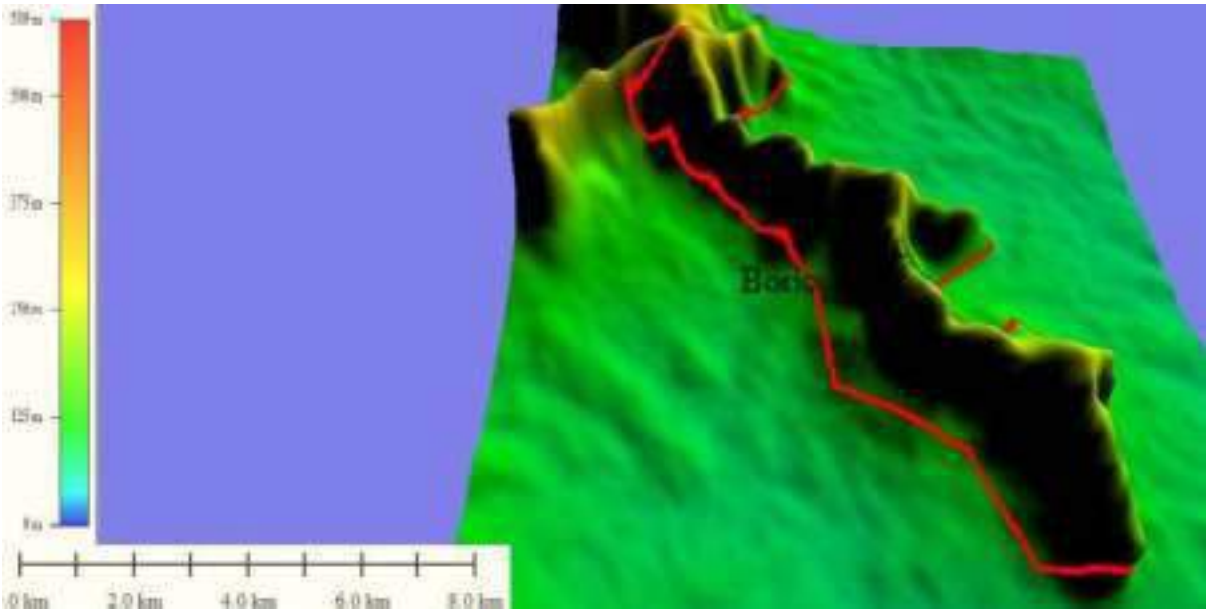


Image showing 3D Topographic view of the Potential Area

Volume of Potential Area - D, Block - Broio, Area 664 Hectare								
Section Proved 237 TO 117	**Cross sectional area of O.B in sqm**	**Total Cross Sectional area in sqm**	**Influence Length m**	**Total Volume of O.B in Cum situ (B)**	**Total Volume in Cum situ (A)**	**Total Volume of Stone Cum situ (A-B)**	**Recovery 60% in m cum situ**	**Million tons of Stone**
1000N	5584	104609	1700	9492800	177835300.00	168342500.00	457.78578	1236.02
0.00	6354	74567	1900	12072600	141677300.00	129604700.00		
1000S	9345	181578	2700	25231500	490260600.00	465029100.00		
Total				**34724300**	**668095900.00**	**762976300.00**		

Block - Mandro

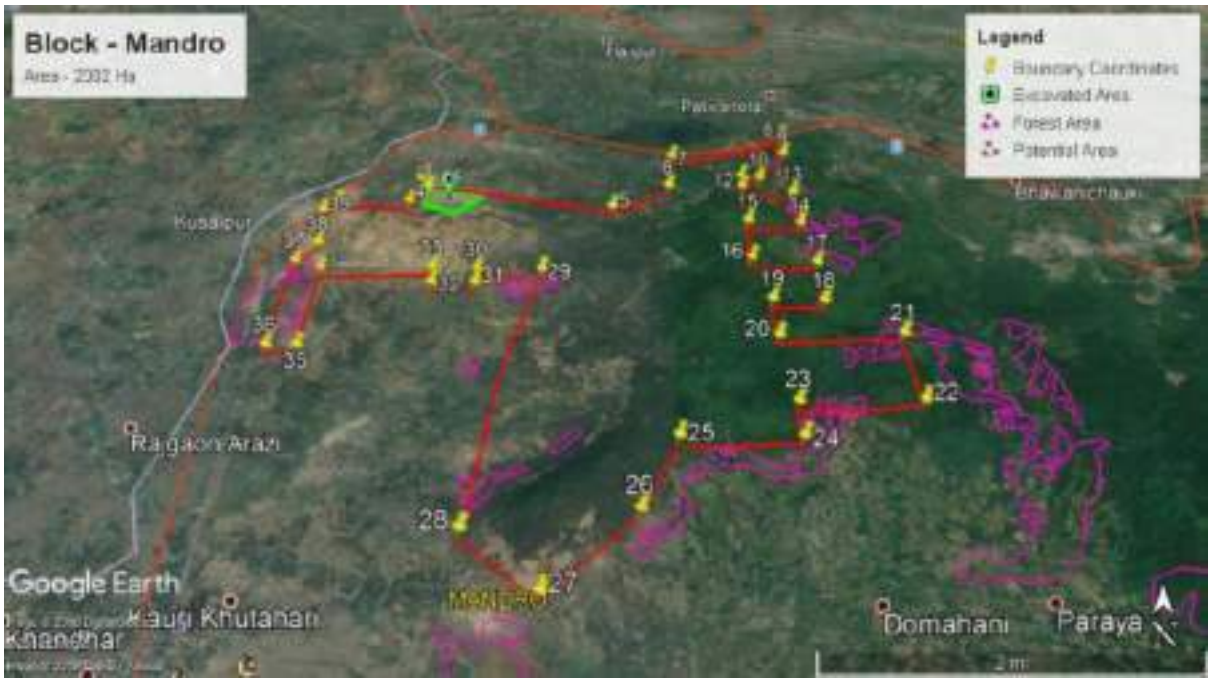
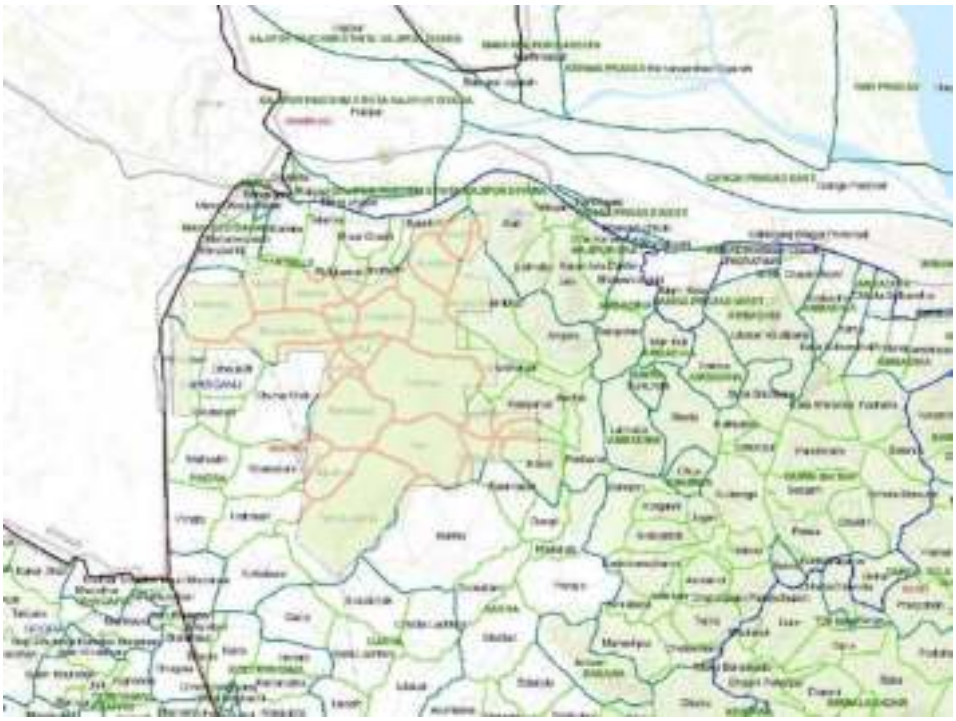


Image showing the Potential Area (Block – A, Mineral – Basalt & Granite Gneiss) As Per KML Data

Sl no	Latitude	Longitude
1	25°14'40.14"N	87°28'53.34"E
2	25°14'38.37"N	87°29'25.79"E
3	25°14'50.45"N	87°29'31.95"E
4	25°14'56.57"N	87°29'27.99"E
5	25°14'38.24"N	87°30'55.26"E
6	25°14'50.36"N	87°31'20.61"E
7	25°15'12.34"N	87°31'23.09"E
8	25°15'23.04"N	87°32'14.93"E
9	25°15'9.19"N	87°32'14.22"E
10	25°14'52.52"N	87°32'1.36"E
11	25°14'53.94"N	87°31'53.44"E
12	25°14'45.45"N	87°31'52.90"E
13	25°14'41.60"N	87°32'14.91"E
14	25°14'22.16"N	87°32'15.45"E
15	25°14'22.52"N	87°31'53.18"E
16	25°14'0.20"N	87°31'52.24"E
17	25°13'59.67"N	87°32'19.31"E
18	25°13'38.23"N	87°32'18.67"E
19	25°13'37.90"N	87°31'58.20"E
20	25°13'21.02"N	87°31'58.61"E

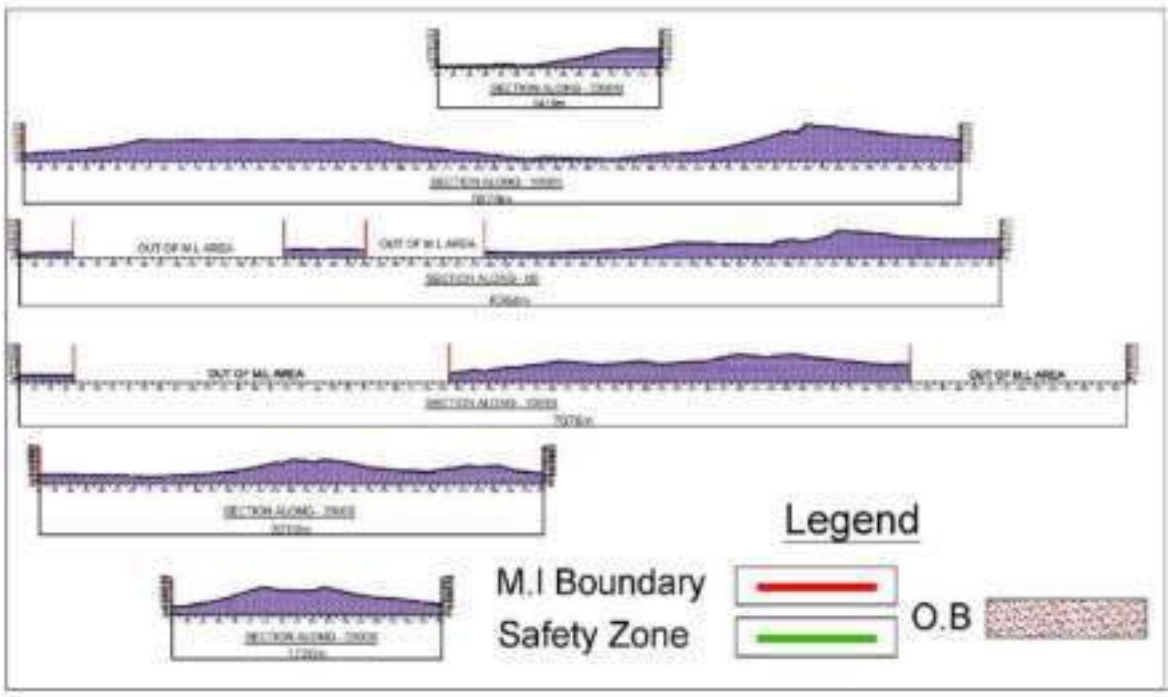
Sl no	Latitude	Longitude
21	25°13'21.73"N	87°32'46.51"E
22	25°12'52.35"N	87°32'48.06"E
23	25°12'51.99"N	87°32'2.23"E
24	25°12'37.91"N	87°32'2.50"E
25	25°12'36.69"N	87°31'18.29"E
26	25°12'9.53"N	87°31'4.00"E
27	25°11'41.47"N	87°30'31.93"E
28	25°12'2.96"N	87°30'4.67"E
29	25°13'58.25"N	87°30'25.80"E
30	25°13'58.81"N	87°29'59.22"E
31	25°13'51.41"N	87°29'58.99"E
32	25°13'51.36"N	87°29'41.24"E
33	25°13'59.31"N	87°29'41.00"E
34	25°13'59.20"N	87°28'54.66"E
35	25°13'19.17"N	87°28'53.97"E
36	25°13'19.21"N	87°28'41.87"E
37	25°14'4.04"N	87°28'42.98"E
38	25°14'14.68"N	87°28'50.27"E
39	25°14'34.61"N	87°28'48.14"E

Central Coordinate of Excavated Area			
Sl no	**Latitude**	**Longitude**	**Area (Ha)**
A	25°14'44.19"N	87°29'43.65"E	30



List of villages falling under the potential area:

Sundere, Daminbhita, Damra (Daminbhita), Pakria, Kodepara, Sugnipaharpur, Bomria, Butaha, Mundli, Bumra Mago, Balbadri, Kairasol, Chui, Banskola, Gari, Banchapa, Guti, Talmi, Baubathan, Sonda, Kanipahar, Hathmari, Khairabani, Chuna Khali, Dhaukuti, Paharpur, Rosoi, Tetaria, Bichkanre, Bartala, Nimgachhi.



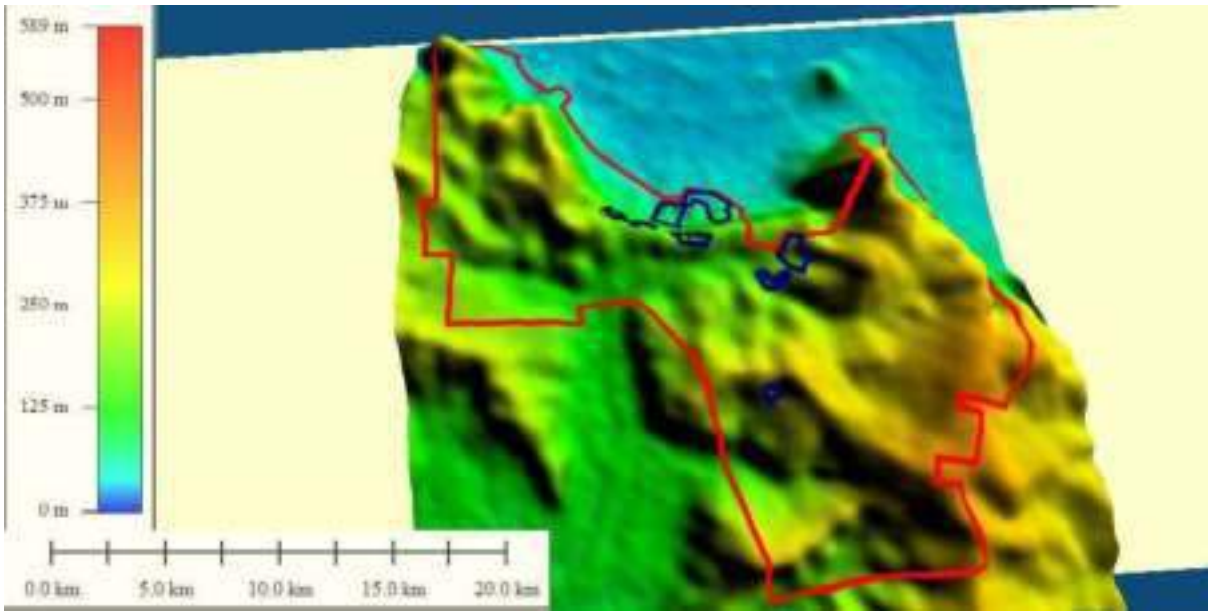


Image showing 3D Topographic view of the Potential Area

Volume of Potential Area - A, Block - Mandro, Area 2000 Hectare								
Section Proved 245 TO 45	**Cross sectional area of O.B in sqm**	**Total Cross Sectional area in sqm**	**Influence Length m**	**Total Volume of O.B in Cum (B)**	**Total Volume in Cum (A)**	**Total Volume of Stone Cum (A-B)**	**Recovery 60% in m cum**	**Million tons of**
2000N	5726	74461.00	850	4867100	63291850.00	58424750.00	1111.852	3002.00
1000N	24180	631296.00	1000	24180000	631296000.00	607116000.00		
0.00	16758	342980.00	1000	16758000	342980000.00	326222000.00		
1000S	13275	386615.00	1000	13275000	386615000.00	373340000.00		
2000S	13020	284142.00	1000	13020000	284142000.00	271122000.00		
3000S	7007	204154.00	1100	7707700	224569400.00	216861700.00		
Total				**79807800**	**1932894250.00**	**1853086450.00**		

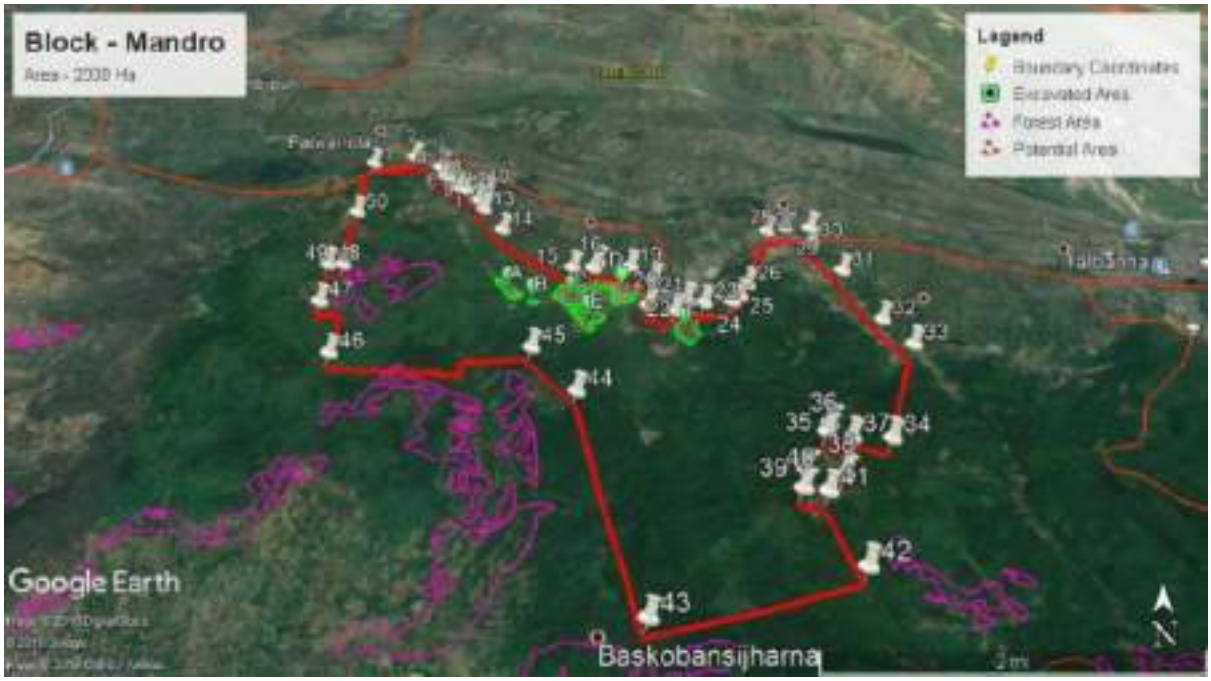


Image showing the Potential Area (Block – B, Mineral - Basalt) As Per KML Data

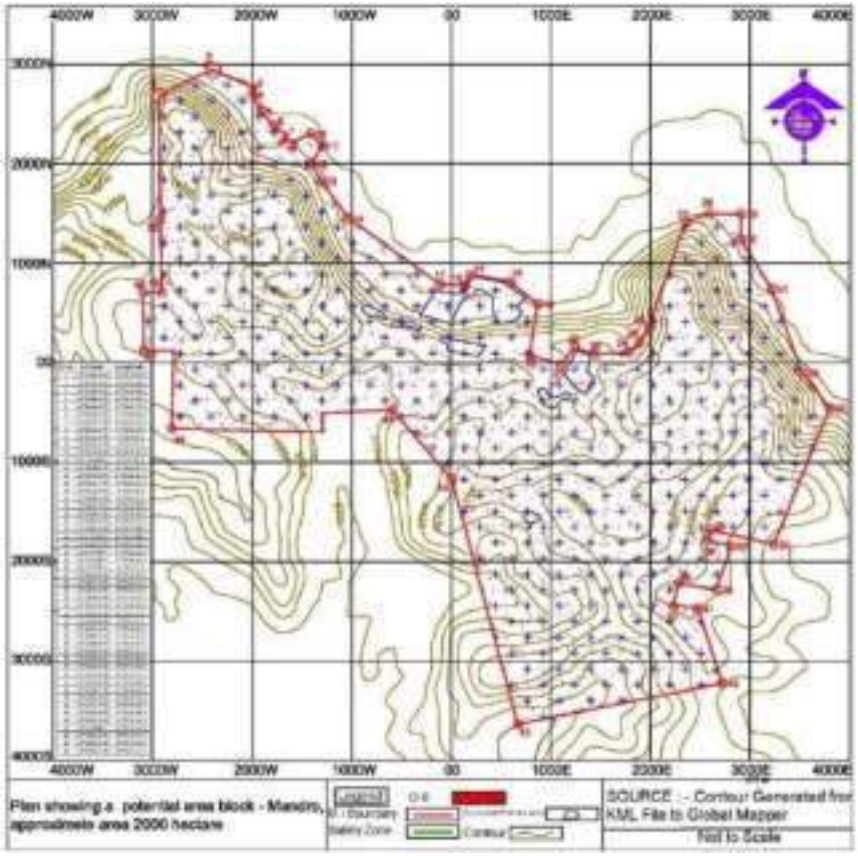
Sl no	Latitude	Longitude
1	25°15'25.53"N	87°32'18.04"E
2	25°15'35.95"N	87°32'34.60"E
3	25°15'30.84"N	87°32'48.28"E
4	25°15'28.64"N	87°32'47.59"E
5	25°15'22.32"N	87°32'50.76"E
6	25°15'19.01"N	87°32'53.62"E
7	25°15'14.72"N	87°32'59.12"E
8	25°15'13.11"N	87°32'58.62"E
9	25°15'12.12"N	87°33'1.92"E
10	25°15'15.17"N	87°33'7.47"E
11	25°15'10.98"N	87°33'11.81"E
12	25°15'4.84"N	87°33'7.94"E
13	25°14'58.87"N	87°33'10.97"E
14	25°14'46.40"N	87°33'20.35"E
15	25°14'23.73"N	87°33'51.55"E
16	25°14'23.34"N	87°34'0.26"E
17	25°14'26.87"N	87°34'2.23"E
18	25°14'24.36"N	87°34'15.99"E
19	25°14'16.53"N	87°34'25.28"E
20	25°13'59.35"N	87°34'22.57"E
21	25°13'56.19"N	87°34'32.99"E
22	25°14'1.85"N	87°34'37.88"E
23	25°13'59.61"N	87°34'45.03"E
24	25°14'0.46"N	87°34'56.22"E
25	25°14'3.26"N	87°34'59.61"E

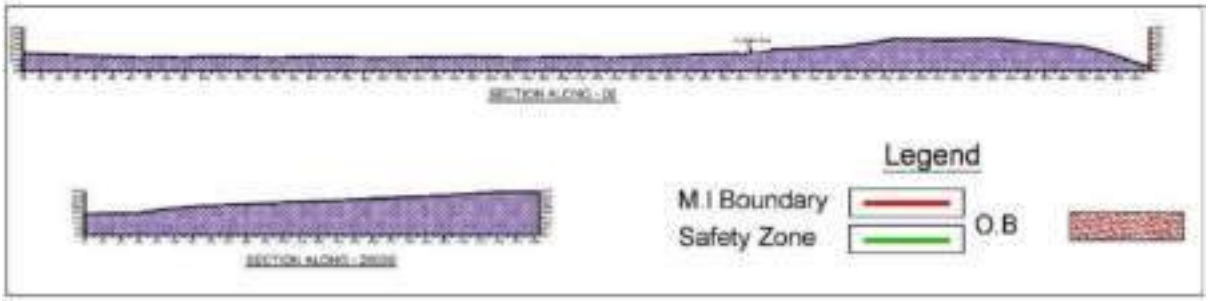
Sl no	Latitude	Longitude
26	25°14'9.25"N	87°35'3.47"E
27	25°14'44.63"N	87°35'15.73"E
28	25°14'47.59"N	87°35'24.31"E
29	25°14'47.60"N	87°35'35.12"E
30	25°14'38.90"N	87°35'34.56"E
31	25°14'21.95"N	87°35'45.06"E
32	25°13'53.21"N	87°35'55.57"E
33	25°13'40.86"N	87°36'5.10"E
34	25°12'54.58"N	87°35'46.04"E
35	25°12'59.31"N	87°35'24.45"E
36	25°12'55.96"N	87°35'23.07"E
37	25°12'53.91"N	87°35'31.41"E
38	25°12'39.00"N	87°35'26.09"E
39	25°12'40.88"N	87°35'13.40"E
40	25°12'33.86"N	87°35'11.71"E
41	25°12'32.62"N	87°35'19.80"E
42	25°13'16.01"N	87°35'28.23"E
43	25°11'53.26"N	87°34'18.73"E
44	25°11'51.39"N	87°33'54.95"E
45	25°13'38.59"N	87°33'36.88"E
46	25°13'34.09"N	87°32'20.15"E
47	25°14'0.56"N	87°32'10.73"E
48	25°14'20.43"N	87°32'10.21"E
49	25°14'20.50"N	87°32'16.34"E
50	25°14'52.51"N	87°32'16.11"E

Details of Excavated Area within this potential area			
Sl no	**Latitude**	**Longitude**	**Area (Ha)**
A	25°14'16.00"N	87°33'27.20"E	4
B	25°14'9.87"N	87°33'37.60"E	0.68
C	25°14'14.07"N	87°33'53.71"E	12.5
D	25°14'18.66"N	87°34'14.00"E	14
E	25°14'0.14"N	87°34'0.61"E	6.58
F	25°13'52.75"N	87°34'39.11"E	8
		Total	45.76

List of villages falling under the potential area:

Gari, Daminbita, Amjora, Sugnipahar, Amjhor, Jani, Karamtola Dakhin, Bhawanichauki, Desipokeria, Marikuti, Burkunda, Siwria, Demba, Majh Kola, Hathidari, Chua, Kulbanga, Jagori, Kotgandi, Baskobansijharna, Medo, Polma, Bara Gutibera, Bara Bhiranda, Ambadiha, Teliagarhi, Kanipahar, Sergarh.


4000W
3000W
2000W
1000W
00
1000E
2000E
3000E
4000E
Plan showing a potential area block - Mandro, approximate area 2000 hectare
SOURCE :- Contour Generated from KML File in Global Mapper
Not to Scale


Legend
M.I Boundary
Safety Zone
O.B

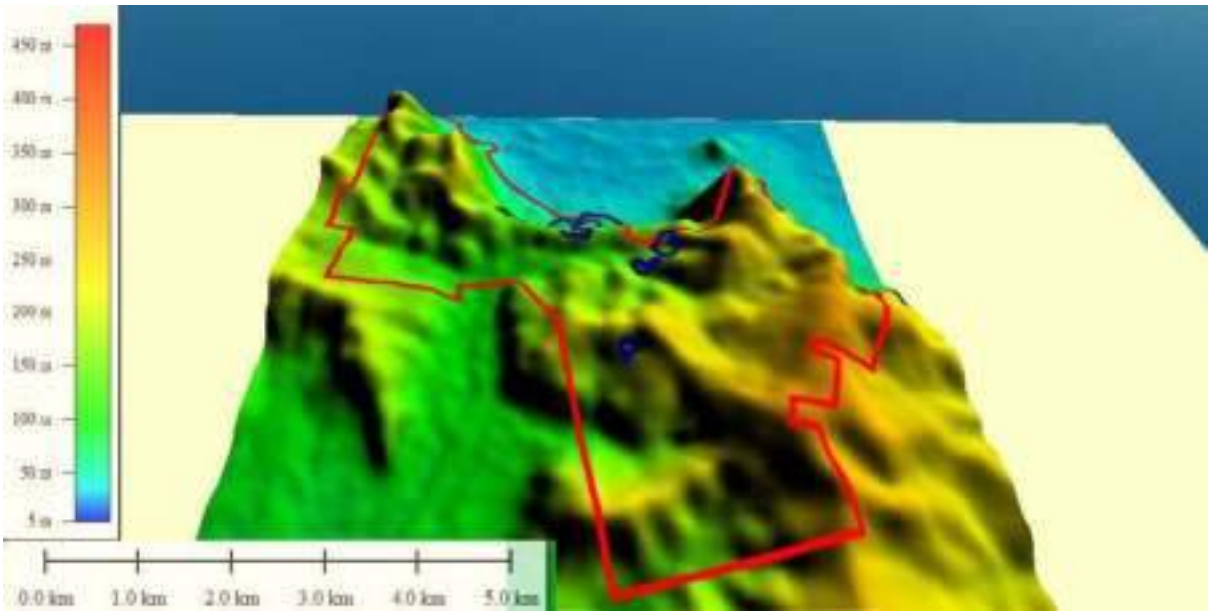


Image showing 3D Topographic view of the Potential Area

Volume of Potential Area - B, Block - Mandro, Area 1828 Hectare								
Section Proved 237 TO 57	**Cross sectional area of O.B in sqm**	**Total Cross Sectional area in sqm**	**Influence Length m**	**Total Volume of O.B in Cum situ (B)**	**Total Volume in Cum situ (A)**	**Total Volume of Stone Cum situ (A-B)**	**Recovery 60% in m cum situ**	**Million tons of Stone**
0.00	24476	625196.00	2800	68532800	1750548800.00	1682016000.00	1943.8419	5248.37
2000S	10136	455199.00	3500	35476000	1593196500.00	1557720500.00		
Total				**104008800**	**3343745300.00**	**3239736500.00**		

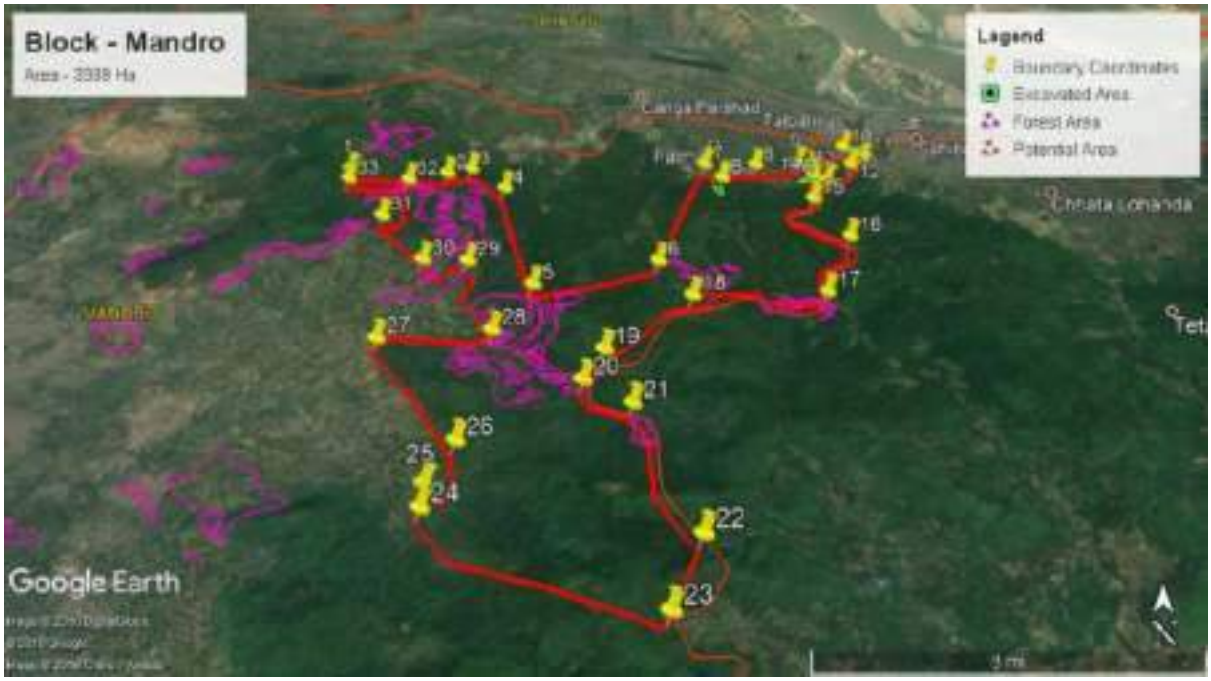


Image showing the Potential Area (Block – C, Mineral - Basalt) As Per KML Data

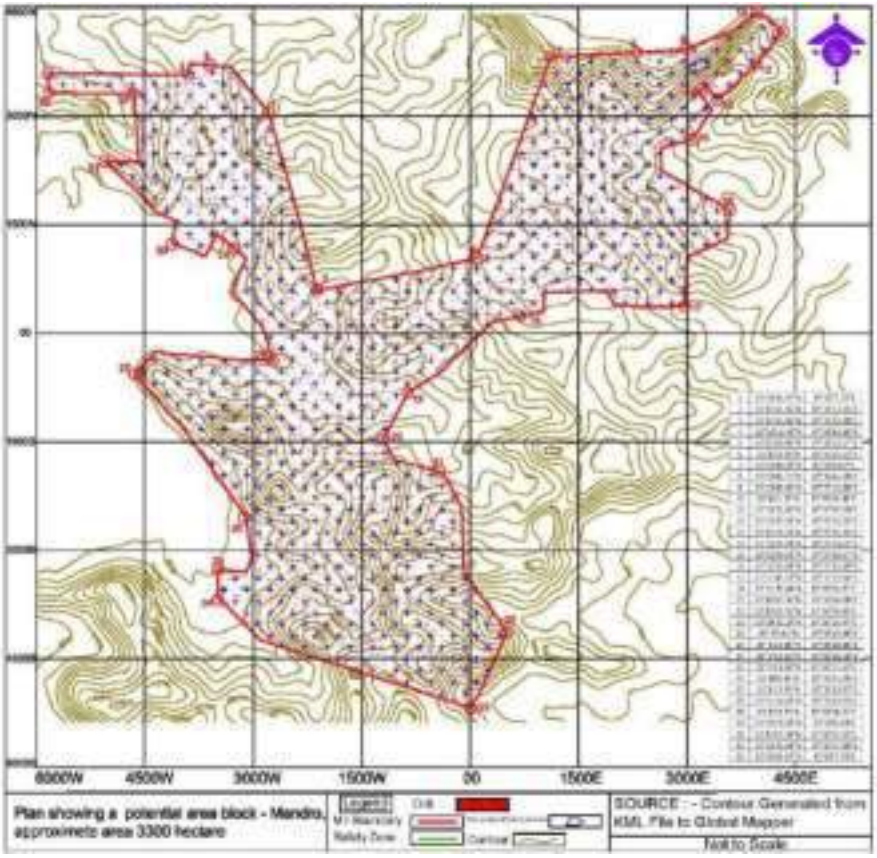
Sl No	Latitude	Longitude
1	25°13'31.37"N	87°32'7.15"E
2	25°13'31.16"N	87°33'12.25"E
3	25°13'35.66"N	87°33'27.78"E
4	25°13'12.48"N	87°33'52.55"E
5	25°11'48.86"N	87°34'15.77"E
6	25°12'3.94"N	87°35'31.52"E
7	25°13'40.09"N	87°36'6.87"E
8	25°13'41.71"N	87°36'41.68"E
9	25°13'43.60"N	87°37'10.86"E
10	25°14'1.27"N	87°37'45.49"E
11	25°13'52.06"N	87°37'57.59"E
12	25°13'37.36"N	87°37'45.75"E
13	25°13'19.43"N	87°37'26.35"E
14	25°13'24.48"N	87°37'18.32"E
15	25°12'50.02"N	87°37'33.97"E
16	25°12'25.84"N	87°37'31.89"E

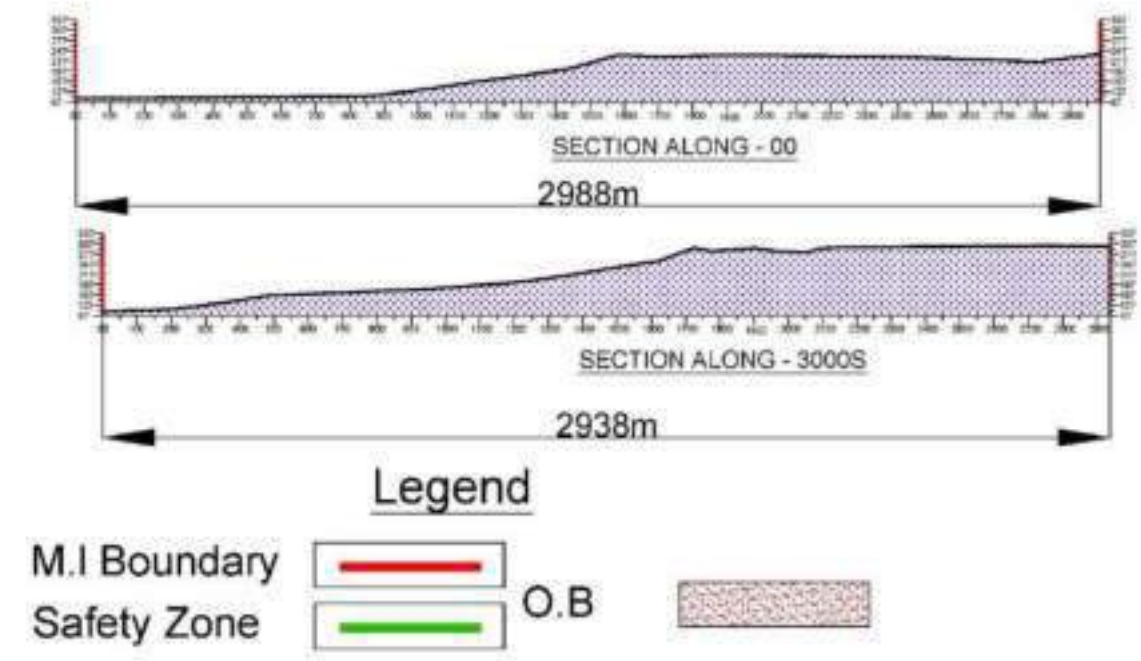
Sl No	Latitude	Longitude
17	25°11'41.59"N	87°37'10.94"E
18	25°11'35.64"N	87°35'50.31"E
19	25°10'59.96"N	87°34'58.60"E
20	25°10'37.43"N	87°34'46.88"E
21	25°10'22.29"N	87°35'13.94"E
22	25° 9'5.61"N	87°35'45.90"E
23	25° 8'29.85"N	87°35'28.85"E
24	25° 9'22.12"N	87°33'28.18"E
25	25° 9'31.80"N	87°33'17.63"E
26	25°10'0.46"N	87°33'41.46"E
27	25°11'2.29"N	87°32'53.97"E
28	25°11'14.83"N	87°33'53.93"E
29	25°12'9.73"N	87°33'34.51"E
30	25°12'11.09"N	87°33'6.54"E
31	25°12'49.70"N	87°32'35.03"E
32	25°13'22.08"N	87°32'47.88"E
33	25°13'22.67"N	87°32'7.73"E

Central Coordinate of Excavated Area		
Sl No	Latitude	Longitude
1	25°13'30.49"N	87°37'17.83"E
2	25°13'24.61"N	87°36'17.22"E

List of villages falling under the potential area:

Kanaipahar, Rosoi, Amjhor, Pokharia, Lalmatia, Khelatola, Gangti, Kotgandi, Simberitok, Baskobansijharna, Amdandi, Medo, Bara Bhiranda, Pacharaki, Karambi, Lalatok, Betonra, Sergarh, Polma, Chaldih, Pokhariapahar, Koreparapahar, Rohre, Medo, Tetria, Maheshpur, Chotrogoga, Amsari, Chuko, Heth Chara, Kalajhor, Maligoda, Dule, Bhomdai, Badem, Damdama, Jokani.





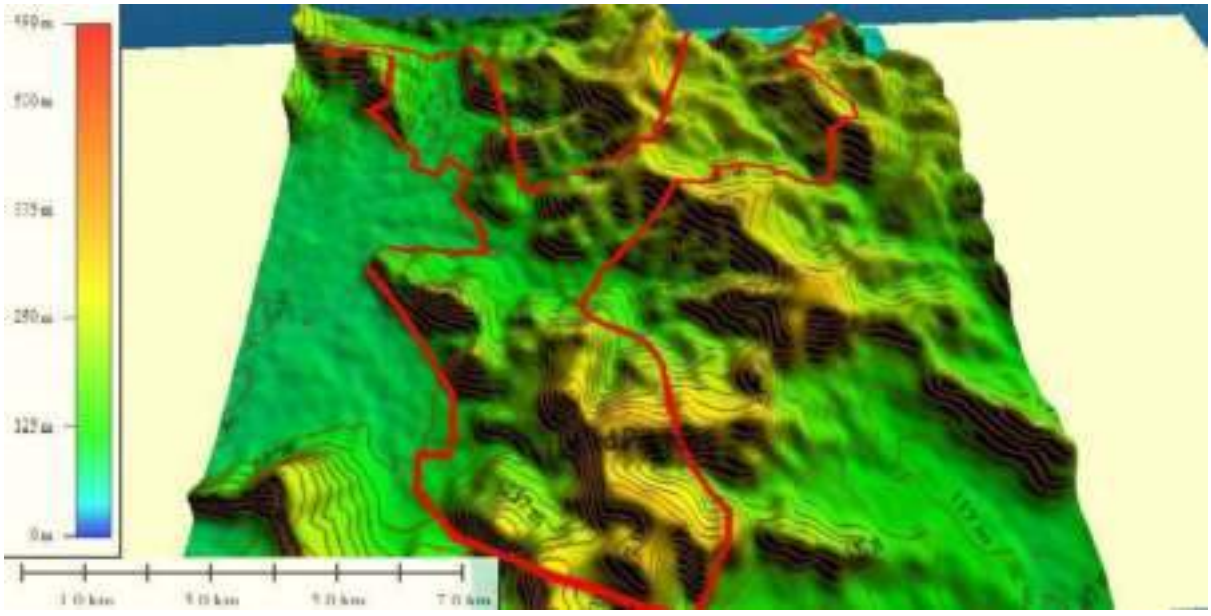


Image showing 3D Topographic view of the Potential Area

Volume of Potential Area - C, Block - Mandro, Area 3300 Hectare

Section Proved 237 TO 57	Cross sectional area of O.B in sqm	Total Cross Sectional area in sqm	Influence Length m	Total Volume of O.B in Cum (B)	Total Volume in Cum (A)	Total Volume of Stone Cum (A-B)	Recovery 60% in m cum	Million tons of
0.00	12006	241560.00	5700	68434200	1376892000.00	1308457800.00	1757.41218	4745.01
3000N	11836	371961.00	4500	53262000	1673824500.00	1620562500.00		
Total				**121696200**	**3050716500.00**	**2929020300.00**		

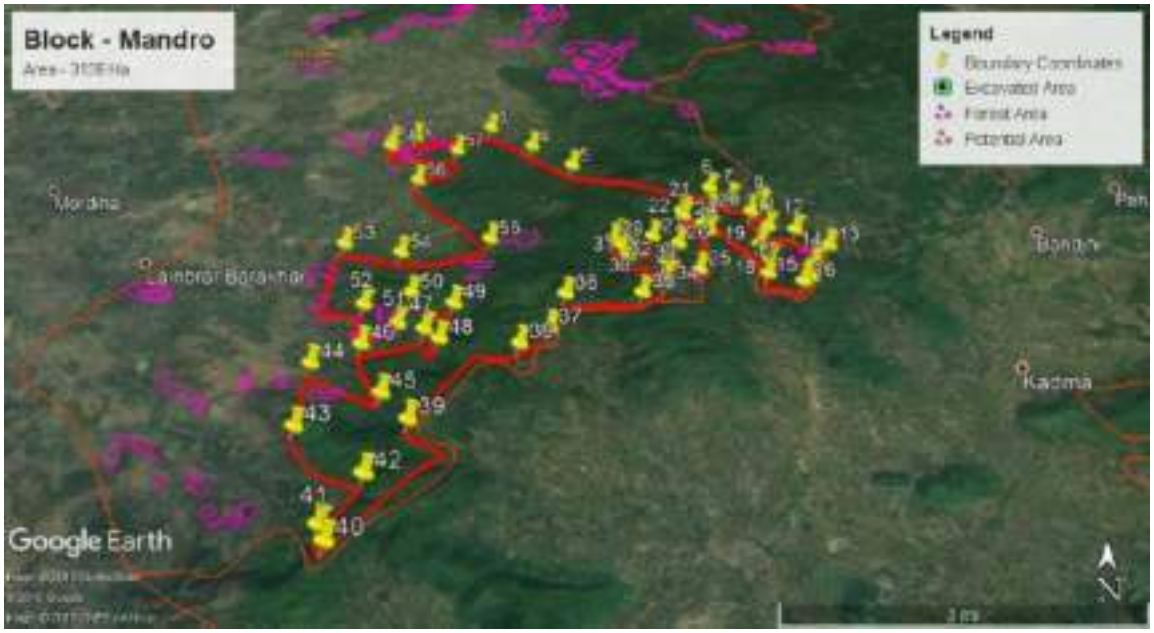


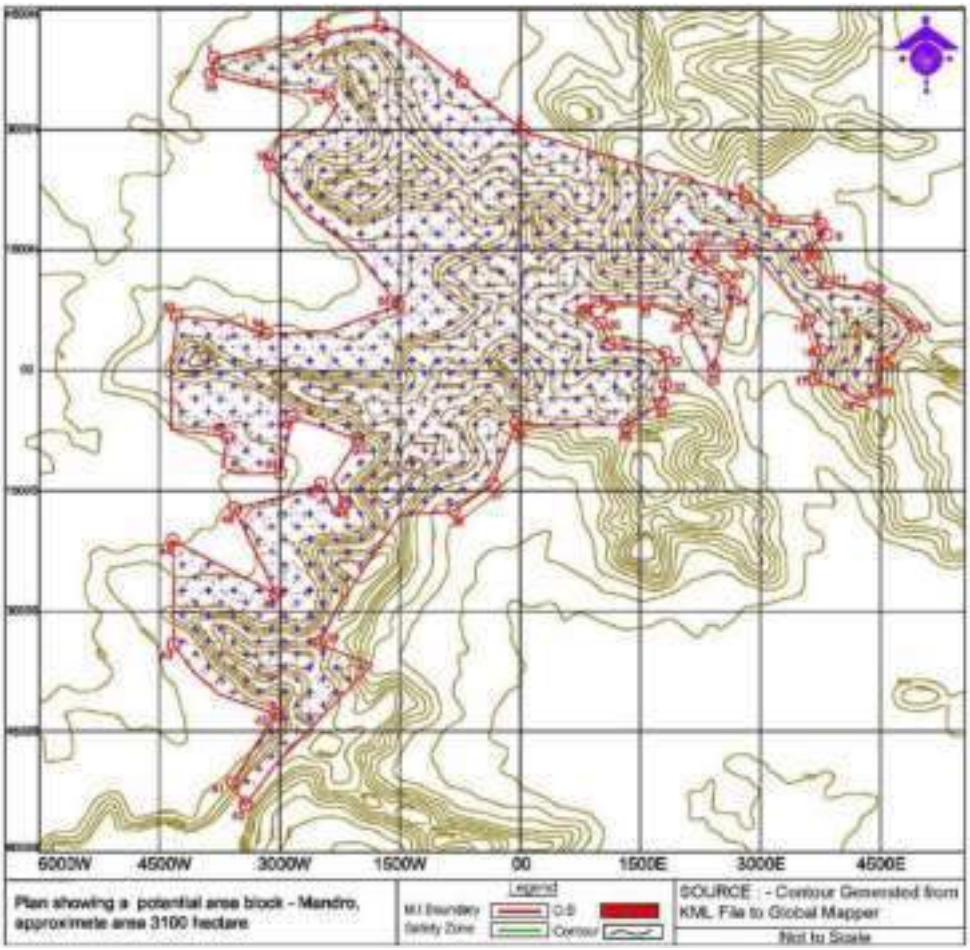
Image showing the Potential Area (Block – D, Mineral - Basalt) As Per KML Data

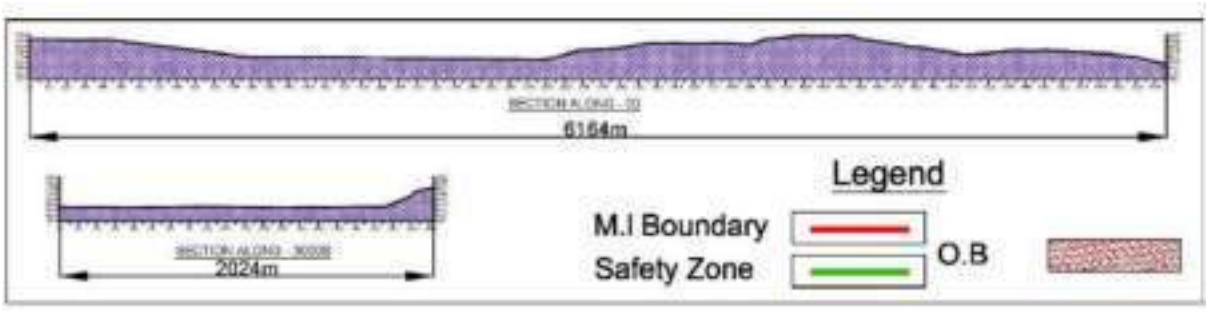
Sl No	Latitude	Longitude
1	25° 9'26.75"N	87°31'37.87"E
2	25° 9'29.76"N	87°31'54.58"E
3	25° 9'40.19"N	87°32'49.08"E
4	25° 9'18.60"N	87°33'20.84"E
5	25° 8'55.35"N	87°33'50.10"E
6	25° 8'27.73"N	87°35'24.81"E
7	25° 8'17.45"N	87°35'38.16"E
8	25° 8'15.82"N	87°35'57.21"E
9	25° 8'12.07"N	87°35'58.72"E
10	25° 8'2.83"N	87°35'50.22"E
11	25° 7'50.61"N	87°35'59.99"E
12	25° 7'48.28"N	87°36'17.78"E
13	25° 7'32.67"N	87°36'36.61"E
14	25° 7'16.37"N	87°36'23.70"E
15	25° 7'4.74"N	87°36'20.61"E
16	25° 7'0.65"N	87°36'14.73"E
17	25° 7'9.50"N	87°35'54.21"E
18	25° 7'21.68"N	87°35'56.98"E
19	25° 7'35.22"N	87°35'52.31"E
20	25° 8'2.54"N	87°35'25.06"E
21	25° 8'6.04"N	87°35'4.36"E
22	25° 7'55.81"N	87°35'11.14"E
23	25° 7'48.63"N	87°35'18.86"E
24	25° 7'46.97"N	87°35'20.13"E
25	25° 7'13.86"N	87°35'11.32"E
26	25° 7'35.82"N	87°34'59.64"E
27	25° 7'42.10"N	87°34'43.26"E
28	25° 7'42.79"N	87°34'21.20"E
29	25° 7'39.28"N	87°34'17.14"E

Sl No	Latitude	Longitude
30	25° 7'33.74"N	87°34'22.88"E
31	25° 7'24.65"N	87°34'26.91"E
32	25° 7'21.04"N	87°34'50.16"E
33	25° 7'7.05"N	87°34'50.65"E
34	25° 6'59.37"N	87°34'49.13"E
35	25° 6'49.90"N	87°34'34.00"E
36	25° 6'50.70"N	87°33'46.76"E
37	25° 6'25.04"N	87°33'37.07"E
38	25° 6'11.59"N	87°33'20.03"E
39	25° 5'16.77"N	87°32'22.74"E
40	25° 4'7.70"N	87°31'51.20"E
41	25° 4'17.51"N	87°31'45.82"E
42	25° 4'46.49"N	87°32'3.41"E
43	25° 5'16.38"N	87°31'20.40"E
44	25° 6'0.08"N	87°31'19.94"E
45	25° 6'1.37"N	87°31'40.28"E
46	25° 6'13.96"N	87°31'46.77"E
47	25° 6'24.65"N	87°32'22.81"E
48	25° 6'16.29"N	87°32'32.78"E
49	25° 6'43.37"N	25° 6'43.37"N
50	25° 6'46.12"N	87°32'27.69"E
51	25° 6'29.48"N	87°32'5.92"E
52	25° 6'40.25"N	87°31'46.34"E
53	25° 7'12.58"N	87°31'32.64"E
54	25° 7'28.75"N	87°32'0.04"E
55	25° 7'41.49"N	87°32'56.73"E
56	25° 8'40.55"N	87°32'1.97"E
57	25° 9'12.09"N	87°32'26.73"E
58	25° 9'19.91"N	87°31'36.89"E

List of villages falling under the potential area:

Deodanr, Chalgona, Aurjanr, Komodari, Dudama, Kanri, Rakesi, Guti, Chua, Mori, Bunda, Sahara, Kaurikusum, Dubigoda, Gilamari, Mandra, Garapani, Sormari, Doda, Baskola, Jhirikbhita, Amrabedo, Pagro, Kukdar, Cheokola, Magalmendo, Soonjha, Tetria, Cheokola, Katingi Mago, Magalmendo, Bhomdai, Badem, Partutola.





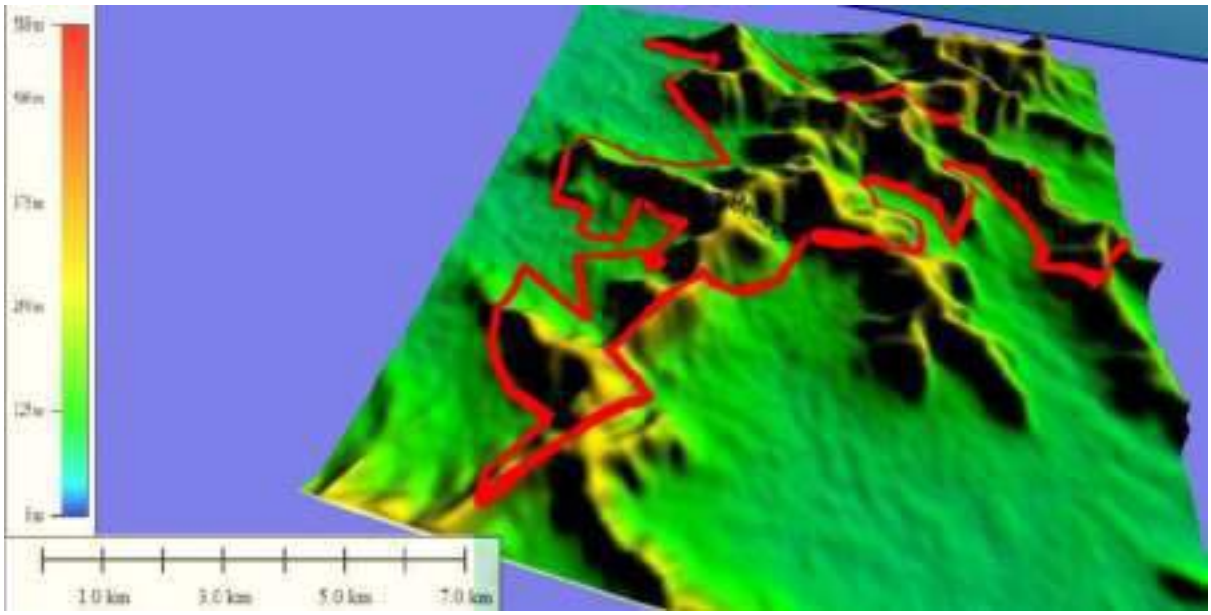


Image showing 3D Topographic view of the Potential Area

Volume of Potential Area - D, Block - Mandro, Area 3100 Hectare								
Section Proved 297 TO 97	**Cross sectional area of O.B in sqm**	**Total Cross Sectional area in sqm**	**Influence Length m**	**Total Volume of O.B in Cum situ (B)**	**Total Volume in Cum situ (A)**	**Total Volume of Stone Cum situ (A-B)**	**Recovery 60% in m cum situ**	**Million tons of Stone**
0.00	24814	977600.00	4200	104218800	4105920000.00	4001701200.00	2885.83128	7791.74
3000S	8194	163582.00	5200	42608800	850626400.00	808017600.00		
Total				**146827600**	**4956546400.00**	**4809718800.00**		

Block - Pathna

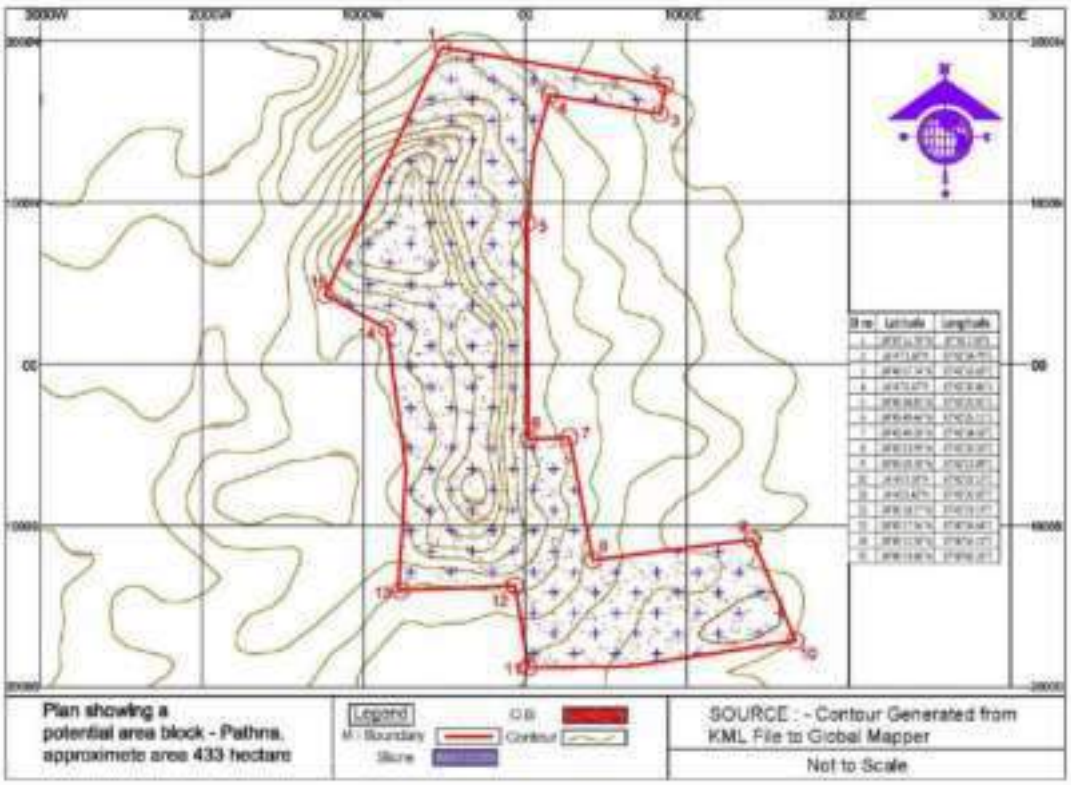
Image showing the Potential Area (Block – A, Mineral – Basalt & Granite Gneiss) As Per KML Data

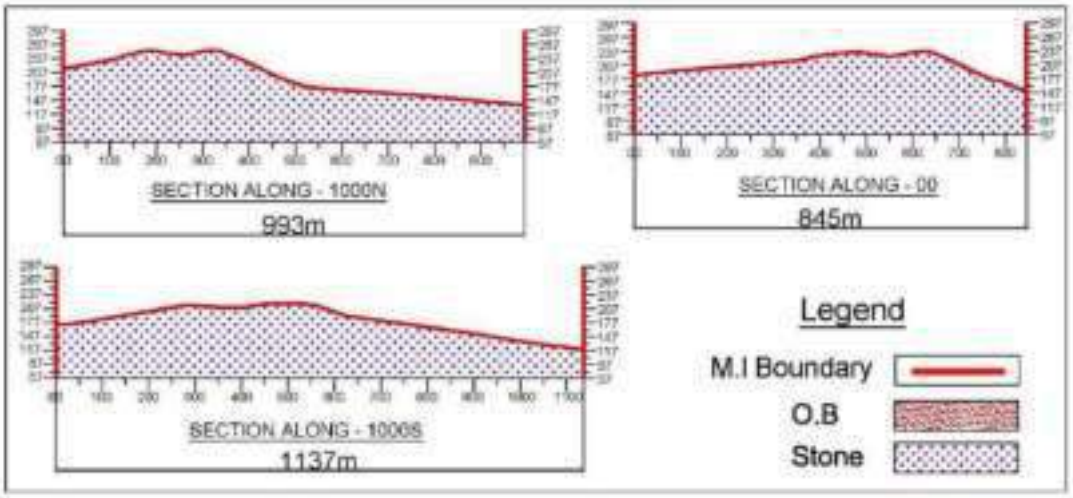
Sl no	Latitude	Longitude
1	24°47'11.70"N	87°41'7.98"E
2	24°47'3.68"N	87°41'54.79"E
3	24°46'57.74"N	87°41'53.69"E
4	24°47'1.67"N	87°41'30.46"E
5	24°46'34.85"N	87°41'25.91"E
6	24°45'49.44"N	87°41'26.11"E
7	24°45'49.58"N	87°41'34.58"E

Sl no	Latitude	Longitude
8	24°45'23.99"N	87°41'39.50"E
9	24°45'28.30"N	87°42'13.09"E
10	24°45'7.03"N	87°42'22.13"E
11	24°45'1.42"N	87°41'26.02"E
12	24°45'18.57"N	87°41'23.19"E
13	24°45'17.56"N	87°40'58.64"E
14	24°46'12.50"N	87°40'56.19"E
15	24°46'19.68"N	87°40'43.26"E

List of villages falling under the potential area:

Gumapahar, Keschipri, Gutijharna, Talbaria, Ikapokhar.





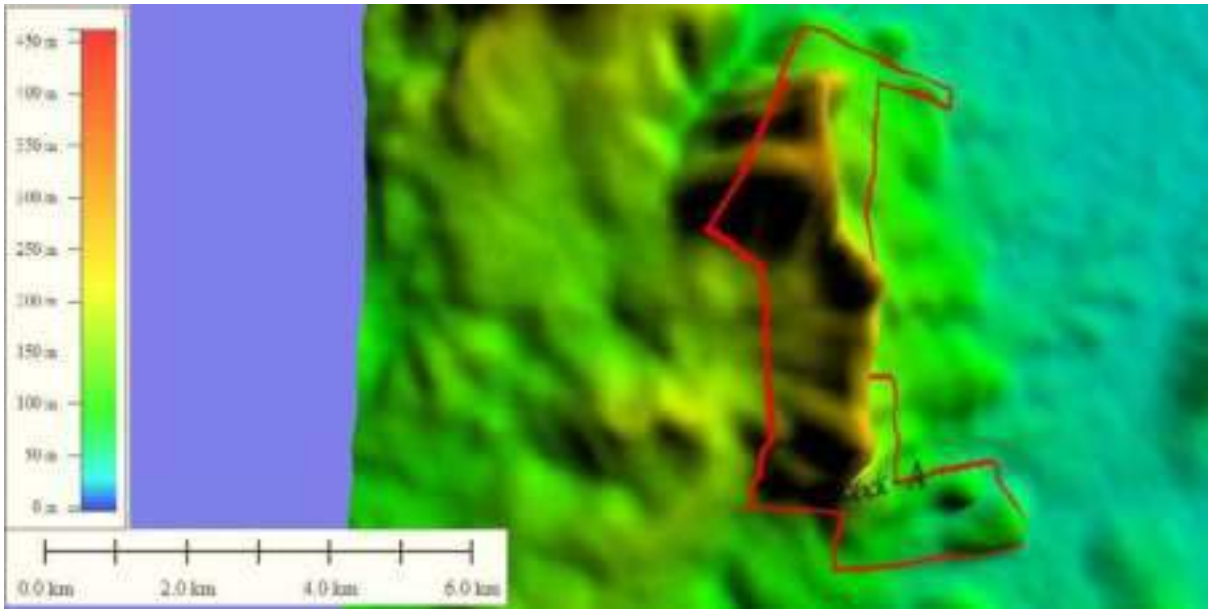


Image showing 3D Topographic view of the Potential Area

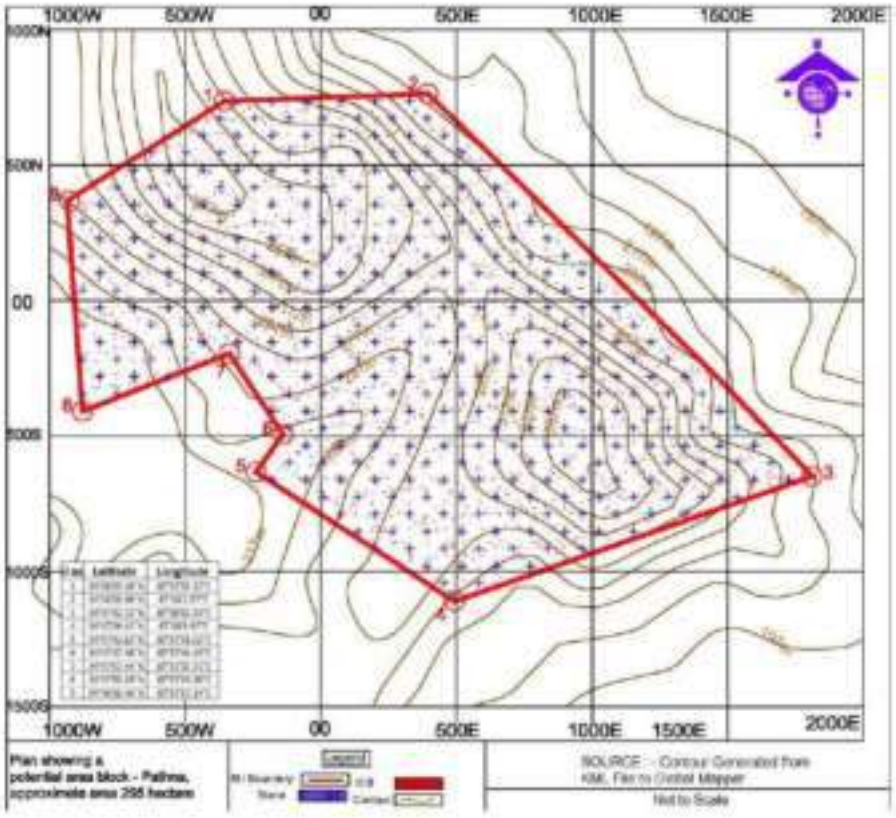
Volume of Potential Area - A, Block - Pathna, Area 433 Hectare								
Section Proved 257 TO 57	**Cross sectional area of O.B in sqm**	**Total Cross Sectional area in sqm**	**Influence Length m**	**Total Volume of O.B in Cum situ (B)**	**Total Volume in Cum situ (A)**	**Total Volume of Stone Cum situ (A-B)**	**Recovery 60% in m cum situ**	**Million tons of Stone**
1000N	4066	136070.00	1500	6099000	204105000.00	198006000.00	321.57852	868.26
0.00	3468	125951.00	1000	3468000	125951000.00	122483000.00		
1000S	4601	139273.00	1600	7361600	222836800.00	215475200.00		
Total				**16928600**	**552892800.00**	**535964200.00**		

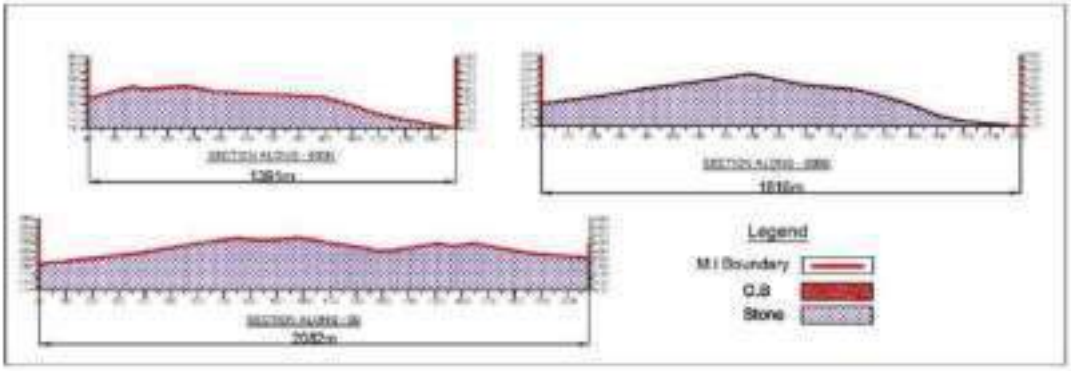
Image showing the Potential Area (Block – B, Mineral - Basalt) As Per KML Data

Sl no	Latitude	Longitude
1	24°48'29.18"N	87°37'37.17"E
2	24°48'29.96"N	87°38'2.57"E
3	24°47'42.12"N	87°38'50.74"E
4	24°47'26.42"N	87°38'5.97"E
5	24°47'42.63"N	87°37'41.02"E
6	24°47'47.36"N	87°37'44.43"E
7	24°47'57.44"N	87°37'37.71"E
8	24°47'50.29"N	87°37'19.26"E
9	24°48'16.46"N	87°37'17.14"E

List of villages falling under the potential area:

Tetulbhita, Belekapa, Gambari, Kari, Goga, Kishan, Narbita Bedo, Tatgebita, Pandanbhita, Nirbita.





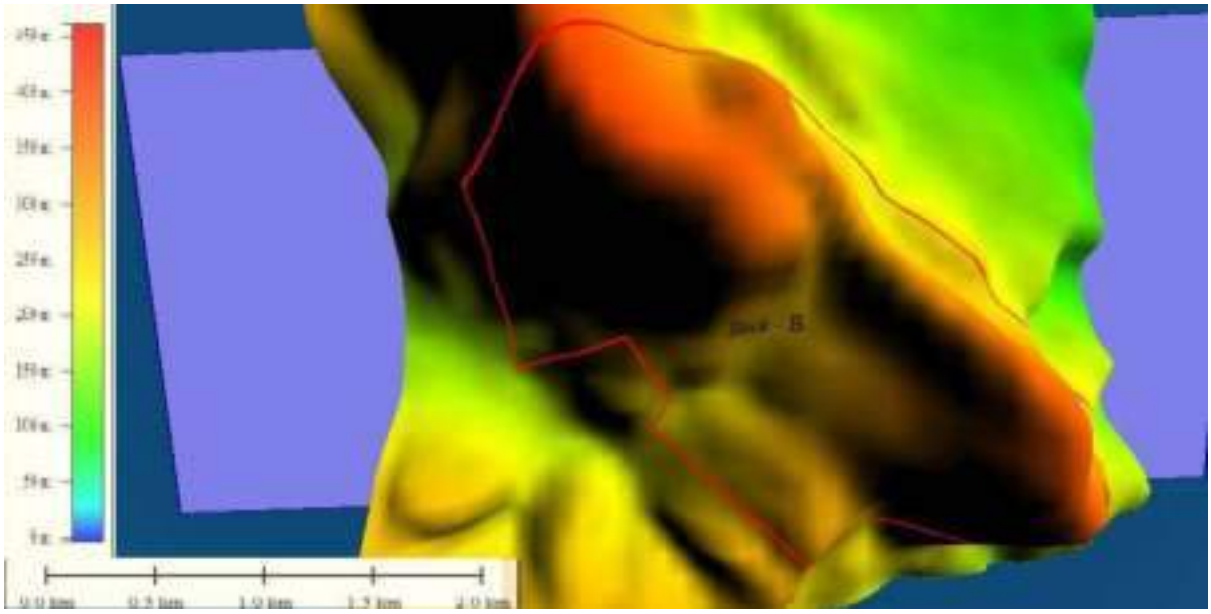


Image showing 3D Topographic view of the Potential Area

Volume of Potential Area - B, Block - Pathna, Area 295 Hectare								
Section Proved 357 TO 117	Cross sectional area of O.B in sqm	Total Cross Sectional area in sqm	Influence Length m	Total Volume of O.B in Cum situ (B)	Total Volume in Cum situ (A)	Total Volume of Stone Cum situ (A-B)	Recovery 60% in m cum situ	Million tons of Stone
500N	5620	144790.00	250	1405000	36197500.00	34792500.00	246.53826	665.65
0.00	8410	324335.00	500	4205000	162167500.00	157962500.00		
500S	7308	205619.00	1100	8038800	226180900.00	218142100.00		
Total				**13648800**	**424545900.00**	**410897100.00**		

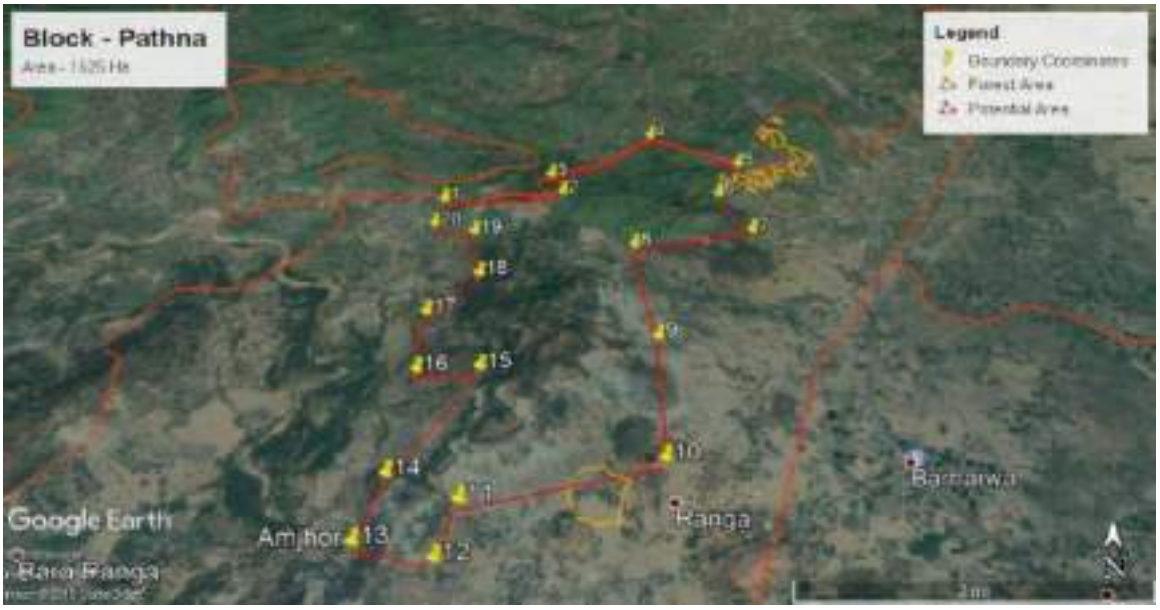


Image showing the Potential Area (Block – C, Mineral - Basalt) As Per KML Data

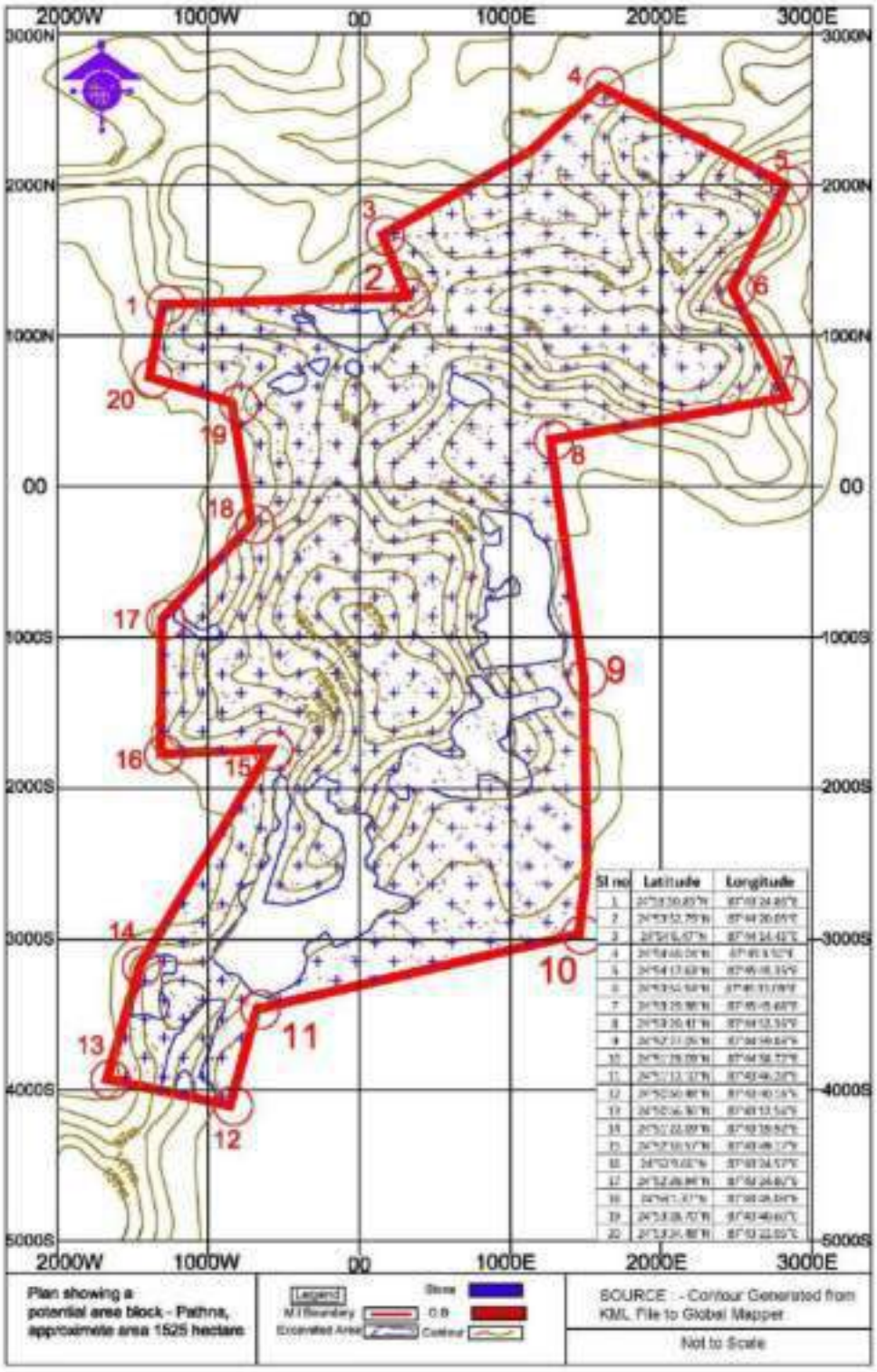
Sl no	Latitude	Longitude
1	24°53'50.85"N	87°43'24.86"E
2	24°53'52.79"N	87°44'20.05"E
3	24°54'6.47"N	87°44'14.45"E
4	24°54'40.04"N	87°45'3.50"E
5	24°54'17.63"N	87°45'45.35"E
6	24°53'54.54"N	87°45'33.09"E
7	24°53'29.98"N	87°45'45.68"E
8	24°53'20.41"N	87°44'52.36"E
9	24°52'27.05"N	87°44'59.83"E
10	24°51'29.09"N	87°44'58.72"E

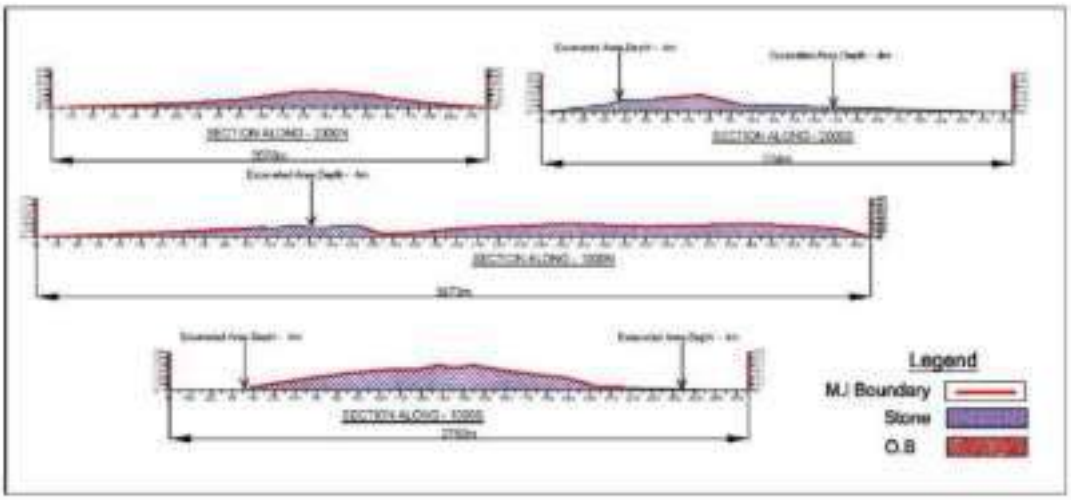
Sl no	Latitude	Longitude
11	24°51'12.10"N	87°43'46.28"E
12	24°50'50.48"N	87°43'40.16"E
13	24°50'56.36"N	87°43'12.54"E
14	24°51'22.09"N	87°43'19.92"E
15	24°52'10.57"N	87°43'49.17"E
16	24°52'9.66"N	87°43'24.57"E
17	24°52'39.94"N	87°43'24.80"E
18	24°53'1.37"N	87°43'45.09"E
19	24°53'28.70"N	87°43'40.60"E
20	24°53'34.48"N	87°43'22.05"E

Central Coordinate of Excavated Area			
Sl no	Latitude	Longitude	Area (Ha)
A	24°53'44.81"N	87°44'6.39"E	10

List of villages falling under the potential area:

Chandolapahar, Kalopahari, Idri, Chaigo, Dhibra Kalopahar, Bunda Baraghat, Barhibastipahar, Aamdanda, Baijinathpur, Kadampur, Jhumarbad, Tangani, Mansbera, Bunda Mago, Basko, Telo, Simbera, Ambare, Bade, Idpe, Kandergoda, Manjhladih, Mahkup, Kund, Chapande, Sitapahari, Kesro, Taljhari, Gangopara Mago, Gangopara Bedo, Borna, Ranga.





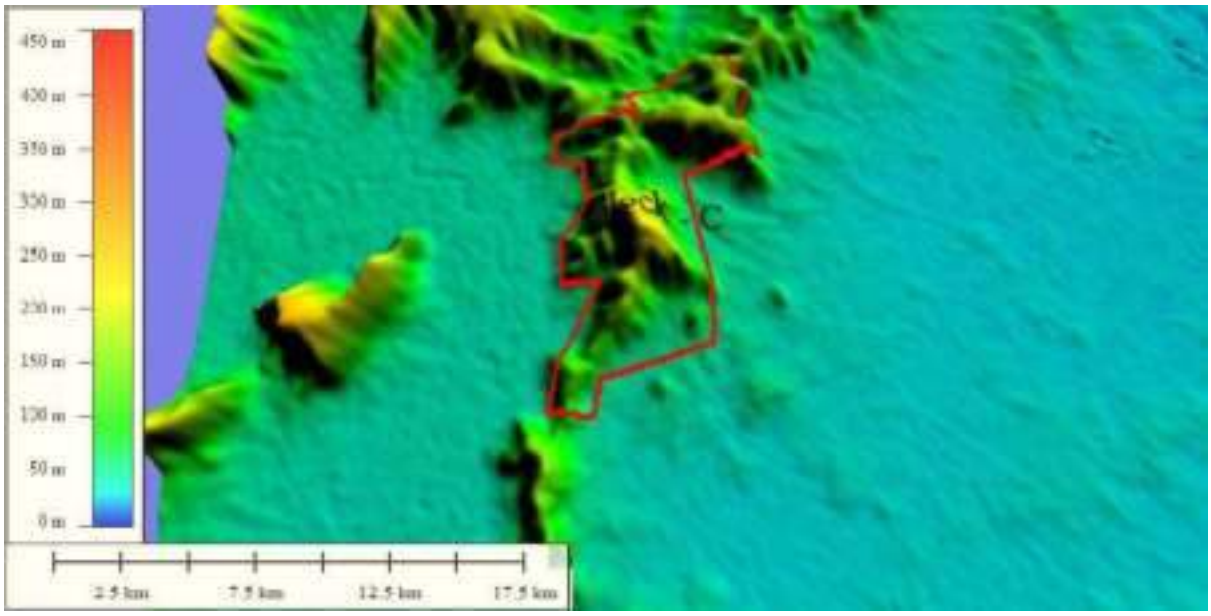


Image showing 3D Topographic view of the Potential Area

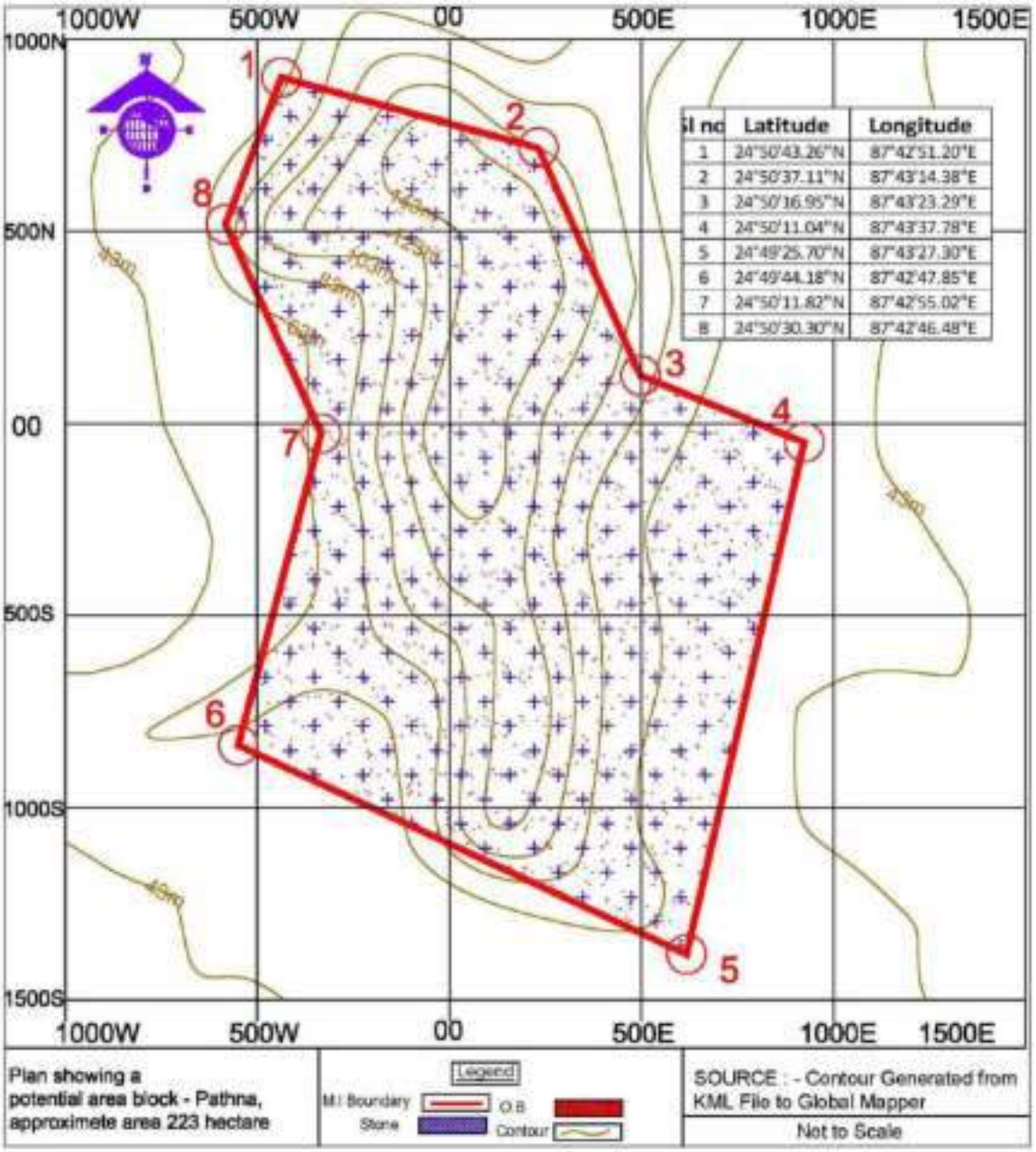
Volume of Potential Area - C, Block - Pathna, Area 1525 Hectare								
Section Proved 237 TO 97	**Cross sectional area of O.B in sqm**	**Total Cross Sectional area in sqm**	**Influence Length m**	**Total Volume of O.B in Cum situ (B)**	**Total Volume in Cum situ (A)**	**Total Volume of Stone Cum situ (A-B)**	**Recovery 60% in m cum situ**	**Million tons of Stone**
1000N	13936	137596.00	600	8361600	82557600.00	74196000.00	303.16254	818.54
2000N	8008	62589.00	1000	8008000	62589000.00	54581000.00		
1000S	7169	125918.00	2000	14338000	251836000.00	237498000.00		
2000S	1472	61905.00	2300	3385600	142381500.00	138995900.00		
Total				**34093200**	**539364100.00**	**505270900.00**		

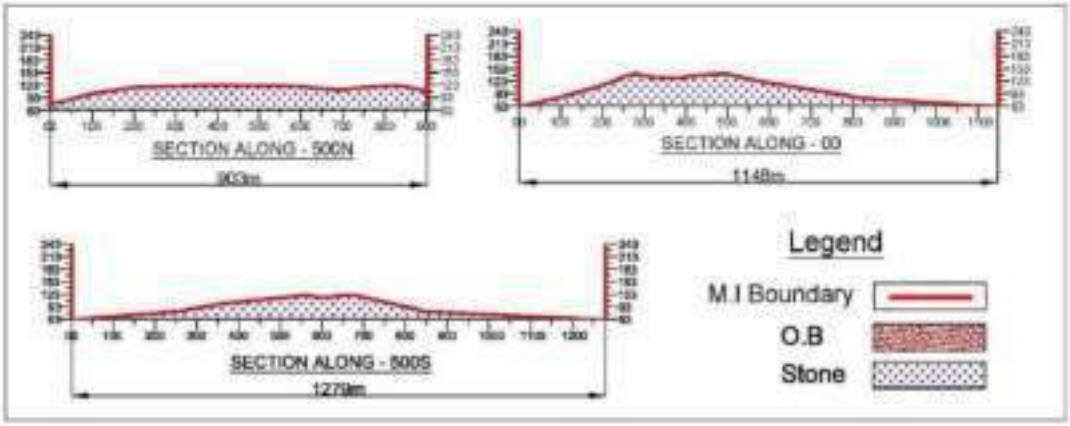
Image showing the Potential Area (Block – D, Mineral - Basalt) As Per KML Data

Sl no	Latitude	Longitude
1	24°50'43.26"N	87°42'51.20"E
2	24°50'37.11"N	87°43'14.38"E
3	24°50'16.95"N	87°43'23.29"E
4	24°50'11.04"N	87°43'37.78"E
5	24°49'25.70"N	87°43'27.30"E
6	24°49'44.18"N	87°42'47.85"E
7	24°50'11.82"N	87°42'55.02"E
8	24°50'30.30"N	87°42'46.48"E

List of villages falling under the potential area:

Borna, Modikola, Telbhita, Kendua, Dahujor


1000W
500W
00
500E
1000E
1500E
1000N
500N
00
500S
1000S
1500S
1
2
3
4
5
6
7
8
Sl no | Latitude | Longitude
1 | 24°50'43.26"N | 87°42'51.20"E
2 | 24°50'37.11"N | 87°43'14.38"E
3 | 24°50'16.95"N | 87°43'23.29"E
4 | 24°50'11.04"N | 87°43'37.78"E
5 | 24°49'25.70"N | 87°43'27.30"E
6 | 24°49'44.18"N | 87°42'47.85"E
7 | 24°50'11.82"N | 87°42'55.02"E
8 | 24°50'30.30"N | 87°42'46.48"E
Plan showing a potential area block - Pathna, approximete area 223 hectare
Legend
M.I Boundary
O.B
Stone
Contour
SOURCE : - Contour Generated from KML File to Global Mapper
Not to Scale


SECTION ALONG - 500N
SECTION ALONG - 00
SECTION ALONG - 500S
Legend
M.I Boundary
O.B
Stone

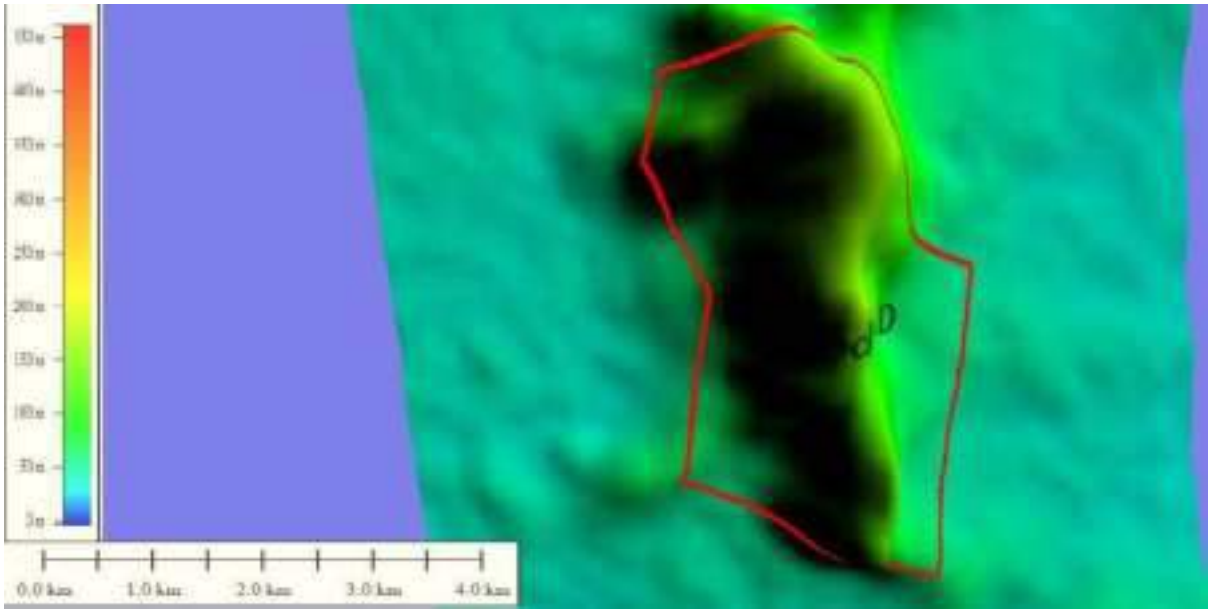


Image showing 3D Topographic view of the Potential Area

Volume of Potential Area - D, Block - Pathna, Area 213 Hectare								
Section Proved 143 TO 63	**Cross sectional area of O.B in sqm**	**Total Cross Sectional area in sqm**	**Influence Length m**	**Total Volume of O.B in Cum situ (B)**	**Total Volume in Cum situ (A)**	**Total Volume of Stone Cum situ (A-B)**	**Recovery 60% in m cum situ**	**Million tons of Stone**
500N	3639	44631.00	390	1419210	17406090.00	15986880.00	38.950968	105.17
0.00	4510	41161.00	500	2255000	20580500.00	18325500.00		
500S	4883	28426.00	1300	6347900	36953800.00	30605900.00		
Total				**10022110**	**74940390.00**	**64918280.00**		

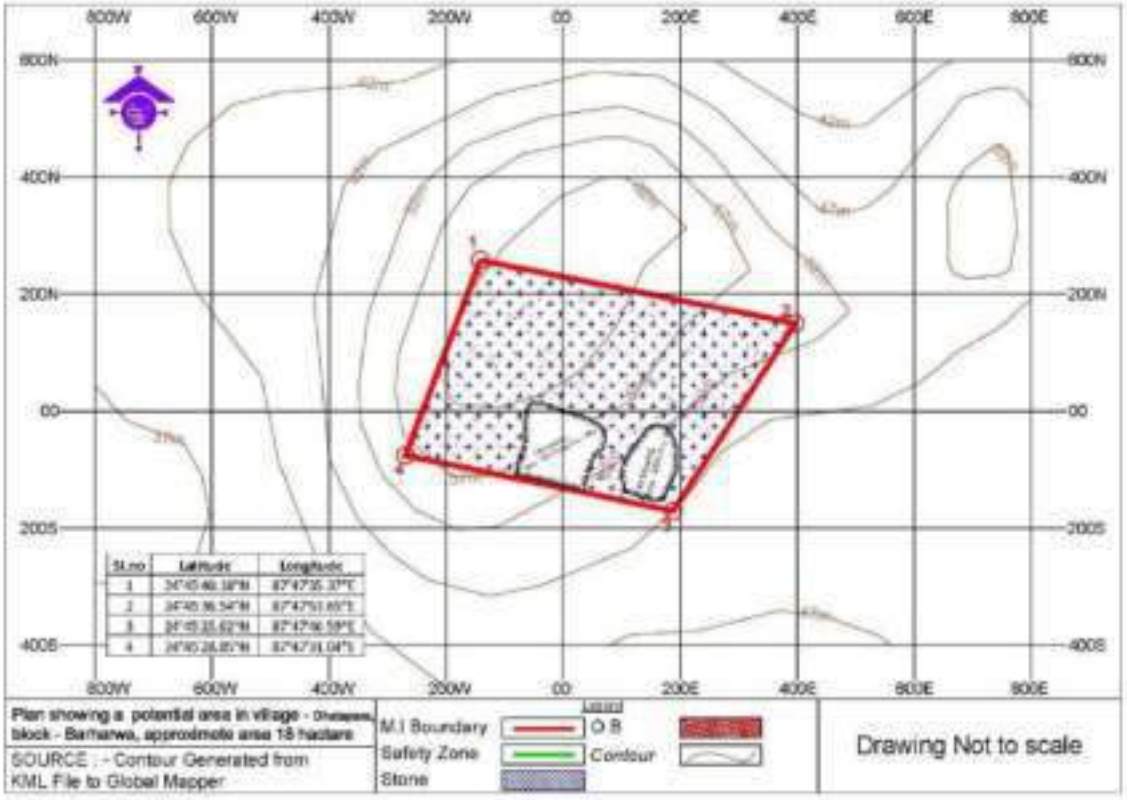
Block - Barharwa

Image showing the Potential Area (Block – A, Mineral – Basalt & Granite Gneiss) As Per KML Data

Sl.no	Latitude	Longitude
1	24°45'40.18"N	87°47'35.37"E
2	24°45'36.54"N	87°47'53.65"E
3	24°45'25.62"N	87°47'46.59"E
4	24°45'28.85"N	87°47'31.04"E

Details of Excavated Area within this potential area			
Sl. No.	**Latitude**	**Longitude**	**Area (Ha)**
1	24°45'28.05"N	87°47'40.26"E	1.61
2	24°45'27.86"N	87°47'45.32"E	0.93

Village – Dhatapara, Panchayat - Majurkol



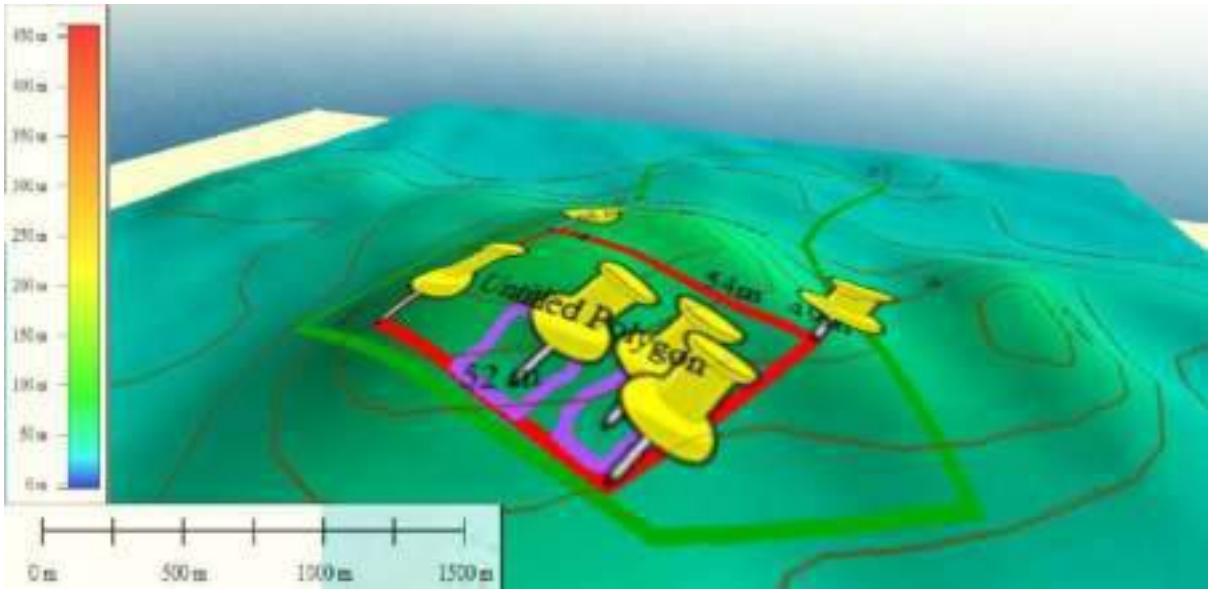


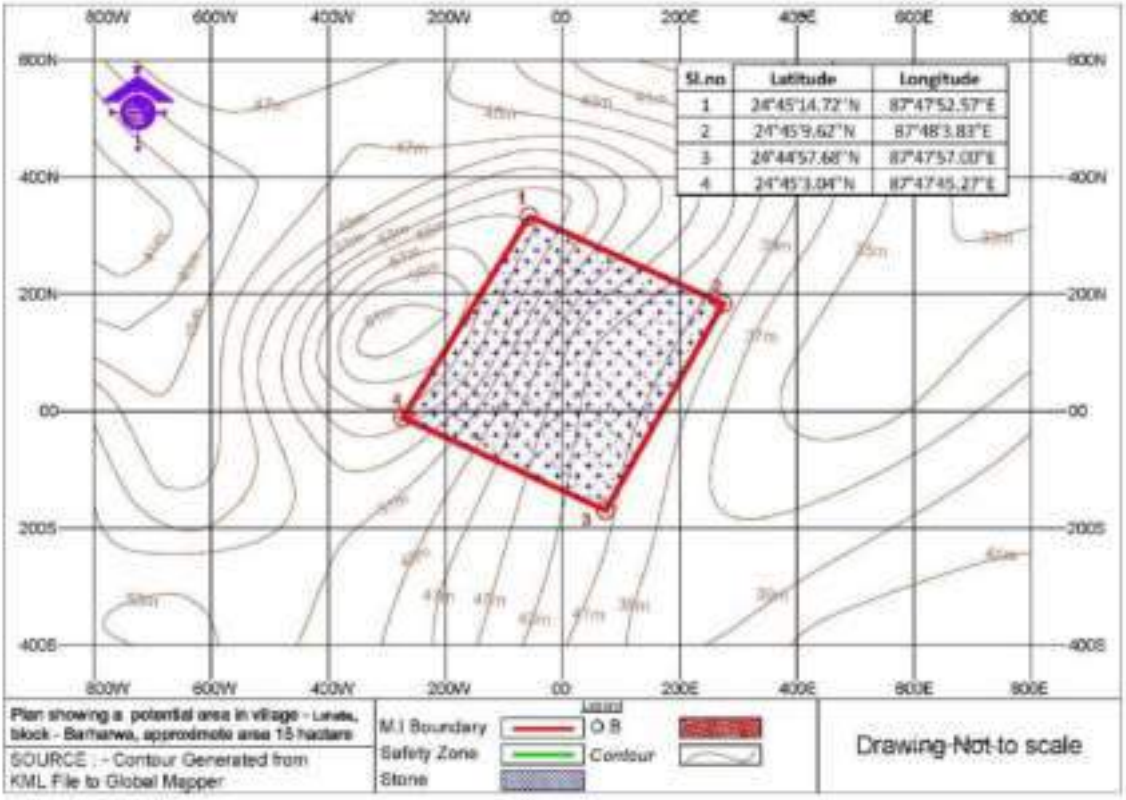
Image showing 3D Topographic view of the Potential Area

Block - Barharwa, Vill - Dhatapara, Area - 18 Ha Volume in cum										
Area in Ha	**Length in M**	**Width in M**	**Min R.L in M**	**Max. R.L in M**	**Av. Height in M**	**Total Volume in Situ in Million cum**	**Total Volume of O.B in Cum at depth upto 4m**	**Volume of Stone in m cum**	**Recovery Factor 60% in m cum**	**Million tons of Stone**
18	370	487	47	62	15	2.70285	0.72076	1.98209	1.189254	3.2109858

Image showing the Potential Area (Block – B, Mineral – Basalt & Granite Gneiss) As Per KML Data

Sl.no	Latitude	Longitude
1	24°45'14.72"N	87°47'52.57"E
2	24°45'9.62"N	87°48'3.83"E
3	24°44'57.68"N	87°47'57.00"E
4	24°45'3.04"N	87°47'45.27"E

Village – Lohatia, Panchayat - Majurkol



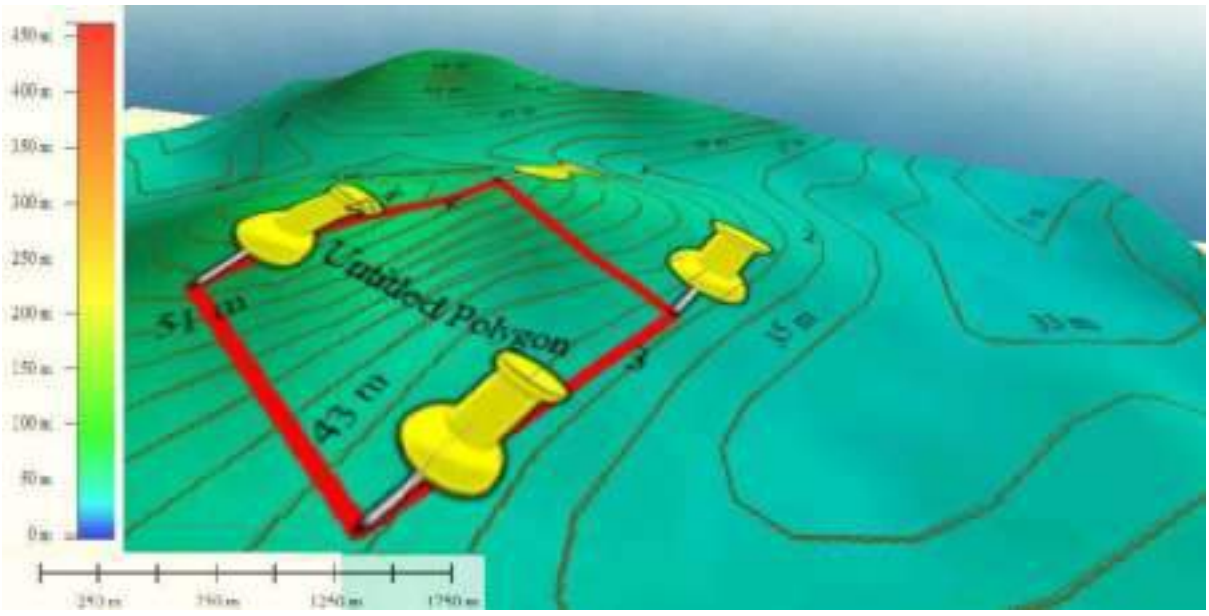


Image showing 3D Topographic view of the Potential Area

Block - Barharwa, Vill - Lohatia, Area - 15 Ha Volume in cum

Area in Ha	Length in M	Width in M	Min R.L in M	Max. R.L in M	Depth in m av. R.L 57 to 37	Total Volume in Situ in Million cum	Total Volume of O.B in Cum at depth upto 4m	Volume of Stone in m cum	Recovery Factor 60% in m cum	Million tons of Stone
15	416	361	41	57	20	3.00352	0.600704	2.402816	1.4416896	3.89256192

Image showing the Potential Area (Block – C, Mineral – Basalt & Granite Gneiss) As Per KML Data

Sl.no	Latitude	Longitude
1	24°44'42.30"N	87°47'21.24"E
2	24°44'44.10"N	87°47'29.74"E
3	24°44'33.89"N	87°47'32.84"E
4	24°44'31.57"N	87°47'25.12"E

Village – Pipurjori, Panchayat - Majurkol

Block - Barharwa, Vill - Pipurojori, Area - 8 Ha Volume in cum

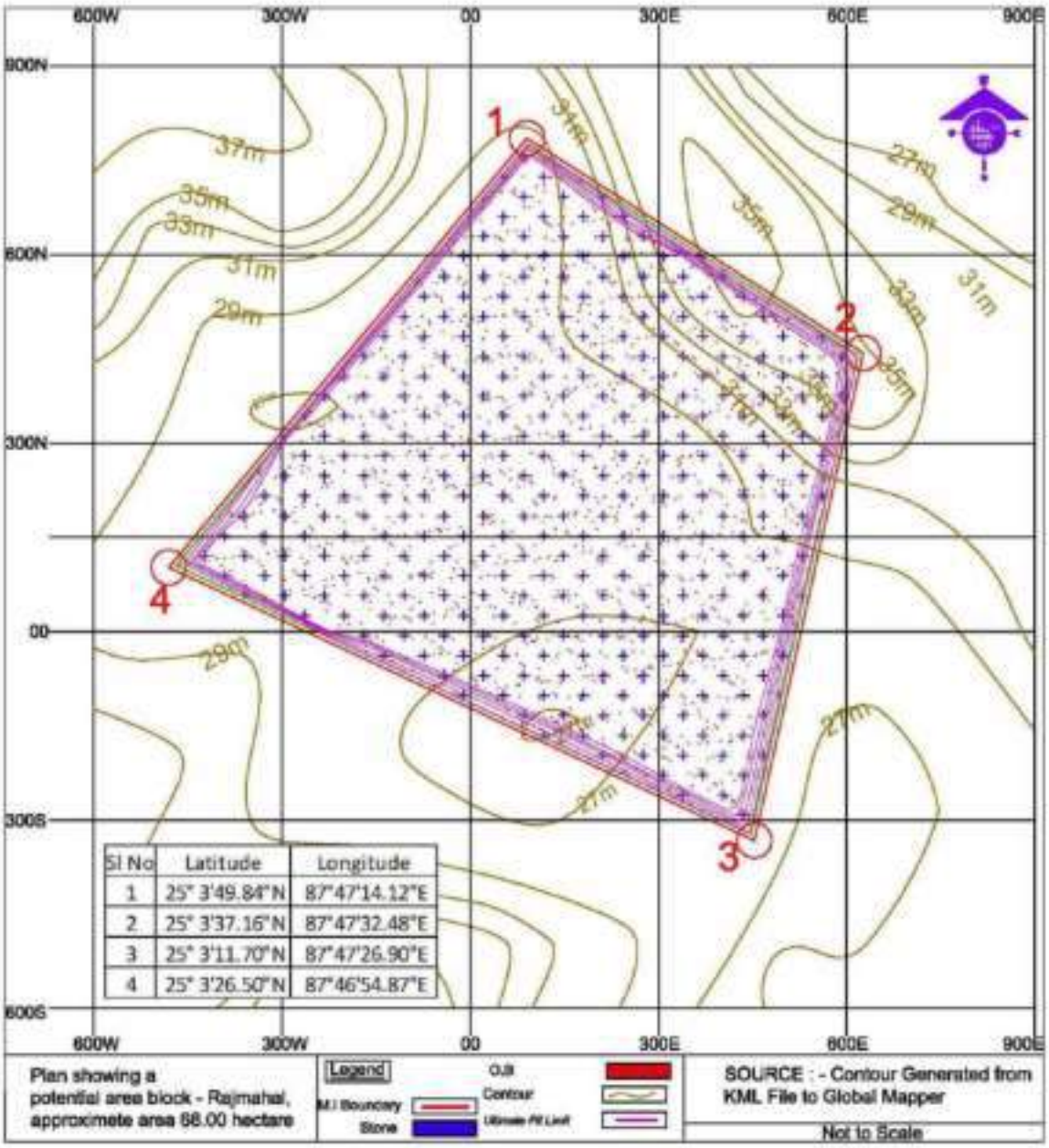
Area in Ha	Length in M	Width in M	Min R.L in M	Max. R.L in M	Depth in m av. R.L 53 to 33	Total Volume in Situ in Million cum	Total Volume of O.B in Cum at depth upto 4m	Volume of Stone in m cum	Recovery Factor 60% in m cum	Million tons of Stone
8	334	240	51	55	20	1.6032	0.32064	1.28256	0.769536	2.0777472

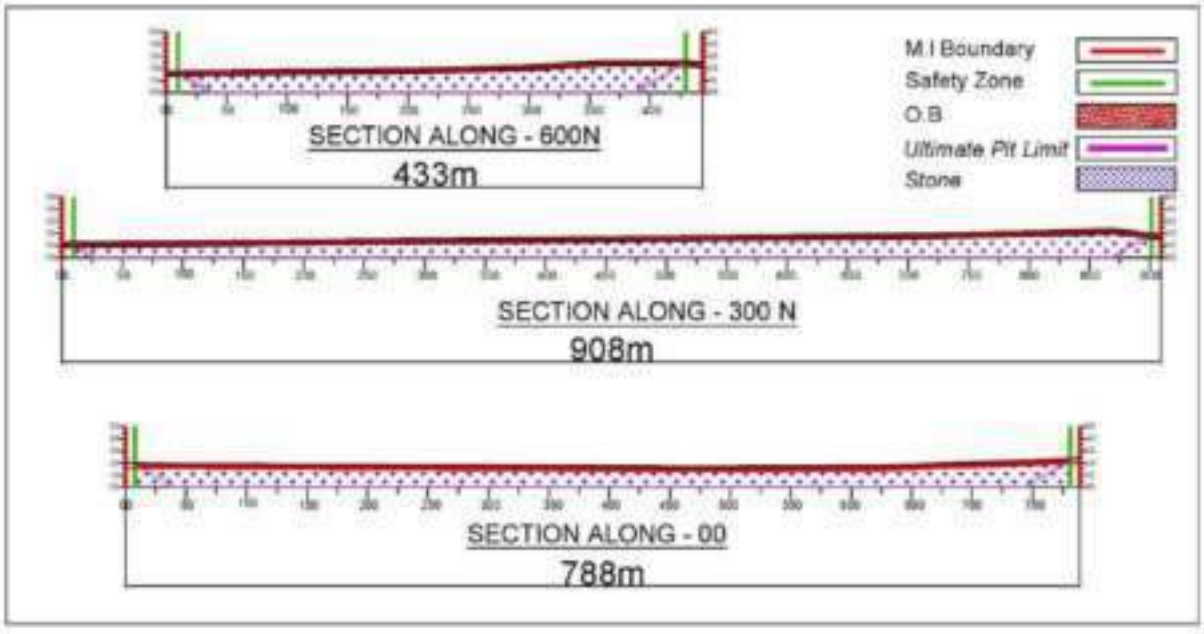
Block - Rajmahal

Image showing the Potential Area (Block – A, Mineral – China Clay) As Per KML Data

Sl No	Latitude	Longitude
1	25° 3'49.84"N	87°47'14.12"E
2	25° 3'37.16"N	87°47'32.48"E
3	25° 3'11.70"N	87°47'26.90"E
4	25° 3'26.50"N	87°46'54.87"E

Villages under this potential area : Raibazar, Mahasingpur, Mundomala, Kasba


600W
300W
00
300E
600E
900E
900N
600N
300N
00
300S
600S
1
2
3
4
37m
35m
33m
31m
29m
27m
Sl No | Latitude | Longitude
1 | 25° 3'49.84"N | 87°47'14.12"E
2 | 25° 3'37.16"N | 87°47'32.48"E
3 | 25° 3'11.70"N | 87°47'26.90"E
4 | 25° 3'26.50"N | 87°46'54.87"E
Plan showing a potential area block - Rajmahal, approximate area 68.00 hectare
Legend
M.I Boundary
Stone
O.B
Contour
SOURCE : - Contour Generated from KML File to Global Mapper
Not to Scale


SECTION ALONG - 600N
433m
SECTION ALONG - 300 N
908m
SECTION ALONG - 00
788m
M.I Boundary
Safety Zone
O.B
Ultimate Pit Limit
Stone

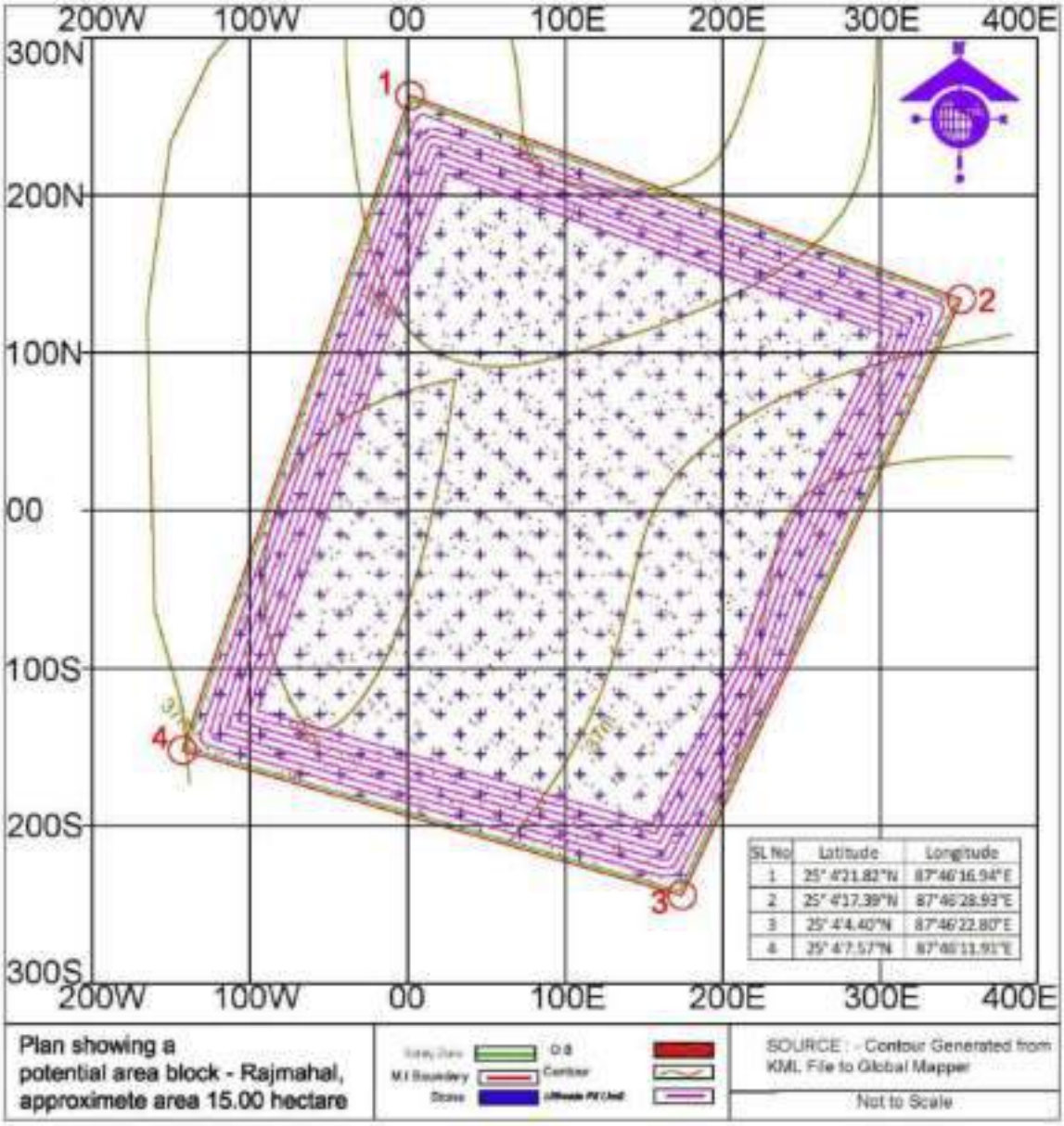
		Total Volum In cum				*Volum Of ROM In Cum*			
Section Proved 29 TO 09	**Cross sectional area of O.B in sqm**	**Sectional area sqm**	**Inffuence Length m**	**Total Volume of O.B in Cum (B)**	**Total Volume Cum**	**Sectional area sqm**	**Inffuence Length m**	**Total Volume Cum**	**ROM Blocked In Benches and safety zone Cum**
600N	1775	7692	295	523625	2269140	8177.00	295	2412215.00	143075.00
300N	3636	12066	300	1090800	3619800	15026.00	300	4507800.00	888000.00
0.00	3156.00	11685	400	1262400	4674000	13777.00	400	5510800.00	836800.00
				2876825	**8293800**			**10018600.00**	**1867875.00**

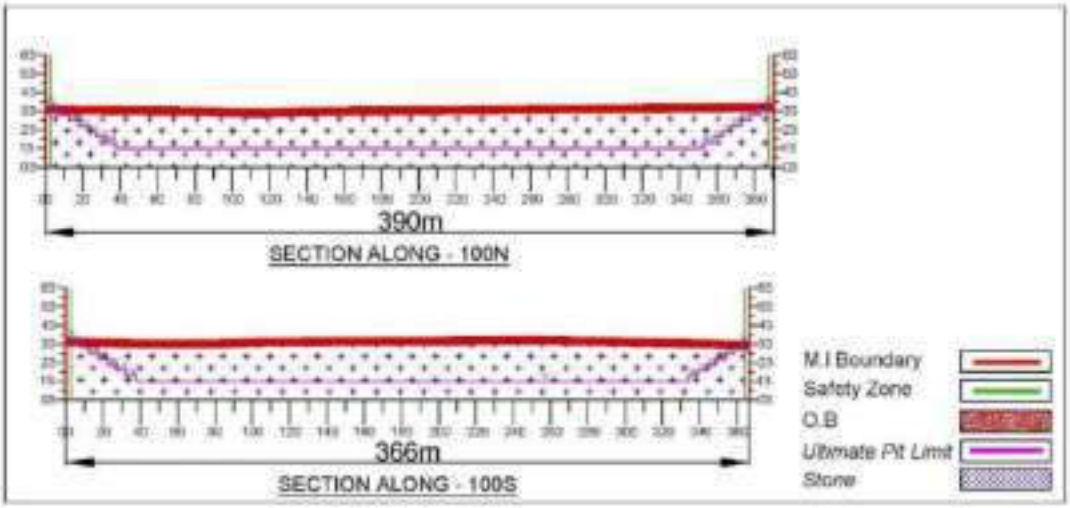
SUMMARY OF TOTAL RESOURCE						
working area details	**R.L in m**	**Vol of total O.B**	**Volume of stone**	**Recovery 60% of A**		
		cum	**Cum**	**Cum**	**MT=B ×2.7**	**Million tons**
			A	**B**	**C**	**D**
from surface up to 20m depth	29 to 09	0	10018600.00	6011160.00	16230132.00	16.230
Total		**1**	**10018600.00**	**6011160.00**	**16230132.00**	**16.230**

Image showing the Potential Area (Block – B, Mineral – China Clay) As Per KML Data

SL No	Latitude	Longitude
1	25° 4'21.82"N	87°46'16.94"E
2	25° 4'17.39"N	87°46'28.93"E
3	25° 4'4.40"N	87°46'22.80"E
4	25° 4'7.57"N	87°46'11.91"E

Village – Kasba


200W
100W
00
100E
200E
300E
400E
300N
200N
100N
00
100S
200S
300S
1
2
3
4
SL No
Latitude
Longitude
1
25° 4'21.82"N
87°46'16.94"E
2
25° 4'17.39"N
87°46'28.93"E
3
25° 4'4.40"N
87°46'22.80"E
4
25° 4'7.57"N
87°46'11.91"E
Plan showing a potential area block - Rajmahal, approximete area 15.00 hectare
O.B
Contour
SOURCE : - Contour Generated from KML File to Global Mapper
Not to Scale


390m
SECTION ALONG - 100N
366m
SECTION ALONG - 100S
M.I Boundary
Safety Zone
O.B
Ultimate Pit Limit
Stone

Total Volum In cum					*Volum Of ROM In Cum*				
Section Proved 33 TO 13	**Cross sectional area of O.B in sqm**	**Sectional area sqm**	**Inffuence Length m**	**Total Volume of O.B in Cum (B)**	**Total Volume Cum**	**Sectional area sqm**	**Inffuence Length m**	**Total Volume Cum**	**ROM Blocked In Benches and safety zone Cum**
100N	1562	7255	156	243672	1131780	7859.00	156	1226004.00	94224.00
100S	1466.00	6940	294	431004	2040360	7557.00	294	2221758.00	181398.00
				674676	**3172140**			**3447762.00**	**275622.00**

SUMMRUCTONY OF TOTAL PROD						
working area details	**R.L in m**	**Vol of total O.B**	**Volume of stone**	**Recovery 60% of A**		
		cum	**Cum**	**Cum**	**MT=B ×2.7**	**Million tons**
			A	**B**	**C**	**D**
from surface up to 20m depth	33 to 13	0	3447762.00	2068657.20	5585374.44	5.585
Total		**0**	**3447762.00**	**2068657.20**	**5585374.44**	**5.585**

15. QUALITY/GRADE OF MINERAL AVAILABLE IN THE DISTRICT

Rocks and Minerals found in Sahibganj District:-

- **GRANITE GNEISS / MIGMATITE**

Granite gneiss is a rock consisting of an orthogneiss or paragneiss having the composition of a granite. Gneiss is an old German word meaning bright or sparkling. It is a high grade metamorphic rock, meaning that it has been subjected to higher temperatures and pressures than schist. It is formed by the metamorphosis of granite, or sedimentary rock. Gneiss displays distinct foliation, representing alternating layers composed of different minerals. However, unlike slate and schist, gneiss does not preferentially break along planes of foliation because less than 50% of the minerals formed during the metamorphism are aligned in thin layers. Because of the coarseness of the foliation, the layers are often sub-parallel, i.e. they do not have a constant thickness, and discontinuous.

Mineralogy The granite gneiss includes several varieties: banded gneiss, schistose granite, porphyroblastic gneissose granite and granodiorite. Grain size -medium to coarse grained; can see crystals with the naked eye. Hardness -hard. The granite gneiss is full of mafic enclaves at places. The gneiss is composed of quartz, microcline, plagioclase (An_{20}-An_{44}), biotite, hornblende and other accessory minerals, but lacks in muscovite. Felsic minerals such as feldspar (orthoclase, plagioclase) and quartz generally form the light coloured bands; mafic minerals such as biotite, pyroxene (augite) and amphibole (hornblende) generally form the dark coloured bands.

Texture - foliated, foliation on a scale of cm or more.

Colour - variable - generally alternating lighter and darker sub-parallel discontinuous bands garnet porphyroblasts common.

Occurence- The granite gneiss complex is a composite mass consisting mainly of granite gneiss, migmatites and massive granite with enclaves of para and orthometamorphics, dykes of dolerite and innumerable veins of pegmatite; aplite and quartz. Because of repeated folding, highgrade regional metamorphism and profuse granitic activities, the elucidation of the stratigraphic succession in the area poses a great problem.

MIGMATITE - The magmatic rocks are exposed in several parts, both as an 'in situ' migmatites and as an injection migmatites. There are innumaerable enclaves of mica-schist and hornblende schist of varying size in the granitic rocks. Biotite rich schlierens show considerable amount of contortion and flowage. Thin leucocratic, granites are commonly seen to form 'lit-per-lit' veins in the enclaves

Sometimes, the leucocratic granites and the metamorphic country rocks are intermingled in layer in fine scale so that the resulting rock is a banded gneiss or a banded augen gneiss. The minerals in the schlierens or melanosocnes are recrystallised and show schistose structure

with marked variation in the proportion of mafics. The leucosomes generally show crude hypidiomorphic texture with subhedral laths of microcline, and plagioclase (albite-orthoclase), anhedral grains of quartz and some thin flakes of biotite with minor amounts of apatite, sphene, epidote and opaque ores. Perthites (microcline - micro perthite) and myrmekites are quite common. Potash feldspar rimmed with albite and occurring within potash feldspars is also noted. Some potash feldspar plates show sieve structure with quartz inclusions. Muscovite is generally absent but whenever present, is seen gradually being replace by orthoclase from the borders and along the cleavage planes.

Geographical Location of Granitic Rocks in Sahibganj District – In Sahibganj district Granitic rocks are found in **Sahibganj block ($25^0$16'N : $87^0$36'E).**

➢ Rajmahal Trap- Basalt (Rajmahal Formation)

By definition, basalt is dark coloured aphanitic (fine-grained) igneous rock with generally 45-53% silica (SiO_2) and less than 10% feldspathoid by volume, and where at least 65% of the rock is feldspar in the form of plagioclase. This is as per definition of the International Union of Geological Sciences (IUGS) classification scheme. It most commonly forms as an extrusive rock, such as a lava flow, but can also form in small intrusive bodies, such as an igneous dyke or a thin sill.

Mineralogy - Essential minerals are augite, calcic plagioclase and iron oxide. Usually Olivine is also present. Labradorite feldspar is the chief constituent of the groundmass where as more calcic plagioclase(bytownite or anorthite) may occur as phenocrysts.

Geological formation- The Rajmahal Formation exposed in the Rajmahal area is represented by 450 to 550m thick predominantly basaltic lava flows (4-15 individual flows) intercalated with fresh-water sedimentary beds. This formation is well developed in the Rajmahal hills of Jharkhand, Bihar and West Bengal. It is made up of extensive lavaflows of Basic composition, called the Rajmahal Traps. The hills extend in N-S direction for about 125 km from near the River Ganga at Sahibganj to 24^0N latitude. The basalts are intercalated with clay stone, siltstone, some of which are silicified and porcellanoid. The cumulative thickness of these intertrappean beds is about merely 40 m.

The Rajmahal formation can be divided into four units: lower lava flows with intercalated unfossiliferous sedimentary beds from the lowermost unit. The second unit comprises five to six lava flows with four to five sedimentary beds composed of tuff, claystone, siltstone, etc. The fourth unit comprises series of basalt flows with or without sedimentary beds. The radiometric dating of the Rajmahal traps has shown that they are of Albian age.

Geographical Location of Rajmahal Trap -Basalt in Sahibganj District- In Sahibganj district Rajmahal Trap- Basalt are found in Mandro, Borio, Barhait, Pathna, Taljhari Blocks**.**

➢ Sandstone & Shale:-

Sandstone is a clastic sedimentary rock composed mainly of sand-sized (0.0625 to 2 mm) mineral particles or rock fragments. It is clastic in origin (as opposed to either organic, like chalk and coal, or chemical,like gypsum and jasper). They are formed from cemented grains that may either be fragments of a pre-existing rock or be mono-minerallic crystals. The cements binding these grains together are typically calcite, clays, and silica. Grain sizes in sands are defined (in geology) within the range of 0.0625 mm to 2 mm (0.002–0.079 inches). Clays and sediments with smaller grain sizes not visible with the naked eye, including siltstones and shales, are typically called argillaceous sediments; rocks with larger grain sizes, including breccias and conglomerates, are termed rudaceous sediments.

Mineralogy:- The chemical compounds like silicon dioxide or silica, calcium carbonate, and iron dioxide act as natural cementing agents to hold together the sand in the form of a rock that we know by the name of sandstone. Chemically, sandstone is an absolutely impervious and monomineralic rock that is primarily composed of quartz.

Shale is a fine-grained, clastic sedimentary rock composed of mud that is a mix of flakes of clay minerals and tiny fragments (silt-sized particles) of other minerals, especially quartz and calcite. Shale is characterized by breaks along thin laminae or parallel layering or bedding less than one centimeter in thickness, called fissility. It is the most common sedimentary rock.

Geographical Location of Sandstone and Shale in Sahibganj District- In Sahibganj district Sandstone and Shale are found in **Barhait Block(24^{0}52'N : 87^{0}30'E)**.

➢ Quartz:-

Quartz is a mineral composed of silicon and oxygen atoms in a continuous framework of SiO4 silicon–oxygen tetrahedra, with each oxygen being shared between two tetrahedra, giving an overall chemical formula of SiO_2. Quartz is the second most abundant mineral in Earth's continental crust, behind feldspar

Occurence- Quartz is a defining constituent of granite and other felsic igneous rocks. It is very common in sedimentary rocks such as sandstone and shale. It is a common constituent of schist, gneiss, quartzite and other metamorphic rocks.

While the majority of quartz crystallizes from molten magma, much quartz also chemically precipitates from hot hydrothermal veins as gangue, sometimes with ore minerals like gold, silver and copper. Large crystals of quartz are found in magmatic pegmatites. Well-formed crystals may reach several meters in length and weigh hundreds of kilograms.

Geographical Location of Quartz in Sahibganj District- It is common constituent of schist, gneiss, quartzite, sandstone, shale. It is found in almost every block of Sahibganj District.

➢ Bentonite:-

Bentonite is an absorbent aluminium phyllosilicate clay consisting mostly of montmorillonite.

The different types of bentonite are each named after the respective dominant element, such as potassium (K), sodium (Na), calcium (Ca), and aluminium (Al).

Occurence- Bentonite usually forms from weathering of volcanic ash, most often in the presence of water. However, the term bentonite, as well as a similar clay called tonstein, has been used to describe clay beds of uncertain origin. For industrial purposes, two main classes of bentonite exist: sodium and calcium bentonite.
In stratigraphy and tephrochronology, completely devitrified (weathered volcanic glass) ash-fall beds are commonly referred to as K-bentonites when the dominant clay species is illite. In addition to montmorillonite and illite another common clay species that is sometimes dominant is kaolinite. Kaolinite-dominated clays are commonly referred to as tonsteins and are typically associated with coal.

Chemical Composition- Chemically, montmorillonite is described as a hydrous aluminum silicate containing small amounts of alkali and alkaline earth metals. Structurally, montmorillonite is made of two basic building blocks, the aluminum octahedral sheet and the silica tctrahedral sheet.

Geographical Location of Bentonite in Sahibganj District:- It is found in Taljhari Block in Ranga, Pokharia and Manoharpur village.

➢ Flint

Flint is a hard, sedimentary cryptocrystalline form of the mineral quartz, categorized as a variety of chert. It occurs chiefly as nodules and masses in sedimentary rocks, such as chalks and limestones. Inside the nodule, flint is usually dark grey, black, green, white or brown in colour, and often has a glassy or waxy appearance. A thin layer on the outside of the nodules is usually different in colour, typically white and rough in texture. From a petrological point of view, "flint" refers specifically to the form of chert which occurs in chalk or marly limestone. Similarly, "common chert" (sometimes referred to simply as "chert") occurs in limestone. The uniform fine grain, brittleness, and conchoidal fracture made it relatively easy to shape arrowheads by flaking off chips, and the edges produced were quite sharp.

Occurence-

The exact mode of formation of flint is not yet clear, but it is thought that it occurs as a result of chemical changes in compressed sedimentary rock formations, during the process of diagenesis. Chert and flint provided the main source of tools and weapons for Stone Age man.

Geographical Location of Flint in Sahibganj District:- It is found in Khorbanni, Bisunpur village in Rajmahahal Block, Dudhkol village in Taljhari Block.

➢ China clay

Rocks that are rich in kaolinite are known as kaolin or china clay. Kaolinite is a clay mineral, part of the group of industrial minerals, with the chemical composition $Al_2Si_2O_5(OH)_4$. It is a layered silicate mineral, with one tetrahedral sheet of silica (SiO_4) linked through oxygen atoms to one octahedral sheet of alumina(AlO_6) octahedral.

Owing to their following features, these clays are widely demanded and appreciated :

- Good plasticity
- Ability to withstand high temperature
- Accurate composition
- Longer shelf life

Occurence-

China clay occurs in abundance in soils that have formed from the chemical weathering of rocks in hot, moist climates—for example in tropical rainforest areas. Comparing soils along a gradient towards progressively cooler or drier climates, the proportion of kaolinite decreases, while the proportion of other clay minerals such as illite (in cooler climates) or smectite (in drier climates) increases. Such climatically-related differences in clay mineral content are often used to infer changes in climates in the geological past, where ancient soils have been buried and preserved.

Composition-

In its natural state China clay is a white, soft powder consisting principally of the mineral kaolinite, which, under the electron microscope, is seen to consist of roughly hexagonal, platy crystals ranging in size from about 0.1 micrometre to 10 micrometres or even larger. These crystals may take vermicular and book like forms, and occasionally macroscopic forms approaching millimetre size are found. Kaolin as found in nature usually contains varying amounts of other minerals such as muscovite, quartz, feldspar, and anatase. In addition, crude kaolin is frequently stained yellow by iron hydroxide pigments. It is often necessary to bleach the clay chemically to remove the iron pigment and to wash it with water to remove the other minerals in order to prepare kaolin for commercial use.

Geographical Location of China clay in Sahibganj District:- It is found in Rajmahal block.

➢ Coal

Geographical Location of Coal in Sahibganj District:- In Sahibganj district it is found Barhait block (24^0 45':$87^0$30' & $24^0$60':$87^0$30')

Coal is a combustible black or brownish-black sedimentary rock usually occurring in rock strata in layers or veins called coal beds or coal seams. The harder forms, such as anthracite coal, can be regarded as metamorphic rock because of later exposure to elevated temperature and pressure. Coal is composed primarily of carbon, along with variable quantities of other elements, chiefly hydrogen, sulfur, oxygen, and nitrogen. Coal is a fossil fuel that forms when dead plant matter is converted into peat, which in turn is converted into lignite, then sub-bituminous coal, after that bituminous coal, and lastly anthracite. This involves biological and geological processes. The geological processes take place over millions of years.

Throughout human history, coal has been used as an energy resource, primarily burned for the production of electricity and heat, and is also used for industrial purposes, such as refining metals. Coal is the largest source of energy for the generation of electricity worldwide, as well as one of the largest worldwide anthropogenic sources of carbon dioxide releases. The extraction of coal, its use in energy production and its byproducts are all associated with environmental and health effects including climate change.

Formation-

At various times in the geologic past, the Earth had dense forests in low-lying wetland areas. Due to natural processes such as flooding, these forests were buried underneath soil. As more and more soil deposited over them, they were compressed. The temperature also rose as they sank deeper and deeper. As the process continued the plant matter was protected from biodegradation and oxidation, usually by mud or acidic water. This trapped the carbon in immense peat bogs that were eventually covered and deeply buried by sediments. Under high pressure and high temperature, dead vegetation was slowly converted to coal. As coal contains mainly carbon, the conversion of dead vegetation into coal is called carbonization.

The wide, shallow seas of the Carboniferous Period provided ideal conditions for coal formation, although coal is known from most geological periods. The exception is the coal gap in the Permian–Triassic extinction event, where coal is rare. Coal is known from Precambrian strata, which predate land plants—this coal is presumed to have originated from residues of algae.

Ranks-

As geological processes apply pressure to dead biotic material over time, under suitable conditions, its metamorphic grade increases successively into:

- Peat, considered to be a precursor of coal, which has industrial importance as a fuel in some regions. In its dehydrated form, peat is a highly effective absorbent for fuel and oil spills on land and water, and also used as a conditioner for soil to make it more able to retain and slowly release water.
- Lignite, or brown coal, the lowest rank of coal, used almost exclusively as fuel for electric power generation
  - Jet, a compact form of lignite, sometimes polished; used as an ornamental stone since the Upper Palaeolithic

- Sub-bituminous coal, whose properties range between those of lignite and those of bituminous coal (It is used primarily as fuel for steam-electric power generation and is also an important source of light aromatic hydrocarbons for the chemical synthesis industry.)
- Bituminous coal, a dense sedimentary rock, usually black, but sometimes dark brown, often with well-defined bands of bright and dull material (It is used primarily as fuel in steam-electric power generation, with substantial quantities used for heat and power applications in manufacturing and to make coke.)
- Steam coal, a grade between bituminous coal and anthracite (It was once widely used as a fuel for steam locomotives.
- Anthracite, the highest rank of coal (It is a harder, glossy black coal used primarily for residential and commercial space heating; it may be divided further into metamorphically altered bituminous coal and "petrified oil", as from the deposits in Pennsylvania.)
- Graphite (It is one of the more difficult coals to ignite and not commonly used as fuel; it is most used in pencils, or powdered for lubrication.)

16. USE OF MINERAL

➢ GRANITE GNEISS / MIGMATITE

Uses of granitic rocks-

- **Building Stone**:- Granitic rocks have been extensively used as a dimension stone and as flooring tiles in public and commercial buildings and monuments.
- **Sub base and base material in road and highway construction:**- Crushed stone is the most basic use of granite. Crushed granite is used as a sub base and base material in road and highway construction. It is used as crushed stone media in sewage system drain fields and as a base material for foundations and construction slabs. Crushed granite in attractive colors is used as a landscape stone and in planters. It also makes great railroad ballast, and in larger sizes it makes good riprap.
- **Engineering:-** Engineers have traditionally used polished granite surface plates to establish a plane of reference, since they are relatively impervious and inflexible. Sandblasted concrete with a heavy aggregate content has an appearance similar to rough granite, and is often used as a substitute when use of real granite is impractical. Granite block is usually processed into slabs, which can be cut and shaped by a cutting center. Granite tables are used extensively as bases for optical instruments because of granite's rigidity, high dimensional stability, and excellent vibration characteristics.
- **Granite Paving Stone**:- Granite paving stones or "pavers" can make a colorful and interesting way of paving a driveway or patio. The beauty of natural stone combined with expert craftsmanship and design can produce a unique and lasting result. In the past granite blocks were often used to pave city streets.

➢ Rajmahal Trap- Basalt (Rajmahal Formation)

Uses of Basalt-

- Basalt is used for a wide variety of purposes. It is most commonly crushed for use as an aggregate in construction projects. Crushed basalt is used for road base, concrete aggregate, asphalt pavement aggregate, railroad ballast, filter stone in drain fields, and may other purposes.
- Basalt is also cut into dimension stone. Thin slabs of basalt are cut and sometimes polished for use as floor tiles, building veneer, monuments, and other stone objects.

➢ Sandstone

Uses:-

- It has also been used for artistic purposes to create ornamental fountains and statues.
- Some sandstones are resistant to weathering, yet are easy to work. This makes sandstone a common building and paving material including in asphalt concrete.

➢ Shale

Uses-

- Shale is relatively fragile, as far as rock fragility goes, so it is rarely used for building materials or industrial uses in its raw form. When properly processed, it can be used as an additive in cement and art clay products.
- Shale uses in construction industry include Cement manufacture, Construction aggregate, For road aggregate, Making natural cement, Raw material for the manufacture of mortar.

➢ Quartz

Uses- Quartz is an important mineral with numerous uses.

- **Glass Making-** Geological processes have occasionally deposited *sand* that are composed of almost 100% quartz grains. These deposits have been identified and produced as sources of high purity silica sand. These sands are used in the glassmaking industry. Quartz sand is used in the production of container glass, flat plate glass, specialty glass and fibreglass

- **Abrasive-** The high hardness of quartz, seven on the Mohs Scale, makes it harder than most other natural substances. As such it is an excellent abrasive material. Quartz sands and finely ground silica sand are used for sand blasting, scouring cleansers, grinding media, and grit for sanding and sawing.

- **Foundry Sand-** Quartz is very resistant to both chemicals and heat. It is therefore often used as a foundry sand. With a melting temperature higher than most metals it can be used for the molds and cores of common foundry work.

Refractory brick are often made of quartz sand because of its high heat resistance. Quartz sand is also used as a flux in the smelting of metals.

- **Petroleum Industry-** Quartz sand has a high resistance to being crushed. In the petroleum industry *sand slurries* are forced down oil and gas wells under very high pressures in a process known as*hydraulic fracturing*. This high pressure fractures the reservoir rocks and the sandy slurry injects into the fractures. The durable sand grains hold the fractures open after the pressure is released. These open fractures facilitate the flow of natural gas into the well bore.
- **Many Other Quartz Sand Uses-** Quartz sand is used as a filler in the manufacture of rubber, paint and putty. Screened and washed, carefully sized quartz grains are used as filter media and roofing granules. Quartz sands are used for traction in the railroad and mining industries. These sands are also used in recreation on golf courses, volleyball courts, baseball fields, children's sand boxes and beaches.

➢ Flint

Uses-

- **Tools or cutting edges**

Flint was used in the manufacture of tools during the Stone Age as it splits into thin, sharp splinters called flakes or blades (depending on the shape) when struck by another hard object (such as a hammerstone made of another material). This process is referred to as knapping.

- **Flintlocks**

A piece of flint held in the jaws of a spring-loaded hammer, when released by a trigger, strikes a hinged piece of steel ("frizzen") at an angle, creating a shower of sparks and exposing a charge of priming powder. The sparks ignite the priming powder and that flame, in turn, ignites the main charge

- **As a building material**

Flint, knapped or unknapped, has been used from antiquity up to the present day as a material for building stone walls, using lime mortar, and often combined with other available stone or brick rubble.

- **Ceramics**

Flint pebbles are used as the media in ball mills to grind glazes and other raw materials for the ceramics industry. The pebbles are hand-selected based on colour; those having a tint of red, indicating high iron content, are discarded. The remaining blue-grey stones have a low content of chromophoric oxides and so are less deleterious to the colour of the ceramic composition after firing.

- **Jewellery**

Flint bracelets were known in Ancient Egypt, and several examples have been found. Striped flint is today in use as a gemstone as well.

- **Fragmentation**

While flint may be used in fire-lighting, it should not be exposed to excessive heat, as from a fire. Due to uneven expansion, flint may fracture, sometimes violently, during heating. This tendency to fracture is enhanced by the fact that most samples of flint contain impurities that may expand to a greater or lesser degree than the surrounding stone. This makes the material more homogeneous and thus more "knappable" and produces tools with a cleaner, sharper cutting edge.

➢ China clay

Uses-

- **Kaolin**, also called **china clay**, soft white clay that is an essential ingredient in the manufacture of china and porcelain and is widely used in the making of paper, rubber, paint, and many other products.

- When kaolin is mixed with water in the range of 20 to 35 percent, it becomes plastic (i.e., it can be molded under pressure), and the shape is retained after the pressure is removed. With larger percentages of water, the kaolin forms a slurry, or watery suspension.

➢ Bentonite

Uses-

- **Bentonite** is a type of absorbent clay that is usually refined from volcanic ash. Its high absorbency makes it a useful substance in industrial applications, in products like kitty litter and even in natural medicine.

- Bentonite also used as “Multani Mitti”has great scope of export to other parts of the other state of Jharkhand.

➢ Coal

Different types of coal have different uses.

- Steam coal - also known as thermal coal - is mainly used in power generation.
- Coking coal - also known as metallurgical coal - is mainly used in steel production.

Other important users of coal include alumina refineries, paper manufacturers, and the chemical and pharmaceutical industries. Several chemical products can be produced from the by-products of coal. Refined coal tar is used in the manufacture of chemicals, such as creosote oil, naphthalene, phenol, and benzene. Ammonia gas recovered from coke ovens is used to manufacture ammonia salts, nitric acid and agricultural fertilisers. Thousands of different products have coal or coal by-products as components: soap, aspirins, solvents, dyes, plastics and fibres, such as rayon and nylon.

Coal is also an essential ingredient in the production of specialist products:

- Activated carbon - used in filters for water and air purification and in kidney dialysis machines.
- Carbon fibre - an extremely strong but light weight reinforcement material used in construction, mountain bikes and tennis rackets.
- Silicon metal - used to produce silicones and silanes, which are in turn used to make lubricants, water repellents, resins, cosmetics, hair shampoos and toothpastes.

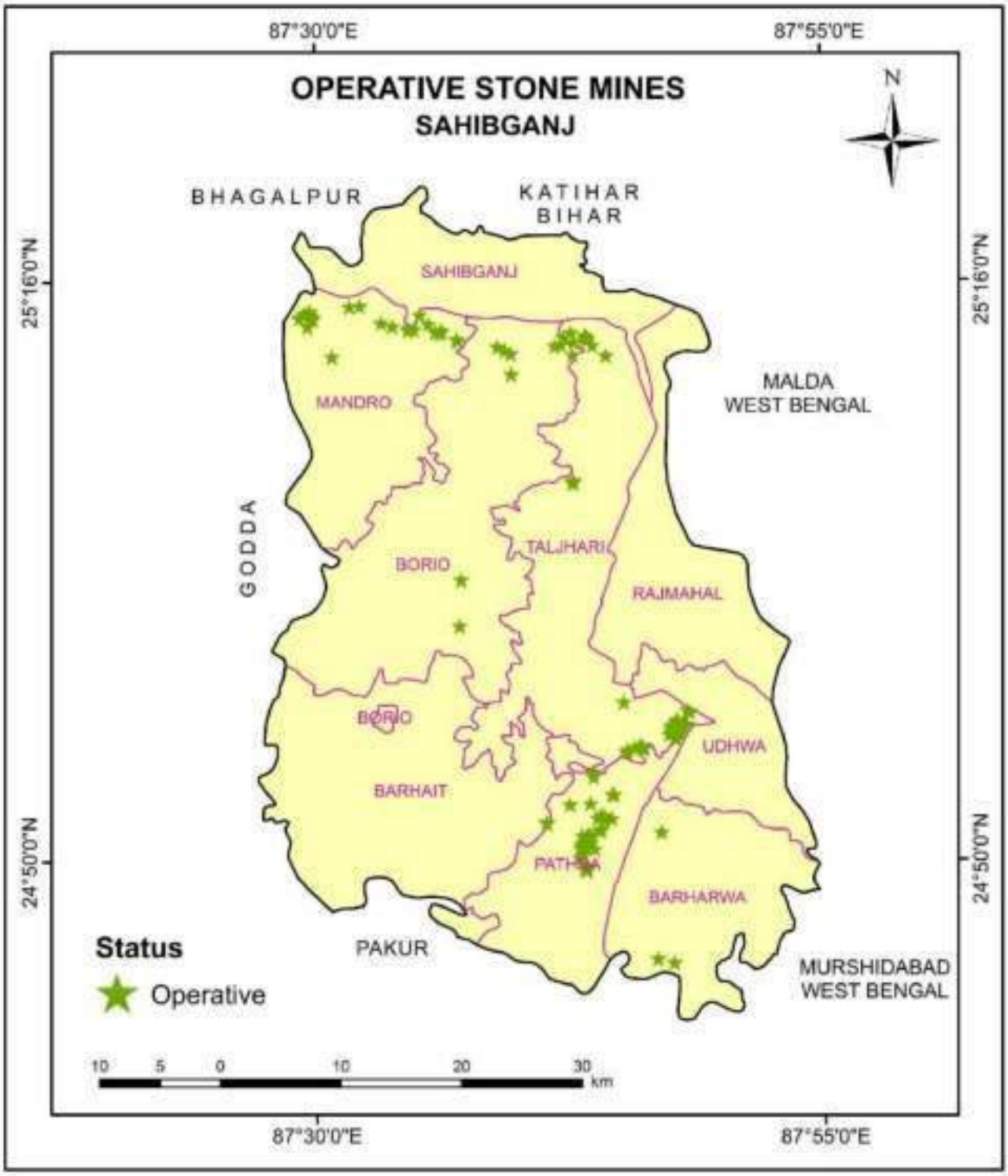
17. DEMAND AND SUPPLY OF THE MINERAL IN THE LAST THREE YEARS

As such there are huge infrastructural activities such as road, building, railways are coming up by Govt. of India & PSUs under “Make In India” programme.

The Granite Gneiss, Basalt are the main raw minerals for the above activities and considering the last three years’ actual production of Sahibganj with respect to the requirement of the state has a huge gap.

It is proposed to start the stone production from larger block/area to atleast double the production of the district which will enhance the revenue of the district and also support the livelihood of the locial people.

18. MAP OF EXISTING MINING LEASES IN THE DISTRICT



19. DETAILS OF THE AREA OF WHERE THERE IS A CLUSTER OF MINING LEASE VIZ. NUMBER OF MINING LEASES, LOCATION (LATITUDE AND LONGITUDE)

Currently there is no such cluster of mining lease. However, it is proposed to consider the cluster of mining lease while planning for new lease area in coming years.

20. DETAILS OF ECO-SENSITIVE AREA, IF ANY, IN THE DISTRICT

Moti Jharna Waterfall, Shivgadi Temple, Udhwa Bird Sanctuary and National Fossil Park have been identified as some of the important historical monuments in the district and it is suggested that a mininum distance as per DEIAA guideline to be declared as No Mining Zone.

Moti Jharna in Taljhari Block (Latitude: 25 12’ 51.51”N, Longitude: 87 44’ 26.45”E)

Shivgadi Temple in Taljhari Block (Latitude: 24 55’ 34.70”N, 87 38’ 53.97”E)

Udhwa Bird Sanctuary (Latitude: 24 57’ 54.06”N, 87 49’ 37.30”E)

National Fossil Park, Ghughwa Forest, Sahibganj

21. IMPACT OF MINING ON ENVIRONMENT

Impact on Environment due to mining activities varies based on the quantam of production rate proposed. The different activities envolved before & during mining are narrated below, which helps to asses the impact on environment.

- **Exploration:**

A mining project can only commence with knowledge of the extent and value of the mineral ore deposit. Information about the location and value of the mineral ore deposit is obtained during the exploration phase. This phase includes surveys, field studies, and drilling test boreholes and other exploratory excavations.

The exploratory phase may involve clearing of wide areas of vegetation (typically in lines), to allow the entry of heavy vehicles mounted with drilling rigs. Many countries require a separate EIA for the exploratory phase of a mining project because the impacts of this phase can be profound and because further phases of mining may not ensue if exploration fails to find sufficient quantities of high-grade mineral ore deposits of economical values.

- **Development**

If the mineral ore exploration phase proves that there is a large enough mineral ore deposit, of sufficient grade, then the project proponent may begin to plan for the development of the mine. This phase of the mining project has several distinct components.

- **Site preparation**

If a mine site is located in a remote, undeveloped area, the project proponent may need to begin by clearing land for the construction of staging areas that would house project personnel and equipment. Even before any land is mined, activities associated with site preparation and clearing can have significant environmental impacts, especially if they are within or adjacent to ecologically sensitive areas. The EIA must assess, separately, the impacts associated with site preparation and clearing.

- **Active mining**

Once a mining company has constructed access roads and prepared staging areas that would house project personnel and equipment, mining may commence. All types of active mining share a common aspect, i.e. the extraction and concentration (or beneficiation) of a metal from the earth. Proposed mining projects differ considerably in the proposed method for extracting and concentrating the metallic ore. In almost every case, metallic

ores are buried under a layer of ordinary soil or rock (called 'overburden' or 'waste rock') that must be moved or excavated to allow access to the ore deposit. The first way in which proposed mining projects differ is the proposed method of moving or excavating the overburden. What follows are brief descriptions of the most common methods.

- **Open-pit mining**

Open-pit mining is a type of strip mining in which the ore deposit extends very deep in the ground, necessitating the removal of layer upon layer of overburden and ore.

In many cases, logging of trees and clear-cutting or burning of vegetation above the ore deposit may precede removal of the overburden. The use of heavy machinery, usually bulldozers and dump trucks, is the most common meas of removing overburden. Open-pit mining often involves the removal of natively vegetated areas, and is therefore among the most environmentally- destructive types of mining, especially within tropical forests.

- **Underground mining**

In underground mining, a minimal amount of overburden is removed to gain access to the ore deposit. Access to this ore deposit is gained by tunnels or shafts. Tunnels or shafts lead to a more horizontal network of underground tunnels that directly access the ore. In an underground mining method called 'stoping' or 'block caving,' sections or blocks of rock are removed in vertical strips that leave a connected underground cavity that is usually filled with cemented aggregate and waste rock.

Although underground mining is a less environmentally-destructive means of gaining access to an ore deposit, it is often costlier and entails greater safety risks than strip mining, including open-pit mining. While most large- scale mining projects involve open-pit mining, many large underground mines are in operation around the world.

- **Disposal of overburden and waste rock**

In almost every project, metallic ores are buried under a layer of ordinary soil or rock (called 'overburden' or 'waste rock') that must be moved or excavated to allow access to the metallic ore deposit. For most mining projects, the quantity of overburden generated by mining is enormous. The ratio of the quantity of overburden to the quantity of mineral ore (called the 'strip ratio')
is usually greater than one, and can be much higher. For example, if a proposed mining project involves the extraction of 100 million metric tons of mineral ore, then the proposed mining project could generate more than one billion metric tons of overburden and waste rock.

These high-volume wastes, sometimes containing significant levels of toxic

substances, are usually deposited on-site, either in piles on the surface or as backfill in open pits, or within underground mines. Therefore, the EIA for a proposed mining project must carefully assess the management options and associated impacts of overburden disposal.

- **Human displacement and resettlement**

According to the International Institute for Environment and Development:

The displacement of settled communities is a significant cause of resentment and conflict associated with large-scale mineral development. Entire communities may be uprooted and forced to shift elsewhere, often into purpose-built settlements not necessarily of their own choosing. Besides losing their homes, communities may also lose their land, and thus their livelihoods. Community institutions and power relations may also be disrupted. Displaced communities are often settled in areas without adequate resources or are left near the mine, where they may bear the brunt of pollution and contamination. Forced resettlement can be particularly disastrous for indigenous communities who have strong cultural and spiritual ties to the lands of their ancestors and who may find it difficult to survive when these are broken.

ENVIRONMENTAL AND SOCIAL IMPACTS OF MINING

The most impotant important environmental impact of mining projects are:-

- **Acid mine drainage and contaminant leaching**

Acid mine drainage is considered one of mining most serious threats to water resources. A mine with acid mine drainage has the potential for long-term devastating impacts on rivers, streams and aquatic life.

HARM TO FISH & OTHER AQUATIC LIFE:

If mine waste is acid-generating, the impacts to fish, animals and plants can be severe. Many streams impacted by acid mine drainage have a pH value of 4 or lower – similar to battery acid. Plants, animals, and fish are unlikely to survive in streams such as this.

***PERPETUAL POLLUTION*:**

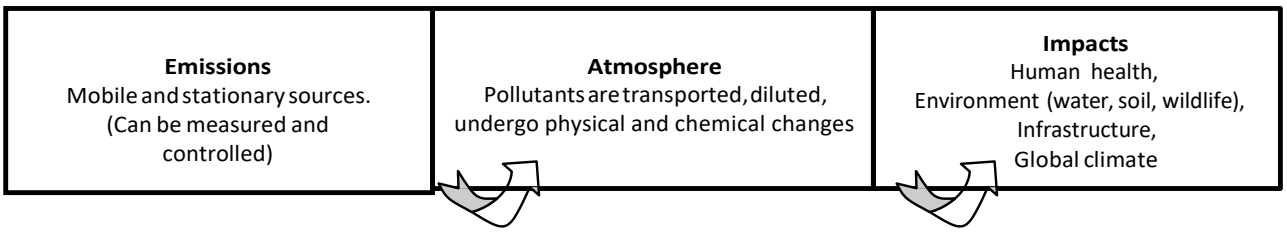
Acid mine drainage is particularly harmful because it can continue indefinitely causing damage long after mining has ended. Due to the severity of water quality impacts from acid mine drainage, many hardrock mines across the west require water treatment in perpetuity. Even with existing technology, acid mine drainage is virtually impossible to stop once the reactions begin.

To permit an acid generating mine means that future generations will take responsibility for a mine that must be managed for possibly hundreds of years."

Impacts of mining projects on air quality:-

The largest sources of air pollution in mining operations are:

Particulate matter transported by the wind as a result of excavations, blasting, transportation of materials, wind erosion (more frequent in open-pit mining), fugitive dust from tailings facilities, stockpiles, waste dumps, and haul roads. Exhaust emissions from mobile sources (cars, trucks, heavy equipment) raise these particulate levels; and gas emissions from the combustion of fuels in stationary and mobile sources, explosions, and mineral processing. Once pollutants enter the atmosphere, they undergo physical and chemical changes before reaching a receptor. These pollutants can cause serious effects to people's health and to the environment.



Large-scale mining has the potential to contribute significantly to air pollution, especially in the operation phase. All activities during ore extraction, processing, handling, and transport depend on equipment, generators, processes and materials that generate hazardous air pollutants such as particulate matter, heavy metals, carbon monoxide, sulfur dioxide, and nitrogen oxides.

Transportation sources

Transporation sources of air pollutants include heavy vehicles used in excavation operations, cars that transport personnel at the mining site, and trucks that transport mining materials. The level of polluting emissions from these sources depends on the fuel and conditions of the equipment. Even though individual emissions can be relatively small, collectively these emissions can be of real concern. In addition, mobile sources are a major source of particulate matter, carbon monoxide, and volatile organic compounds that contribute significantly to the formation of ground-level ozone.

Stationary sources

The main gaseous emissions are from combustion of fuels in power generation installations, and drying, roasting, and smelting operations. Many producers of precious metals smelt metal on-site, prior to shipping to off-site refineries. Typically, gold and silver is produced in melting/fluxing furnaces that may produce elevated levels of airborne mercury, arsenic, sulfur dioxide, and other metals.

Fugitive emissions

Common sources of fugitive emissions include: storage and handling of materials; mine processing; fugitive dust, blasting, construction activities, and roadways associated with

mining activities; leach pads, and tailing piles and ponds; and waste rock piles. Sources andcharacteristics of fugitive emissions dust in mining operations vary in each case, as do their impacts. Impacts are difficult to predict and calculate but should be considered since they could be a significant source of hazardous air pollutants.

Noise and vibration

Noise pollution associated with mining may include noise from vehicle engines, loading and unloading of rock into steel dumpers, chutes, power generation, and other sources. Cumulative impacts of shoveling, ripping, drilling, blasting, transport, crushing, grinding, and stock-piling can significantly affect wildlife and nearby residents.

Vibrations are associated with many types of equipment used in mining operations, but blasting is considered the major source. Vibration has affected the stability of infrastructures, buildings, and homes of people living near large-scale open-pit mining operations. According to a study commissioned by the European Union in 2000:
“Shocks and vibrations as a result of blasting in connection with mining can lead to noise, dust and collapse of structures in surrounding inhabited areas. The animal life, on which the local population may depend, might also be disturbed.”

22. REMEDIAL MEASURES TO MITIGATE THE IMPACT OF MINING ON THE ENVIRONMENT

Following are the remedial measures to mitigate the impact of mining :

1. Water sprinkeling on haul road, loading and unloading points.
2. Plantation along the safety zone and dump area.
3. Providing dust masks to workers.
4. Regular monitoring of ambient air quality.
5. Provision of air conditioned cabin of Excavators and Dumpers.
6. Regular and proper maintainance of working equipments.
7. Periodic medical examination of the workers and organise medical camp in the area.
8. Use Milli Second Delay Detonator in blasting operation.
9. Pvovision of ear plug to the workers.
10. Regular training program to the mines workers and operators.

23. RECLAMATION OF MINED OUT AREA

Necessity of Reclamation & Rehabilitation:

- Exponential growth in mineral production since 1980.
- Mining activities causes hysical, chemical, biological and socio-economic changes in the area.
- Surface mining activities disturb the original land profile.
- In India, mineral production comes mostly from opencast mines & hence Land degradation problems is of serous concern.
- An intricate, in-depth and site-specified techniques involving integrated approach is necessary.

Reclamation has three vital roles:

i. **Reclamation** – Reclamation means return the mined-out land with useful life. It implies restoring the land to a form and productivity that is useful and inconfromiti with a prior land use. Reclamation always may not be a single-phase operation.

ii. **Rehabilitation** – Rehabilitation is to bring bach the degraded land to a normal stage by a special treatment. It is a process of taking some mitigation measures for disturbed environmental condition created through mining activities.

iii. **Restoration** – Restoration is the process of returning the mined out land being fit to an acceptable environmental condition. However, the general acceptable meaning of the term is bringing the disturbed land to its original form. Restoration is often used to indicate that biological properties of soil are put back ot what they were. This is a rate phenomenon.

When active mining ceases, mine facilities and the site are reclaimed and closed. The goal of mine site reclamation and closure should always be to return the site to a condition that most resembles the pre-mining condition. Mines that are notorious for their immense impact on the environment often made impacts only during the closure phase, when active mining operations ceased. These impacts can persist for decades and even centuries.

Mine reclamation and closure plans must describe in sufficient detail how the mining company will restore the site to a condition that most resembles pre-mining environmental quality; how it will prevent – in perpetuity – the release of toxic contaminants from various mine facilities (such as abandoned open pits and tailings impoundments); and how funds will be set aside to insure that the costs of reclamation and closure will be paid for.

Proposed future land use after reclamation:

a. Forestery, b. Recreation, c. Water Reservoir, d. Crop Land, e. Residential/Commercial, f. Fish & wildlife Habitat, g. Undeveloped Land, h. Grazing/Pasture Land

Statutory requirement:

As per the Mineral Conservation Development Rule, 2017, the following rules must be bare in mind by the mine owner/agent/manager, which is a part of reclamation activities –

Rule 22, Mine Closure Plan

Rule 23, Submission of Progressive Mine Closure Plan

Rule 24, Submission of Final Mine Closure Plan

Rule 26, Responsibility of holder of mining lease

Rule 27, Financial Assurance

Rule 35, Sustainable Mining

24. RISK ASSESSMENT AND DISASTER MANAGEMENT PLAN

24.1 Vulnerability of the State

Almost all the 24 districts are affected by different kind of Disaster. There is great need to strengthen the capacity of State, District, Block and newly formed Panchayat level of departments, institutions and functionaries to respond to the Disaster at their own level in participation of community. Jharkhand is vulnerable to following kind of Hazards:-

- Drought,
- Mining Accidents,
- Chemical and Industrial Hazards,
- Lightning,
- Bird Flu,
- Flood,
- Earthquake,
- Fire / Forest Fire,
- Elephant Attacks,
- Climate Change, Biodiversity loss,
- Naxalism/Landmine Blasts etc.

Major Hazards affected districts Sl No	Name of Hazards	No. of districts affected	Name of the district
1.	Drought	All the 24 Districts (2010)	All districts affected
2.	Flood	01	(Sahibgunj)
3.	Flash Flood	03	(Jamshedpur, Saraikela , Ranchi)
4.	Forest Fire	09	(Garhwa, Palamau, Latehar, Chatra, Hazaribagh, E. & W. Singhbhum, Simdega, Gumla)
5.	Lightening	09	(Palamau, Chatra, Latehar, Koderma, Ranchi, Giridih, 9 Hazaribagh, Lohardagga, Dumka)
6.	Mining Hazards	09	Latehar, Ramgarh, Dhanbad, Lohardagga, Giridih E & W Singhbhum & Koderma
7.	Earthquake Hazard – Zone –IV	02 Districts	(Godda & Sahibgunj - Partially)

	Zone –III	15 Districts	(Godda , Sahibgunj, Garhwa, Palamau, Chatra, Hazaribagh, Koderma, Giridih, Bokaro, Dhanbad, Deoghar, Dumka, Godda, Pakur, Jamtara)
	Zone – II	7 Districts	(Lohardagga, Ranchi, Ramgarh, Khunti, Gumla, E. & W. Singhbhum)

24.2 Mine disaster

Thousands of miners die each year around the globe due to mining accidents, especially from underground coal mining, although hard rock mining is not immune from accidents. A number of coal mines in the state are affected by fires leading to steady destruction of precious energy resource. The reason for mine fires presumably involves the phenomenon of spontaneous heating through two interrelated processes viz., the oxygen coal interaction or oxidative process and the thermal process. It is estimated that about 10% of total national coal resources are in the fire-affected areas. Although underground mining has considerably less impact than opencast mining on land, it causes enough damage through subsidence as observed in Jharia and Raniganj coalfields. Apart from this, leaks of poisonous gases such as hydrogen sulphide or explosive natural gases, especially firedamp or methane, dust explosions, collapsing of mine stopes, mining-induced seismicity, flooding, or general mechanical errors from improperly used or malfunctioning mining equipments and improper explosives underground can also cause to catastrophe.

The Chasnala mining disaster happened on 27 December 1975 in a coal mine near Dhanbad caused by an explosion in the mine followed by flooding which killed 372 miners.

The Dhanbad coal mine disaster occurred on May 28, 1965, in a coal mine near Dhanbad. On the fateful day, there was an explosion in Ghori Dhori colliery near Dhanbad, which led to fire in the mines which killed 375 miners.

25. DETAILS OF THE OCCUPATIONAL HEALTH ISSUE IN THE DISTRICT

Since all the stone mines excavating below six mitres from the supergescent ground, it attracts Mines Act 1952. As such there is no previous record in this regard available in the department, however it is proposed as per *Section 9A of Mines Act 1952*, it is the responsibility of the owner/agent/manager of the mine to provide occupational health survey facilities to the employees. In line with above *rule 29B of Mines Rules 1955*, it speaks about the initial and periodical medical examinations of the employees employed in the mine.

For initial medical examination, every person seeking employment in the mine and person has already undergone within the preceeding 5 years, a medical examination under these rules is to be carried out.

According to MSME Report 2011, there are 10 numbers of Allopathic Hospitals, 27 nos Community Health Centers, 58 Dispensaries, 2 Sub health centers and 1 Private Hospital, and it is proposed to carryout the above-mentioned activities with the guidance of these available facilities in the district.

26. PLANTATION AND GREEN BELT DEVELOPMENT IN RESPECT OF LEASE ALREADY GRANTED IN THE DISTRICT

It is proposed to have a detailed record of plantation to be kept by the respective owner/agent/manager of the mine every year, which has been planted in the safety zone area and transport rout, which is statutorily required.

As per the norms of the forest department, the plantation has to be carried out at the rate of 2500 local plants per hectare and along the road side, at an interval of 5 metres in the zig-zag manner in both sides.

27. Other Information

Jharkhand Minor Minerals (Auction) Rules, 2017 and Jharkhand Minor Minerals (Evidence & Mineral Contents) Rules, 2018 in Annexure I & II has been attached for ready reference.

Conclusion

1. 27 numbers of new potential areas have been identified having total reserve of **77764.27** Million Ton in Sahibganj district on the basis of geological study carried out during field observation. All the parameters and the statutory clearances required for mining should be verified by consulting with concerned authorities before opting for E.C.

2. Since it is an interim report, to meet the requirement of minerals in the present scenario, it is proposed to identify such potential areas at certain interval and get the data bank of DSR to be updated.

REFERENCES

- Geology of Bihar and Jharkhand by T. M. Mahadevan
- District Mining Office – Sahebganj
- District Forest Office - Sahebganj
- National Institute of Disaster Management Report
- Report of Central Ground Water Board, Ministry of Water Resources – State Unit Office, Ranchi, September 2013.
- http://www.jharkhandminerals.gov.in
- http://gis.jharkhand.gov.in/
- http://sahibganj.nic.in/
- https://en.wikipedia.org/wiki/Sahebganj_district
- https://sameti.org/Soil_Inventory/Sahibganj_Soil_Analysis.pdf
- Brief Industrial Profile of Sahibganj District, MSME Development Institute, Ranchi
- Geological Maps of GSI
- Survey of India Topo Sheets
- GSI Memoirs Vol LXXVIII
- Geology And Mineral Resources of the States of India, GSI, Miscellaneous Publication No. 30, Part – V (Bihar & Jharkhand)

Annexure I

Department of Industries, Mines and Geology.

NOTIFICATION

16 AUGUST, 2017

No.05/kha.Ni.-JMM(Auction)Rules-02/2017-2302-- In exercise of the powers conferred by section 15 of the Mines and Minerals (Regulation and Development) Act, 1957 (67 of 1957), the Governor of Jharkhand exercises power to notify following rules :-

CHAPTER I

PRELIMINARY

1. **Short title and commencement.-** (1) These rules may be called the Jharkhand Minor Mineral (Auction) Rules, 2017.
(2) They shall come into force on the date of their publication in the Official Gazette.
2. **Definitions.-** (1) In these rules, unless the context otherwise requires,-
   a) "Act" means the Mines and Minerals (Development and Regulation) Act, 1957 (67 of 1957);
   b) "Composite Licence" means prospecting licence-cum-mining lease granted under rule 18;
   c) "Mine Development and Production Agreement" means the agreement referred to in sub-rule (4) of rule 10 or sub-rule (8) of rule 18;
   d) "Preferred bidder" means the bidder referred to in sub-clause (iii) of clause (b) of sub-rule (4) of rule 9;
   e) "Qualified bidders" means the bidder referred to in sub-clause (iv) of clause (a) of sub-rule (4) of rule 9;
   f) "Reserve Price" means the minimum percentage of value of mineral despatched as referred to in sub-rule (1) of rule 8;
   g) "State Government" means Government of Jharkhand.
   h) "Section" means section of the Act;
   i) "Schedule" means a Schedule appended to these rules;
   j) "Successful bidder" means the bidder as referred to in sub-rule (3) of rule 10 or sub-rule (2) of rule 18;
   k) "Technically Qualified Bidders" means the bidder as referred to in sub-clause (ii) of clause (a) of sub-rule (4) of rule 9;

l) "Tender Document" means the tender document issued by the Director, Mines / Deputy Commissioner for conduct of an auction referred to in sub-rule (2) of rule 9;

m) "Upfront Payment" means the payment referred to in sub-rule (1) of rule 11;

n) "Value of estimated resources" means an amount equal to the product of,-

i) the estimated quantity of mineral resources for which the mineral block is being auctioned, expressed in metric tonne/cft; and

ii) the average price per metric tonne of such mineral as published by Indian Bureau of Mine for Jharkhand State for a period of twelve months immediately preceding the month of computation of the Value of Estimated Resources or the price notified by the Director, Mines; on the basis of the norm followed by Indian Bureau of Mines.

"Value of mineral despatched" shall have the meaning specified in sub-rule (2) of rule 8.

o) "Director, Mines" means appointed as Director, Mines by the State Government.

p) "Director, Geology" means appointed as Director, Geology by the State Government.

q) "Deputy Commissioner" means appointed as Deputy Commissioner of respective District

(2) The words and expressions used in these rules but not defined herein shall have the same meaning as assigned to them in the Act or rules made there under.

3. Application- These rules shall apply to all minor minerals except Soil, Brick Earth, Morrum, Reh Soil, clay for making Raniganj tiles and Stone (Boulder, Bajri, Single, Stone Brick, Stone Dust) over an area of less than five hectare of Raiyati land (private land).

4. Grant of concession- (1) Where mineral contents of an area has been established and demarcated by the Director Geology, Mining Lease shall be granted in the manner specified under the provisions of JMMC Rules, 2004 as amended from time to time.

(2) A Composite Licence with respect to an area where the mineral content of an area have not been fully established but mineral block has been prepared by Director of Geology for grant of composite Licence, shall be granted in the manner specified under the provision of JMMC Rules, 2004 as amended from time to time.

CHAPTER II

GRANT OF MINING LEASE

5. **Prerequisites for auction of Mining Lease-** (1) The Director, Mines /Deputy Commissioner may initiate an auction process for grant of a mining lease with respect to an area within the District if the mineral contents in such area has been established by Director, Geology.

(2) The Director, Mines /Deputy Commissioner shall, prior to issuance of the notice inviting tender with respect to mineral auction, identify and demarcate the area where a mining lease is proposed to be granted through auction and the area so demarcated shall be classified into forests land, land owned by the State Government and land not owned by the State Government.

(3) The extent of area so demarcated shall include area required for all the activities falling under the definition of 'mine' as defined in clause (j) of sub-section (1) of section 2 of the Mines Act.

6. **Eligibility for Mining Lease.-** (1) For the purpose of participating in the auction of mining lease, an applicant shall meet the requirements as specified in section 5 of MMDR Act and the terms and conditions of eligibility as specified in Schedule-I.

(2) The Director, Mines /Deputy Commissioner may having regard to article 244 and the Fifth Schedule to the Constitution, the provisions of the Panchayats (Extension to the Scheduled Areas) Act, 1996 (40 of 1996); and the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (2 of 2007), make such amendments to Schedule I as it may deem necessary.

(3) The eligibility for participating in the auction shall be determined as per the terms and conditions of eligibility for participating in the

auction and the Successful Bidder shall be decided solely on the basis of financial bids submitted by the eligible bidders.

7. **Electronic Auction-** (1) An auction shall be conducted only through an online electronic auction platform.

(2) The Director, Mines /Deputy Commissioner may utilise any online electronic auction platform which meets the minimum technical and security requirements as specified in the Guidelines for compliance to Quality requirements of e-Procurement Systems issued by the Standardisation Testing and Quality Certification Directorate, Department of Information Technology, Ministry of Communications and Information Technology, Government of India.

8. **Bidding parameters-** (1) The Director, Mines / Deputy Commissioner shall specify in the tender document the minimum percentage of the value of mineral despatched, which shall be known as the "reserve price".

(2) The value of mineral despatched shall be an amount equal to the product of,-

(i) mineral despatched in a month; and

(ii) sale price of the mineral (Grade-wise and State-wise) as published by Indian Bureau of Mines for such month of despatch or the price notified by the Director, Mines.

(3) The bidders shall quote, as per the bidding parameter, for the purpose of payment to the State Government, a percentage of value of mineral despatched equal to or above the reserve price and the successful bidder shall pay to the Director, Mines /Deputy Commissioner an amount equal to the product of,-

(i) percentage so quoted; and

(ii) value of mineral despatched.

(4) Where an area is being auctioned for more than one mineral, the percentage of value of mineral despatched as quoted by the successful bidder under sub-rule (3) shall be applicable for the

purpose of payment to the Director, Mines /Deputy Commissioner in respect of each such mineral.

(5) If subsequent to grant of a mining lease, one or more new minerals are discovered, the percentage of value of mineral despatched as quoted by the successful bidder under sub-rule (3) shall be applicable for the purpose of payment to the Director, Mines /Deputy Commissioner in respect of each such mineral.

9. **Bidding Process.-** (1) Subject to the provisions of rule 5, the Director, Mines/Deputy Commissioner shall issue a notice inviting tender, at least in three daily News Paper and on the State Government Website to commence the auction process and such notice shall contain brief particulars regarding the area under auction, including.-

(a) particulars of the area identified and demarcated shall be divided into forest land, land owned by the State Government, and land not owned by the State Government

(b) estimated mineral resources and brief particulars regarding evidence of mineral contents with respect to all minerals in the area as provided by Director, Geology.

(2) The tender document issued by the Director, Mines /Deputy Commissioner shall contain.-

(a) geological report prepared by the Director, Geology specifying particulars and estimated quantities of all minerals discovered in the area; and

(b) revenue survey details of the area identified and demarcated shall be divided into forest land, land owned by the State Government, and land not owned by the State Government

(3) The bidders shall be provided a fixed period, as notified by the Director, Mines /Deputy Commissioner to study the tender document and such reports and the bidding process shall commence only on expiry of such period.

(4) The auction shall be an ascending forward online electronic auction and shall comprise of the following rounds, namely:-

(a) First Round of Auction to be held in the following manner, namely:-

(i) the bidders shall submit-

(A) a technical bid comprising amongst others, documentary evidence to confirm eligibility as per the provisions of the Act and the rules made thereunder to participate in the auction, bid security and such other documents and payments as may be specified in the tender document; and

(B) an initial price offer which shall be a percentage of value of mineral despatched;

(ii) only those bidders who are found to be eligible in accordance with the terms and conditions of eligibility specified in rule 6 and whose initial price offer is equal to or greater than the reserve price, referred to as "technically qualified bidders", shall be considered for the second round of electronic auction;

(iii) The Highest initial price offer amongst the technically qualified bidders shall be the floor price of the second round of online electronic auction.

(iv) the technically qualified bidders shall be ranked on the basis of the descending initial price offer submitted by them and the technically qualified bidders holding the first fifty percent of the ranks (with any fraction rounded off to higher integer) or the top five technically qualified bidders, whichever is higher, shall qualify as qualified bidders for participating in the second round of electronic auction:

Provided that where the total number of technically qualified bidders is less than three, then no technically qualified bidder shall be considered to be qualified bidder and the auction process shall be annulled:

Provided further that the Director, Mines /Deputy Commissioner may, in its discretion, decide not to annul the auction process if even in the third or subsequent attempt the total number of technically qualified bidders continues to be less than three and the Director, Mines/Deputy Commissioner may, in such case, decide to consider the technically qualified bidders as qualified bidders so as to continue with the bidding process:

Provided also that if the number of technically qualified bidders is between three and five, then all the technically qualified bidders shall be considered as qualified bidders:

Provided also that in the event of identical initial price offers being submitted by two or more technically qualified bidders, all such technically qualified bidders shall be assigned the same rank for the purposes of determination of qualified bidders and in such case, the aforementioned fifty percent shall stand enhanced to fifty percent plus the number of technically qualified bidders, whose initial price offers are identical less the number of such identical initial price offers

Illustration;

In the event there are a total of ten technically qualified bidders, and each technically qualified bidder submits different initial price offer, then the technically qualified bidders holding the first fifty percent of ranks shall be considered to be qualified bidders. If three such technically

qualified bidders submit the same initial price offer and are ranked in first fifty percent of the total number of ranks, then, all the three technically qualified bidders shall be considered to be qualified bidders and the total number of qualified bidders shall stand increased by two.

(b) Second Round of Auction to be held in the following manner, namely:-

(i) the qualified bidders may submit their final price offer which shall be a percentage of value of mineral despatched and greater than the floor price:

Provided that the final price offer may be revised till the conclusion of the auction as per the technical specifications of the auction platform;

(ii) The auction process shall be annulled if none of the qualified bidders submits a final price offer on the online electronic auction platform;

(iii) the qualified bidder who submits the highest final price offer shall be declared as the "preferred bidder" immediately on conclusion of the auction.

10. Grant of Mining Lease- (1) The preferred bidder shall submit the first installment being ten percent of the upfront payment as per rule 11.

(2) Upon receipt of the first instalment of the upfront payment, the Director, Mines / Deputy Commissioner shall issue a letter of intent to the preferred bidder.

(3) The preferred bidder shall be considered to be the "successful bidder" upon,-

(a) continuing to be in compliance with all the terms and conditions of eligibility;

(b) payment of the second instalment being ten per cent. of the upfront payment;

(c) furnishing performance security as specified in rule 12;

(d) satisfying the conditions with respect to Mining Plan specified in Jharkhand Minor Mineral Concession Rules, 2004 as amended from time to time

(e) satisfying such other conditions as may be specified by the Director, Mines /Deputy Commissioner with the prior approval of the State Government.

(4) The successful bidder shall sign the Mine Development and Production Agreement with the Deputy Commissioner upon obtaining all consents, approvals, permits, no-objections and the like as may be required under applicable laws for commencement of mining operations.

(5) The successful bidder shall pay the third installment being eighty percent of the upfront payment subsequent to execution of the Mine Development and Production Agreement and upon such payment the Deputy Commissioner shall grant a mining lease to the successful bidder.

(6) The Mining Lease Deed shall be executed by the Deputy Commissioner within thirty days of the date of completion of the conditions specified in sub-rule (5) and shall be subject to the provisions of the Act and the rules made thereunder.

(7) The mining lease shall be for minerals found in the area pursuant to exploration/reserve estimated prior to the auction:

Provided that where, subsequent to the auction, any new mineral is discovered, then the holder of mining lease shall follow the provisions of the Jharkhand Minor Mineral Concession Rules, 2004 as amended from time to time for inclusion of such new mineral in the Mining Lease Deed.

(8) Where, prior to the auction or subsequent to the auction, presence of minor mineral is established or discovered, such minor minerals shall

be dealt in accordance with such rules made/to be made by the State Government under section 15.

(9) The date on which a duly executed Mining Lease Deed is registered shall be the date of commencement of the mining lease.

11. Upfront payment for mining lease- (1) An amount equal to 0.50% of the value of estimated resources shall be the upfront payment.

(2) The upfront payment shall be payable to the Director, Mines/Deputy Commissioner in three installments of ten percent; ten percent; and eighty percent as specified in the tender document and shall be adjusted in full against the amount paid under sub-rule (3) of rule 8 of these rules within the first five years of commencement of production of mineral as specified in the tender document.

12. Performance security for mining lease.—(1) The successful bidder shall provide a performance security of an amount of 0.50% of the value of estimated resources and the performance security shall be adjusted every five years so that it continues to correspond to 0.50% of the reassessed value of estimated resources.

(2) The performance security provided through bank guarantee in the format as specified in Schedule II or through security deposit, may be invoked as per the provisions of –

(i) the Mine Development and Production Agreement and

(ii) the Mining Lease Deed.

13. Payments under mining lease— (1) The lessee shall pay royalties and dead rent to the State Government as specified in the Act and the rules made thereunder.

(2) The lessee shall pay the applicable amount quoted under rule 8 to the State Government on a monthly basis.

(3) The lessee shall contribute such amounts as may be required under the Act/Rule made thereunder to -

(a) the designated account of the District Mineral Foundation.

(4) The lessee shall also pay such other amounts as may be required under any law for the time being in force to the concerned authorities.

14. Payment of Interest—The State Government shall charge simple interest at the rate of twenty four percent per annum on any payment due to State Government under these rules the payment of which is delayed beyond sixty days from the due date thereof.

15. Time Period—The time period for compliance of rules 10 to 14 of these rules shall be as specified in the tender document.

CHAPTER III

GRANT OF COMPOSITE LICENCE

16. Prerequisites for auction of Composite Licence—

(1) The Director, Mines/Deputy Commissioner may initiate an auction process for grant of a Composite Licence with respect to an area within the State in accordance with the provisions of these rules and this Chapter for the mineral block prepared by the Director, Geology for grant of a Composite Licence.

(2) The Director, Mines /Deputy Commissioner shall, prior to issuance of the notice inviting tender with respect to auction, identify and demarcate the area where a Composite Licence is proposed to be granted through auction and the area so demarcated shall be classified into forests land, land owned by the State Government, and land not owned by State Government.

17. Auction for Composite Licence—(1) The auction process as specified in rules 6 to 9 shall be applicable for conduct of auction for grant of a Composite Licence subject to the following, namely:—

(a) the State Government shall not make any reservation on the basis of end use;

(b) the Director, Mines /Deputy Commissioner shall subject to compliance of rule 16, issue a notice inviting tender, including on

their website, to commence the auction process and such notice shall contain brief particulars regarding the area under auction, including,-

(i) particulars of the area identified and demarcated shall be divided into forest land, land owned by the State Government, and land not owned by the State Government

(ii) estimated mineral resources with respect to all minerals discovered in the area as prepared by Director, Geology.

(c) the tender document issued by the Director, Mines, shall contain,—

(i) geological report specifying particulars and estimated quantities of all minerals discovered in the area as prepared by Director, Geology; and

(ii) revenue survey details of the area identified, demarcated shall be divided into forest land, land owned by the State Government, and land not owned by the State Government.

(d) the bidders shall be provided a fixed period, as prescribed by the Director, Mines/Deputy Commissioner to study the Tender Document and such reports and the bidding process shall commence only on expiry of such period.

18. Grant of Composite Licence.— (1) Upon completion of the auction process, the preferred bidder shall submit a performance security in the manner specified in sub-rule (1) of rule 19 and upon receipt of such performance security, the Director, Mines /Deputy Commissioner shall issue a letter of intent to the preferred bidder.

(2) On receipt of the letter of intent the preferred bidder shall be considered to be the successful bidder upon fulfilment of the following conditions, namely:—

(a) compliance with all the terms and conditions of eligibility;

(b) obtaining all consents, approvals, permits, no-objections and the like as may be required under applicable laws for commencement of prospecting operations; and

(c) submitting the Scheme of prospecting.

(3) Upon fulfilment of the conditions specified in sub-rule (2), the Director, Mines /Deputy Commissioner shall grant a Composite Licence to the successful bidder and such Composite Licence shall be subject to the provisions of the Act and the rules made thereunder, as applicable to a prospecting licence and mining lease.

(4) The minimum area for grant of a Composite Licence shall not be less than the minimum area for which a mining lease may be granted in accordance with the provisions of the Jharkhand Minor Mineral Concession Rules, 2004 as amended from time to time and the maximum area shall be in accordance with section 6 as applicable to a prospecting licence.

(5) The holder of a Composite Licence shall conduct geological exploration of the area under the Composite Licence so as to ascertain evidence of mineral contents and shall submit periodic reports in accordance with the Act and rules made thereunder, as applicable to a prospecting licence and all reports, studies and other documentation related to the geological exploration of the area under the Composite Licence shall be submitted to the Director, Mines/Deputy Commissioner.

(6) If a holder of a Composite Licence,—

(a) fails to complete prospecting operations or fails to establish the existence of mineral contents in accordance with the guidelines issued by the Director, Geology such holder shall not be eligible to receive a mining lease and the Composite Licence shall be terminated;

(b) completes prospecting operations in accordance with the guidelines issued by the Director, Geology resulting in determination of evidence of mineral contents, such holder shall make an application to the Director, Mines/Deputy

Commissioner for grant of a mining lease accompanied with the first installment, being ten percent of the upfront payment:

Provided that the mining lease shall be granted only with respect to the area for which evidence of mineral contents has been found and shall not be for an area larger than the maximum area for which a mining lease may be granted under the Act:

Provided further that any excess area shall be deemed to be surrendered by the holder of Composite Licence after completing its reclamation.

(7) Upon receipt of the duly completed mining lease application and the first installment of the upfront payment as specified in clause (b) of sub-rule (6), the Director, Mines /Deputy Commissioner shall issue a letter of intent for mining lease.

(8) A Mine Development and Production Agreement shall be executed between the Director, Mines /Deputy Commissioner and the holder of Composite Licence if the holder of a Composite Licence—

(a) continues to comply with the terms and conditions of eligibility;

(b) pays the second instalment being ten percent of the upfront payment;

(c) furnishes the enhanced performance security as specified in sub-rule (2) of rule 19;

(d) satisfying the conditions with respect to Mining Plan specified in Jharkhand Minor Mineral Concession Rules, 2004 as amended from time to time;

(e) obtains all consents, approvals, permits, no-objections and the like as may be required under applicable laws for commencement of mining operations; and

(f) satisfies such other conditions as may be specified by the Director, Mines with the prior approval of the State Government.

(9) The holder of the Composite Licence shall pay the third instalment being eighty percent of the upfront payment, subsequent to execution of the Mine Development and Production Agreement and upon such payment, the State Government shall execute a Mining Lease Deed with the holder of the Composite Licence within thirty days of the date of completion of all the conditions specified in sub-rule (8).

(10) The mining lease shall be subject to the provisions of the Act and the rules made thereunder.

(11) The mining lease shall be for minerals found in the area pursuant to exploration prior to the auction:

Provided that where subsequent to the auction, any new mineral is discovered, then the holder of the mining lease shall follow the provisions of the Jharkhand Minor Mineral Concession Rules, 2004 as amended from time to time for inclusion of such new mineral in the Mining Lease Deed.

(12) The date on which a duly executed Mining Lease Deed is registered shall be the date of commencement of the mining lease.

19. Performance Security for Composite Licence— (1) An amount of 0.25% of the value of estimated resources shall be payable by the preferred bidder as performance security prior to the issuance of the Composite Licence.

(2) The amount of performance security shall be revised, prior to the issuance of the mining lease, to an amount of 0.50% of the value of estimated resources.

(3) The performance security provided under sub-rule (2) shall be adjusted every five years so that it continues to correspond to 0.50% of the reassessed value of estimated resources.

(4) The performance security may be invoked as per provisions of,-

(i) the Mine Development and Production Agreement and

(ii) the Mining Lease Deed.

CHAPTER IV

MISCELLANEOUS

20. Power to rectify apparent mistakes—Any clerical or arithmetical mistake in any order passed by the Director, Mines /Deputy Commissioner or any authority or officer under these rules and any error arising therein due to accidental slip or omission, may be corrected by the Director, Mines /Deputy Commissioner the concerned authority or officer, as the case may be:

Provided that no rectification order prejudicial to any person shall be passed unless such person has been given a reasonable opportunity of being heqrd.

21. Exploration Obligation—The holder of a Composite Licence shall complete detailed exploration and prepare a detailed feasibility study report confirming to the Guidelines issued by the Director, Geology over the entire area under the mining lease, within a period of Three years from the date of commencement of such mining lease.

By order of Governor of Jharkhand

Sunil Kumar Barnwal,
Secretary of Government.

SCHEDULE I

Terms and conditions of eligibility

[See rules 6(1) and 6(2)]

1. The following net worth requirements shall be applicable for an auction of mining lease depending on the Value of Estimated Resources,—
   (a) If the Value of Estimated Resources is more than Rupees 10 (Ten) Crores, the applicant, including an individual, shall have a net worth more than 4% of Value of Estimated Resources.
   (b) If the Value of Estimated Resources is less than or equal to Rupees 10 (Ten) Crores, the applicant, not being an individual, shall have a net worth more than 2% of Value of Estimated Resources.
   (c) If the Value of Estimated Resources is less than or equal to Rupees 10 (Ten) Crores, the applicant, being an individual, shall have a minimum net worth of 1% of the Value of Estimated Resources.
2. In case of auction of Composite Licence, the applicant must have a net worth of more than 1% of the Value of Estimated Resources.

Explanation:

(1) In case an applicant is a subsidiary of another company incorporated in India, the net worth of such holding company may also be considered:
Provided that, in such case, the applicant must continue to be a subsidiary of such holding company until such time the applicant meets the aforementioned net worth threshold.

(2) In case of a Company, the Net worth shall be the sum of paid up share capital and the free Reserves as per the audited Balance Sheet of the immediately preceding financial year.

(3) In case of an individual, the Net worth shall be the closing cash balance on the last date for submission of application, and such amount may include amount in Savings Bank accounts in Scheduled Bank/ Post Office, free and un-encumbered Fixed Deposits in Scheduled Banks, Post Office, Listed Companies/Government Organisation/Public Sector Undertaking of State and Central Government, Kisan Vikas Patra, National Saving certificate, Bonds, Shares of Listed Companies, Listed Mutual Funds, Unit Linked Insurance Plan, Public Provident Fund, Surrender Value of Life Insurance policies in the name of Applicant.

By order of Governor of Jharkhand

Sunil Kumar Barnwal,
Secretary of Government.

SCHEDULE II

Format of Performance Security

[See rules 12(2)]

[Reference number of the bank] [date]

To

The Director, Mines/ Deputy Commissioner

[address]

WHEREAS

A. [Name of the Successful Bidder] incorporated in India under the Companies Act, [1956/2013] with corporate identity number [CIN of the Successful Bidder], whose registered office is at [address of registered office], India and principal place of business is at [address of principal place of business, if different from registered office] (the "Successful Bidder") is required to provide an unconditional and irrevocable bank guarantee for an amount equal to INR [figures] (Indian Rupees [words]) as a performance security valid until [date of expiry of performance bank guarantee] ("Expiry Date").

B. The Performance Security is required to be provided to The Director, Mines/ Deputy Commissioner of [Name of District], for discharge of certain obligations under the Tender Document dated, [date] with respect to auction of [particulars of auction] and the Mine Development and Production Agreement to be executed between the Director, Mines /Deputy Commissioner and the Successful Bidder (collectively the "Agreement").

C. We, [name of the bank] (the "Bank") at the request of the Successful Bidder do hereby undertake to pay to the Director, Mines/ Deputy Commissioner an amount not exceeding INR [figures] (Indian Rupees [words]) ("Guarantee Amount") to secure the obligations of the Successful Bidder under the Agreement on demand from the Director, Mines /Deputy Commissioner on the terms and conditions herein contained herein.

NOW THEREFORE, the Bank hereby issues in favour of the Director, Mines /Deputy Commissioner this irrevocable and unconditional payment bank guarantee (the "Guarantee") on behalf of the Successful Bidder in the Guarantee Amount:

1. The Bank for the purpose hereof unconditionally and irrevocably undertakes to pay to the Director, Mines /Deputy Commissioner without any demur, reservation, caveat, protest or recourse, immediately on receipt of first written demand from the Director, Mines /Deputy Commissioner, a sum or sums (by way of one or more claims) not exceeding the Guarantee Amount in the aggregate without the Director, Mines /Deputy Commissioner needing to prove or to show to the Bank grounds or reasons for such demand for the sum specified therein and notwithstanding any dispute or difference between the Director, Mines /Deputy Commissioner and Successful Bidder on any matter whatsoever. The Bank undertakes to pay to the Director, Mines /Deputy Commissioner any money so demanded notwithstanding any dispute or disputes raised by the Successful Bidder in any suit or proceeding pending before any court or tribunal relating thereto the Bank's liability under this present being absolute and unequivocal.
2. The Bank acknowledges that any such demand by the Director, Mines /Deputy Commissioner of the amounts payable by the Bank to the State shall be final, binding and conclusive evidence in respect of the amounts payable by Successful Bidder to the Director, Mines /Deputy Commissioner under the Agreement.
3. The Bank hereby waives the necessity for the Director, Mines /Deputy Commissioner from demanding the aforesaid amount or any part thereof from the Successful Bidder and also waives any right that the Bank may have of first requiring the Director, Mines/Deputy Commissioner to pursue its legal remedies against the Successful Bidder, before

presenting any written demand to the Bank for payment under this Guarantee.

4. The Bank further unconditionally agrees with the Director, Mines /Deputy Commissioner that the Director, Mines /Deputy Commissioner shall be at liberty, without the Bank's consent and without affecting in any manner the Bank's obligation under this Guarantee, from time to time to:

(i) vary and/or modify and of the terms and conditions of the Agreement;

(ii) extend and / or postpone the time for performance of the obligations of the Successful Bidder under the Agreement, or

(iii) forbear or enforce any of the rights exercisable by the Director, Mines /Deputy Commissioner against the Successful Bidder under the terms and conditions of the Agreement. and the Bank shall not be relieved from its liability by reason of any such act or omission on the part of the State or any indulgence by the Director, Mines /Deputy Commissioner to the Successful Bidder or other thing whatsoever which under the law relating to sureties would, but for this provision, have the effect of relieving the Bank of its obligations under this Guarantee.

5. Any payment made hereunder shall be made free and clear of and without deduction for, or on account of, any present or future taxes, levies, imposts, duties, charges, fees, commissions, deductions or withholdings of any nature whatsoever.

6. The Bank agrees that Director, Mines /Deputy Commissioner at its option shall be entitled to enforce this Guarantee against the Bank, as a principal debtor in the first instance without proceeding at the first instance against the Successful Bidder.

7. The Bank further agree that the guarantee herein contained shall remain in full force and effect during the period that specified in the Agreement and that it shall continue to be enforceable till all the obligations of the Successful Bidder under or by virtue of the said Agreement with respect

to the Performance Security have been fully paid and its claims satisfied or discharged or till the Director, Mines /Deputy Commissioner certifies that the terms and conditions of the Agreement with respect to the Performance Security have been fully and properly carried out by the Successful Bidder and accordingly discharges this guarantee. Notwithstanding anything contained herein, unless a demand or claim under this guarantee is made on the Bank in writing on or before the Expiry Date the Bank shall be discharged from all liability under this guarantee thereafter.

8. The payment so made by the Bank under this Guarantee shall be a valid discharge of Bank's liability for payment thereunder and the Director, Mines /Deputy Commissioner shall have no claim against the Bank for making such payment.

9. This Guarantee is subject to the laws of India. Any suit, action, or other proceedings arising out of this Guarantee or the subject matter hereof shall be subject to the exclusive jurisdiction of courts at Ranchi.

10. The Bank has the power to issue this Guarantee in favour of the Director, Mines /Deputy Commissioner. This guarantee will not be discharged due to the change in the constitution of the Bank.

11. The Bank undertakes not to revoke this Guarantee during its currency except with the previous consent of the Director, Mines /Deputy Commissioner in writing.

12. The Director, Mines/Deputy Commissioner may, with prior intimation to the Bank, assign the right under this Guarantee to any other departments, ministries or any governmental agencies, which may act in the name of the Director, Mines /Deputy Commissioner. Save as provided in this Clause 12, this Guarantee shall not by assignable or transferable.

13. Notwithstanding anything contained herein,

a. the liability of the bank under this bank guarantee shall not exceed the Guarantee Amount.

b. This bank guarantee shall be valid up to the Expiry Date.

14. The Bank is liable to pay the guaranteed amount or any part thereof under this bank guarantee only and only if the Director, Mines /Deputy Commissioner serves upon the Bank a written claim or demand on or before the Expiry Date. Dated the [day] day of [month] [year] for the Bank. In witness whereof the Bank, through its authorized officer, has set its hand and stamp.

_____

(Signature)

_____

(Name and Designation)

(Bank Stamp)

By order of Governor of Jharkhand

Sunil Kumar Barnwal,
Secretary of Government.

अधीक्षक, झारखण्ड राजकीय मुद्रणालय, राँची द्वारा प्रकाशित एवं मुद्रित,
झारखण्ड गजट (साधारण) 24--200 ।

Annexure II

GOVERNMENT OF JHARKHAND
DEPARTMENT OF INDUSTRY, MINES & GEOLOGY
MINES & GEOLOGY DIVISION

Notification

No. 547 Dated: 22/02/2018

In exercise of the powers conferred by section 15 of the Mines and Minerals (Development and Regulation) Act, 1957 (67 of 1957) and in the light of Jharkhand Minor Mineral (Auction) Rules, 2017, the Government of Jharkhand hereby makes the following rules, namely:-

1. Short title and commencement:

1) These rules may be called the Jharkhand Minor Minerals (Evidence of Mineral Contents) Rules, 2018.
2) It shall come into force on the date of its publication in the Official Gazette.

2. Application: These rules shall extend to the whole State of Jharkhand and shall apply to minor minerals as specified in clause (e) of section 3* of Mines and Minerals (Development and Regulation) Act, 1957 (67 of 1957) (Schedule-II).

3. Definitions and interpretation:

In these rules, unless the context otherwise requires, -

a. "Act" means the Mines and Minerals (Development and Regulation) Act, 1957 (67 of 1957);
b. **"Evidence of mineral contents"** means the existence of mineral contents established by the process of geological exploration according to the norms fixed in Schedule-I of these Rules.
c. **"Threshold value of minerals"** means the limits prescribed by the Indian Bureau of Mines or Government of Jharkhand from time to time based on the beneficiability and marketability of a mineral for a given region and for given time, below which the material obtained after mining can be discarded as waste;
d. "Schedule" means the Schedule annexed to these rules;
e. The expressions General Exploration (C2) & Detailed Exploration (C1), Feasibility Study (FS) used in these rules shall have the meanings assigned to them in Part-I of the Schedule-I.
f. All other words and expressions used in these rules, but not defined, shall have the same meaning as assigned to them in the Act or the rules made there under.

**minor minerals" means building stones, gravel, ordinary clay, ordinary sand other than sand used for prescribed purposes, and any other mineral which the Central Government may, by notification in the Official Gazette, declare to be a minor mineral.*

4. Preparation of mineral blocks:-

A mineral block may be defined as an area where there is evidence to show the existence of mineral contents in accordance with the parameters prescribed in **Schedule-I**. The Government may grant a mining lease/ composite license through Electronic Auction, in the manner specified in Jharkhand Minor Mineral (Auction) Rules, 2017. Mineral Blocks should be prepared in defined geometrical shapes as far as possible.

5. Existence of mineral contents for grant of composite license

(1) An area may be notified for auction to grant a composite license under chapter III of Jharkhand Minor Mineral (Auction) Rules, 2017 if, in respect of such area:-

a) General Exploration (C2) has been completed to establish Inferred Mineral Resource.

b) A geological report has been prepared conforming to Part-III A of the schedule.

6. Existence of mineral contents for grant of mining lease

'An area shall be considered for grant a mining lease under Chapter II of Jharkhand Minor Mineral (Auction) Rules, 2017 if, in respect of such area:-

a) Detailed Exploration (C1) has been completed to establish Indicated/ Measured Mineral Resource.

b) A geological report has been prepared conforming to Part-III A of Schedule-I.

7. Relaxation

Depending upon the local geological setup, mode of occurrence and nature of mineralization, the Government (State Cabinet) may relax the exploration norms as specified in Part III of Schedule-I, in whole or in part for any mineral or any area.

SCHEDULE I

EVIDENCE OF MINERAL CONTENTS

Existence of mineral content will have to be established in an area for the purpose of auction of Mineral Block by carrying out exploration as per the suggested geological parameters and exploration norms given in **Part-I, II and III of Schedule-I.**

Part – I

Definitions

1. The exploration for any minor mineral deposit involves two stages namely, General Exploration (C2) and Detailed Exploration (C1). These stages of exploration lead to resource categories namely Inferred Mineral Resource and Indicated/ Measured Mineral Resource respectively reflecting the degree of geological assurance.
2. **General Exploration (C2)** involves the initial delineation of an identified deposit. Methods used include surface mapping, pitting/ trenching/ drilling, followed by sampling for evaluation of mineral quantity and quality (including mineralogical tests on laboratory scale if required), and limited interpolation based on indirect methods of investigation. The objective is to establish the main geological features of a deposit, giving a reasonable indication of continuity and providing an initial estimate of size, shape, structure and grade.
3. **Detailed Exploration (C1)** involves the detailed three-dimensional delineation of a known deposit achieved through sampling, such as from outcrops, pits, trenches, boreholes, shafts and tunnels etc. Sampling grids are closely spaced such that size, shape, structure, grade and other relevant characteristics of the deposit are established with a high degree of accuracy. Processing tests involving bulk sampling may be required.
4. **Mineral Resource** is a concentration or occurrence of solid material of economic interest in or on the earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling. Mineral Resources are subdivided, in order of increasing geological confidence into Reconnaissance, Inferred, Indicated and Measured resource categories which are defined as follows:-

   (a) **Inferred Mineral Resource** is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling achieved through a stage of preliminary exploration. An Inferred Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and shall not be converted to a Mineral Reserve. The majority of Inferred Mineral

Resources could be upgraded to Indicated Mineral Resources with continued exploration.

(b) **Indicated Mineral Resource** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit. Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation. An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve.

(c) **Measured Mineral Resource** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit. Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation. A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proved Mineral Reserve or to a Probable Mineral Reserve.

5. **A Feasibility Study (FS)** is a detailed comprehensive economic study of the selected development option for a mineral project that includes appropriately detailed assessments of applicable Modifying Factors together with any other relevant operational factors and detailed financial analysis that are necessary to demonstrate at the time of reporting that extraction is reasonably justified (economically mineable).

6. **Feasibility Mineral Resource:** A Feasibility Mineral Resource is that part of Indicated/ Measured Mineral Resource which is not economically mineable as, defined by studies at feasibility level. This material is identified as being possibly economically viable subject to changes in technological, economic, and environmental and/ or other relevant conditions.

7. **Mineral Reserve** is the economically mineable part of a Measured and Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Feasibility level as appropriate that include application of **Modifying Factors** which are factors those are taken into consideration while conducting a Pre-feasibility or feasibility study so as to convert Mineral Resources to Mineral Reserves. These include, but are not

restricted to, mining, processing, end use, cut-off grade, threshold value, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors. Mineral reserve may further be categorized as:-

(a) **Probable Mineral Reserve** is the economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource. The confidence in the Modifying Factors applying to a Probable Mineral Reserve is lower than that applying to a Proved Mineral Reserve.

(b) **Proved Mineral Reserve** is the economically mineable part of a Measured Mineral Resource. A Proved Mineral Reserve implies a high degree of confidence in the Modifying Factors.

Part-II

Geological Parameters and Exploration Norms

1.	**Aerial reconnaissance:** Satellite imagery/ aerial photograph studies, as per necessity.
2.	**Topographic & Geological survey (Mapping):** General Exploration stage: 1:50,000 to 1:4,000 scale and Detailed Exploration stage: larger than 1:4,000 to 1:1,000 scale as per type of mineral deposit. Geological mapping during general and detailed exploration to be carried out with the help of Total Station, Theodolite and other Electronic Survey Instruments. Exploration block to be geo-coordinated with the help of DGPS/ GPS.
3.	**Ground Geophysical and Geochemical survey:** Geophysical and geochemical survey using appropriate techniques, as may be necessary, for the style of mineralization as per requirement.
4.	**Technology: Exploration and sampling using appropriate techniques from locations such as outcrops, trenches, pits, old workings and drill holes. The sampling locations are spaced suitably (in a grid pattern to the extent possible and may be modified depending on structural complexity) for establishing existence of mineralized body and its lateral and vertical continuity.** The lateral extension to be considered for resource assessment shall depend on geological considerations supplemented by geological continuity by mapping or by other means and in any case shall not be more than 50% of the grid spacing of the probe points. **Assessment based on selected information such as isolated assays, isolated drill holes, assays of panned concentrates etc. is not recommended.**
5.	**Sampling & sub sampling:** a. Random grab/ chip/ channel sampling from surface exposure/ escarpments/ nala cuttings/ pit/ channel etc.

	b. Systematic sampling from pits/ trenches/ outcrops/ workings etc. spaced closely enough to confirm geological and grade continuity for other stages of geological assessment. c. Geological logging and sampling of drill core/ chip samples at regular interval, preferably metre wise or less for the mineralized portions. d. The drill technique to be deployed shall depend on the rock type to be penetrated and with an aim to achieve maximum sample/ core recovery. e. The exploration samples including surface samples, drill core/ chip samples shall be preserved for future use.
6.	**Assay data & Laboratory tests:** Analysis of all samples generated for major radicals appropriate to the mineral under investigation.
7.	**Petrographic & Mineragraphic studies:** Petrographic analysis of mineralized portions to ascertain the rock types and mineral assemblages including grain size, texture, gangue and its liberation characteristics etc. if considered necessary.
8.	**Bulk density study:** The bulk density must be measured by methods that adequately account for incipient void spaces (vugs, porosity etc.) in mineral/ ore body.
9.	**Bulk Sampling for Beneficiation studies:** Bulk sampling, if necessary, for testing processing technology.
10.	**Environmental setting:** Details about local infrastructure, host population, historical sites, forests, sanctuaries, national park and base line information on environmental setting of the area to be collected.
11.	**Any other relevant data:** Groundwater, geotechnical and rock characteristics etc. that may be relevant.

Part-III
Exploration Norms (category-wise) for different types of Minor Mineral Deposits/ Mineralization

Category	Type of deposit & Principal Minerals	General Exploration (C-2)	Detailed Exploration (C-1)
A	**Building materials/ Road materials/ General items** **Bedded Stratified and Tabular deposits of regular and irregular habit:** Road Metal, Boulder, Murrum, Calcareous Sand, Diaspore, Laterite, Lime Kankar, Sand (others), Quartzite and Sand Stone (for making road metal), ordinary earth (used or filling or leveling purposes in construction or embankments, roads, railways, building) Brick-earth, Ordinary Earth, Soft & Murrum, Felsite,	1. Geological Survey: i. Geological Mapping on 1:50,000 to 1:4,000 scale with boundary demarcation with GPS. ii. Broad assessment of lithology, structure, surface extension of mineral. iii. Recording of broad geomorphology, drainage, weather profile. 2. Geochemical Survey: not necessary 3. Ground geophysical survey: not necessary. 4. Technology: i. Pitting/ Trenching: As per requirement to proof mineralization in the area. ii. Scout drilling: not	1. Geological Survey: iv. Mapping on 1:4,000 to 1:1,000 scale with boundary demarcation with GPS. v. Assessment of lithology, structure, surface extension of mineral. vi. Recording of geomorphology drainage, weather profile. 2. Geochemical Survey: not necessary 3. Geophysical survey: not necessary. 4. Technology: i. Pitting/ trenching: 2 to 5 per sq km per prospect. ii. Drilling: not necessary. iii. Sampling: systematic, grab chip, pit & trench sampling for geotechnical studies. iv. Geotechnical studies: measurement of compressive strength, tensile strength etc., if necessary. v. Bulk density/ specific gravity study. 5. Petrographic and mineralogical

	Shale, Slate, Shingle, Chalcedony pebbles used for ball mill purpose only, Lime shell, Kankar and Limestone used in kilns for manufacture of lime used as building materials, Gneissic & schistose rocks, Acid and Basic rock, Gabbro, Dolerite, Basalt, Norite etc. Phyllite, Quartzite, Sandstone, Slate, Boulder, Chalcedony Pebbles, Gravel, Ordinary Sand and Quartzite Pebbles, Trachyte, and Ordinary Clay.	necessary. iii. Sampling: Regional and random grab/ chip sample for geotechnical, specific gravity studies as per necessity. iv. Bulk density/ specific gravity. 5. Integration of all data and identification of blocks for further exploration.	studies as per requirement.
B	**Industrial minerals** **(I) Bedded Stratified and Tabular deposits of regular and irregular habit:** Ball Clay, Red Clay Lithomargic Clay, Pozzolanic Clay, Natural Clay, Diatomaceous Clay, Bentonite, Chalk, Dolomite, Fireclay, Fuller's Earth, Gypsum, Quartzite, Molding Sand, Silica sand, Barytes, Chinaclay, Kaolin, Reh Matti, Ochre, Calc-Tuffa	1. Geological Survey: i. Geological Mapping on 1: 50,000 to 1:4,000 scale with boundary demarcation with GPS. ii. Broad assessment of lithology, structure, surface extension of mineral. iii. Recording of broad geomorphology, drainage, weather profile. 2.Geochemical Survey: not necessary 3.Ground geophysical survey: not necessary. 4. Technology: iv. Pitting/ Trenching: As per requirement to proof mineralization in the area. v. Scout drilling: not necessary. vi. Sampling: Regional and random grab/ chip sample for geotechnical, specific gravity studies as per necessity. vii. Bulk density/ specific gravity. 5. Integration of all data and identification of blocks for further exploration.	1. Geological Survey: i. Mapping on 1:4,000 to 1:1,000 scale with boundary demarcation with GPS. ii. Assessment of lithology, structure, mineralization extent. 2.Geochemical Survey: Not Necessary 3. Geophysical survey: Not Necessary 4. Technology: i. Pitting/ Trenching: 2 to 5 per sq km or as per requirement. ii. Drilling: Core drilling on grid spacing of 400m or closer for deposits of regular habit and 200m or closer for irregular habit. iii. Sampling: systematic pit & trench sampling. Core/ sludge sampling mineralization wise. iv. Chemical analysis of all samples. v. Bulk density/ specific gravity study. 1. Petrographic and mineralogical studies as per requirement.
	(II) Lenticular bodies of all dimensions including Bodies occurring en echelon, silicified linear zones of composite veins. Lenses, pockets, stockworks, irregular shaped modest to small sized bodies	1. Geological Survey: i. Geological Mapping on 1: 50,000 to 1:4,000 scale with boundary demarcation with GPS. ii. Broad assessment of lithology, structure, surface extension of mineral. iii. Recording of broad geomorphology, drainage, weather	1. Geological Survey: i. Mapping on 1:4,000 scale to 1:1,000 scale with boundary demarcation with GPS. ii. Assessment of lithology, structure, mineralization extent. 2.Geochemical Survey: Not Necessary 3. Geophysical survey: Not Necessary. 4. Technology: i. Pitting/ Trenching: 2 to 5 per sq km or as per requirement. ii. Drilling: Core drilling on grid

	a. General Industrial Minerals Calcite, Clay (Others), Feldspar, Ochre, Quartz, Steatite or Talc or Soapstone, China Clay, Kaolin and White Clay.	profile. 2. Geochemical Survey: not necessary 3. Ground geophysical survey: not necessary. 4. Technology: i. Pitting/ Trenching: As per requirement to proof mineralization in the area. ii. Scout drilling: not necessary. iii. Sampling: Regional and random grab/ chip sample for geotechnical, specific gravity studies as per necessity. iv. Bulk density/ specific gravity. 5. Integration of all data and identification of blocks for further exploration.	spacing of 400m or closer for deposits of regular habit and 200m or closer for irregular habit. iii. Sampling: systematic pit & trench sampling. Core/ sludge sampling mineralization wise. iv. Chemical analysis of all samples. v. Bulk density/ specific gravity study. 5. Petrographic and mineralogical studies as per requirement.
	b. Precious & Semi Precious Stones, Pegmatite, Ultra basic rocks and Mica Agate, Corundum, Diaspore (gem varities), Dunite, Peridotite, Pyroxenite and Mica all varities.	1. Geological Survey: i. Geological Mapping on 1: 50,000 to 1:4,000 scale with boundary demarcation with GPS. ii. Broad assessment of lithology, structure, surface extension of mineral. iii. Recording of broad geomorphology, drainage, weather profile. 2.Geochemical Survey: not necessary 3.Ground geophysical survey: not necessary. 4.Technology: i. Pitting/ Trenching: As per requirement to proof mineralization in the area. ii. Scout drilling: not necessary. iii. Sampling: Regional and random grab/ chip sample for geotechnical, specific gravity studies as per necessity. iv. Bulk density/ specific gravity. 5. Integration of all data and identification of blocks for further exploration.	1. Geological Survey: i. Mapping on 1:4,000 scale to 1:1,000 scale with boundary demarcation with GPS. ii. Assessment of lithology, structure, mineralization extent. 2.Geochemical Survey: Not Necessary 3. Geophysical survey: Not Necessary. 4. Technology: i. Pitting/Trenching: 2 to 5 per sq km or as per requirement. ii. Drilling: Not required. iii. Sampling: systematic pit & trench sampling. iv. Chemical analysis of all samples. v. Bulk density/ specific gravity study. 5. Petrographic, Gem Testing and mineralogical studies as per requirement.
C	Dimension and Decorative Stones Granite (Granite means dolerites, granite gneisses, migmatites, gabbros, anorthosites, rhyolites, syenites, leptynites, charnockites and any other igneous and ortho-metamorphic rock	1. Geological Survey: i. Geological Mapping on 1: 50,000 to 1:4,000 scale with boundary demarcation with GPS. ii. Broad assessment of lithology, structure, surface extension of mineral. iii. Recording of broad geomorphology.	1. Geological Survey: i. Mapping on 1:4,000 to 1:1,000 scale with boundary demarcation with GPS. ii. Assessment of lithology, structure, mineralization extent. 2.Geochemical Survey: Not Necessary 3. Geophysical survey: Not Necessary. 4. Technology:

	types) Marble (marble means crystalline metamorphosed calcareous or dolomitic rocks and serpentine rock types) BHJ, Fesshite Quartzite	drainage, weather profile. 2. Geochemical Survey: not necessary 3. Ground geophysical survey: not necessary. 4. Technology: i. Pitting Trenching: As per requirement to proof mineralization in the area. ii. Scout drilling: not necessary. iii. Sampling: Regional and random grab/ chip sample for geotechnical, specific gravity studies as per necessity. iv. Bulk density/ specific gravity. 5. Integration of all data and identification of blocks for further exploration.	i. Pitting/ Trenching: 2 to 5 per sq km or as per requirement. ii. Drilling: Not required. iii. Sampling: 2 to 3 grabs per prospect. iv. Geotechnical: Further refinement of blockability data, polishing index measurement, measurement of compressive strength, tensile strength etc. v. Bulk density/ specific gravity study. 5. Petrographic and mineralogical studies as per requirement.

Part-III A

Reporting of Minor Mineral Resources

A Geological Study Report for estimation and reporting of Minor Mineral Resources may be prepared integrating all data of exploration (sampling and testing generated through aerial, geophysical, geochemical, geological surveys and technological study) collected for assessing the resources as per the stage of exploration. The report may incorporate, among other things, the following contents:

Sl.	Contents	Explanation
1	Title & Ownership	• Title of Report. • Details of period of prospecting/ mineral right if any. • Details of exploration agency, qualification, experience of associated technical persons engaged in exploration.
2	Details of the area	• Mauza/ Village, Post Office, Taluka, District, State. • Survey of India Toposheet/ OSM Sheet Number and Geo-coordinates of the area of all corner points. • Mineral(s) under investigation.
3	Infrastructure & Environment	Local infrastructure, host population, historical sites, forests, sanctuaries, national park and environmental settings of the area.
4	Previous exploration	• Details of previous exploration carried out by other agencies/ parties.
5	Geology	• Brief regional geology of the area outlining the broad geological, structural frame work. • Local Geology: Deposit/ mineralization type, geological

		setting and details of dip, strike, old workings, surface exposures etc. of the area under study also of adjoining nearby areas if the information is likely to have an impact on the area under study. • Geological map of appropriate scale with geo-coordinates showing major litho-logical units, structural features; extent of surface mineralization, location of boreholes, pits, trenches, old workings etc.
6	Aerial/ ground geophysical/ geochemical Data	Details of aerial, geophysical & geochemical survey results taken up if any and their results (if carried out).
7	Technological investigation	Details of technological investigation (pitting/ trenching/ drilling etc.).
8	Type of Sampling	Grab, channel, random etc.
9	Drilling technique & drill sampling employed	• Drill type and details like core diameter, collar R.L, azimuth, inclination, coordinates of bore holes etc. • Whether core and chip sample recoveries have been properly recorded and results assessed. • Measures taken to maximize sample recovery and ensure representative nature of the samples. • Whether a relationship exists between sample recovery and grade. • Logging: -Whether core and chip samples have been logged to a level of detail to support • Appropriate Mineral Resource estimation, mining studies.
10	Grade and chemical analysis	Chemical analysis data for grade determination and procedures.
11	Bulk Density/ Specific Gravity	Whether assumed or determined.
13	Resource estimation techniques	• Discussion on mineralization and techniques for resource estimation. • The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, maximum distance of extrapolation from data points.

14	Geotechnical Studies For Dimensional stone report	• Assessment of Blockability. • Polishing Index. • measurement of compressive strength, tensile strength etc.
15	Annexure/ enclosures to the report	The report shall include all relevant data including maps, sections, logs, analysis reports, photographs etc. in support of the estimates made.
16	Any other information	Any other information as may be available or required by any authority as prescribed.

SCHEDULE II
MINOR MINERALS
Categorization of Minor Minerals for conditions relating to grant of Mineral Concessions

Category- A	Building materials/ Road materials/ General stones **Bedded Stratified and Tabular deposits of regular and irregular habit:** Road Metal, Boulder, Murrum, Calcareous Sand, Diaspore, Laterite, Lime Kankar, Sand (others), Quartzite and Sand Stone (for making road metal), ordinary earth (used or filling or leveling purposes in construction or embankments, roads, railways, building) Brick-earth, Ordinary Earth, Soft & Murrum, Felsite, Shale, Slate, Shingle, Chalcedony pebbles used for ball mill purpose only, Lime shell, Kankar and Limestone used in kilns for manufacture of lime used as building materials, Gneissic & schistose rocks, Acid and Basic rock, Gabbro, Dolerite, Basalt, Norite etc. Phyllite, Quartzite, Sandstone, Slate, Boulder, Chalcedony Pebbles, Gravel, Ordinary Sand and Quartzite Pebbles, Trachyte, and Ordinary Clay.
Category- B	Industrial minerals **(i) Bedded Stratified and Tabular deposits of regular and irregular habit:** Ball Clay, Red Clay Lithomargic Clay, Pozzolanic Clay, Natural Clay, Diatomaceous Clay, Bentonite, Chalk, Dolomite, Fireclay, Fuller's Earth, Gypsum, Quartzite, Molding Sand, Silica sand, Barytes, Chinaclay, Kaolin, Reh Matti, Ochre, Calc-Tuffa
	(ii) Lenticular bodies of all dimensions including Bodies occurring en echelon, silicified linear zones of composite veins. Lenses, pockets, stockworks; irregular shaped modest to small sized bodies a. General Industrial Minerals Calcite, Clay (Others), Feldspar, Ochre, Quartz, Steatite or Talc or Soapstone, China Clay, Kaolin and White Clay.

	b. **Precious & Semi Precious Stones, Pegmatite, Ultra basic rocks and Mica** Agate, Corundum, Diaspore (gem varities), Dunite, Peridotite, Pyroxenite and Mica all varities.
Category- C	**Dimension and Decorative Stones** Granite (Granite means dolerites, granite gneisses, migmatites, gabbros, anorthosites, rhyolites, syenites, leptynites, charnockites and any other igneous and ortho-metamorphic rock types) Marble (marble means crystalline metamorphosed calcareous or dolomitic rocks and serpentine rock types) BHJ, Fuschite Quartzite

Annexure - 2

JHARKHAND STATE POLLUTION CONTROL BOARD

TOWNSHIP ADMINISTRATION BUILDING, HEC COMPLEX, DHURWA, RANCHI 834004

Telephone: 0651-2400850 (Fax)/ 2400851/2400852/2401847/2400979/240013

Ref. No.:- B-1949 Ranchi, Dated: - 09/11/2021

From,

Y.K.Das

Member Secretary

To,

The Regional Director,

Eastern Regional Directorate,

Central Pollution Control Board, Kolkata

502, South-end Conclave, 1582

Rajdanga Main Road, Kolkata

Sub:- Submission of the list of stone mines and stone crushers operating in sahebganj District :- Regarding

Sir,

With regard to the subject stated above, in light of Minutes of Meeting held on 30.10.2021, under the chairmanship of the Joint Secretary, MoEF&CC cum Chairman of the Committee constituted by the Hon'ble NGT in its order 12.03.2021 in O.A. No. 23/2017 Syed Arshad Nasar Vs Union of India with Ramchandra Chourasia Vs State of Jharkhand, Regional Officer, JSPCB Regional Office, Dumka along with the District Mining Officer, Sahebganj has prepared a list of stone mines and stone crushers operating in Sahebganj District and the same is enclosed as Annexure 1 for your information and necessary action.

Thanking you

Yours sincerely

Encl.: A/a

(Y.K.Das)
Member Secretary

DISTRICT MINING OFFICE, SAHIBGANJ

Dealer List

SL#	DEALER NAME	CODE	MOUZA
1	ANAND INCORPORATION PRIVATE LIMITED	620143833001	DEMBA,PLOT NO-09P,10P,13P
2	ASARAFUL HAQUE	620134863001	BORNA
3	BHOLA KUMAR SAHANI	620123113001	GUDWA
4	BPY INFRA BUILD PVT LTD	620154273001	JOKMARI ,P NO 38P,JB NO-81,AREA-3.00 ACRES.
5	DADA BHAI STONE WORKS	620139193001	BARA PANCHKULI PLOT NO 48P AREA 04 BIGHA
6	DRM ASSOCIATES PRIVATE LIMITED	620108483001	MARGARO
7	ECO FRIENDLY INFRA TECHNOLOGY PVT LTD	620146743001	BELBHADRI PLOT NO 214P
8	GANESH STONE WORKS	620160593001	DEMBA ,P NO-6P,AREA-2.00ACRES
9	GOBERDHAN YADAV	620128233001	AMBADIH,PLOT NO 259,SAKRIGALI
10	HASNANE SHEIKH	620127483001	DHATAPARA, PLOT NO- 556, 557, 558
11	HINDUSTAN CONSTRUCTION COMPANY LTD. PROJECT MANAGER. NARESH KUMAR	620112313001	JHUMERABAD
12	HINDUSTAN CONSTRUCTION COMPANY LTD. PROJECT MANAGER. NARESH KUMAR	620112313002	JHUMERABAD
13	JAI HANUMAN STONE WORKS	620102563001	BARA LOHANDA,PLOT NO-330,331
14	KISHOR KUMAR RAY	620127133001	AMBADIHA,PLOT NO-186,261,
15	KRISHNA STONE CHIPS	620155423001	BELBHADRI NO 3,PLOT NO-48P
16	M S STAR STONE WORKS	620096803001	MARI KUTI,P NO-33,34,AREA-2.05ACRES
17	M/S AANAND STONE WORKS	0620429631	CHOTA LOHANDA PLT NO-385,390
18	M/S ADITYA STONE WORKS	0620138831	CHHOTI BHAGIAMARI,PLOT NO-922
19	M/S B N PANDY STONE WORKS	0620423731	HATHIGARH PLOT NO 95,107,
20	M/S B N PANDY STONE WORKS	0620423732	HATHIGARH PLOT NO 95,107,
21	M/S BALAJI STONE WORKS	0620316031	MUNDLI PLOT NO-21
22	M/S CHOURASIA & SONS	0620419932	MUNDLI PLOT NO-20P
23	M/S FALAK STONE WORK	0620436431	PAHARPUR,PLOT NO-07,08
24	M/S FALAK STONE WORK	62043643002	PAHARPUR,PLOT NO-07,08
25	M/S GUPTA & SONS	62042711002	CHOTA LOHANDA PLT NO-368,369,373,376
26	M/S HINDUSTAN STONE WORKS	0620420232	PAHARPUR
27	M/S INSHA STONE WORKS	0620419532	BOHA NO 2,PLOT NO-411,AREA-04B,01K,1D
28	M/S JAI MATA DI STONE WORKS	0620027032	NIMGACHI
29	M/S JHARKHAND MINRALS	0620419331	BARA PARTE PLOT NO-28
30	M/S KISHOR KUMAR	0620424032	AMBADIHA PLOT NO-183,184
31	M/S KOHINUR MINING	0620433531	HATIHARH PLOT NO-297P,301P,304P
32	M/S LAXMI STONE WORKS	0620033731	BELBHADRI
33	M/S M ALAM & BROTHERS	0620418831	MADHOPARA, P NO- 736P ,737P
34	M/S MAA AMBA STONE WORKS	62055043001	MARIKUTI, PLOT NO.-51P, SAHIBGANJ
35	M/S MAA AMBA STONE WORKS	62055043002	MARIKUTI, PLOT NO.-51P, SAHIBGANJ
36	M/S MAA CHINNAMASTIKA STEEL INDIA PVT.LTD	0620422031	BUNDA BARA GHATI PLOT NO 355P TO 359P
37	M/S MAA DURGA STONE WORKS	0620035533	
38	M/S MANIKANT MANDAL	0620421831	MANGLADIH
39	M/S PAHARIYA STON WORK	0620416731	MAHKUB
40	M/S PRACHI STONE WORKS	62043093002	MUNDLI,SAHIBGANJ,PLOT NO-24, AREA-2 BIGHA
41	M/S RADHA VIDYA SAGAR STONE WORKS	62043313002	MAHADEVWARAN, PLOT NO-150,151,152
42	M/S RADHA VIDYA SAGAR STONE WORKS	620433131	MAHADEVWARAN, PLOT NO-150,151,152
43	M/S RAJ STONE WORKS	620219733	BARA LOHANDA, PLOT NO 382,386
44	M/S RAJ STONE WORKS	620219734	PIPARJORI,PLOT NO-423,424,476,477
45	M/S RETASH DEV STONE WORK	620434331	MAHADEVBARAN,PLOT NO-232,AREA-02B,01K,15D
46	M/S S S BLACK STONE WORKS	62054983001	BELBHADRI,PLOT NO-198P,199P AREA-3.50 ACRS
47	M/S SHAMBHU & CO.	0620420532	RANGA BAKUDIH
48	M/S SHANTI STONE WORK	0620416932	MUNDLI,PLOT NO-4P
49	M/S SHILA MINRALS	620417331	TETARIA, PLOT NO- 92,93,237, AREA- 03-15-00

50	M/S SHIV SHANKAR STONE WORKS	0620134032	HAJIPUR PRATAPGANJ, PLOT NO-407.408
51	M/S SHIV SHANKAR STONE WORKS	62013403003	CHOTA LOHANDA, PLOT NO-333, 336,
52	M/S SILPI STONE WORKS	62042723002	MAHADEVWARAN,PLOT NO-143,161,
53	M/S SILPI STONE WORKS	0620427231	MAHADEVWARAN,PLOT NO-143,161,
54	M/S SUBHAM STONE WORKS	0620425332	DEMBA, PLOT NO 2, 6
55	MAA AMBIKA TRADERS	620143733001	Kharbani
56	MAA JAGDAMBA STONE WORKS	620146973001	KATHALBARI,
57	MADAN KANT	620136363001	KIROKURIA
58	MAHAKAL STONE WORKS	620168043001	DESHIPOKHARIA,
59	MAHALAXMI CRUSHER AND LOGISTIC	620100853001	GUDWA
60	MD MURSHID ALAM	620109423001	DHAMDHAMIA,PLOT NO-137,138,139,
61	MD TAUKIR ALAM	0620421931	GANGOPARA
62	MOHAMMAD SHABIH EQBAL	620122963001	CHHOTA LOHANDA
63	MS A K BUILDERS	620118073001	JOKMARI GUTHI BEDA PLOT NO 69P
64	MS AADERSH STONE WORKS	620394531	MUNDLI
65	MS ABBAS AND SONS	0620432531	DHAMDHAMIA,
66	MS AD STONE WORKS	620118083001	BEKCHURI,
67	MS ADITI STONE WORKS	620426631	MUNDLI,PLOT NO-21P,AREA-01B,05K
68	MS ADITYA STONE WORKS	620130503001	CHHOTI BHAGIAMARI SAKRIGALI
69	MS ALOK STONE	620102253001	Tetariya plot no 09 area 09B 01K 12D
70	MS AMBA STONE WORKS	620387731	MARIKUTTI
71	MS AMBIKA STONE SUPPLY COMPANY	62066573001	BARTALLA
72	MS AMIT YADAV	620135403001	CHOTI BHAGYAMARI PLOT NO 854
73	MS ANANYA STONE WORKS	620127493001	MUNDLI, PLOT NO- 24, AREA- 02 BIGHA
74	MS ANKIT STONE INDUSTRIES	62096393001	MAHADEVBARAN,PLOTNO-144,145P,160,
75	MS APEX ENTERPRISES	620150793001	CHOTI BHAGYAMARI PLOT NO 849P
76	MS ARJUN BALCK STONE WORKS	620422931	Jokmari Mahadevganj
77	MS ARJUN YADAV STONE WORKS	620151973001	KIROKURIA, PLOT NO-44,45
78	MS ASCENT INFRABUILD LLP	0620431731	MARIKUTTI PLOT NO 58,59
79	MS ASHTHA STONE WORKS	0620420831	BANSBHITA
80	MS AWADH KISHORE AND SONS	620129203001	TETARIA, PLOT- 93, 94P, AREA- 01B 06K 04D
81	MS B B S STONE WORKS	62095333001	PAHARPUR, PLOT NO- 136, 137 AREA- 3B 4K 14D
82	MS BALAJI PRODUCTION	620163983001	FATHEPUR PLOT NO 516 519 529 AND 535
83	MS BALAJI STONE WORKS	620144563001	JOKMARI PLOT NO 229/119
84	MS BALAJI STONE WORKS	62031603002	MUNDLI MIRZACHOUKI
85	MS BALRAM STONE WORKS	620135413001	AMBADIHA, PLOT.NO. 254, JB NO- 12, AREA- 53 DISMIL
86	MS BHAGWAN STONE AND MINERALS	620156543001	BUNDA BARA GHATI PLOT NO 355P TO 359P
87	MS BHAGWAN STONE WORKS	620126093001	BORNA PLOT NO 126 127 128P 129P 130 133 TO 136 138
88	MS BHAGWAN STONE WORKS	620374631	BORNA
89	MS BHARAT STONE WORKS	620140153001	NIMGACHHI MIRZACHOWKI
90	MS BIHAR BENTONITE SUPPLY CO	620420631	BANKUDI
91	MS BIHAR BENTONITE SUPPLY CO	0620420632	BASBHITHA
92	MS BINDUWASINI STONE WORKS	620150883001	MANGLADIH
93	MS BISWAKARMA MARCHANT	620153483001	DUDHKOL,PLOT NO-969,970,972,1017
94	MS BSC C AND C JV	62044993001	MAHDEVGANJ
95	MS CHANDAN STONE WORKS	620019331	NIMGHACHI, PLOT NO.- 668
96	MS CHAR TARA STONE WORKS	62088233001	PIPALJORI,MAJURKOLA
97	MS CHOURASIA AND SONS	620419931	MUNDLI
98	MS CTS INDUSTRIES LTD	620416532	JOKEMARI MAHADEVGANJ
99	MS CTS INDUSTRIES LTD	620416531	damramako chhota daminbhita
100	MS D AND D S STONE WORKS	620147173001	Mouza Paharpur Plot No. 141p
101	MS DADA JEETU BUILDCON PVT LTD	620126603001	DESHIPOKHARIA, PLOT- 61P, 62P, AREA- 02.00
102	MS DDS STONE WORKS	620431231	PAHARPUR, PLOT NO- 133, 134, AREA- 02B 06K
103	MS DEV STONE WORKS	620140553001	CHHOTI BHAGIYAMARI,PLOT NO- 864,865,866
104	MS DOKANIA STONE WORKS	62055502001	CHAPANDE

105	MS DURGA STONE WORKS	620425132	BELBHADRI
106	MS DURGA STONE WORKS	620425131	ADRO
107	MS DURGA STONE WORKS	620166083001	BELBHADRI,JB NO-11,P NO-07,
108	MS DURGA STONE WORKS	620157153001	BELBHADRI,JB NO-11,P NO-07,AREA- 01 BIGH 06 KHATA
109	MS FIZA STONE WORKS	62082923001	PIPERJODI
110	MS G G STONE WORKS	620116353001	SITAPAHAR PLOT NO 7 8 9
111	MS G R G STONE WORKS	620126323001	CHHOTI BHAGIAMARI,P NO 824,1.05 ACERS SAKRIGALI
112	MS GANESH STONE WORKS	620153443001	NIMGACHI, PLOT NO- 671, 672 AREA- 1 BIGHA 11 DHUR
113	MS GANESH STONE WORKS	0620170932	DEMBA
114	MS GANGA STONE WORKS	620436331	CHAPANDE
115	MS GANPATI STONE WORKS	620154873001	BARTALLA, PLOT NO.- 455
116	MS GANPATI STONE WORKS	62006483001	BARTALLA, PLOT NO.- 455
117	MS GAYATRI STONE WORKS	62078283001	MUNDLI
118	MS GAYATRI STONE WORKS	62078283002	MUNDLI
119	MS GOPE STONE WORKS PROP PANKAJ KUMAR YADAV	620134983001	GADWA P. NO 54P AREA 01ACRES
120	MS GUPTA SONS	620427131	CHOTA LOHANDA
121	MS GUPTA INDUSTRIES	620152603001	NIMGACHHI, MIRZACHOWKI
122	MS GUPTA STONE WORKS	620413431	PLOT NO- 776P,MOUZA- NIMGHACHI, AREA- 1B 15K 2D
123	MS HARI RAMA CONSTRUCTIONS	620141143001	BINDRI BANDARKOLA PLOT NO 713P
124	MS HIMALYA STONE WORKS	620154823001	PAHARPUR, PLOT NO- 05, AREA- 11-17-15 DHUR
125	MS HINDUSTAN STONE WORKS	620151883001	BELBHADRI
126	MS HINDUSTAN STONE WORKS	620420231	PAHARPUR, PLOT NO-04, AREA-02 BIGHA
127	MS J B STONE WORKS	620147773001	MADHOPARA,PLOT NO-743,744,745,746,749
128	MS JAI BAJRANG STONE WORKS	62095323001	BELBHADRI, PLOT N0- 49, 47 AREA- 06B 9K 15D
129	MS JAI GURU STONE WORKS	620417731	BARTALLA PLOT NO-456
130	MS JAI MAA AMBEY STONE WORKS	620123703001	BOHA NO 2
131	MS JAI MAA SHERAWALI STONE WORKS	620421231	MUNDLI,PLOT NO-25P,AREA-09B,17K,17D
132	MS JAI MATA DI STONE WORKS	620027031	MATHADIH, PLOT NO- 636, AREA- 1 B 11 K 13 D
133	MS JAI MATA DI STONE WORKS	620027033	NIMGACHI
134	MS JAISHWAL STONE WORK	620424531	MAHADEOBARAN PLOT NO.-233
135	MS JAY MAA KALI STONE WORKS	620127193001	NIMGACHI, PLOT- 678, 679, 680, AREA- 2B 8K
136	MS JB STONE WORKS	620430731	MADHOPARA
137	MS JHARKHAND MINERALS	620136183001	BARE PARTE,PLOT NO 28
138	MS JINDAL STONE WORKS	620394031	BARA LOHANDA PLOT NO-391 TO393, AREA-6B 8K 5D
139	MS JYOTI CREATORS PVT LTD	620417831	MARKUTTI
140	MS JYOTI STONE WORKS	620164253001	LOHANDA BEDO PLOT NO=33,34,35
141	MS K K STONE WORKS	620421031	BARA LOHANDA PLOT NO-338, 339
142	MS KAMLESH STONE WORKS	620424431	AMBADIHA PLOT NO-173 ,174
143	MS KANAK STONE	620418031	CHOTTA LOHANDA PLOT NO-373 TO 376 , AREA-2.44 ACRE
144	MS KARAMBI STONE WORKS	620159563001	PINDARI PLOT NO-279,280
145	MS KASHI VISWANATH STONE WORKS	620123823001	BELBHADRI, PLOT- 03, 04, 05, 06 ARE- 1B 10K
146	MS KEDIA STONE WORKS	620150593001	GANGOPARA MAKO PLOT NO 45P AREA 1.00 ACRES
147	MS KHUSBHU STONE WORKS	620141043001	MAHADEVBARAN PLOT NO 223P
148	MS KISHOR KUMAR	620424031	AMBADIHA PLOT NO-183,184
149	MS KOHINUR STONE WORK	620572811	MEHKUB RANGA BARHARWA
150	MS KRISHNA KUMAR SAHA	620141813001	MAHKUP PLOT NO 100P 101 102 104 AREA 2.00 ACRES
151	MS KRISHNA STONE WORKS	620151343001	ADROMAKO, PLOT NO- 36, JB NO-1
152	MS LADO STONE WORKS	620148533001	MUNDLI, PLOT NO- 11P, AREA- 03 BIGHA
153	MS LALAN SINGH	620152743001	MAHADEOBARAN PLOT NO. 133 TO 139 164P
154	MS LALITA ENTERPRISES	620101833001	DESI POKHRIA MAHADEVGANJ,PLOT NO-54P AREA-1.94

155	MS LAXMI STONE WORKS	620142603001	BADA PARTE, PLOT NO- 14P, 34P, AREA- 04 ACR
156	MS LAXMI STONE WORKS	620033732	CHOTA BHAGIAMARI
157	MS LAXMI STONE WORKS	620166503001	CHHOTA BHAGIMARI P.No 856
158	MS M ALAM AND BROTHERS	62041883002	MADHOPARA, P NO- 736P ,737P
159	MS M ALAM AND BROTHERS	62041883003	MADHOPARA, D195H
160	MS M L STONE WORKS	620422531	BARA LOHANDA
161	MS MAA AMBE STONE WORKS	620123743001	MUNDLI, PLOT NO- 04, AREA- 01BIGHA 10KATHA
162	MS MAA AMBIKA TRADERS	620114613001	MANGLADIH
163	MS MAA BHAVANI STONE WORKS	620419131	NIMGACHI, PLOT N0- 686, AREA- 03B 08K 19D
164	MS MAA DURGA STONE WORKS	620035531	CHOTA BHAGIAMARI
165	MS MAA GAYATRI STONE WORKS	620023631	MADHOPARA
166	MS MAA GAYATRI STONE WORKS	620420131	MAHADEOVARAN, PLOT NO-162,163,164,133,132P,134P
167	MS MAA LAXMI STONE WORKS	62095003001	BELBHADRI
168	MS MAA RAKSHA KALI STONE WORKS	620144953001	MADHOPARA PLOT NO 730P 731P 732P AREA 02 BIGHA 16.5 DHUR
169	MS MAA SARASWATI STONE WORKS	62057663001	MUNDLI, PLOT- 03, AREA- 01 BIGHA 10 KATHA
170	MS MAA SHEETLA STONE WORKS	620130533001	MARIKUTI MAHADEOGANJ SAHIBGANJ
171	MS MAA SHITLA STONE WORKS	620100103001	GUDWA,PLOT NO-10P, AREA-2 ACRE
172	MS MAA SHITLA STONE WORKS	620100103002	GUDWA,PLOT NO-10P, AREA-2 ACRE
173	MS MAA TARA STONE WORKS	620136563001	CHHOTA LOHANDA,PLOT NO-397,406,407,408
174	MS MAA TARA STONE WORKS	620419231	KATHHALBARI
175	MS MAA VAISHNAVI STONE WORKS	62043583003	MUNDLI
176	MS MAA VAISHNAVI STONE WORKS	62043583002	MUNDLI , PLOT NO- 13,16P
177	MS MAA VAISHNAVI STONE WORKS PROP. RAJIV KUMAR BHAGAT	620145403001	MUNDLI PLOT No.24P
178	MS MAA VASHNAVI STONE WORKS	620435831	MUNDLI
179	MS MAHADEO STONE WORKS	620127813001	BELBHADRI, PLOT- 05, 06, AREA- 01B 05K
180	MS MAHADEO STONE WORKS	620127813002	MAHADEOBARAN, PLOT- 140, 141, AREA- 01B 10K
181	MS MAHAMAYA STONE WORKS	620130463001	BARTALLA PLOT NO 95,96
182	MS MANOJ KUMAR STONE WORKS	620124423001	NIMGACHI, PLOT- 757, AREA- 03B 04K 15D
183	MS N.S.STONE WORKS PROP. NAZRUL ISLAM	62094363001	FATHEPUR,PLOT-514,519,512,513,AREA 5B-7K-1DH
184	MS NANCY STONE WORKS	620427431	MATHADIH,PLOT NO-528,AREA-02B,12K,5D
185	MS NARAYAN STONE WORKS	620365431	BARTALLA
186	MS NATH STONE WORKS	62095293001	BELBHADRI ,PLOT NO-44,AREA-3B,12K
187	MS NATURAL MINING AND CONSTRUCTION PVT LTD	620096843001	GANGOPARA BEDO PLOT NO-80,58 AREA-6.16 ACRES
188	MS NAV DURGA STONE WORKS PROP. VINOD KUMAR CHOUDHARY	620144223001	BARTALLA PLOT NO. 129 130 132P
189	MS NEHA BLACK STONE WORKS	620427831	BORNA
190	MS NEHA STONE WORKS	62094083002	MUNDLI, PLOT NO- 25P, AREA- 1 ACRES
191	MS NEHA STONE WORKS	62094083001	BELBHADRI
192	MS NEHA STONE WORKS	620175903001	BELBHADRI,PLOT NO 55
193	MS NILKANTH STONE WORKS	620163403001	BARA LOHANDA PLOT NO. 346 347 348
194	MS NILKANTH STONE WORKS	620108903001	BARA LOHANDA,PLOT NO-347,348,346
195	MS NOOR STONE WORKS	620160793001	MARIKUTI, JB NO-11, PLOT NO- 30P,36P
196	MS NOOR STONE WORKS	620419031	NIMGHACHI, PLOT N0- 921, 922 AREA- 02.0 BIG
197	MS NOORANI AND BROTHERS	620156633001	TETRIA,PLOT NO=237P,238P
198	MS OM STONE WORKS	620041431	MATHADIH J.B NO.-23, PLOT NO.-610
199	MS OM STONE WORKS	620150303001	JAGRU CHOWKI, PLOT NO- 157
200	MS OM STONE WORKS	620123653001	NEEMGACHI, PLOT NO- 674, AREA- 02 B 02 K
201	MS P L STONE WORKS	620422631	CHOTA LOHANDA
202	MS PAHARIA STONE WORKS	620144483001	MAHKUP PLOT NO 33P 34 TO 37 AREA 04.26 ACRES
203	MS PATLIPUTRA ENTERPRISES PRIVATE LIMITED	620159443001	CHUBE,PLOT NO-5,6
204	MS PIYUSH STONE WORKS	62078273001	MAHADEOWARAN
205	MS PRACHI STONE WORKS	620430931	MUNDLI MIRZACHOUKI
206	MS PRATIK STONE WORKS	620417931	BELBHADRI, J.B.NO.-5,PLOT NO.-8

207	MS PRIYA MINRALS	620423831	HATHIGAD
208	MS PROGRESSIVE STONE WORKS PROP ILIYAS	620136283001	DHATAPARA,JB-24,PLOT-568,AREA-02B-15K-00DH
209	MS PUJA STONE WORKS	620378031	MAHADEVWARAN, PLOT NO-158,159
210	MS PURNIMA STONE WORK	620424631	MAHADEOVARAN
211	MS PURNIMA STONE WORKS	620148343001	MAHADEOBARAN
212	MS R K STONE WORKS	620163843001	BARA LOHANDA,P NO-352,351P,
213	MS RAA ARSALAN ENTERP PVT LTD	620416331	PINDHARI
214	MS RADHA VIDYA SAGAR STONE WORKS	62043313002	MAHADEOWARAN MIRZACHOUKI
215	MS RAJ STONE WORKS	620219731	BARTALLA
216	MS RAJA MINERALS AND COMPANY	620138413001	RAJMAHAL
217	MS RAJA STONE WORKS	62004443001	HATIGARH,PLOTNO-260,297,298,AR-02.50A RLY SDG SLJ
218	MS RAJEEV RANJAN STONE WORKS	620125693001	MARIKUTI, PLOT- 45P, 76P, AREA- 11B 12 K 6D
219	MS RAJESH STONE WORKS	620421631	KALYANI
220	MS RAM MINRALS INDS	620424331	HATHIGARH,PLOT NO-10,RLY SIDING SAKRIGALI
221	MS RAM RAHIM STONE WORKS OCCUPIER NAME DINANATH PRASAD BHAGAT	620097553001	PIPALJORI,PLOT-209,210,211,AREA-3B-17K-8DH
222	MS RAMPRIT STONE WORKS	620419831	JAMNI
223	MS RATAN STONE WORKS	620160053001	NIMGACHI, PLOT NO- 673
224	MS RAVINDER YADAV	620147623001	GHOGHI,PLOT NO-37,38
225	MS RIDDHI STONE WORKS PROP RAVI KUMAR JAISWAL	620099803001	MUNDLI
226	MS RITIKA STONE WORKS	620430631	ADRO
227	MS RITIKA STONE WORKS	620166143001	ADRO,P NO-450-453 , AREA-02-19-18 DHUR
228	MS RODIC VANANCHAL PROJECT P L	62061083001	AAMDANDA
229	MS S R STONE WORKS	62016923001	PIPARJORI,JB-29,50,PLOT-197 TO 202,207,208
230	MS S S STONE WORKS	62038303001	CHOTA LOHANDA
231	MS S S STONE WORKS	620124103001	BARA LOHANDA PLOT NO-386P , 394P
232	MS SAI ASHRIWAD STONE WORKS	620417231	MATHADIH, PLOT NO- 611, AREA- 04BIGHA
233	MS SAI MALTI SERVICE	620159533001	BINDRI BANDARKOLA JB NO 54 PLOT NO 713
234	MS SANTOSH IND	620421732	JAMNI
235	MS SARASWATI STONE WORKS	620142753001	CHOTI BHAGIYAMARI PLOT NO. 844P 845
236	MS SARASWATI STONE WORKS	620114023001	AMBADIHA,PLOT NO-243P,244P,245P
237	MS SATAMEW JAYATE MINERAL	620168363001	MUNDLI P. No. 16P 18P
238	MS SATYAMEV STONE WORK	620426331	MUNDLI PAHAR,PLOT NO-24P,AREA-02 BIGHA
239	MS SHAKTI STONE WORKS	620417631	ADRO
240	MS SHAMBHU CO	0620420531	BAKUDIH
241	MS SHAMIM STONE WORKS	62094943001	BEKCHURI, PLOT NO-27P, AREA-1 ACRE
242	MS SHANTI STONE WORK	620416931	MUNDLI, PLOT NO- 3, 4
243	MS SHANTI STONE WORKS	620126343001	AMBADIHA, PLOT NO-202,226,299,323
244	MS SHIV SHAKTI STONE WORKS	620435631	KENDWA
245	MS SHIV SHANKAR STONE WORKS	620134031	CHOTA LOHANDA
246	MS SHIV STONE WORKS	620122613001	CHOTI BHAGIA MARI SAKRIGAL
247	MS SHIV STONE WORKS	620159333001	BELBHADRI PLOT NO-2 ,5
248	MS SHIVAM STONE WORKS	620139503001	CHHOTI BHAGIYAMARI,PLOT NO-822P
249	MS SHIVAM STONE WORKS	620162323001	CHHOTI BHAGIYAMARI,PLOT NO-822P
250	MS SHLOK YADAV	620122243001	SAKRIGALI
251	MS SHREE HARI STONE WORKS	620139083001	MUNDLI PLOT NO 4 JB NO 5
252	MS SHRI SHYAM STONE WORKS	620154763001	MARIKUTTI PLOT NO 10 11 20 22 TO 25 & 30
253	MS SHYAM STONE WORKS	620114893001	BELBHADRI PLOT NO=31, 32
254	MS SIDHI VINAYAK STONE WORKS	620426931	NIMGHACHI
255	MS SIFA GROUP	620416431	BELBHADRI,PLOT NO 45P,AREA-4.00ACRES ONLY
256	MS SING STONE WORKS	620422331	MAHKUB
257	MS SINGH DEEP STONE WORKS	620155113001	JOKMARI, PLOT NO- 78, AREA-09-09-18 DHUR
258	MS SINGH STONE WORKS	620171613001	MAHKUB,PLOT NO-54
259	MS SOURAV STONE WORKS	620426031	CHOTA LOHNADA PLOT N0-431 - 434
260	MS SRI BALAJI STONE WORKS	620165063001	MUNDLI, PLOT NO-24P

261	MS SRI DURGA STONE WORKS	620137543001	MANJHIKOLA,PLOT NO-672
262	MS SRI GURU STONE WORKS	620420931	PIPALJURI
263	MS SRI KRISHNA STONE WORKS PROP. SONI DEVI	620096723001	MUNDLI, PLOT NO-21, AREA-1B, 10K
264	MS SRI RAM STONE WORKS	62005333002	NIMGACHI, PLOT N0- 659, AREA- 02 BIGHA
265	MS SRI RAM STONE WORKS	620181183001	PAKARIA, PLOT NO- 55P, 56P, 127P
266	MS SRI SHYAM STONE WORKS	620134333001	MARIKUTI PLOT NO 2 3 4 26 27 28 AND 30
267	MS SRI SRIRAM STONE WORKS	62078883001	BELBHADRI, PLOT NO-2, AREA-2.09 BIGHA
268	MS SUBHAM STONE WORKS	620425331	AMBADIHA, PLOT NO-170
269	MS SUBHDRA STONE WORKS	62057932002	BARTALLA ,PLOT NO-152,153,AREA- 4B 1K 11D
270	MS SUMIT STONE WORKS	620201631	MUNDLI, PLOT NO- 25P, AREA- 01B 1K
271	MS SUNIL KUMAR. PROP.SUNIL KUMAR	620115053001	JHUMRABANDH
272	MS SWASTIK MINERAL AGENCY PROP VIKRAM PRATAP	620150273001	KARIGUNIYA TALJHARI
273	MS T B S STONE WORKS	620096653001	PIPALJORI,PLOT NO-111,112,114 AREA-07B-04K
274	MS TAMANNA STONE WORKS	620418131	MARIKUTI PLOT NO-29,30, AREA-2 ACRE
275	MS TARKESHWER JAISWAL	620141763001	BHUTAHA PLOT NO 09P
276	MS USHA STONE WORKS	620124993001	ADRO MAKO,PLOT NO-22P,23,30P,34
277	MS VANSHRAJ STONE WORKS	62091363001	BELBHADRI ,PLOT-53, AREA-0.83 ACRE
278	MS VANWASI KALYAN STONE WORKS	620147873001	MARIKUTI,PLOT NO-47P,48P
279	MS VIDYARTHI STONE WORKS	620110113001	HATIGARH,PNO290,292,293,AR-2B,RLY SIDING SAKRIGALI
280	MS VIKASH STONE WORKS	62016593001	CHOTA BHAGIAMARI PLOT NO-853
281	MS VISHWNATH STONE WORK	620419432	AMBADIHA
282	MS WARISH STONE WORKS	62094953001	MATHADIH,PLOT NO-640
283	MS YASHRAJ BLACK STONE WORKS	620423031	JOKMARI
284	NASIRUDIN SHEKH	62080043001	DHATAPARA,P.S-KOTALPOKHAR,DIST-SAHEBGANJ
285	NIKKY DEVI	620105243001	BELBHADRI MIRZACHOWKI SAHEBGANJ
286	PAWAN KUMAR BHAGAT	620098713001	BELBHADRI , PLOT NO-34 TO 37 AREA-1.83
287	PRAKASH CHANDRA YADAV	62042001001	GUDWA, PLOT NO. 10P, 12ACRES
288	RAHUL METALS	620101203001	RANGA BAKUDIH
289	RAJMAHAL CHINA CLAY WORKS	620162813001	KASWA PLOT NO 1780 1778
290	RAKESH KUMAR JAISWAL	620102293001	mundli plot no 16p area 01B 10K
291	RAMESH KUMAR DOKANIA	62090233001	MAHKUP PLOT NO-100P,101,102,104 AREA-2 ACRES
292	RM INFRASTRUCTURES	620119633001	CHOUKIPAHAR PLOT NO 17P, 19P AREA -3.72 AC
293	SAMIM ALAM	620134823001	GANGO PARA BEDO
294	SHABNAM PRAWEEN	620146043001	Barharwa Sahebganj
295	SONAMTECH BUILDCON PRIVATE LIMITED	620142033001	MARIKUTI,PLOT NO-10,11
296	SRI SATYA NATH SAH	620427331	BINDARI BANDAR KOLA, PLOT NO-713.AREA-3 ACRE
297	SRI KUNDAN KUMAR	62039263001	MUNDLI
298	SRI PRAKASH CHANDRA YADAV	620420031	GUDWA
299	UNIVERSAL ENTERPRISES	620154183001	JOKMARI GUTIBERA ,PLOT NO. 147P KHATA NO. 14

Jharkhand State Pollution Control Board

Regional Office-Cum-Laboratory, Dumka- 814101

Sl	Lessee Name	Lessee Code	Mouza	Plot No	Area In Hec
1	MS HILL MOVEMENT	620549001	GUDWA	9P, 10P, 11P, 14P, 17P	8.195
2	MS JAI BAGRANG WALEE STONE WORKS	620376602	GUDWA	74P, 75P, 76P, 77P, 78P, 89, 90, 91P, 92, 94, 95, 96, 97P, 98, 99P, 100P, 111P, 115P, 100/229,	10.11
3	MS PATNIBONA STONE QUARRY	620379801	PATNIBONA	22, 25, 34, 35, 36, 37	4.05
4	MS SRI RAM STONE WORKS	620053304	PAKRIA	55,56, 127p	2.43
5	SRI KRISHNA KUMAR SAHA	620376102	IDPE	37p, 38	3.18
6	MS MINERAL INDIA	620549101	GUDWA	18P, 19P ,23P, 24P, 26P, 27P	4.98
7	MS SWASTIK MINERAL AGENCY	620386907	KARIGONIA	84, 88, 87, 83, 85, 95, 89, 96, 91, 94, 90, 92, 93, 100, 98	14.985
8	MS MAA AMBA STONE WORKS	620550401	DEMBA	84 to 88, 91, 92p, 98p	4.00
9	MS JIAL DAS AND CO	620379901	PAKTURI	49,50,51,52,53,86p88,89	13.53
10	MS K.P. AND G. SONS	620831901	AAMDANDA	225p, 239p, 240p, 244p	3.17
11	MS SHAKTI STONE WORKS	620417601	LOHANDA	46p 50p	4.03
12	MS KARAMBI STONE WORKS	620389702	KARAMBI	13p,19p, 16p,17, 18,29, 20p,21,26p,25p,27, 28	8.71
13	MS BLACK STONE WORKS	620159501	DESHPOKHRIA AND AMJHOR	63,64P,65,66,67,204P,205 ,217,208,209,218P,221P,2 22P,219,220	7.61
14	MS MD ALAM AND BROTHER	620549301	GODIATUNGI	82p,83,84p,85,86p,87p,88 p,	3.238
15	MS RATAN BLACK STONE	620421401	KARAMBI	26p	3.238
16	MS CTS INDUSTRIES LTD	620020201	CHOTA DAMINBHITA	18p, 23p, 24p	3.62
17	MS JINDAL STONE WORKS	620394001	LOHANDA BEDO	5p,6p	2.023
18	MS RAJAN STONE WORKS	620374701	BORNA	44p, 43, 49, 51, 52p, 85p	1.89
19	MS MAA DURGE STONE WORKS	620035501	GILAMARI	167p	3.035
20	MS HARILAL AJOY AND CO.	620382404	PATANIBONA AND CHAWKIPAHAR	19p, 41, 42, 43p, 44p, 45p, 46p, 47, 92p, 93, 94, 95, 110	6.03
21	MS PRATIK STONE WORKS	620417901	GILAMARI	154, 155	3.38
22	MS BHAGWAN STONE WORKS	620374602	BORNA	91,107to109,112to117	2.414
23	MS GANGA STONE WORKS	620375401	TELO	37 to 39, 15p, 16, 42,41, 17 to 21, 40	4.715
24	SRI MANOJ KUMAR SAH	620390701	MUNDLI	51P	1.620
25	RAHUL METALS	620420601	BANAPARA AND MOTIYANI	15, 17P,18,19,24P, 25P, 26,	9.086
26	MS NARSINGH LAGHIR	620380001	PATNIBONA	26p	6.086
27	MS AYACHI STONE WORKS	620610901	GILAMARI	208P,210P,214P,216,217	2.63
28	MS S S BLACK STONE WORKS	620549801	BELBHADRI	79p194p,198p,	3.64
29	MS BHAGWAN STONE WORKS	620374601	BORNA	87p,89P,118P,121-125	2.9

30	MD M ALAM AND BRO.	620382402	GADAITUNGI	89, 90 to 92	1.42
31	MS HINDUSTHAN INDUSTRIES AND MINING CORPORATION	620379701	patnibona	28, 29, 49, 50, 178, 180, 32, 33, 170, 166, 31, 171, 172, 174, 30, 176, 182, 51, 26p, 175, 177	15.58
32	MS DOKNIA STONE WORKS	620375101	CHAPANDE	202 to 204, 207, 208	3.431
33	MS BIHAR BENTONITE SUPPLY CO	620420603	CHALPAHAR AND PATNIBONA	33P, 34 to 37, 24, 87, 88p, 89, 90, 83, 80, 5,6,11,12	9.08
34	MS NETURAL MINING AND CONSTRUCTION PVT LTD	620621901	GANGOPARA BEDO	25p, 76, 77p, 80p	3.54
35	MS MAYUR MACHINE PVT LTD	620673201	MOTIJHARNA	205p	7.811
36	MS VIDHYARTHI STONE WORKS	620381501	GADWA	63P,72,80	4.455
37	MS BABA PROJECT PVT.LTD	620390201	PACHRUKHI	11,12,13	5.680
38	MS VEESHNAV STONE WORKS	620391201	DAMIN BHITA	15, 16, 24p, 19p, 14, 6p, 9p	4.34
39	MS MOHAN AND SANJAY STONE WORKS	620380901	GUDWA	60,61,62	2.33
40	MS TRIDEV STONE WORKS	620819601	BEKCHURI	07, 13P ,14P, 15P	4.18
41	MS BOBY STONE WORKS	620833301	GADAITUNGI	129p	1.11
42	MS DOKNIA STONE WORKS	620375102	CHAPANDE	190p, 192p,193p, 194p, 195p. 201, 205, 206	3.229
43	MS RAJAN STONE WORKS	620374702	BORNA	52p, 53 to 61, 249 to 252	3.504
44	MS CTS INDUSTRIES LTD	620550201	JOKMARI MAHADEGANJ	56p, 58p, 70p	4.452
45	SRI KRISHNA KUMAR SAHA	620779003	BORNA	214p, 396 to 400, 402	3.49
46	SRI KRISHNA KUMAR SAHA	620378901	BORNA	201p, 202, 203, 216 to 219	2.731
47	MS B.B.A STONE WORKS	620549501	TALMI	15P,17P,35P,17/204P	3.74
48	MS BAGRANJBALI STONE WORKS	620375001	GANGOPARA MAKO	23P	2.390
49	M/s MAHARANI STONE WORKS	620940601	DEMBA	192, 193P, 194P, 195, 196, 197P, 198P, 199P	3.27
50	M/s Maa kalika Stone Works	620375502	Ambade	17p,18p,22,31p, 32p & 35p	4.45
51	MS ABBAS AND SONS	620432501	DHAMDHAMIA	108,109,160P, 159, 110	1.620
52	SRI CHAMAN TULSYAN	620954101	JOKMARI	85, 86, 88p,	3.116
53	RIPLEY AND COMPANY STEVEDORING AND HANDING PVT LTD	620376101	AMBADE, BADE, IDPE	9,10,13,2,37p,40,41	4.086
54	SRI KRISHNA KUMAR SAHA	620375301	CHAPANDEY	47 to 52, 44, 45p	2.48
55	MS R.P SINGH STONE WORKS	620384602	BANSKOLA	448p,450,451,452,453,	3.076
56	MS MAA GAYATRI STONE WORKS	620420101	MALITOK	71 to 73, 77p, 78, 79p, 80, 81, 86p, 87	2.11
57	SRI ARJUN YADAV	620081501	KIROKURIA	44,45	1.21
58	MS ANSARI STONE WORK	620376401	GANGOPARA BEDO	59,60,61,62,80P	2.550
59	MS MAHAVEER ENGICONS PVT LTD	620550802	DEMBA	197p, 198p, 206, 207p, 208p, 209p	4.84
60	MS MAA TARA STONE WORKS	620067701	GUDAITUNGI	41p,42 to 46, 47p	2.16

61	MS BAJRANG STONE	620606301	CHUBE	71p to 73p, 88p	2.12
62	SRI CHATURANAND PANDEY	620832701	JOKMARI	101P, 147P	1.90
63	M/S SRI GURU STONE WORKS	620420902	FATHEPUR DHATAPARA	541P, 621 TO 623, 624P, 625P, 626P, 631	4.28
64	SHRI SATYNATH SAH	620395401	BINDARI BANDAR KOLA	719	1.62
65	MS R.B STONE WORKS	620134801	MAYURKOLA LOHATIA AND PIPALJOR	786p, 787p, 788p,798p,145 to 150	4.55
66	MS JIAL DAS COMPENY	620379902	PAKTURI	45	1.63
67	MS KWALITY STONE PRODUCT	620396401	DHATPARA AND FATHPUR	424, 541p, 621p, 622p, 623p, 624p, 625p, 626p, 631p,	2.884
68	MS KOHITUR STONE WORKS	620394601	MIRAPARA	124P	1.42
69	MS MAHADEV BLACK STONE CO	620552701	KORDRA	1p, 15p, 16p, 17p, 22p	3.594
70	BHAGWAN STONE WORKS	620374604	BORNA	89p,118p,119,120P,128P, 129p,	1.420
71	MD SAMIM ALAM	620771301	GANGOPARA BEDO	44p, 25p	2.830
72	MS USHA STONE WORKS	620549901	LOHANDA MAKO	4P, 75P 76, 91	3.687
73	BUDHAWA PAHARIA	620550901	MUNDLI	9P	1.210
74	MS ZEON EARTH MINERAL RESOURCE PVT LTD	620396101	BANSHPAHAR, RANGA	62,63,64p	1.44
75	MS YASHRAJ BLACK STONE WORKS	620423001	DEMBA, MAHADEVGANJ	34,43p,61,32p,35,41,62p, 42,60,59,39p	4.960
76	MS PAHARIA STONE WORKS	620379101	BANSPAHAR	27,31	3.167
77	AKASH ALI	620379601	MALITOK	140P,141,144,145	2.570
78	MS SRASWATI STONE WORKS	620382501	KIROKURIA	4p,8p,9p,30p	3.73
79	MS SINGH STONE WORKS	620051702	BUNDAMOKO	13	0.80
80	NETINCON MARKETING PVT LTD	620435001	AMBADE	34,36p,38,45p,46,54p,57p , 58 to 60	0.75
81	MS OM STONE WORKS	620432002	PIPERJODI	37to42, 43p, 44p, 45, 46p, 55 to 61	4.29
82	MS MINAKSHI STONE WORKS	620859301	DEMBA	57,59,62p,63to 66	4.04
83	MS SHAH STONE	620796001	BARA PANCHKULI	48p, 49p, 50p, 62p	1.66
84	MS BAJRANG BALI STONE WORKS	620377501	GANGOPARA MACO AND BEDO	21, 22P,23P,25P,70to75	5.84
85	RAHUL METALS	620380101	BARA BANAPARA	27	3.19
86	MS NEHA BLACK STONE WORKS	620427801	GANGOPARA BEDO	11, 15, 16, 17, 24p, 25p	2.42
87	MS BANDANA STONE WORKS	620550701	LOHANDA MACO	03P,08P,107P,4P,5P,	2.72
88	SRI TARKESHWAR JAISHWAL	620391601	MUNDLI	57p	1.620
89	MS SHIV SHAKTI STONE WORKS Trn RAHUL	620378701	BORNA	437p, 438p, 439p	1.62

90	MS BHAI BHAI STONE WORKS	620572101	BANSPAHAR	53,54,55,60,261P	2.995
91	MS S.D. ENTERPRISES	620396301	DHATAPARA	164, 165, 167 to 177	2.428
92	MS SHIV SHAKTI STONE WORK	620552501	BORNA	466p	1.012
93	SRI MADAN KANT	620381902	KIROKURIA	2P, 30P, 31P	2.428
94	SRI MADAN KANT	620381901	KIROKURIA	18P, 19, 20, 21P	1.98
95	MD. MOJIBUR REHMAN	620377401	BORNA	405	0.81
96	SRI CHANDRESWAR PRASAD SINHA	620380301	KORDAR	2	3.4
97	MS ADARSH GROUP	620550501	JOKMARI	309P,310P,312P,315,314, 316,317P	3.035
98	MS GHOSH STONE WORKS	620374801	GANGOPARA BEDO	25p, 44p	3.76
99	MS ALOK STONE WORKS	620877501	MANOHARPUR	398, 399	0.995
100	MS MAA LAXMI STONE WORKS	620950002	DEMBA	36 to 38, 89, 90, 92p, 96p, 97p	4.654
101	MD IQBAL	620431901	DHATAPARA	344, 349, 350, 442, 444	2.020
102	MD JAHID ABBAS	620774001	DHATAPARA AND FATEHPUR	434, 435, 632 to 636	3.278
103	MS MIRA PAHAR STONE MINES	620713101	MIRAPARA	98p,100p,101p, 105p, 106p	3.64
104	MS STAR INDIA INDUSTRIES	620572501	CHOTA DAMINBHITA	33p,34 to 36, 56p, 57p, 60p	4.86
105	GOLDEN STONE HARVEST PRIVATE LIMITED	620555201	TELO	24,36p,27p,28p,29p,	3.49
106	MS S.S. ENTERPRESES	620377101	BORNA	468p, 469	1.66
107	SEKH MD SIRAJ	620549201	BORNA	444p, 445, 446, 458p, 463	2.12
108	RAHUL METALS	620380102	MURKO	13	1.052
109	MS OM SAI STONE WORKS	620177301	DEMBA	211P, 212P ,213P,	3.03
110	SRI SHANKAR KUMAR	620689901	BORNA	442p, 466p	1.011
111	MS HARILAL AJOY AND COMPANY	620382401	PATNIBONA	20, 21	1.4
112	SABNAM PARVEEN	620375901	BORNA	63,64P,65,244,246P,247,285P	2.26
113	RAHUL METALS	620420602	BARA BANAPARA	24P to 26p	1.41
114	RAHUL METALS	620553101	BARA BANAPARA	26p, 29	1.149
115	MS MAA JAGDAMBAY STONE WORKS	620772301	JOKMARI	150, 147	1.83
116	SHRI SUNIL KUMAR SINGH	620393801	LOHANDA BEDO	26	1.21
117	ABDUL RAJJAK	620548601	BOARNA	282P,284P,285P,286,287	2.22
118	BHAGWAN STONE AND MINERAL	620419701	BUNDABEDO BARAGHATI	355P,356P,357P,358P,359P,	2.83
119	MS DEV BLACK STONE WORKS	620555302	BORNA	273,299,417 to 422, 432,433	3.3858
120	MS MAA AMBIKA TRADERS	620108601	BORNA	69P, 67, 70P, 64P, 68P	1.77

121	MS MAHAVEER ENGICONS PVT LTD	620550801	DEMBA	112p, 113p, 115p, 116p,117p,118p,119,121p ,122to124, 125p, 126p, 127	2.94
122	MS SHIVAM STONE WORKS	620041402	BORNA	441, 443p	1.0773
123	MS SHIVAM STONE WORKS	620041401	BORNA	440p	1.198
124	MS SKY STONE WORKS	620829301	MAYURKOLA	752 to 756, 761 to 764, 766 to 771	2.857
125	MS SWASTIK MINERAL AGENCY	620386901	CHALPAHAR	3,15P, 16P, 18P, 25, 27, 31, 4, 23, 30, 5, 6, 21, 26, 17, 20, 38, 24, 28, 29, 39, 32	12.367
126	MS VANSLA GRANITE	620380201	PATNIBONA AND CHALPHAHAR	40, 17, 18P, 13, 14, 16	2.79
127	MS VANSLA GRANITE	620380202	CHALPAHAR	55, 56	0.605
128	SMT MIRU SOREN	620615901	BORNA	93 to 97, 241	1.88
129	SOMNATH GHOSH	620704701	PATHARIA	216.225.228	1.62
130	USMAN SEKH	620877301	DHATAPARA	305, 306, 308 to 312, 316	1.838
131	JAI MAA BHBAGWATI STONE WORKS	620378102	BELBHADRI	170P 171P 172P 177 178P 190P	2.02
132	ABDUL KADIR	620877401	FATEHPUR	521P	2.02
133	BASUKU YADAV AND YOGESH YADAV	620383901	BARE PARTE	14P,33P,34P	1.21
134	MS JAI MATA DI STONE WORKS	620027001	BANCHAPPA	299P,302P	0.55
135	MS MAA VAISNAVI STONE WORKS	620389801	MUNDLI	50,51	1.93
136	MS MAA VAISNAVI STONE WORKS	620435801	MUNDLI	55,56	2.22
137	MS MAA RAKSHA KALI STONE WORKS	620796501	MALITOK	149P ,150,151,153P,	1.64
138	SHIV SHAKTI STONE WORKS	620435102	MODIKOLA	1P,2P,3 TO 9,10P,11,14,21 TO 23	3.071
139	MS AMBIKA TRADERS	620134701	GANGOPARA BEDO	63 to 66, 25/P	4.590
140	SWASTIK MINERAL AGENCEY	620386910	RORO	10,11P,18P,	4.856
141	SMT NAJNIN BIBI	620396001	MARGADO	106P,	2.025
142	MS STAR INDIA MINING MINERAL	620550001	BHUTHA AND DAMINBHITHA	82 & 60/P,	4.86

Annexure - 3

Environment Management of Stone Mines & Crusher Industry in Sahibganj

October, 2021

This report is prepared by Centre for Environment and Energy Development (CEED), New Delhi

Table of Contents

Key Recommendations and Immediate Steps to be Taken

Based on the request made by the Jharkhand State Pollution Control Board (JSPCB), Centre for Environment and Energy Development (CEED) conducted a detailed study of prevailing situation of Stone Mines and Crusher activities in Sahibganj with an aim to understand the key factors attributing to the rise of air pollution and bring out far reaching solutions to clean the environment. In this regard, CEED meticulously prepared emission inventory, carrying capacity and preliminary clean air action plan for the same purposes and submitted them to the JSPCB. In order to present scientifically proven practices and solutions, CEED analysed data of IIT-Delhi, CPCB JSCPB and CSTEP and conducted field level interactions with key stakeholders in Sahibganj including officials at JSPCB, Ranchi and its regional office, Dumka.

The main objective of this report is to put forwards certain condition based on which operations of stone mines and crusher activities can be allowed in Sahibganj and to further present plausible measures to ensure effective environment management in the hotspots and clusters, which takes into considerations of adoption of best practices, and capacity building and awareness programs.

Considering the economic importance of stone mining and crushing industry in terms of supporting local livelihood but at the same time upholding the environment norms, following policy related actions are recommended.

- Based on data available, **the downward trend in the Air Quality Index (AQI) has been observed in the last five years (2015-2019), but still above the national standard. At the same time, JSPCB needs to take corrective measures to reduce the pollution by 38% (taking 2019 as base year) to bring the PM 2.5 as per the National Ambient Air Quality Standard (NAAQS).** A detailed action plan to that extent has already been submitted to JSPCB.

- It has been observed that air pollution in Sahibganj is more concentrated in clusters, where stone crushers are located, rather than in overall city or district. It has also been observed that air quality of Sahibganj is better than the other industrial districts of the state such as Dhanbad and Jamshedpur.

- It is highly recommended that JSPCB must demonstrate **a model solution of "environmentally sound management of mining and crushing activities"** on the site. **JSPCB, may create a possible window of defined and mutually agreed timeframe for the stone crushers units to adopt such solutions. Once the window of shifting to environmentally sound solutions is over, JSPCB may consider the cancellation of the license.**

- Since it is difficult to define or cap the number of stone crushers units that can operate in certain geography, therefore it is recommended that **JSPCB must implement the pollution control measures with the existing units before considering any new CTO. It is also recommended that while permitting a new CTO, JSPCB should consider a new cluster of stone crusher units complying with all the norms that also create a precedent for existing industry to follow and implement.**

- JSPCB should take an immediate step in **setting up a field office in Sahibganj which will play a major role in managing and regulating mines and crushers effectively**. In addition to this, there should be a responsive and result oriented mechanism in place like creation of a District and Block level task force taking support from the local panchayats to monitor, supervise and inspect the compliance and control measures strictly.

- In order to have real time accurate data of PM 10, it is recommended to have continuous monitoring of air quality, all existing units must be mandated to install an Air Quality Sensor, PM10 Analyser and relevant monitoring device in their premises. **At least 8-10 Air Quality Monitoring devices should be installed in various blocks of Sahibganj.**

- Based on the scientific data available, **the overall carrying capacity in the district is positive,** however the available supportive capacity is different for each month. **It is recommended to have daily monitoring and fortnightly reporting from the field office especially between November to January when the supportive carrying capacity is 'Very Low'. JSPCB may also decide to suspend the activities for a few weeks or months depending on high pollution days.**

- In order to have regular information on pollution level **JSPCB should develop an online dashboard and a app to properly observe and disseminate the levels of pollution in real time manner** which will ultimately help JSPCB to take firm decision on closing certain units/cluster for some days or months as per the gravity of the pollution situation.

- There has to be a **new policy to allow stone dust generated from the mines and crusher activities to be used as a sand in the building and construction material** which will resolve its proper disposal and will also prevent it from merging with the water of the Ganges and other water bodies.

- JSPCB must facilitate a **baseline survey to assess the health condition of people impacted by the stone crushing and mining in the region**. Accordingly, regular health advisories should be issued for the community and corrective measures should be taken.

- There should be specific measures to reclaim the land of closed and abandoned mines. **A proper plan to regain greenery and vegetation should be in place to reduce further land degradation.**

NOTE: All the key action points are mentioned here, but for getting a sense of idea on effective solutions and best practices in detail, please see the chapter 'key recommendations' presented in the last section of this report.

List of Figures and Tables

Abbreviations

Jharkhand State Pollution Control Board	JSPCB
Central Pollution Control Board	CPCB
Comprehensive Clean Air Action Plan	CCAAP
Department of Forest, Environment and Climate Change	DoFECC
Ministry of Environment, forest and climate change	MoEFCC
National Air Quality Index	NAQI
National Clean Air Program	NCAP
Particulate Matter	PM
Suspended Particulate Matter	SPM
Consent to Operate	CTO
Heavy Motor Vehicles	HMV
Air Quality Index	AQI
GoJ	Government of Jharkhand
EI	Emission Inventory

(I)

Sahibganj : Current Scenario

1. Introduction

The Stone mines & crusher units have been seen as one of the key sources of air pollution in Sahibganj. CEED conducted a detailed study with an aim to understand the key factors attributing to the rise of air pollution and bring out far reaching solutions to clean the environment locally.

(A) Aims and Objectives

The main objective of this report is to put forwards certain condition based on which operations of stone mines and crusher activities can be allowed in Sahibganj and to further present plausible measures to ensure effective environment management in the hotspots and clusters, which takes into considerations of adoption of best practices, and capacity building and awareness programs.

(B) Research Methodology

This report is based on the primary and secondary research methods composed of field based data collection, literature review and formal field level interactions with key stakeholders in Sahibganj including officials at JSPCB, Ranchi and its regional office, Dumka and stone mines & crusher unit owners and others. The data available in public domains such as Air Quality Index and relevant satellite data of CPCB and JSPCB, India Meteorological Department, IIT-Delhi, and other notable institutions (CSTEP and urban emission) have also been analysed and used.

The Emission Inventory (EI) has been prepared through a combination of primary and secondary research. Primary research consisted of surveys on vehicular emissions and traffic assessment and the data obtained through a set of questionnaire developed for key government departments and agencies regarding their respective contribution to the emissions (*see Annexures for detail*). In addition to these, regular meetings and interactions with the concerned department representatives were also held to get required info and insights.

For calculating Total Estimated Load, Assimilative Capacity and Supportive Carrying Capacity in Sahibganj, the estimation method used by NGT for determining the capacity of NCR district of Haryana, Rajasthan & UP has been applied.

For presenting scientifically proven practices and solutions, CEED analysed and reviewed various reports and control measures suggested by CPCB, and other state pollution control board mainly Maharashtra, Punjab, Haryana, Kerala, Andhra Pradesh, Himachal Pradesh, Karnataka, Odisha, etc.

(C) Scope and Limitation of the study

Though, the process of preliminary emission inventory has been validated by the data provided by the government departments and JSPCB, however due to the paucity of data further survey and studies should be conducted. Therefore, it is recommended that a comprehensive source assessment study based on the ground air quality monitoring with taking account the pollution's seasonal variations is required. A systematic evaluation of the relationship between pollutant concentrations and meteorological conditions is a prerequisite to understand the air quality trend, though it is beyond the scope of this study, thus further analysis and validation is recommended.

2. Sahibganj : A Brief Profile

(A) Location, Topography and Climate :

Sahibganj (also known as Sahebganj) is situated at the North-Eastern part of Jharkhand. The Rajmahal and Pakur subdivisions of old Santhal Pargana district were carved out on 17 May, 1983 to form Sahibganj district. Sahibganj is bounded on the North by Katihar district (Bihar), on the South by the Godda district (Jharkhand), on the East by Maldah and Murshidabad districts (West Bengal), and on the West by Bhagalpur district (Bihar). Sahibganj lies approximately between 240 42' North and 250 21' North latitude and between 87025' and 87054' east longitude, and situated at the height of 37.185m from the sea level.[1] The geographical area of the district is 1599.00 sq. km. The vast tract of land enclosed between hill ranges had been assigned a name Damin-i-Koh, which is a Persian word, which means 'Skirts of the hills'.

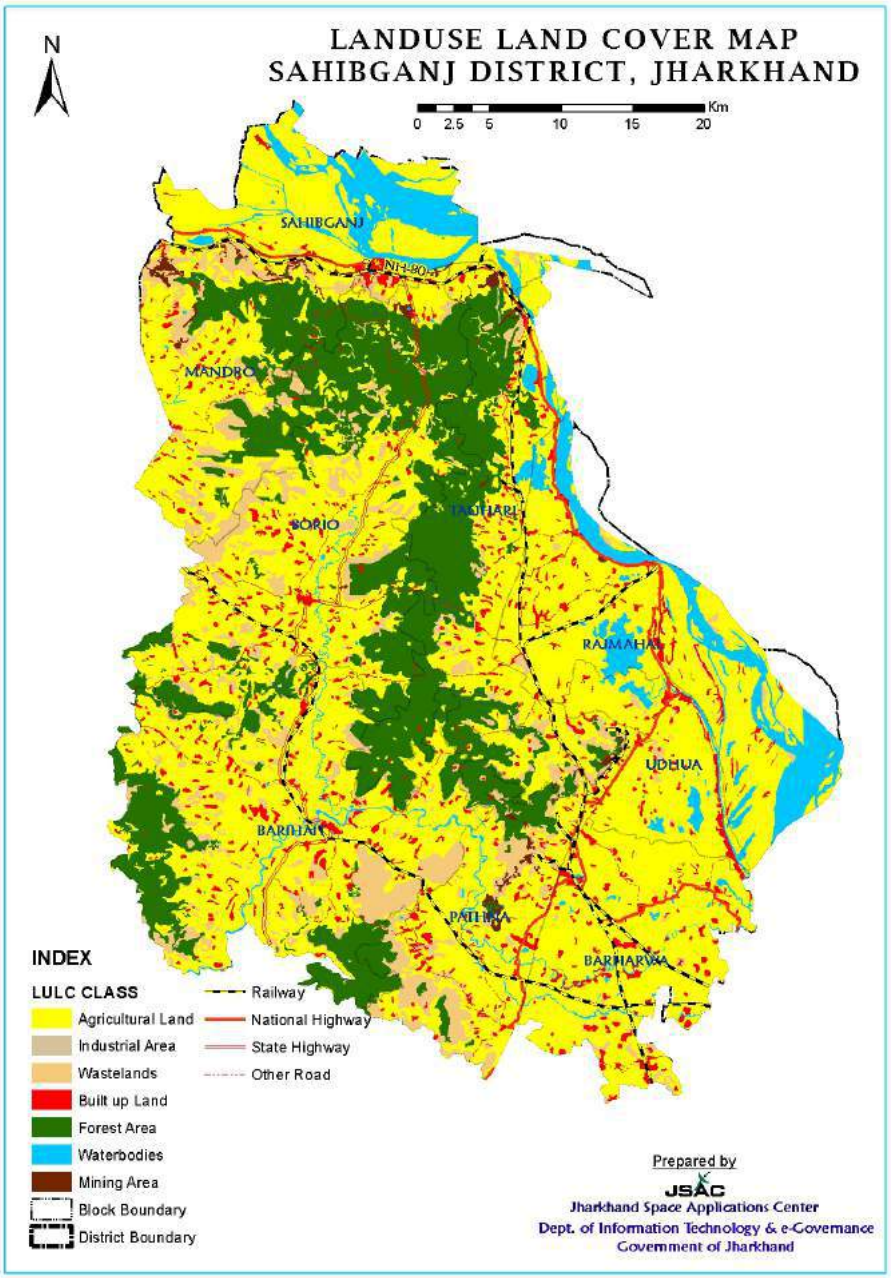


Figure 1: Land use and land cover map of Sahibganj

The district has a sub-tropical climate and it becomes cool during winter and records average temperature of 15°C, however, during summer the temperature ranges from 30°C to 40C with humidity. The district receives an annual rainfall of 1500 mm but due to its hilly topography the water run off to nearby districts. The Ganges, Gumani and Bansloi rivers flow through this

[1] https://sahibganj.nic.in/profile/

region. Some of its areas are often prone to flood in the rainy season. Sahibganj is gifted with sufficient water supply and the region settled near rivers has plenty of fertile lands. The most common tree found is Sal and Teak, Jackfruit, Murga, Simal, Bamboo, Asan are also found.

(B) Regions and Blocks :

For administrative purposes the district has been divided into 2 sub-divisions and 9 Blocks, where 166 gram panchayats covering 1307 villages are inhabited. The district may be divided into two natural divisions on the basis of its geographical location and cultivable land. First region consists of Borio, Mandro, Barhait, Pathna and Taljhari blocks and they lie under the Damin-i-Koh area. The second region consists of Sahibganj, Rajmahal, Udhwa and Barharwa blocks. This plain region consists of the uplands, undulation along ridges and depressions.

(C) Demography & Community Profile

As per the Census-2011, the population of Sahibganj is 1,150,567 of which male and female were 589,391 and 561,176 respectively. Sahibganj district ranks thirteenth in terms of total population in Jharkhand. It has sex ratio of 948 females on every 1000 males and an average literacy rate of 53% which is lower than the national average of 74.4%. The district has a predominantly tribal population largely of Santhals, Paharia and Mal Paharias along with non-tribal communities. These Paharias are placed under Primitive Tribal Group (PTG), who are largely dependent on forest produce and t indulge in agriculture to some extent. Hindu constitutes 54%, Muslims 34% Christian 7% and Sarna over 3% of total

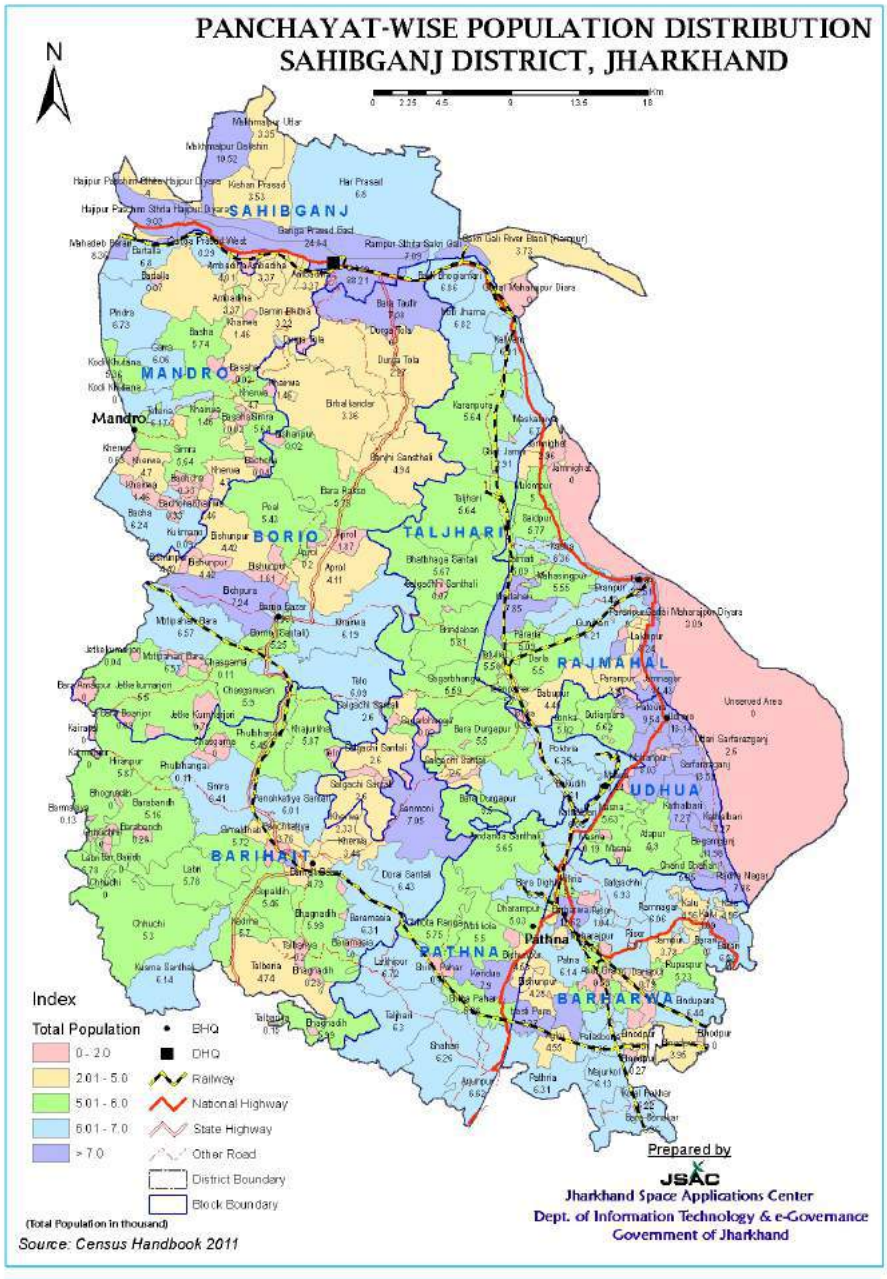


Figure 2 : Population cover map of Sahibganj

population and Santhali, Bengali, Hindi and Khortha are major languages and dialects.

(D) Natural Resources and Minerals:

The hills and slopes are covered with forests. Owing to large scale unscrupulous felling the region once known for its thick and extensive forests is now bereft of much of its jungle wealth. The Rajmahal Hills are the source of building and road stones.Similarly, Sahibganj has minerals such as coal, china clay, fire clay, quartz, silica sand, and glass sand, etc. It is famous for the Stone, Pottery, Clay Washing industry.[2]

(E) Economy

The district has an agrarian economy and more than 64% of the total workers are engaged in agro and its allied activities. The valleys have cultivable lands, yielding mostly staple food-grains, vegetables and some cash crops in limited levels. The inhabitants cultivate mainly paddy, wheat, sugarcane, chickpea and some vegetables and maize for sustenance. In terms of leaked activities, poultry farming, piggery, animal husbandry and fisheries to some extent provide supplementary income. Since the quality of livestock is very poor, it does not constitute main occupations for most of the people. The traditional cottage and village industries practiced by the Santhals and the Paharias constitute tasar rearing, village black-smithy, carpentry, handloom weaving, rope making, bidi making, earthenware making, stoneware making, etc.

(F) Backwardness as a Historical Legacy

Since time immemorial, the area is inhabited only by Malers (Mal Paharia) and it has found mentions in works of Megasthenes and Hiuen Tsang in ancient period. In the Medieval period, the region of Rajmahal was ruled by Nawabs of Bengal. In the British colonial period, Sahibganj under Dami-i-Koh witnessed the series of rebellions of Pahrias in 1772-74 and Santhal Hul (1854-55) and likewise subject to suppression by the colonial masters. As a direct consequence of the Santhal Hul Santhal Pargana was created as a separate district in 1855 by ceding portions of Bhagalpur (Bihar) and Birbhum (West Bengal) district. In later periods of freedom struggle, the region was not immune from patriotic fervour, and played its important role.[3]

In the post-independence era, under Bihar, the Southern part including this district remained to be a backward region. The central and state government considered the Paharias and other tribals of Rajmahal hills as a demographically underdeveloped section of society and embarked on policies and plans for their development. However, despite the demands of separate Jharkhand movement and several efforts made in the past could not bring the desired results and the district continued to remain relatively backward. Sahibganj block is the only block where urban characteristics are

[2] http://dcmsme.gov.in/old/dips/Sahibganj.pdf

[3] https://sahibganj.nic.in/history/

seen and largely its a rural region. Sahibganj currently receives funds from the Backward Regions Grant Fund Programme (BRGF). Union Ministry of Panchayati Raj named Sahibganj as one of the country's 250 most backward districts (out of a total of 640) in 2006.[4]

The district receives most of the power supply from the Super Thermal Power Station at Kahalgaon and reliable supply is still a major concern in rural areas. In the absence of major industries and employment opportunities, the economic options are limited to agriculture. Despite more than 93 per cent of land is cultivable agriculture activities are of sustenance nature.

There is no large-scale industry available in the area mainly due to lack of infrastructure support. Most small scale industries are based on mining and related quarrying activities. Stone chips, pottery and clay washing manufacturing are the sources of income generation for a significant proportion of the people of the district. This has created a scenario where a large-scale unscrupulous felling of trees and mining activities have led to environmental loss and rise of air pollution in the region. The problem of air pollution is significant in the mining areas due to activities such as stone mining and crushing that causes the emission of Suspended Particulate Matter (SPM) and deteriorating the local environment.

[4] /http://www.nird.org.in/brgf/doc/brgf_BackgroundNote.pdf

3. Air Pollution Scenario in Sahibganj

(A) Air Pollution Trends (2000-2019)

Understanding the extent of air pollution is crucial for developing a set of strategies to control pollution. It should be noted that two main sources used to create $PM_{2.5}$ exposure data are ground-based measurements (especially regulatory monitoring) and satellite retrievals (especially aerosol optical depth, (AOD)[5]. Aerosol Optical Depth (AOD) is a quantitative estimate of the amount of aerosol present in the atmosphere, and it can be used as a proxy for surface Particulate Matter PM2.5[6].

Considering the National Ambient Air Quality Standard (NAAQS) of PM 2.5 prescribed by the CPCB, the study also highlights the extent to which pollution has increased/decreased in Sahibganj and how much pollution reduction is required (See Figure 3).

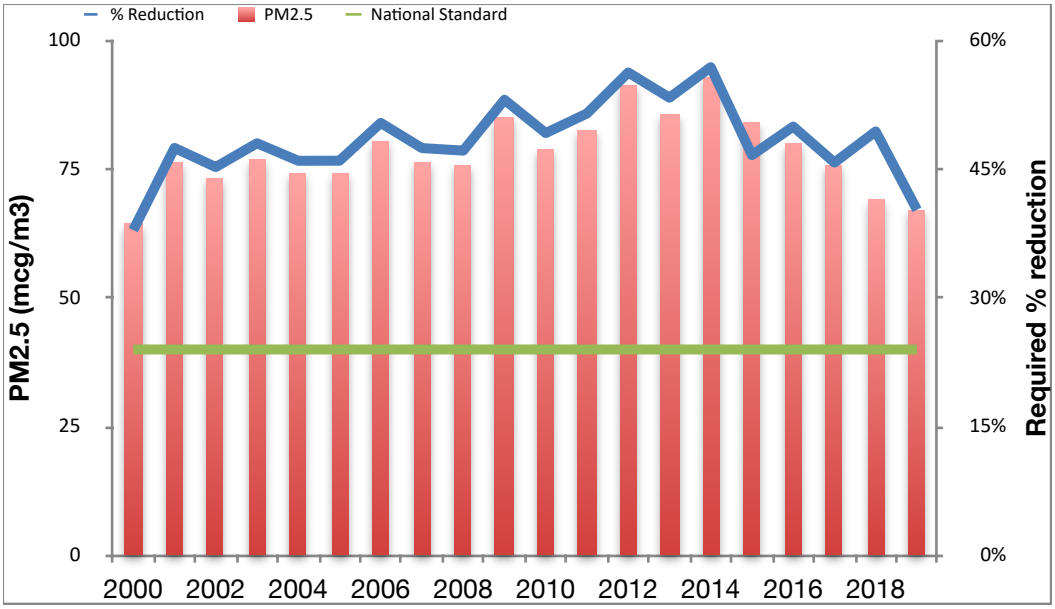


Figure 3: Annual trend of PM2.5 and % reduction required[7] (Source: CEED Analysis)

Analysis of annual average concentration is important in defining pollution reduction targets in the district and plan to control pollution. A well specified and definite target for pollution reduction helps in planning for better air quality management.

It is suggested that keeping in mind the average annual concentration of PM2.5 in Sahibganj district, efforts should be made to reduce PM2.5 up to 38% (taking 2019 as base year) to ensure clean air. Reducing the PM concentration by the above-mentioned value will bring the air quality at Good-Satisfactory level in the district.

[5] https://www.tandfonline.com/doi/abs/10.1080/10962247.2019.1668498?journalCode=uawm20

[6] http://cimss.ssec.wisc.edu/goes/OCLOFactSheetPDFs/ABIQuickGuide_BaselineAerosolOpticalDepth.pdf

[7] Satellite data received from IIT Delhi

(B) Monthly Mean Concentration of PM2.5 (2015-2019)

To understand the monthly variation in air pollution in the district this report computed the monthly mean of PM2.5 during 2015-2019. Based on the analysis of the monthly average data of PM2.5 (see figure 4), the Sahibganj air quality can be divided into three

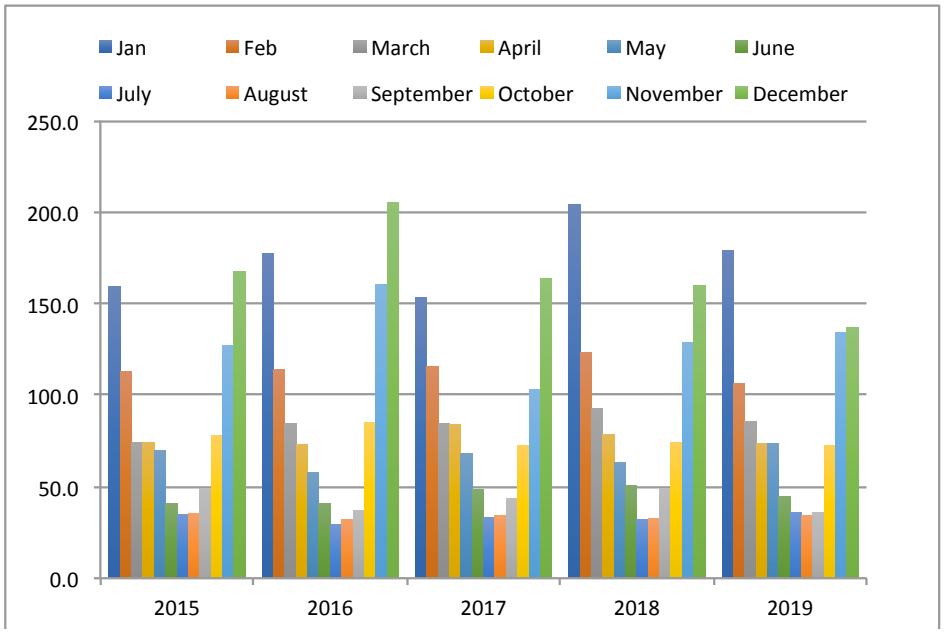


Figure 4: Monthly trend of PM2.5 for year 2015-2019 (Source: CEED Analysis)

phases viz, the period of clean air quality (from May to September) and polluted period (November to February). November, December, January and February were the months when the district has generally seen the worst air quality, the monthly average of these four months is generally found to be between around 100 -200 mcg/m3 whereas between May and September, the concentration of PM 2.5 has been found to be generally within safe limits. March, April and October can be seen as a transitional period, when the concentration is slightly above the national standard, but below the concentration noted between November–February.

This type of variation mainly takes place due to seasonal effects when during winter month's vertical winds and high pressure prevails on the ground which results in the concentration of pollutants at the surface for a more extended period and so recording the high pollution levels.

Observations on declining trend of air quality during 2015-2019

The air quality in the district has shown a declining trend, especially in the last five years (2015-2019). The potential reduction in pollution can be attributed to two main reasons: the first may be attributed to the corrective measures taken by the state government, JSPCB and the district administration, for example the closure of 304 mines (*Data of Dept of Mines & Geology, GoJ, as on 07.07.2021; see Chapter 4 more details*) and other enforcement measures such as the covering of trucks carrying mining materials, sustainable mining practices, etc. Second, other factors that have significant impacts on the dispersion and dilution of pollutants are meteorological parameters such as atmospheric wind speed, wind direction, relative humidity, rainfall and temperature. The topography of Sahibganj with hilly regions and plateau landscapes also creates a nice ventilation process locally.

However, a systematic evaluation of the relationship between pollutant concentrations and meteorological conditions is a prerequisite to understand the trend, although it is beyond the scope of this study thus a further analysis and validation is recommended.

During field survey and visit, it has been observed that the air pollution in Sahibganj is more concentrated in clusters, where stone crushers are located, rather than in overall city or district. It has also been observed that air quality of Sahibganj is better than the other industrial districts of the state such as Dhanbad and Jamshedpur.

(C) Air Quality Index in 2019

The total number of months with varied Air Quality Index (AQI) values in accordance with CPCB's AQI category is elaborated in Figure 5 for 2019.

It is observed that air quality was in the 'moderate' to 'satisfactory' category for 66% of the year, 25% in the 'very poor' category while the rest (9%) in 'Poor' category in 2019.

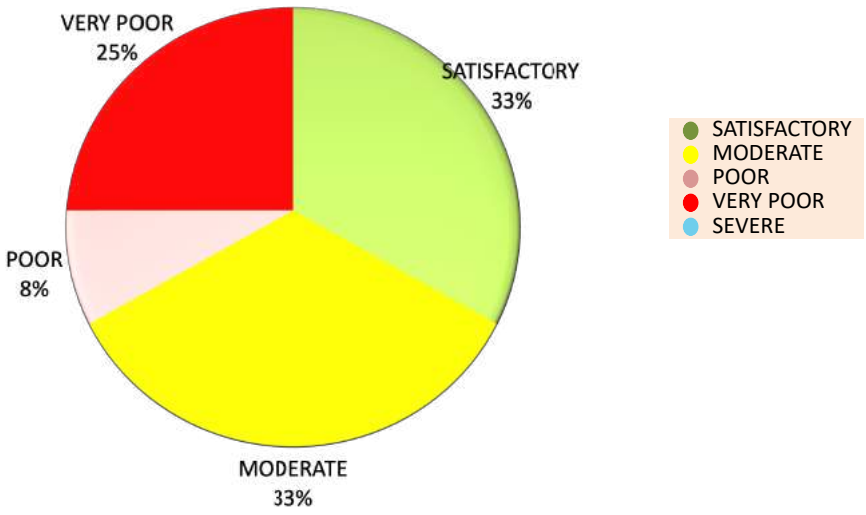


Figure 5: Monthly distribution of Air Quality Index in 2019[8]

[8] Satellite data

The downward trend in the air quality index has been observed in the last five years (2015-2019), see Figure 6 below.

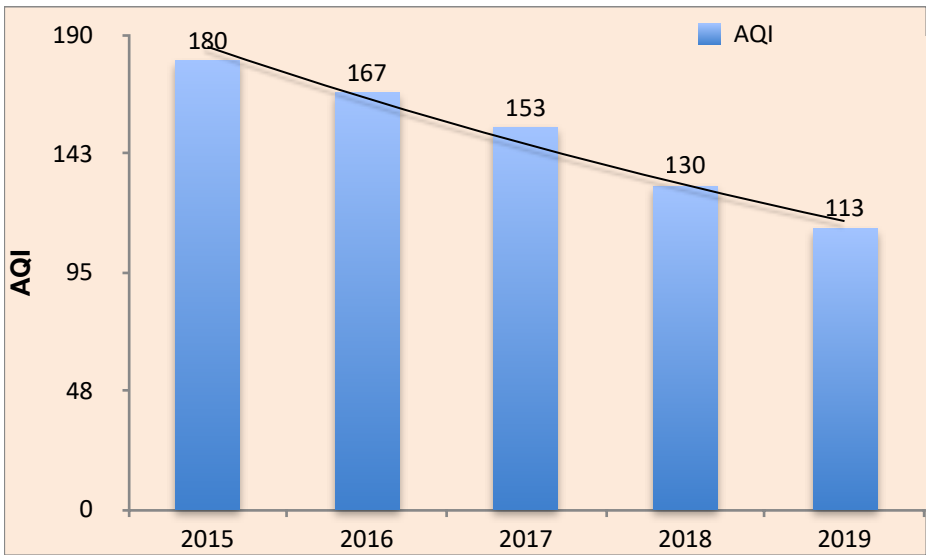


Figure 6: Annual AQI noted in 2015-2019 (Source: CEED Analysis)

(D) Air Quality Status in the District

In order to evaluate the pollution intensity and air quality status of Sahibganj district, the Exceedance Factor (EF) method given by CPCB has been applied.

The analysis found a significant amount of concentration in the city, as the range of PM2.5 is witnessed at high levels between these years. Based on the data PM2.5, the Exceedance Factors are calculated which is shown in Figure 7.

The district of Sahibganj has been found with a critical level of pollution with respect to PM2.5 thus more efforts in terms of mitigating emissions are required.

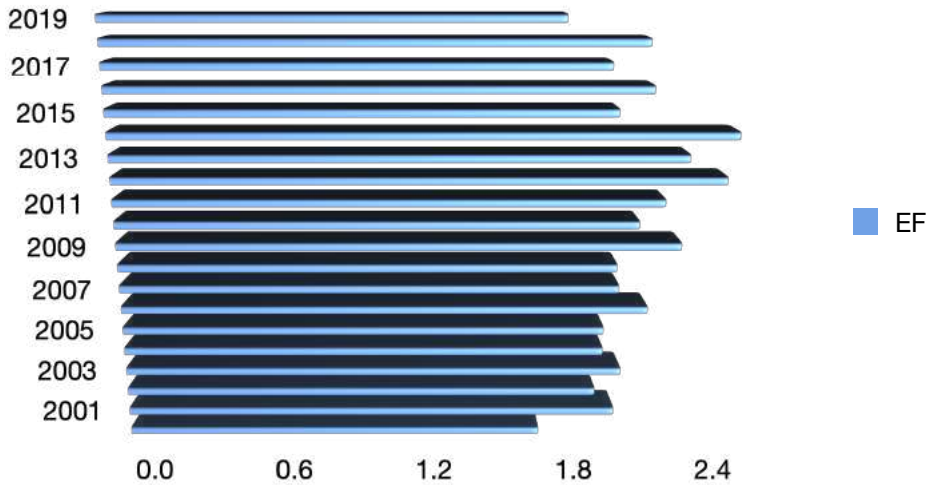


Figure 7 : Exceedance Factor of PM2.5 in Sahibganj (2000-2019)[9] (Source: CEED Analysis)

[9] Satellite Data

It is evident from Figure 7 that the pollution level crosses the critical level for PM2.5 in all the years. This indicates that proper attention is needed to curb the particulate matter. The Exceedance value for the PM2.5 in all consecutive years, i.e**.,** from 2000 to 2020, was within 1.6 to 2, which is a critical level. **In the last five years the exceedance factor remains between 1.5 - 2, in the year 2015, the value is 2.1, followed by 1.9 for the year 2016, 1.8 for 2017, 1.7 for the year 2018, and 1.6 for 2019** (see Table 1).

YEAR	EF	CATEGORY		YEAR	EF	CATEGORY
2000	1.6	Critical		2011	2.1	Critical
2001	1.9	Critical		2012	2.3	Critical
2002	1.8	Critical		2013	2.1	Critical
2003	1.9	Critical		2014	2.3	Critical
2004	1.9	Critical		2015	2.1	Critical
2005	1.9	Critical		2016	1.9	Critical
2006	2.0	Critical		2017	1.8	Critical
2007	1.9	Critical		2018	1.7	Critical
2008	1.9	Critical		2019	1.6	Critical
2009	2.1	Critical				
2010	2.0	Critical				

Table 1 : Exceedance Factor value for consecutive 20 years (Source:CEED analysis)

(E) Trend of PM10 Concentration in 2020

For measuring the PM10 concentration, few continuous air quality monitors have been installed in the district in January 2020. These are located inside or around the periphery of the mines. Air quality monitoring stations are installed at Mandhan Mines, M/S Maa Ambika Mines, Bhagwan Stones and Maa Ambika traders (old). The PM10 value recorded at these stations has also been used to understand the trend of pollution in relation to PM10 in Sahibganj. Although the data monitored is discrete, it is sufficient to represent the air quality observed in the district in the year 2020 (see Figure 8).

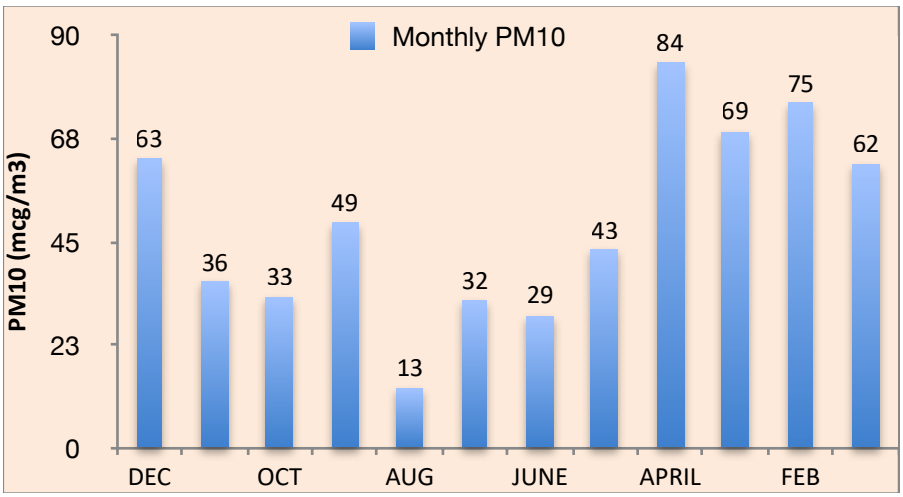


Figure 8 : Monthly mean concentration of PM10 in 2020[10] (Source: CEED Analysis)

The 24-hour concentrations of PM10 at all monitoring stations (2020) are recorded within the national standard (100 mcg/m3)[11]. The annual average concentration of PM10 is noted as 42 mcg / m3, which is below the national standard of 60 mcg/m3.

(F) Emission Inventory / Source Profiling of Air Pollution in Sahibganj

An Emission Inventory of air pollution in Sahibganj city and district indicates that major reason for the increase is attributed to the use of biomass (coal, cow dung, etc.) in domestic cooking, heating and lighting purposes, while open burning of waste is another major contributor to total PM10 emissions in the region. Figure 9 depicts the sectoral contribution of PM10 emission in Sahibganj city area and the district separately.

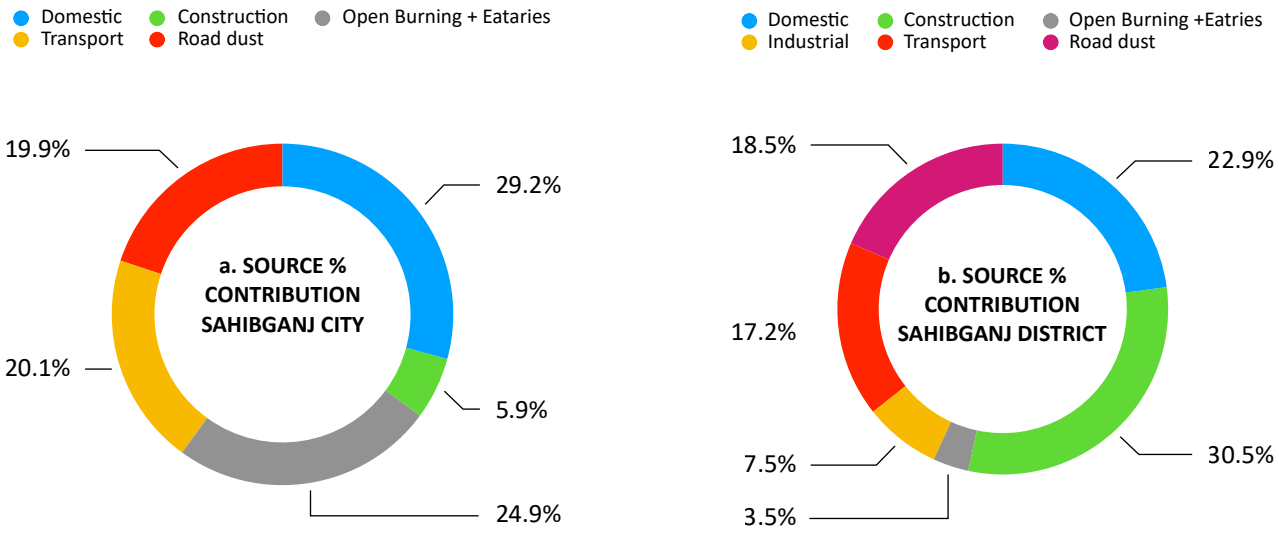


Figure 9 : Source Profile of Sahibganj (a. City & b. District)

[10] CAAQMS data provided by JSPCB

[11] http://cpcbenvis.nic.in/air_pollution_main.html#

The source profile of Sahibganj city indicates that domestic sector and open burning contributes 29.2% and 24.9%. Whereas transportation and road dust contributes 20.1% and 19.9% respectively and construction contributes 5.9%, followed by Eateries (1.4%). However the source classification at the district level shows a major contribution from the construction activities (30.5%) followed by domestic cooking (22.9%), and road dust which is contributing 18.5% to the total pollution load. Movement of vehicles and industries in the district contributes to 17.2% and 7.5% respectively.

Method: The Emission Inventory is based on the information gathered from primary and secondary sources. Primary research consisted of surveys on vehicular emissions and traffic assessment, and the data obtained through a set of questionnaire developed for key government departments and agencies regarding their respective contribution to the emissions. In addition to these, regular meetings and interactions with the concerned department representatives were also held to get required info and insights.

Also, Figure 10 presents spatial distribution of PM10 emission load for Sahibganj city.

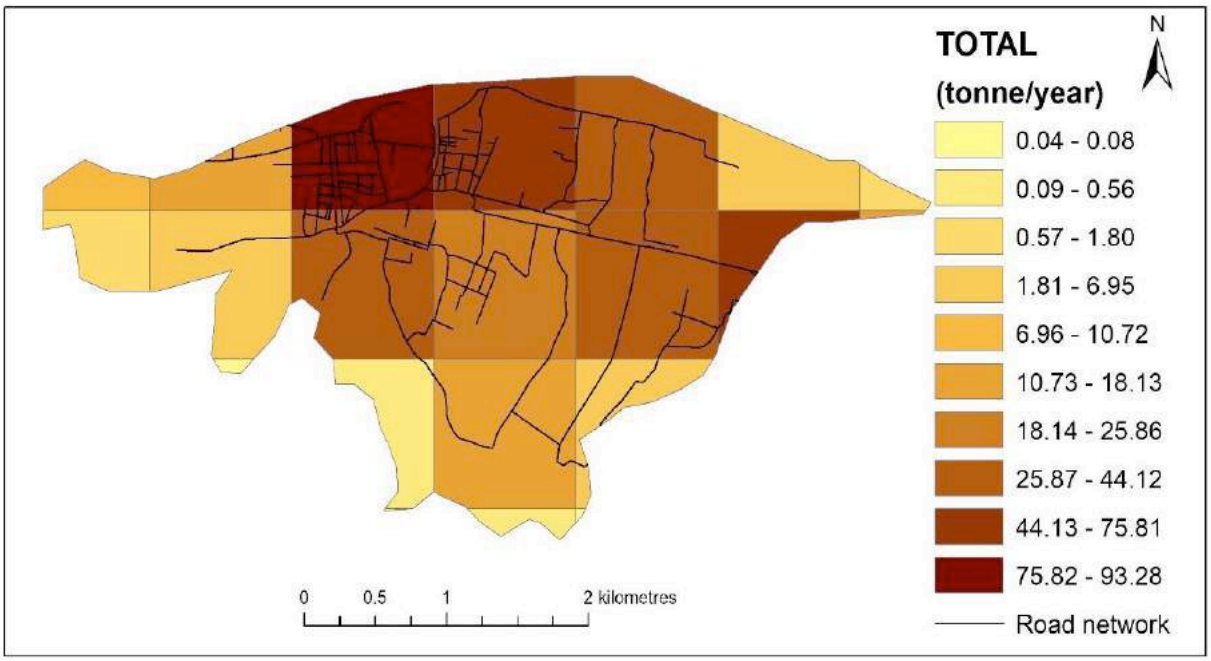


Figure 10: Spatial distribution of PM10 emission load for Sahibganj City

The problem of air pollution is significant in the mining area and activities such as stone mining and crushing that causes the emission of Suspended Particulate Matter (SPM). Many activities involving distinct physical operations, including quarrying (like drilling, blasting, loading, hauling) and plant process operations (such as crushing, screening, conveying and transfer operations) generate considerable emissions.

It is noteworthy that extensive stone mining and crusher operations are one of the most notable anthropogenic activities in terms of the quantity of fugitive dust and aerosol emissions in Sahibganj. The road dust is composed of dust from multiple sources, including wind transported mineral dust from mines and tailings as well as uncovered truck leakage and unpaved roads. Collectively, these are then distributed via wind and traffic activities, making them an important source of particulate matter in the region.

4. Estimation of Carrying Capacity for Sahibganj

The district does not have large industries, but it is famous for the stone, pottery, clay washing industry and mining as an important commercial activity. Mining and crusher industry is estimated to be providing direct employment to a large number of people engaged in activities like extraction, crushing and transportation of mined stones, etc.

In such a scenario, it is important to do an assessment of carrying capacity to understand how much pollution can be assimilated without violating the standards in the district leading to an appropriate environment management plan for sustainable mining/crushing in the district. The estimation of monthly assimilative capacity, total pollution load with respect to PM10 and supportive capacity has been computed to quantify the carrying capacity (i.e. upper limit of emissions a region can take without infringing permitted pollutant standards).

Method: The estimation process used by the National Green Tribunal (NGT) report for determining the district-wise carrying capacity in NCR districts of Haryana, Uttar Pradesh and Rajasthan with reference to the Order of Hon'ble NGT dated 17/ 03/ 2020 (in the matter of O.A. No. 1016 of 2019; Utkarsh Panwar Vs. CPCB &Ors) have been used here to compute the carrying capacity in Sahibganj.

The following components (see Table 2) were derived in order to assess the carrying capacity.

Table 2 : Assessment of Carrying Capacity

Estimation of total existing PM10

Total estimated load of particulate matter (PM10) during a particular month = Total Volume of Air during a particular month in Km^3 x Average PM10 Concentration of Ambient Air for a particular month in Kg/Km^3

Estimation of Assimilative Carrying Capacity

Assimilative Carrying Capacity = Total Volume of Air in a district during a particular month in Km^3 X NAAQS of Particulate Matter (PM10) (100)

Estimation of Supportive Capacity

Supportive Carrying Capacity = Assimilative Carrying Capacity - Total Estimated Load

- **Estimated Load of Particulate Matter:** The load of pollution in a given amount of air mainly released by anthropogenic emissions.
- **Assimilative Carrying Capacity:** It is defined as the maximum load of pollutants that can be

added without compromise of its resources and major impact[12].

- **Supportive Capacity:** The difference between the maximum allowable concentration for a given area and the present average concentration in that region is the supportive carrying capacity.

Method: The district wise carrying capacity has been evaluated using the monthly average PM10 concentrations. In order to calculate the carrying capacity, the mixing height parameters were taken from the global meteorological data processed by urban emissions. Sahibganj district does have a very efficient natural ventilation process because of its topography and other natural settings. The coefficient ventilation was favourable to disperse the pollutants because of hills and rivers.

The PM10 data and mixing height used for estimating the carrying capacity in Sahibganj is given below[13] in Table 3. The geographical area of the district is taken from the District Census Handbook, Census of India, 2011, which is 2063 sq Km.

Table 3 : Extrapolated monthly PM10 concentration and mixing height in Sahibganj

Month	PM10 (mcg/m3)	Mixing Height (KM)
Jan	73	0.2
Feb	44	0.3
March	35	0.5
April	30	0.6
May	30	0.6
June	18	0.7
July	15	0.5
August	14	0.4
Sep	15	0.4
Oct	30	0.3
Nov	55	0.2
Dec	56	0.2

The carrying capacity, as determined by using the method described above, is summarised in Table 4 below. In estimating the carrying capacity the PM value (100 mcg/m3) to keep the ambient air quality at 'Satisfactory' level has been used.

[12] Meteorologists calculate the assimilation capacity through the atmosphere using the atmospheric coefficient or through the pollution potential, but the study followed a process of estimating the assimilation capacity used by the NGT for NCR cities of UP, Rajasthan and Punjab.

[13] The mixing height for Sahibganj district is not available for the year 2019; hence the 2015 data was extrapolated to get the mixing height for 2019.

Table 4 : Total Estimated Load, Assimilative Capacity and Supportive Carrying Capacity in Sahibganj (Based on the PM value required to keep ambient air quality at 'Satisfactory Level')				
Month	**Total Estimated load (kg)**	**Assimilative Capacity (kg)**	**Supportive Capacity (kg)**	**% Supportive Capacity**
January	31503	42901	11398	26.57
February	30945	70937	39991	56.38
March	33725	96094	62369	64.90
April	38000	125929	87928	69.82
May	40143	133391	93249	69.91
June	25688	140162	114475	81.67
July	14981	101499	86518	85.24
August	12211	86576	74366	85.90
September	11825	80113	68288	85.24
October	18577	62584	44006	70.32
November	27453	49895	22442	44.98
December	25419	45253	19834	43.83

The analysis indicates that the carrying capacity (Positive Supportive Carrying Capacity) is available in the district and stone mining/crushing activities may be permitted however the number should be limited. **It is observed that although the carrying capacity is positive throughout the year, the available supportive capacity is different for each month.** The supportive carrying capacity is very

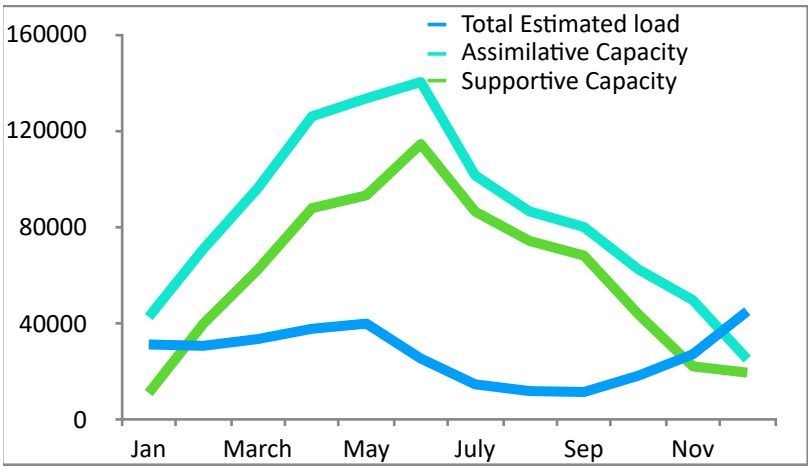


Figure 11 : Month wise Estimated Load, Assimilative Capacity and Supportive Capacity

low during months of November, December and January. It is moderate in February, March, April and May; while it is sufficient in the rest of the year e.g. July, August, September (See Figure 11).

(I) Based on the estimated supportive carrying capacity, it is indicated that the district has some capacity to accommodate few more activities, but there are some blocks, Mandro, Taljhari and Pathna, which have been identified as a local hot spot of pollution based on satellite mapping and

ground evidence. A detailed estimate has been presented here based on the current number of units prevalent in the blocks.

As it was mentioned previously, the atmospheric pollutants are strongly affected by the meteorological parameters, which are varied spatially due to the atmospheric conditions and topographical features. Specifically, convection or mechanical turbulence disperses the pollutants released at the surface vertically, within an hour or less, up to the upper level, which is defined by the mixing height. Thus, the pollutants are lifted during the daytime due to the convective activity and remain suspended.

Further analysis suggests that some months have comparatively higher carrying capacity, which is due to meteorological parameters where the mixing height plays a major role. This can be seen from the Figure 11 above. For simplification, **three categories have been prepared based on the estimated carrying capacity of Sahibganj. This is done with the intention of indicating the months where the environment has the maximum pollution assimilation capacity.** Capacity assessment will be useful in planning further activities in the district.

Value	Category
Less than 40000	Very low Carrying Capacity
40001- 80000	Moderate Carrying Capacity
80001-120000	Sufficient Carrying Capacity

The categories used here are presented in Figure 12 to identify months with low or higher carrying capacity:

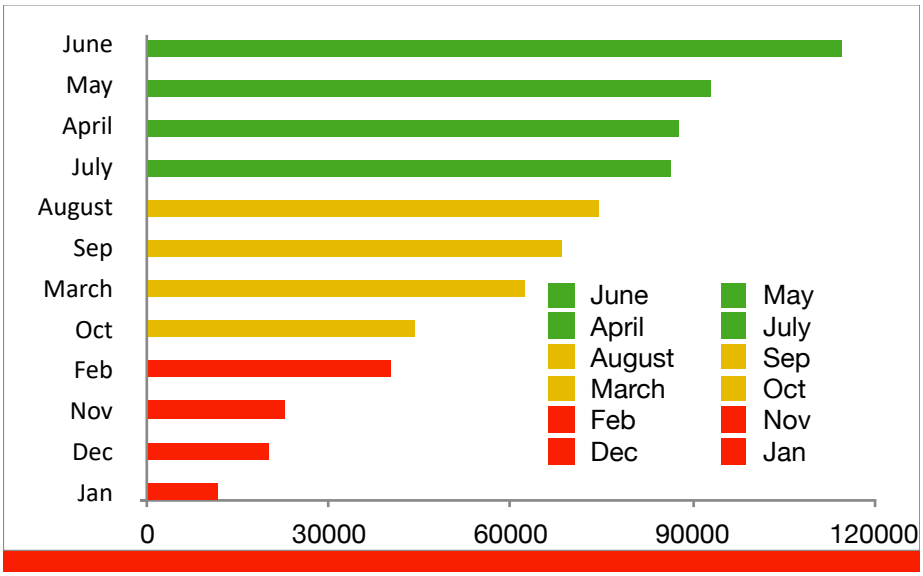


Figure 12 : Month wise distribution based on carrying capacity

(II) Based on the recommendations of the NGT Committee meeting held on 30 October, 2021, the carrying capacity of Sahibganj has been re-evaluated using the same steps described above. However, in the re-evaluation, the concentration value (60 mcg/m3) for keeping the ambient air quality at a 'Good' level as specified by CPCB has been used (see Table 5), while previously

'Satisfactory' level had been used (see Table 4). Figure 13 presents comparative carrying capacity assessment both at 'Satisfactory' and 'Good' level.

Table 5 : Total Estimated Load, Assimilative Capacity and Supportive Carrying Capacity in Sahibganj (Based on the PM value required to keep ambient air quality at 'Good' Level)

Months	Total Estimated load	Assimilative Capacity	Supportive Capacity
Jan	31503	25741	-5762
Feb	30945	42562	11617
March	33725	57657	23932
April	38000	75557	37557
May	40143	80035	39892
June	25688	84097	58409
July	14981	60899	45918
August	12211	51946	39735
Sep	11825	48068	36243
Oct	18577	37550	18973
Nov	27453	29937	2484
Dec	45253	27152	-18101

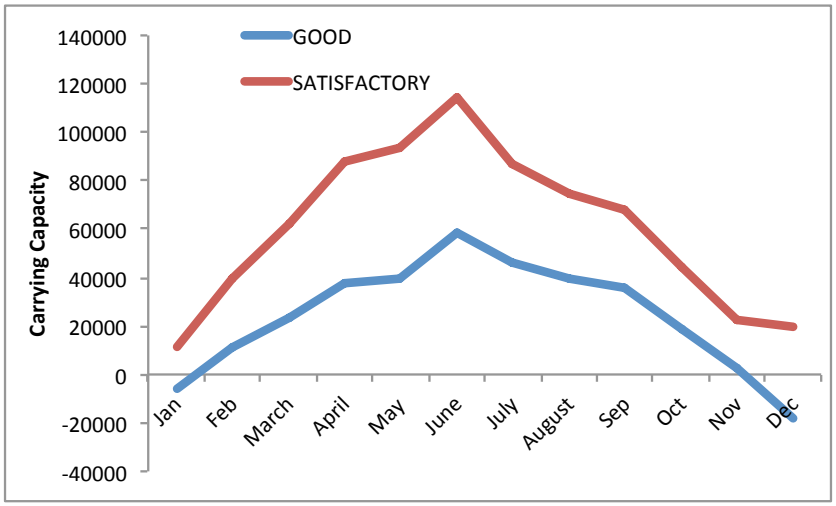


Figure 13 : Comparative Carrying Capacity for maintaining air quality at 'Good' & 'Satisfactory' level

Based on the carrying capacity analysis done at parameters of 'Satisfactory' (100 mcg/m3) and 'Good' (60 mcg/m3) level, a positive carrying capacity has been observed in Sahibganj. However, at the same time the carrying capacity assessment of Sahibganj also indicates towards effective control measures between November and January, when the carrying capacity slightly moves towards borderline.

(II)

Present Status of Stone Mines & Crusher Industry

5. Stone Mines and Crusher Industries in Sahibganj

Sahibganj district is divided into two subdivisions: Sahibganj subdivision and Rajmahal subdivision. It is further subdivided into nine community development blocks:

- Sahibganj subdivision : Sahibganj, Mandro, Borio, Barhait
- Rajmahal subdivision : Taljhari , Rajmahal, Udhwa, Pathna, Barharwa

The Figure 14 depicts an overview of distribution of Stone Mines and Crusher spread in various blocks.

Figure 14 : Distribution of Stone Mines & Crusher in blocks

(A) Industries with a valid CTO

As on 07.07.2021, **there are 177 stone crusher units, 101 stone mines, 12 units of combination of stone mines and crushers**, and 3 clay industry, 2 sand mining and 1 each of Bidi, sandstone and wood industry with a valid Consent To Operate (CTO)[14] from JSPCB in Sahibganj district (See Table 6).

Table 6: Units with a valid CTO

Type of industry	No. of units
Stone Crushers	177
Stone Mines	101
Stones mines and crushers	12
Clay industry	5
Bidi manufacturing	1
Sandstone	1
Wood	1

(B) Block wise distribution of Stone works

Stone works like stone mining and stone crusher are particularly more dominant in Mandro, Pathna and Taljhari blocks of the district (see Figure 15 and 16).

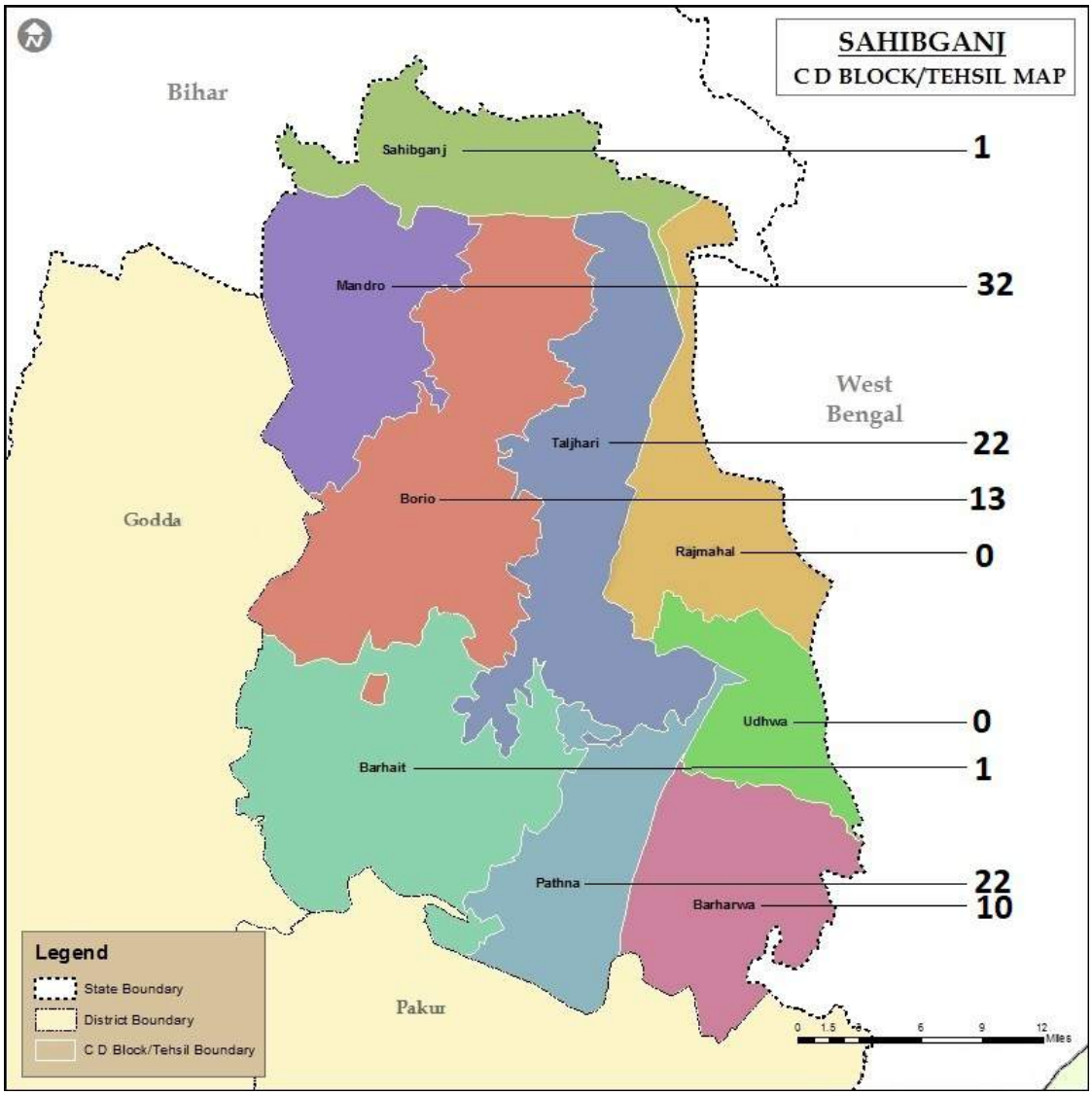


Figure 15 : Block wise distribution of Stone Mines with a valid CTO

[14] SPCB Admin Home (jhkocmms.nic.in) of JSPCB **(Retrieved on 07/07/2021)**

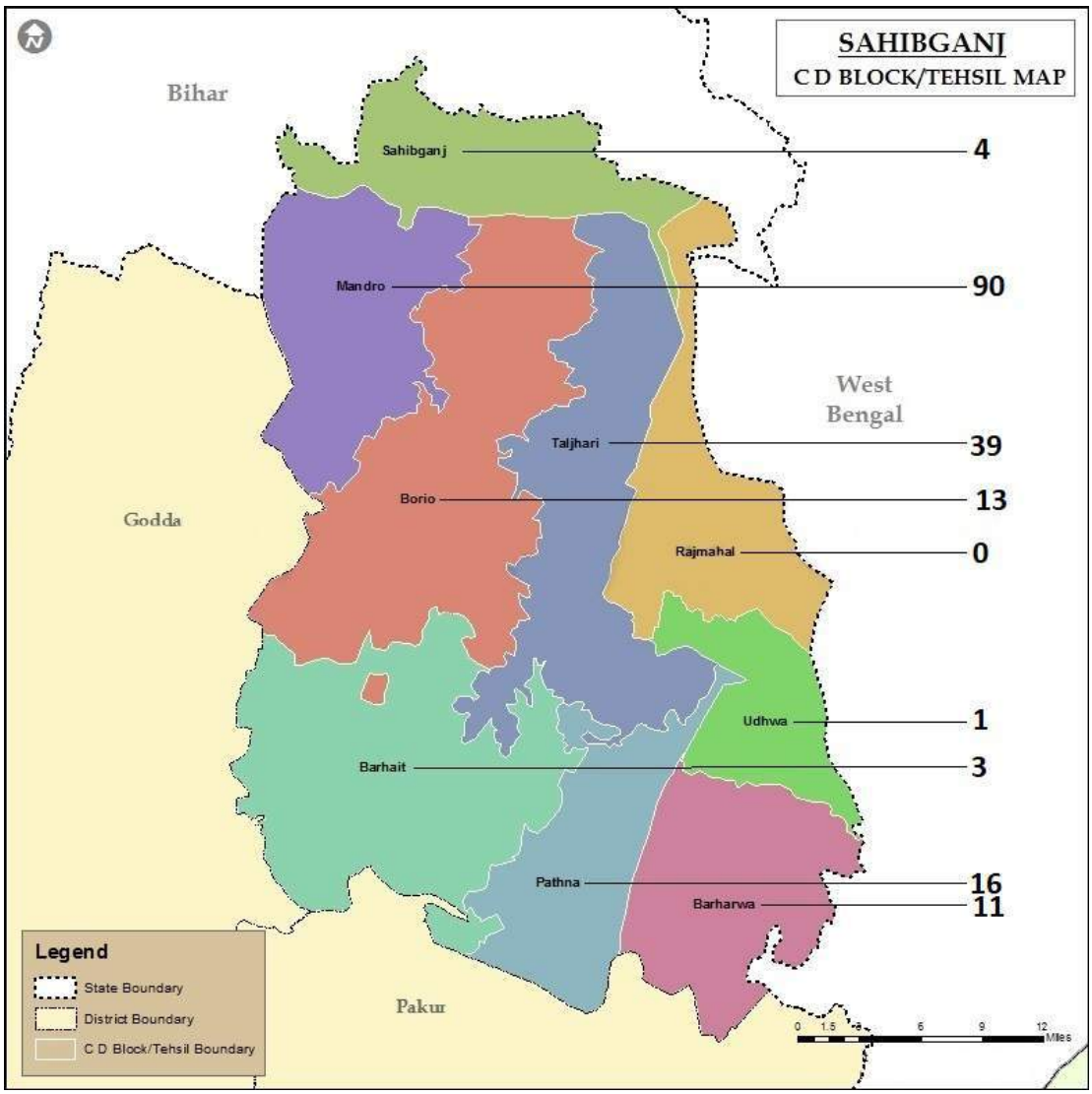


Figure 16 : Block wise distribution of Stone Crushers with a valid CTO

(C) Stone Mines

As on 07.07.2021, **424 mining leases had been granted by the Dept. of Mines and Geology (GoJ), out of which 120 mining leases were reportedly working while 304 were temporarily discontinued**.[15] Certain blocks like Mandro, Pathna and Taljhari are the stone mining belts of the district. The stone mines in these blocks are more compared to other parts of the district.

As on 07.07.2021, the total number of stone mines was 101 operating in various blocks with a valid CTO[16]

Table 7: Number of Stone Mines in various blocks

Block name	No. of mines
Mandro	32
Pathna	22
Taljhari	22
Borio	13
Barharwa	10
Barhait	1
Sahebganj	1

[15] https://portal.jharkhandminerals.gov.in/portal/MisReports/DMOWiseUserDetails.aspx?DID=20&SID=2&LID=1&MTYPE=2 . **Retrieved on 07/07/2021 from** Department of Mines & Geology, Government of Jharkhand (jharkhandminerals.gov.in)

[16] SPCB Admin Home (jhkocmms.nic.in) of JSPCB **(Retrieved on 07/07/2021)**

is summarised in Table 7.

(D) Stone Crushers

Similarly, the concentration of the stone crushers at certain blocks is observed to be greater than other parts of the district. Mandro in particular has the most number of stone crushers followed by Taljhari and others. **As on 07.07.2021, the total number of stone crushers was 177** operating in various blocks of Sahibganj with a valid CTO[17] as given in Table 8.

Table 8: Number of Stone Crushers in various blocks

Block name	No. of units
Mandro	90
Taljhari	39
Pathna	16
Borio	13
Barharwa	11
Sahebganj	4
Barhait	3
Udhwa	1

(E) Local Pollution Hotspots

While observing air quality and the presence of multiple stone quarry mines and crusher units, Pathna and Mandro seemed to be the most affected and have been identified as local pollution hot spots (see Table 9).

The District Survey Report has also identified that Pathna, Mandro and Taljhari blocks have maximum mineral reserves, making new units more likely to be established, resulting in further deterioration of air quality.

Table 9 : Major Clusters of Stone Mines/ Crusher Units

Mouza name	Block name	No. of mines and crushing units
Belbhadri	Mandro	16
Mundli	Mandro	18
Borna	Pathna	12
Nimgachi	Mandro	12
Jokmari	Mandro	11
Marikuti	Mandro	9
Pipaljori	Barharwa	9
Demba	Mandro	7
Gudwa	Taljhari	7
Ambadiha	Mandro	6
Choti Bhagiamari	Taljhari	6
Mahadeobaran	Mandro	6
Chota Lohanda	Borio	5

[17] SPCB Admin Home (jhkocmms.nic.in) of JSPCB **(Retrieved on 07/07/2021)**

6. Current Practices in Stone Mines and Crusher sector

In Sahibganj, stone crushers function as a small industry under unorganised sector, so they adopt varieties of measures for undertaking mining and crushing. As per the standards set by the Jharkhand State Pollution Control Board, they have tried to meet compliance norms. Stone mining and crusher industry involves a series of distinct operations, including quarrying (like drilling, blasting, loading, hauling) and plant process operations (such as crushing, screening, conveying and transfer operations).[18]

Current Practices in Sahibganj:

- Most of the stone crushers source the raw material generally from small hillocks, open-cast mines, river bed situated in the local region of Mandro and Pathna as they are the major clusters.
- Most of the crusher units are processing stone from quarries for producing different grades of stone and crushed sand (40mm, 20mm, 10mm, crushed sand, stone dust etc.) using crushing, screening and shaping activities.
- The modus operandi for mining of stones vary from manual excavations to automated blasting and mechanical excavations. The mined stones are transported to the crusher sites using a variety of vehicles such as trucks and dumpers. The drilling is done mostly manually or by mechanical means.
- Various types of crushers are used in the stone crushing industry such as Jaw Crushers, Roller Crushers, Cone Crushers, Impactor, Rotopactor etc.
- Under the process of Screening separation and sorting of the materials into groups of different products of various sizes are done. Often washing of the materials is done as part of screening.
- Various types of material handling technologies like feeder, conveyors and elevators are used in the local stone crushing industry for the purpose of moving the stones from one equipment to another.
- Stone chips with specific sizes are loaded onto trucks and dumpers as a final product and transported to outside markets.

[18] http://www.informaticsjournals.com/index.php/JEOH/article/view/2255

Figure 17 : A schematic of distinct operations with equipment and machineries

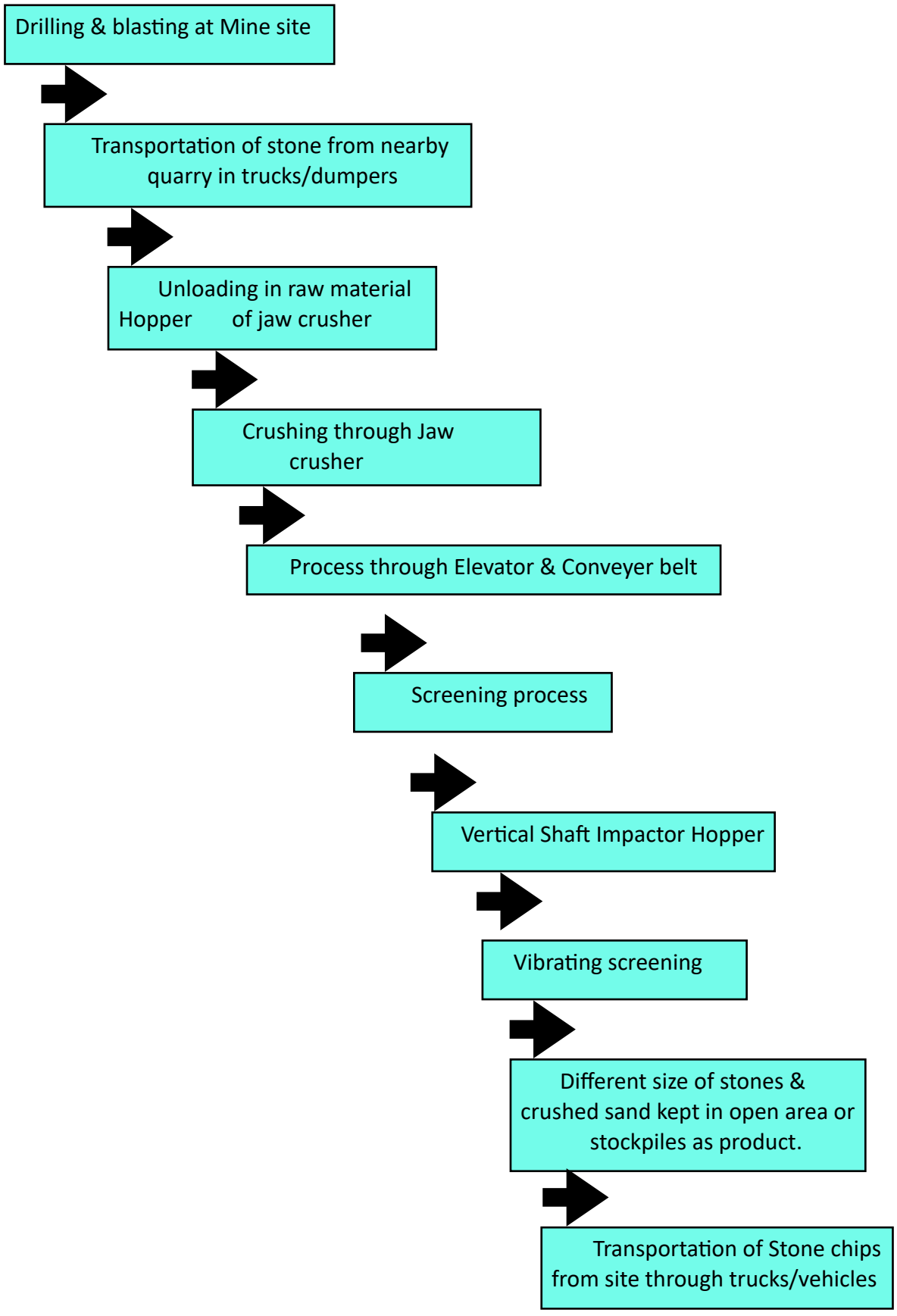


Figure 18: Representative Images of current practices from various Sites in Mandro, Taljhari & Pathna (Sahibganj)

Source : JSPCB

7. Causes of Emissions in Mining & Crusher Activities

All quarrying and stone processing operations including surface mining, crushing, screening, material handling and transfer operations are seen as potential sources of particulate emissions. These sources may be categorised as either process sources or fugitive dust sources (see Table 10).

Process sources include those sources for which emissions are amenable to capture and subsequent control. Fugitive dust sources generally involve the re-entrainment or settled dust by wind or machine movement.

Table 10 : Process and Fugitive based Emission Sources
(Source: *Source: Comprehensive Industry Document Stone Crusher report by CPCB)*

Activity	Process Sources	Fugitive Dust Sources
Mining	Drilling	Blasting, Loading and Hauling
Transportation	—	Haul Roads
Crushing	Crushing	Stockpiles
	Screening	Conveying
	Conveyer to Transfer Points	

It should be noted that factors affecting emissions from either source include the type, quantity and the moisture content of the rock processed, variety of equipment and operating practices employed as well as topographical and climatic conditions of the region.

Causes of Emission sources

- All quarrying and stone processing operations are potential sources of particulate emissions.
- Fugitive Emissions are generated during various mining activities such as drilling, blasting, excavation, breaking and loading etc.
- During crushing operation, generation of particulate emissions is inherent and the emissions are most apparent at crusher feed and discharge points. Dust is emitted from screening operations as a result of the agitation of dry stone.
- The re-suspension of road dust carries a large part of the burden in PM concentration and most of the dust comes from mining and crushing activities.
- During transportation of mined stones by heavy vehicles like trailers, trucks, dumpers, fugitive dust emission occurs due to movement of heavy vehicles on Kachcha or unpaved roads.
- Uncovered mined material transportation, lack of water spraying system and movement of heavy vehicles have brought an addition to air pollution to the locality.

- Since various handling devices like feeders, belt conveyors, bucket elevators and screw conveyors are used to transport crushed materials from one point to another. Particulate matter may be emitted from any of the material handling operations.

- Dust that settles within the plant gets air borne again due to vehicular movement or by wind and acts as a secondary emission source. Dust emissions affect the climate, damage the material, human health and vegetation.

- Sporadically located hot-mix plants and ready-mix concrete plants and blasting are also recognisable sources of air pollution.

- Abandoned or temporary crusher units with make-shift arrangements with unattended heaps of dust and stone metal material can also increase air pollution.

Best Practices &
The Way Forward

8. Best Practices for Effective Management of Emissions

Considering the rise of fugitive emission and dust in stone processing operations, there is an urgent need to adopt and replicate proven control methods and techniques. To solve the fugitive emissions and dust problem, there could be two alternatives:

(1) Installing of dust control system and reduce emissions to acceptable level

(2) Shift the crushers to a new site away from human settlements

The first option (controlling dust emissions) has been seen by many as a more practical and acceptable option. As the experiences of some countries and Indian states suggest that shifting of existing crushers, especially small ones, may not be a techno-economically feasible option. It is possible to achieve dust free operations of crusher units by adopting proper dust suppression system and this option may be insisted upon which if denied or not satisfactorily implemented, then shifting option can be implemented.

Shifting of crushers without arranging infrastructure facilities may eventually lead to closure of the unit as owners require high investment cost and financial constraints to arrange adequate land, water and mines, build approach roads for transportation and logistic arrangements, procure electricity supply, and establish closeness to market, etc.

(A) Best Practices from USA and Canada

(i) Minimising Dust, Noise and Vibrations[19]

Reducing noise and vibrations of quarry equipment and detonation practices can cause public disturbance through noise pollution and geologic vibration. To maintain positive relations with the neighbouring public, some steps have been taken.

- Replace blasting with the use of wire saws, belt saws, and expanding mortar where possible.
- When blasting is necessary, use the minimum amount of explosive material coupled with micro-sequential detonation to reduce vibrations under existing rules and regulations.
- Detonate explosives only during times of the day designated by the local authority

(ii) Dust Control

- All saws and drilling machines must have adequate dust catchment or air filtration systems, particularly when the machines are situated in a confined or enclosed area where air flow is limited.
- Water mists are used conservatively to remove airborne particulates.
- Cover with a tarp truck hauling loose material.

[19] https://naturalstonecouncil.org/wp-content/uploads/2018/10/Quarry-Site-Best-Practices-NSC.pdf

- Establishment a haul road dust control plan depending on the local conditions of the site and proximity to public roadways
- Retain as much native vegetation as possible throughout the quarry's operation. Root structures help maintain soil stability, while tall vegetation—particularly trees— can act as a filter.
- Keep disturbed areas as small as possible, and ensure vehicles keep to the designated paths.
- Research local wildlife populations to understand any issues with threatened or endangered species in the region.
- Upon closure, the quarry sites are cleared of any materials that would not naturally be found in the area. Ensure that all trash and recycling is removed as well as any machine parts and packaging material.

(B Proven Technological Solutions in various parts of the World[20]:

Over the years three types of technological design have been evolved around the globe for different kinds & natures of stone crushers.

(1) Wet type system : The wet type dust suppression system consists of introducing moisture into the material flow by spraying water at key dust generating locations so as to restrain fine particulate matter from becoming airborne. The objective of wet dust suppression is not to fog an emission source with a fine mist to capture and remove particulates emitted, but rather to prevent their emission by keeping the material moist at all process stages.

(2) Dry type systems : The dry type dust control system comprises of adequate Enclosure of key locations with hooding arrangement for extraction of the dust, and arrangement Settling Chamber to collect the coarser portion of the dust, and a Bag-filter house to capture the finer portion of the emission if not captured by Settling Chamber, etc.

(3) A combination of Wet and Dry Type System : In the combination system the dust is suppressed at some point with water sprays and from some points the dust is extracted with the help of an induced draft fan, which can be captured in dry type or wet spray chamber type control equipment. Such combination control systems are commonly used in stone crushers in developed countries like the USA and Canada.

(C) Necessity of implementing robust measures suggested by CPCB[21]

The Central Pollution Control Board (CPCB) has specified certain control measures during each operation activities to minimise the emissions which is indicated in Table 11.

---

[20] http://cpcbenvis.nic.in/scanned%20reports/COMP_IND_STONE_CRUSHER_REPORT.pdf

[21] https://www.mpcb.gov.in/sites/default/files/focus-area-reports-documents/joint_report_stone_crusher_28122016.pdf

Some important measures as best practices, which are effective in emission management at the

Table 11 : Control Measure as per the Sources of Emissions
(Source: Comprehensive Industry Document Stone Crusher report by CPCB)

Operation or Source	Control Measures
(A) Mining Operations	Liquid injection (water/water plus a wetting agent) Capturing and venting emission to a control device
Drilling	No Control
Loading	Wetting by Water
Hauling	Wetting by Water, Treatment with surface agents, soil stabilisations, paving, traffic control
(B) Plant Operations	
Crushing	Wet dust suppression system, Capturing and venting emission to a control device
Screening	Same as above
Conveying	Same as above
(C) Fugitive Dust Sources	
Stokcpiling	Stone Ladders, Stacker conveyer, Water sprays at conveyer discharge
Conveying	Covering, Wet dust suppression system
Windblown dust from stockpiles	Water wetting, Treatment with surface agents, covering, windbreaks
Windblown dust from roads	Oiling, Treatment with surface agents, soil stabilisations, paving, sweeping

sites are mentioned below:

- **Dust Containment cum Suppression for the equipment**

Dust suppression techniques are the most commonly used. They are designed to prevent particulate matter from becoming airborne and are applicable to both process and fugitive dust sources. All the crushing equipment should be properly enclosed within enclosures with proper approach ladders. The wet control system requires proper enclosure of machinery and scientific design of water jetting or sprinkling system as suggested in stone crusher guidelines of CPCB.

- **Construction of Wind Breaking Walls**

Some states pollution control boards have made provision to ensure that height of the walls should be at least half the height of discharge point of belt conveyors to the stockpiles with a chute system for all conveyor belt nodes of discharge to contain the fugitive emission followed by

localised water sprinkling arrangement. The height of the stockpile should always be kept lower than the height of the wind breaking wall. The walls can be erected radially with a screen as center point.


A representative visuals of some good practices adopted in crusher units in Sahibganj (Source: JSPCB)

- **Construction of the Metalled roads within the premises**

Internal pucca or metalled roads are required for the movement of trucks and vehicles with regular road cleaning & wetting mechanism to control suspension/resuspension of the dust particles in the air.

- **Regular cleaning and wetting of the ground within the premises**

Regular cleaning of the site and machines with a good network of fogging & sprinkling systems based on hydraulic pressure and water consumption measuring arrangement can do work effectively.


A representative visuals of some good practices adopted in crusher units in Sahibganj (Source: JSPCB)

- **Green Belt along the periphery**

As various states have done, a minimum of two row plantation at the spacing of 5 meters is required to ensure green belt to serve as the nearest sink for dust emissions. The unit should maintain the record of plantations such as number of trees planted, date when planted, type of trees and rate of their growth annually. Plant species suitable for removal of particulate matter and gaseous pollutants differ in their morphological characteristics, sizes and shapes of crowns periodic phenomena like leaf-shedding, also contribute to plant efficiency for pollution abatement.

- **Covered Guard Wall and equipment with metal sheets**

The vibratory screen should be compulsorily enclosed from the screen supporting platform level up to top of the screen. The enclosure should be provided either with a maintenance walkway around or without walkways with a compact enclosure of the size of the screen only. As a part of dry type control measures, the sufficient capacity of extraction and pressure drop across the system would be required to be provided by installing an induced draft fan of sufficient capacity.

A representative visuals of some good practices adopted in crusher units in Sahibganj (Source: JSPCB)

9. Lessons from other States on Control Measures

Various states have grappled with regulating and controlling the stone mines and crusher activities and taking cognisance of the public issues, media reports, research findings and judicial interventions, they have taken various measures to control the pollution emissions and set guidelines for siting and sifting activities for ensuring a cleaner environment. In the recent past, how some states have attempted to deal with these issues have been elaborated here.

(A) Experiences of Some States on Regulating and Controlling Crusher units[22]

Punjab

Taking considerations of rising pollution level and other concerns, various notices for shifting of stone crushers located in the vicinity of state or national highways were issued. In the areas where shifting was physically not possible due to undulated terrain, the crusher units gave representation to the regulatory authorities mentioning their willingness to install necessary dust control systems in all units in the cluster to reduce dust emission. Subsequently, all the units implemented measures such as enclosures, gravity type water sprinkling arrangement, construction of metalled roads within premises, dust hopper and more prominently development of green belt.

Result:

The green belt developed by many stone crushers in Punjab has by now grown to heights above the belt conveyor discharge points and mostly leafy trees covering the site are visible. Subsequent to the successful implementation of above measures, the regulatory authorities have considered their continuing operation at the same place subject to substantial reduction in dust emissions by all the units in the cluster.

Haryana

Haryana State Pollution Control Board has adopted the strategy of relocating stone crusher units in a planned/organised zone, each has been given about an acre land and 40 to 50 units located in a single zone. The basic infrastructure and land development has been carried out by the state government. This attempt has been made to eliminate scattered stone crusher units in the state.

Result:

Most units have installed dust suppression systems comprising water tank, pump, GI pipelines and many nozzles spraying at many locations, but the dust control is hardly satisfactory. This could be primarily due to some faults in the designing of spray systems such as improper layouts,

[22] *Comprehensive Industry Document Stone Crusher report by CPCB*

inadequate knowledge, inadequate water pressure, absence of water filter leading to choking of nozzles etc. Thus, locally it has a mixed response to contain pollutants.

Odisha

Notices have been issued to the crushers located in the vicinity of state/national highways (within 100 meters.) for shifting or closure. However, the notices have not been generally sent for having ineffective dust control systems but against the siting criteria of vicinity to roads.

Result:

Considering the successes achieved in states like Gujarat in terms of substantial reduction in dust emission levels from stone crushers by adopting cleaner production schemes, many states are considering representations from stone crushers against shifting subject to adoption of cleaner production schemes by these units.

Tamil Nadu

The state pollution control board has given social focus to stone crushers nearer to major city and airport areas in light of public complaints. It issues several guidelines and measures to be adopted by the stone mine and crusher owners.

Result:

The authorities are facing difficulties in implementing the relocation orders for existing crushers who claim that when the crushers came up there, hardly was any population surrounding it which has grown only afterwards. This situation indicates a complex issue for relocations and shifting with minimal problems.

Himachal Pradesh

In the hilly states like Himachal Pradesh there is hardly any citing criteria applied for locating stone crushers. The stone crushers are widely found alongside the river and at times located in the vacant space between major river and national/state highways.

Result:

As regards to pollution control measures, hardly any crusher has a dust separation arrangement installed. This aspect of non availability of plain land in hilly areas is being considered while fixing siting criteria.

(B) Key Controlling Measures taken by Some State Pollution Control Boards

Andhra Pradesh

- All the products of various sizes are prominently stored in fully enclosed elevated hoppers made of steel and the material is directly loaded from the hoppers into the trucks. This arrangement eliminates secondary dust emissions from open stock piles which generally is quite predominant in most states.
- Some units have additional arrangements such as Water Sprinklers around the plant, along with a pump and G.I. Pipeline network in and around the plant.
- Some stone crushers have installed water sprinklers all around the plant premises which spray water at a height of about 5-7 meters in 360 degrees periodically. The sprinklers wet the floor area as well as the stock piles and hauling roads and therefore help minimise only the secondary fugitive dust emissions but are ineffective in suppressing/controlling primary process dust emissions which are airborne.

Karnataka

The State Pollution Control Board is implementing certain recommendations[23]

- Total ban on blasting within 500 m from public habitations, structures such as bridges, Railway lines, tanks and canals.
- Renewal of lease should not be considered till the rehabilitation has taken place.
- To prevent selective mining causing environmental laws, royalty should be linked to the area of the lease. Larger areas should attract higher royalties.
- Out of the royalty collected by the Department of Mining & Geology, 50% should be retained by the department for reclaiming an ecological restoration of closed mines.
- The minimum distance between quarries and human habitations must be increased to 500 meters.[24]

Haryana

Haryana State Pollution Control Board has set standard for suspended particulate matter[25] Dust containment cum suppression system for the equipment

- Construction of wind breaking walls

[23] http://parisara.kar.nic.in/PDF/Mining.pdf

[24] https://india.mongabay.com/2020/11/quarrying-in-kerala-needs-more-monitoring-indicates-environmental-panel/

[25] https://hspcb.gov.in/content/emission/EStoneCrushingUnit.pdf

- Construction of the metalled roads within the premises
- Regular cleaning and wetting of the ground within the premises
- Growing of a green belt along the periphery
- The suspended particulate matter measured between 3 to 10 metres from any process equipment of a stone crushing unit shall not exceed 600 µg/m3

Maharashtra

Certain guidelines for Installation and operations of stone rushing units have been issued:

- Each stone crusher unit should install adequate pollution control measures including erection of G.I./ M.S. sheet cover and the sprinklers before commencement of operations.
- Crusher should be covered and a water sprinkling system shall be provided on the crusher to suppress the dust generated due to material handling/loading/unloading activity.
- Screen classifiers should be adequately covered by G.I./ M.S. sheet to prevent the emission into the atmosphere due to screening/grading activity.
- All conveyor belts should be adequately covered by G.I./ M.S. sheet only.
- Regular wetting of roads should be carried out to suppress the ground level dust within the premises to control the air borne dust emission due to wind velocity.
- All approach roads and ramps should be metalled.
- Curtain or wall should be provided for surrounding the stone crusher unit.
- Display board should be provided at the entrance of the stone crusher indicating survey no, name and address of own and the unit.

Table 12 : Criteria Specified for Siting/Shifting of Stone Crushers

Punjab

1. All Stone Crusher units shall install pollution control measures which will include construction of sheds and installation of sprinklers.
2. All stone crusher units shall comply with restrictions and provisions of the department of Town & Country Planning of the State Government
3. That no stone crusher unit shall be allowed to operate within the limits of
   a) 1.5 KM of the National Highway
   b) 1 KM of State Highway
   c) 300M of link road
   d) 5 KM of the boundary of metropolitan cities
   e) 3 KM of district head quarters
   f) 1.5 KM from the town population, other district headquarters, approved residential colonies and any existing tourist complexes.
   g) 1 KM of village population or any land recorded as forest in Government Records or any areas which come under the controlled area
4. Each stone crusher shall be located in the minimum area of one acre which should be owned by the stone crusher unit and should not be owned on lease from panchayats
5. Each stone crusher unit shall install suitable pollution control measures to satisfaction of State Pollution Control Board

(*Source: Comprehensive Industry Document Stone Crusher report by CPCB)*

Madhya Pradesh:

1. Distance between the crusher boundaries and the boundary of the National/State Highways shall be as specified below in case of new installations:

Cluster/Crusher	Distance from Highways	Green Belt at the periphery
Single User	100 Mtrs	05 Mtrs
10 Crusher	150 Mtrs	10 Mtrs
25 Crusher	250 Mtrs	30 Mtrs
50 Crusher	300 Mtrs	50 Mtrs

2. In respect of residential area, No Stone crushing industries are to be allowed to operate within 500 Mtrs
3. The Stone crusher shall obtain NOC from Local Body or Gram Sabha in a prescribed form.

(Source: http://www.mppcb.nic.in/proc/Guideline%20for%20stone%20crushers.pdf)

Maharashtra

1. Minimum distance shall be required from the nearest National Highway : 1.0 Km.
2. Minimum distance shall be required from the nearest State Highway: 500 meters and of major District roads and other roads: 200 meters.
3. Minimum distance shall require from human Habitation: 500 meters.
4. Sensitive areas such as Educational Institutions / Hospitals: 500 meters.
5. Place of historical monuments identified by Archaeological Survey Of India :500 meters.
6. Stone crushers should comply with other locational statutory requirements in force

(Source: https://www.mpcb.gov.in/sites/default/files/whats_new/2020-03/circular05032020.pdf)

10. Key Recommendations & The Conclusion

In order to reduce pollution related emissions, the CPCB has already evolved emission standards and guidelines in 1989 in light of the Environment (Protection) Act, 1986. Further, to strengthen the compliance monitoring and also to ensure that industries and facilities comply with emission standards, in June 2015 installation of OCEMS in 17 categories of highly polluting industries was mandated. Although some immediate interventions, such as strict implementation of localised action plans for pollution hotspots and strict vigilance of violations and non-compliance activities are being implemented, more robust steps are required for cleaning the local environment in Sahibganj.

In order to present scientifically proven practices and solutions, CEED conducted primary and secondary research methods composed of field based data collection, literature review and formal field level interactions with key stakeholders in Sahibganj including officials at JSPCB, Ranchi and its regional office, Dumka and stone mines & crusher unit owners and others. The data available in public domains such as Air Quality Index and relevant satellite data of CPCB and JSPCB, India Meteorological Department, IIT-Delhi, and other notable institutions (CSTEP and Urban Emission) have been analysed and used.

Based on this meticulous study, the key recommendations are presented below :

(B) Strengthen Local Governance and Compliance Mechanism

- JSPCB should take an immediate step in setting up a field office in Sahibganj which will play a major role in managing and regulating mines and crushers effectively. In addition to this, there should be a responsive and result oriented mechanism in place like creation of a District and Block level task force with support from the local panchayats to monitor, supervise and inspect the compliance and control measures strictly.
- It is highly recommended that JSPCB must demonstrate a model solution of “environmentally sound management of mining and crushing activities” on a site. JSPCB, may create a possible window of defined and mutually agreed timeframe for the stone crushers units to adopt such solutions. Once the window of shifting to environmentally sound solutions is over, JSPCB may consider the cancellation of the license.
- Since it is difficult to define or cap the number of stone crushers units that can operate in certain geography, therefore it is recommended that JSPCB must implement the pollution control measures with the existing units before considering any new CTO. It is also recommended that while permitting a new CTO, JSPCB should consider a new cluster of stone crusher units complying with all the norms that also create a precedent for existing industry to follow and implement.
- There should be a proper re-survey and appraisal to ascertain if stone crushers are adequately following the control measures and guidelines led by CPCB and JSPCB or not, and if non-compliance is still found there then licenses of such violators must be cancelled.

- In order to have continuous monitoring of air quality, all existing units must be mandated to install an Air Quality Sensor, PM10 Analyser and relevant monitoring device in their premises. At least 6-10 Air Quality Monitoring devices should be installed in various blocks of Sahibganj.
- In order to have regular information on pollution level JSPCB should develop an online dashboard and a app to properly observe and disseminate the levels of pollution in real time manner which will ultimately help JSPCB take firm decision on closing certain units/cluster for some days or months as per the gravity of the situation.
- There has to be a new policy to allow a certain percentage of dust generated from the mines and crusher activities to be used as a sand in the building and construction material which will resolve its proper disposal and will also prevent it not merging with the water of Ganges since siltation is major concern in the adjoining region.
- JSPCB must facilitate a baseline survey to assess the health condition of people impacted by the stone crushing and mining in the region. Accordingly, regular health advisories should be issued for the community and corrective measures should be taken.

(B) Enforcement of Best Practices for Controlling Air, Water & Noise Pollution

- **Dust Suppression Management :** All units must have dust suppression and wetting arrangements for certain hours in a day through fixed sprinklers at the transfer point and movable sprinklers, fogger line, etc. During loading and unloading of raw materials, water sprinklers should be used. Mobile tankers need to be used to sprinkle water on haul roads and concrete pavement. Wet drilling shall be carried out to contain the dust particles. Controlled blasting techniques shall be adopted.

- **Enclosure around sites and equipment:** It is suggested that the wind breaking wall should be higher than the free fall height of finished good discharge from the conveyor belts if adequate arrangement of chute is not in place for discharging the material at lower height from the conveyor. The screening of crushed materials should be closed with MS or GI Sheet and a fan connected with a motor to extract the dust generated. Dust should be vented into a chamber wherein a water sprinkler should be used.

- **Proper Cover Management:** All the conveyor belts should be covered from nod to nod points adequately without side gaps in enclosure and belts. Strong structural base and framing should be provided for wind breaking walls to withstand strong wind conditions. All the conveyor belts should be covered from nod to nod points adequately without side gaps in enclosure and belts.

- **Regular Cleaning of equipment and machines:** Regular cleaning of water spray nozzles should be carried out to avoid choking. Similarly fine dust accumulated in the crushing area should be periodically cleaned. All the dumps and transportation should be covered with tarpaulin to arrest the erosion by wind. The cleaning mechanism of the internal road should be such that the black top or concrete top of the road should be recognisable.

- **Pucca Roads around Mines /Crusher sites:** All the units should have internal pucca/paved/ concrete roads for all the stretches in the premises where regular internal movement of the vehicles are done. Outside the mine or crusher site, the approach road should be properly developed and regularly sprayed with water.

- **Green Belt Development:** Comprehensive greenbelt around overburden dumps and periphery of the mining projects/clusters should be carried out to reduce fugitive dust transmission from the project area. With due consideration of a scientific approach with respect to selection of species, spacing, location, direction and numbers are very important for green belt development. The green belt of 5 meters should be developed by crushing units with an adequate number of tree rows on the periphery.

- **Tarpaulin Covered Transportations** : All the trucks & dumpers carrying the crushed stones, sands and other building material from the area should have proper cover so that fugitive dust from loaded material can be entrapped at source itself. The measures like end-to-end road pavement, plantations along road sides, strict compliance of existing policies and the introduction of mechanical sweepers can help to reduce suspended road dust particles.

- **Ensure Safety of Workers:** All the workers should be provided with adequate personal protective equipment (PPEs) while on the job. All workers at the site should be provided with a nose mask, face shields and gloves along with earplugs for their safety.

- **Containing Water and Soil pollution:** Construction of planned drains and settling tanks to divert surface run–off of the mining area to the natural drainage in a sustainable manner. Construction of checks dams/gully plugs at strategic places is important to arrest silt wash off from broken up areas. Periodic analysis of mine pit water and ground water quality must be undertaken. The mined out pits should be converted into the water reservoir at the end of mine life. This will help in recharging the groundwater table by acting as a water harvesting structure.

- **Controlling Noise Pollution:** Periodic maintenance of machineries and equipment shall be ensured to keep the noise generated within acceptable limits. Provision of earplugs to workers exposed to high noise generating activities like blasting, excavation sites etc should be there. Periodic noise monitoring at locations within the mining area and nearby habitations should be done to assess efficacy of adopted control measures.

(C) Capacity Development, Awareness and Localised Support

- **Capacity building & awareness for crusher owners, their associations and transporters:** A series of awareness programmes and capacity building measures on best practices, and demonstration of proven technology on safe and sustainable mining activities for all CTO granted units and their associations must be in place. Another set of awareness should be developed for transporters and drivers for ensuring safe and covered transpositions.

- **Required Support from the Local Administration:** Considering building roads around prominent clusters is beyond the capacity and purview of local crusher owners, concerned local

government authorities should be roped in to make necessary arrangements of proper road development in such areas to minimise the release of dust emissions. The regular cleaning and wetting of roads is an important measure to improve the air quality locally.

- **Role of Gram Sabha and Panchayat bodies:** Since many mining regions fall under the fifth schedule of Santhal Pargana, so the Gram Sabha as a lowest administrative unit at village level has much to say on allowing such activities as per the existing law and regulations. They can play an important role in addressing local concerns related to mining and crushing activities.
- **Green Coverage around clusters:** Afforestation and dense poly culture plantation and canopy development using local floral species in the mining areas should be widely promoted through various means such as social and community forestry. This can be a part of Corporate Social Responsibility for big miners and crusher owners.
- **Restoration strategies and reclamation of land from abandoned and closed mines:** There should be specific measures to reclaim the land of closed and abandoned mines as they cannot be left idle. A proper plan to regain the greenery and vegetation should be in place to manage land degradation and land deformation.

References

- https://sahibganj.nic.in/profile/
- http://dcmsme.gov.in/old/dips/Sahibganj.pdf
- Comprehensive Industry Document Series: COINDS/78/2007-08 (http://cpcbenvis.nic.in/)
- Comprehensive Industry Document Stone Crusher Report by CPCB
- Air Pollutant Control Techniques for Crushed and Broken Stone Industry by USEPA
- Technical guidance for Control of Industrial Process Fugitive Particulate Emissions: EPA-450/3-77-010
- The Environment Protection Act 1986, No 29 of 1986
- Mines and Minerals (development and Regulation)Act-1957
- Guidelines for Environmentally sound Operations for Stone Quarries, MPCB
- http://cpcbenvis.nic.in/air_pollution_main.html#
- http://cpcbenvis.nic.in/scanned%20reports/COMP_IND_STONE_CRUSHER_REPORT.pdf
- http://www.mppcb.nic.in/proc/Guideline%20for%20stone%20crushers.pdf
- https://www.mpcb.gov.in/sites/default/files/whats_new/2020-03/circular05032020.pdf
- https://hspcb.gov.in/content/emission/EStoneCrushingUnit.pdf
- https://portal.jharkhandminerals.gov.in/portal/MisReports/DMOWiseUserDetails.aspx?DID=20&SID=2&LID=1&MTYPE=2 .
- Department of Mines & Geology, Government of Jharkhand (jharkhandminerals.gov.in)
- SPCB Admin Home (jhkocmms.nic.in) of JSPCB
- http://www.informaticsjournals.com/index.php/JEOH/article/view/2255
- https://www.tandfonline.com/doi/abs/10.1080/10962247.2019.1668498?journalCode=uawm20
- http://cimss.ssec.wisc.edu/goes/OCLOFactSheetPDFs/ABIQuickGuide_BaselineAerosolOpticalDepth.pdf
- http://www.nird.org.in/brgf/doc/brgf_BackgroundNote.pdf

Annexure

(I) Questionnaire / Data Required for Preparing Emission Inventory

Transport Department, Govt. of Jharkhand

1) Number of vehicles in the city

   a) No. of Buses:

   b) No. of Auto Rickshaw (2 Stroke/ E-Rickshaw & 4 Stroke)

	E-Rickshaws	Four-stroke autos	Two-stroke autos	Others
Total Plying in the city				

   c) No. of Two Wheelers:

   d) No. of Cars:

   e) No. of Taxis:

   f) No. of Heavy Vehicles:

2) Vehicle registration details for the past 15 years (Yearly data for all vehicles)

Year	Buses	Auto-Rickshaws	Two-Wheelers	Cars	Taxi	Heavy Duty Vehicles	Others
2020							
2019							
2018							
2017							
2016							
2015							
2014							
2013							
2012							
2011							

2010							
2009							
2008							
2007							
2006							
2005							

3) Number of new buses proposed for public transportation in the city (if any) and its fuel type
4) Total number of charging infrastructure for EVs.
    a) Existing:
    b) Proposed:
5) Transportation modal share and Vehicle Kilometres Travelled (VKT) for each vehicle type
6) Number of Pollution Under Control (PUC) centres
    a) Operational:
    b) Non-operational:
7) Year of calibration (last) for the PUC units:

Jharkhand State Pollution Control Board (JSPCB)

1) Number of hospitals with incineration facility
    a) Total:
    b) Operational:
2) Amount of medical waste that is generated in city hospitals (tonnes/day):
3) Total amount of wastes
    a) Generated by the industries (tonnes/day):
    b) Treated by the industries (tonnes/day):
    c) Disposed by the industries (tonnes/day):
4) List of industry with
    a) Waste disposal facilities
    b) Waste treatment technology and
    c) Treatment capacities
5) Total no. of Brick Kilns in the City
    a) Based on Technology Used:

b) Based on Fuel Used:

c) Based on Location

i) Inside City:

ii) Outside City:

Municipal Corporation

1) Number of petrol pumps:
2) Total road length in the city, types of roads and road width

Type of Road (Arterial/Sub-arterial)	Road Length (Km)	Road width (m)

3) Total solid waste generated in the city (tonnes/day)-domestic:
4) Waste segregation level and collection efficiency:
5) Total solid waste (per day)
   a) Collected:
   b) Treated:
6) Total waste burned on daily basis:
7) Total number of solid waste treatment plants in the City, technology used and their treatment capacity
   a) Composting:
   b) Recycling:
   c) Waste to energy plants:
8) Total number of planned solid waste treatment plants and their treatment capacity
   a) Composting:
   b) Recycling:
   c) Waste to energy plants:
9) Total number of upcoming solid waste treatment plants and their treatment capacity
   a) Composting:
   b) Recycling:
   c) Waste to energy plants:

10) Total population in the city
    a) Urban:
    b) Rural:
    c) Slum:
11) LPG penetration rate in the city:
12) Number of households benefited under the UJJWALA YOJANA:
13) Number of slums inside the city:
14) Mode of cooking and fuel used by the slum people
    a) Biomass burning:
    b) Chulhas:
    c) Dung cakes:
15) Total number of households that use traditional chulhas:
16) Percentage of households that have access to electricity:
17) Type of fuel used in households
    a) Cooking-LPG:
    b) Kerosene:
    c) Lighting-electricity:
    d) Kerosene for lamps:
18) Average land cost in the city:
19) Number of parking facilities that are available in the city and their vehicle parking capacity
    a) Public:
    b) Private:

Jharkhand Industrial Area Development Authority (JIADA) / Dept. of Industries

1) Total no. of Industries in the city
    a) Based on Industry Type:
    b) Based on Fuel Used:
    c) Based on Technology Used:
    d) Based on Location
        i) Inside City:
        ii) Outside City:
2) List of Metal fabrication industries that use clean technologies
3) Number of industries that meet the standards set by CPCB

4) An estimate on the total number of DG sets (industrial) that are used in the city:
5) Average running hours of DG sets:

Health Department, Govt. of Jharkhand

1. Total number of respiratory health diseases registered in various hospitals (details for at least one year)
2. Average cost that is spent on one person on respiratory health diseases
3. Average number of days a person stays in a hospital for cases related to respiratory health diseases

Fuel Companies (IOCL/BPCL/HPCL)

1) Total consumption of LPG (in kg/year) for last 5 years
    a) Domestic:
    b) Commercial:
2) Number of petrol bunks in the city
3) Fuel consumption in the petrol pumps (bulk/retail) (kg/years)
    a) Petrol
    b) Diesel
    c) LPG
4) Amount of fuel consumed in the industries
    a) HSD
    b) FO
    c) CNG
5) Total number of charging/ fuelling infrastructure for CNG/LPG
    a) Existing:
    b) Proposed:
6) Number of petrol stations carrying out fuel adulteration:

Electrical Inspectorate

1) Total number of roadside vendors that use DG sets:
2) Type and amount of fuel used for (Cooking / DG sets):
3) Estimate of number of DG sets used for commercial and domestic purpose:
4) Average running duration (hrs./day):
5) Capacity of the DG sets (KVA):

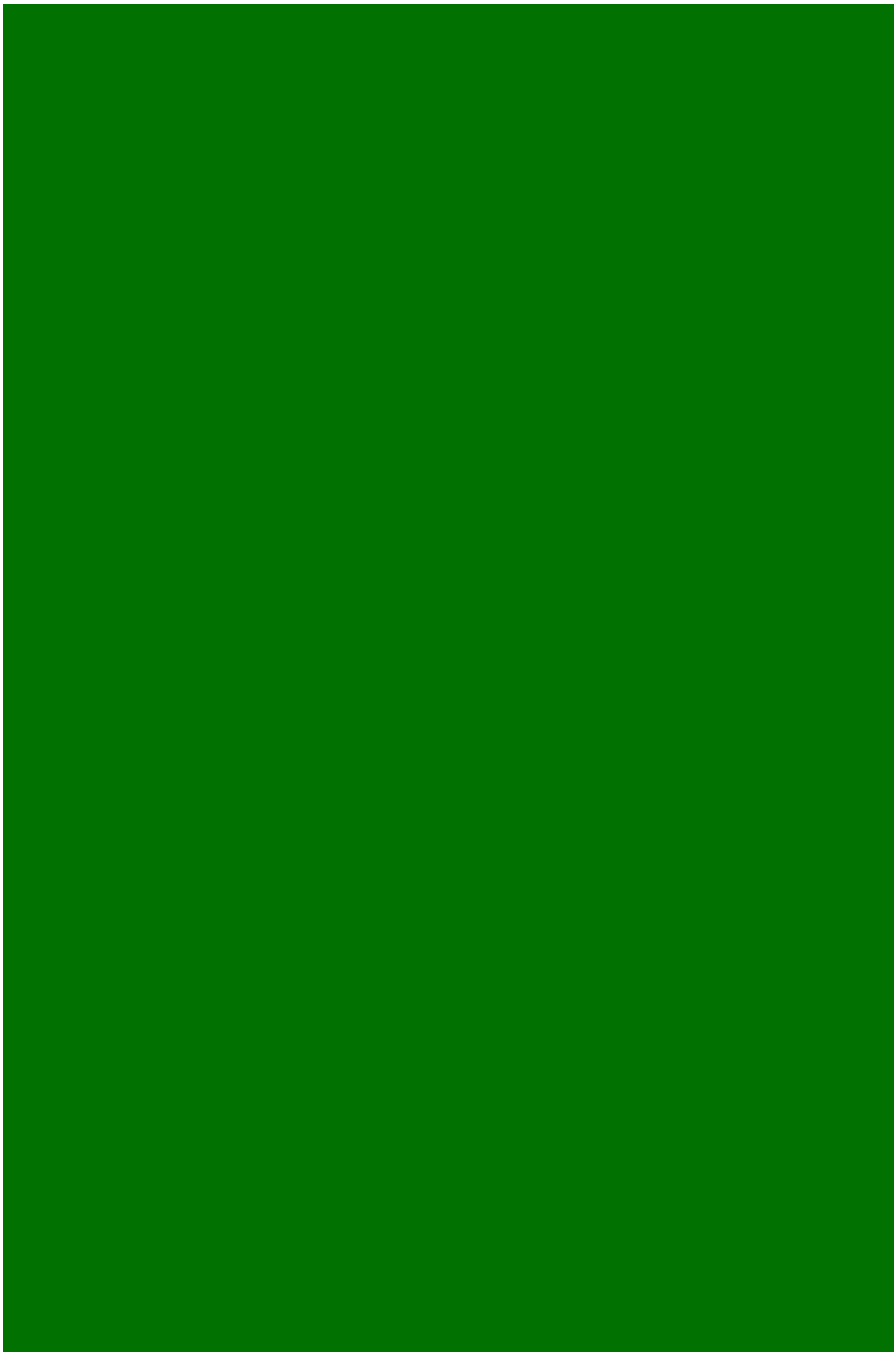
(II) Transportation Survey – Jharkhand

Sl no.	Vehicle Registration Number	Registration Year	Vehicle Type (2-wheeler/ Auto/ Car/ LCV/ HCV)	Private / Taxi (for Cars only)	Engine Type (Two stroke/ Four stroke) (for Autos only)	Fuel Type (Petrol/ Diesel/ CNG/ EV/ Hybrid)	Mileage (km/l)	Odometer Reading (km)

Note:-

LCV = Light Carriage Vehicles (small trucks e.g. Tata Ace (407))

HCV = Heavy Carriage Vehicles (Trucks/ Buses/ Multi-axle vehicles)



Annexure - 4

October 2021

Mechanism for Assessment of Environmental Compensation

JHARKHAND STATE POLLUTION CONTROL BOARD

Report prepared by Centre for Environment and Energy Development (CEED)

Background

With reference to a Joint Committee Report in the matter of Syed Arshad Nasar Vs Union of India with Ramchandra Chaurasia Vs State of Jharkhand (NGT order dt. 12.03.2021 in O.A. No. 23/2017(EZ) with O.A. No 776/2018), Hon'ble NGT vide its order dated. 12.03.2021 directed as under

"Preventive measures to control pollution are not being taken in spite of repeated show cause notices remaining uncompiled. We note that CPCB submitted a report dated 06.07.2020 in O.A. No. 1016/2019, Utkarsh Panwar vs. Central Pollution Control Board & Ors., about the carrying capacity of the NCR to sustain the number of brick kilns and siting criteria including inter se distance. The joint Committee may take into account the pattern followed in the said report, while preparing the report in the present case. The joint Committee may also make recommendations on the subject of assessment of compensation taking into account the cost of restoration for the damage caused and its apportionment among the violators."

In this context, a meeting was scheduled and chaired by the Joint Secretary, MoEF&CC, GoI on 21/09/2021 for the finalization of the joint committee report. During the discussion, the Joint Secretary, MoEF&CC, GoI directed the following:

1. To develop a model plan for the stone mines and crushers s so that they can be made compliant with the environmental standards and norms.
2. To develop a mechanism for assessment and calculation of environmental compensation taking into account the cost of restoration for the damage caused and its apportionment among the violators.

Methodology

In order to develop a mechanism for assessment/calculation of environmental compensation while taking into account the cost of restoring the damage, **it is vital to assess the extent of damage caused due to the stone mining and crushing industry**.

A baseline study of land environment (topography and drainage, geology, land use, soil), water environment (groundwater and surface water), air environment (meteorological data and ambient air quality), biological environment (terrestrial flora and fauna, aquatic flora and fauna), etc needs to be done to arrive to a sound conclusion of the actual impact of mining and crusher activities on the environment, and hence the cost of restoring the damage induced.

However, a generalized mechanism can be adopted to calculate environmental compensation from those who constantly violate the environmental norms.

The formula laid out by Central Pollution Control Board (CPCB)[1] can be used to calculate the environmental compensation based on the severity of the violation, duration, scale of operation and the location of the unit.

This report aims to define the mechanism for assessment of environmental compensation and not does not assess the damage to the environment due to stone crushing activities.

[1] report-15.07.2019.pdf (cpcb.nic.in)

Environment Compensation to be levied on the Industrial Units

The environmental compensation shall be based on the formula:

EC = PI* N* R* S* LF

Where,

EC is Environmental Compensation in ₹
PI = Pollution Index of industrial sector
N = Number of days of violation took place
R = A factor in Rupees (₹) for EC
S = Factor for scale of operation
LF = Location factor

The above formula can be used when:

1. The industry violates the consent conditions, mainly the prescribed standards
2. The industry does not comply with the directions issued such as non-installation of OCEMS, non-adherence of action plan submitted
3. Intentionally avoidance of data submission or tampering of monitoring data by the industries

Description of the factors involved in calculation of EC

- **PI** is a number from 0 to 100 and its increasing value denotes the increasing degree of pollution hazard from the industrial sector. It is suggested that the average pollution index of 80, 50 and 30 may be taken for calculating the Environmental Compensation for Red, Orange and Green categories of industries respectively. Stone crusher units fall under the red category.
- **N** is the number of days for which violation took place is the period between the day of violation observed/due date of direction's compliance and the day of compliance verified by CPCB/SPCB/PCC.
- **R** is a factor in Rupees, which may be a minimum of 100 and maximum of 500. It is suggested to consider R as 250, as the Environmental Compensation in cases of violation.
- **S** could be based on small/medium/large industry categorization, which may be 0.5 for micro or small, 1.0 for medium and 1.5 for large units.
- **LF** is based on the population of the city/town and location of the industrial unit. For the industrial unit located within municipal boundary or up to 10 km distance from the municipal boundary of the city/town, following factors (LF) may be used:

S. No.	Population* (million)	Location Factor (LF)
1	1 to <5	1.25
2	5 to <10	1.5
3	10 and above	2.0

- In any case, minimum Environmental Compensation shall be ₹ 5000/day.
- In order to include a deterrent effect for repeated violations, EC may be increased on an exponential basis, i.e., by 2 times on 1st repetition, 4 times on 2nd repetition and 8 times on further repetitions.
- If the operations of the industry are inevitable and violator continues its operations beyond 3 months then for deterrent compensation, EC may be increased by 2, 4 and 8 times for 2nd, 3rd and 4th quarter, respectively. Even if the operations are inevitable beyond 12 months, violators will not be allowed to operate.
- Besides EC, industry may be prosecuted or closure directions may be issued, whenever required.

Mechanism for Assessment of Environmental Compensation

To develop the mechanism for assessment of EC, we have listed out all the possible control measures that must be deployed/adopted by each Stone Crusher Unit (SCU). A degree of weightage has been allocated against each of processes depending on its effectiveness to control or suppress the dust emissions and other pollutants.

The degree of weightage of a control technique is the measure of its significance in the entire control process. A stone crusher unit must adopt at least 80% of the control measures to avoid EC.

Alternatively, a certain score could be allotted to each process and the SCU must have the minimum score to avoid EC.

EC will be calculated based on the above formula per day from the day of inspection until it meets the minimum score/percent to avoid EC.

In order to avoid the environmental compensation, the occupier must comply with 80 percent of the above-listed control techniques i.e., an aggregate score of 80.

Table 1: Maximum Weightage assigned to Control Techniques

S. No.	Pollution control techniques (As per the model plan)	Weightage
1	Meeting all the siting criteria specified by JSPCB	8
2	SPM concentration should be less than 600 µg/m³ at a distance of 3-10 m	18
3	Dust control techniques (Only one can be assigned)	
3.1	Combination of wet and dry dust suppression system, OR	28
3.2	Enclosure of crusher, screen and conveyor belts and then venting it to a control device (Dry dust collection system), OR	15
3.3	Sprinkling at all the crusher feed and transfer points as per model crusher plan (Wet dust suppression system), OR	5
3.4	Only enclosure structures (without control devices)	5
4	Emission control technique from Haul roads (Only one can be assigned)	
4.1	Paving, OR	8
4.2	Water sprinkling at regular intervals/ Soil stabilisation	5
5	Green Belt development around the periphery (@100 trees per acre of land)	9
6	Height of Wind breaking structures must be greater than height of stockpiles	8
7	Regular Cleaning of equipment	4
8	Boundary Wall height of at least 10 m all around the site periphery	5
9	Loaded trucks should be covered with tarpaulin while transportation	3
10	Rainwater Harvesting system cum ground water recharge unit	9

The maximum score that can be awarded is 100.

The inspecting official is allowed to deduct scores on the basis of incomplete or ineffective or insufficient application of control technique.

Complying Score and Non-Compliance Factor

The difference between minimum score required (i.e. 80) and the score obtained is termed as complying score. The higher value of complying score implies the lesser compliance with control measures as listed in the Table 1.

Non-compliance factor (NCF) is a factor that depends on the value of complying score. Higher the complying score, more is the NCF. NCF is multiplied to the calculated EC. Non-compliance factor is given as:

Complying Score	Non-Compliance Factor
1-10	0.5
11-20	0.75
20-30	1.0
More than 30	1.5

Now, Total EC levied per day can be written as:

EC = PI* R* S* LF * NCF

The whole process is illustrated with an example below.

Example:

On inspection it was found that a medium stone crusher unit named X of production capacity 45 TPD meets all the siting criteria and the SPM concentration at a distance of 3-10 m from the crusher unit is 400 µg/m^3. It uses wet dust suppression system and covers all the structures but does not vent them to any control device. The roads are paved and scanty green cover is developed. Wind breaking structures are of inadequate height and equipment carry layers of dust. Boundary wall of 10 m is provided along the perimeter and rainwater harvesting cum groundwater recharge units is present and functioning. However, it was observed that trucks used for carrying load were not covered properly and dust was emitted from it.

Solution:

S. No.	Pollution control techniques (As per the model plan)	Weightage	Score
1	Meeting all the siting criteria specified by JSPCB	8	8
2	SPM concentration should be less than 600 µg/m^3 at a distance of 3-10 m	18	18
3	Dust control techniques (Only one can be assigned)		
3.1	Combination of wet and dry dust suppression system	28	10
3.2	Enclosure of crusher, screen and conveyor belts and then venting it to a control device (Dry dust collection system)	15	(5+5)
3.3	Sprinkling at all the crusher feed and transfer points as per model crusher plan (Wet dust suppression system)	5	
3.4	Only enclosure structures (without control devices)	5	
4	Emission control technique from Haul roads (Only one can be assigned)		
4.1	Paving	8	8
4.2	Water sprinkling at regular intervals/ Soil stabilisation	5	
5	Green Belt development around the periphery (@100 trees per acre of land area)	9	5
6	Height of Wind breaking structures must be greater than height of stockpiles	8	0
7	Regular Cleaning of equipment	4	0
8	Boundary Wall height of at least 10 m all around the site periphery	5	5
9	Loaded trucks should be covered with tarpaulin while transportation	3	0
10	Rainwater Harvesting system cum ground water recharge unit	9	9

The crusher unit X was awarded a total score of 63. This is 17 less than 80% of the maximum score and therefore the inspecting person is obligated to impose EC on account of violation/non-compliance to suggested measures in the model plan.

Therefore, to achieve a minimum of 80%, the inspecting person can advise the SCU to adopt measure(s) that improves its score to the minimum required score of 80. It is the duty of the

inspecting person to suggest the measure that holds the most significance in controlling the pollution suitable for that particular unit.

EC will be levied based on the formula EC = PI* N* R* S* LF for every violation required to cover up the gap of this 17 points, as in this case could be:

(a) Improving green cover @100 trees per acre of land area, increasing height of wind breaking walls to more than height of stockpiles, keeping the equipment clean and tidy, and using tarpaulin to cover the trucks while transportation. (4+8+4+3); OR

(b) Adopting combination of wet and dry dust suppression system with a control device like bag filter (18)

Calculation of EC:

Since stone crushing industry is categorised as Red category, the value of pollution index can be taken as 80 as suggested by CPCB. Value of R in case of violations can be taken as 250

Therefore,

PI=80; R=250; S=1.0; LF= 1.25 (Assuming population in the range of 1 to 5 million)

Hence, EC (per day)= PI * R * S * LF * NCF

= 80 * 250 * 1 * 1.25 * 0.75

= 18750

Therefore an EC of Rs 18,750/- will be levied per day until the compliance is verified by the board.

Note: The weightage has been assigned solely on the basic theoretical understanding of the control measures and not on the practical on-ground data which may vary depending on the site conditions and its location. To achieve a more reliable and accurate figure, site specific studies need to be done.

Annexure - 5

Office of the Deputy Commissioner, Sahibganj

Letter No. 1074...../M. dated..4/11/21.....

From : Deputy Commissioner
Sahibganj. (Jharkhand)

To,

Dr. G.P.Singh
Scientist 'D'
Central Pollution Control Board
Kolkata- 700107

Sub : Meeting for O.A. 23/2017(EZ) & other on dated 30.10.21

Sir,

With reference to above subject and as per discussion in meeting held on dated 30.10.21 I am sending Sahibganj Action Taken Report by the District Task Force in which Total no. of FIR lodge 16 from 1st jan-21 to till date in involving of 26 Truck & Tractore , Crusher Demolished&Crusher Sealed- 4, Boats- 2, Person Arrested- 29, Illegal Mining- JCB Equipment- 8. Penalty recovered 18.75 lakh.

- Request letter has been sent to Member Secretary JSPCB, Ranchi vide letter no 1269 dated 24.11.20 for cancellation CTO'S. within Railway and road side. Annexure- I
- Direction given to Ex. Engineer Electricity Division, Sahibganj vide letter no 1270 dated 24.11.20 for disconnection of Illegal Crushing Plant and not to give any new connection to crushing unit without CTE/CTO. Annexure- II
- Letter sent to DRM, Malda vide letter no 1065 dated 31.08.21 to shifting of Loading Rack Point within Municipal Area. i.e Sahibganj Railway siding and Sahibganj Goods sheds Siding. Annexure- III
- Monthly Task Force meeting is conducting on regular basic. The Proceding of District task Force meeting held on dated 07.09.21 and ATR with Photograph and newspaper cutting. Annexure- IV

Thinking you.

Yours Faithfully

Deputy Commissioner
Sahibganj

Annexure - 6

जिला समाहरणालय, साहबगज
(खनन शाखा)

पत्रांक 1269 / एम0, दिनांक 24/11/2020

प्रेषक :

उपायुक्त,
साहेबगंज।

सेवा में,

सदस्य सचिव
झारखंड राज्य प्रदूषण नियंत्रण पर्षद, रांची।

विषय : दिनांक 18.11.2020 को जिला टास्क फोर्स (खनन) की आहूत बैठक के संबंध में।

महाशय्

उपर्युक्त विषय के आलोक में दिनांक 18.11.2020 को जिला टास्क फोर्स (खनन) की आहूत बैठक जिसमें क्षेत्रीय पदाधिकारी, प्रदूषण नियंत्रण पर्षद की उपस्थिति में निर्णय लिया गया कि माननीय NGT के द्वारा दिये गये आदेश के अनुरुप N.H. S.H सड़को से सटे 100 मीटर के अंदर अवस्थित क्रसर प्लांट को निर्गत CTE/CTO को रद्द किया जाये, (सूची संलग्न) ताकि माननीय NGT के आदेशों का अनुपालन सुनिश्चित कराया जा सके।

विश्वारंभाजन
24/11/20
उपायुक्त
साहेबगंज।

24/11/20

जिला खनन कायालय, साहबगंज

एन0एच0, एस0एच0 रेलवे लाईन के किनारे अवस्थित क्रशर मशीन

	अनुज्ञप्तिधारी का नाम एवं पता	मौजा	अंचल / थाना	अभ्युक्ति
	पाण्डेय, पिता– स्व0 परमा पाण्डेय	हाथीगढ़	तालझारी	
	द पाण्डेय, पिता– स्व0 मुरलीधर पाण्डेय	हाथीगढ़	तालझारी	
	कांत, पिता– स्व0 दुधनाथ चौधरी	हाथीगढ़	तालझारी	
	म यादव, समदानाला	हाथीगढ़	तालझारी	
	ल गुहा, मु0– एन एस0 कालोनी, साहेबगंज।	जुमनी	तालझारी	
	ति स्टोन वर्क्स, प्रो0– राजेश्वर सिंह	जुमनी	तालझारी	
	रारी केजरीवाल	छोटा भगियामारी	तालझारी	
	बेनय गुप्ता	नीमगाछी	मंडरो	
	दीना नाथ महतो	नीमगाछी.	मंडरो	
	राजकुमार महतो	नीमगाछी	मंडरो	
5	पंकज कुमार सिंह	प्रतापगंज	मंडरो	
7	राजीव सिंह	प्रतापगंज	मंडरो	
9	अवधेश सिंह, पिता– सहदेव सिंह	प्रतापगंज	मंडरो	
1	श्रीनाथ चौधरी	बड़तल्ला	मंडरो	
3	मुन्ना चौधरी	बड़तल्ला	मंडरो	
5	मो0 आजाद	बड़तल्ला	मंडरो	
7	मदन सिंह	बड़तल्ला	मंडरो	
29	बिनोद चौधरी	बड़तल्ला	मंडरो	
31	रुपेश चौधरी	बड़तल्ला	मंडरो	
33	राहुल तिवारी, पिता– नीलु तिवारी	बड़तल्ला	मंडरो	
35	बिनोद चौधरी	बड़तल्ला	मंडरो	
37	रवि शंकर सिंह	बड़तल्ला	मंडरो	
39	अशोक सिंह			

झारखण्ड सरकार

अनुमंडल कार्यालय, राजमहल

(E-mail-sdo.rajmahal@gmail.com, sdo-rajmahal@jharkhandmail.gov.in)

गोपनीय शाखा

ज्ञापांक 216 / गो0, राजमहल, दिनांक 12 अप्रैल, 2021

प्रेषित

1. मेसर्स विद्यार्थी स्टोन वर्क्स
   प्रो0–प्रशान्त पाण्डेय।
2. मेसर्स राजा स्टोन वर्क्स
   प्रो0–मदनकान्त।
3. मेसर्स राम मिनरल्स इन्डस्ट्रीज,
   प्रो0–विक्रम यादव।
4. मेसस संतोष इन्डस्ट्रीज,
   प्रो0–राजेश्वर सिंह।
5. मेसर्स शिव स्टोन वर्क्स
   प्रो0–मुरारी केजरीवाल

सभी थाना–तालझारी, जिला साहेबगंज।

विषयः– पत्थर क्रशर संयंत्र ईकाई उपयुक्त स्थान पर स्थानान्तरित करने के संबंध में।

उपर्युक्त विषयक के संबंध में कहना है कि इस कार्यालय के ज्ञापांक 188 / गो0, दिनांक 10.04.2021 के द्वारा आप सबों के सकरीगली स्टेशन के अत्यन्त नजदीक संचालित पत्थर क्रशर ईकाई को दिनांक 09.04.2021 को आहुत जिला खनन टास्क फोर्स की बैठक में उपायुक्त, साहेबगंज के निदेशानुसार उत्पादन कार्य स्थगित करवाया गया था। चुंकि स्टेशन के अत्यन्त नजदीक होने से वायु प्रदूषण एवं ध्वनि प्रदूषण से समीप के विद्यालय तथा स्टेशन में कार्यरत कर्मी एवं स्टेशन पर आने जाने वाले यात्रियों को काफी परेशानी होती थी।

अतः उपर्युक्त तथ्यों को दृष्टिगत करते हुए आदेशानुसार निदेश दिया जाता है कि एक माह के अन्दर अपने–अपने पत्थर क्रशर संयंत्र ईकाई उपयुक्त स्थान पर स्थानान्तरित करना सुनिश्चित करें।

इसे अति महत्वपूर्ण समझें।

12.4.21
अनुमण्डल पदाधिकारी,
राजमहल।

ज्ञापांक 216 / गो0, राजमहल, दिनांक 12 अप्रैल, 2021

प्रतिलिपि–अंचल अधिकारी / थाना प्रभारी, तालझारी को सूचनार्थ एवं आवश्यक कार्रवाई हेतु प्रेषित।

प्रतिलिपि–जिला खनन पदाधिकारी, साहेबगंज को सूचनार्थ प्रेषित।
प्रतिलिपि–अनुमंडल पुलिस पदाधिकारी, राजमहल को सूचनार्थ प्रेषित।
प्रतिलिपि–उपायुक्त / पुलिस अधीक्षक, साहेबगंज को सादर सूचनार्थ समर्पित।

12.4.21
अनुमण्डल पदाधिकारी,
राजमहल।

Annexure - 7

(खनन शाखा)

पत्रांक 1220 / एम0, दिनांक 24/11/2020

प्रेषक :

उपायुक्त,

साहेबगंज।

सेवा में,

कार्यपालक अभियंता, विद्युत (C &R)

विद्युत आपुर्ति अंचल, साहेबगंज।

विषय : दिनांक 18.11.2020 को जिला टास्क फोर्स (खनन) की आहूत बैठक के संबंध में।

महाशय्

उपर्युक्त विषय के आलोक में दिनांक 18.11.2020 को जिला टास्क फोर्स (खनन) की आहूत बैठक निर्णय लिया गया कि ज़िलान्तर्गत जितने भी बिजली द्वारा संचालन क्रशर मशीन को खनन अनुज्ञप्ति प्राप्त नहीं है तथा कुछ अनुज्ञप्ति प्राप्त क्रशर संचालको द्वारा बिना परिवहन चालान व्यवहार के ही अवैध रुप से पत्थर को क्रस कर पत्थर चिप्स इत्यादि का बिक्री किया जाता है, जिससे सरकारी राजस्व का बड़े पैमाने पर क्षति पहुँचाई जा रही है।

अतः सरकारी राजस्व हित को ध्यान में रखते हुए बिना भंडारण अनुज्ञप्ति / CTO के बिद्युत कन्केशन नहीं दिया जाय एवं जिलान्तर्गत बिजली से चल रहे क्रशर मशीन (सूची संलग्न) का बिद्युत विच्छेद करते हुए प्रतिवेदन अधोहस्ताक्षरी को उपलब्ध कराया जाये।

24/11/20

विश्वासभाजन

उपायुक्त
साहेबगंज।

	अनुज्ञप्तिधारी का नाम एवं पता	मौजा	अंचल / थाना	अभ्युक्ति
	पीयुष स्टोन वर्क्स, प्रो० श्री राजकुमार भगत	महादेववरण	मंडरो	
	महादेव स्टोन वर्क्स श्री अजय कुमार जायसवाल	महादेववरण	मंडरो	
	मे० अंकित स्टोन वर्क्स, प्रो०–श्री अर्जुन प्र० जायसवाल,	महादेववरण	मंडरो	
	मे० मा गायत्री स्टोन वर्क्स, प्रो०– श्री शंभु कुमार जायसवाल,	महादेववरण	मंडरो	
	मे० शिल्पी स्टोन वर्क्स, प्रो०– शैलेन्द्र कुमार जायसवाल	महादेववरण	मंडरो	
	मे० आदित्य स्टोन वर्क्स, प्रो०– श्री मोहन यादव,	छोटी भगियामारी	तालझारी	
9	मे० किशोर कुमार ,प्रो० किशोर कुमार	अम्बाडीहा	तालझारी	
10	मे० शांति स्टोन वर्क्स, प्रो०– श्री हरेन्द्र यादव, पिता– श्री राम जतन यादव,	अम्बाडीहा	तालझारी	
11	मे० देव स्टोन वर्क्स, प्रो०– श्री रंजीत कुमार सिंह,	छोटा भगियामारी	तालझारी	
14	मे० सिंह स्टोन वर्क्स,प्रो० श्री मोहन सिंह, पिता--श्री रामानुज सिंह	अम्बाडीहा	तालझारी	
15	मे० सरस्वती स्टोन वर्क्स,प्रो० हीरा लाल यादव,	अम्बाडीहा	तालझारी	
17	मे० कमलेश स्टोन वर्क्स,प्रो० श्री लल्लु सिंह,पिता श्री गजाधर प्रसाद सिंह	अम्बाडीहा	तालझारी	
18	मे० विकास स्टोन वर्क्स,प्रो० श्री अनिल कुमार यादव, पिता– श्री राम भवन यादव,ग्राम	छोटी भगियामारी	तालझारी	
19	मे० हरहर महादेव स्टोन वर्क्स, प्रो०– श्री अशोक यादव, पिता– श्री यमुना प्रसाद यादव,	छोटी भगियामारी	तालझारी	
20	किशोर कुमार राय	अम्बाडीहा	तालझारी	
21	लोहा यादव	अम्बाडीहा	तालझारी	
22	बबलू यादव	अम्बाडीहा	तालझारी	
23	पिंकी अग्रवाल	छोटा भगियामारी	तालझारी	
24	मोहन यादव	छोटा भगियामारी	तालझारी	
25	श्लोक यादव	छोटा भगियामारी	तालझारी	
26	रातदरेश यादव	गदवा	तालझारी	
27	मोहन यादव	छोटा भगियामारी	तालझारी	
28	अखिलेश यादव	छोटा भगियामारी	तालझारी	
29	व्यास यादव	छोटा भगियामारी	तालझारी	
30	नीष चौरसिया, पिता– प्रभात चौरसिया	छोटा भगियामारी	तालझारी	
31	गोपाल यादव	छोटा भगियामारी	तालझारी	
32	प्रमेन्द अग्रवाल (उर्फ पिंकी)	लोहण्डा माको	बोरियो	

ल साहनी	छोटा भगियामारी	तालझारी
यादव	अम्बाडीहा	तालझारी
शांति स्टोन वर्क्स, प्रो0– श्री हरेन्द्र यादव, पिता– श्री	गदवा	तालझारी
नेश यादव पिता– हीरा यादव	किरोकुरिया	तालझारी
लेन्द्र जायसवाल	महादेववरण	मंडरो
संजय जायसवाल	महादेववरण	मंडरो
जय प्रकाश साह	महादेववरण	मंडरो
गणेश भगत	मुंडली	मंडरो
रवि चौरसिया	मुंडली	मंडरो
अभयानद भगत, पिता– बलराम भगत	मुंडली	मंडरो
अभय जायसवाल	भुंडली	मंडरो
प्रसाद जासवाल	बड़तल्ला	मंडरो
रिंदो स्टोन वर्क्स, प्रो0 रवि जायसवाल	महादेववरण	मंडरो
आयुरमान स्टोन वर्क्स, राकेश जायसवाल	महादेववरण	मंडरो
शालोग्राम भगत	मुंडली	मंडरो
पकज कुमार सिह	प्रतापगंज	मंडरो
राजीव सिंह	प्रतापगंज	मंडरो
प्रकाश सिह, पिता– सहदेव सिह	प्रतापगंज	मंडरो
	बड़तल्ला	मंडरो
	बड़तल्ला	मंडरो
	बड़तल्ला	मंडरो
	बडतल्ला	मडरो
	बड़तल्ला	मंडरो
	बड़तल्ला	मंडरो
राहुल तिवारी, पिता– नीलु तिवारी	बड़तल्ला	मंडरो
	बड़तल्ला	मंडरो
	बड़तल्ला	मंडरो
	पीपलजोरी	बरहरवा
स्टोन वर्क्स, प्रो0– सफीकुल इस्लाम	फतेहपुर	बरहरवा
एस0स्टोन, प्रो0– नजरुल इस्लाम	धातपाडा	बरहरवा
स्टोन वर्क्स प्रो0– ईलियास	पीपलजोरी	बरहरवा
रहीम स्टोन वर्क्स, दीनानाथ प्रसाद भगत	पीपलजोरी	बरहरवा
आर0 स्टोन वर्क्स	पीपलजोरी	बरहरवा
एस0 स्टोन वर्क्स, सोमनाथ घोष	धातपाड़ा	बरहरवा
	हाथीगड	

Annexure - 8

उपायुक्त कार्यालय, साहेबगंज
गोपनीय शाखा।

पत्रांक..... / गो0

प्रेषक,

रामनिवास यादव, (भा0प्र0से0)
उपायुक्त, साहेबगंज।

सेवा में,

मंडल रेलवे प्रबंधक,
पूर्व रेलवे मालदा (प0बं0)

साहेबगंज, दिनांक अगस्त, 202

विषय :– साहेबगंज शहर के बीचो–बीच अवस्थित रेलवे साईडिंग को अन्यत्र स्थानान्तरित कर के संबंध में।

महाशय,

उपर्युक्त विषयक अनुमंडल पदाधिकारी, साहेबगंज के पत्रांक 471 / गो0, दिनां 25.08.2021 के द्वारा प्रतिवेदित किया गया है कि साहेबगंज शहर के बीचो–बीच अवस्थित रेल साईडिंग के कारण शहर में लगातार भारी वाहनों की आवाजाही होती है। उक्त के प्रदुषण स्थानीय जनजीवन प्रभावित होते हैं तथा शहर में यातायात की समस्या बनी रहती है। भारी वाह के आवागमन के कारण आये दिन दुर्घटना में जानमाल के साथ–साथ सड़क भी क्षतिग्रस्त हो र हैं।

उल्लेखनीय है कि करमटोला रेलवे स्टेशन के आस–पास खाली पड़ी जमीन है। ज रेलवे साईडिंग को स्थानान्तरित किया जा सकता है। जिससे शहरी क्षेत्र में आमजनों की समस का समाधान हो सकता है।

अतः अनुरोध है कि लोकहित में साहेबगंज शहर के बीचो–बीच अवस्थित रे साईडिंग को करमटोला रेलवे स्टेशन के आस–पास खाली पड़ी जमीन पर स्थानान्तरित करने अविलम्ब कार्रवाई करने की कृपा की जाय।

विश्वासभाज

ED
उपायु
साहेबगं

अनुलग्नक :– यथोक्त।

ज्ञापांक 1065 / गो0, साहेबगंज, दिनांक 31 अगस्त, 2021

प्रतिलिपिः– जिला खनन पदाधिकारी, साहेबगंज को सूचनार्थ एवं अगली टास्क फ की बैठक में उक्त मामले को रखने हेतु प्रेषित।

प्रतिलिपिः– अनुमंडल पदाधिकारी, साहेबगंज को सूचनार्थ प्रेषित।

उपायुक्त
साहेबगंज

जिला टॉस्क फोर्स (खनन) साहेबगंज की बैठक दिनांक 07.09.2021 को उपायुक्त –सह– अध्यक्ष की अध्यक्षता में आहूत की गई बैठक की कार्यवाही।

उपस्थिति पंजी के अनुसार

1 पुलिस अधीक्षक, साहेबगंज।
2 वन प्रमंडल, पदाधिकारी, साहेबगंज।
3 अनुमंडल पदाधिकारी, साहेबगंज।
4 अनुमंडल पदाधिकारी, राजमहल।
5 अनुमंडल पुलिस पदाधिकारी, साहेबगंज।
6 अनुमंडल पुलिस पदाधिकारी, राजमहल।
7 अनुमंडल पुलिस पदाधिकारी, बरहरवा।
8 जिला खनन पदाधिकारी, साहेबगंज।
9 विद्युत कार्यपालक अभियंता, साहेबगंज।

उपायुक्त महोदय के द्वारा सर्वप्रथम गत बैठक की कार्रवाही एवं उसके अनुपालन की समीक्षा की गयी। तत्पश्चात् निम्न बिन्दुओं पर चर्चा हुई :–

1 निर्णय लिया गया कि रिहाईसी इलाका रहने के कारण जिलेबिया घाटी में स्थित क्रशरों/खदानों की जांच कर तत्काल प्रभाव से बंद करा दिया जाय।

अनुपालन–अनुमंडल पदाधिकारी, साहेबगंज
जिला खनन पदाधिकारी, साहेबगंज।

2 बरहेट अंचल में नियमित रुप जांच कर बालू के अवैध उठाव/भंडारण स्थल को चिन्हित करते हुए उनके विरुद्ध कार्रवाई सुनिश्चित करें।

अनुपालन– अनुमंडल पुलिस पदाधिकारी, बरहरवा
एवं सभी सदस्य जिला टास्क फोर्स खनन

3 बाकुडी रेलवे स्टेशन के पास रेलवे जनरल साईंडिंग हो रहे पत्थर प्रेषण एवं अवस्थित क्रशरों को बंद कराये।

अनुपालन–अनुमंडल पदाधिकारी, राजमहल,

4 वन प्रमंडल पदाधिकारी, साहेबगंज को वन भूमि से संबंधित जांच प्रतिवेदन प्रमंडलीय आयुक्त समर्पित करना सुनिश्चित करें, चूँकि बार–बार स्मार प्रत्र प्राप्त हो रहें है।

अनुपालन– वन प्रमंडल पदाधिकारी, साहेबगंज।

Annexure - 9

5 बरहरवा अंचलन्तर्गत कोटालपोखर में पुल के नीचे से परिवहन हो रहें वाहनों को रुप से जांच कर खनिजों से लदे वाहनों पर करवाई सुनिश्चित करें।

अनुपालन– अनुमंडल पदाधिकारी, राजमहल, अ
पुलिस पदाधिकारी, बरहरवा एवं जिला खनन पदाधि
साहेबगंज।

6 क्षेत्रीय पदाधिकारी, झारखंड राज्य प्रदूषण नियंत्रण प्रर्षद, दुमका को निर्देषित किया गया केवल नोटिस ही निर्गत नहीं किया जाय, बल्कि निर्गत नोटिस पर कार्रवाई भी की जाये।

अनुपालन – क्षेत्रीय पदाधिकारी, झारखंड राज्य प्रदूषण नियंत्रण प्रर्षद, दुम

7 साक्षरता चौक के पास काफी मात्रा में अवैध बालू को भंडारित कर व्यापार किया जाता है जिसे तत्काल बंद कराना सुनिश्चित करें।

अनुपालन– अनुमंडल पदाधिकारी, साहेबगंज,
अनुमंडल पुलिस पदाधिकारी, साहेबगंज,
जिला खनन पदाधिकारी, साहेबगंज।

8 DRM, मालदा को साहेबगंज रेलवे साईडिंग बंद कर अन्य जगहों पर स्थानान्तरण करने पर विचार किया गया है एवं पत्र प्रेषित की गयी है।

धन्यवाद ज्ञापन के साथ टास्क फोर्स की आहूत बैठक समाप्त की गयी।

जिला खनन पदाधिकारी
साहेबगंज।

उपायुक्त,
साहेबगंज।

ज्ञापांक 918 /एम0, दिनांक 7/9/21

प्रतिलिपि : पुलिस अधीक्षक, साहेबगंज/अपर समाहर्त्ता/अनुमंडल पदाधिकारी, साहेबगंज/राजमहल /क्षेत्रीय स्तर पर राज्य नियंत्रण प्रदूषण पर्षद, के पदाधिकारी, दुमका/जिला परिवहन पदाधिकारी/जिला खनन पदाधिकारी साहेबगंज एवं अनुमंडल पुलिस पदाधिकारी, साहेबगंज, राजमहल एवं बरहरवा को सूचनार्थ एवं आवश्यक कार्रवाई हेतु प्रषित।

उपायुक्त,
साहेबगंज।

TASK FORCE/SM/209

प्रभात

आज का पंचांग

तिथि - चतुर्दशी तिथि सायं 6.13 तक उपरांत अमावस्या तिथि, नक्षत्र - पुनर्वसु नक्षत्र दिवा 8.27 तक उपरांत पुष्य नक्षत्र, पक्ष - कृष्ण, मास - श्रावण, विक्रम संवत - 2078, शक संवत - 1943, हिजरी तारीख - 27 दिन - हफ्ता, महीना - जिलहिज, वर्ष - 1442, बांग्ला तारीख - 21, दिन - शनिवार, मास- श्रावण, बंगाब्द - 1428.

- डॉ एनके बेरा

प्रभात खबर

देवघर, शनिवार

07.08.2021

आज अस्त 06:23 बजे संध्या

कल उदय 05:15 बजे प्रातः

एक्शन: नियमों का उल्लंघन करने पर जिला खनन टास्क फोर्स की टीम ने की कार्रवाई

जिलेबी घाटी में छापेमारी कर चार क्रशर किया ध्वस्त

- रिहायसी इलाके के 100 मीटर के दायरे से हटाना था क्रशर
- एक सप्ताह पहले 21 संचालकों को दिया था नोटिस

संवाददाता, साहिबगंज

क्रशर ध्वस्त करता जेसीबी व कार्रवाई के दौरान पदाधिकारी.

डीसी के निर्देश पर शुक्रवार को जिलेबी घाटी के नजदीक अदरो व छोटा लोहंडा मौजा क्षेत्र में सदर एसडीओ हेमंत सती, डीएमओ विभूति कुमार, बोरियो सीओ महेंद्र मांझी की उपस्थिति में चार क्रशर को जेसीबी से ध्वस्त कर दिया गया है. जिला टास्क फोर्स की टीम ने पहले चरण में कार्रवाई की है. 21 लोगों को नोटिस किया गया है. टीम ने दोपहर में पहुंच कर में शिव शंकर स्टोन वर्कर्स, अशोक कुमार मंडल, पिता स्व परमेश्वर मंडल, मौजा छोटा लोहंडा, मे रितिका स्टोन वर्कर्स के प्रो सुशील कुमार भरतिया ग्राम भरतिया कॉलोनी साहिबगंज, मौजा अदरो में शक्ति स्टोन वर्कर्स के प्रो शंभु जाजोदिया पिता स्व जयकिशन लाल जाजोदिया मौजा अदरो, दुर्गा स्टोन वर्कर्स प्रो आदित्य कुमार सिंह, पिता अमर देव सिंह मौजा अदरो को ध्वस्त कर दिया. प्रशासन की कार्रवाई से क्रशर मालिकों में हड़कंप है. याद हो कि 26 जुलाई को डीसी राम निवास यादव की अध्यक्षता में जिला खनन टास्क फोर्स की बैठक हुई थी. इसमें रिहायसी इलाके के 100 मीटर के दायरे में आनेवाले क्रशर को हटाने का निर्णय लिया गया था. उन क्र प्लांट को एक सप्ताह के भीतर बंद कर का निर्देश दिया था. बैठक के दौरान उन्ह पूर्व में की गयी कार्रवाई की सूचना दी ग

तीन दिनों से लापता नगर पंचायत सफाई

समग्र शिक्षा पर वेबिनार आज : साहिबगंज. राष्ट्रीय शिक्षा नीति 2020 परिवर्तन व प्रभाव विषय पर स शिक्षा साहिबगंज व अरविंद सोसाइटी के द्वारा वेबिनार का आयोजन शनिवार को होगा. एडीपीओ आशीष कुमार बताया कि इसमें डीइओ मिथिलेश झा, क्षेत्रीय शिक्षा पदाधिकारी राजेश कुमार पासवान, अतिरिक्त जिला कार्यक्र

सूबे में एक मादर में ताड़फाड़ किये जाने पर भारत ने गुरुवार को पाकिस्तानी उच्चायोग के प्रभारी को तलब किया और कड़ा विरोध दर्ज कराया. विदेश मंत्रालय के प्रवक्ता अरिंदम बागची ने कहा कि भारत ने पाकिस्तान में अल्पसंख्यक समुदायों पर निरंतर हमलों को लेकर अपनी चिंता जाहिर की.

●देश-विदेश पेज भी देखें

370 हटने के दो साल कहीं जश्न, कहीं गम

श्रीनगर/जम्मू. अनुच्छेद 370 के तहत जम्मू-कश्मीर का विशेष दर्जा खत्म किये जाने के दो साल पूरे होने पर गुरुवार को भाजपा ने जगह-जगह तिरंगा रैलियां निकाल कर राष्ट्रध्वज फहरा कर जश्न मनाया. वहीं, पीडीपी ने इसे जम्मू कश्मीर के लिए 'शोक दिवस' बताया और विरोध मार्च निकाला.

नीट में दो बार फेल होने

पास होने की अनिवार्यता से छूट दी गयी है. इसके अलावा अभ्यर्थियों को

बताया कि गुरुवार को हुई बैठक में

के स्थान पर सभी परीक्षाओं

साहिबगंज में 13 क्रशर संचालकों का सीटीओ रद्द

संवाददाता ▷ साहिबगंज

- डीसी ने सात दिनों के भीतर क्रशर प्लांट हटाने का दिया निर्देश

साहिबगंज में राज्य प्रदूषण नियंत्रण बोर्ड की ओर से मानकों का अनुपालन नहीं करने के एवज में 13 क्रशर संचालकों का सीटीओ (क्रशर संचालित करने का प्रमाण-पत्र) रद्द कर दिया गया है. इस संबंध में डीसी राम निवास यादव ने बताया है कि जिनका सीटीओ रद्द हुआ है वे सात दिनों के अंदर क्रशर प्लांट हटा लें. ऐसा नहीं होने पर नियम संगत कार्रवाई करते हुए इन क्रशर प्लांट को ध्वस्त कर दिया जायेगा.

इन सभी का सीटीओ हुआ रद्द : खनन विभाग से मिली जानकारी के मुताबिक, क्रशर संचालकों में शांति सिंह (सकरी गली साहिबगंज), दीनानाथ सिंह (मिर्जाचौकी) अवधेश कुमार (मंडरो), जयंती गुहा (सकरीगली), राजकुमार महतो, विनय कुमार गुप्ता, राजीव सिंह, पंकज कुमार सिंह, अशोक कु सिंह (सभी मिर्जाचौकी),

●बाकी पेज 10 पर

प्रमोद सिंह मर्डर के में सीबीआइ की बह पूरी नहीं

धनबाद. धनबाद के चर्चित प्रमोद सिंह हत्याकांड की गुरुवार को सीबीआइ के न्यायाधीश अरविंद कुमार पां अदालत में वीडियो कॉन्फ्रें जरिये हुई.

अभियोजन पक्ष की सीबीआइ के लोक अभियो बहस शुरू की जो अंत तक हो सकी. अदालत ने बहस अगली तारीख 12 अगस्त निर्धारित कर दी. अभियोजन बहस पूरी होने के बाद ही बच के अधिवक्तागण बहस शुरू व

तनिक न करें देरी, वैक्सीन है जरूरी

अखबार नहीं आंदोलन

प्रभात खबर

देवघर । रांची । पटना । जमशेदपुर । धनबाद । कोलकाता । मुजफ्फरपुर । भागलपुर । गया से प्रकाशित

पेज 11

ा व मदनशाही घाट पर छापा, दो नाव व उस पर लदे चिप्स-बोल्डर जब्त

ाने के बाद एसडीओ व ने की कार्रवाई

प्रभात खबर
इंपैक्ट

ाट व मदनशाही
नियमों को ताक
से गंगा में दर्जनों
ारी ले जाने की
में छापने के बाद
वाई की है. जिला
दा व मदनशाही
की. छापेमारी के
सके लदे हजारों
जब्त किया गया.
ामिल एसडीओ

पंकज भाव ने बताया कि लगातार समदा व मदनशाही गंगा तट पर अवैध तरीके से नावों में पत्थर लादकर बिहार व बंगाल ले जाने की जानकारी मिल रही थी. शनिवार को टॉस्क फोर्स टीम ने छापेमारी की. दो नाव समेत तट के किनारे • बाकी पेज 07 पर

डीएमओ ने जिरवाबाड़ी थाने में दर्ज करायी अवैध उत्खनन व परिवहन मामले में प्राथमिकी


माफिया रात का करते हैं इंतजार, अंधेरा होते ही शुरू हो जाती है नाव से पत्थर की ढुलाई

4 मार्च को प्रभात खबर में छपी थी खबर

छापेमारी से पहले ही घाट खाली

सूत्रों की माने तो इस छापेमारी की खबर पूर्व में ही माफियाओं को मिल चुकी थी. अबतक टॉस्क फोर्स की टीम स्थल पर पहुंचती उससे पहले ही दर्जन भर से ज्यादा नाव घाट छोड़ कर फरार हो चुके थे.


समदा घाट पर छापेमारी करते अधिकारी व पुलिस.

अवैध पत्थर उत्खनन व परिवहन की प्राथमिकी दर्ज

डीएमओ विभूति कुमार ने जिरवाबाडी थाना में अवैध परिवालन को लेकर प्राथमिकी दर्ज करायी है. दर्ज प्राथमिकी में कहा गया है कि टास्क फोर्स में शामिल एसडीओ, डीएमओ थाना प्रभारी जिरवाबाडी एवं सशस्त्र पुलि बल ने कबूतर खोपी घाट, चानन घाट, समदा घाट, मदनशाही घाट आदि क्षेत्रों में छापेमारी की. चानन घाट पर लगभग 5500 घनफीट पत्थर बोल्डर पाया गया. किसी ने भंडारित पत्थर का कोई कागजात नहीं दिखाया गया. कार्यरत मजदूर हमलोगो देखते ही भाग खड़े हुए. स्थानीय लोगों से पूछताछ के क्रम में पता चला कि कालाचंद मंडल पिता राधे मंडल, खुटहरी के अलावा चानन के संजय साह, निरंजन दास, बड़ा मदनशाही के गब्बर अंसारी, बजीर अंसारी, सुल्तान अंसारी उर्फ बिजु, रहीस अंसारी, जमामुद्दीन अंसारी, मदनशाही के बिरजू अंसारी तथा छोटा पांगड़ो के मकसूद मिया द्वारा गंगा घाटों से अवैध पत्थर का परिवहन कर व्यापार किया जा रहा है. सरकारी राजस्व की चोरी हो रही है. बगैर लाइसेंस के खनिज का उत्खनन व परिवहन कानूनन अपराध है. खान एवं खनिज विकास एवं विनियम 1957 की धारा 04 1 एवं 1 ए का स्पष्ट उल्लंघन है.

विभाग. केंद्र सरकार ने बंद की योजना

जून को बेरोजगार हो

राज्य में ब्लैक फंगस के 63 संक्रमित व 43 संदिग्ध भर्ती

रांची. राज्य में म्यूकर माइकोसिस (ब्लैक फंगस) के नए संक्रमण के मामले कम हो रहे हैं. स्वास्थ्य विभाग

पाकुड़. इलामी पंचायत में वारदात

खेत में मिला बच्ची का शव

दुष्कर्म के बाद हत्या की

Annexure - 10

झारखण्ड
JSPCB
JHARKHAND STATE POLLUTION CONTROL BOARD
TOWNSHIP ADMINISTRATION BUILDING, HEC COMPLEX, DHURWA, RANCHI 834004
Telephone: 0651-2400850 (Fax)/ 2400851/2400852/2401847/2400979/2400139

Ref. No. B-167 Ranchi, Dated 29/1/2021

A SUPPLEMENTARY REPORT ON THE FACTUAL ASPECTS AND ACTION TAKEN BY THE JHARKHAND STATE POLLUTION CONTROL BOARD IN LIGHT OF THE HON'BLE NGT ORDER DATED 23/09/2020 IN O. A. NO. 23/2017 EZ (SYED ARSHAD NASAR VS UNION OF INDIA & ORS.); O. A. NO. 776/2018 (RAMCHANDRA CHAURASIA VS STATE OF JHARKHAND) & O. A. NO. 373/2019 (PRADEEP KUMAR SINGH VS STATE OF JHARKHAND)

1. A progressive Emission Inventory & Assimilative Carrying Capacity Report has been prepared by the Center for Environment and Energy Development, New Delhi (CEED). The CPCB's Exceedence Factor (EF) method has been applied based on the average annual concentration of the $PM_{2.5}$. While adhering to the EF, it is found that the trend of air pollution is improving i.e. for the year 2015, the average annual concentration of $PM_{2.5}$ was 84 µg/m^3, followed by 80 µg/m^3 in 2016, 76 µg/m^3 in 2017, 69.1 µg/m^3 in 2018 and 64 µg/m^3 in 2019. The report has suggested the various preventive measures to be adopted in the Sahebganj district to reduce $PM_{2.5}$ level to achieve the clean air standard of 40 µg/m^3.keeping in mind the annual concentration of $PM_{2.5}$ in year 2019. It has been targeted to reduce $PM_{2.5}$ level up to 38% to ensure clean air in the district. *(The copy of Emission Inventory & Assimilative Carrying Capacity Report is enclosed as Annexure - I)*

2. No fresh CTE is being accorded in the Sahebganj district from last 1.5 years (approx).

3. In the meanwhile, after the last order of the Hon'ble Tribunal, 170 Units (Mines/Crusher) has been inspected by the Board. A Third and final show cause has been issued to the non- complying Units with a condition that if they don't comply with the conditions of the CTO/EC (as applicable) then a closure direction will be issued to them with immediate effect and Environmental Compensation will be levied.

4. To curb down the pollution and to ensure the compliances of the directions issued by Hon'ble NGT, a Monitoring Committee has been notified vide Notification no. 3001 dated 30.09.2020 by the Forest Environment & Climate Change Dept., Govt. of Jharkhand under the chairmanship of the Secretary, Urban Development &

Housing Department. *(The copy of Notification no. 3001 dated 30.09.2020 is enclosed as Annexure - 2)*

5. A total of Seventeen stone crushing units has been issued a show cause notice in light of the report of the Deputy Commissioner, Sahebganj and if found non complaint then closure direction would be issued.

6. The District Mining Task Force, Sahebganj including Regional Officer, Dumka, JSPCB as a member, have conducted rigorous inspections against all the units involved in illegal mining, storage and transportation. However, FIR against 125 defaulters have been lodged by the Task Force from Jan-19 till Dec-2020.

7. The Deputy Commissioner, Sahebganj has directed the Executive Engineer, Electric Supply Circle, Sahebganj not to provide electrical connectivity to the Stone Crushers which are not having valid CTO and Dealers Licence (Mining). Moreover he has also provided a list of Sixty Nine such Units which were illegal and has directed to disconnect their electric supply.

29/01/2021

(Rajeev Lochan Bakshi)
Member Secretary

ANNEXURE-1

TOWARDS A BETTER AIR QUALITY MANAGEMENT IN SAHIBGANJ

EMISSION INVENTORY & ASSIMILATIVE CARRYING CAPACITY*

*Disclaimer: This report is based on the data provided by the JSPCB and other government departments/agencies. Though a through scientific study is in process, therefore this report is work in progress.

SUMMARY

The Jharkhand State Pollution Control Board (JSPCB) has taken a pro-active initiative to develop an air quality management plan for Sahibganj, along with eight cities of Jharkhand, in view of prevailing poor air quality situation in the district. A well-structured management plan includes the identification and quantification of sources that contribute to pollution levels, mitigation measures, the evaluation of future emissions to assess the effectiveness of mitigation measures, and a robust monitoring mechanism.

The foremost step in developing the air quality management plan is to understand the sources of air pollution and to explore its quantitative contribution to ambient air quality. This can be done through source apportionment study. Further, the understanding of assimilative capacity of air environment is also important in air quality management as it quantifies the amount of emission loads an area can assimilate without violating the standards. ***But the estimation of carrying capacity requires a long-term seasonal and meteorological data along with other information therefore in the present report; a modified approach has been used. A detailed carrying capacity is under process.***

Thus, the report seeks ***to assess and present the major sources of air pollution in Sahibganj, their percentage contribution to ambient air quality and the PM2.5 reduction target required to achieve under the National Ambient Air Quality Standard has been computed in this report.***

In terms of methodological approach, the major sources of air pollution in Sahibganj have been identified qualitatively and assessed through the evaluation of available secondary information. Therefore, meetings, surveys and physical visits have been helpful in identifying the key sources. To develop a source apportionment a bottom-up approach is used. In this approach, an emission inventory is established for all the known sectors of the district and processed through meteorology coupled chemical transport model to ascertain their share of contribution to the air shed.

It is noteworthy to mention that the PM2.5 concentration in the district is mainly coming from the domestic sector (use of biomass in cooking and lighting) followed by the contribution of road dust. The primary reason of suspended dust is the fugitive missions coming from the mining and crushing activities prevalent in the district. Hence, ***Domestic sector accounts for 33.5% of the total PM2.5, while 17% from road dust, 12.5% from power plants and Diesel Generator sets, 7.5% from industry, 5% from vehicles, 8% from open fires and 7.5% from open waste burning. The remaining 8.1% is coming from anthropogenic emissions from outside district periphery and natural emissions together.***

In addition, satellite based PM2.5 data has been used for the last 20 years (2000–2019) to assess the air quality and understand the level of pollution in the district and required reduction. Moreover, **CPCB's *Exceedance Factor (EF) method has been applied based on the average annual concentration of the PM2.5. While adhering to the EF, it is found that Sahibganj faces critical air pollution in year 2019.*** The report has also considered the NAAQS set by Central Pollution Control Board (CPCB) to understand the pollution reduction required in Sahibganj and the extent to which it can address the issue.

The annual concentration of $PM_{2.5}$ has been recorded higher for all the years. ***For the year 2015, the average annual concentration of $PM_{2.5}$ was 84 µg/m3, followed by 80 µg/m3 in 2016, 76 µg/m3 in 2017, 69.1 µg/m3 in 2018 and 64 µg/m3 in 2019. Keeping in mind the annual concentration of PM2.5 in year 2019, PM2.5 should be reduced up to 38% to ensure clean air in the district.*** The reduction of 38% of PM2.5 from base year 2019 can bring the district into the 'moderate' to 'low' category. ***The air quality index for the year 2019 showed that the air quality has been 'moderate' category in Sahibganj. The AQI index value for the year 2019 is 113.***

Moreover, the trend analysis of monthly mean concentration of PM2.5 shows that air quality of the district can be classified in two seasons, i.e. clean air period (March to September) and polluted period (October to March). Thus, the report tries to present a vivid scenario about the current air quality of Sahibganj and the sources which are

endowed with some suggestions to control the air quality. **This document is a part of the process to develop the Clean Air Action Plan of Sahibganj.**

TABLE OF CONTENTS

List of Figures

List of Tables

ABBREVIATIONS

Jharkhand Bijli Vitran Nigam Limited	JBVNL
Central pollution control board	CPCB
Comprehensive Clean Air Action Plan	CCAAP
Compressed Nitrogen Gas	CNG
Construction and Demolition Waste	C & D
Department of Forest, Environment and Climate Change	DoFECC
Electric Vehicles	EV
End of life	EOL
Environment Protection	EPCA
Graded Response Action Plan	GRAP
HC+Nox	Hydrocarbon+ Nitrogen oxides
ICMR	Indian council for Medical Research
Jharkhand State pollution control board	JSPCB
Ministry of Environment, forest and climate change	MoEFCC
Ministry of Health and Family welfare	MoFHW
National Air Monitoring Program	NAMP
National Air Quality Index	NAQI
National Ambient Air Quality Standards	NAAQS
National Clean Air Program	NCAP
Nitrogen dioxide	NO2
Operation and continuous emission monitoring system	OCEMS
Particulate matter	PM10
Particulate Matter	PM
PHFI	Public Health foundation of India
Sulphur dioxide	SO2
Suspended Particulate matter	SPM
Pardhan Mantri Ujjwala Yojna	PMUY
Indian Meteorological Department	IMD
Heavy Motor Vehicles	HMV

Light Motor Vehicles	LMV
Exceedance Factor	EF

KEY HIGHLIGHTS

1. The PM2.5 concentration in Sahibganj is largely coming from the domestic sector (use of biomass in cooking and lighting) followed by the contribution of road dust. This suspended dust is mainly due to fugitive emissions coming from the mining and crushing activities prevalent in the district.

2. Domestic sector accounts for 33.5% of the total PM2.5, while 17% from road dust, 12.5% from power plants and DG sets, 7.5% from industry, 5% from vehicles, 8% from open fires and 7.5% from open waste burning. The remaining 8.1% is coming from anthropogenic emissions from outside district periphery and natural emissions altogether.

3. The satellite PM2.5 data for the last 20 years (2000–2019) has been used to assess the air quality of Sahibganj and understand the level of pollution and the required reduction. PM10 measured by continuous air quality monitoring stations in the year 2020 has also been analyzed.

4. Based on the Exceedance Factor for the year 2019 it is found that Sahibganj is in critical pollution level. In the last five years the exceedance factor remains between 1-2, in the year 2015, the value is 2.1, followed by 2.0 for the year 2016, 1.9 for 2017, 1.7 for the year 2018, and 1.6 for 2019.

5. The annual concentration of $PM_{2.5}$ was recorded higher for all the years. For the year 2015, the average annual concentration of $PM_{2.5}$ was 84µg/m3, followed by 80µg/m3 in 2016, 76 µg/m3 in 2017, 69.1 µg/m3 in 2018 and 64 µg/m3 in 2019.

6. PM2.5 should be reduced up to 38% taking 2019 as a base year to ensure clean air in the district. Sahibganj can be brought to moderate to low range based on CPCB exceedance factor by reducing PM2.5 concentration by the above-indicated value.

7. Based on the monthly average data of PM2.5, the Sahibganj air quality can be divided into two seasonal variations viz, the period of clean air quality (from April to September) and polluted period (October to March).

8. It is observed that air quality was in 'moderate' to 'satisfactory' category for 67% of the year, 25% in 'very poor' category while rest (8%) in 'Poor' category.

9. The air quality has been in the 'moderate' category for year 2019 in Sahibganj . The AQI index value for the year 2019 is 113.

10. The concentration of PM10 in the district monitored by Continuous Air Quality Monitors has also been used to understand the air pollution in the last year (2020) in Sahibganj.

11. The 24-hour concentrations of PM10 at all monitoring stations in year 2020 are recorded within the national standard (100mcg /m3). Based on the data monitored in these stations, the annual average concentration of PM10 is noted at 42 mcg / m3 which is below the national standard.

12. By observing air quality and keeping in mind the presence of multiple crushing and mining units, Pathna and Mandro seem to be the most affected and they have been identified as local pollution control locations.

1. LOCATION, TOPOGRAPHY & ECONOMIC PROFILE

Sahibganj (also known as Sahebganj) is situated at the North-Eastern part of Jharkhand and it has a predominantly tribal population largely of Santhals and Paharia along with non-tribal communities. Sahibganj is bounded on the North by the river Ganges and Katihar district (Bihar), on the South by the Godda district (Jharkhand), on the East by Maldah and Murshidabad districts (West Bengal), and on the West by Bhagalpur district (Bihar). Sahibganj lies approximately between 240 42' North and 250 21' North latitude and between 87025' and 87054' east longitude, and situated at the height of 37.185m from the sea level. The geographical area of the district is 1599.00 sq. km.[1]

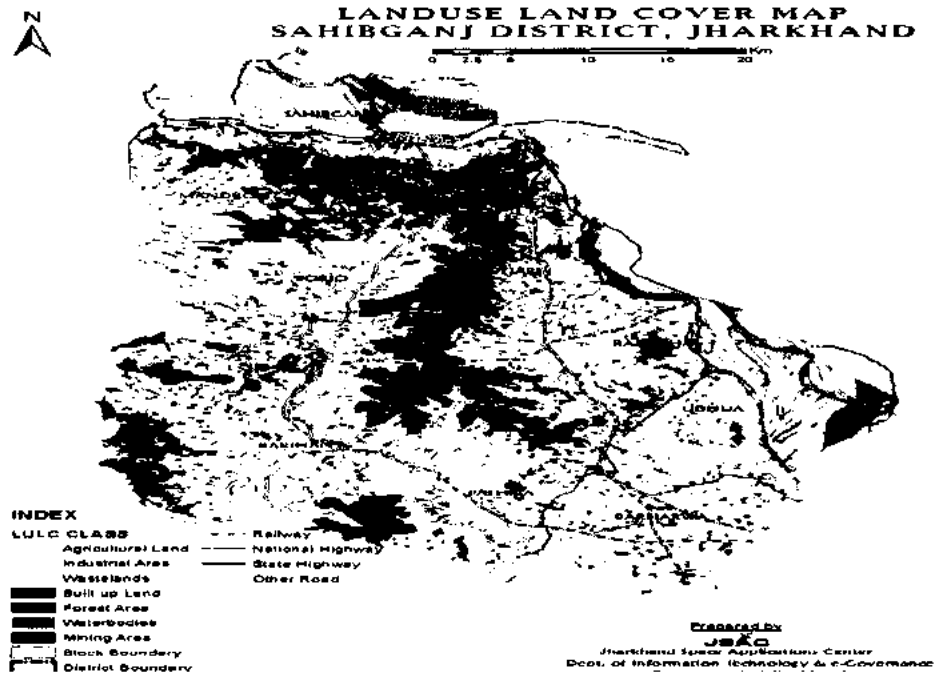


Figure 1:Land use and land cover map of Sahibganj (Source: Jharkhand Space Application Centre)

As per the Census-2011, the population of Sahibganj is 1,150,567 of which male and female were 589,391 and 561,176 respectively. Sahibganj district ranks thirteenth in terms of total population in the state. It has an average literacy rate of 53% which is

[1] https://sahibganj.nic.in/profile/

lower than the national average of 74.4%. For administrative purpose the district has been divided into 2 sub-divisions and 9 Blocks.

It has sub-tropical climate and it becomes cool during winter and record average temperature of 15°C but during summer temperature ranges from 30°C to 40C with humidity. The district receives an annual rainfall of 1500 mm, but due to its hilly topography the water during the rainy season flows away to nearby states. Since the Ganges flows in the district, this area is often prone to flood in rainy season. The district has agrarian economy and more than 64% of the total workers are engaged in agro and its allied activities.

2. SOURCES OF AIR POLLUTION IN SAHIBGANJ

The air quality management has two pre-requisite, first the identification and quantification of sources that contribute to pollution levels; and second the evaluation of scenarios for future emissions to assess the effectiveness of mitigation measures to control air quality levels. **The source profiling and capacity assessment study best serves this purpose and is a guiding factor. However, estimation of carrying capacity requires a long term seasonal and meteorological data along with other information. Therefore, in the present study, a modified approach has been illustrated. A detailed carrying capacity is under process.**

The emissions inventory for Sahibganj region has been developed for total PM in size fractions of PM2.5. As the Figure 2 shows, there are two ways to conduct the source apportionment; a top down approach (collecting samples & analyzing them in lab) and bottom approach (to use existing data and surveys).

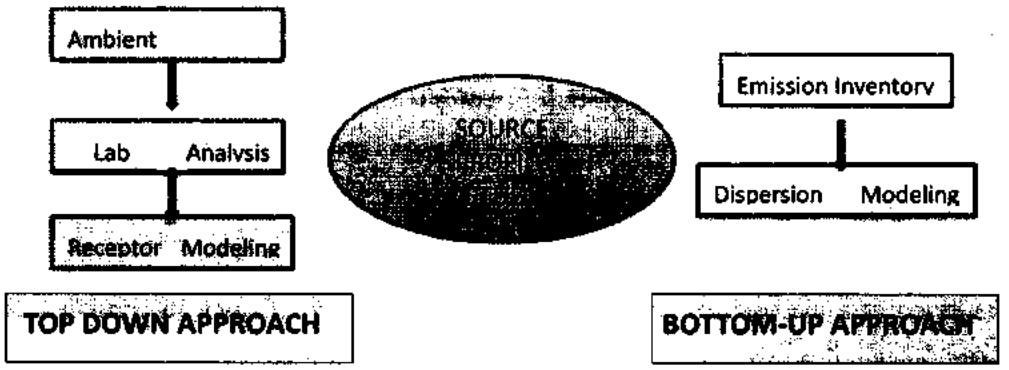


Figure 2: Diagram of process for conducting Source Profile study

Methodological Approach:

To develop a source apportionment of Sahibganj a bottom-up approach is used. In this approach an emission inventory is established for all the known sectors of the district and processed through meteorology coupled chemical transport model to ascertain their share of contribution to the air shed[2]. The major sources of air pollution in entire Sahibganj have been identified qualitatively and through

[2] Urbanemissions.info

assessment of secondary information available. Moreover, meetings, surveys and physical visits have been helpful in assessing the key sources.

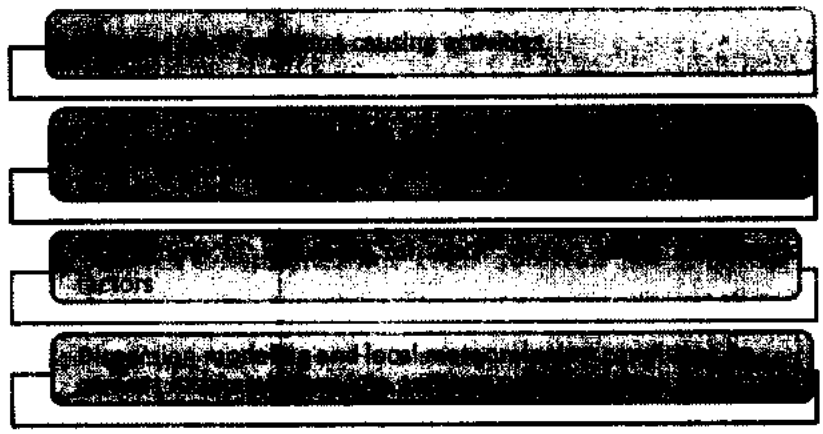


Figure 3: Flowchart of steps employed in source apportionment study of Sahibganj

The secondary information has been collated from the pollution control board, census bureau, national sample survey, industries' annual survey, municipal waste management, and publications from academic and non-governmental institutions. ***For instance, industrial energy consumption has been identified using audits and energy statistics, vehicle population has been analyzed using official transport data, and energy use at household level has been computed using the census 2011 data.***

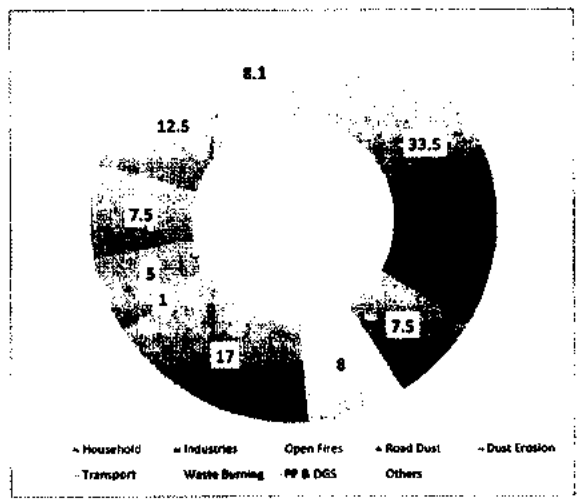


Figure 4: Sahibganj PM2.5 emission inventory[3]

- **Household**: Contribution of domestic cooking, space heating, water heating, and lighting
- **Road dust**: Contribution of re-suspended dust on the roads and construction activities
- **PP and DGS**: Contribution of power plants (PP) and Diesel Generator Sets (DGS)
- **Open fires**: Contribution of open biomass burning (both in agricultural lands and forest areas), a seasonal affair linked to dry conditions and agricultural clearing patterns (supported via satellite feeds)
- **Waste burning**: Contribution of open waste burning
- **Industries**: Contribution of industrial activities
- **Transport**: Contribution of passenger transport (two/three/four wheelers, buses, and aviation) and freight transport (heavy and light trucks, non-road vehicles, and shipping)
- **Dust erosion**: Contribution of wind-blown dust from dry and arid regions, dependent on hourly meteorological conditions
- **Others**: Contribution of anthropogenic emissions from outside (and within the modelling domain) and natural emissions

A detailed source apportionment of the major sources of air pollution in Sahibganj is described above (see Figure 4). A major reason for the increase in air pollution is attributed to the use of biomass (coal, cow dung etc.) in domestic cooking, heating and lighting purposes, while thermal power plants and extensive use of diesel generator sets in industrial units is another major contributor to total PM2.5 emissions in the region.

Domestic/household sector accounts for 33.5% of the total PM2.5, while 17% from road dust, 12.5% from power plants and DG sets, 7.5% from industry, 5% from vehicles, 8% from open fires and 7.5% from open waste burning. The remaining 8.1% is coming from anthropogenic emissions from outside district periphery and natural emissions. The suspended road dust is mainly due to fugitive emissions from mining and crushing activities prevalent in the district.

Extensive stone mining and crusher operations are one of the most notable anthropogenic activities in terms of the quantity of dust and aerosol emissions in Sahibganj. ***The road dust found in Sahibganj is composed of dust from multiple***

[3] Urbanemissions.info

sources, including wind transported mineral dust from mines and tailings as well as uncovered trucks leakage. Collectively, these are then distributed via wind and traffic activity, making them an important source of particulate matter in the region.

2.1 MINING

The district does not have large industries, but it is famous for the stone, pottery, clay washing industry and mining as they are important commercial activities there. ***Six red-category industries involving mining and clay processing unit are operational in the district[4].*** Mining is estimated to be providing direct employment to large number of people engaged in activities like extraction, crushing plant, transportation of mined stones and crushed products etc.

Sahibganj has ***a total of 604 registered small industrial units; and as the district is brimful of minor minerals like Black stone, Kaolin, China clay etc maximum of these units are based on stone mining and related query activities*** *(see Table 1).* These mining activities give rise to substantial quantity of fine fugitive dust emissions that create health hazards to the workers as well as surrounding population by way of causing respiratory diseases.

S. No.	Types of Units	Total Units
1	Registered Industrial Units	604
3	Registered Medium & Large Unit	NA
4	Number of Industrial area	NA

Table 1: Industrial setup at Sahibganj[5]

The problem of air pollution is significant in the mining area and around; activities such as stone mining and crushing causes the emission of suspended particulate matter (SPM). Many activities involving distinct physical operations, including quarrying (like drilling, blasting, loading, hauling) and plant process operations (such as crushing, screening, conveying and transfer operations) generates considerable emissions (see Table 2). Further, in mining area the internal transportation also

[4] Information provided by JSPCB

[5] http://dcmsme.gov.in/old/dips/Sahibganj.pdf

contributes to total particulate matter emission.

Activity	Process Sources	Fugitive Dust Sources
Mining	Drilling	Blasting
		Loading and hauling
Transportation	N/A	Haul roads
Stone Crushing	Crushing	Stockpiles
	Screening	Conveying
	Conveyor transfer points	

There are 320 stone crushers and 155 stone mines are operative in the district. It should also be noted that according to the 'District Profile of Sahibganj-2018', there are 282 non-operational mines in the district[67]. The production of minor minerals increased by about 38% between three years (2015-2018), indicating the contribution of mining activities to the increasing air quality of the district (see Table. 3). Further, it can be noted that most of the non-operational mines in the district have not followed any restoration plans and are also of concern.

S.No	Year	Production (cft)
1	2015-2016	118,019,586
2	2016-2017	140,699,287
3	2017-2018	195,042,738

[6]https://cdn.s3waas.gov.in/s369421f032498c97020180038fddb8e24/uploads/2018/08/2018082857.pdf

[7] Data Shared by JSPCB

[8]https://cdn.s3waas.gov.in/s369421f032498c97020180038fddb8e24/uploads/2018/08/2018082857.pdf

According to a survey report of Sahibganj prepared by the Government of ***Jharkhand, there are 77764.26 million tonnes of minor minerals (stone and kaolin)*** in seven blocks of Sahibganj, indicating the possibility of more mining activities in the district. And if the proper emission control measures are not followed, pollution will increase further.

Sr	No. of Potential Blocks identified	Total Area (Ha)	Calculated Reserve in Million Tton
		36601	
Total	27		77764.26

Table 4: Minor Mineral Reserves in Sahibganj District as on August 2018

Interventions like 'mist sprinkler, fixed sprinklers and dust extraction' should be implemented with utmost stringency to control the dust suppression and fugitive emissions. Mobile tankers are to be augmented to sprinkle water on haul road and concrete pavement, along with many other measures to reduce the pollution impacts of mining on local and urban air quality.

2.2 ROAD DUST

The re-suspension of road dust carries a large part of the burden in PM concentration and most of the dust comes from mining and crushing activities. Along with uncovered mined material transportation, lack of water spraying system and movement of heavy vehicles have brought an addition to air pollution to the locality. The measures like end-to-end road pavement, plantations along road sides, strict compliance of existing policies and the introduction of mechanical sweepers can help to reduce suspended road dust particles.

2.3 THERMAL POWER PLANTS AND DIESEL GENERATORS

Though there are no thermal power plants present inside the district but air pollution has a trans-boundary impact and sources around the peripheries of the district can also affect the air quality. The emissions from thermal power plants around the periphery of the district like NTPC-Farakka, NTPC-Kahalgaon, ECL-Pakur also

contribute to the total PM2.5 in the district.

Reliable power supply is also a major challenge in the district and most commercial establishments and industrial sets are completely dependent on diesel generator sets. Domestic electricity needs in the district are mostly met by coal-fired power stations, while mobile phone towers, commercial establishments, stone crushers and mining units, hotels and theatres generally use diesel generators to meet their electricity needs. The prevalent use of diesel generator sets also adds to the total PM2.5 load at Sahibganj.

2.4 VEHICLES

The road transport sector in Sahibganj is not a major cause of rising air pollution, but Heavy Motor Vehicles (HMVs), especially those involved in mining activities, contribute a lot. The movement and the loading and unloading activities contribute a significant percentage to air pollution.

The information on registration of total vehicles in Sahibganj clearly shows the large number of vehicles used for transport mining materials and excavation. In addition, there are many buses and trucks, which are not registered in the district, but they are moving within and across the district also contribute to pollution.

The data available in the public domain by the Transport Department, Government of Jharkhand states that there are more than 48,000 vehicles registered in Sahibganj (till September 2020) and a major proportion of them are at the end of life stage. Actually, this particularly raises concern on the air pollution. This estimate is being made in view of the data present in the Comptroller and Auditor General (CAG) report of Transport Department of Jharkhand. This report states that ***26% of the total registered vehicles in the state are over 15 years old.***

Further, new vehicles are added every year on the roads of Sahibganj. Between January 2017 and January 2020, ***around 29,000 new vehicles were registered in Sahibganj,*** The maximum number of vehicles registered is motorcycle followed by

tractor[9]. On an average it has been calculated that every year around 9000[10] new vehicles are coming on the road of Sahibganj and the way the number of vehicles in the district is increasing, especially the exponential growth of HGV vehicles is a serious concern for air pollution and it needs to be tapped.

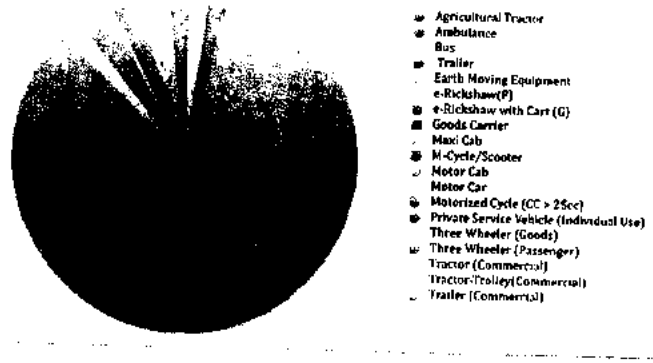


Figure 5. Vehicles Classification in Sahibganj[11] (Source:CEED analysis)

The high number of Heavy Motor Vehicles (HMVs) is a concern for the district as these vehicles emit more as compared to Light Motor Vehicles (LMVs) as most of these are diesel vehicles. Impact of movement of transportation for carrying mined material on ambient air quality of surrounding area including traffic congestion on roads. Further, the increase in purchasing capacity and the way the automobile industry is booming there is a possibility of more vehicles coming on road and further worsening of the air quality.

2.5 BIOMASS BURNING IN DOMESTIC PURPOSE FOR COOKING & HEATING

Biomass burning in massive amounts by households for cooking and lighting purposes has also led to the increase in the pollution levels in the district. This will have to be strongly curtailed. Majority of the population in district relies on solid fuels for domestic cooking and lighting purposes due to their inability to access

[9]https://cdn.s3waas.gov.in/s369421f032498c97020180038fddb8e24/uploads/2020/07/2020071625.pdf

[10] Based on CEED analysis

[11] https://cdn.s3waas.gov.in/s369421f032498c97020180038fddb8e24/uploads/2020/07/2020071625.pdf

cleaner and more efficient sources of energy. The Census of India-2011 in its 'Household and Amenities Survey' has presented a morbid scene for Jharkhand (88%), the state ranks third among the highest consumers of biomass and charcoal.

The district level data of Sahibganj shows that the majority of the households use solid fuel as a household fuel (see Figure 6). **Merely 5% of the total population uses LPG/PNG for cooking in households.**

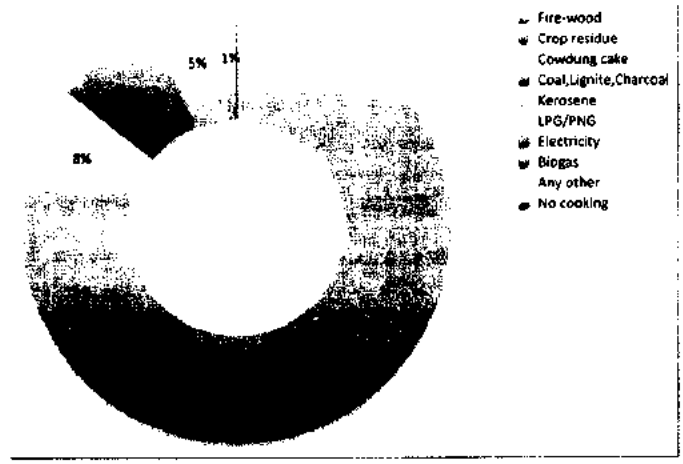


Figure 6: Status of cooking fuel usage in [illegible] Source: GIS analysis

However, due to Pradhan Mantri Ujjwala Yojna (PMUY) and several other initiatives to promote cleaner energy options the number of households using solid fuel decreases in the district. But, still the situation is far from favourable.

The clean fuels should be made economically viable for domestic use as compared to cheaper solid fuels such as coal, firewood and crop residues. Sahibganj requires 100 percent LPG penetration and reliable supply for domestic and commercial usage, which will also require strong public awareness program support.

2.6 SOLID WASTE BURNING

With incompetent waste management systems in the district there are chances that waste deliberately burned to free up space at dumpsites, to facilitate scavenging of non-combustible materials (such as metals) for profit, or for use as a heat source.

[12] CENSUS Survey-2011

Further, in uncontrolled landfills and dump sites, waste may also spontaneously combust adding much to the already polluted air.

2.7 BRICK KILNS AND OTHER SOURCES

Owing to presence of river Ganges in the district few brick kilns also flourishes in the district. Six major brick kilns have been found operating in the region[13].

[13] Based on the data provided by CPCB

3.ASSIMILATIVE CARRYING CAPACITY OF SAHIBGANJ

Sahibganj is witnessing unprecedented poor air quality that leads to worrisome public health scenario. Apart from analysing the current situation of pollution, ***it is also necessary to understand how much pollution can be assimilated without violating the standards in the district. As mentioned earlier, assimilative carrying capacity is a key parameter to understand this but considering the lack of long-term information on metrological data and others in the present study, a modified approach has been illustrated.***

The report attempt to investigate the air quality situation and its prospective threat to the district of Sahibganj ***by computing the 'Exceedance Factor' of the region. An estimate has also been made on the necessary reduction in pollution to achieve NAAQS using the annual PM2.5 concentration. Moreover, to comprehend the level of pollution trend analysis the monthly mean concentration of PM2.5 for last 20 years (2000-2019) has been computed***. The study has put focus on particulate matter as generally concentration of gaseous pollution is comparatively less compared to particle pollution in mining areas.

Both the ***satellite-based available data in public domain and ground data is used to understand the morbid picture of air pollution in the district.*** It can to be noted that two main sources used to create $PM_{2.5}$ exposure data are ground-based measurements (especially regulatory monitoring) and satellite retrievals (especially aerosol optical depth, (AOD)[14]. Aerosol Optical Depth (AOD) is a quantitative estimate of the amount of aerosol present in the atmosphere, and it can be used as a proxy for surface Particulate Matter PM2.5[15].

In order to evaluate the pollution intensity and air quality status of Sahibganj district, the Exceedance Factor (EF) method given by CPCB has been applied. An EF

[14] https://www.tandfonline.com/doi/abs/10.1080/10962247.2019.1668498?journalCode=uawm20

[15] http://cimss.ssec.wisc.edu/goes/OCLOFactSheetPDFs/ABIQuickGuide_BaselineAerosolOpticalDepth.pdf

is the "proportion of the yearly average concentration of a pollutant and its particular standard". The equation for calculating Exceedance Factor is below:

Exceedance Factor (EF) = (Yearly average concentration of the pollutant)/(Yearly standard for that particular pollutant)[16]

The air quality has been classified into four broad categories based on an Exceedance Factor.

- **Critical pollution (C): EF is above 1.5**
- **High pollution (H): EF is between 1.0–1.5**
- **Moderate pollution (M): EF between 0.5–1.0; and**
- **Low pollution (L): EF is below 0.5.**

Based on the EF, any locations in either of the first two categories are actually not meeting the standards, although, with varying magnitude. Those, falling in the third category are meeting the standards as of now but likely to exceed the standards in future if pollution continues to increase and it is not controlled. However, the locations in Low pollution category have a rather clean air quality[17].

The satellite based annual average concentration of PM2.5 has been used to understand the air quality of Sahibganj with respect to NAAQS. ***The analysis found a significant amount of concentration in the city, as the range of PM2.5 is witnessed at high level between these years. Based on the data PM2.5, the exceedance factors are calculated which is shown in Figure 7.*** It is evident from the figure that the pollution level crosses critical level for PM2.5 in all the years. This indicates that immediate attention is needed to curb the particulate matter.

The Exceedance value for the PM2.5 in all consecutive years, i.e., ***from 2000 to 2020, was within 1.6 to 2, which is a critical level. In the last five years the exceedance***

[16] Central Pollution Control Board

[17] https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvMzJfMTQ1ODEyNjU5MV9OZXdJdGVtXzE5Ml9OQUFRU1RJLnBkZg==

factor remains between 1.5- 2, in the year 2015, the value is 2.1, followed by 2.0 for the year 2016, 1.9 for 2017, 1.7 for the year 2018, and 1.6 for 2019 (see Table 5).

The district of Sahibganj has been found with critical level of pollution with respect to PM2.5 thus more efforts in terms of mitigating emissions are required.

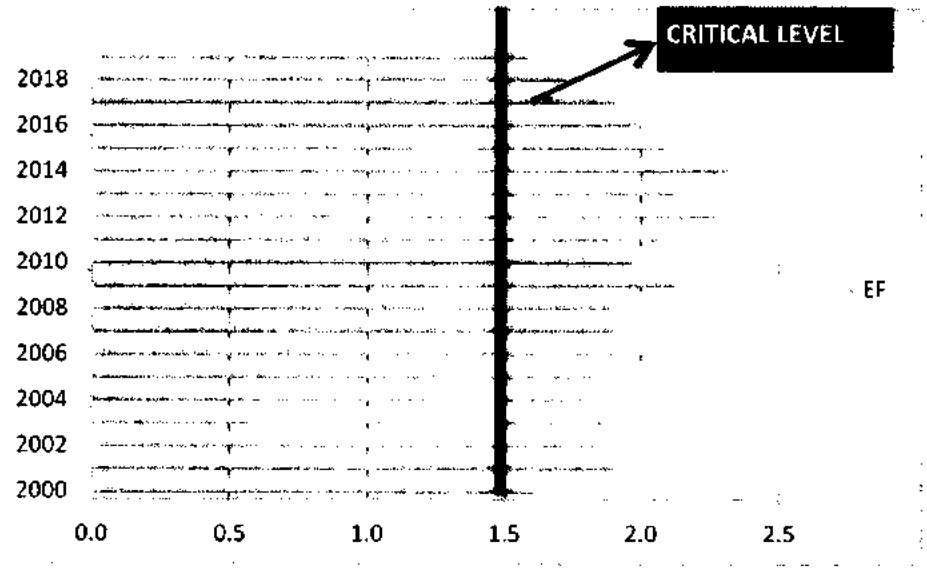


Figure 7: Exceedence factor of PM2.5 in Sahibganj (2000-2019)[18] (Source: CEED Analysis)

YEAR	EF	CATEGORY	YEAR	EF	CATEGORY
2000	1.6		2011	2.1	
2001	1.9		2012	2.3	
2002	1.8		2013	2.1	
2003	1.9		2014	2.3	
2004	1.9		2015	2.1	
2005	1.9		2016	2.0	
2006	2.0		2017	1.9	
2007	1.9		2018	1.7	
2008	1.9		2019	1.6	

[18] Satellite data

2009	2.1	[redacted]
2010	2.0	

Table 5: Exceedance factor as per for consecutive years. Source: CEED analysis

Considering the National Ambient Air Quality Standard prescribed by the CPCB, the present study also highlights the extent to which pollution has increased in Sahibganj district and how much pollution reduction is required. The CPCB standards fall above the World Health Organization's (WHO) Interim Target-2 (IT-2) (WHO, 2006). ***The annual concentration of $PM_{2.5}$ was recorded higher for all the years. For the year 2015, the average annual concentration of $PM_{2.5}$ was 84µg/m3, followed by 80µg/ m3 in 2016, 76 µg/m3 in 2017, 69.1 µg/m3 in 2018 and 64 µg/m3 in 2019*** (Figure 8).

Keeping in mind the average annual concentration of PM2.5 in Sahibganj district for last 20 years, ***PM2.5 should be reduced up to 38% taking 2019 as base year to ensure clean air in the district.*** *Sahibganj can be brought to moderate range based on CPCB exceedance factor by reducing PM2.5 concentration by the above-indicated value.*

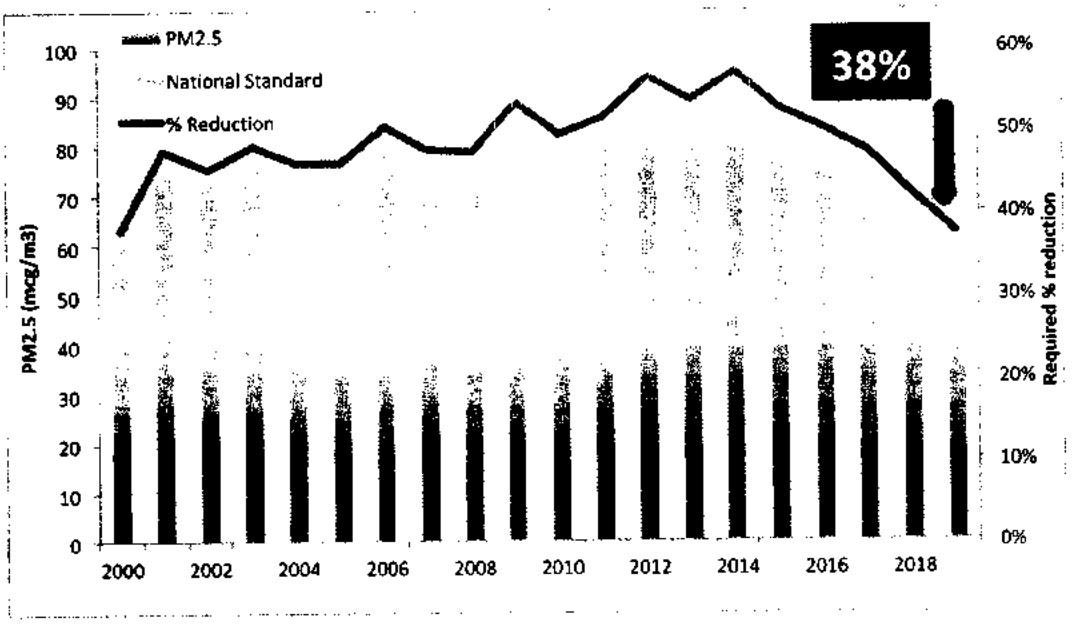
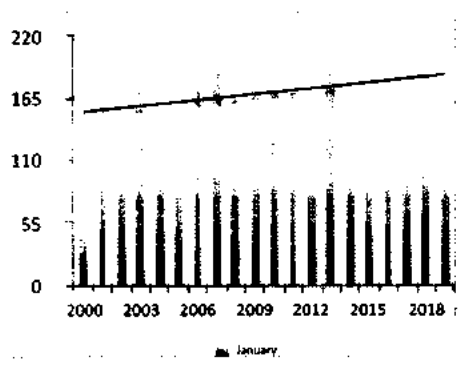


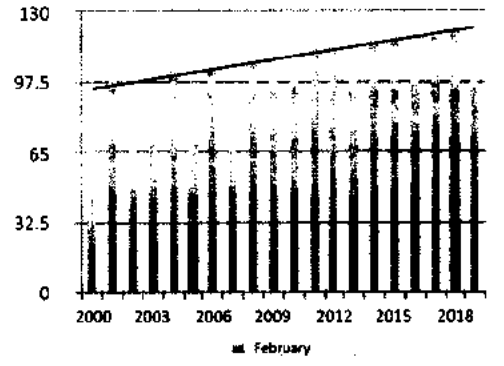
Figure 8: Annual trend of PM2.5 and % reduction required (Source: CEED Analysis)

[19] Satellite data

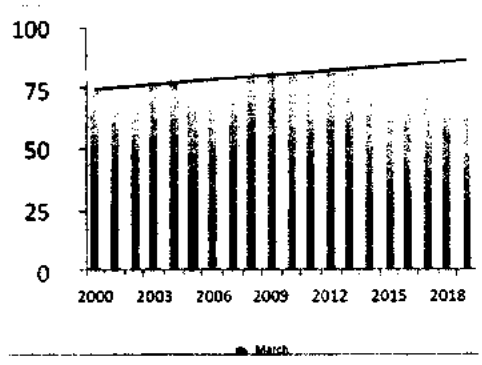
To understand the monthly variation in PM2.5 concentration in Sahibganj the report computed the monthly trend of PM2.5. As per the Figure 9 mentioned below, which has been prepared based on the monthly average data of PM2.5, ***the Sahibganj air quality can be divided into two seasonal variations viz, the period of clean air quality (from May to September) and polluted period (October to March)***. This type of variations mainly takes place due to seasonal effect when during winter month vertical winds with high pressure prevails on the ground which results in the concentration of pollutants at the surface for a more extended period and so recording the high pollution levels. The concentrations of PM 2.5 between May and September have generally been found to be within the safe limit[20].



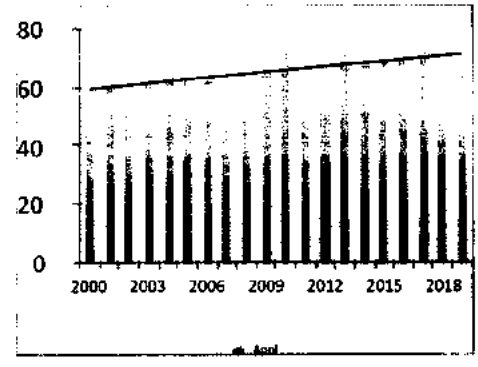
A. January



B. February

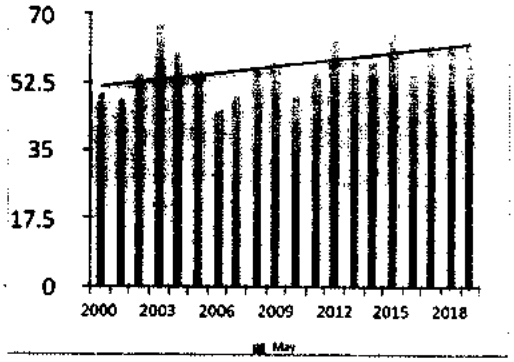


C. March

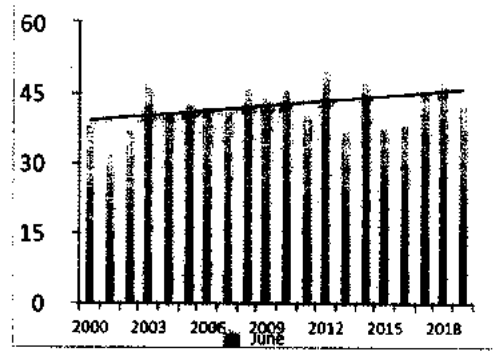


D. April

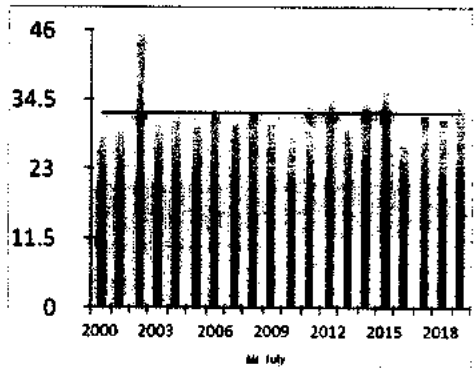
[20] Monthly national standard for PM2.5 does not exist



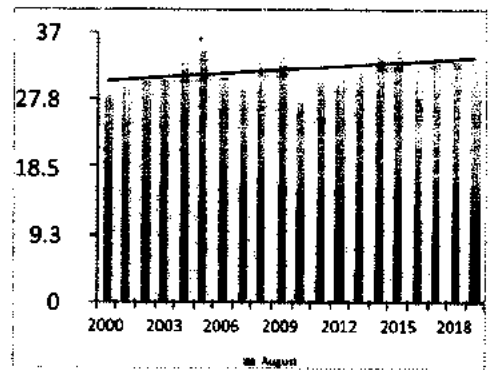
E. May



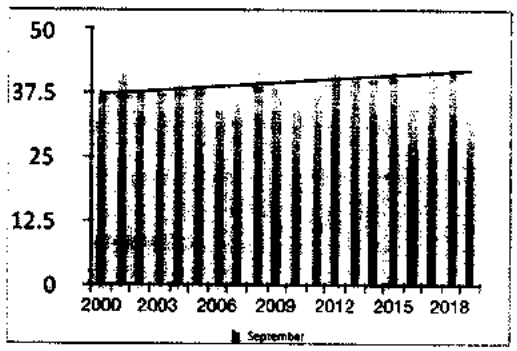
F. June



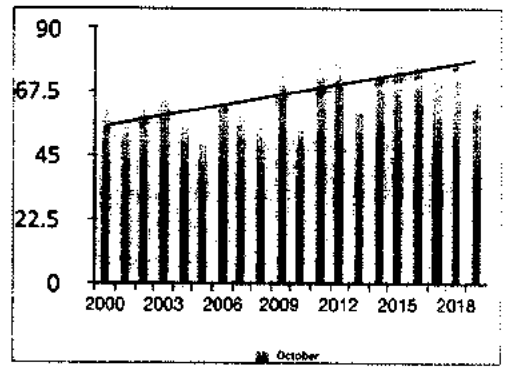
G. July



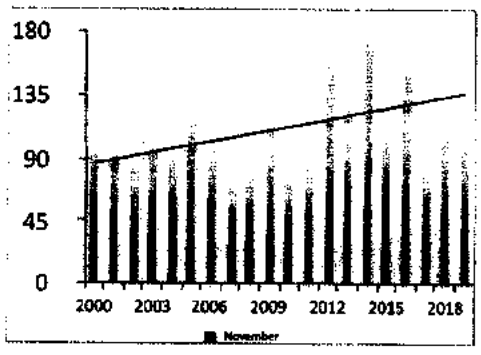
H. August



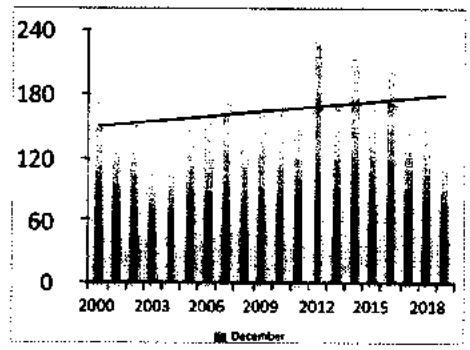
I. September



J. October



K. November



L. December

Figure 15: Monthly mean concentration of PM2.5 over the years (2000-2019)[21] (Source: CEED Analysis)

3.1 AIR QUALITY INDEX

The total number of months with varied Air Quality Index (AQI) values in accordance with CPCB's AQI category is elaborated in the graph for year 2019. It is observed that air quality was in 'moderate' to 'satisfactory' category for 67% of the year, 25% in 'very poor' category while rest (8%) in 'Poor' category

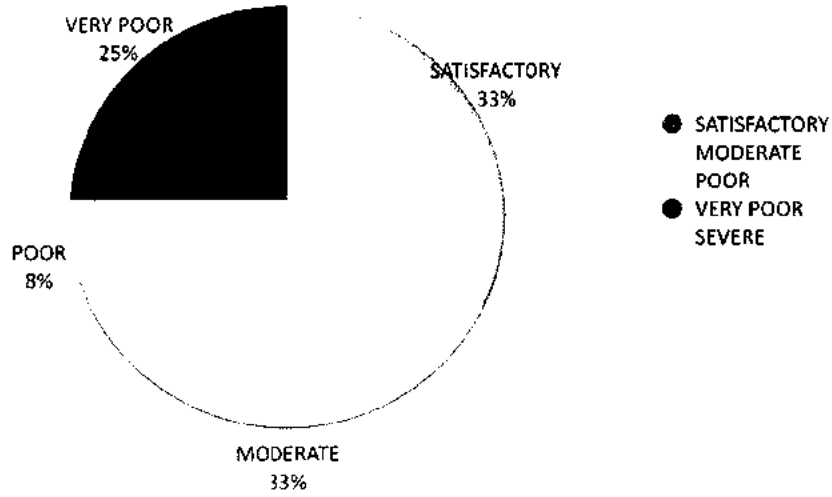


Figure 16: Monthly distribution of air quality index in Sahibganj district[22] (Source: CEED Analysis)

In the year 2019, the air quality in Sahibganj has been in the 'Moderate' category. The AQI index value for the year 2019 is 113 indicating that the air quality in the district has been generally in 'poor' to 'very poor' category for 3-4 months, the rest of the time it is in 'moderate' to 'satisfactory' category. This is also indicated in the monthly trend of PM2.5 for the last 20 years, as discussed above.

[21] Satellite data

[22] Satellite data

The downward trend in the air quality index has also been observed in the last five years (2015-2019). AQI was 180 in 2015, 167 in 2016, 153 in 2017, 130 in 2018 and 113 in 2019.

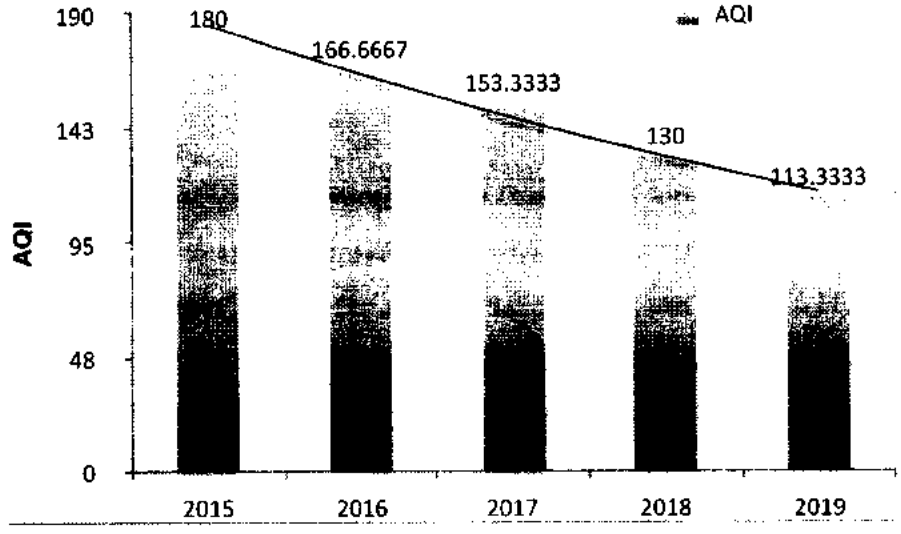


Figure 11: Annual AQI noted in 2015-2019 (Source: CLED Analysis)

3.2 TREND OF PM10 CONCENTRATION (2020)

For measuring the PM10 concentration, few continuous air quality monitors have been installed in the district in January 2020. These are located inside or around the periphery of the mines. Air quality monitoring stations are installed at ***Mandhan Mines, M / S Maa Ambika Mines, Bhagwan Stones and Maa Ambika traders (old)***. The PM10 value recorded at these stations has also been used to understand the trend of pollution in relation to PM10 in Sahibganj. Although the data monitored is discrete, it is sufficient to represent the air quality observed in the district in the year 2020 (see Figure 11).

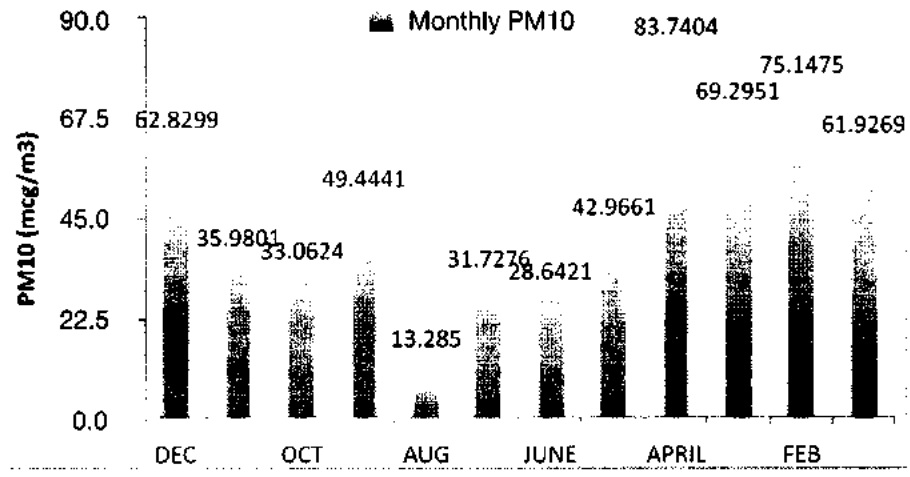


Figure 12: Monthly mean concentration of PM10 in year 2020[23] (Source: CEED Analysis)

The 24-hour concentrations of PM10 ***at all monitoring stations in year 2020 are recorded within the national standard (100mcg/m3)[24]. Based on the data monitored in these stations, the annual average concentration of PM10 is noted as 42 mcg / m3, which is below the national standard.***

3.3 AIR QUALITY MONITORING

The district Sahibganj, which is famous for stone chips, is witnessing severe levels of air pollution. Known sources of air pollution, such as vehicles, industries and mining, solid fuel usage, brick kilns, road dust etc., are responsible for the air pollution in Sahibganj. To understand the air quality in the district a robust network of air quality monitoring stations is required. The required number of minimum air quality stations required for understanding the trends of the pollutants is recommended in the guidelines for ambient air quality monitoring developed and published by CPCB.

Based on the thumb rule proposed by CPCB and district level population (2011 census), the minimum number of air quality monitoring stations required in Sahibganj is 5 as mentioned below in Table 6. The calculated required stations have also been correlated with the analysis and findings of several other reports.

[23] CAAQMS data provided by JSPCB

[24] http://cpcbenvis.nic.in/air_pollution_main.html#

City	Minimum no. of required stations
Sahibganj	5

Table 6 Requisite expansion of air quality monitoring network based on CPCB guidelines[25]

Moreover, the possibility of low cost sensor based air quality monitors and use of satellite-driven air quality data should also consider. This can help in assessing a much larger area to generate baseline data for local action.

4. LOCAL POLLUTION HOT SPOTS

There are 9 blocks in Sahibganj district, out of which mining and stone crushing activities are prevalent in 7 blocks. While observing air quality and the presence of multiple crushing and mining units, Pathna and Mandro have been seemed to be the most affected and have been identified as local pollution control locations. The process of identification of major polluting clusters in this block is under progress and local action plan will be implemented

A local pollution hot spot action plan is also required for the Rajmahal block. Most of the china clay processing units are situated in this block. The District Survey Report has also identified that Pathna, Mandro and Takjhari blocks has maximum mineral reserve, making new units more likely to be established, resulting in further deterioration of air quality[26].

[25] http://www.indiaairquality.info/wpcontent/uploads/docs/2003_CPCB_Guidelines_for_Air_Monitoring.pdf

[26] https://cdn.s3waas.gov.in/s369421f032498c97020180038fddb8e24/uploads/2018/08/2018082857.pdf

Figure 13 Local pollution hot spots in Sahibganj

5. EXISTING POLICIES AND PROGRAMS FOR REDUCING POLLUTION

Any clean air action plan should be developed based on the review of the current challenges in each sector and existing policy and schemes both at the State and National level. The current status of the ongoing policy initiative in each sector is important to align the emerging policy initiatives and actions for reducing the pollution level. Thus, a brief review of every policies and programs pertaining to the sector concern for air pollution has been undertaken. The current policies and programs in each region are given below.

4.1 INDUSTRIES

Over the last few years JSPCB has undertaken many steps to improve regulatory framework for industrial emissions.

4.1.1 Compliance of Emission Standards, OCEMS & Environment (Siting for Industrial Projects) Rules, 1999

Industries release large quantum of pollutants through air emissions and effluent discharge. In order to regulate such emissions and discharges to safe limits, CPCB has prescribed standards for various pollutants emitted/discharged by the industries as notified under the Environment (Protection) Act, 1986. Further to strengthen the compliance monitoring and also to ensure that industries and facilities comply with emission standards in June 2015, installation of OCEMS in 17 categories of highly polluting industries has been mandated[27].

However, it is also important to have an immediate implementation of the new sulphur oxides (SOx) and nitrogen oxides (NOx) standards that have been notified by the MoEF&CC in March 2018. The stringent compliance of the Environment (Siting for Industrial Projects) Rules-1999 should also be ensure during the implementation of the new industrial development projects or shifting of the current projects.

4.1.2 Star Rating Program

JSPCB is also implementing the star-rating program. The program utilizes the continuous monitored emissions data from major industrial plants to categorize industry from least complaint to the most compliant. The program is bringing more transparency to control emissions from industries and also incentivize quicker uptake of improved emissions control system.

4.1.3 Emissions from thermal power plants

The thermal power plants emit harmful gases and particulate matter and most important among them are sulphur oxides, nitrogen oxides and particulate matter. The Union Ministry of Environment, Forest and Climate Change (MoEFCC) had set standards to limit the concentration of these from coal power plants. Further in December 2015, it had come out with new standards to limit the concentration of pollutants, which has been further extended to the year 2022. Few thermal power plants are in around the Sahibganj and it is crucial to ensure that the power plants comply with the new standards by an early date.

---

[27] http://www.indiaenvironmentportal.org.in/files/file/Revised%20Guidelines%20for%20Real-time%20Effluent%20Quality%20Monitoring%20System.pdf

	Before 31.12.03	After 31.12.03 - 31.12.16	[illegible]
Particulate Matter (PM)	100mg/N3	50 mg/Nm3	30 mg/N3
SO2	600 mg/Nm3 (For < 500 MW Unit)	200 mg/Nm3 (For => 500 MW Unit)	100 mg/Nm3
NOx	600 mg/Nm3	300 mg/Nm3	100 mg/Nm3
Mercury	NIL (< 500 MW Unit) 0.03 mg/ Nm3 (=>500 MW Unit)	0.03 mg/Nm3	0.03 mg/Nm3
Water	1. All plants with once through cooling (OTC) shall install cooling tower and achieve specific water consumption (SWC) up to maximum of 3.5 m3 /MWh within a period of 2 years from the date of publication of the notification. 2. All CT-based plants reduce SWC up to maximum of 3.5 m3 /MWh within a period of 2 years from the date of publication of the notification. 3. New plants to be installed after 1 January 2017 shall have to meet SWC up to maximum of 2.5 m3 /MWh and achieve zero wastewater discharge.		

Table 7: New environmental norms for thermal power stations (MoEFCC 2015)[28]

For each thermal power plants, a transition plan need to be drawn up and stringent stack monitoring to be scaled up for the plants which have higher emissions. This will enable the emission control and ensure compliance.

3.2 VEHICLES

4.2.1 Emission Control of on road vehicles

The emission standards have been set by the central government to keep a check on the pollutant levels emitted by vehicles that use combustion engines. Following the national roadmap, Jharkhand has implemented the Bharat Stage VI (BSVI) emission norms for new vehicles in April 2020. As per BS-VI emission norms, it is expected to reduce the pollution level in the state; petrol vehicles will have 25% reduction in their

[28] https://www.teriin.org/sites/default/files/2020-02/emissions-control-thermal-power.pdf

NOx while diesel engine will reduce their HC+NOx by 43%, NOx level by 68% and particulate matter by 82%. It helps to ensure low emissions of new vehicles.

However, the on-road emissions from older vehicles are also important to regulate as usually their emissions are higher than those from newer ones because of deteriorated engine, decreased fuel efficiency, low maintenance, etc. Due to the presence of a large number of old and ill-maintained vehicles in the state, the benefits of strict emission norms and introduction of BS VI vehicles will not be reflected in the ambient air quality. To check emissions from these vehicles and to ensure proper maintenance, Central Motor Vehicle Rules (1989) mandates every one-year-old transport and non-transport vehicle to be tested for emission compliance and obtain a PUC certificate. However, due to fraud, ineffective implementation, and infrastructural constraints, the current system (PUC) is failing to effectively control emissions from vehicles. A robust implementation and strengthening of the current emission control system (PUC) is needed to effectively mitigate vehicular emission.

4.2.2 CNG and Electric Mobility

Compared to petrol and diesel, CNG vehicles are pollution free as it is made up of methane and results in less carbon emissions. Additionally, it has close to zero emissions of particulate matter. ***In a major push towards CNG transportation in the personal mobility space, rollout of 200 to 250 CNG stations within the next few years has been announced for Jharkhand***[29].

In partnership with the Energy Efficiency Services Limited (EESL), Jharkhand government has adopted an E-mobility program for the deployment of 50 electric vehicles (EVs) for various Jharkhand Bijli Vitran Nigam Limited (JBVNL) offices in Ranchi. However the state does not have a statewide comprehensive Electric Vehicle Policy yet. The state wise number of electric/battery operated vehicles in India shows

[29] https://auto.economictimes.indiatimes.com/news/oil-and-lubes/cng-png-project-launched-in-jharkhand/70815043

that as on 9 July 2019, 5257 electric/battery-operated vehicles exist in Jharkhand. Out of the total 36 are the electric cars[30].

National Urban Electric Mobility Mission by the Union Government gives a considerable opportunity in Jharkhand to adopt electric mobility and to reduce the vehicular emission. Converting maximum fleet to electric powered, will result in reduction in air pollution to a large extent. ***Sahibganj is favourable for quicker adoption of the electric vehicles because of their compact periphery, urban design and being small in area.***

4.2.3 Phasing of old vehicles

Many studies have highlighted that the emission rate of vehicles generally increases with usage over time, and diesel and petrol vehicles should be scrapped as they reach their End-of-Life (EOL) stage after 10 and 15 years respectively. Jharkhand has been articulating the need to phase out all the old polluting vehicles. But despite repeated directives and drafts, implementation has not been done. As of now no cities in Jharkhand have phase out program for older vehicles.

4.2.4 Movement of Heavy Motor vehicles (HMV)

The heavy vehicles (Trucks and Trollies) play a major role in the economy of the state especially in Sahibganj; the vehicle movement and operations like hauling coals from mines to industries and transporting thousands of raw materials around cities. But these vehicles also greatly affect the air pollution and public health. The heavy-duty vehicles comprise only about mere percent of all vehicles on the road, yet they contribute to large emissions that come from the transportation sector. The movement and the loading and unloading activities contribute a significant percentage to air pollution.

A spatial planning and development of road network to bypass the highly populated cities should be done, ensuring the norms like covering the loading and pavements of pathway in coal yard. Continuing to lower emissions from heavy-duty vehicles is an important step.

---

[30] https://www.indiastat.com/transport-data/30/transport/30/vehicles/289/stats.aspx

4.2.5 Public Transport

The public transport produces significantly less air pollution per passenger mile than a standard car carrying a single driver and also helps to keep traffic congestion lower, which in turn reduces air pollution from idling vehicles and fetch many more people in much less space than individual automobiles. Apart from rising affluence and economic progress, lack of effective and convenient public transport can be seen as the major reason for high growth of private vehicles.

4.3 SOLID FUEL BURNING

Firewood, animal dung, and low quality coal are some of the fuels commonly used in households across Sahibganj as a means of generating energy for cooking, light, and heating purposes. Their contribution to the total particulate matter places the need of immediate action. The Pradhan Mantri Ujjwala Yojana (PMUY) is an initiative taken by the Government of India to promote LPG for use in households is also implemented in Sahibganj but further expansion is needed. More effort is required, in particular, increasing the use of electricity as a substitute and ensuring that the use of LPG is sustained.

5. CONCLUSION

Air pollution is one of the most serious public health risks we face today. The study published by British Journal 'Lancet Commission' ranks India first in terms of air pollution-related deaths with 1.24 million deaths recorded in the year 2017[31]. The same report has predicted that nearly 100.2 deaths per 100,000 in Jharkhand occurred due to rising air pollution[10]. Further, the state-level disease burden estimates (released by IHME, ICMR and PHFI) shows that air pollution is the third-largest risk factor responsible for the premature deaths in Jharkhand. The air pollution exposure is associated with a broad range of health effects; short-term effects and long-term effects. Ischaemic heart disease and lower respiratory

[31] https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(18)30261-4/fulltext

infections have been identified as the leading cause of disability in year 2017[32].

As this report has indicated through the source apportionment study, one of the major source that contributes large amounts of pollution in the districts is the use of biomass in cooking methods at domestic level. In addition to this, the air pollution is increasing mainly due to the movement of heavy vehicles, mining and crushing activities and transportation of raw materials and it needs to be reduced through stringent enforcement. Hence, policy interventions, regulatory frameworks and capacity building and public awareness programs at the industry and community level can deal with the air pollution, which are mentioned below:

- A well-defined strategy should be in place, and in this connection Graded response action plan (GRAP) is important for immediate response, emergency action along with public health advisory during episodic spikes of air pollution.

- A comprehensive clean air action plan to cap emissions from identified sources by taking strong and sustained action has great significance. This may range from strict compliance of existing policies and adherence of emission norms to initiate interventions likemist sprinkler, fixed sprinklers and dust extraction' should be implemented with utmost stringency to control the dust suppression and fugitive emissions.

- Although some immediate interventions, such as strict implementation of local action plans for pollution hotspots and strict vigilance of norms violations from non-compliance activities are being implemented, but more robust steps are required for ensuring breathable air. For instance, a robust implementation and strengthening of the current emission control system (PUC) is needed to effectively mitigate vehicular emission. There should be more periodic inspection to ensure that the transport of the mined raw material is done with covered vehicles.

- Apart from phasing out the older vehicles, increasing use of cleaner fuels (e.g. CNG), cleaner energy sources (solar powered solutions) and zero emission based

[32] https://phfi.org/wp-content/uploads/2018/05/Jharkhand-Disease-Burden-Profile.pdf

efficient public and transport systems (such as Electric mobility) should be promoted at a wider scale to curb the hazardous impact of air pollution.

- A series of awareness programs and capacity building of personnel involved in the industry and reclamation and rehabilitation of abandoned mines needs to be ensured. Also, public eduction and community awareness is the key in ensuring a sustainable environment and breathable city.

BIBLIOGRAPHY

1. https://www.sciencedirect.com/science/article/pii/S0160412019301539
2. https://link.springer.com/article/10.1007/s10098-009-0270-z
3. https://jharkhand.pscnotes.com/jharkhand-general-studies/jharkhand-economy/jharkhands-major-industriesthier-location-and-industrial-development/
4. http://moef.gov.in/wpcontent/uploads/2017/06/moef_gov_in_citizen_specinfo_siguin_html.pdf
5. https://jspcb.nic.in/upload/uploadfiles/files/Star%20Rating%20---AAAAA%20(1F)(5).pdf
6. https://india.mongabay.com/2019/08/pollution-control-in-coal-based-thermal-power-plants-will-cost-money-but-benefits-will-outweigh/
7. https://auto.economictimes.indiatimes.com/news/oil-and-lubes/cng-png-project-launched-in-jharkhand/70815043
8. https://mercomindia.com/jharkhand-adopts-e-mobility-program-in-partnership-with-eesl/
9. https://www.ucsusa.org/resources/cars-trucks-buses-and-air-pollution
10. https://www.tandfonline.com/doi/abs/10.1080/09208119108944290?src=recsys
11. http://ibm.nic.in/writereaddata/files/022320181147l0Jharkhand%20AdvanceRe2016.pdf
12. https://shaktifoundation.in/wp-content/uploads/2019/12/PCAAP_Report_Final-3-1.pdf
13. http://164.100.107.13/upload/NewItems/NewItem_174_FinalReport_onInventorizationof17CategoryGPIRedCategoryIndustries.PDF
14. https://www.jspcb.nic.in/upload/5d6cabafc0dec5bd05a060aaefUpdated_list_of_17_Cat._of_highly_polluting_Ind._and_calibration.pdf
15. http://jsac.jharkhand.gov.in/pollution/
16. https://cpcb.nic.in/Actionplan/Raipur.pdf
17. https://cpcb.nic.in/Actionplan/Korba.pdf
18. https://cpcb.nic.in/Actionplan/Kashipur.pdf
19. https://cpcb.nic.in/Actionplan/Bhubaneswar.pdf
20. https://ranchi.nic.in/economy/
21. http://dcmsme.gov.in/dips/DIPS-Saraikela-Kharsawan.pdf
22. http://dcmsme.gov.in/dips/DIPS%20Dumka.pdf
23. http://dcmsme.gov.in/dips/DIPS%20Hazaribagh.pdf
24. http://dcmsme.gov.in/dips/Pakur.pdf
25. http://dcmsme.gov.in/dips/Sahibganj.pdf
26. http://dcmsme.gov.in/dips/Ramgarh.pdf
27. http://dcmsme.gov.in/dips/DIPS%20Ranchi.pdf
28. https://cpcb.nic.in/displaypdf.php?id=bWFudWFsLW1vbml0b3JpbmcvTG9jYXRpb25fZGF0YV8yMDE4LnBkZg==
29. https://cpcb.nic.in/displaypdf.php?id=bWFudWFsLW1vbml0b3JpbmcvTG9jYXRpb25fZGF0YV8yMDE3LnBkZg==

30. https://cpcb.nic.in/displaypdf.php?id=bWFudWFsLW1vbml0b3JpbmcvTG9jYXRpb25fZGF0YV8yMDE2LnBkZg==
31. https://cpcb.nic.in/displaypdf.php?id=bWFudWFsLW1vbml0b3JpbmcvTG9jYXRpb25fZGF0YV8yMDE1LnBkZg==
32. https://www.jspcb.nic.in/upload/project/5d15e105232d4ACTION%20PLAN%20FOR%20IMPROVING%20AIR%20QUALITY%20OF%20DHANBAD.pdf
33. https://www.teriin.org/sites/default/files/2020-02/emissions-control-thermal-power.pdf
34. https://cerca.iitd.ac.in/app/assets/cities-plan-pdf/Orrisa/Bhubaneswar.pdf
35. https://cpcb.nic.in/Actionplan/Bhubaneswar.pdf
36. http://ceedindia.org/know-what-you-breathe-air-pollution-statistics-for-north-indian-cities/
37. http://ceedindia.org/towards-healthy-air-for-patna/
38. http://ceedindia.org/air-pollution-begins-at-home/
39. http://ceedindia.org/wp-content/uploads/2019/01/PUC-Report-I-1.pdf

ANNEXURE-2

झारखण्ड सरकार

वन, पर्यावरण एवं जलवायु परिवर्तन विभाग

अधिसूचना

संख्या-[illegible]-02/2012-3001 राँची, दिनांक-30/09/[illegible]

मुण्डा-मदनशाही एवं बड़ा [illegible], जिला-साहेबगंज में गंगा नदी के किनारे [illegible] ट्रस्ट/पत्थर की अवैध [illegible] / [illegible] से परिवहन तथा [illegible] के कारण गंगा नदी में हो रहे प्रदूषण संबंधी विषय की नियमित समीक्षा हेतु निम्नवत् Monitoring समिति गठित की जाती है :- [illegible]

1. सचिव, नगर विकास एवं आवास विभाग, झारखण्ड, राँची। — सदस्य।
2. सचिव, परिवहन एवं नागर विमानन विभाग, झारखण्ड, राँची। — सदस्य।
3. सचिव, खान एवं भूतत्व विभाग, झारखण्ड, राँची। — [illegible]
4. सचिव, उद्योग विभाग, झारखण्ड, राँची। — [illegible]
5. सदस्य सचिव, झारखण्ड राज्य प्रदूषण नियंत्रण पर्षद, राँची। — सदस्य।
6. क्षेत्रीय मुख्य वन संरक्षक, दुमका।

समिति गठन के प्रस्ताव पर मुख्य सचिव, झारखण्ड का अनुमोदन प्राप्त है।

ह0/-
(सुनील कुमार)
विशेष कार्य पदाधिकारी

ज्ञापांक-3/[illegible](वि0)-02/2012-3001 राँची, दिनांक-30/09/[illegible]

प्रतिलिपि-सचिव, नगर विकास एवं आवास विभाग, [illegible] राँची/[illegible] विमानन विभाग, झारखण्ड, राँची/[illegible] झारखण्ड, राँची/सदस्य सचिव, झारखण्ड राज्य प्रदूषण नियंत्रण पर्षद, [illegible] दुमका को सूचनार्थ एवं आवश्यक कार्यार्थ हेतु प्रेषित।

Annexure - 11

JHARKHAND STATE POLLUTION CONTROL BOARD
TOWNSHIP ADMINISTRATION BUILDING, HEC COMPLEX, DHURWA, RANCHI 834004
Telephone: 0651-2400850 (Fax)/ 2400851/2400852/2401847/2400979/2400139
JSPCB

By Email **Hon'ble NGT Matter**
Urgent

Ref. No. B-925 Ranchi, Dated 28/7/2021

From,

Yatindra Kumar Das,
Member Secretary.

To,

Sri Naresh Pal Gangwar (I.A.S.),
Joint Secretary cum chairman of the committee,
MoEF&CC, GoI, New Delhi

Sub: Compliance status in the matter of Syed Arshad Nasar Vs Union of India with Ramchandra Chaurasia Vs State of Jharkhand in O.A. No. 23/2017(EZ) - Regarding.

Ref: - Your D.O. Letter No. L-11011/54/2017-IA-II (M)-Pt.; dated 25/06/2021.

Sir,

In connection with the above subject matter and with reference to the above referred letter the desired information (point wise) is as follows:-

1. There are 126 stone mines and 189 stone crushers having valid CTO from the Board and 6 stone mines and 60 stone crushers CTO application is under process respectively in Sahebganj district (Status as on 20/07/2021).
2. The total Environmental Compensation imposed on the mines and crushers in Sahebganj district is ₹6,33,57,000/- out of which an amount of ₹2,47,38,000/- has been recovered till now.
3. The details of the action taken in the Sahebganj District to curb the air pollution is as follows:-
   a) CTO of the Crushers/mines are being renewed only when the Units are found compliant.
   b) Center for Environment and Energy Development (CEED), Delhi has been appointed for Emission Inventory, Source Apportionment Study and for preparation of Clean Air Action Plan. The preliminary Clean Air Action Plan has already been submitted before the Hon'ble NGT.
   c) The crushing units are directed to carry out the crushing operations in a covered section with proper pollution control equipment.
   d) The crushing units are directed to adopt Fogging/Misting/Sprinkling arrangement at the hopper (where trucks unload the large stones) and other transfer points/loading/unloading points. Consumprion of water would be considerably reduced through the use of this system.
   e) The crushing units are directed to use G.I water pipes instead of plastic pipes.
   f) The crushing units are directed to make pucca road within the crusher premises.
   g) The crushing units are directed to install the boundary wall of 10 ft. height around the crusher premises.

Thanking You.

Yours sincerely,
Sd/-
(Yatindra Kumar Das)
Member Secretary

Memo No.:- B-925 Ranchi, dated 28/7/2021

Copy to: The Regional Director, CPCB, ERD Kolkata for information and necessary action from your end please.

(Yatindra Kumar Das)
Member Secretary

KMB/245

झारखण्ड राज्य प्रदूषण नियंत्रण पर्षद
Jharkhand State Pollution Control Board
नगर प्रशासन भवन, एच0ई0सी0, धुर्वा, राँची
दूरभाष : 2400851, 2400852, 2400979 फैक्स : 0651– 2400850
Web: www.jspcb.nic.in (new) www.jspcb.org(old) E-mail: ranchijspcb@gmail.com

Notification no. B – 20 Date 16/4/19

NOTIFICATION

In continuation of the notification released vide notification no. B-19, dated 28.02.2019 in pursuance of 37th Board meeting, dated 29.01.2019 related to PM_{10} analyzers, following directions has to be followed alongwith the directions given in the said notification.

1. The PM_{10} analyzers should be of certified technology as prescribed by CPCB;
2. The PM_{10} analyzers should have an onsite display alongwith connectivity to JSPCB server;
3. All stone crushers having capacity above 500 TPD or more than 10,000 cft/day, will have to install the certified PM_{10} analyzers with on-site display and online connectivity to JSPCB server.
4. Wherever applicable, for exisiting units, PM10 analyzers should be installed before 31st May' 2019.

Rajeev. 16/04/2019
(Rajeev Lochan Bakshi)
Member Secretary

झारखण्ड राज्य प्रदूषण नियंत्रण पर्षद्
JHARKHAND STATE POLLUTION CONTROL BOARD
T.A Division Building (Ground Floor) HEC Campus, Dhurwa, Ranchi- 834004.
Phone No:-0651- 2400852, 2400851, Fax No:- 2400850..

Notice

1.Relaxation in 'Siting Criteria of Industry, in suppression of all the previous notifications for location of industries as per decision taken by JSPCB in its 33rd board meeting held on 17/10/2017.

List of 46 industries* has been notified in respect of distance for siting of industry with following exceptions:

1. Units covered under EIA Notification 2006 (Environmental Clearance) are exempted from these guidelines.
2. Units established in Notified Industrial Area/ Estate are exempted from these guidelines.
3. (a) Hotels, Hospitals/ Nursing Homes, Automobile Servicing Stations, Printing Press, Laundry (excluding Boiler) will be exempted from CTE guidelines.
   (b) CTE applications for units mentioned in 3(a) will be considered after submission of NOC from Urban Local Body/ Authority or Circle Officer, as applicable, with adequate pollution control arrangements.

- Siting criteria of new Industry with pollution index of more than 50 (as per CPCB Notification No. B-29012/ESS(CPA)/2015-16 dated March 7, 2016 notification) not included in the said list of 46 industries, will be decided by the Board on case to case basis.

2. Applicants are required to submit only self-certification/undertaking regarding valid source of Raw Material with CTE/CTO applications.

Other existing provisions

1. CTE/CTO is not required for 'White' category industry (36 industries listed under White category as classified by CPCB vide Notification No. B-29012/ESS(CPA)/2015-16 dated March 7, 2016 notification)*
2. Auto renewal of CTO on the basis Self-Certification' is applicable for Green & Orange (low risk) category industries.
3. In principle it has been decided to grant combined CTE & CTO for Green category industry and it will be implemented very soon.
4. Inspection Reports are uploaded within 24 hours of inspection
5. 'New industry Registration' has been initiated at www.advantage.jharkhand.gov.in
6. All JSPCB approvals are covered under the Right to Sewa dene ki Guarantee Act, 2011

***Please visit www.jspcb.org**

Member Secretary

झारखण्ड

JSPCB

झारखण्ड़ राज्य प्रदूषण नियंत्रण पर्षद्

JHARKHAND STATE POLLUTION CONTROL BOARD

TA Division Building (Ground Floor), HEC Campus, Dhurwa, Ranchi- 834004

Phone No.: 0651- 2400852/ 2400851, Fax No. : 2400850.

Notification -B-15

Ref. No. : B-1966 **Ranchi/ Date :** 18/10/17

As per the decision taken in the 33rd Board meeting held on 17.10.2017 and in supersession of all the previous notifications issued by the Board pertaining to distance regulations for location of industries, the revised CTE guidelines for siting of industries will be as per the chart annexed hereto (Annexure -1) with following exceptions :-

1. Units covered under EIA Notification 2006 (Environmental Clearance) are exempted from these guidelines.
2. Units established in Notified Industrial Area/ Estate are exempted from these guidelines.
3. (a) Hotels, Hospitals/ Nursing Homes, Automobile Servicing Stations, Printing Press, Laundry (excluding Boiler) will be exempted from CTE guidelines.

   (b) CTE applications for units mentioned in 3(a) will be considered after submission of NOC from Urban Local Body/ Authority or Circle Officer, as applicable, with adequate pollution control arrangements.

Encl. :As above.

(Sanjay Kumar Suman)
Member Secretary

Memo No. : **Ranchi/ Date :**

Copy : Additional Chief Secretary, Forest, Environment & Climate Change, Jharkhand / Secretary, Department of Industries and Mines, Jharkhand/ Director, Industries, Jharkhand/ Director, Mines, Jharkhand for information and necessary action.

(Sanjay Kumar Suman)
Member Secretary

Memo No. : B-1966 **Ranchi/ Date :** 18/10/17

Copy : All Section Heads/ Regional Officers, Jharkhand State Pollution Control Board for information and necessary action.

(Sanjay Kumar Suman)
Member Secretary

CTE guidelines regarding distances for siting of industries

S no.	CPCB Classification of industries	Industry Sector	Distances from (in meters)						
			NH	SH	Rail way line	River	Habitation (above 800 nos. of dwellers/160 nos. of houses)	Forest land (PF/RF)	Wildlife Sanctuary/ National Park.
1	G-2.2	Automobile Manufacturing (integrated facilities)	50	25	50	100	200	200	500
2	G-2.3	Industries engaged in recycling / reprocessing/ recovery/reuse of Hazardous Waste under schedule iv of HW(M, H& TBM) rules, 2008 - Items namely - Spent cleared metal catalyst containing copper,, Spent cleared metal catalyst containing zinc,,	100	50	200	200	500 (No house within 100 meters)	500	1000
3	G-2.4	Manufacturing of lubricating oils, grease and petroleum based products	100	50	200	200	500 (No house within 100 meters)	500	1000
4	G-2.6	Industrial carbon including electrodes and graphite blocks, activated carbon, carbon black	50	25	50	100	200	200	500
5	G-2.7	Lead acid battery manufacturing(excluding assembling and charging of lead-acid battery in micro scale)	100	50	200	200	500 (No house within 100 meters)	500	1000
6	G-2.9	Power generation plant [except Wind and Solar renewable power plants of all capacities and Mini Hydel power plant of capacity <25MW]	50	25	50	100	200	200	500
7	G-2.10	Industries engaged in recycling / reprocessing/ recovery/reuse of Hazardous Waste under schedule iv of HW(M, H& TBM) rules, 2008 Items namely - Spent catalyst containing nickel, cadmium, Zinc, copper, arsenic, vanadium and cobalt,	100	50	200	200	500 (No house within 100 meters)	500	1000
8	G-2.11	Processes involving chlorinated hydrocarbons	50	25	50	200	200	200	500
9	G-2.13	Fibre glass production and processing (excluding moulding)	100	50	200	200	500 (No house within 100 meters)	500	1000
10	G-2.14	Fire crackers manufacturing and bulk storage facilities	100	50	200	200	500 (No house within 100 meters)	500	1000

S no.	CPCB Classification of industries	Industry Sector	Distances from (in meters)						
			NH	SH	Rail way line	River	Habitation (above 800 nos. of dwellers/160 nos. of houses)	Forest land (PF/RF)	Wildlife Sanctuary/ National Park.
11	G-2.15	Industries engaged in recycling / reprocessing/ recovery/reuse of Hazardous Waste under schedule iv of HW(M, H& TB M) rules, 2008 Items namely - Dismantlers Recycling Plants -components of waste electrical and electronic assembles comprising accumulators and other batteries included on list A, mercury-switches, activated glass cullets from cathode-ray tubes and other activated glass and PCB-capacitors , or any other component contaminated with Schedule 2 constituents (e.g . cadmium, mercury, lead, polychlorinated biphenyl) to an extent that they exhibit hazard characteristics indicated in part C of this Schedule.	100	50	200	200	500 (No house within 100 meters)	500	1000
12	G-2.16	Milk processes and dairy products(integrated project)	50	25	50	100	200	200	500
13	G-2.18	Pulp and paper (waste paper based without bleaching process to manufacture kraft paper)	50	25	50	100	200	200	500
14	G-2.19	Coke making , liquefaction, coal tar distillation or fuel gas making	100	50	200	200	500 (No house within 100 meters)	500	1000
15	G-2.20	Manufacturing of explosives, detonators, fuses including management and handling activities	100	50	200	200	500 (No house within 100 meters)	500	1000
16	G-2.27	Chlorates, per-chlorates & peroxides	100	50	200	200	500 (No house within 100 meters)	500	1000
17	G-2.28	Chlorine, fluorine, bromine, iodine and their compounds	100	50	200	200	500 (No house within	500	1000
18	G-2.32	Industries engaged in recycling / reprocessing/ recovery/reuse of Hazardous Waste under schedule iv of HW(M, H&TBM) rules, 2008 - Items namely - Lead acid battery plates and other lead scrap /ashes/residues not covered under Batteries (Management and Handling) Rules, 2001. [*Battery scrap, namely: Lead battery plates covered by ISRI, Code word "Rails" Battery hugs covered by ISRI , Code word "Rakes ". Scrap drained /dry while intact, lead batteries covered by ISRI, Code word "rains ".	100	50	200	200	500 (No house within 100 meters)	500	1000
19	G-2.33	Industries engaged in recycling/ reprocessing/ recovery/reuse of Hazardous	100	50	200	200	500 (No house within	500	1000
20	G-2.39	Railway locomotive work shop/Integrated road transport workshop/Authorized service centers	50	25	50	100	200	200	500

S no.	CPCB Classification of industries	Industry Sector	Distances from (in meters)						
			NH	SH	Rail way line	River	Habitation (above 800 nos. of dwellers/160 nos. of houses)	Forest land (PF/RF)	Wildlife Sanctuary/ National Park.
21	G-2.40	Yarn / Textile processing involving any effluent/ emission generating processes including bleaching, dyeing, printing and colouring	50	25	50	100	200	200	500
22	G-2.44	Industry or process involving metal surface treatment or process such as pickling/ electroplating/paint stripping/ heat treatment using cyanide bath/ phosphating or finishing and anodizing /enamellings/galvanizing	50	25	50	100	200	200	500
23	G-2.49	Slaughter house (as per notification S.O.270(E)dated 26.03.2001)and meat processing industries, bone mill, processing of animal horn, hoofs and other body parts	100	50	200	200	500 (No house within 100 meters)	500	1000
24	G-2.54	Pulp and paper (waste paper based units with bleaching process to manufacture writing & printing paper)	100	50	200	200	500 (No house within 100 meters)	500	1000
25	G-3.20	Brickfields (excluding fly ash brick manufacturing using lime process)	50	25	50	50	200	150	500
26	G-3.22	Ceramics and Refractories with DD Kiln	100	50	200	200	500 (No house within 100 meters)	200	1000
27	G-3.26	Dry coal processing, mineral processing, industries involving ore sintering, pelletisating, grinding & pulverization	50	25	50	50	200	150	500
28	G-3.27	Fermentation industry including manufacture of yeast, beer, distillation of alcohol (Extra Neutral Alcohol)	50	25	50	50	200	150	500
29	G-3.28	Ferrous and Non- ferrous metal extraction involving different furnaces through melting, refining, re-processing, casting and alloy- making	50	25	50	50	200	150	500
30	G-3.29	Fertilizer (granulation / formulation /blending only)	50	25	50	50	200	150	500
31	G-3.30	Fish feed, poultry feed and cattle feed	50	25	50	50	200	150	500
32	G-3.34	Glass ceramics , earthen potteries and tile manufacturing using oil and gas fired kilns , coating on glasses using cerium fluorides and magnesium fluoride etc	50	25	50	50	200	150	500
33	G-3.37	Hot mix plants	50	25	50	50	200	150	500
34	G-3.40	Industries engaged in recycling / reprocessing/ recovery/reuse of Hazardous Waste under schedule iv of HW(M, H& TBM) rules, 2008 - Items namely - Paint and ink Sludge/residues	50	25	50	50	200	150	500

S no.	CPCB Classification of Industries	Industry Sector	Distances from (in meters)						
			NH	SH	Rail way line	River	Habitation (above 800 nos. of dwellers/160 nos. of houses)	Forest land (PF/RF)	Wildlife Sanctuary/ National Park.
35	G-3.41	Industries engaged in recycling /reprocessing/ recovery/reuse of Hazardous Waste under schedule iv of HW(M, H& TB M) rules, 2008 - Items namely - Brass Dross,, Copper Dross,, Copper Oxide Mill Scale,, Copper Reverts, Cake & Residues,, Waste Copper and copper alloys indispersible form,, Slags from copper processing for further processing or refining ,, Insulated Copper Wire,, Scrap/copper with PVC sheathing including ISRI-code material namely "Druid" ,, Jelly filled Copper cables,, Zinc Dross-Hot dip Galvanizers SLAB,, Zinc Dross-Bottom Dross,, Zinc ash/Skimming arising from galvanizing and die casting operations,, Zinc ash/Skimming/other zinc bearing wastes arising from smelting and refining,, Zinc ash and residues including zinc alloy residues in dispersible from ,,	50	25	50	50	200	150	500
36	G-3.42	Industry or processes involving foundry operations (capacity <5 MT/hr)	50	25	50	50	200	150	500
37	G-3.43	Lime manufacturing (using lime kiln)	50	25	50	50	200	150	500
38	G-3.45	Manufacturing of glass	50	25	50	50	200	150	500
39	G-3.56	Ply-board manufacturing(including Veneer and laminate) with oil fired boiler/ thermic fluid heater (without resin plant)	50	25	50	50	200	150	500
40	G-3.58	Printing ink manufacturing	50	25	50	50	200	150	500
41	G-3.61	Rolling mill (oil or coal fired) and cold rolling mill	50	25	50	50	200	150	500
42	G-3.63	Steel and steel products using various furnaces like blast furnace /open hearth furnace/induction furnace/arc furnace/submerged arc furnace / basic oxygen furnace /hot rolling reheated furnace	100	50	200	200	500 (No house within 100 meters)	200	1000
43	G-3.64	Stone crushers	100	100	50	200	500 (No house within 100 meters)	250	1000
44	G-3.67	Thermocol manufacturing (with boiler)	50	25	50	50	200	150	500

S no.	CPCB Classification of industries	Industry Sector	Distances from (in meters)						
			NH	SH	Rail way line	River	Habitation (above 800 nos. of dwellers/160 nos. of houses)	Forest land (PF/RF)	Wildlife Sanctuary/ National Park.
45	G-3.71	Vegetable oil manufacturing including solvent extraction and refinery /hydrogenated oils	50	25	50	50	200	150	500
46	G-3.79	Parboiled Rice Mills	50	25	50	100	200	200	500

N.B. -1. Distance for Eco-Sensetive Zone(ESZ) in case of Wildlife Sanctuary/ National Park will be applicable as per the provision in its Notification or as mentioned above, whichever is more.

N.B. -2. The siting criteria for new industries not included in the above list having pollution index more than 58, will be decided by the Board.

Dinesh Pd. Singh
AEE, JSPCB, Ranchi

Deputy GM (Env.)
MECON, Ranchi

CE, Ranchi

Vice Chairman
Chhotanagpur Small Scale,
Ranchi

Director Mines
Govt. of Jharkhand

Director Industry
Govt. of Jharkhand

(Sanjay Kumar Suman)
Member Secretary
JSPC Board, Ranchi

Chief Conservator of Forest
Admn., Ranchi

15053/2021/PRJT-NGRBA-RD (Kolkata)

केन्द्रीय प्रदूषण नियंत्रण बोर्ड
CENTRAL POLLUTION CONTROL BOARD

(पर्यावरण ,वन एवं जल वायु परिवर्तन मंत्रालय, भारत सरकार)
(Ministry of Environment. Forest & Climate Change, Government of India)

क्षेत्रीय निदेशालय, कोलकाता
Regional Directorate, Kolkata

URGENT NGT MATTER
Date-05.11.2021

OFFICE MEMORANDUM

Subject: Minutes of Meeting regarding Carrying Capacity Assessment Status in the matter of Syed Arshad Nasar Vs Union of India with Ramchandra Chaurasia Vs State of Jharkhand in O.A. No. 23/2017(EZ) held on 30.10.2021 at 2:00 PM & 3.11.2021 at 11:00 AM through Video Conferencing

A copy of Minutes of the Meeting as approved by the competent authority on review of carrying capacity assessment status in compliance to Hon'ble NGT order dated 12.03.2021 held through Video Conference on **30.10.2021** at 2:30 PM & **03.11.2021** at 11:00 AM is forwarded herewith for information/necessary actions.

(M. K. Biswas)
Regional Director & Nodal Agency

To

i. Principle Secretary, MoEF&CC, Regional Office (ECZ)-Ranchi
ii. The Secretary, Dept. of Forest, Environment & Climate Change, Govt. of Jharkhand
iii. Sh Sundeep, Director, MoEF & CC
iv. Sh. Y.K Das, Member Secretary, JSPCB
v. Sh Pankaj Verma, Additional Director, MoEF & CC
vi. Sh. Rajeev Ranjan, Additional Director, MoEF & CC, Regional Office (ECZ)- Ranchi
vii. Dr. M.K. Jain, Professor, IIT (ISM), Dhanbad
viii. Sh. Ramapati Kumar, CEO, CEED, Delhi
ix. Sh. Ramnivas Yadav, District Magistrate, Sahebganj
x. Sh. Kamlakant Pathak, Regional Officer, JSPCB
xi. Sh. Bibhuti Kumar, DMO, Sahebganj
xii. Dr. G.P. Singh, Sc-D, CPCB, RD-Kolkata

Copy for kind information to:

i. PS to Joint Secretary (Sh. Naresh Pal Gangwar, MoEF & CC)
ii. PS to MS, CPCB, Delhi- 110032
iii. Sh. S.K. Gupta, AD & Div. Head, IPC –V, CPCB, Delhi

(M. K. Biswas)

Head Office:
Parivesh Bhawan, CBD cum Office Complex,
East Arjun Nagar, Delhi-110 032
Tel: 011-43102030, 22305792
Website: www.cpcb.nic.in

Regional Directorate:
502, Southend Conclave
1582, RajdangaMain Road, Kolkata- 700107
Tel: 033-2441 6634/4289/4677/6003
e-mail: rdkolkata.cpcb@gov.in

Minutes of Meeting regarding Carrying Capacity Assessment Status in the matter of Syed Arshad Nasar Vs Union of India with Ramchandra Chaurasia Vs State of Jharkhand in O.A. No. 23/2017(EZ) held on 30.10.2021 at 2:00 PM & 3.11.2021 at 11:00 AM through Video Conferencing

With reference to the above-mentioned matter, Hon'ble NGT vide its order dated 17.04.208 & 12.03.2021 has directed to undertake Carrying Capacity Assessment of the area. In compliance to the order, Jharkhand State Pollution Control Board (JSPCB) has awarded the study to Centre for Environment and Energy Development (CEED), Delhi. CEED, Delhi has submitted the report of the study "*Environment Management of Stone Mines & Crusher Industry in Sahebganj*". The observation and findings of the carrying capacity assessment study is vital for finalization of the comprehensive Joint Committee Report. Therefore, Sh. Naresh Pal Gangawar, Chairman and Joint Secretory (JS), MoEF&CC, directed to review the observation and findings of the study. Accordingly, a Video Conference of the Joint Committee was held on 30.10.2021 at 2:00 PM and 3.11.2021 at 11:00 AM

List of the official attended the meeting is enclosed ***Annexure I & II.***

Minutes of Meeting held on 30.10.2021 at 2:00 PM

1. Sh. Sundeep, Scientist F/ Director MoEF&CC welcomed the committee members and all the officials attending the meeting and informed that Joint Secretory, MoEF&CC could not attend the meeting due to some medical emergencies. He also informed that JS, MoEF&CC has outlined that the committee should come up with a road map to finalize the report of the CEED, Delhi in this meeting.

2. Dr. G.P Singh, Scientist D, CPCB-RD Kolkata requests Sh. Ramapati Kumar, CEO & PI, CEED, Delhi to present the Study carried out by them.

3. Sh. Ramapati Kumar, presented their study and explained major three sections as mentioned below:

A. Pollution Trend in Sahebganj:

I. Sh. Ramapati Kumar explained that the Air Quality Index (AQI) of the district is improving in the last five years (2015-2019). However, the data used for carrying out this study is obtained from various organization such as National Aeronautics and Space Administration (NASA), The Energy and Resources Institute (TERI), etc. Apart from the secondary data, this has been cross-checked from the JSPCB on-site data for last 5-10 years.

II. Sh. Sundeep stated that data of JSPCB is for 2-3 days as there is no online continuous monitoring station, which cannot be compared with the annual data. Even, 23-30 set of data is not the actual representation for the annual data. Reduction of approximately 40% of the AQI from 2015 to 2019, without any intervention is quite misleading. If the analysis is only through satellite data, then it should be verified, since it is only the predicted data.

However, he also emphasized that along with the satellite data, if the data is verified through the data of Jharkhand State Pollution Control Board and other state government as clarifies by Sh. Ramapati Kumar, then it can be relied and included in the comprehensive report of the Joint Committee.

B. <u>Emission Inventory of Air Pollution:</u>

I. Sh. Ramapati Kumar stated that they have done inventory for the Sahebganj city, its airshed and airshed other than the city boundary. He later explained the terms such as "airshed" used in the study.

II. Sh Sandeep stated the study has considered the airshed as the admirative boundary, however, the source of pollution changes when the topography and meteorology of the area changes. Since Sahebganj is a hilly area, therefore, the airshed cannot be defined as per the administrative blocks. The technical term, such as airshed should be clearly defined as this can be confusing for the public.

He also emphasized that it is very difficult to differentiate between the dust emitted from stone crushers, construction activities and road dust. Therefore, a specific study should be carried out to clearly define the source of the dust.

Even, CEED in its study has not considered the impact from paved/non paved road, dumpers, therefore these should also be taken into consideration while assessing the emission inventory of the area.

Therefore, he suggested CEED, Delhi to rephrase the whole set of data of the area and present in a different form which should be more clear.

C. <u>Carrying Capacity Assessment</u>

I. Sh. Ramapati Kumar stated that they have carried out the carrying capacity assessment as per the formulae recommended by Hon'ble NGT order dated. 12.03.2021. The Satellite data is used for PM 2.5 data and mixing height is obtained from India Meteorological Department (IMD).

Based on the findings of the report he emphasized that the supporting carrying capacity of the area is still positive (ranges from 26.57% to 86.90%), which signifies that the area can still accommodate more PM 2.5 load.

II. Sh Sandeep explained that that the formulae recommended by Hon'ble NGT in its above-mentioned order was done for Delhi, which is a land locked area. However, Sahebganj has different topography, it's a hilly area and is bounded by river Ganga in one of its boundaries. Moreover, Ventilation Coefficient should also be considered while calculating the carrying capacity. Therefore, the recommended formulae for calculating carrying capacity assessment of Delhi is not applicable for Sahebganj area.

He questioned the findings of the report on supportive carrying capacity of the area (26.57% to 86.90%) by asking that if the area still have so much supportive carrying capacity, then why the area is not meeting the National Ambient Air Quality (NAAQ) Standard. It indicates that the findings are not based on reality and actual assessment of pollution load in the area needs to be done to assess the ground reality.

He also recommended that a meeting is required to finalize the components/assumptions, which are required to be taken into consideration for carrying capacity assessment. Even, if required, additional time can be taken from Hon'ble NGT, as the order is given in March, and for monthly assessment, a whole year is required. Even, the critical months/period such as Dec-Jan should be taken into consideration for accurate estimation.

He stated that mainly three components should be considered for calculation of the carrying capacity which are:

a. On ground-grid based monthly/quarterly/annual data of stone crushers/mines available with JSPCB, assuming this data as a background of receiving source

b. Monthly/quarterly/annual data where major population resides

   Average the data of these two sources

c. Ventilation coefficient, mixing height and area obtained from the IMD

4. Apart from the CEED, Delhi Report, Sh Sandeep also asked JSPCB and DC Sahebganj together to finalize the total number of stone crushers and stone

mines. Even they should ensure the exact number of the stone crushers and stone mines, which have valid/awaiting CTO should also be finalized.

5. DC Sahebganj reported that at present 139 stone mine have active lease and 299 stone crushers have active CTO. The 10-12 stone crushers in Shakrigali, near to railway station has been shifted and the remaining 2-4 crushers will also be closed soon. Even, few crushers near to the city has been closed and few was demolished.

DMTC is also conducting review meeting every 15 days to review the action taken. The railways sliding has been identified and will be shifted in next six months as per the DRM, Sahebganj.

He also reported that many crushers get the electricity connections through online application stating false information of CTO, as the online portal does not have the CTO verification system. As a preventive measure, DC, Sahebganj has closed the online system and instructed the electricity board to give only connection to the crushers which have valid CTO after proper verification.

6. Based on the deliberation held, following were decided:

I. The Carrying Capacity assessment should be more scientifically conducted by CEED, Delhi. The Ventilation Coefficient, topography of hills and river side should also be considered while calculating the carrying capacity.

II. It should be very clearly concluded that the impact of stone crushers and mines are zone specific or area specific. These zones should be contoured as cluster or individual basis.

III. Action Plan should be made as per zone/cluster/mine/individual basis.

IV. A proper timeline should be prepared by CEED, Delhi and proposed by the committee to Hon'ble NGT for extension of additional time for the comprehensive and scientific study of carrying capacity.

V. The Formulation of Environmental Compensation norms for violators and also the cost of restoration of already damaged areas should be carried out by JSPCB and DC Sahebganj. It should be practical and implementable before it is presented to Hon'ble NGT.

VI. The exact number of stone mines and stone crushers with or without valid CTO/CTE should be ensured by JSPCB and DC, Sahebganj together.

VII. The next meeting to finalize the following will be done on 3rd Nov 2021:
   a. findings/outcomes of study carried out by CEED, Delhi
   b. Environmental Compensation norms formulation by JSPCB and DC Sahebganj

c. Total number of stone mines and crushers operating in Sahebganj District and number of the units with or without valid CTO/CTE presented by JSPCB and DC Sahebganj.

The meeting ended with a vote of thanks to Shri Naresh Pal Gangwar, Joint Secretary, M/o EF&CC and the Chairman.

Minutes of Meeting held on 3.11.2021 at 11:00 AM

1. Sh. Naresh Pal Gangwar, Joint Secretory (JS), MoEF&CC & Chairman of the Committee welcomed the committee members and all the officials attending the meeting and requested Sh. Sundeep, Scientist F/ Director MoEF&CC to brief about the previous meeting.

2. Sh. Sundeep stated that previous meeting was primarily focused on the carrying capacity study carried out by CEED, Delhi. The methodology adopted by CEED as well as scope of improvement was discussed. He highlighted that the carrying capacity assessment should consider few important criteria and the critical months Dec-Jan for accurate as well as scientific assessment. He recommended that this must be put up before Ho'ble NGT for extension of time period for proper scientific assessment. He also stated that the study carried out by CEED, Delhi has positive carrying capacity, which signifies more pollution load can be accommodated in the area, however, the ambient air quality does not meet the NAAQS. This should have positive correlation.

He even highlighted that the action plan should be prepared based on cluster /individual basis.

He informed that DC Sahebganj along with CEED, Delhi and JSPCB was awarded the formulation of the Environmental Compensation Norms, which should be more practical and implementable.

He highlighted that the draft report has data variation between the reported data by CEED, Delhi, JSPCB and DC, Sahebganj, which should be reconciled.

3. In view of the above highlights, JS, MoEF&CC, stated that since scientific study of carrying capacity will take time, therefore, an interim report without the carrying capacity should be drafted and circulated to all the committee members on 9th Nov 2021. This report will be finalized on 11th Nov 2021 meeting (via a Virtual Conference of Joint Committee) for submission to Hon'ble NGT.

The meeting ended with to and from the chairman of the committee.

***

Annexure I

Table 1. List of officials attended the meeting held on 30.10.2021 at 2:30 PM

Sl No	Name of Officer	Organization	Designation	E-mail id
1	Sh. Sundeep	MoEF&CC	Sc F/Director	sundeep.cpcb@nic.in
2	Sh Y.K Das	JSPCB	Member Secretary	ranchispscb@gmail.com
3	Sh Rajeev Ranjan	MoEF&CC,Regional Office (ECZ)-Ranchi	Scientist-E / Additional Director	ranjan.rajeev@nic.in
4	Dr. M. K. Jain	IIT (ISM),Dhanbad	Professor	manish@iitism.ac.in
5	Sh. Ramniwash Yadav	Sahebganj District, Government of Jharkhand	District Magistrate	dc-sah@nic.in
6	Sh. Kamlakant Pathak	RO, JSPCB	Regional Officer	kkpathak1964@gmail.com
7	Sh. Nirala Bakshey	RO, JSPCB, DMTF	Executive Consultant	niralabas006@gmail.com
8	Kumar Manibhusan	JSPCB	Consulting Executive	kmbcoep@gmail.com
9	Sh Ramapati Kumar	CEED, Delhi	CEO	rkumar@ceedindia.org
10	Sh. M.K Biswas	CPCB, RD-Kolkata	Sc E, RD	mkbiswas.cpcb@nic.in
11	Dr. G.P Singh	CPCB, RD-Kolkata	Sc-D	singh.gyanprakash@gmail.com
12	Dr. Priti Saha	CPCB, RD-Kolkata	SRF	pritisaha.cpcb@supportgov.in

Annexure II

Table 1. List of officials attended the meeting held on 03.11.2021 at 11:00 AM

Sl No	Name of Officer	Organization	Designation	E-mail id
1.	Sh. Naresh Pal Gangawar	MoEF&CC	Joint Secretary	jsnpg.mefcc@gov.in
2	Sh. Sundeep	MoEF&CC	Sc F/Director	Sundeep.cpcb@nic.in
2	Sh Y.K Das	JSPCB	Member Secretary	ranchispscb@gmail.com
3	Sh Rajeev Ranjan	MoEF&CC,Regional Office (ECZ)-Ranchi	Scientist-E / Additional Director	ranjan.rajeev@nic.in
4	Dr. M. K. Jain	IIT (ISM),Dhanbad	Professor	manish@iitism.ac.in
5	Sh. Bibuti Kumar	Sahebganj District, Government of Jharkhand	District Mining Officer	dmo-sahibganj@jharkhandmail.gov.in
6	Sh. Kamlakant Pathak	RO, JSPCB	Regional Officer	kkpathak1964@gmail.com
7	Sh. Nirala Bakshey	RO, JSPCB, DMTF	Executive Consultant	niralabas006@gmail.com
8	Dr. G.P Singh	CPCB, RD-Kolkata	Sc-D	singh.gyanprakash@gmail.com
9	Dr. Priti Saha	CPCB, RD-Kolkata	SRF	pritisaha.cpcb@supportgov.in