BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL

PRINCIPAL BENCH, NEW DELHI

Original Application No. 1140/2024

In the matter of**:**

Sumit Kumar …Applicant

Versus

State of Haryana …Respondents

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Filed by: Adv. Rajkumar

On behalf of Central Pollution Control Board

Place: Delhi

Date: 28.02.2025

Final Report of the Joint Committee in the matter of OA No. 1140 of 2024; Sumit Kumar Versus State of Haryana, in compliance to the Orders of Hon'ble National Green Tribunal dated 19/11/2024.

1.0. Background and the Orders of Hon'ble NGT:

The matter pertains to a letter petition 02.02.2024 filed by Sumit Kumar s/o Prakash Chand r/o Village Bayal, Tehsil Nagal Choudhary, District Mahendragarh, which has been registered as Original Application by Hon'ble National Green Tribunal.

It is alleged in the letter petition that M/s Bayal Quartz and Feldspar Mines is illegally conducting mining activities by heavy blasting though residential area is just about 50 mtrs. from mining site and there is school and hospital also at 200 mtrs. Mining activities are causing huge damage to buildings and construction raised in nearby area and also causing heavy air pollution creating health hazards to local people. Conditions of Environmental Clearance (hereinafter referred to as 'EC') are also being violated by said proponent with respect of plantation, depth of mines, CSR activities etc. Proponent has also installed three stone crushers and one is running illegally without requisite statutory permissions and licenses etc. Mining activities are being carried out at Khasra No. 198 and 202 of village Bayal which is also part of Aravali Forest Region.

It was observed and directed by Hon'ble NGT in its Order dated November 19, 2024 **(Annexure-1)** that:

Para 03: *Allegations made in the complaint, in our view, prima facie give rise substantial question relating to environment arising due to implementation of Enactments specified in Schedule I to NGT Act, 2010. However, before taking any further action in the matter, we find it appropriate to obtain a factual report for which we constitute a joint Committee comprising: i. Central Pollution Control Board (hereinafter referred to as 'CPCB'), ii. Divisional Forest Officer, Mahendragarh, iii. District Magistrate, Mahendragarh, iv. Haryana State Pollution Control Board (hereinafter referred to as 'HSPCB')*

Para 04: *CPCB shall be the nodal authority for coordination and compliance.*

Para 05: *The above Committee shall visit the site, collect relevant information, interact with stakeholders including complainant and submit factual report within one month.*

The Joint Committee filed a Status cum Progress report on 23/12/2024, seeking time to file the final report. The request for grant of time for filing the report was accepted by the Hon'ble NGT vide order dated 23/01/2025 (**Annexure-2**) with the following directions:

***Para 06**: Further report of the Joint Committee be filed within six weeks and advance copy thereof be also supplied to the respondents .*

***Para 07**: Replies/responses be filed by respondents at least three days before the date of hearing fixed.*

2.0. Compliance of Directions of Hon'ble NGT:

2.1. Constitution of the Joint Committee:

In compliance to the directions of the Hon'ble NGT, a joint committee comprising of the following members, was constituted:

i. Dr. Vivek Bharti, IAS, District Magistrate, Mahendragarh
ii. Shri Jai Bhagwan, Range Forest Officer (Member nominated by DFO Mahendragarh)
iii. Er. Shri Sanjeev Kumar, SEE, HSPCB, Panchkula (Member nominated by Member Secretary, Haryana State Pollution Control Board)
iv. Dr. Narender Sharma, Scientist 'F', CPCB Regional Directorate, Chandigarh (Member and Nodal Officer, nominated by Member Secretary, CPCB)

2.2. Site Visit and Collection of relevant information:

2.2.1: **Ist Site Visit**: The Joint Committee conducted a site visit on 19/12/2024 to: (i) verify the facts mentioned in the letter petition and (ii) collect relevant information for compiling the factual report as directed by the Hon'ble National Green Tribunal.

The applicant in Original Application 1140 of 2024, Shri Sumit Kumar interacted with the Joint Committee. However, he left after interaction with the Joint Committee and didn't participate in the subsequent Joint Inspection.

SDM Nangal Chaudhary, Mahendragarh, Shri Ramit Yadav, as a representative of District Magistrate, Mahendragarh; HSPCB Regional Officer, Mahendragarh, Er. Krishan Kumar and other officers of Mining Department, HSPCB and District Administration, also participated in the site inspection, to assist the Joint Committee. The attendance sheet is attached as **Annexure-3**.

The Joint Committee carried out inspections of the following sites mentioned in the letter petition and interacted with various stakeholders, as directed by Hon'ble National Green Tribunal:

1. Mining sites of M/s Bayal Quartz and Feldspar Mines
2. Stone Crushers of M/s Bayal Quartz and Feldspar Mines
3. Harijan Basti, Bayal
4. Senior Secondary School, Bayal
5. Primary Health Centre, Bayal
6. Jeen Mata Temple, Bayal

The Joint Committee instructed the Project Proponent and the officials of District Administration, State Pollution Control Board and Mining Department, who were accompanying the committee for providing assistance, to produce the record as outlined below for verification of the facts and preparation of Factual Report, as directed by Hon'ble National Green Tribunal:

i. Environmental Clearance granted to M/s Bayal Quartz and Feldspar Mines, for mining activities.

ii. CTE/CTO granted to M/s Bayal Quartz and Feldspar Mines, for mining activities.

iii. Consent to operate (CTO) granted to Stone Crushers of M/s Bayal Quartz and Feldspar Mines.

iv. Compliance of half yearly report with regard to the compliance of the conditions of Environmental Clearance granted to M/s Bayal Quartz and Feldspar Mines.

v. Copy of the report of verification of the conditions of Environmental Clerance, conducted by MoEF&CC, if any.

vi. Approved Mining Plans of M/s Bayal Quartz and Feldspar Mines.

vii. The details of illegal mining activities reported to and by Mining Department in the Mahendragarh and Bayal area during last 05 years along with action taken by the Mining Department.

viii. The details of illegal mining activities reported to and by Police Department in the Mahendragarh and Bayal area during last 05 years along with action taken by the Police Department.

ix. The details of illegal mining activities reported to and by Forest Department in the Forest area in Mahendragarh and Bayal area during last 05 years along with action taken by the Forest Department.

x. Inspection reports of Mining Department prepared during last 05 years, with regard to compliance of the conditions of approved mining plans.

xi. The report of Revenue Department with regard to the distance of the sites mentioned in the letter petition, from the Mining Area and the Stone Crushers of M/s Bayal Quartz and Feldspar Mines.

xii. The number of respiratory disease case reported in the Harijan Basti, which is very close to the Mining Site, during last 05 years.

2.2.2. 2nd Site Visit: After receiving the relevant details from the concerned departments, the 2nd site visit was scheduled for 17-18 February, 2025. 03 out of the 04 members earlier nominated were replaced by new members as per following details:

i. A communication was received from HSPCB to HSPCB RO, Mahendragarh dated 14/01/2025 regarding change of nomination, which was shared with the CPCB Nodal Officer. HSPCB Member Er. Sanjeev Kumar, Senior Environmental Engineer, HSPCB, Panchkula, was replaced by the concerned HSPCB Regional Officer, Mahendragarh, Er. Krishan Kumar Yadav, Environmental Engineer (**Annexure-4**)

ii. Shri Jai Bhagwan, Range Forest Officer, Nangal Chaudhary (Member nominated by DFO Mahendragarh), was replaced by Shri Rajnish Kumar, Range Forest Officer, Nangal Chaudhary, following the transfer of the previously nominated member.

iii. Shri Ramit Yadab, SDM, Nangal Chaudhary, Mahendragarh (representing the DC, Mahendragarh), was replaced by Shri Manoj Kumar, SDM, Nangal Chaudhary, Mahendragarh, following the transfer of the previously nominated member.

The 2nd site visit was conducted by the Joint Committee comprising of the following members to complete the remaining activities and also verify the compliance of environmental norms:

i. Shri Manoj Kumar, SDM, Nangal Chaudhary, District Mahendragarh (Representative of District Magistrate, Mahendragarh)
ii. Shri Rajnish Kumar, Range Forest Officer, (Member nominated by DFO Mahendragarh)
iii. Er. Krishan Kumar Yadav, EE and Regional Officer, HSPCB, Mahendragarh (Member nominated by Member Secretary, Haryana State Pollution Control Board)
iv. Dr. Narender Sharma, Scientist 'F', CPCB Regional Directorate, Chandigarh (Member and Nodal Officer, nominated by Member Secretary, CPCB)

The attendance sheet is attached as **Annexure-5**.

2.3. Factual Report of the Joint Committee:

The following allegations have been levelled by the complainant in the letter petition:

i. Illegal mining activities and mining activities in the Aravalli Plantation, in Khasra No. 198 and 202.
ii. Mining below the water table, leading to water discharge from the mine due to deep excavation.
iii. Intense blasting resulting in dust pollution, structural damage to school walls, houses in Harijan Basti located at 50 mtr distance from the Mine, Hospital & School at a distance 200 mtr from the mine and cracks appearing in the walls of the Jirna Mata Temple near the mine.

iv. Failure to establish a green belt as per conditions of the environmental clearance.
v. Dust Pollution and Respiratory health issues/diseases arising in the area due to dust pollution.
vi. Three stone crushers have been set up, with approval for only two; the third operates without proper authorization.
vii. Violation of environmental guidelines.
viii. No Corporate Social Responsibility (CSR) initiatives carried out in the village.

The point-wise factual status of the above allegations based on the physical inspection carried out and the examination of the relevant documents available with the Joint Committee, is as follows:

2.3.1. Illegal mining activities and mining activities in the Aravalli Plantation, in Khasra No. 198 and 202:

1. The total mining lease area of M/s Bayal Quartz & Feldspar Mine is 76.75 hectares falling in Khasra Nos. 201, 223 and 224 in Village Bayal, District Mahendragarh. The mining area is divided into two blocks namely i) Block 1 (North Block) and ii) Block 2 (South Block).

2. The following two approved mining plans were shared with the Joint Committee:

   i. Mining Scheme and Progressive Mine Closure Plan of Bayal Quartz & Felspar Mine Approved by State Mining Engineer vide No. DMG/HY/MP/Bayal/2017/2733-36 dated 23/6/2017, for the total lease area of 76.75 hectares. This is the first mining plan and the progressive mine closure plan for mining of minerals namely Quartz and Feldspar (**Annexure-6**)

   ii. Mining Scheme and Progressive Mine Closure Plan of Bayal Quartz & Felspar Mine Approved by State Mining Engineer vide No DMG/HY/MP/Bayal/2022/4651-4654 dated 17/08/2023 for the total lease area of 76.75 hectare (Non-Forest) for the period 2023 to 2028 (05 Years). This is the modified Mining Plan for four minerals namely Quartz, Feldspar, Quartzite and Stone prepared and approved consequent upon the addition of quartzite and Stone by Mines & Geology Department, Haryana vide Memo No. Glg/Hy/E-2578/229 dated 12/01/2018. As on date this modified Mining Scheme and Progressive Mine Closure Plan for the total lease area of 76.75 hectare (Non-Forest) is valid and applicable (**Annexure-7**)

3. The Mining Scheme and Progressive Mine Closure Plan of Bayal Quartz & Felspar Mine Approved by State Mining Engineer vide No. DMG/HY/MP/Bayal/2017/2733-36 dated 23/6/2017 mentions that *"Mr. Manmohan Singh Bhadana S/o Shri Kartar Singh, VPO Anangpur, Tehsil and District Faridabad, holds a mining lease over an area of 228.60 hectares falling in Khasra Nos. 198, 201, 202, 223 and 224 in Village Bayal, District Mahendragarh, which was granted on 09/07/2002 for a period of 20 years Quartz and Feldspar, both as major minerals as per provisions of Mines and Mineral (Development & Regulation) Act, 1957. Now the lease which was granted on 09/07/2002 shall be valid upto 08/07/2052 as per Central Government Ordinance dated 12/01/2015.*

   With the subsequent notification dated 10/02/2015, 31 minerals (as notified in the Act) have been declared as minor minerals. Therefore, minerals namely Quartz & Feldspar for which lease was granted for major mineral now have fallen under the category of Minor Minerals and shall be under the purview and provisions of the "Haryana Minor Mineral Concession. Stocking, Transportation and Prevention of Illegal Mining Rule, 2012."

4. As per above approved mining plan ***part of the lease falling under the Khasra numbers 198 and 202 (comprising total area of 151.85 hectares) is under Aravalli Project Plantation and can not be used for mining as per orders of the Hon'ble Supreme Court. It is also mentioned that the Lessee submitted letter to DMG, Haryana for surrender of 151.85 hectare area and which has been accepted by DMG, Haryana vide letter No. Glg/Hy/E-2578/281 dated 11/01/2017***. The execution of the revised/modified mining lease deed for 76.75 hectare (Supplementary Lease Deed) on surrender of part of area of mining lease in Village Bayal has been executed on 12/5/2017).

5. The permission to surrender the lease area of 151.85 hectares falling under the Khasra numbers 198 and 202 and to retain remaining area of 76.75 hectares, given by Director General, Mines and Geology, Haryana vide Glg/Hy/E-2578/281 dated 11/01/2017, is attached as **Annexure-8**.

6. The Environmental Clearance for the above mining lease in the area of 76.75 hectares was granted on 04/05/2018 for the production of 55,00,000 TPA vide letter No. J-11015/10/2017-IA-II(M) dated 04/05/2018 (**Annexure-9**)

7. The above facts indicate that :

   i. ***The area of mining lease (151.85 hectares) falling under the Aravalli Project Plantation in Khasra No. 198 and 202, which is also referred in the letter petition, was surrendered before starting the mining activities after obtaining the Environmental Clearance.***

   ii. ***The total mining lease area of M/s Bayal Quartz & Feldspar Mine is 76.75 hectares falling in Khasra Nos. 201, 223 and 224 in Village Bayal, District Mahendragarh and this area doesn't fall under Aravalli Project Plantation.***

   iii. ***The project proponent has obtained approved mining plan from Department of Mines and Geology Haryana, Environmental Clearance from MoEF&CC, Consent to Establish*** **(Annexure-10)** ***and Consent to Operate for 18333 MT/day production from HSPCB*** **(Annexure-11).**

8. ***It was observed by the Joint Committee during site inspection with the assistance of Mining Inspector of the area concerned that the mining is being done within the pillars installed for the demarcation of mining area.*** The member representing the forest department in the Joint Committee also confirmed that as per record, the forest area is not involved in the mining by the project proponent.

9. The details of illegal mining cased registered and the action taken in the Bayal area was also sought from Mining Department and Police Department. As per information provided by SP, Mahendragarh vide Letter No. 26524 dated 10/01/2025 (**Annexure-12**), Total 373 cases of illegal mining have been registered during last 05 years and 08 accused have been arrested against 06 FIR registered in Police Station Bayal during last 05 years. As per information made available to the Joint Committee, no case of illegal mining has been registered against M/s Bayal Quartz and Feldspar Mine, so far.

2.3.2. Mining below the water table, leading to water discharge from the mine due to deep excavation:

1. According to the relevant information based on the hydrogeological study of the area, provided in the approved mining plan, the static water level in the Village Bayal is 86-96 meter. Further, as per hydrogeological study conducted by the project proponent in 2016 in compliance to the conditions of the Environmental Clearance granted by MoEF&CC, water table in the Bayal Village is 333 m above sea level (during May 2016) and 346 m above sea level. ***Further, as per hydro-geological report referred***

in the approved mining plan, the depth of the water level is reported to be at 278 to 282 meters above mean sea level (AMSL). In the approved mining plan, it has been concluded based on the hydro-geological report that the mining upto 280 m above mean sea level is safe. The ultimate pit level as per EIA Report submitted by the Project Proponent for obtaining Environmental Clearance is 355 meter above sea level.

2. As per condition of Environmental Clearance granted by MoEF&CC, *"A safety margin of 02 meters shall be maintained above the ground water table shall be maintained above the ground water table and no mining operations shall be permissible below this level unless a specific permissible is obtained from the competent authority" and in the instant case, the Project Proponent has already committed to keep a safety margin of 10 meters above the ground water table.*

3. ***It was observed by the Joint Committee from the numbers and height of benches in the working pit that, as the mining operation by M/s Bayal Quartz and Feldspar Mines, is yet to achieve the maximum permissible depth of mining, the intersection with the water table is not expected at this stage, as against allegation in the letter petition.***

4. However, ***some localized water accumulation was observed in the working pit which appeared to be rain water*** (**Photograph-1 and 2** of **Annexure-36**). In this regard, according to the Approved mining plan, *"since the mine pit is open, the rain water and seepage from the mine dump may accumulate in the mine pit which requires pumping. The pulping of stored or accumulated water in the mine pit would not create cone of depression"*

2.3.3. Intense blasting resulting in dust pollution, structural damage to school walls, houses in Harijan Basti located at 50 mtr distance from the Mine, Hospital & School at a distance 200 mtr from the mine and cracks appearing in the walls of the Jirna Mata Temple near the mine:

1. It was observed that there are Harijan Basti, Temple, School and Primary Health Centre in the vicinity of the mine. *The information regarding distance of mine from various structures provided by Revenue Department vide Letter No. 148/MC dated 21/02/2025 indicates that* ***the mining activities have been carried out at a distance of 400 mtr from Hospital and 350 mtr from school and around 100 mtr from the houses built in the vicinity*** (**Annexure-13**).

2. As per conditions of Environmental Clearance granted to the Project Proponent by MoEF&CC with regard to blasting:

   - *No mining should be carried out within 50 meters of the outer boundary of any Village Abadi, national Highway, State Highway, Mahor District Roads (MDR) and Other District Roads (ODRs), temple and no mining should be carried out within 100 meters by using explosives from the outer boundary of any Village Abadi, National Highway, State Highway, Major District Roads(MDR) and other District Roads(ODRs), temple even if, PP obtained permission from DGMS.*

   - *For mining in the remaining area, the proponent should conduct the blast vibration study by engaging CSIR-Central Institute of Mining and Fuel Research (CIMFR),Dhanbad or National Institute of Rock Mechanics (NIRM), Karnataka. The report so obtained should be submitted to DGMS for obtaining the permission for carrying out mining by using explosive.*

   - *The proponent shall monitor ground vibration and air overpressure of each blast and shall keep a record of the same which include logs generated from Blastmate, geo-location of the blast. Dated and time of blast, number of holes blasted, charge per holes, explosive used, bench parameters, drill hole parameters etc.*

3. The observations/findings of the Joint Committee regarding the compliance of the above conditions with regard to blasting are as follows:

   a. ***No signs of mining within 50 mtr distance from the Abadi, School, Temple, Health Centre were observed. This was also confirmed by the Revenue Department vide letter No. 148/MC dated 21/02/2025*** (**Annexure-13**). As per site inspection and details of blasting operations including geo-coordinates provided to the Joint Committee, ***no blasting activities have been carried out within 100 mtr from the outer boundary of any Village Abadi, National Highway, State Highway, Major District Roads(MDR) and other District Roads(ODRs)***.

   b. ***The project proponent has conducted three blast vibration studies by engaging CSIR-Central Institute of Mining and Fuel Research (CIMFR), Dhanbad*** vide i) **Project Code**: CNP/4718/2018-19 August 2018 (**Annexure-14**), ii) **Project Code**: CNP/5073/2021-22 September 2021 (**Annexure-15**) and iii) **Project No.**: CNP/5236/2023-24 MAY 2024 (**Annexure-16**), in compliance to the condition of Environmental Clearance.

c. ***The project proponent is monitoring ground vibration and air overpressure of each blast and keeping the record of the same which include logs generated from Blastmate, geo-location of the blast, date and time of blast etc***. The copy of the records maintained for each blasting activity undertaken in North Block and South Block of the mine in the Month of January, 2025 was obtained from the Project proponent for verification by the Joint Committee (**Annexure-17** and **Annexure-18**).

2.3.4. Failure to establish a green belt as per conditions of the environmental clearance:

The following conditions have been imposed with regard to green belt in the approved mining plan and the environmental clearance granted to the Project Proponent, for implementation in the mining area:

1. **Approved Mining Plan**: As per last approved mining plan (2017-2022), the project proponent was required to plant 9300 plants @ 1870 plants /annum during 2017-2022. The project proponent has planted 10000 plants during 2017-2022 and out of this, 9630 plants have survived. Further, as per details shared by the project proponent, additional 3000 plants have been planted during 2023-2024.

   The Photographs of the plantation observed by the Joint Committee during inspection of the Mining area are attached as **Photographs 3 to 6 of Annexure-36** .

2. **Environmental Clearance**: As per conditions of the environmental clearance granted to the project proponent for mining on 04/05/2018: Plantation shall be raised in a 7.5m wide green belt in the Safety zone around the mining lease, backfilled and reclaimed area, around water body, along the roads etc. by planting the native species in consultation with the local DFO/Agriculture Department. The density of the trees should be around 2500 plants per ha. Greenbelt shall be developed all along the mine lease area in a phased manner and shall be completed within first five years.

   It was observed that greenbelt all along the mine lease area including 7.5 m wide green belt in the safety zone, as mandated in Environmental Clearance is yet to be completed by the project proponent.

2.3.5. Dust pollution and respiratory health issues/diseases arising in the area due to dust pollution:

1. ***The following conditions have been imposed in the Environmental Clearance granted to the project proponent for mining:***

   i. Purchase of minimum two water tankers having mist cannon fogger.

   ii. Shelter belt i.e. wind barrier of 30 meter width and consisting of at least 5 tiers around lease facing the habitation/ school/public road (if any in the vicinity) shall be raised.

   iii. The critical parameters as per the Notification 2009 such as PM_{10}, PM $_{2.5}$, NOx and SOx etc. In the ambient air within the impact zone, peak particle velocity at 300m distance or within the nearest habitation, whichever is closer shall be monitored periodically.

   iv. The Proponent shall install online Ambient Air Quality Monitoring System and there should be system for display of digital AAQ data within 03 months at least three locations as per wind direction.

   v. Effective safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of PM_{10}, and PM2.5 such as haul road, loading and unloading point and transfer points. Fugitive dust emissions from all the sources shall be controlled regularly. It shall be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard. Monitoring of Ambient Air Quality to be carried out based on the Notification 2009, as amended from time to time by the Central Pollution Control Board.

   vi. Main haulage road in the mine should be provided with permanent water sprinklers and other roads should be regularly wetted with water tankers fitted with sprinklers.

2. ***The observations/findings of the Joint Committee regarding the compliance of the above conditions with regard to dust pollution control are as follows:***

   i. The Project proponent has provided 05 Nos. water tankers and 02 Nos. mist cannon foggers in the mining lease area (**Photograph 7 to 9** of **Annexure-36**).

   ii. Shelter belt has been provided around the lease facing the habitation (Harijan Basti) and road in the vicinity of the mining lease (**Photograph 10 to 12** of **Annexure-36**).

iii. The periodical monitoring of critical ambient air quality monitoring parameters is being conducted as per details shared by the project Proponent and the analysis reports of monitoring are attached as **Annexure-19**.

iv. The project proponent has installed online Ambient Air Quality Monitoring System alongwith system for display of digital AAQ data at least three locations of the mining lease (**Photograph 13 to 15** of **Annexure-36**).

v. The project proponent has made arrangement for water sprinkling on main haulage road and other using water tankers fitted with sprinklers. ***However, permanent sprinklers on the haulage roads have not been provided*** **(Photograph 16-17 of Annexure-36).**

vi. *The ambient air quality monitoring for PM_{10}, $PM_{2.5}$, SOx and NOx at 03 locations of the mining lease area was also conducted by the Joint Committee* with the assistance of Haryana State Pollution Control Board during site visit on 17-18 February, 2025, to verify compliance of prescribed norms. The collected samples were analysed in HSPCB Laboratory Gurugram. *According to the analysis reports dated 21/02/2025, provided to the Joint Committee on 26/02/2025,* ***results of PM_{10}, $PM_{2.5}$, SOx and NOx parameters are within prescribed limits of 100 ug/Nm^3, 60ug/Nm^3, 80ug/Nm^3 and 80ug/Nm^3 respectively*** (**Annexure-20**).

3. The Joint committee also obtained the data of respiratory diseases in the habitation namely Harijan Basti in the vicinity of the mining area, from the primary Health Centre, Bayal. As per information received from the Office of Civil Surgeon, Narnaul, ***total 06 cases of respiratory diseases aged between 54 to 71 years have been reported in Harijan Basti duding last 05 years*** **(Annexure-21)**

2.3.6. Three stone crushers have been set up, with approval for only two; the third operates without proper authorization:

It is alleged in the letter petition that the project proponent has also installed three stone crushers and one is running illegally without requisite statutory permissions and licenses etc.

In this regard, the relevant details regarding stone crushers owned by M/s Bayal Quartz & Feldspar Mines along with copies of CTE and CTO granted to these stone crushers were obtained from Haryana State Pollution Control Board. The observations/findings of the Joint Committee based on the physical inspection carried out during site visit and examination of relevant documents received from HSPCB are as follows:

1. M/s Bayal Quartz and Feldspar Mines have established following two Crushing Units in the same premises:

   i. **M/s Shri Ram Stone Crusher**, Khewat No. 11, Khatoni No. 11, M.No. 49, Kila No. 3 (7-11) & 4 (7-11), Total 15 Kanal 02 Marla located at Village Panchnota, Nangal Chaudhary, Distt. Mahendragarh

   ii. **Shri Ram Stone Crusher Plant 02** , Khewat No. 23, Khatoni No. 1. M/Kila.No. 46/21 (8-0), 22(8-16), 48/1 (7-7) and 2(2-11), Total 26 Kanal 14 Marla located at Village Panchnota, Nangal Chaudhary, Distt. Mahendragarh

2. **M/s Shri Ram Stone Crusher:**

   - This plant was first established vide CTE No. HSPCB/Consent/ 313129218MAHCTE6117016 dated 26/12/2018 (**Annexure-22**) with the condition that "The Unit will abide for the ***production capacity upto average 11000 MT/day*** with installation of ***two set of machinery*** as per submitted proposed site plan.

   - The Consent to Operate (CTO) to this Unit was granted by HSPCB vide No. HSPCB/Consent/313129219MAHCTO6636376 dated 30/07/2019 (**Annexure-23**) for ***production of 3000 MT/day*** .

   - The consent to Establish for the expansion of the above Unit was granted by HSPCB vide No. HSPCB/Consent/313129223MAHCTE70193938 dated 19/11/2023 (**Annexure-24**).

   - After expansion, the Unit was granted Consent to Operate (CTO) by HSPCB vide No. HSPCB/Consent/313129224MAHCTOA682 dated 02/02/2024 (**Annexure-25**) for ***production of 11000 MT/day.***

   Therefore, as per record of HSPCB, M/s Shri Ram Stone Crusher has installed two set of Machinery (02 Jaw Crushers and associated downstream machinery) for production of 11000 MT/day and is operating with valid consent to operate. *The Joint Committee also observed during site inspection that the two sets of machinery have been installed at* M/s Shri Ram Stone Crusher.

3. **Shri Ram Stone Crusher Plant 02:**

   - This plant was first established vide CTE No. HSPCB/Consent/ 313129220MAHCTE8036401 dated 26/08/2020 (**Annexure-26**) with the condition that "The Unit will abide for the ***production capacity upto average 3000 MT/day with one machinery set.***

- The Consent to Operate (CTO) to this Unit was granted by HSPCB vide No. HSPCB/Consent/313129220MAHCTO8136111 dated 14/10/2020 **(Annexure-27)** for ***production of 4000 MT/day***.
- The consent to Establish for the expansion of the above Unit was granted by HSPCB vide No. HSPCB/Consent/313129223MAHCTE79016688 dated 19/11/2023 (**Annexure-28**).
- After expansion, the Unit was granted Consent to Operate (CTO) by HSPCB vide No. HSPCB/Consent/313129224MAHCTOA55104406 dated 02/02/2024 **(Annexure-29)** for production of 11000 MT/day.

Therefore, as per record of HSPCB, M/s Shri Ram Stone Crusher (Plant 2) has installed one set of Machinery (01 Jaw Crushers and associated downstream machinery) for production of 11000 MT/day and is operating with valid consent to operate. *This was verified by the Joint Committee during site inspection.*

2.3.7. Violation of Environmental Guidelines:

The findings/observations of the Joint Committee with regard to Compliance/Violation of Environmental Guidelines by the Project Proponent for the Mining Lease and the Stone Crushers are as follows:

1. **Mining Lease:**

The status of compliance of various conditions of Environmental Clearance granted to the project proponent for the mining lease with regard to mining, water table, green belt, blasting and dust pollution and control have been explained in Section 2.3.1 to Section 2.3.5. The last half yearly report regarding of compliance of other conditions as submitted by the Project Proponent to MoEF&CC (**Annexure-30**) was examined by the Joint Committee and it was found that the project proponent is complying with the prescribed conditions.

However, it was observed during site inspection that rain water harvesting system comprising of two pits has not been designed as per CGWB guidelines and has not been maintained properly **(Photograph 18-19** of **Annexure-36**).

2. **Stone Crushers:**

A. The standards notified by MoEF&CC for Stone crushers under Environment (Protection) Act, 1986 consist of two paras namely: i) Implementation of pollution control measures and ii) Quantitative Standard for SPM.

Under Implementation of pollution control measures, the following measures are listed:

a) Dust containment cum suppression system for the equipment.
b) Construction of wind breaking walls.
c) Construction of the metalled roads within the premises.
d) Regular cleaning and wetting of the ground within the premises.
e) Growing of a green belt along the periphery.

B. The findings/observations of Joint Committee regarding compliance of the above measures are as follows:

i. The Stone Crushing Units have provided water sprinkling system for conveyors and material transfer points (**Photograph 20-21** of **Annexure-36**).

ii. Flexible Telescopic chute from top of discharge point to the ground level have been provided (**Photograph 22-24** of **Annexure-36**).

iii. Wind breaking wall has been provide on all sides of the stone crusher premises (**Photograph 25-27** of **Annexure-36**).

iv. Roads within the premises have been constructed using stone gravels (**Photograph 28-29** of **Annexure-36**).

v. Wetting of the ground within the premises using water tanker and sprinklers was observed during site inspection (**Photograph 30-31** of **Annexure-36**).

vi. A green belt has been established on three sides of the stone crusher premises (**Photograph 32-33** of **Annexure-36**). ***However, it was observed that only a wind-breaking wall is provided on the side where the jaw crushers are located*** (**Photograph 34-35** of **Annexure-36**). ***To prevent fugitive emissions from escaping the premises, the height of the wind-breaking wall needs to be increased up to the loading point of the jaw crusher.***

C. As per the production data obtained from the project proponent for both the stone crushers for the last 06 months (**Annexure-31**), it was found that the crushers are operating at around 30% of the installed capacity. The emission monitoring of the Stone Crushers for SPM parameter was conducted by the Joint Committee with the assistance of HSPCB, to verify compliance with the prescribed norms at 30% operating capacity. The collected samples were analysed in HSPCB Laboratory, Gurugram, *According to the analysis reports dated 21/02/2025 provided to the Joint Committee on 27/02/2025,* ***both the stone crushers are***

complying with the prescribed standards of 600 microgrammes per cubic metre for SPM at 30% operating capacity (Annexure-32).

D. The Central Pollution Control Board (CPCB) has released Environmental Guidelines for Stone Crushing Units in July 2023 (**Annexure-33**). These guidelines include a checklist that State Pollution Control Boards (SPCBs) and Pollution Control Committees (PCCs) must follow before granting Consent to Establish (CTE) and Consent to Operate (CTO).

E. ***It was informed by the HSPCB member that CPCB Guidelines are yet to adopted by HSPCB*** and that the HARYANA GOVERNMENT ENVIRONMENT, FOREST AND WILDLIFE DEPARTMENT has issued a draft Notification No. S.O.6/C.A.29/1986/S.5 and 7/2025 on 24th January, 2025 for notifying SCHEDULE I : NORMS FOR SITING OF STONE CRUSHERS IN HARYANA and SCHEDULE II : EMISSION NORMS AND POLLUTION CONTROL MEASURES REQUIREMENTS, which also mandates compliance with CPCB Guidelines, for inviting objections and suggestions within 30 days from the date of publication (**Annexure-34**).

F. The Joint Committee verified the compliance of CPCB Guidelines by both the stone crushers of M/s Bayal Quartz and Feldspar Mine and the status of compliance is summarized in the following **Table 1**:

Table 1: Status of compliance of the CPCB Guidelines by the Stone Crushers of M/s Bayal Quartz and Feldspar Mines.

S. No.	Fugitive Emission Source Locations/Particulars	Checklist/requirement for compliance of conditions of Environmental guidelines	Status of Compliance as on 12/08/2024, as verified by the Joint Committee
1.	Unloading area of raw material, primary crusher, Screener, conveyors belts and transfer points,	Water sprinklers installed with adequately designed nozzles.	Complying
2.	Primary crushers, Secondary crushers, Screeners and tertiary crushers.	Enclosures by GI/MS sheets on top and at least three sides completely from the ground level.	Complying (**Photograph 36-38** of **Annexure-36**)
3.	Secondary, Tertiary crushers and Screener.	Dry extraction cum bag filter followed by cyclone.	***Not provided. It was informed by the HSPCB member that CPCB***

			Guidelines are yet to adopted by HSPCB *and that the HARYANA GOVERNMENT ENVIRONMENT, FOREST AND WILDLIFE DEPARTMENT has issued a draft Notification No. S.O.6/C.A.29/1986/S.5 and 7/2025 on 24th January, 2025 for notifying SCHEDULE I : NORMS FOR SITING OF STONE CRUSHERS IN HARYANA and SCHEDULE II : EMISSION NORMS AND POLLUTION CONTROL MEASURES REQUIREMENTS, which also mandates compliance with CPCB Guidelines, for inviting objections and suggestions within 30 days from the date of publication*
4.	Covering of Conveyor belts from node to node with a thick sheet of suitable material.	Covering of Conveyor belts.	Complying **(Photograph 39-42 of Annexure-36)**
4	At discharge points.	Flexible Telescopic chute from top of discharge point to the ground level.	Complying.
5	GI/MS/brick wind breaking wall of 3-ft more than the highest node of the crusher along the periphery of crusher	Wind breaking wall.	Complying. *However, to prevent fugitive emissions from escaping the premises, the height of the wind-breaking wall needs to be*

			increased up to the loading point of the jaw crusher.
7.	Roads	Metaled/concrete roads within the premises. Ramps and the entire ground area inside the premises should also be metaled.	Complying. Roads within the premises have been constructed using stone gravels.
8.	Suppression of dust within the premises	Arrangement of rotating water sprinkling System/fogger/Anti-smog gun in the premises to suppress dust within the premises to control dust emission resuspension	Complying. **(Photograph 43 of Annexure-36).**
9.	Green belt	Plantation of 2-3 rows of tall trees around the periphery of crusher	Partially Complying. A green belt has been established on three sides of the stone crusher premises **(Photograph 44-46 of Annexure-36)**. *However, to prevent fugitive emissions from escaping the premises, the height of the wind-breaking wall needs to be increased up to the loading point of the jaw crusher.*
10.	CCTV/PTZ camera	CCTV/PTZ cameras installed at the entrance and all corners of the premises of the unit covering entire area with minimum of 30 days data storage	Complying.
11.	Jaw Shed	The stone crushing unit shall be provided with acoustic enclosure near jaw sheds and shall be properly designed and approved	Complying. **(Photograph 47-48 of Annexure-36).**

		by the State Pollution Control Board.	
12.	Spray Nozzle System	The water mists spray nozzle system shall be interlocked with stone crushing unit main energy supply and water supply meter.	Interlocking not observed.

2.3.8. No Corporate Social Responsibility (CSR) initiatives carried out in the village:

It was alleged in the petition that the project proponent has not carried initiatives under Corporate Social Responsibility (CSR) in the village.

However, CA certificate dated 09/12/2023 shared by the project proponent indicates that an expenditure of Rs. 4843311/= has been incurred from the year 2018 to September 30, 2023 on various CSR activities (**Annexure-35**).

3.0. Submission of the Joint Committee:

It is respectfully submitted that in compliance to the directions of Hon'ble NGT, Joint Committee has visited the site, collected relevant information, interacted with stakeholders including complainant and examined the relevant documents collected during the site visit. This factual report prepared on the basis of site inspection, interaction with the stakeholders and examination of relevant documents may kindly be considered and taken on record by the Hon'ble National Green Tribunal.

The Joint Committee shall abide by further directions of Hon'ble NGT in this matter.

Shri Rajnish Kumar Range Forest Officer, Mahendragarh	Er. Krishan Kumar Yadav, RO, HSPCB, Mahendragarh	Dr. Narender Sharma Scientist 'F' CPCB, RD, Chandigarh	Shri Manoj Kumar, SDM, Nangal Chaudhary

Date: February 27, 2025

Annexure-1

Item No. 02 Court No. 2

BEFORE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

Original Application No. 1140/2024

Sumit Kumar Applicant

Versus

State of Haryana Respondent

Date of hearing: 19.11.2024

CORAM: HON'BLE MR. JUSTICE SUDHIR AGARWAL JUDICIAL MEMBER
HON'BLE DR. AFROZ AHMAD, EXPERT MEMBER

Applicant: None

ORDER

1. Letter petition dated 02.02.2024 sent by Sumit Kumar s/o Prakash Chand r/o Village Bayal, Tehsil Nagal Choudhary, District Mahendragarh has been registered as Original Application (hereinafter referred to as '**OA**') under Section 14 and 15 of National Green Tribunal Act, 2010 (hereinafter referred to as '**NGT Act, 2010'**) in exercise of *suo-moto* jurisdiction in view of law laid down by Supreme Court in *"Municipal Corporation of Greater Mumbai vs. Ankita Sinha & Ors." reported in 2021 SCC Online SC 897.*

2. Complainant has said that M/s Bayal Quartz and Feldspar Mines is illegally conducting mining activities by heavy blasting though residential area is just about 50 mtrs. from mining site and there is school and hospital also at 200 mtrs. Mining activities are causing huge damage to buildings and construction raised in nearby area and also causing heavy air pollution creating health hazards to local people. Conditions of Environmental Clearance (hereinafter referred to as '**EC**') are also being violated by said proponent with respect of plantation, depth of mines, CSR activities etc. Proponent has also installed three stone crushers and one is

running illegally without requisite statutory permissions and licenses etc. Mining activities are being carried out at Khasra No. 198 and 202 of village Bayal which is also part of Aravali Forest Region.

3. Allegations made in the complaint, in our view, *prima facie* give rise to substantial question relating to environment arising due to implementation of Enactments specified in Schedule I to NGT Act, 2010. However, before taking any further action in the matter, we find it appropriate to obtain a factual report for which we constitute a joint Committee comprising:

i. Central Pollution Control Board (hereinafter referred to as '**CPCB**') and;

ii. Divisional Forest Officer, Mahendragarh

iii. District Magistrate, Mahendragarh

iv. Haryana State Pollution Control Board (hereinafter referred to as '**HSPCB**')

4. CPCB shall be the nodal authority for coordination and compliance.

5. The above Committee shall visit the site, collect relevant information, interact with stakeholders including complainant and submit factual report within one month.

6. List on 24.12.2024.

Sudhir Agarwal, JM

Dr. Afroz Ahmad, EM

November 19, 2024
Original Application No. 1140/2024
SN

Item No.04 Court No. 2

BEFORE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

Original Application No.1140/2024

Sumit Kumar Applicant

Versus

State of Haryana & Ors. Respondents

Date of hearing: 23.01.2025

CORAM: HON'BLE MR. JUSTICE ARUN KUMAR TYAGI, JUDICIAL MEMBER
HON'BLE DR. AFROZ AHMAD, EXPERT MEMBER

Applicant: None for the applicant.

Respondents: Mr. Raj Kumar, Advocate for CPCB.
Mr. Rahul Khurana, Advocate for HSPCB.

ORDER

1. Report dated 20.12.2024 of the Joint Committee has been filed by CPCB by forwarding letter dated 23.12.2024 seeking further six weeks time for submission of report.

2. In view of the averments made in the application and observations made in the report of the Joint Committee, we consider it necessary to have responses of (1) State of Haryana through Additional Chief Secretary, Environment, Forest and Wild Life Department, Government of Haryana (2) Director, Mining and Geology, Government of Haryana, (3) District Magistrate, Mahendragarh at Narnaul (4) Central Pollution Control Board (CPCB) through Member Secretary, (5) Haryana State Pollution Control Board (HSPCB) through Member Secretary, (6) M/s Bayal Quartz and

Feldspar Mines (Project Proponent), Village Bayal, District Mahendragarh who stand impleaded as respondents no. 1 to 6.

3. The Registry is directed to prepare and attach memo of parties to the application.

4. Respondent no. 4-CPCB and respondent no. 5-HSPCB are already represented before this Tribunal. Learned Counsel for HSPCB has also accepted notice on behalf of respondents no. 1 to 3.

5. Notice be served on M/s Bayal Quartz and Feldspar Mines (Project Proponent) through the District Magistrate, Mahendergarh at Narnaul and for this purpose notice issued to the M/s Bayal Quartz and Feldspar Mines (Project Proponent) be sent to the District Magistrate, Mahendergarh at Narnau by E-mail for getting service of the same effected on it and sending his report in this regard.

6. Further report of the Joint Committee be filed within six weeks and advance copy thereof be also supplied to the respondents .

7. Replies/responses be filed by respondents at least three days before the date of hearing fixed.

8. List on 03.03.2025 for further consideration.

9. A copy of this order be sent to the District Magistrate, Mahendergarh at Narnaul by email for requisite compliance.

Arun Kumar Tyagi, JM

Dr. Afroz Ahmad, EM

January 23rd, 2025
O.A. No. 1140/2024
M

Inspection of Joint Committee in matter of Original Application No. 1140/2024 titled as Sumit Kumar Vs State of Haryana in Hon'ble National Green Tribunal, New Delhi conducted on 19.12.2024.

Sr. No.	Name of officer	Designation & Department	Mobile No.	Email ID	Signature
1.	Sanjeev Kumar	SEE HSPCB	9212385088		
2.	Krishan Kumar	RO Mahendergarh	9810232041	hspcbromg@gmail.com	
3.	Dr. Narender Sharma	RD, CPCB, Gurugram	9814004377	narendrsharma.cpcb@gov.in	
4.	Jai Bhagwan	Range forest officer, Nangal Chaudhary	9518850449	Rfonch@yahoo.com	
5	Manisha	Mining Inspector Mines & Geology Dept.	7015727952	monarawal@gmail.com	
6	Anuj Narwal	AEE HSPCB	9996192738	hspcbromg@gmail.com	
7.	Sumit Kumar	BAYAL	9992730733		
8.	[illegible]	BAYAL [illegible]	9729206783	[illegible]	
9.	Pramod Project Physicist	Project Physicist	9215057371		
10.	Harish CK	Bayal	9671344437		
11	Ajeet	Bayal	9911302468		
12	Ramit	SDM Narnaul	7719690319		

HARYANA STATE POLLUTION CONTROL BOARD
C-11, SECTOR-6, PANCHKULA
Ph-0172-577870-73, Fax No. 2581201
E-Mail: hspcbcoordination@gmail.com
website: hspcb.org.in

No. HSPCB/Coord. Cell/2025/679 **Dated:- 14.01.2025**

To

The Regional Officer,
HSPCB, Mahendragarh.

Subject: Status cum Progress Report of the Joint Committee in the matter of OA No. 1140 of 2024; Sumit Kumar Versus State of Haryana, in compliance to the Orders of Hon 'ble National Green Tribunal dated 19/11/2024.

Kindly refer to the subject noted above.

In this connection, it is intimated that the you are nominated as Member on behalf Member Secretary, Haryana State Pollution Control Board by for joint committee consituted by Hon'ble NGT in the place of Sr. Environmental Engineer.

In view of above, you are asked to conduct inspection with joint committee and submit status report before Hon'ble NGT.

Env. Engineer (Coord. Cell)
For Member Secretary

Inspection of Joint Committee in matter of Original Application No. 1140/2024 titled as Sumit Kumar Vs State of Haryana in Hon'ble National Green Tribunal, New Delhi conducted on 17.02.2025.

Sr. No.	Name of officer	Designation & Department	Mobile No.	Email ID	Signature
1.	Krishan Kumar	RO HSPCB Mgrh	9810232041		17/2/25
2.	Manoj Kumar	SDM NIC	9416164147		
3.	Rajnish Kumar	RFO Nangal Chaudhary	9416903077		17/02/25
4.	Dr. Narendra Sharma	Regional Director, CPCB, RO, Chd	9814504372		
5.	Anuj Nanwal	AEE, HSPCB Mgarh	9996192738		
6.	Abhishek Sharma	Employee	9494092260		
7.					
8.	Manisha	Mining Inspector Mines & Geology	7015727952		
9.					
10.					

MINING PLAN AND PROGRESSIVE MINE CLOSURE PLAN OF

Bayal Quartz and Feldspar Mine (Minor Minerals)

VILLAGE: BAYAL
DISTRICT: MAHENDERGARH
STATE: HARYANA
(Area-76.75 Hetares)

खान एवं भूविज्ञान विभाग, हरियाणा, चण्डीगढ़
Department of Mines and Geology
Haryana, Chandigarh
APPROVED
With Conditions
शर्तों के साथ अनुमोदित
Vide Letter No. DMG/HY/MP/Bayal/2017/2733-36
दिनांक / Dated 23-06-2017
राज्य खनन अभियन्ता
State Mining Engineer

Submitted To: DMG, HARYANA(MAY-2017)

APPLICANT

Shri Man Mohan Bhadana s/o ShriKartar Singh BhadanaVPO :Anangpur, Tehsil & District : Faridabad (Haryana)

PREPARED BY

S.N. SHARMA
RQP/DDN/0135/2001-A
House No. 282, sector 11-D, Faridabad (Haryana)

CHAPTER -1

INTRODUCTION

Mr. Manmohan Bhadana s/o Shri Kartar Singh, VPO : Anangpur, Tehsil and District : Faridabad) hold a mining lease over an area of 228.60 hectares falling in Khasra Nos 198, 201, 202, 223 & 224 in village Bayal, District: Mahendergarh which was granted on 09.07.2002 for a period of 20 years Quartz and Felspar, both as Major Minerals as per provisions of Mines & Mineral (Development & Regulation) Act, 1957. Now, the lease which was granted on 09.07.2002 shall be up to 08.07.2052 as per the Central Government Ordinance dated 12.01.2015.

With subsequent notification dated 10.02.2015, 31 minerals (as notified in the Act) have been declared as Minor Minerals. Therefore, minerals namely Quartz & Felspar for which lease was granted Major Mineral now have fallen under category of Minor Minerals and shall be under the purview and provisions of the " Haryana Minor Mineral Concession, Stocking, Transportation and Prevention of Illegal Mining Rule, 2012"

We would like to mention here that part area of the lease falling under Khasra numbers 198 and 202 (comprising total area of 151.85 hectares) is under Aravalli Project Plantation and cannot be used for mining as per orders of the Hon'ble Supreme Court. Lessee submitted letter to DMG, Haryana for surrender of 151.85 hect area and which has been accepted by DMG, Haryana vide letter no. Glg/Hy/E-2578/281 dated 11.01.2017. The execution of the Revised/Modified Mining Lease Deed (Supplementary Lease Deed) on surrender of part of area (76.75 Hect) of mining lease in village Bayal has been executed on 12th May, 2017, which is attached as Annexure-5. Applicant approached us to prepare "Mine Plan and Progressive Mine Closure Plan for remaining lease area of 76.75 hectares **under the Rule 20 of " Haryana Minor Mineral Concession, Stocking, Transportation and Prevention of Illegal Mining Rule, 2012"**.

APPROVED
P. K. Sharma
S.M.E.

Attached are Mining Plan and Progressive Mine Closure Plan for remaining area of 76.75 Hectares.

1.0. GENERAL:

1.1. **Name and address of the applicant**: Sh. Manmohan Bhadana S/o Sh. Kartar Singh Bhadana R/o V & PO- Anangpur; Distt.- Faridabad (Haryana)

1.2 **Status of the Applicant**;-Individual

1.3. **Mineral or Minerals, for which the Applicant has a Mining Lease**:

Quartz and Feldspar (Minor Minerals)

1.4 **Details of the land covered in the 'M.L. Area'**

Details of the land covered in the 'M.L. Area' is as under:-

District :Mohindergarh

State : Haryana.

Village	Taluka	Khasra no.	Area in hect.	Ownership
BAYAL	Narnaul.	201,223 & 224	76.75hectares	Gram panchayat

The following are the GPS locations of the mine lease hold area which have been considered in two blocks :

Block 1: Lat: 27°51.485'N to Lat: 27°51.970'N
Long: 75°58.642'E to Long: 75° 58.932'E

Block 2: Lat: 27°50'54.20"N to Lat: 27 51.203' N
Long: 75°58'37.58"E To Long: 75°59.041' E

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1.5 **Period for which mining lease is granted**: The lease was originally granted on 09.07.2002 for a period of 20 years. However as per the Central Government Ordinance dated 12.01.2015, which also became Act on 27.03.2015, the period of lease, shall be 50 years. Hence the period of lease in the instance case shall be 09.07.2002 to 08.07.2052.

1.6 **Name, Address and registration number of the person who Prepared this plan.-**

The applicant assigned the work of preparation of Mining Plan to S.N.Sharma

(Consent letter enclosed as Annexure -2)

Regd. No RQP/DDN/0135/2001/A

House No. 282; Sector 11-D Faridabad (Haryana)

1.7. Reference No and Date of Consent letter from the State Government - Existing lease.

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CHAPTER – 2

2.0 LOCATION AND ACCESSIBILITY:

a) Details of the area (With Location Map)

The location Map of the area has been given in plate no.(1)

Details of area	Location Map Plate No. (1)
District	Mohindergarh and state Haryana
Taluka	Narnaul
Village	Bayal
Khasra details	201,,223 &224;
Area	76.75 hectares
Whether the area is recorded to be in forest	No.
Ownership/occupancy	Gram Panchayat
Existence of public road/railway line	A public road from Nangal Choudhary to Patan village passes through the lease area.
Nearest railway head	The nearest railhead (meter gauge) is at Nizampur, which is 15 Km. The other important station of Narnaul is at a Distance of 25Km from the are under reference.
Toposheet no.	G43 D13

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Present Land Use pattern - Barren waste Land

Sl. No.	Type of Land Use	Value (in Ha)
1	Quarry Area	0.085
2	Infrastructure (road/ material handing / stockyard)	0.00
3	Road	1.50
4	Agriculture	0.00
5	Plantation	0.00
6	Water body	0.00
7	Habitation	0.00
8	Undisturbed land	75.165
9	OB dump	0.00
Total		76.75

A general location and vicinity map showing area boundaries and existing and proposed access routes is enclosed as plate No. 2. The area is marked on survey of India Topo sheet No. G 43 D 13.

INFRASTRUCTURE

The following infrastructure facilities are available in the lease area/ Bayal village

ELECTRIC POWER

The nearest electrical substation is in Bayal village which is just 500 mtrs from the area. There is no direct connection in the area; however, the extension made up to the site from the Bayal village.

Telephone facility is available in the Bayal village. A separate telephone connection may be taken upto the proposed area from the /Bayal village.

HOSPITAL

Primary health center is available in the village. The nearest civil hospital is at Narnaul which is 25 km from the area.

SCHOOL/COLLEGES

The village Bayal have secondary schools The nearest college and ITI are at Narnaul.

WATER

The Daily water demand will be about 18 KLD which will be met from tube well situated in the lease area.

CHAPTER – 3

3.0 GEOLOGY & RESERVES:

The rocks exposed in the proposed area and surrounding areas belong to Alwar Series of Delhi super group.

3.1 TOPOGRAPHY

The lease area consists of ridges and valleys. The highest point in the lease area is recorded to be 480mRL and the lowest point recorded is 370 mRL .

The lease area does not have any water body. There are dry nalas in which water flows only during rains for a short duration, otherwise they remain dry for the rest of the period. The rain water from these nalas drains either into local Johars or in agriculture fields.

3.2 REGIONAL GEOLOGY

The regional stratigraphic sequence in District Mohindergarh and southern part of Haryana is as follows:

	----- Ajabgarh series	- Biotitic schist, phyllites, quartzites, Impure limestone & calciphyres.
Delhi System	---- Alwar Series	- Dolomite, Quartzite, Arkoses, Conglomerates and mica schist With bedded Lavas.
	---- Railo series	- Railo limestone and marble, Railo Quartzites.

Out of the above sequence of formations, Quartzite associated with vein of Quartz and Feldspar belongs to Alwar series of Delhi system are exposed in the area under reference.

3.3 LOCAL GEOLOGY

The Geology of the area has been described under regional geology. Local Geology of the lease area with the description of different formations found in the area along with its physical and chemical properties and reserves have been detailed in this chapter.

The area was got surveyed geologically. The geological plan and sections have been prepared on 1:2000 scale as attached plate No. 3

The following sequence of rock formations belonging to Delhi Super group are found in the lease area have been as under

Alluvium

Quartz mixed with Quartzite

Feldspar mixed with Quartzite

Amphibolites

Micaceous Phyllite with quartzite

3.4 GENERAL DESCRIPTION OF FORMATIONS (ref. plate no.3) :-

(i) Alluvium:

It is the top layer and the youngest sedimentary layer in the lease area. Though there is no soil exposure on the top of the hill but on the foot hill or at the bottom, there is brown sand and detritus soil. It is mainly exposed in the foot hill side of the lease area. It is reddish, brown in color. Thickness varies from 0.5m to 2.0m.

(ii) Quartz:

The quartz is very well mineralized in the area. It is milky white in color, fine grained and cryptocrystalline. Quartz veins have intruded and mixed in the country rock which is pre-dominantly Phyllites Quartzite. One sample of quartz has been collected from the main vein and was analyzed.

(iii) Feldspar

There is a good deposit of Feldspar in the lease area. Feldspar is also intruded and mixed with country rock which is pre-dominantly Phyllite and Quartzite. One sample of Feldspar has been collected from the main feldspar body and has been analyzed.

(iv) Amphibolite

Amphibolite is also found in the lease area. It is the product of dynamo thermal metamorphism of basic igneous rocks.

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(v) **Micaceous Phyllite with quartzite**

Micaceous phyllite is also found in the lease area. Micaceous Phyllite is the counry rock in this area. The quartz has intruded in to the country rock i.e. micaceous phyllite and Quartzite and is itself sheared at the margins. This has given rise to quartz schist

The strike of the quartzite formation varies from N 20 - 25° E to S 20° - 25° W with dip of 65 to 70° due south east

STRUCTURE

The general strike of quartzite is N 20°-25° E to S 20°-25° W with dips of 45° to 60° due East. The strike and dip of the quartzite bands is not uniform since there are structural disturbances and intrudes and mix with Quartz and Feldspar.

3.3.1 (a) CHEMICAL CHARACTERISTICS OF QUARTZ

S. No.	Chemical Characteristics	Percentage Composition
1	SiO_2	99.55
2	AL_2O_3	0.08
3	Fe_2O_3	0.20
4	CaO	0.00
5	MgO	0.00
6	LOI	0.17

3.5 (b) CHEMICAL CHARACTERISTICS OF FELDSPAR

S. No.	Chemical Characteristics	Percentage Composition
1	K_2O_3	14.00
2	SiO_2	49.00
3	Fe_2O_3	3.00
4	AL_2O_3	8.25
5	CaO	11.00
6	MgO	2.25
7	LOI	12.50

3.6 GEOLOGICAL CROSS SECTIONS

Geological Cross sections have been drawn at an interval of 200mtrs across the strike of the host rock as shown in plate in plate no. 4.

3.7 DETAILS OF EXPLORATION

The area is prominently marked by outcrops of Quartz & feldspar as seen in Surface geological Plan. Moreover, the area has undergone quartz mining in the past; therefore, no

fresh exploration to prove the quartz reserves is required. However area was not worked for feldspar. Therefore 5 no. of exploratory pits are proposed during the plan period as detailed below.

Year	Proposed Exploratory pit	Size in meters (LxWxD)	Location
1st	PEP-1	20x20x9	N2010 E 580
2nd	PEP-2	20x20x9	N1880 E 890
3rd	PEP-3	20x20x9	N1800 E 690
4h	PEP-4	20x20x9	N1670 E 500
5th	PEP-5	20x20x9	N1620 E 280

3.8 METHODS OF ESTIMATION OF RESERVES

For estimating the reserve of Quartz the following

Parameters are considered are as follows:

1. The reserves are calculated on the basis of established width, thickness and strike length/influence of the mineralized formation in the area where good pits are available such area has been put under proved category.
2. The entire reserves of quartz are put under proved category up and above valley level i.e. up to 385 mRL. Next 20 meters i.e up to 365 mRL are considered as probable and further 10 meters (up to 355 mRL) as possible.
3. The bulk density of Quartz and Feldspar is considered 2.6.
4. Since the mineral Quartz, Feldspar have been intruded and mixed with country rock (Phyllite and Quartzite), the Geological Reserves are calculated separately for Quartz, Feldspar and country rock Quartzite. While mining of the Quartz and Feldspar, quartzite rock shall also be removed/mined as waste/reject material.

Grade and use of minerals: The entire minerals produced from the areas are usable in glass, ceramic and other chemical industries.

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Quartz

Section Line	C. Area	UL	Bulk Density	Proved	Probable	Possible
AA'	50	170	2.6	22,100		
	600	170	2.6		265,200	

	300	170	2.6			1,32,600
BB'	3284	200	2.6	17,07,680		
	4440	200	2.6		23,08,800	
	2220	200	2.6			11,54,400
CC'	3716	200	2.6	19,23,320		
	5520	200	2.6		23,70,400	
	2760	200	2.6			14,35,200
DD'	2352	200	2.6	12,23,040		
	3960	200	2.6		20,59,200	
	1980	200	2.6			10,29,600
EE'	360	96	2.6	89,856		
	1200	96	2.6		2,99,520	
	600	96	2.6			1,49,760
Category wise Reserves			=	49, 74,966	78,03,120	39,01,560

Total Geological Reserves (Proved+Probable+Possible)

= 1, 66, 79,676 MT

a) Mineable reserves @90% Recovery (Quartz) = 1, 50, 11, 700 MT

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Quartzite (Masonry Stone) mixed with Quartz

Section Line	C. Area	DL	Bulk Density	Proved	Probable	Possible
AA'	450	170	2.6	1,98,900		
	1200	170	2.6		53,04,000	
	6000	170	2.6			26,52,000
BB'	12656	200	2.6	65,81,120		
	26760	200	2.6		1,39,15,200	
	13380	200	2.6			69,57,600
	15634	200	2.6	81,29,680		

CC'	34080	200	2.6		1,77,21,600	
	19040	200	2.6			88,60,400
DD'	10796	200	2.6	56,13,920		
	34440	200	2.6		1,79,08,800	
	17220	200	2.6			89,54,400
EE'	2712	96	2.6	6,76,915		
	15360	96	2.6		38,33,856	
	7680	96	2.6			19,16,928
Category wise Reserves =				2,12,00,535	5,86,83,456	2,93,41,728

Total Geological Reserves (Proved+Probable+Possible)=10,92,25,719 MT

Mineable Reserves @90%Recovery = 9, 83, 03,147 MT

Out of Mineable Reserves 40% is Quartz and 60% is Quartzite (Masonry Stone)

b) 40% Quartz = 3, 93, 21,258 MT

c) 60 % Quartzite (Stone) = 5, 89, 81,888 MT

Feldspar Mixed with Quartzite (Masonry Stone)

SL	C. Area	DL	Bulk Density	Proved	Probable	Possible
FF'	4220	130	2.6	14,26,360		
	2110	130	2.6		7,13,180	
	2110	130	2.6			7,13,180
GG'	6280	200	2.6	32,65,600		
	3140	200	2.6		16,32,800	
	3140	200	2.6			16,32,800
HH'	4500	240	2.6	28,08,000		
	2250	240	2.6		14,04,000	
	2250	240	2.6			14,04,000
Category wise Reserves =				74,99,960	37,49,980	37,49,980

Total Geological Reserves(Proved+Probable+Possible)=1,49,99,920 MT

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Mineable Reserves @90% Recovery = 1, 34, 99,928 (Including both)

Out of Mineable Reserves, 60% is Feldspar and 40% Quartzite (Masonry Stone)

d) Feldspar= 60% = 80, 99,960 MT

e) Quartzite (Masonry Stone) = 40% = 53, 99,970 MT

SUMMARY OF MINEABLE RESERVES OF QUARTZ, FELDSPAR & QUARTZITE (HOST ROCK)

Quartz Mineable Reserves (a+b) = 1, 50, 11,700 + 3, 93, 21,258

= **5, 43, 32,958 MT**

Feldspar mineable Reserves (d) = **80, 99,960 MT**

Quartzite (stone) (c+e) = 5, 89, 81,888 + 53, 99,970

= **6, 43, 81, 858 MT**

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CHPATER - 4

4. MINING

The existence of old working pit in the area reveals that the area was worked for Quartz in the past. The shape of the pit shows that earlier no systematic mining was done. Now it is proposed to do systematic and scientific mining of "Quartz" and "Feldspar" during the next Five years. The mining proposed to undertaken by forming benches by drill holes and blasting with the explosive. It is proposed to do mining by mechanized method. Drilling and blasting shall be required to dislodge the mineral. The mining is proposed in the south block during the next 5 years. Workings are proposed from top downwards. First of all mine road is proposed from 395mRL to 471 mRL.The total length of the road will be around 1220 meters with 10m width. The gradient of the road is proposed 1:16.

There is overburden in the lease area. This overburden will be removed in advance by excavator and stacked near the foot hill. This constitutes weathered quartz schist/quartzite. The same found use for construction purposes and is salable. In case some waste generated is not sold, the same will be stored in the stock yard . The quartz will be excavated with the help of excavators and transported by trucks to destinations directly.

4.1 Site Appreciation

Our experts (Geologist, Mining Engineer) visited the mine site and found that the allotted area comprised of long and narrow hill range. Two shallow excavated old pits exist in the allotted area revealing that the area has been worked for building stone in the past. Existing road length is about 1650 m. The shape of the pit shows that no systematic mining has been done. Now it is proposed to undertake systematic and scientific mining for excavation of road metal and masonry stone/building stone during the lease period.

4.2 Pre-production Activities:

As a pre-production activity, roads from crusher to top most entry to the initial mining area, from mining faces to the proposed dump area, from ground level to the mining area, to the mines office complex, and to the garage / workshop will be developed. Access roads / haul roads from topmost bench to benches at lower levels shall be developed gradually. As mining operations advance to lower levels, larger face lengths and width shall be available. Face management, which is a continuous process, shall be taken into account to secure shortest (average) lead distance up to crusher / dump yard as also to prevent clustering of dumpers. Following activities shall be undertaken during quarry development phase:

- Removal of vegetation and top soil to expose quartzite beds
- To make the access road to the mine working area.
- Provision and construction of access roads from ground level to mines office complex, workshop, entrance to mine faces.

- Development of haulage road from proposed crusher location to the floor of initial mining areas at a slope of 1 in 20 is proposed (not exceeding 1 in 16 except for ramps)
- Making of parapet wall/retaining walls along gradient of haul road.
- Construction of mine office, first aid station, crèche, canteen, workshop and other ancillary infrastructural facilities shall also be undertaken during first and second year of developmental activities.

4.3 MINING OPERATIONS:

The mining operations will comprise of following activities for excavation of mineral.

a) Drilling of "Down-the-Hole" holes as per specified pattern.

b) Blasting of holes

I) Primary Blasting

II) Secondary Blasting

c) Loading of blasted material by deploying hydraulic excavators

d) Transportation of material to Crusher

Thus, these mining operations shall be carried out by fully mechanized opencast method utilizing Heavy Earth Moving Equipment (HEMM) in conjunction with deep hole drilling by crawler mounted DTH drills and blasting. To start with benches shall be kept narrow and then gradually widened. To the extent possible, benches shall be kept along dip and advanced along the strike to give a fairly well blended material in each bench. The direction may be varied in due course based on experience gained, to give wider benches, longer faces and proper alignment along haul roads / ramps.

It is proposed to adopt mechanized opencast mining method for exploitation of the mineral. Drilling and blasting shall be required to dislodge the mineral. The mining method involves breaking the rocks with explosives, loading the material with excavators and haulage with dumpers.

4.1 Pit Design Parameters:-

In view of the geological setting of the deposit it is proposed to work the mine by machines open cast mine using shovel and dumper combination. The rate of production is proposed 55,00,000 MT/ year by the following mentioned parameters so that not only the production is achieved but mine also takes a proper / regular shape and size .

It is proposed to work the mine by 3.5 cubic meters shovel and 25 tones dumpers with bench height 9 m and width 10 m

Sr.no	Particulars	Dimensions with unit
1	Bench Height and width	9mx10m
2	Ultimate pit slope	45 degree
3	Face length	All along the strike length
4	Bench Alignment and bench slope	Parallel to each other; 80^0
5	Depth of pit.	30 m
6	Blast hole diameter	110mm
7	Inclination of blast hole	Vertical
8	Gradient of haul Road	1 in 16

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4.1.i Ultimate pit slope: -

The quartzite rock is hard and compact. Once the pits reach the ultimate limit, it is necessary that it does not start collapsing due to weathering and other effects. This can be achieved by planning ultimate pit slope at a maximum of 45 degree to avoid collapse of the pit sides. There is no overburden except a thin sol cover. Entire mineral produced will be useful.

4.1.ii Bench height and width

Since the host rock quartzite is hard and compact, the same parameters are considered for making benches.

In view of mechanized method of mining to be adopted , the bench height is proposed 9.0mtrs and bench width 10 mtrs.

Formation of benches in this manner will result in an overall safe slope of 45^0 or less in the ultimate pit position.

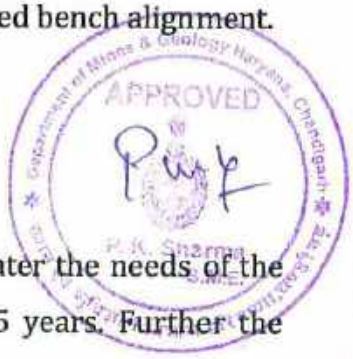
4.1.iii Face length :-

The following parameters have been followed to arrive at the face length to facilitate the required production of 55,00,000 MT mineral per annum.

Since only one pit is planned to developed in the area to obtain targeted production, the optimum face length available along the strike length is sufficient to cater to the optimum production required. The face length will attain the maximum face length on closure of mining operations.

4.1.iv Bench alignment: -

The benches are gradually aligned to give a regular shape. In general the benches will advance in all directions parallel to each other. Since geological formation in the area are of simple nature, there will not be difficulty in maintaining the proposed bench alignment.



4.1.V Depth of pit:

The reserves are calculated up to 355 mRL and are sufficient to cater the needs of the applicant. Workings are proposed up to 399mRL during the next 5 years. Further the water table is about 50 m below the general ground surface. The reserves will not be depleted during the next Five years.

4.2.0 General Consideration

4.2.1 In order to exploit optimum mineral with proper mine safety the benches in minerals will be of 9.00 m height and width will be 15-20 m.

4.3 Development during the next five years:

Pre- production development work is required to start the mining from top downwards .Therefore to align the mine road and to reach the mine for mining. The mining is proposed in the south block during the next 5 years. Workings are proposed from top downwards. First of all mine road is proposed from 395mRL to 471 mRL. The total length of the road will be 1220 meters with 10m width. The gradient of the road is proposed 1:16. The construction of garland parapet, wire fencing etc, shall be provided year wise and will be shifted along with the development of pit. Provision of stack yard for mineral is not proposed as the same is loaded and transported directly to the consumers. Only waste and soil stack yard are proposed to stack the waste and sub grade mineral & soil generated during the mining.

For making stacking yard, ground is almost level. A boundary wall around soil stack yard shall be made.

Dump yard	Size	Location
Waste dump Yard	290m x 80 m	NW side Near pillar no23,24,
Soil dump Yard	80m x 40 m	NW side Near pillar no23,24,

Working area occupied at the end of 5th year mining will be= 16.38 Hectares

A part from the stations site service shall be developed which include construction of manager's office, Crèche, Canteen etc.

Approach road from mine to mineral stack yard, soil stack yard and dump yard and site services shall also be made.

4.3 Year wise Production & Development for the first Five years

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The general surface level within the area selected for mining is varying from 385mRL to 480 mRL. The terrain is hilly with scanty vegetation.

In order to access the proposed area it is proposed to construct the approach road from the kutcha road up to the 471mRL as shown in the plan plate no5. There is a thin soil/alluvium cover about 0.5-1m in the area which needs to dredged and placed at the location earmarked for stacking the soil.

4.4 Individual Year wise plan and sections

The position of mine workings and dump at the end of 1st year to 5th along with sections are shown in plate no. 5 to 9.

4.4.1 Production & development for the next five years (refer Plate no 5 to 9)

First Year : First of all mine road is proposed from 395mRL to 471 mRL. The total length of the road will be 1220 meters with 10m width . The production will start from 471mRL to up to 444mRL as shown in plate no.5.

During first year the total production shall be 49,50,000 MT. **Second Year:** During the second year benches will be advanced from 444mRL to 426 mRL as shown in plate no.6.Production will come from 444m,435m and 426m benches.The total production of ROM will be about 49,50,000 MT during second year.

During second year 49,50,0000 MT mineral will be produced.

Third Year : During the third year benches will be advanced from 426mRL to 417 mRL as shown in plate no.7.Production will come from 444mRL,435mRL and 426mRL benches.The total production of ROM will be about 53,25,000 MT during third year

During 3rd year 1870 nos of plants will be planted covering an area of about 1.87 hectares as shown in plate no.7.

Fourth Year:

During the 4th year benches will be advanced from 417 mRL to 408 mRL as shown in plate no.8.Production will come from 417mRL,& 408mRL benches. The total production of ROM will be about 53,25,0000 MT during fourth year.

During 4th year 1870 nos of plants will be planted covering an area of about 1.87 hectares as shown in plate no.7.

Fifth Year:

During the 5th year benches will be advanced from 408 mRL to 399 mRL as shown in plate no.9.Production will come from 408mRL,& 399 mRL benches.The total production of ROM will be about 55,00,000 MT during fifth year.

During 5th year 1870 nos of plants will be planted covering an area of about 1.87 hectares as shown in plate no.7

SUMMERY OF YEARWISE PRODUCTION OF MINERAL & REJECT DURING 5 YEARS(In MT)

Year	QUARTZ	FELDSPAR	WASTE/REJECT(QUARTZITE) MASONRY STONE	TOTAL PRODUCTION (Per Annum)	Soil
Ist	4,00,000	2,50,000	43,00,000	49,50,000	40000MT
2nd	4,00,000	2,50,000	43,00,000	49,50,000	35000MT
3rd	5,00,000	3,25,000	45,00,000	53,25,000	35000MT
4th	5,00,000	3,25,000	45,00,000	53,25,000	30,000MT
5th	6,00,000	4,00,000	45,00,000	55,00,000	30,000MT

4.4.6 Proposed rate of production when the mine is fully developed

As it is aimed to prepare this Mining Plan for 55,00,000 T mineral production per annum. The required rate of production shall be achieved by the end of 2nd year. Further quantum of production will depend upon the market demand of mineral.

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4.4.7 Mine able Reserves and Anticipated Life of the mines

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As discussed in the chapter of geology, the Mineable reserves are calculated as 5,53,32,958 T for Quartz, 80,99,860 T for Feldspar and 6,43,81,858 for Quartzite (as waste/reject). The lease is up to July, 2052. The production targets for next (i.e. second, third, fourth....) 5 years plan shall be considered as per Market demand.

4.4.8 Proposed Method of Mining

The present mining operations are designed to be carried out by open cast mining means. The entire mining operation proposed are mechanized. Apart of mining, the loading and transportation up to stack yard shall be done mechanically. It is proposed to load the mineral in the trucks/dumpers directly to the destinations and mineral is not put up in this stack yard to avoid the double handling. In the present operation the bench height shall be 9mtrs. Each bench will advance one by one. While carrying out the mining operations in accordance with the above provision the overall pit slope shall be maintained the 45^0 the mineral bearing rocks being hard and compact.

4.5.0 Conceptual mine plan parameter:

During the first 5 years mining will be done in south block by mechanized method of mining forming 9m high and 10m wide benches.

In view of the proposed planned production of 55,00,000 MT per annum the life of the mine is calculated 35 year. However the life may very depending on the demand and the quality and reserves of the deposit.

4.5.1 Ultimate Size of the pit:

The size of the pit at the conceptual stage in the north block will be 708m x290m x30m.

The size of the pit at the conceptual stage in the south block will be 705mx560mx30m.

4.5.2 Final Slope angle:

The deposit dips at 64° to 75^0 towards south - east. The final slope angle will be 45°.

4.5.3 Ultimate Capacity of dumps:

The quartz and feldspar is every well exposed, except overburden and inter mixed. The size of the dump during the five years will be about 2.64 hectares up to 5m height. Entire

waste/low grade mineral is salable. Lessee will get permission from The State Government to sale the **waste.**

4.5.4 Post Mining Reclamation plan including A forestation:

Plantation at 3mx3m grid will be done. Total 9.36 hectares area will be planted. 1870 nos of plants will be planted annually for the first five years. Saplings will be selected with the consultation of Forest Department. Thus total of 9360 nos of plants are proposed during plan period.

4.6.1 Extent of Mechanization

4.6.2 Drilling

It is proposed to use drill machines of 110mm dia. As per the production target of about 7500 MT (3000 M^3per day) it is estimated that about 25 holes of 10 m depth per day 250 to275m drill meter age will be required to maintain the proposed production targets . Therefore at least (three in working ad one stand by)four drill machines of higher drilling rate with availability of 75% of time as well and 70 % utilization hours will be required

The details of machinery and performance will be as under

Sr.no	Details	
1	A machine can drill total of meters in a shift	100-110m
2	Total drill meters required per day	250 m
3	Total no of machines required per day	4
4	Stand by drill machine	1
5	Total no of machines required	5

4.6.3 Loading Equipment, Haulage and other mining Machinery

The productivity of excavator is decided based on the following consideration i.e. two shifts per day working and 300 working days in a year

	Excavator Category	Capacity
A	Diesel hydraulic shovel	3.5 m^3
B	Fill Factor	85 %
C	Tonnage Factor	2.60
D	Availability of excavator	80 %
E	Utilization of excavator	60%

Standard annual productivity of Excavator

Sr.no	Type of excavator	No. of shift
1	3.5 m3 Diesel hydraulic shovel	6
2	25 tonne rear dumper	40

Therefore, the requirement of HEMM i.e. shovel, dumpers, drill machines and dozers have been estimated based on the adopted productivity norms and workload determined by the calendar plan . For calculation of number of dumpers it is the lead from the mine to the

destination which will determine the no of dumpers. At least 40 no. of dumpers at an average lead of 2-5 Km will be needed. Considering 55,00,000 MT production it proposed to deploy Two hydraulic shovel in conjunction with 40 no. of 25 T dumpers along with two back hoe. Thus the total population of equipment required will be as under

S.No.	Equipment	Size	Nos
1	Diesel hydraulic shovel	3.5 cu.m	4
2	Diesel back hoe	3.5 cu.m	2
3	Rear dumpers	25T	40
4	Drill	110mm	5
5	Track chain Dozer	440 HP	1
6	Grader	145 HP	1
7	Crane	40T	1
8	Heavy duty tow truck		1
9	Water tanker with sprinkler	10 KL	1
10	Maintenance van		1
11	Tractor	50 HP	1
12	Tractor mounted compressor	80 HP	1
13	Ambulance		1
14	Jeep/Van	Mahindra	2

CHAPTER 5

Blasting

5.1 Blasting Parameters:-

For mining of Quartz & felspar drilling and blasting is required. The job of drilling and blasting is of continues nature

Considering the time frame of mining and total requirement of material, the daily mineral production comes out to 7500 MT(3000 m^3) The above target will be utilized to frame the pattern and size of blast. The blasting parameters are described as below.

Bench height	9m
Hole depth	9.3m
Hole Diameter	115mm
Loading density	8.5 Kg/m
Burden	3m
Spacing	4m
Charge factor	0.5kg/m^3
Charge per hole	55 kg
Top Stemming	3m
Volume per hole	120 m^3

5.1.1 No. of holes per round =25

5.1.2 Total Explosive to be fired per round = 1375 Kg

5.1.3 It is expected that 55,00,000 MT mineral/rock will need blasting per year. Assuming powder factor of 6 MT/kg. The total requirement of year will be 9,16,666Kg

Expected consumption of Explosive per month= 76,388 Kg.

Av. Daily consumption will be about 3055 Kg

5.2 **Type of Explosives**

Emulsion- Primer charge (20% of charge per hole)

ANFO--- column charge 80 % of charge per hole

5.2.1 Initiation System and minimum charge per delay

Delay ---------- milliseconds delay detonators

Drilling pattern ------- staggered

Firing pattern------- V pattern

5.3 secondary Blasting

Large sized fragments should be reduced to acceptable size by drilling shallow holes (0.75-1.2m). The pattern will be as follows

Depth of hole	0.75 -1.2m
Diameter of holes	38 mm
Diameter of explosive	25 mm
Quantity of explosive	65 gms
Firing pattern	Instantaneous

5.4 Storage of explosive

Both primary / mass blast and secondary blasting will be carried out in the mines Since the regular consumption of primer explosive is very less. One portable magazine for storage of primers and one portable magazine for storage of initiation system will be arranged. All statutory provisions made under the Explosive act and modifications thereof are proposed to be followed. The applicant will apply for explosive license for storage and use to the Explosive department.

In the meantime explosive shall be procured from the authorized source complying with the provisions of Indian Explosives act 1884 .Explosives will be transported to site from the magazine by approved explosive van.

5.5 Precautions to be taken in storage, Handling and use of explosives:

All precautions regarding storage, handling and use of explosives will be followed as per the conditions laid down in Metalliferous Mines Regulations, 1961 and Explosives Act,1983 and Explosives Rules 1984.

5.6 Protective Equipments:

Dust will be generated while drilling shot holes. It is proposed to provide protective equipments such as respirators, goggles, muffles etc. to the operators of drill machines and compressors.

Relevant Provisions under MMR-1961 regarding blasting

Regulation160. Blasters –

1. The preparation of charges and the charging and stemming of holesshall be carried out by or under the personal supervision of a competent person, in these regulations referred to as a 'blaster'. The blaster shall fire the shots himself.
2. No person shall be appointed to be a blaster unless he is the holder of Manager's, Foreman's Mate's or Blaster's certificate.
3. The manger shall fix, from time to time, the maximum number of shots that a blaster may fire in any one shift; and such number shall not unless the Regional Inspector by an order in writing and subject to such conditions as he may specify therein otherwise permits, exceed 80 in case they are fired electrically or by means of an igniter cord and 50 in other cases, and shall be based upon –
   - the time normally require to prepare and fire a shot in accordance with the provisions of these regulations;
   - the time required for that blaster to move between places where shots are fired;
   - the assistance, if any, available to him in the performance of his said duties; and

- any other duties assigned to him, whether statutory or otherwise :

Provided that the Director General of Mine Safety may, by an order in writing and subject to such conditions as he may specify, permit the manager to fix the maximum number of shots to be fired by a blaster differently from the limits specified in this sub-regulation.

4 The number of detonators issued to, and in the possession of, a blaster during his shift shall not exceed the maximum number of shots that he is permitted to fire under sub -regulation (5).

Regulation: 161Shotfiring tools –

1 Every blaster on duty shall be provided with –

a suitable electric lamp or torch ;

b a tool, made entirely of wood, suitable for charging and stemming shot holes;

c a scraper made of brass or wood suitable for cleaning out shot holes;

d where fuses are used, a knife for cutting off fuses an, unless machine capped fuses are provided, also a pair of suitable crimpers for crimping detonators; and

e where detonators are used, a pricker made of wood or a non-ferrous metal for priming cartridges.

2 No tool or appliance other than that provided as above shall be used by a blaster.

Regulation 162. Drilling, charging, stemming and firing of shot holes –

1 No drill shall be used for boring a shot hole unless it allows a clearance of at least 0.3 centimeter over the diameter of the cartridge of explosive which it is intended to use.

2 No shot hole shall be charged before it is thoroughly cleaned.

3 Before any shot hole is charged, the direction of the hole shall, where practicable, be distinctly marked on the roof or other convenient place.

4 No detonator shall be inserted into a priming cartridge until immediately before it is to be use. Detonators once inserted into a priming cartridge shall not be taken out.

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5 Unless otherwise permitted by the Chief Inspector by an order in writing and subject to such conditions as he may specify therein, the charge in any shot hole shall consist of one or more complete cartridges of the same diameter and the same type of explosive.

6 The blaster shall, to the best of his judgment, ensure that no charge in a shot hole is over-charged of under-charged, having regard to the task to be performed.

7 No shot hole shall be fired by a fuse less than 1.2 meters in length.

8 Every shot hole shall be stemmed with sufficient an suitable non- inflammable stemming so as to prevent the shot from blowing out. Only sand loosely filled in, or soft clay lightly pressed home, or a compact but not hard mixture of sand and clay or water shall be used as stemming.

9 In charging or stemming a shot hole, no metallic tool, scraper or rod shall be used; an no explosive shall be forcibly pressed into a hole of insufficient size.

10 No shot shall be fired except in a properly drilled, charged and stemmed shot hole.

12 All surplus explosives shall be removed from the vicinity of a shot hole before a light is brought near it for the purpose of lighting the fuse.

13 As far as practicable, a shot shall be fired by the same blaster who charged it.

14 In any mine in which explosives other than gunpowder are used, every shot shall, if so required by the Regional Inspector, be fired electrically.

15 No more than 10 holes shall be fired in one round unless they are fired electrically or by means of an igniter cord.

16 No shot hole shall be charged except those which are to be fired in that round; and all shot holes which have be charged shall be fired in one round.

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17 Where a large number of shots has to be fired, a shot firing shall, as far as practicable, be carried out between shifts.

18 No person shall remove any stemming otherwise than by means of water or an approved device, or pull out nay detonator lead or remove any explosive from any charged shot hole.

Regulation 163 Electric Shot firing.– Where shots are fired electrically, the following provisions shall have effect, namely :-

1

A No shot shall be fired except by means of a suitable shot firing apparatus; and the number of shots fired at any one time by the apparatus shall not exceed the number for which it is designed.

B Every electrical shot firing apparatus shall be so constructed and used that –

i it can only be operated by a removable handle or plug. This handle or plug shall not be placed in position until a shot is about to be fired and shall be removed as soon as a shot has-been fired; and

ii the firing circuit is made an broken either automatically or by means of a push-button switch.

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(i) No apparatus shall be used which is defective; an every apparatus shall m once at least in every three months, be cleaned an thoroughly overhauled by a competent person.

2 No current from a signaling, lighting or power circuit shall be used for firing shots.

3 The blaster shall –

(a) retain the key of the firing apparatus in his possession throughout his shift;

(b) use a well- insulated cable of sufficient length to permit him to take proper shelter, and in no case, shall this cable be less than 20 meters in length;

(c) Before coupling the cable to the firing apparatus, couple up the cable himself to the detonator leads;

(d) Take care to prevent the cable from coming into contact with any power or lighting cable or other electrical apparatus;

(e) Take adequate precautions to protect electrical conductors and apparatus from injury;

(f) Himself couple the cable to the firing apparatus; an before doing so, see that all persons in the vicinity have taken proper shelter as provided under regulation 164; and

(g) After firing the shots and before entering the place of firing, disconnect the Cable from the firing apparatus.

4 Where more than one shot are to be fire at the same time:-

(a) Care shall be taken that all connections are properly made;

(b) All shots if fired belowground shall be connected in series;

(c) The circuit shall be tested either for electrical resistance or for continuity before connecting it to the firing apparatus. Such a test shall be made with an apparatus specifically designed for the purpose and after the provisions of regulation 164 have been complied with; and

(d) The cable to the shot firing apparatus shall be connected last.

CHAPTER 6

MINE DRAINAGE

6.1 GENERAL:

Open cast mining projects requires effective arrangements for drainage and provision of adequate dewatering capacity in the pits under mining. In the area under mining water can reach the workings from surface drainage, rainwater and due to seepage through joints and fissures. Therefore, the problem can be solved by preventing drainage water from entering the pits on one hand and pumping out the percolated and direct rain water from the pits on the other hand . The general water table around the leasearea at 50 meters below ground.

6.2 Drainage Around And Within Mine:

The proposed area is hilly terrain. The mining area will become a depression during the next five years, which warrant accumulation of water during rainy season. A plan is proposed to prevent the accumulation of such water.

1) Drainage as shown in the mine plan (plate no 5-9) shall be made all round the pit to prevent the entry of surface/ rain water inside the pits.

2) All the benches will be provided with mild inward slope to keep the benches in drained condition. Provision of sumps is provided as shown in plate No 4-6 . The lowest bench shall be slightly sloped towards the sump so that the entire drain water goes to the sump.

3) The working faces will be advanced with a mild upward gradient to facilitate the drainage. The water shall be gradually drained from the upper most bench to the lowest bench and then ultimately to the sump.

4) Similarly in the ultimate pit position, large sump will be provided at the pit bottom to accumulate drained water as well as direct rain water.

6.3 DEWATERING :

Since the depth of mining proposed is well above the water table, there will be no chance of encountering the ground water table during the mining operations. Hence normal-pumping operations will be required during the monsoon season only. The water accumulates within the pits will be due to direct rainfall over the pit and seepage from adjoining areas, if any. Further the rain water accumulated in the pit if any will percolate down in to the porous excavated bed rock/aquifer.

6.4.1 The average rainfall of the last 10 years is 500mm only.

6.4.2 An examination of the above reveals that the rainy season extends from June to September. Although in the above period under consideration there has been rainfall in other months also, but it can be considered as stray occurrence and will not after all proposed pumping plan.

6.4.3 The water to be pumped out from the open pits will be contributed both by direct precipitation over the open pits and seepage. The water due to direct precipitation will depend upon the rainfall and the area of the pit.

6.4.4 Based on the rainfall records, the sumps of the sizes as shown plates No. 5-9 shall be provided at the bottom most bench. During the monsoon period a continuous process of dewatering the sumps shall be there to facilitate the mining at the lower benches.

6.4.5 Based on the Rainfall data it is proposed to have a diesel engine operated water pump of 7.5H.P which may dewater 20m^3/hour from the pit. The water will be sent to the drain of 0.5mtr depth .. This water will finally go into the natural nalla. 5) Following measures shall be taken to prevent fall of side as per mine statute.

Provisions under MMR 1961 regarding Mine Workings (Slope angle, fall of sides, overhangs etc)

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Regulation 106. Opencast workings –

In opencast workings, the following precautions shall be observed, namely: -

1 In alluvial soil, morum gravel, clay, debris or other similar ground -

(a)

(i) the sides shall be sloped at an angle of safety not exceeding 45 degrees from the horizontal or such other angle as the Regional Inspector may permit by an order in writing and subject to such conditions as he may specify therein; or

(ii) the sides shall be kept benched and the height of any bench shall not exceed 1.5 metres and the breadth thereof shall not be less than the height:

Provided that the Regional Inspector may, by an order in writing and subject to such conditions as he may specify therein, exempt from the operation of this clause any working in the case of which special difficulties exist, which in his opinion make compliance with the provisions thereof not reasonably practicable; and

(2)

(a) Where 'float' or other similar deposit is worked by manual means on a sloping face, the face shall be benched and the sides shall be sloped at an angle of not more than 60 degrees from the horizontal. The height of any bench shall not exceed six metres and the breadth thereof shall not be less than the height: Provided that where the ore-body consists of comparatively hard and compact rock, the Regional Inspector may, by an order in writing an subject to such conditions as he may specify therein, permit the height of the bench to be increased up to 7.5 metres while its width is not less than six metres: Provided further that in case of a mine or part where special difficulties exist, the Chief Inspector may, by an order in writing an subject to such conditions as he may specify therein, relax the provisions of this sub-regulation.

(b) Where in any mine or part it is proposed to work by a system of deep-hole blasting and/or with the help of heavy machinery for its digging, excavation

and removal in such manner as would not permit of compliance with the requirement of sub-regulation (1) the owner, agent or manager shall, not less than 60days before starting such work, give notice in writing of the method of working to the Chief Inspector and the Regional Inspector; and no such work shall be commenced o carried out except in accordance with such conditions as the Chief Inspector may specify by an order in writing. Every such notice shall be induplicate, and shall give the details of the method of working including the precautions that are proposed to taken against the anger from falls of sides and material.

3 In an excavation in any hard and compact ground or in prospecting trenches or pits, the sides shall be adequately benched, slopped or secured so as to prevent danger from fall of sides.

4 No tree, loose stone or debris shall unless otherwise permitted in writing by the Chief Inspector be allowed to remain within a distance of three metres from the edge or side of the excavation.

5 No person shall undercut any face or side or cause or permit such undercutting as to cause any overhanging.

CHAPTER 7

STACKING OF MINEAL REJECTS AND DISPOSAL OF WASTE

7.1 Disposal of Waste

7.2 Soil: There is a thin soil cover 30-100 cms in the proposed area. Little amount of soil is also generated from joints and cracks. Top soil will be stripped and preserved by stacking. Soil and powder of quartzite will be stacked separately

Rejects/Associated Mineral (Quartzite): - Around 52 lakh MT of associated mineral per annum (as quartzite i.e. masonry stone) which does not have any Industrial use , will be required to handle consequent upon mining of Quartz and Felspar, material will be generated as reject. This material is saleable and very well can be used in construction industry and will not need stacking and shall be disposed off or sold as per Mineral Rules, 2012 of Government of Haryana. If the same is not sold/disposed off, it will be stacked in the stack yard separately.

7.3 Maximum Height and Slope of Dumps

i) The area ear - marked for the stacking the soil mixed finer material of stone is 3200 M2 Plate no 5-9 which can accommodate at least 8000 MT of material. In the present case soil generated shall be sorted out and stacked in separate dump yards. Yearly generation of soil/ fines which only about 250 tones shall be used for plantation and as a upper layer on the dumps. The dump may attain a maximum height of 6 mtr. with gentle slopes of 30^0.

ii) The dump yard proposed for waste/rejects will be of the size of 290mx80mx6m.This can accommodate the entire rejects generated during plan period. But as the entire rejects are salable. The same will be disposed off with the permission of the State Govt.& therefore there will be no need to stack the rejects for longer period. About 910m toe wall will be made around dumps and 910m

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drain will also made around dump yard to arrest the sediments if any and to allow the rain water to go into natural drain.

The annual quantum for construction of retaining walls/ dump yards for soil and mineral will be done in the 1st year itself. The length of the soil stack yard will be 240 mtr all along with height of one meter. Rest of the height will be made in the coming years as per the requirements of dumps. The thickness of the wall will be half meter. The height proposed 6 mtr. maximum.

Year	Rejects/Associated Mineral/Quartzite (In lakh T)
Ist	43.00
2nd	43.00
3rd	45.00
4th	45.00
5th	45.00
Total	221.00

As already the optimum height of dumps shall be kept 6 mtr. with gentle slope of 30^0 for soil stack and with moderate slope of 39^0 for rejects/ inter burden stacks.

7.4 Land Chosen for disposal of waste and justification:

The waste unmineralisd land is chosen for disposal of waste.

CHAPTER 8

USE OF MINERALS

8.0 USE OF MINERALS:-

The massive crystalline quartz is hard and tough and it is very expensive to crush In raw form. But it becomes very brittle on heating and sudden quenching in water; it can be easily crushed or finely grinded.

This quartz is used in manufacturing of fused quartz, Chemicals, apparatuses, white and enamel ware, glass, ceramic abrasives, for acid tower packing, as a filter in various industries.

Quartz found in this area is of refractory and glass grade.

8.1 PHYSICAL AND CHEMICAL SPECIFICATIONS:-

The physical properties of quartz can be summarized as under:

a) The quartz found in the area is fine grained, milky white cryptocrystalline. No other impurities are visible except some iron stains.

b) It has hardness of 7 in Moh's scale

c) It has specific gravity 2.60

d) It has vitreous luster

e) It has concoidal to subconcoidal fracture and has no cleavage

f) It is very resistant to weathering.

Chemical Specifications of quartz for manufacture of glass are as under

Figures In percentage			
Minimum SiO_2	Grade-A	Grade-B	Grade-C
Minimum SiO_2	99.5	99.5	98.5
Maximum Fe_2O_3	0.008	0.013	0.03-
Maximum TiO_2	0.03	-	-

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Chromium Cr_2O_3	0.0002	0.0002	0.0006

Quartz found in this area is of refractory and glass grade.

CHAPTER 9

Mineral Beneficiation

In view of the availability of direct market for Quartz & felspar R.O.M., presently there is no proposal of beneficiation . R.O.M. Mineral will be sold to various industries directly . Quartz & felspars will be sold in the form of lumps to the buyers . The waste/reject (Masonry stone from host rock), which will generated during mining of Quartz and Felspar shall be sold/disposed off.

In the view of its direct use there is no proposal to beneficiate it at present.

CHAPTER 10

Surface Transport

The transportation of mineral from pit head to the consumer puverisers crushers / traders will be carried out by the trucks of the applicant of generally 25 MT Capacity. There is all weather metal led road and then a katcha road right up to mines to dispatch the material from mines to the market/crushers. It will be purchased by the parties at mine site and transported by them through their own arrangement of trucks. The practice is quite sound in the area and ensure continuous lifting of the material. Customers come with transport arrangement of their own.

To accommodate and to ensure smooth production of mineral the following points shall be considered:

a.i.1. Existing Kachcha road which joins mine to metalled road shall be strengthened and shall be maintained regularly.

a.i.2. Proper traffic control shall be done at road crossings.

a.i.3. Road crossings shall be wide enough to ensure that dumpers plying on the roads are safe to cross/overtake, where ever necessary.

4 Along the both side of kachchca road, plantation shall be done as it will arrest the dust and will act as sound barrier to larger extent.

CHAPTER -11

SITE SERVICE

11.0 Site Services:-

11.1 Manager's Office:-

As detailed in the preceding chapter the mine is designed to produce some 57,00,000 tonnes of Quartz & feldspar & Quartzite. The activities shall be supervised by one competent person i.e. Mines Manager, one Mining Mate cum blaster to supervise the drilling and blasting operation. Since this is very small mines. The office of Manager 5 x 3 mtrs. Shall also provide accommodation for supervisory staff as well.

11.2 Canteen -cum-rest shelter:-

In order to provide the rest shelter for the personnel working in the mine and also to provide tea/refreshment etc.as per the Mines act,1952. The arrangement shall be made to install a rest shelter-cum-canteen as shown in plate no.4 and shall be utilized by the workers. The rest shelter will be for having rest during the lunch hours by the operators/ labor. The size of rest shelter shall be about 5 x 3 meter to accommodate the working labours.

11.3 Store

Since the mining operation will involve heavy earth moving machinery, a small storeroom will be provided for day to day operations. No provisions for a separate workshop is being made as the heavy repairs will be carried out elsewhere.

11.4 First Aid Room :

To provide the first aid for any sort of injuries encountered during the mining operation, one small first aid room shall be provided . First aid kit and sufficient stock of material / medicines needed for first aid shall be provided as per requirement . As the mining engineer / Manager and mining mates are qualified first aiders they can provide first aid

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to the injured on the spot. More ever the Govt. Hospitals is there at Nangal Chaudhary and Narnaul which are just 6 Kms and 25 km. respectively from the mine and necessary medical aid can be provided from there.

11.5 Crèche :

At present provision of crèche is not provided, however in future if women workers are employed , arrangement for a small crèche shall be made as per the requirement.

11.6 V.T. Centre

Necessary arrangement will be made for conducting refresher course as laid down in Mines vocational training rules.

11.7 Magazine:

A magazine of the required size will be provided to fulfill the requirement of blasting of mineral as well as inter burden as detailed in the chapter of Blasting. The Magazine shall be erected as shown in the enclosed plate no 5-9 . The design of the magazine shall be as per approval of the chief controller of Explosives, Govt. Of India . The magazine shall be properly fenced and provided with as security guard round the clock.

11.8 Electricity Supply :

Presently there is no arrangement for supply , at the mine but it is proposed to take an extension of the electricity line from the nearby point which is jus 0.5 Km from **mines site.**

11.9 Water Supply

The water supply for drinking purpose proposed as well as for dust supression is proposed to be done through an operating tube well of the applicant. The requirement of water for various activities is detailed here below.

S. No	Particular	Proposed KLD
1	Dust suppression	10
2	Drinking	2
2	Green Belt/ Plantation	4
3	Domestic	2

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	Total Water Requirement	18

CHAPTER -12

Employment Potential

12.1 General Consideration

In this project the mechanized mining is proposed for production of Quartz & felspar. The proposed organizational structure for the project is worked out in view of the type of mining system adopted and the need of effective environment Management Plan The requirement of various technical and non-technical personnel is determined while adopting the following norms :-

1. The mine will be worked in Two shifts in day .

2. In estimating the requirement of magazine attendants, and provision of competent person, mates, blaster etc. due consideration has been given to the statutory.

12.2 Man power requirement and its distribution .As The applicant is willing to work the mine in Two shifts. The following manpower is proposed and shall deployed keeping in view the provisions of Mines Act, 1952 and MMR-1961.

S.No.	Designation	Category	Nos
1	First Mines manager	Highly skilled	1
1.	Assistant Manager	Highly Skilled	2
2.	Mining Foremen	Highly Skilled	3
2	Mining Mate cum Blaster	Highly skilled	3
3	Clerical and other staff	Skilled	3
4	Security Guard & Water man	Semi skilled	3
5	Environment Assistance	Skilled	1

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6	Diesel hydraulic shovel operator	Highly skilled	6
7	Diesel back hoe operator	Highly skilled	6
8	Rear dumpers operators	Highly skilled	75
9	Drill operators	Highly skilled	4
10	Track chain Dozer operators	Highly skilled	1
11	Grader	Highly skilled	1
12	Crane	Highly skilled	1
13	Heavy duty tow truck	Highly skilled	1
14	Tyre handler	Highly skilled	1
15	Water sprinkler	Skilled	1
16	Maintenance van driver	Skilled	1
17	Tractor operator/driver	Skilled	1
18	Tractor compressor operator	Skilled	1

In addition to the above mentioned staff rest of the function i.e. supply of explosives, preparation and amendment of plans etc. shall be got performed from the professional on contract basis.

CHAPTER -13

Environment Impact Assessment and Environment Management Plan

13.1 Base line information

13.1.i Existing Land Use Pattern :- The area is almost barren.

Quartzites are covered by weathered surface of the geological formation or by a thin cover of soil.

13.1.ii Water Regime

There is no perennial water drainage on the ground . As the surface is undulated only seasonal Nallahs (rivulets) developed in the area.

13.1.iii Human Settlement :

The area covered under mining plan is uninhabited . The nearest village are Located 1 to 5 km. From the area under reference .The population of these villages as follows :-

Village	Population
Bakhrija	1000
Nangal durgu	8000
Bayal	1000
Golwa	2000
Salodra	700
Munota	2500
Pachnota	2000

13.1.iv Public Building , Places and Monuments :

There are no permanent public buildings within the lease area. The permanent human settlement is about 0.5 away from the proposed mining area. There are no other public places or monuments within or around the mining area.

Infrastructure Facilities

The following facilities already exist in the village mentioned above

(A) **Roads:**

All the village are well connected by public roads with nearby town of Narnaul . Buses of Haryana Road ways ply regularly in these village.

(B) **Power supply**

All the villages have got power supply from the State Electricity Board.

(C) **Water Supply**

Water is supplied by the Public Health Department Haryana through water supply plan to all the village.

(D) **Medical, educational, Post & Telegraphs Facilities** :

A Govt. Hospital is available at Narnaul which is Just 25 Km from the Mine site. All the nearby villages have Middle schools & Sub Post Office. College, I.T.I and other facilities are available at Narnaul.

13.1. v **Quality of water**

There are no water sources in the area excepts dry nallahs (rivulets). The precipitated water flows along the slope of quartzites. The water table in the area is about 50 mtr. Below the 370mtr. RL..

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13.1.vi **Number and Type of Tress :**

The area under reference has no natural growth of vegetation. In the neighboring villages and nearby fields tress of Neem, Kikar Jund trees, Kanji (peganice clabra) etc. are observed. No rare species exist in the area.

13.2 Environment Impact Assessment Statement

13.2A Land Environment:

13.2.A.i Land Escape

Major part of the area is virgin with only small portion covered by an old pit . The dwelling houses of the nearby villages are about 1 to 4km away from the area.

13.2.A.ii **Aesthetic Environment**

Since the present mining plan envisages the proper and systematic development of working and future alignment of the pits, the area will look nice.

13.2.A.iiii **Soil and Land Use Pattern**

The area under reference has very thin cover, with soil embodied in the joints. The soil has to be excavated first and properly stacked. This Mining Plan envisages remarkable change in the present land use pattern, which will be more uniform and systematic at the end of 3rd year due to proper mining and stocking the dumps at the earmarked places.

13.2.A.iv **Agriculture.**

There is no involvement of agriculture land where, mining is proposed. Therefore no impact on agriculture is envisaged in this mine plan.

13.2.A.v **Forest :**

There is no forest land in the proposed area . Therefore, there is no impact of mining on the forestation except the proposal for additional plantation program which will enrich the aesthetic beauty of the area.

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13.2. A.vi **Vegetation and Wild life:**

There is no vegetation in the area as already explained. The mining activities has no adverse impact on the vegetation as the same shall be taken care of by growing additional vegetation, which is suspected to be destroyed due to mining. The same shall be compensated by planned plantation over dumping places. Since the present vegetation is of very poor quality the adverse impact will be negligible. However the proposed plantation will ameliorate the vegetation.

The area is not inhabitant by any significant wild life except stray existence of animals like Jungli rat, mangose jackals etc. reptiles like snakes, lezard and birds like pegaon, bet etc and insects like scorpion spider etc. Due to stray population of wild life there will be no significant effect on the wild life due to mining . Moreover, the growth of vegetation of dumps etc. shall provide additional home for these stray animals.

By adopting the proposed reclamation plan, envisaging liberal plantation of vegetation of mixed species , It is expected to provide congenial habitant to promote wild life. After abandoning the mining operations the area can be converted into a bird sanctuary or a fish farm by having the close liaison with the state Govt. authorities.

13.2.A.vii Public Buildings, places and Monuments.

As already described at 13.1.IV. There is no permanent buildings, places or monuments in and around the area.

13.2.B Water Environment :

13.2.B.i Surface Water and Ground Water.

There is no perennial drainage system in the mining area and while planning due care for drainage has been given. No significant effect on surface water regime is expected. The water table in the nearby area occurs below 50mtr.R.L.Hence there will be no effect on the hydrology of the area as the working will not reach the water table.

13.2.B.ii Water quality

There are no water courses in the area except dry nallahs .The precipitated water also flows along the depressions formed in between the outcrop of country rocks. The water table in the area is about 40-45mtrs below the ground surface.

13.2.C. Air Environment

13.2.C.i Noise :

No test has been carried out to determine the present noise level. However, since this is an isolated area without any habitation industry the existing noise level in this area is well below the level at which normal speech communication may be interfered .The creation of vegetation barrier around the workings on both the sides of the roads and office buildings will also out sound barriers.

13.2.C.ii Air

Since the area is virgin and no other mine is located near the area, the area is basically unpolluted and fresh. Therefore, no air sampling and analysis is carried out. The same is proposed to be carried out in due course of time.

Since exclusive mechanized mining is proposed for removal of over burden as well as for winning of mineral there are chances of environment Pollution due to running of heavy EMMs. The quartzite/ Quartz & felspar mining will be done by drilling with the help of Jack Hammer drills and blasting by using explosives like ANFO, ordinary detonators & substitutes . The proposed mining will not deteriorate the air quality except generation of dust .The dust with air borne may affect the quality of air. This dust will not affect any inhabitants since the Villages are for away from the mining.

13.2.C.ii Dust

The dust generation during drilling will be reduced by wet drilling. The dust generated during blasting will be minimized by water spay at the working faces before and after the

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blasting . The dust generated by excavation will also be controlled by spraying of water at the working faces. Dust generated due to plying of vehicles on mine roads will be dealt with by regular sprinkling of water on the roads . The sprinkling water will be done at short intervals using only a small quantity of water at each time. just sufficient to wet the surface. Further the vehicles used for transportation of the mineral will not be overloaded to prevent generation of airborne dust during their movement.

The speed of the movement of the vehicles will also be controlled to minimize generation of excess dust. Further as far as possible transport of mineral from the mines will not be done during the evening hours of summer season when the relative humidity is low and wind speed is high. The volume of airborne dust raised from the waste dumps will be kept under control by growing grass and vegetation.

13.2.C.iii Climate Condition

The climate of the area can be considered to be extreme with hot in summer and severe winter. The maximum temperatures during (April to June) summer is 44.9^0 C and minimum temperature during winter (November to March) is 2.6 degree centigrade . The rainy season is restricted to four months i.e. June to Sept. and the average rainfall is about 500mm.

Details of rainfall (maximum & minimum), temperature variations change in humidity, variation in wind direction shows that the area experience the climate of severe winter and summer. The relative humidity goes as high as 100% in rainy season and falls as low as 10% in the morning hours of summer morning hours of summer. In the evening hours it goes as high as 100% in rainy season and falls to (5%) in summer.

The general direction of wind in summer season is west to east and in winter it is northwest to southeast (Plate no.2)

13.2. DSocio Economic Environment

13.2. D.i DEMOGRAPHIC STRUCTURE

Details of the Mohindergarh District primary census Abstract has been given in table.

PRIMARY CENSUS ABSTRACT DISTRICT MOHINDERGARH At A GLANCE

Sr. No.	Item	Value			
		Total	Rural	Urban	
1.	Population	1425022	1154629	270393	4
2.	No. Of households	246742	197505	49237	3
3.	Share in total population (%) (Haryana)	6.74	7.68	4.42	4
4	Decadal growth rate (5)	22.49	19.42	37.56	14
5	Child population age (0-6) % to total district population	15.73	16.11	14.13	7
6	Sex ratio (female per 1000 males)	879	884	859	5
7	Child sex ratio (0-6)	841	844	827	7
8	Urban population (%)	18.97			16
9	Literacy rate (%)	67.45	65.25	76.62	13
10	Female literacy rate (%)	53.00	49.72	66.90	13
11	Mate female gap in literacy (%)	20.64	29.38	18.12	
12	Share of SC population (%) to total population in district.	90.61	19.54	19.90	10
13	Workers to total population	42.76	45.65	30.39	7
14	Main workers to total workers	69.78	67.27	85.88	16
15	SC literacy	56.26	55.59	59.05	12
16	Density of population	298	244	5256	18
17	Permanent houses (%) of total census houses.	70.53	68.1	8.67	8
18	Condition of houses good (%)	43.95	41.69	53.36	16
19	Households having no exclusive room or one room (% of total households).	19.5	18.09	25.70	5
20	Household with availability of electricity (% of total household)	83.19	18.76	93.24	12
21	Household having tap water (% of total households)	55.4	48.55	84.01	6
22	Households having bathroom with houses (%)	55.05	45.0	70.93	13
23	Household having kitchen within	62.33	60.18	71.37	5

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	houses (%)				
24	Household having television	42.19	34.26	69.94	17
25	Household having telephone (%)	6.92	3.85	19.69	18
26	Household having bank accounts (%)	44.44	44.21	45.41	11
27	Household having radio (%)	42.63	42.35	43.79	5
28	Household having car, jeep (%)	2.34	1.90	4.14	17
29	Household having scooter, motorcycle (%)	10.35	7.38	22.65	19
30	Household having bicycle (%)	34.41	27.68	62.31	19
31	Household having no drainage of Wastewater (%)	36.3	41.54	14.55	6
32	Household having no Lateran (%)	64.52	73.93	25.51	6
33	Household having none of assets (%)	33.8	38.21	15.58	18
34	Electricity available, latrine no available (%)	50.19	57.28	20.81	5
35	Electricity not available, latrine available (%)	2.48	2.59	2.05	11

Due to mining activities no significant changes are expended in the daily life of the inhabitants in the nearby villages expect the betterment of socio-economic betterment. The favorable changes are expected in the terms of more employment opportunities, better Infrastructure facilities like power linkage, medical facilities, water supply etc.

13.2.D.ii Occupational health and safety :-

The people/labour who are associated with mining activities are generally exposed for pollution related diseases which on prolonged exposure to the same environment become chronic . In order to check the above, regular check up of the labour and other persons working in the same environment shall be made.

Prevent measures viz. Use of respiratory masks, helmets etc. shall be adjusted to avoid the adverse impact of mining / pollution on the health of the labour.

13.2.D.iii Recreational Facilities :

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After eight hours of hard work the labour badly need some kind of entertainment to ease themselves. It is therefore, to organize a cultural and educative program at least once in month. Some additional programs shall be organized, especially on the family welfare and other fields to entertain them as well as to educate them. This will include program on alcohol addiction etc.

13.3 Environment Management Plan :

To check the adverse effect likely to be caused to the proposed mining on the environment and ecology of the area environmental control measures are to be followed . Based on the environmental impact assessment made the following measures shall be taken into account for the betterment of the environment and ecology.

13.3.i Temporary storage and Utilization of top soil :

The topsoil will be removed separately in advance of the mining of other overburden and will be stocked separately. The locations of the soil stack yard is shown in year wise plans. To prevent erosion of the stacked top soil the height of the stacks will be restricted to 6mtrs above ground level . The retaining wall will also be erected along the lower edges of the topsoil of stacks, as they will be prone to erosion . The width of these walls will be 0.5 mtrs. at top and 1 meter at the bottom with a height of about 6 mtrs. Further plantation of grass is proposed on the surface of the dump slopes to improve its quality and to restrict soil erosion.

13.3.ii Proposal for reclamation of land affected by mining activities during and at the end of mining lease period.

Land reclamation is the single broad environmental protection system which will provide protection and control of most of the adverse environmental impacts of mining and also have improvement of aesthetic beauty of the area which will be denuded due to mining activity. As a result of mining of this deposit the original ground profile will be lowered and deep depressions will be created. Besides this the hydrographic system may be affected due to wash-off. Based on these conditions it is proposed to improve the

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effected land wherever possible for better land use, so as to support forestry and creation of water reservoir etc. Accordingly, the land reclamation portion shall be done by planting trees on the dumps along the roads surroundings the office building on the waste barren land and in the open pits when they reach their ultimate stage.

Plantation Along the roads.

In order to barricade the dust generated during the movement of the trucks and also to restrict noise level a forestation is proposed along the approach roads to pits . This will improve the aesthetic beauty of the area by a screening visual intrusion of the quarry workings. For this purpose the soil produced from the mine will be brought and spread in the layer of 2mtr. thick and 6 meters. Wide along both sides of the roads.

Surrounding the office buildings:

A vegetation barrier will be provided around the office buildings and on the waste barren land.

In open pits :

As a result of mining the area will be converted into one large and deep open pit (Plate No. 4). The aim of reclamation planning for the worked out open pits is to create water reservoir which can meet the demand for irrigation , fish culture, creation of tourists resorts and entertainment resorts, bird sanctuary and boating facilities proposed to be developed.

Aforestation

A forestation will be done as proposed earlier. Sapling will be purchased from the Forest Department and the plantation will be done. During a forestation work the selection of combination of vegetation in the surrounding areas shall be as per the suitability of the species in the area.

The tree plantation is proposed at spacing of 3mtr. Into 3 mtr. The size of the pits will be 40cm x 40 cm. Filled with manures. The intervening space between the trees will be

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covered with bush varieties. Taking a survival rate of 60% the following no. of trees will be planted year wise :-

Year	No. of plants proposed	Area covered in ha
Ist	1870	1.87
2nd	1870	1.87
3rd	1870	1.87
4th	1870	1.87
5th	1870	1.87
Total	9350	9.35

Post plantation care :

This will include the following measures :-

a) Protection from grazing and fires.

b) Watering at least once a weak during dry spells.

c) Manu ring

d) Weeding and soil working.

e) Mulching

f) Replacement of causalities.

g) Protection form pests.

The maintaining system will include :-

a) Examination of signs of slopes failure and excess erosion.

b) Collection of water samples.

c) Keeping and effective track of vegetation established .

d) Checking the quality of air near mine site by air sampling and getting it analyzed.

e) Collection and analysis of regular soil samples from reclaimed areas to monitor the improvement in soil characteristics.

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Equipment for Environmental Restoration Plan :

i Water tankers will be used for the sprinkling of water on the mining faces regularly .

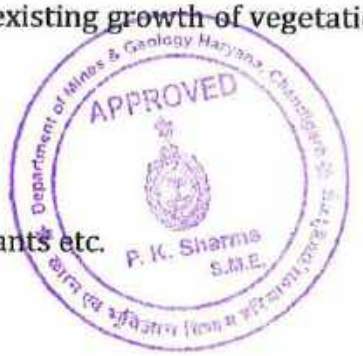
ii A tractor with trolley will be used to transport the seeds, saplings, fertilizers and other agricultural tools. The same tractor will be used for cultivation work also . Other miscellaneous agricultural tools will be required for seedbed preparation, terracing of dumps , mulching, plantation and roast post plantation care

Manpower and Organization:

Regular man power will be required to be deployed for supervision , sample collection , assistance in reclamation works, monitoring system of post plantation care . For carrying out the actual work of a forestation, construction of drains and tanks and other maintenance work, casual labour will be deployed as and when necessary.

13.3.iii Program of A Forestation

The a forestation will be done proposed earlier. Saplings will be procured from the state Forest Department or from the private nurseries. During the a forestation work the combination of different type of species will be done on the existing growth of vegetation in the surrounding areas.



13.3.iv Stabilization and Vegetation of Dumps :-

Dumps will be stabilized by planting grasses/plants etc.

13.3.v Treatment and Disposal of water from Mine :-

There is no regular disposal of water form mines except during rainy season. The water pumped out from the mines during rainy season shall be disposed through water garland ditches where settlement tanks are provided at regular interval to settle down the un dissolved matter/ sediments before finally depositing of the purposed out water through the natural nallah which is situated within the leasehold area.

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Since the rainy water and the ground water do not contain any toxic material, this does not need any chemical treatment before disposal.

13.3.vi Measure for minimizing adverse effects on water regime:

As already described at 13.2.B.i. there shall be slight impact on water regime.

13.3.vii Socio Economic benefits arising out of mining: -

The socio economic benefits in the form of labour employment for mining transportation and other ancillary activities pertaining to mining shall benefit the local people also in the activities like milk supply and sharpening of tools, maintenance of tools etc. will also better the socio-economic status of the local inhabitants.

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CHAPTER -14

Progressive –Mine Closure Plan

14.1 Introduction:-

Vide notification GSR 330(E) date 10-04-2003, MCDR, 1988 has been amended incorporating preparation of Mine Closure Plan. Corresponding amendment has been made in MCDR, 1960. In the present case as it is a new mine a progressive mine closure plan, as a component of the mining plan is required.

The present position of the deposit does not permit to close any part of the pits. At the proposed pace of work in the next coming five years it will not be possible to close down any part except protective works like fencing and making of a drain.

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14.2 Present Land use Pattern: - (in hectares)

Sl. No.	Type of Land Use	Value (in Ha)
1	Quarry Area	0.085
2	Infrastructure (road/ material handing / stockyard)	0.00
3	Road	1.50
4	Agriculture	0.00
5	Plantation	0.00
6	Water body	0.00
7	Habitation	0.00
8	Undisturbed land	75.165
9	OB dump	0.00
Total		76.75

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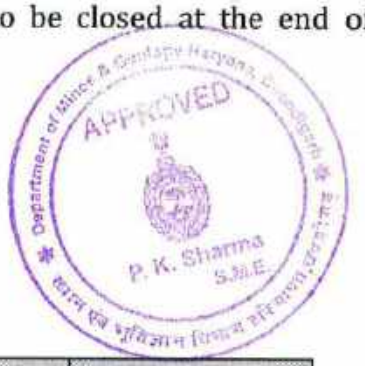
14.3 Reason for closure

Since the workings are proposed below the ground level in the next five years . Enytire minreral will be exhausted and the area is proposed to be closed at the end of the leaseperiod



14.4 Land Use Management

Land use Pattern during next five years: - (in hectares)_

Land use pattern at the end of 5 th year

Sl. No.	Type of Land Use	Value (in Ha)
1	Quarry Area	16.38
2	Infrastructure (material handing / stockyard)	2.64

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3	Road	1.50
4	Agriculture	0.00
5	Plantation	9.35
6	Water body	0.00
7	Habitation	0.00
8	Undisturbed land	46.88
9	OB dump	0.00
Total		76.75

The land use in the proposed lease area is waste land and is not even suitable for grazing. There is no change observed in the land use in the core zone and buffer zone . The total land to be effected / degraded due to mining is about 16.38 hectares. The entire area effected due to mining would not be restored in its original form even at the end of the final closure as about 90% mineral will be sold only a nominal quantity of OB will be left which will be reclaimed by way of plantation and only soil will be available at the end of mining which will be utilized for reclamation purposes.

Land use at the conceptual Stage:

Sl. No.	Type of Land Use	Value (in Ha)
1	Quarry Area	Nil
2	Infrastructure (office etc)	0.05
3	Road	1.06
4	Agriculture	0.00
5	Plantation on 20% area(Lease boundary, along road, on dumps, office premises)	15.35
6	Water body	30.00

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7	Habitation	0.00
8	Undisturbed land	00
9	Reclaimed area by way of Plantation (on top benches after backfilling)	30.29
Total		76.75

14.5 Impact on Hydrology:-

There will be positive impact on the hydrology as the water if any accumulated in the pit will be allowed to percolate in to the aquifer an will ameliorate the water level.

14.6 Impact on Water Quality & Management: -

Quartz and feldspar are chemically inert and will not react with water. Therefore there will not be any impact on the quality of water.

14.7 Solid Waste Management The dump sites are specified and the dumps are to be protected by way of plantation.

14.8 Reclamation Measures

For the purpose of rehabilitation of the mined out area it is proposed that phase plantation program of appropriate species on the l slopes / benches after attaining the pit slopes shall be attempted. Reclamation of mined faces is the most important aspect of controlling environmental impact.

14.8(a) Reclamation Proposal (Plate No10)

The reclamation plan has been developed keeping in view of the anticipated pre-mining land form, soil characteristics, geological and hydrological features of the area, flora & present land use pattern.

As the major area of the lease area will become a major pit with depth of about 40m below the ground. It will not be possible to restore the mined land to its pre-mining land use. There is bound to be improvement over the existing ecological status wherever possible in

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the entire zone, as at the moment it has a barren look. Separate restoration strategies are being proposed for the mine area and roadsides.

The proposed reclamation programme will include broadly:

1 Planning for improving upon the pre-mining land use pattern to the extent possible.

2 Maintaining hydrographic system.

3 Re-vegetation measures.

4 Reclamation monitoring.

14.8(b) Planning for Improving Pre-mining Land Use Pattern

The pre-mining land use in the study area is monotonous and mainly it is baren land with shrubs. The mining will modify land use by introducing water filled pits in excavated areas.

The major areas being disturbed due to mining activities are:

1. Mining Pits
2. Dumping Places
3. Roads and Drainage System

14.8(c) Mining Pits

For the extraction of mineral, only one number of pits have been proposed to be opened as shown in Plate No. 5-9 by forming proper benches as per Metalliferous Mines Regulation 1961. The slope of the benches will also be maintained from safety point of view. Provisions of garland drains have also been proposed to check the flow of water inside the pit so that mining work may not be hampered during rains. These pits can store good amount of water during rainy season which can help in faster recharge of water table.

14.8(d) Dumping Places

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The waste generated will be stacked in the areas adjacent to mining area. The mine waste disposal yards will be made and the yard will have enough capacity to accommodate waste to be raised prior to and during excavation of minerals. Some waste material will be used for construction of retaining walls around the dumping yards Plate No. 5-9

14.8(e) Removal of Soil Cover and its Storage

There is a thin soil cover of about 30 cms to about 1.0 mtrs soil cover in the mineralized area. The same will be removed well in advance and will be stacked in the stack yard meant for this purpose. At a later stage the same will be utilized for plantation purpose

14.8 (f) Storage of Mine Waste / Sub Grade Mineral: -Already explained in the chapter of waste disposal.

There is no mine waste in the area. Entire mineral produced will be useful.

14.8(g) Reclamation of Effected Areas

With in the lease area the following places will be required reclamation:

14.8 (h) Reclamation of Mined Out Areas:- For the extraction of mineral, one number of pit have been proposed to be opened as shown in Plate No. 5-9 by forming proper benches as per Metalliferous Mines Regulation 1961. The slope of the benches will also be maintained from safety point of view. A provision of garland drains has also been proposed to check the flow of water inside the pit so that mining work may not be hampered during rains. These pits can store good amount of water during rainy season which can be used for fissiculture or as a water reservoir for irrigation /agriculture purpose in the nearby agriculture fields. After the mining operations are concluded the mining pit shall be suitably fenced

The reclamation/ plantation will be limited to those areas only, which are non -mineralized. Planting of trees in other areas of mineral deposit cannot be done, as subsequently these areas will be mined in due course of time.

Thus there will be minimum disturbances of ecology of the area and whatever occurs due to mining will be restored soon after mining operations in that area come to an end.

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Plantation along roads, areas of utilities and some of the unexploitable zones will be done in order to improve the landscape and ecology of the surroundings as shown in the Plantation Plan.

14.8(i) Economic Importance

Mining will provide employment to the nearby people of the area & will help the economy of near by villages community.

14.9 Plantation Program:-

Plantation will be carried out basically with the following aim :

i) Plantation along roads etc., to control the air pollution and improve upon bio-aesthetic beauty of the place.

ii) Plantation along unexplainable zone to improve the present environment and ecology.

iii) Landscape - along the areas of utilities and shelters in order to create bio-aesthetic beauty along with places of human interaction.

14.9 (a) Plantation along Benches:-There is no such proposal at present.

14.9 (b) Plantation Along Mine-Waste Disposal Yard:- Already explained.

14.9 (c) Plantation along the Roads

The area all along the main approach road will be planed with rows of trees like Neem (Azadirecta indica), (Albergia sisoo), Babul (Acacia arasica).

Rows of trees will be planted 1 m to 1.5 away from the road sides. Distance between each plant will be kept 3.0 m x 3.0 m depending upon the local conditions. In the space between the trees and shrubs will collect any air borne dust generated from plying of the trucks and the mining activity.

14.9(d) Plantation along the Drains

Plantation along drains will be done. The most suitable shrub will be Karaunda, Karin, Ber and Cheonkar.

14.9(e) Plantation of Unexploitable Zone

It is planned to plant the trees of Neem, Babul, Dhak, etc. at random, wherever approach and space for plantation are available.

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14.9(f) Plantation in the Zone of Utilities and Shelters

In the space available along with office complex, shelters, latrines, urinals, first aid room, magazine etc. It has been proposed to create a bio-aesthic land-scape to beautify the area where human interaction is to take place. The following flowering species are being suggested for this purpose.

Trees – Weeping willow, bottle brush, amaltash, kadamb

Shrubs – Habiscus, Durata verigata

Creepers – Bougenvilla, Trumpet creeper, Wisteria

14.9(g) Plantation Procedure

Before planting of trees, seedlings, saplings, grass species, shrubs, soil preparation, soil amendments etc., are to be under taken well in advance. For proper survival and healthy growth of plant species post plantation care is also necessary in planned and scientific manner.

14.9(h) Preparation of Planting Site

Before sowing and planting can be commenced in the area, the site will undergo adequate preparation in order to achieve successful growth of vegetation. Site preparation will consists of demarcation of the spacing, digging of pits and soil preparation.

In order to organize and monitor aforestation effectively, the area to be taken up for plantation is to be suitably divided into blocks species planted and year of plantation will be maintained by monitoring group.

If possible the area to be taken up for plantation shall be effectively burnt prior of plantation using dry and uprooted vegetation. Alternatively a considerably thick layer (about 25 cm) of dry grass may be spread and fixed during the months of January and February to cover the area. This will provide adequate mulch to prevent movement of the debris and consequent erosion during the rains and promote vegetation growth.

The plantation in the area is being proposed at spacing of 3m x 3m pits to made for tree plantation will normally be of 60 cm x 60 cm x 90 cm size. The soil before spreading on the benches or filling in the pits will be mixed with leaf compost along with the weedicides and insecticides.

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14.9(i) Nursery

No provision of nursery is proposed as a number of nursery including Govt. nursery in the area. Necessary saplings are proposed to be purchased from those nurseries.

Suitable areas for raising the nursery area available near the mine site itself.

14.9(j) Sowing & Planting

Sowing and planting will be carried out with utmost care and due consideration to the species to grown, season of planting and areas to be vegetated.

Well-sprouted cuttings and healthy seedling have to be painted in the months of February and March or prior to the start of monsoon rains. Sowing of grass and shrub seeds will also be carried out prior to start of monsoon rains after suitably preparing the beds.

14.9(k) Post Plantation Care

Post plantation care is most essential for growth of vegetation. These will be :

i) Replacement of causalities at the first opportunity itself

ii) Weeding - monthly for first two months and later on six monthly.

iii) Irrigation – fortnightly from October to March and afterwards once in 10 days between April & June.

iv) Soil working, manuring, mulching etc. twice in a year.

v) Protection from grazing etc.

14.10 Financial Assurance.

The financial assurance will be required in the form of surety bond.

Table indicating the break of areas in the mining lease for calculation of Financial Assurance

Sl. No.	Head	Area put on use at start of plan. (in ha)	Additional requirement during plan period (in ha)	Total (in ha)	Area considered as fully reclaimed and rehabilitated (in ha)	Net area considered for calculation (in ha)
1	Area under mining	-	16.38	16.38	-	16.38
2	Storage for top	-	0.001	0.001	-	0.001

	soil					
3	Overburden / dump	-	2.64	2.64		2.64
4	Mineral storage	-	-	-	-	-
5	Infrastructure (workshop, administrative building etc.)	-	0.02	0.02	-	0.02
6	Roads	-	1.50	1.50	-	1.50
8	Green belt		9.36	9.36	-	9.36
9	Tailing pond	-	-	-	-	-
10	Effluent treatment plant	-	-	-	--	-
11	Mineral separation plant	-	-	---	-	-
12	Township area	-	-	-	-	-
13	Others to specify	-	--	-	-	-
Grand Total		**A**	**B**	**C=(A+B)**	**D**	E=(C+D)
		0.0	**19.90**	**19.90**	**0.0**	19.90

Financial assurance = Rs. 25,000.00 x 19.90= Rs.4,97,500 /-

The total area to be effected due to mining is 19.90 hectares. Therefore the financial assurance @ 25000/ per hectares comes out to rupees 4, 97,500/

14.11 Certificates.

The certificate is enclosed.

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Certificate

I, S.N.Sharma a duly Recognized Qualified Person to prepare Mining Plan under Rule 22 C of the Mineral Concession Rules, 1960 (Revised 1987) has prepared the Mining Plan OfBayalQuartz &Felspar over an area of 76.75 Hectares of Sh.ManmohanBhadana Falling under Survey of India toposheet No G43 D13.

The various data and write up enclosed have been complied and verified by us. The working plan and all other details given in the plan have been prepared under my guidance and duly verified by me. The mining plan and progressive mine closure plan complies all statutory rules , regulations , orders made by the Central or State Government, statutory organizations, court etc. have been taken into consideration and wherever any specific permission is required the lessee will approach the concerned authorities. It is also undertook that all the measures proposed in the progressive mine closure plan will be implemented in a time bound manner as proposed

S.N. Sharma

RQP/DDN/0135/2001-A.

S.N. SHARMA RECOGNISED QUALIFIED PERSON (RQP)

Department of Mines & Geology Haryana, Chandigarh

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Annex-1

Registered

From

The Director General,
Mines and Geology, Haryana,
1st Floor, 30-Bays Building, Sector-17, Chandigarh.

Department of Mines & Geology Haryana, Chandigarh
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P. K. Sharma
S.M.E.

To

Shri Manmohan Bhadana S/o Sh. Kartar Singh.
V.P.O. Anangpur,
Tehsil and District Faridabad.

Memo No. Glg/Hy/E-2578/ 279
Dated Chandigarh, the **11.01.2017**

Subject:- **Permission for Surrender part Area of 155.85 hectares out of total area of 228.60 in Village Bayal, Tehsil Narnaul, District Mahendergarh and retain remaining area of 76.75 hectares - regarding.**

Reference your letter dated 03.10.2016 on the subject noted above.

2. You were granted mining area over **228.60 hectares** comprising of khasra nos. 198, 201, 202, 223 and 224 of land in village **Bayal** district Mahendegarh for the period of 20 years w.ef. 09.07.2002 for mining of **Quartz** and **Felspar** (both as major minerals) in accordance with prevailing provisions of Mines & Mineral (D&R) Act, 1957 and rules namely Mineral Concession Rules, 1960.

3. You vide your letter under reference informed that a part area of 151.85 hectares falling under Khasra nos. **198** and **202** has been reported to be covered under Aravalli Project Plantation where mining can not be undertaken as per orders dated 18.03.2004 of Hon'ble Supreme Court passed in WP (c) 4677 of 1985 –M.C. Mehta v/s UoI and Others.

You sought to surrender said part of 151.85 hectares covered under Aravalli Project Plantation and to retain the remaining area of 76.75 hectares falling under Khasra No. 201, 223 and 224 of the lease in village Bayal, district Mahenderagh..

4. As communicated vide this office memo No.Glg/HY/E-2578/3639 dated 08.07.2016 you are aware that the status qua your lease period and category of minerals granted on lease already stands changed as per latest amendment dated 12.01.2015 made by the Central Government in the Mines and Minerals (Development & Regulation) Act, 1957 and notification dated 16.03.2015 [illegible]

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(iv) The boundary pillars at the requisite distance over the area of mining to be retained shall be got erected and the GPS readings of each of the pillar shall also be recorded and intimated to the department;

(v) The Scheme of Mining/ Mining Plan for the area of 76.75 hectares to be retained on Lease shall be got prepared through RQP and got approved from the authorised officer of the department as per provisions of State Rules, 2012.

Mining Officer
for Director General, Mines and Geology,
Haryana

Endst No. Glg/Hy/E-2578/**280** Dated: **11.01.2017**

A copy is forwarded to the Deputy Commissioner Mahendergarh at Narnaul for information and necessary action.

Sd/-
Mining Officer
for Director General, Mines and Geology,
Haryana

Endst No. Glg/Hy/E-2578/**281** Dated:**11.01.2017**

A copy is forwarded to the Mining Officer Narnaul for information and necessary action he is advised to get the area of 76.75 hectares falling under Khasra No. 201,223 and 224 in village Bayal district Mahendergarh being retained on mining lease demarcated with the help of Revenue Department in the presence representative of the lease holder as well as Forest Department.

Sd/-
Mining Officer
for Director General, Mines and Geology,
Haryana

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Annex-2

CONSENT & DECLRATION LETTER FROM APPLICANT

The Mining Plan& Progressive Mine Closure Plan in respect of Quartz and felspar Mine in village Bayal, over an area of 76.75 Hectares ; District- Mohindergarh ;State –Haryana has been prepared by S.N. Sharma RQP/DDN/0135/2001-A.

We request The Director General, Mines and Geology, Government of Haryana, Chandigarh, to make further correspondence regarding modification of the mining plan with the said RQP on the following address:-

S.N. Sharma

RQP/DDN/0135/2001-A.

House No. 282; Sector 11- D Faridabad (Haryana)

sn_sharma1959@rediffmail.com

Mobile : 09560848579

We also authorize S.N. Sharma to make correspondence with your office.

I hereby undertake that the mining plan in respect of the area prepared by RQP be deemed to have been made with my knowledge and consent and shall be acceptable to me and binding on me in all respects.

It is further Certified that the mining plan for Quartz &Felspar in village BAYAL over an area of 76.75hectares covered under survey of India Toposheet No.G43 D13 has been prepared in full consultation with me and I have understood its contents. I agree to implement the same in accordance with law.

Place: Faridabad

Date: 15th Dec. 2016

Signature of the applicant

(ManmohanBhadana)

Department of Mines & Geology Haryana, Chandigarh

APPROVED

P. K. Sharma
S.M.E.

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Annex-3

Renewed/नवीनीकृत up to 29/3/2021

29/3/11

क्षेत्रीय खान नियंत्रक
Regional Controller of Mines
भारतीय खान ब्यूरो
Indian Bureau of Mines

खनन योजना तैयार करने हेतु योग्य व्यक्ति के रूप में मान्यता का प्रमाणपत्र

(खनिज रियायत नियमावली 1960 के नियम 22(सी) के अंतर्गत)

श्री एस. एन. शर्मा

पुत्र श्री के. डी. शर्मा

निवासी B-21 नं. 2181, सेक्टर-16, फरीदाबाद, हरियाणा

द्वारा अपनी योग्यताओं और अनुभव का संतोषप्रद प्रमाण प्रस्तुत करने के फलस्वरूप खनिज रियायत नियमावली, 1960 के नियम 22(सी) के अंतर्गत उन्हें एतद्द्वारा खनन योजना तैयार करने हेतु योग्य व्यक्ति के रूप में मान्यता प्रदान की जाती है ।

उनका पंजीयन क्रमांक RQP/DDN/135/2001/A है ।

यह मान्यता दिनांक 29.03.2011 को समाप्त

होने वाली पाँच वर्षों की अवधि के लिए वैध है ।

स्थान : देहरादून

दिनांक : 30.03.2001

क्षेत्रीय खान नियंत्रक
भारतीय खान ब्यूरो
क्षेत्रीय खान नियंत्रक
Regional Controller of Mines
भारतीय खान ब्यूरो
Indian Bureau of Mines

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Cat.AMech.O/c

MINING SCHEME AND PROGRESSIVE MINE CLOSURE PLAN
Of BAYALQUARTZ & FELSPAR MINE

(Prepared under sub-rule 8 of Rule 70 of Haryana Minor Mineral Concession, Stocking, Transportation of Minerals & Prevention of Illegal Mining Rules, 2012.)

VILLAGE: BAYAL
DISTRICT: MOHINDERGARH. STATE: HARYANA.
TOTAL LEASE AREA -76.75 HA. (NON- FOREST)
PERIOD OF MINIG SCHEME-2023 to 2028(5 Years)
Targeted production 55, 00,000 MT /year
Lease period: 50 Years (09-07-2002 to 08-07-2052)

APPLICANT-

Manmohan Bhadana S/o Sh. Kartar Singh Bhadana
V&PO- Anangpur;Tehsil& District- Faridabad(Haryana)

Haryana Panchkula
APPROVED DMG/HY/MP/Bayal/2022/4651-4654
With Conditions
Vide Letter No.
Date/Dated 17-08-2023
State Geologist

PREPARED BY

S.N.Sharma RQP /DDN/0135/2001/A
&
D.C.Yadav RQP/DMG/HRY/2018/03,

#282, Sector 11-D Faridabad (Haryana)

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2	Copy of Hydrological report
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5	Copy of Demarcation report showing corner coordinates
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PART -I
CHAPTER -I
REVIEW OF MINING PLAN

INTRODUCTION

Mr. Manmohan Bhadana s/o Shri Kartar Singh, VPO :Anangpur, Tehsil and District : Faridabad) hold a mining lease over an area of 76.75 hectares falling in Khasra Nos 201, 223 & 224 in village Bayal, District: Mahendergarh which was granted on 09.07.2002 for a period of 20 years for Quartz and Felspar, both as Major Minerals as per provisions of Mines & Mineral (Development & Regulation) Act, 1957. Now, the lease which was granted on 09.07.2002 shall be up to 08.07.2052 as per the Central Government Ordinance dated 12.01.2015.

With subsequent notification dated 10.02.2015, 31 minerals (as notified in the Act) have been declared as Minor Minerals. Therefore, minerals namely Quartz &Felspar for which lease was granted Major Mineral now have fallen under category of Minor Minerals and shall be under the purview and provisions of the " Haryana Minor Mineral Concession, Stocking, Transportation and Prevention of Illegal Mining Rule, 2012"

The first Mining Plan and Progressive Mine Closure Plan for Bayal Quartz and Feldapar (Minor Minerals) has been approved vide memo Memo No, DMG/HY/MP/Bayal/2017/2733-36 dated 23rd June, 2017.

In the meantime, Lessee applied for Environmental Clearance from MoEF& CC, Government of India, New Delhi. Terms of Reference were approved by Environmental Committee on vide letter No. J-11015/10/2017-IA.II(M) dated 17th May, 2017. Public Hearing was held at mine site on 24th October, 2017 under the Chairmanship of the D.C, Mahendergarh.

After doing the needful Final EIA report was submitted to the MOEF & CC on 30th November, 2017. The EAC during the course of presentation of Final EIA report held on 21st December, 2017 observed that the proponent has mentioned that waste generate (Quartzite & Masonry Stone) during the mining is saleable and has market value. The EAC noted that as per MCDR, 2017 the mineral rejects "include all the excavated materials that do not constitute useful material, which may be rejected either on the basis of grade or size" but in the instant case as it is salable and has market value the same cannot be treated as waste and asked the applicant to add the salable mineral (Quartzite/Stone-Minor Mineral) in the lease deed. This will not only lead to mineral conservation but also the state government will generate revenue.

In view of above development lessee submitted application on 22nd December, 2017 to the Director General, Department of Mines & Geology, Haryana for addition of associated mineral (Quartzite/stone) in the Bayal Quartz and Feldspar lease deed. This application has been

considered by Mines & Geology Department Haryana vide their Memo No. Glg/Hy/E-2578/229, Dated Chandigarh the 12.01.2018

Consequent upon addition of Quartzite and Stone and as directed through memo no. Memo No.Glg/Hy/E-2578/229, Dated Chandigarh the 12.01.2018 , that lessee is required to get the Modified Mining Plan for additional minerals as minor minerals and get the same approved from the competent authority.

In view of above observations, a modified mining plan was prepared for all the four Minor Minerals namely, Quartz, Feldspar and Quartzite and Stone. The Modified Mining Plan got approved vide memo no DMG/HY/MP/Bayal/2018/493 dated Chandigarh 01.02.2018 from DMG, Haryana .

EC Proposal (1A/HR/MN/62041/2017) for Bayal Quartz, Feldspar, Quartzite and Stone Mine was again considered in the 28th EAC meeting held on 27th Feb, 2018 at MoEF&CC, New Delhi. The Committee in its minutes for 28th EAC Meeting mentioned that mining is not to be carried out within 50 meters of the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs) and temple and blasting is not be carried out within 100 meters of outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs) and temple. In view of these restrictions and other shortcomings the committee directed to correct the spatial configuration of the lease boundary, surface features, distance of habitation, type of blasting, danger zone, quantity of the mineral, ultimate pit limit , post mining land use details, mineral reserves in the mining plan.

Finally EC was granted on 4th May 2018 for production of 55, 00,000 TPA vide letter no. J-11015/10/2017-IA-II(M).(Copy of EC enclosed as annexure-1).

It was mentioned in the EC at page no.3 condition no.5 "that proponent submitted that the Ground water table(GWT) around Bayal Village is located about 346 MASL.The mine workings will be up to 3910 mASL and ground water shall not intersected. The proponent committed to mine 10 m above the ground water table i.e. up to 356 MASL. The Committee in its meeting held on 22-23 March 2018 observed that in the ining lease document it has mentioned that "A safety margin of two meters shall be maintained above the ground water table and no mining operations shall be permissible below this level unless a specific permission is obtained from competent authority" ad in the instant case, the PP has already committed to keep a safety margin of 10 meters above the ground water table. Further during the plan period, as per approved mining plan the mine working will go up to 3910 mASL i.e. above the ground water table of the area.Thus, the Committee was of the view that the mine working should be restricted at 356MASL till the PP submits the detailed hydrological study and obtain permission

from competent authority for intersecting the ground water table,ifonyfor mining beyond 356 MASL.

In Compliance to above condition proponent got the detailed Hydro geological report prepared through an authorized Consultant namely Earth hood Services Private Limited (Guru gram) Copy enclosed as (Annexure-2).It is a very exhaustive report. Hydrological report covering 5km radiusaroundBayal mine was carried out. Detailed analysis of Geological formations,geological setting, structural behavior of formations,satellite imagery, study of CGWB tube wells, ground water levels in and around Bayal Mine area was done.

In the hydrological report ground water level monitored by Central Ground Water Board (CGWB) has been collected and analyzed. Bayal CGWB observation well location is the nearest location to the mine blocks which is about 2 km. The ground water levels of the CGWB observation well for the period of May 2016 and November 2016 was 26.75 m and 18.50 m below ground level respectively. Considering the elevation at Bayal CGWB observation well location, which is 2 km from the mines block, the water table (water table AMSL = MSL-Static water level) at Bayal village would be around 333 m above mean sea level during May 2016 and 346 m amsl during November 2016. Since the study area is heterogeneous, composed of only secondary porosity (no uniform porosity and permeability) the ground water level at the mine site is much deeper than Bayal village. Considering the above and the ground water level at mine site, it is clear that the reserve depth is much above the ground water table. The digital elevation model showing the mines and CGWB observation well is presented in Plate

S. No	Location	Latitude	Longitude	MSL In m	Depth to water level in m (AMSL)	Static water level in m	Depth to spring / fracture (AMSL)
1	Bore well in Southern Block	27° 51' 16.308"	75° 58' 49.613"	374	278	96	214
2	Bore well in Southern Block	27° 51' 13.151"	75° 58' 44.717"	375	283	92	235
3	Near Bhagwala Village	27° 49' 10.42"	75° 57' 37.958"	402	316	86	282
4	Raickeen Wala Village	27° 50' 20.069"	75° 58' 26.346"	390	302	88	280
5	Salodra	27° 51' 57.143"	75° 58' 5.308"	379	289	90	264
6	Lima	27° 51' 43.798"	75° 59' 7.951"	380	291	89	270

Since the mine pit is open, the rainwater and seepage from the mine dump may accumulate in the mine pit which requires pumping. The pumping of stored or accumulated water in the mine pit would not create cone of depression.

During the study period, it is observed that the Mine area falls in 95.5-96.0 m ground water level zones. The area is tectonically highly disturbed zone; hence the behavior of ground water movement is highly disturbed. During the drilling of bore well the spring stuck below 110 - 160 m. After drilling, the static water level raises to 86-96 m.

As per the Hydrological report the depth of water level is reported to be at 278 to 282mAMSL in lease area.

In view of the above Hydro geological report it is concluded that the mining up to 280 m above mean sea level (AMSL) is safe .Reserves are now estimated up to 280 m, which would not intersect the ground water. It is therefore concluded that Proponent can work the mine up to & below water table with due permission from Competent Authority in Consonance with the EC dated 4th May, 2018.Further if the conditions so warrants and ground water intersection is needed the proponent would seek permission under Haryana Water Resource Authority Gazette Notification No.191-2020/Ext dated 23rd Dec . 2020. The Mining projects are location specific, there is no ban on grant of NOC for abstraction of ground water and hence all mining projects are required to obtain NOC for water abstraction, and it is mandatory for all mining projects/industries to ensure that water available from dewatering activity/ operations is properly treated and should be gainfully utilized for supply of irrigation, dustsuppression, miningprocess, recharge in downstream.

Since the 5 years of last approved Mining Plan & Progressive Mine Closure Plan ends on May 2023. Therefore a Mining Scheme is required to be prepared and got approved from DMG, Haryana as per the sub-rule 8 of Rule 70 of Haryana Minor Mineral Concession, Stocking, Transportation of Minerals & Prevention of Illegal Mining Rules, 2012.(Consent to prepare mining Scheme enclosed as annexure-3)

The objective of preparation of this Mining Scheme and Progressive Mine Closure Plan is to fulfill the conditions stipulated by the Department of Mines & Geology, Haryana required under Haryana Minor Mineral Concession Rules, 2012.

1.0 REVIEW OF MINING PLAN

1.1. Name of the mine: BayalQuartz,Felspar,Quartzite and stone mines Distt. Mohindergarh (Haryana)

1.2 Particulars of approval of mining plan (under MCR or MCDR, indicate approval letter No. and date:

The last modified mining plan was prepared and approved vide letter No. DMG/Hr/MP/Bayal/2018/1380 dated 19-03-2018. Mining started in June 2018 after grant of EC.

1.3 Date of commencement of mining operations:-

Mining started during June 2018 after approval of EIA and EMP on 4th May 2018 and since then the workings are continued.

1.4 A review of compliance position of salient features of the mining plan including conditions and stipulations imposed, if any, on year wise basis.

During all these years the mining and other allied activities were undertaken as per the approved mining plan/ scheme of mining. No specific conditions were imposed while approving the first mining plan. The mining plan was followed in the field as per the approval by the Director General Department of Mines & Geology Haryana.

1.5.0 Important chapters of the approved mining plan are reviewed and deviation and justification area as follows:-

1.5.1 **Geology &Exploration**: As the reserves are very well established for quartz, and quartzite. No exploration was proposed in the last mining plan for quart and quartzite. The area is prominently marked by outcrops of Quartz, Feldspar and Quartzite/Stone as seen in Surface geological Plan. Therefore no such exploration was carried out during the plan period.

1.5.2. Mine Development:

- As per detailed proposal under the last approved mining plan & modified mining plan, two pits were proposed and the same is followed. The development work was to be carried out to produce targeted year wise production of Stone mineral. The mining and development works were proposed by developing the mine from top downward by forming proper

benches. The mine was developed in a systematic manner by mining from top downwards. It was proposed to develop the mine fully mechanized system of miming by deploying Heavy Earth Moving Machines and deep hole drilling and blasting by forming benches of 10 mx10 m . A latest surface and geological plan plate no.3 shows the type of working done by lessee. The av. Depth of benches is kept 10 m & the width more than 10 m. A barrier of 7.5m was proposed all along the lease boundary & the same is adhered to in the lease area.

- It was proposed in the last mining plan to make benches of 10 m height, width more than height and bench slope 60^0 from vertical. The bench height is maintained 10 m and the width is more than 10 m and the bench slope is also found more than 60^0.
- Back filling proposal: There was no backfilling proposal during the plan in last approved mining plan. Therefore there is no deviation from original proposal.

The following was the annual production plan in the last approved mining plan.

Year	QUARTZ (TPA)	FELDSPAR (TPA)	QUARTZITE/STONE(TPA)	Waste/Reject (TPA)	Total Production (ROM) (TPA)	Soil (TPA)
Ist	4,00,000	2,50,000	42,26,000	74000	49,50,000	40000
2nd	4,00,000	2,50,000	42,70,000	30000	49,50,000	35000
3rd	5,00,000	3,25,000	4464000	36000	53,25,000	35000
4th	5,00,000	3,25,000	44,66,000	34000	53,25,000	30,000
5th	6,00,000	4,00,000	4469250	30750	55,00,000	30,000

The lease holder produced and dispatched the following quantities of mineral from the mine during the 1st plan period.

YEAR	STONE	QUARTZ	QUARTZITE	FELSPAR	TOTAL
from June 2018	306630.88	108611.6	0	112516.77	527759.25

2019	716919.31	539111.72	366488.56	210594.33	1833113.92
2020	760565.56	12.1	2107341.66	289.53	2868208.85
2021	636381.55	196.61	1455508.2	0.0	2092086.36
2022	1126539.35	302126.94	1968153.44	272208.96	3669028.69
2023 Jan to March	270266.36	65307.14	458034.28	66745.92	860353.70

1.5.3 Generation of soil and overburden during plan period.

The following quantities of soil and reject waste was handled during plan period

Year	Top Soil in MT	reject waste In MT	Low grade mineral	Total
1st	5000	15832	36943	52775
2nd	7500	36600	146710	183310
3rd	4500	57000	229820	286820
4th	3000	40000	169208	209208
5th	2500	26000	106874	132874
Total	22500	175432	689555	864987

Entire Soil generated has been used for plantation. The rejects and low grade minerals are stored in the lease hold area as shown in the plan plate no.3 about2-3% rejects are generated from this mine. These rejects are not salable. These will be used for reclamation/backfilling at the final closure period. About 5-7% low grade mineral is generated based on the last 5 years experiences which are stacked in stack yard. Low grade mineral is salable. At present there is a slump in the demand of low grade mineral. Low grade mineral is salable when there is good

demand in the market. Same is proposed to be sold during the plan period. Efforts will be made to sale low grade mineral with blending of high grade mineral.

1.5.4 A forestation

It was proposed in the last approved mining Plan to plant 1870 No of plants annually. The applicant has planted 10000 nos. of plants Year wise plantation proposed in the last mining plan and actually planted is as follows:-

Year	No. of plants proposed in the mining plan	No. of plants actually planted	Plants actually surviving	Area under plantation
1st	1870	4000	3885	1.60
2nd	1870	2000	1940	0.80
3rd	1870	1500	1420	0.60
4th	1870	1000	950	0.40
5th	1870	1500	1435	0.60
Total	9300	10000	9630	4.00

1.5.3 Prohibitory orders under Metalliferous Mines sub Rule 22(3) of Regulation, 1952 or any other Regulations by DGMS, Ghaziabad Region if any.

The applicant has worked the mine in systematic manner and no such prohibitory orders were ever imposed during the plan period by Authority

1.5.4 Financial Assurance: It was proposed in the first mining plan, as per agreement condition no.6, it was proposed to deposit fund in Joint account of Government against reclamation and rehabilitation. The same is followed by lessee and there was no deviation noticed from original proposal. As per Haryana Minor Mineral Concession, Stocking, Transportation of minerals and

prevention of illegal Mining Rules-2012, lessee is required to deposit @ Rs 15000/per ha for the broken area/used area against the financial assurance. It was proposed to deposit the financial amount in advance.

Review of Financial assurance. There is no deviation of land use at the start of mine and at the end of five years plan period proposed in the first mining plan.

Sr No.	Item details	Area in ha Proposed for use	Actual area at the end of plan	Remarks
1	Area under mining	13.39	15.00	0.80 ha area was found broken at the Start of plan period. about11.70 ha broken during plan period
2	Storage of top soil	0.001	0.0	Soil generated during last 5 years is Spread over the area proposed for plantation. No soil storage is kept.
3	Storage of waste dump	0.64	1.00	Entire waste generated during last 5 years is stored in dump yard. Same will be used at the time of final closure
4	Mineral storage low grade	2.00	3.0	Low grade mineral is stored temporarily. Entirelow grade mineral Will be sold in due course of time.
5	Infrastructure, Workshop etc.	0.020	0.50	Office and other infrastructure facilities are already developed within the lease area.

6	Roads	1.50	1.50	1.50 ha are covered under roads
7	Railways	0	0	-
8	Effluent treatment plant	0	0	-
9	Tailing pond	0	0	-
10	Mineral separation plan	0	0	-
11	Township area	0	0	-
12	Green belt	4.0	4.0	-
13	Others(undisturbed)	55.199	51.01	-
	Total	76.75	76.75	

1.5.5CSR and EMP activities proposed during the plan as advised by EC committee and actually done are as under:

It was proposed during the clearance of EC that proponent will make budgetary provisions for EMP measures, CSR, R&R plans, wildlife conservation plan etc. as detailed below:

Sr No.	Head	Amount
1.	CSR/ESC	26.55 lakhs
2.	Blasting Study	34.00 lakhs
3.	Wild life conservation plan	160.00 lakhs
4.	EMP	172.35 lakhs Capital cost 458.00 lakhs for recurring cost
5.	Budget for Management of Labour Camps etc	28.25 lakhs Capital cost 46.00 lakhs recurring cost
6.	Occupational HealthSurvilane	02.62 lakhs capital

		81.00 Recurring cost
7.	R&R Plan for 43 families	600.19 Lakhs
8.	CSR @ 2% of the average net profit of last years	

Against the above proposals, proponent has done very good work for Village development, Education, Sanitation, assistance during Covid-19,green belt development and R&R plan in a very systematic and responsibleway.Details of actual expenditure done against various heads during the plan period are as under:

Actual Expenditure towards Environment Management Plan (EMP)

A. Capital Expenditure.

Sr No.	Expenditure head from FY2018-19 to till date	Amount in Rs.
1.	Land for Green belt development and construction of GI sheet parapet wall including procurement,leveling and development etc	50,00,000.00
2.	Purchase and erection of wind barrier walls	58,60,000.00
3.	Development of garland drains around dumps	1,00,000.00
4.	Development of desilting Chamber	1,00,000.00
5.	Development of rainwater harvesting system	8,00,000.00
6.	Installation of Fixed water sprinklers around 1000 ft	1,00,000.00
7.	Procurement of plant saplings, their upkeep and maintenance	15,00,000.00
8.	Purchase of water tanker with mist fogger arrangement	6,50,000.00

9.	Dressing and stabilization of slope of OB	33,00,000.00
10.	Contribution to Mines safety & Environment celebration/drives	40,000.00
11.	Total	1,74,50,000

B. Recurring expenditure.

Sr.No.	Expenditure head (from 2018-19 to till date)	Amount
1	Payment towardshiring, operation and maintenance of mobile water tankers-6nos. from 2018 to Dec.2021	1,08,00,000.00
2	Periodic monitoring of Air, water, noise etc from 2018 to Dec.2021	3,00,000.00
3	Total	1,11,00,000

Expenditure towards CSR/ESC

Sr.No.	Expenditure head	Amount
	For FinancialYear 2018-19	
1	Contribution to gram Panchayat Bayal for village Development Activities	4,00,000.00
2	Development of School Library	35,000.00
	For Financial Year 2019-20	
3	Installation of Water Pump at Bayal Village	4,00,000.00
4	Contribution to Gram Panchayat Bayal for village development, health and sanitation etc	6,00,000.00

5	Medicine and stationery to GovBayal and Salodra	28,035.00
6	Development of School Library at Bayal and salodra	1,36,000.00
7	Construction of Sports Stadium in Bayal Village	6,00,000.00
8	Development of Baba Bharthri Temple in Bayal Village	5,00,000.00
	For Financial Year 2020-21	
9	Development of Baba Bharthri Temple in Bayal Village	5,00,000.00
10	Distribution of Food, medicines, mask etc during Covid-19 Pandemic	3,00,000.00
11	Total CSR	38,99,000.00

Expenditure Towards Rehabilitation and Resettlement (R&R)

Sr.No.	Expenditure head from FY 2018-19 to till date	Amount
1	Procurement of land near and surrounding Mining lease area	2.15 Crores
2	One time compensation of houses for families shifted at owned land	1204 Crores
3	Monthly Compensation to 53 families	2.14 crores
4	Total R&R expenses till date	16.33 Crores

CHAPTER-2

PROPOSAL UNDER SCHEME OF MINING FOR THE NEXT FIVE YEARS

2.1	Name &address of the Applicant	Sh. Manmohan Bhadana S/o Sh. Kartar Singh Bhadana R/o V& PO-Anangpur; Distt.- Faridabad (Haryana)
2.2	Status of the Applicant	Individual
2.3	Mineral which the Applicant Intends to mine/ lease granted	Quartz, feldspar, quartzite and stone (minor minerals)
2.4	Details of Lease area	District : Mohindergarh State : Haryana Taluka :Nangal Chaudhary .

Village	Khasra no.	Area in hect.	Owner ship
Bayal	201,223 & 224	76.75 hectares	Gram panchayat

Area lies between coordinates (Plate No 2 and annexure-5)

Block 1 (North Block):	Lat: 27°51.485'N to Lat: 27°51.970'N Long: 75°58.642'E to Long: 75° 58.932'E
Block 2 (South Block):	Lat: 27°50'54.20"N to Lat: 27 51.203' N Long: 75°58'37.58"E To Long: 75°59.041' E

2.5	Period for which the mining Lease was granted	which was granted on 09.07.2002 for a period of 20 years for Quartz and Feldspar, both as Major Minerals as per provisions of Mines & Mineral (Development & Regulation) Act, 1957. Now, the lease which was granted on 09.07.2002 shall be up to 08.07.2052 as per the Central Government Ordinance dated 12.01.2015.			
2.6	Name, Address and Registration Number of RQPs Preparing Mining Scheme and Progressive Mine Closure plan (Annexure-3)	Name	:	S.N.Sharma& D.C. Yadav	
		Address	:	282, sector 11-D Faridabad.	
		Mob. NO	:	+91-9560848579; +91-9416214247,	
		E-mail	:	snsharma@jbbtechocrat.com dcyadav747@gmail.com	
		Regd No. S.N.Sharama Regd No. D.C.Yadav	: :	RQP /DDN /0135 /2001 / A DMG/HRY/RQP/2018/03	
2.7	**Date of Expiry of 5 years period for which approved on the last occasion**	Last modified mining plan was prepared for all the four Minor Minerals namely, Quartz, Feldspar and Quartzite and Stone. The Modified Mining Plan got approved vide memo no DMG/HY/MP/Bayal/2018/493 dated Chandigarh 01.02.2018 from DMG, Haryana			
2.8	**Date of approval Environment clearance(EIA/EMP)**	4th May 2018 for production of 55, 00,000 TPA vide letter no. J-11015/10/2017-IA-II (M).			

Consent letter enclosed as Annexure -3and RQP certificate attached as Annexure-4

LOCATION AND ACCESSIBILITY:

DETAILS OF THE AREA (WITH LOCATION MAP)

A general location and vicinity map are attached as Plate no.1

Key plan: key plan on 1: 50,000 scale covering an area in a radius of 5 km showing salient features as per Rule 28(5) (a)of MCDR, 1988 has been prepared on Toposheet no.G43 D13 &G3 E1. The area is marked on the enclosed key map(Plate no. 2).

Block 1 (North Block):	Lat: 27°51.485'N to Lat: 27°51.970'N Long: 75°58.642'E to Long: 75° 58.932'E
Block 2 (South Block):	Lat: 27°50'54.20"N to Lat: 27 51.203' N Long: 75°58'37.58"E To Long: 75°59.041' E

Further Coordinates of all corner points are enclosed as **annexure-5** in the demarcation map certified by HalkaPatwari,forester and mining inspector dated 04-02-2017

Infrastructure facilities in the nearby area and within mine are as detailed below

Nearest railway station	Nizampur 15 km
Police station	Nangal Chaudhary
Post office	All the nearby villages
Medical facilities	Narnaul, Nangal Chaudhary, Mohindergarh
Electricity	Electrical supply is available in all nearby villages.
Education facilities	Most of the nearby villages have secondary schools and for higher education institutes are available at Narnaul, NangalChaudhary,Mohindergarh , Rohtak& other nearby towns
Mode of transportation of mineral	Mineral stone will be transported by tippers/ trucks. Loaded trucks will travel on Kuccha road made for plying of trucks up to the crushers in the nearby area. Village Bayal and the lease area is connected with metaled road which further joins the Narnaul- Nizampur –Patan and Nangal Chaudhary State Highways and nearby cities.

Infrastructure developed in the mine is as under.

Mine office, Rest shelter and first aid station and security Guard Rooms	Mine office ,First aid station , rest shelter,canteenand security guard room Developed within lease area.
Weigh bridge	Installed within lease boundary
Store room/ servicing and repair maintenance of vehicles	Developed near the mine
Medical facilities	First aid room setup in Managers office. A doctor visits the site as and when required
Electricity	Connection available in the mine office as well as extension given into mines as well.
Water	Masonry water tank as well as Syntax tanks provided near mine office.

CHAPTER 3
GEOLOGY & RESERVES

3.1.1 Physiography, Drainage and Climate

There are two rivers namely Dohan and Krishnawati which passing through the district . Krishnawati River is originated from the hillocks of Sikar district of Rajasthan and Dohan is originated from the hillocks near Khetri . Both the rivers remained dry except during rainy days. Physiographical the district consists of flat and level plain interrupted from place to place by clusters of sand dunes, isolated hillocks and rocky ridges. A few isolated rocky ridges elevated sharply from the plain occur in the west and south west portion of the district.

The lease area is consists of ridges and valleys. The highest point in the lease area is recorded to be 480mRL and the lowest point recorded is 290 mRL .

The lease area does not have any water body. There are dry nalas in which water flows during rains for a short duration, otherwise they remain dry for the rest of the months. The rain water from these nalas drains either into local Johars or in agriculture fields.

3.1.2 Hydrogeology

The geological formation met within the district are phyllites, mica schist and quartzite of Delhi & Aravalli. Ground water occurs in alluvium and Aeolian sands and under lying jointed and fractured hard rock formations also form the aquifers, in alluvium, sands, silt , and hard bed rock. In-shallow aquifers zones, ground water occurs under water table conditions where as in the deeper zones, confined/semi - confined condition exist, hard rocks comprising of Aravalli group of rocks, Malani suite of volcanic and Alwar Quartzite's of Delhi system are water bearing but have yet not been explored thoroughly. Proponent has carried out Hydrological study of the lease area as well as nearby area and it is concluded that the water table is 95 m below the general ground level of 370 mRL.

3.1.3 Climate &Rainfall:

The climate of Mahindra Garh district can be classified as tropical steppe, semi -arid and hot which is mainly dry with very hot summer and cold winter except during monsoon season when moist air of oceanic origin penetrates into the district. There are four

seasons in a year. The hot weather season starts from mid-March to last week of the June followed by the south- west monsoon which lasts up to September. The transit ion period from September to October forms the post –monsoon season. The winter season starts late in November and remains up to first week of March. The normal annual rainfall of the district is 420 mm which is unevenly distributed over the area 22 days. The south west monsoon sets in from last week of June and withdraws in end of September, contributed about 85% of annual rainfall. July and August are the wet test months. Rest 15% rainfall is received during non-monsoon period in the wake of western disturbances and thunder storms. Generally rainfall in the district increases from southwest to northeast.

Normal Annual Rainfall: 420 mm

Normal monsoon Rainfall: 355 mm

Temperature

Mean Maximum: 41oC (May & June)

Normal Rain days: 22

(Source: Meteorological Department, Govt. of Haryana)

3.2 REGIONAL GEOLOGY OF THE AREA

The rocks of Delhi super Group constitute a part of the main Aravali Range originating from Gujrat in the south to Haryana in the northeast. The super group comprising of meta sediments with 6000m thickness which is divided older alwar Group and Younger Ajabgarh Group. The detailed stratigraphic sequence of the sequence of Delhi Super group are detailed here below. The general regional strike varies from N15^{0}E-S15^{0}W to N45^{0}E –S45^{0}W Regionally the area belongs to the Alwar Series of Delhi Super Group. The regional stratigraphic sequence in Mohindergarh District is as follows:

	Ajabgarh series	Biotite-schist, phyllites, quartzite and impure biotitic limestone and calciphyres.
Delhi System	*Alwar series*	Quartzites, arkose, conglomerates and mica-schists with bedded lavas.

Rialo series	Rialo limestone and Rialo marble, quartzite

3.3 LOCAL GEOLOGY:

The Geology of the area has been described under regional geology. Local Geology of the lease area with the description of different formations found in the area along with its physical and chemical properties and reserves have been detailed in this chapter.

The area was surveyed geologically. A geological plan and sections are prepared on 1:2000 scale as plate No. 3

The following sequence of rock formations belonging to Delhi Super group are found in the lease area have been as under

Alluvium

Quartz mixed with Quartzite

Feldspar mixed with Quartzite

Amphibolites

Micaceous Phyllite with quartzite

GENERAL DESCRIPTION OF FORMATIONS (REF. PLATE NO.3) :-

Alluvium:

It is the top layer and the youngest sedimentary layer in the lease area. Though there is no soil exposure on the top of the hill but on the foot hill or at the bottom, there is brown sand and detritus soil. It is mainly exposed in the foot hill side of the lease area. It is reddish, brown in color. Thickness varies from 0.5m to 2.0m.

Quartz:

The quartz is very well mineralized in the area. It is milky white in color, fine grained and cryptocrystalline. Quartz veins have intruded and mixed in the country rock which is pre-dominantly Phyllites Quartzite. One sample of quartz has been collected from the main vein and was analyzed.

Feldspar

There is a good deposit of Feldspar in the lease area. Feldspar is also intruded and mixed with country rock which is pre-dominantly Phyllite and Quartzite.

Amphibolite

Small and thin veins of amphibolite are also found in the lease area. It is the product of dynamo thermal metamorphism of basic igneous rocks.

Micaceous Phyllite with Quartzite

Micaceous phyllite is also found in the lease area. Micaceous Phyllite is the country rock in this area. The quartz has intruded in to the country rock i.e. micaceous phyllite and Quartzite and is itself sheared at the margins. This has given rise to quartz schist. Quartzite is metamorphic rock formed when quartz rich sandstone or chert has been exposed to high temperatures and pressures. Such conditions fuse the quartz grains together forming a dense, hard and equigranular rock.

The strike of the quartzite formation varies from N 20^0 - 25^0 E to S 20^0 - 25^0 W with dip of 65 to 70^0 due south east. The strike and dip of the quartzite bands is not uniform since there are structural disturbances and intrudes and mix with Quartz and Feldspar.9 Nos of Samples of different minerals of Bayal Mine were got tested from Gujrat Minerals Laboratory, as under

9 Nos of Samples of different minerals of Bayal Mine (annexure-6) were got tested from Gujrat Minerals Laboratory, Bewar(Rajasthan).Summary of testing reports of Bayal Mine Minerals are as under:

Sample No	1	2	3	4	5	6	7	8	10
properties	Felspar	Felspar	Felspar	Quartz	Quartzite	Quartz	Quartzite	Quartz	Quartz
SiO2 %	72.080	72.86	78.710	95.885	93.910	96.765	88.965	92.450	98.425
Al2 O3 %	15.730	15.055	11.885	2.145	2.605	1.085	7.125	4.365	0.895
Fe2O3 %	0.265	0.235	0.105	0.048	0.085	0.310	0.625	0.185	0.00
CaO %	1.035	0.985	1.455	0.520	0.695	0.765	0.995	0.810	0.0
Mg O %	0.255	0.105	0.265	0.065	0.065	0.105	0.145	0.065	0.370
LOI %	0.645	0.615	0.895	0.435	0.385	0.430	0.750	0.560	0.085
Na2O %	6.730	4.110	0.785	0.235	0.835	0.145	0.710	0.850	0.155
K2O %	3.145	5.925	5.795	0.635	1.375	0.295	1.065	0.530	0.017
TiO2 %	0.105	0.105	0.090	0.017	0.025	0.097	0.105	0.085	0.00
Sp. Gravity	2.68	2.685	2.69	2.70	2.69	2.68	2.63	2.71	2.69
Bulk Density gm/cc	2.69	2.84	2.70	2.60	2.80	2.7	2.63	2.70	2.70
Hardness on MOHS scale	6	6	5.5	7	6.5	7	7	6.5	7

GEOLOGICAL CROSS SECTIONS

8 nos of Geological Cross sections have been drawn across the strike of the host rock as shown in plate in plate no. 3 &4.

APPROVED Deepak Kumar

DETAILS OF EXPLORATION

The area is prominently marked by outcrops of Quartz, Feldspar and Quartzite/Stone as seen in Surface geological Plan. Moreover, the area has undergone quartz, feldspar, quartzite and stone mining Mineral has been proved very well.Therefore, no further exploration to prove the reserves is needed.

METHODS OF ESTIMATION OF RESERVES

For estimating the reserve of Quartz, Feldspar and Quartzite and Stone, the following

Parameters are considered are as follows:

The reserves are calculated on the basis of established width, thickness and strike length/influence of the mineralized formation in the area where good pits are available such area in put under proved category.

The entire reserves of quartz ,quartzite,feldspar and stone are put under proved category up to and above 300MRL. Next 10 meters i.e up to 290 MRL are considered as probable and further 10 meters (up to 280 MRL) as possible.

The Av.bulk density of Quartz, Feldspar and Quartzite/Stone is considered 2.7 Tonne/M3

Since the mineral Quartz, Feldspar have been intruded and mixed with country rock (Phyllite and Quartzite), the Geological Reserves are calculated separately for Quartz, Feldspar and country rock Quartzite. While mining of the Quartz and Feldspar, quartzite rock shall also be mined as host rock (Quartzite).

Grade and use of minerals: The entire minerals produced from the areas are usable in glass, ceramic and other chemical industries as well as in construction/RCC work.

Quartz

Section Line	Cross sectional Area (m2)	Influence Length (m)	Bulk Density (Tonne/m3)	Proved (Tonne)	Probable (Tonne)	Possible (Tonne)
AA'	890	170	2.70	408510		
	113	170	2.70		51867	
	113	170	2.70			51867
BB'	8108	200	2.70	4378320		

Section Line	Cross sectional Area (m2)	Influence Length (m)	Bulk Density (Tonne/m3)	Proved (Tonne)	Probable (Tonne)	Possible (Tonne)
	642	200	2.70		346680	
	646	200	2.70			348840
CC'	9945	200	2.70	5370300		
	782	200	2.70		422280	
	785	200	2.70			423900
DD'	5108	200	2.70	2758320		
	595	200	2.70		321300	
	595	200	2.70			321300
EE'	1510	96	2.70	391392		
	92	96	2.70		23846	
	92	96	2.70			23846
Category wise Reserves =				13306842	1165973	1169753

Total Geological Reserves=15642568 MT

Mineable reserves @90% Recovery (Quartz) =14078310 MT

Quartzite (Masonry Stone) mixed with Quartz

Section Line	Cross sectional Area (m2)	Influence Length (m)	Bulk Density (Tonne/m3)	Proved (Tonne)	Probable (Tonne)	Possible (Tonne)
AA'	15632	170	2.70	7175088		
	1945	170	2.70		892755	
	1952	170	2.70			895968

BB'	47741	200	2.70	25780140		
	4542	200	2.70		2452680	
	4556	200	2.70			2460240
CC'	64421	200	2.70	34787340		
	5755	200	2.70		3107700	
	5712	200	2.70			3134700
DD'	54044	200	2.70	29183760		
	5777	200	2.70		3119580	
	5805	200	2.70			3134700
EE'	23685	96	2.70	6139152		
	2661	96	2.70		689731	
	2667	96	2.70			691286
Category wise Reserves =				103065480	10262446	10266674

Total Geological Reserves = 12, 35, 94,600 MT

Mineable Reserves @90%Recovery = 11, 12, 35,140MT

Out of Mineable Reserves 40% is Quartz and 60% is Quartzite (Masonry Stone)

40% Quartz =4, 44, 94,056 MT

60 % Quartzite (Stone) = 6, 67, 41,084MT

Feldspar Mixed with Quartzite (Masonry Stone)

Section	Cross sectional	Influence	Bulk Density	Proved	Probable	Possible

Line	Area (m2)	Length (m)	(Tonne/m3)	(Tonne)	(Tonne)	(Tonne)
FF'	22998	130	2.7	8072298		
	3115	130	2.7		1093365	
	3115	130	2.7			1093365
GG'	42178	200	2.7	22776120		
	5513	200	2.7		2977020	
	5805	200	2.7			3134700
HH'	41858	240	2.7	27123984		
	4456	240	2.7		2887488	
	4456	240	2.7			2887488
Category wise Reserves =				57972402	6957893	7115553

Total Geological Reserves = 72045828 MT

Mineable Reserves @90% Recovery = 64841245 MT (Including both)

Out of Mineable Reserves, 40 % is Feldspar and 60 % Quartzite (Masonry Stone)

Quartzite = 60%= 38904747 MT

Feldspar = 40% = 25936498 MT

SUMMARY OF UP DATED MINERAL RESERVES OF QUARTZ, FELDSPAR & QUARTZITE (HOST ROCK)

Mineral	Proved	Probable	Possible	Total	Total Geological Reserves recoverable @ 90%
Quartz	13306842	1165973	1169753	15642568	14078310
	41226192	4104978	4106670	49437840	44494056
Total	**54533034**	**5270951**	**5276423**	**65080408**	**58572366**
Quartzite	61839288	6157467	6160004	74156759	66741084
	34783441	4174736	4269332	43227509	38904747
Total	**96622729**	**10332203**	**10429336**	**117384268**	**105645831**
Felspar	23188961	2783157	2846221	28818339	25936498
Total	**23188961**	**2783157**	**2846221**	**28818339**	**25936498**

Mineral	Proved	Probable	Possible	Total	Total Geological

					Reserves recoverable @ 90%
Quartz	54533034	5270951	5276423	65080408	58572366
Quartzite	96622729	10332203	10429336	117384268	105645831
Feldspar	23188961	2783157	2846221	28818339	25936498
G.Total	174344724	18386311	18551980	211283015	190154695

Mineral blocked in 7.5m lease boundry,road and end benches and total mineable Reserves

Description	Quartzite (Stone) MT	Quartz MT	Feldspar MT	Total MT
Blocked in 7.5m along lease boundary	2770569	1313800	1198804	5283173
Blocked in Road	5741280	0	8611920	14353200
Blocked in end benches	19658070	9110320	8988878	37757268
Total Blocked	28169919	10424120	18799602	57393641
Total Geological reserves	105645831	58572366	25936498	190154695
Total mineable Reserves	77475912	48148246	7136896	132761054

Total Mineral available for mining=13, 27, 61,054 MT

Life of the mine @55, 00,000 MT/year=13, 27, 61,054/5500000=24 years

The mineral reserves are computed as per UNFC. The reserves are as follows: -

Reserves of Stone

Total Mineral Resources (A+B)		Code	Reserves in MT
A.	Mineral Reserves		
1.	Proved Mineral Reserves		
2.	Probable Mineral Reserves	111	**17,43,44,724**
		121 & 122	**1,83,86,311**
B.	Remaining Mineral		
1.	Feasibility Mineral Resources	211	**1,85,51,980**
2.	Prefeasibility Mineral Resources		

3.	Measured Mineral Resources	221 & 222	**5,73,93,641**
4.	Indicated Mineral Resources	331	Nil
5.	Inferred Mineral Resources	332	Nil
6.	Reconnaissance Mineral Resources	333	Nil
		334	

C. Details of UNFC classification

UNFC is a three digit code based system, the economic viability axis representing the first digit, the feasibility axis the second digit and the geological axis the third digit. Each digit provided. Codes 1, 2 and 3 in decreasing order. The highest category of resources under UNFC system has code (111) and for lowest category the code is (334).

Code (111): This code is provided for the economically mineable part of the measured mineral resources (proved category reserves).

Code (121): This code is provided for the economically mineable part of the indicated mineral resources (probable category reserves).

Code (211): The part of the measured mineral resources (proved category), which as per feasibility study has not found economically mineable. The reserves blocked in 7.5 meters buffer zone and 45 meters from permanent structure.

Code (222): The part of the indicated mineral resources (probable category), which as per feasibility study has not found economically mineable. The reserves blocked in 7.5 meters buffer zone and 45 meters from permanent structure.

Code (333): Tonnage, Grade and mineral contents can be estimated with low level of confidence and resources are also inferred from geological.

Life of mine

Total Mineral available for mining=13, 27, 61,054 MT

Life of the mine @55, 00,000 MT/year=13, 27, 61,054/5500000=24 years

3.5 Grade & Uses of Minerals: -Quartz, Quartzite, feldspar and stone available in the area are useful as road metal and masonry stone, glass, ceramics and other industries in and around NCR. Stone is having very good strength. The raw/lumps stone of the Bayal area is crushed as rori , chips, and dust/crushed stone in the nearby stone crushers. This material is finally used as road metal and for RCC material in building industry mostly in the NCR area.

3.6 Year wise exploration proposed to be carried out during the ensuing 5 years period.

No further exploration is required as the mineral is very well exposed laterally as well as depth wise. The mine has reached up to 300 mRL and no deviation of mineral is noticed. Reserves are sufficient to cater to the need of the proponent. Therefore no further exploration is needed/proposed.

CHAPTER -4
MINING

The lease area is being worked since June 2018 i.e. after getting the environmental clearance from designated authority. Further, it is proposed to continue systematic and scientific mining for extraction of minerals namely Quartz, feldspar, Quartzite and stone/building stone during the next plan period of Mining Scheme. At present fully mechanized method of mining by deploying heavy Earth moving machines and deep hole drilling and blasting by forming benches of 10 mx10 m from top downward is followed. It was proposed to mine 55, 00,000 MT per annum and the actual productions are as under

YEAR	STONE	QUARTZ	QUARTZITE	FELSPAR	TOTAL
from June 2018	306630.88	108611.6	0	112516.77	527759.25
2019	716919.31	539111.72	366488.56	210594.33	1833113.92
2020	760565.56	12.1	2107341.66	289.53	2868208.85
2021	636381.55	196.61	1455508.2	0.0	2092086.36
2022	1126539.35	302126.94	1968153.44	272208.96	3669028.69
2023 Jan to March	270266.36	65307.14	458034.28	66745.92	860353.70
Total Mineral Mined during plan period	3817303.01	1015366.11	6355526.14	662355.51	11850550.77

Proposed method of mining: The existing method of mining is proposed to be continued which is fully mechanised open cast method of mining. The working bench width is kept more than 10 m with pit slope of 60^0 and non working benches are kept 10x10 m. The same will continue by making the rectifications of existing benches by maintain the proper height and widths and further formation of systematic benches in mineral will continue. Haulage roads and ramps will

be further developed during the mining with combination of dozer,excavator,and dumpers. The underlying minerals will be excavated in benches of 10 m in depth in succession. The bench width is proposed to be kept more than 10 m in working benches having pit slope of 60^0 or more. Transportation of mineral/ stone is from face to consumer is being done by dumpers of 25-30MT capacity. About 2% waste is stacked in the yard proposed for it. About 5-7% low grade mineral is also generated during the mining which will be disposed off/ sold at consumer end.

Working for the next 5 years is proposed to be continued in both the blocks laterally as well as depthwise as shown in plan plate no to 5-9. Drilling & loading activities are proposed/done at present in three shifts.Blasting will be takenup in daylight hours only with all safeguards. Adequate lightning arrangements are/ and will be made by mobile portable lighting towers.

PRE-PRODUCTION ACTIVITIES:

As it is a working mine. No preproduction activities are required. Roads from lease boundary to top most entry to the mining area, from mining faces to the proposed dump area, from ground level to the mining area, to the mines office complex, plantation area, and to the garage / workshop have been developed. Access roads / haul roads from topmost bench to benches at lower levels have been developed. As mining operations advance to lower levels, larger face lengths and width shall be available. Face management, which is a continuous process, shall be taken into account to secure shortest (average) lead distance up to mine exit, waste dump yard and top soil dump as also to prevent clustering of dumpers. Following activities shall be undertaken during quarry development phase:

Removal of vegetation and top soil to expose mineral beds – It is a working mine and no such vegetation need to be removed

To make the access road to the mine working area.-All access roads are already developed. Pl. refer Plate no.3.Making of parapet wall/retaining walls along gradient of haul road.

Construction of mine office, first aid station, crèche, canteen, workshop and other ancillary infrastructural facilities have been undertaken during first plan period.

MINING OPERATIONS:

The mining operations will comprise of following activities for excavation of mineral.

Drilling of "Down-the-Hole" holes as per specified pattern.

Blasting of holes (only Primary Blasting)Loading of blasted material by deploying hydraulic excavators

Loading of broken material (in no blasting zone) by Rock Breaker and Terminator by deploying hydraulic excavators. Transportation of material to Crushers located outside lease area. Thus, these mining operations are proposed to be continued by fully mechanized opencast method utilizing Heavy Earth Moving Equipment (HEMM) in conjunction with deep hole drilling by crawler mounted DTH drills, blasting and by breaking of the rock (in no blasting zone) with the help of rock breaker and terminator. To start with benches shall be kept narrow and then gradually widened. To the extent possible, benches shall be kept along dip and advanced along the strike to give a fairly well blended material in each bench. The direction may be varied in due course based on experience gained, to give wider benches, longer faces and proper alignment along haul roads / ramps.

It was proposed in the last mining plan to adopt mechanized opencast mining method for exploitation of the mineral. Drilling, dislodging the mineral with help of explosive (primary blasting) and without use of explosive (with the help of terminator & rock breaker). Loading of blasted & broken up material with the use excavators and transportation with the help of dumpers.The same will continue during the next plan period.

Since there is certain inhabitations near the lease hold area, applicant has sought necessary permission from the Directorate General of Mines Safety under the Regulation 164 of MMR-1961 for conducting deep hole blasting. The contents of Regulation 164 of MMR-1961 are re-produced here below for reference purpose:-

164. Taking shelter etc. – 1(1) The blaster shall, before a shot is charged, stemmed or fired, see that all persons other than his assistants, if any, in the vicinity, have taken proper shelter and he shall also take suitable steps to prevent any person approaching the shot and shall himself take adequate shelter, along with his assistants if any, before firing the shots.

(1-A) in the case of an opencast working the blaster shall not charge or fire a shot (a) Unless he has taken the precautions laid down in sub-regulation (1). (b) Unless sufficient warning, by efficient signals or other means approved by the manager, is given over the entire area falling within a radius of 300 m from the place of firing (hereinafter referred to as the danger zone) and also he has ensured that all persons within such area have taken proper shelter, and (1-B) (a) In the case of an opencast working, where any permanent building or structure of permanent nature, not belonging to the owner, lies within the danger zone, the aggregate maximum charge in all the holes fired at one time shall not exceed two kilograms unless permitted in writing by the Chief Inspector of the Regional Inspector and subject to such conditions as he may specify therein :

Provided that if blasting is done with delay detonators or other means an that there is a delay of at least half a second between successive shots fired, a maximum charge of two kilograms can be used in each hole;

no blasting shall be done except with the permission in writing of the Chief Inspector or the Regional Inspector and subject to such conditions as he may specify therein. Further, in compliance of Ministry's Office Memorandum No. Z-11013/57/2014-IA.II (M) dated 29.10.2014, it is proposed to undertake vibration studies (within 500 m of such site vulnerable to blasting vibrations) through competent agency for evaluation of zone of influence and impact of blasting on the neighborhood. Blasting/Vibration study report will be submitted to the Directorate General of Mines Safety and according to the permission/approval from DGMS, the blasting pattern shall be followed up.

Note: Danger Zone as mentioned above is now changed to 500 meters as per DGMS circular No. DGMS (SOMA)/(Tech)Cir.No.2 of 2003 dated 31.01.2003.

4.1 PIT DESIGN PARAMETERS:-

In view of the geological setting of the deposit it is proposed to work the mine by machines open cast mine using shovel and dumper combination. The rate of production is proposed 55, 00,000 MT/ year by the following mentioned parameters so that not only the production is achieved but mine also takes a proper / regular shape and size .

It is proposed to work the mine by 3.5 cubic meters Hydraulic Excavators with combination of Hydraulic Breaker and Hydraulic Terminator Equipment and 25 tones dumpers with bench height 10 m and width 10 m

Sr.no	Particulars	Dimensions with unit
1	Bench Height and width	10 mx10 m
2	Ultimate pit slope	45^0
3	Face length	All along the strike length
4	Bench Alignment and bench slope	Parallel to each other; 80^0
5	Depth of pit.	85 m
6	Blast hole diameter	110 mm
7	Inclination of blast hole	Vertical
8	Gradient of haul Road	1 in 16

Ultimate pit slope: -

The quartzite rock is hard and compact. Once the pits reach the ultimate limit, it is necessary that it does not start collapsing due to weathering and other effects. This can be achieved by planning ultimate pit slope at a maximum of 45 degree to avoid collapse of the pit sides. There is no overburden except a thin sol cover. Entire mineral produced will be useful.

Bench height and width

Since the host rock quartzite is hard and compact, the same parameters are considered for making benches.

In view of mechanized method of mining to be adopted, the bench height is proposed 10 mtrs and bench width 10 mtrs.

Formation of benches in this manner will result in an overall safe slope of 45^0 or less in the ultimate pit position.

Face lengt :-

The following parameters have been followed to arrive at the face length to facilitate the required production of 55, 00, 000 MT (ROM) per annum.

Since only two pits are developedin the area to obtain targeted production, the optimum face length available along the strike length is sufficient to cater to the optimum production required. The face length will attain the maximum face length on closure of mining operations.

Bench alignment: -

The benches are gradually aligned in a regular shape. In general the benches will advance in all directions parallel to each other. Since geological formation in the area are of simple nature, there will not be difficulty in maintaining the proposed bench alignment.

Depth of pit:

The reserves are calculated up to 280 MRL for Quartz , Feldspar and quartzite are sufficient to cater the needs of the applicant. Workings are proposed up to 280mRL during the next 5 years. Further the water table is about 92-95 m below the general ground surface. It is proposed to keep the working 2 m above the water table in line with theMineral Concession Rules & conditions laid down in EC.

In order to exploit optimum mineral with proper mine safety the benches in minerals are of 9.00 m height and width will be 15-20 m , the same will continue during the next plan period.

4.3 DEVELOPMENT DURING THE NEXT FIVE YEARS:

No Pre- production development work is required as it is a working mine.Workings are already started from top downwards .Roads have been aligned to reach the mine for mining. Working is going on in North and south blocks. The gradient of the road was proposed 1:16 which is maintained. The construction of garland parapet, wire fencing etc, are provided yearwise.Provision of stack yard for mineral is not proposed as the same is loaded and transported directly to the consumers. However low grade mineral is produced/generated during mining.It has not been dispatched due to slump in rates. Same is proposed to be sold in due course of time. About 2-3 Waste is generated and the same is stacked.

Stack yard is properly maintained. A boundary wall around soil stack yard shall be made. Stack yards shall be stabilized by plantation, garland drains will be provided at the bottom of the dump and stone masonry wall will be erected for arresting the sediments.

Dump yard	Size	Location
Waste dump Yard	290m x 80 m	NW side Near pillar no.23,24,
Soil dump Yard	80m x 40 m	NW side Near pillar no.S 62

Working area occupied at the end of 5th year mining is= (13.39) Hectares

A part from the stations site service have been developed as shown in surface and geological plan plate no.3which include construction of manager's office, Crèche, Canteen etc.

Approach road from mine to mineral stack yard, soil stack yard and dump yard and site services have been developed.

Sr.No	Year	Bench Level in north block	Bench levels in north block south of main road	Bench levels south block	Production MT
1	1st year	435 to 295mRL	363 -323mRL	426 to 356 mRL	55,00,000
2	2nd year	435 to 295mRL	363 -313mRL	426 to 346 mRL	55,00,000

3	3rd year	435 to 295mRL	363 -303mRL	426 to 336 mRL	55,00,000
4	4th year	435 to 295mRL	363-293mRL	426 to 326 mRL	55,00,000
5	th year	435 to 295mRL	363 -283mRL	426 to 316 mRL	55,00,000

Year wise Production & Development for the next Five years

The general surface level within the area selected for mining is varying from 363 mRL to 435 mRL. The terrain is hilly with scanty vegetation.

Individual Year wise plan and sections

The position of mine workings and dump at the end of 1st year to5th year along with sections are shown in plate no. 5 to 9.

SUMMERY OF YEARWISE PRODUCTION OF MINERAL & REJECT DURING 5 YEARS (In MT)

Year	QUARTZ (TPA)	FELDSPAR(TPA)	QUARTZITE/STONE(TPA)	Waste/Reject (TPA)	Total Production (ROM) (TPA)	Soil (Tonne)
1st year	5,00,000	2,50,000	47,00,000	50000	55,00,000	5000MT
2nd year	5,00,000	2,50,000	47,08,000	42000	55,00,000	3500MT
3rd year	5,00,000	3,00,000	46,64,000	36000	55,00,000	3000MT
4th year	5,00,000	4,00,000	45,66,000	34,000	55,00,000	1000MT
5th year	6,00,000	4,00,000	44,69,250	30,750	55,00,000	500MT

4.4.2 Proposed rate of production when the mine is fully developed

As it is aimed to prepare this Mining Plan for 55, 00,000 T (ROM) per annum. The required rate of production shall be achieved by the end of 1st year of plan period. Further quantum of production will depend upon the market demand of mineral.

4.4.3 Mine able Reserves and Anticipated Life of the mines

As discussed in the chapter of geology, the Mineable reserves are calculated as 13, 27, 61,054 T .Lease is up to July, 2052. The production targets for next are proposed @ 55, 00,000MT.However the market demand plays a major role in achieving the production.

Life of the mine @55, 00,000 MT/year=13, 27, 61,054/5500000=24 years

4.4.4 Proposed Method of Mining

The present mining operations are going on and further proposed to be continued/ carried out by open cast mining means. The entire mining operations proposed are mechanized. Apart of mining, the loading and transportation up to stack yard shall be done mechanically. It is proposed to load the mineral in the trucks/dumpers directly to the destinations and mineral is not put up in this stack yard to avoid the double handling. In the present operation the bench height shall be 10 mtrs. Each bench will advance one by one. While carrying out the mining operations in accordance with the above provision the overall pit slope shall be maintained the 450 the mineral bearing rocks being hard and compact.

(Refer Chapter 4 of first mining plan and modified mining plan) .Details of Mining Method, working days, per day proposed production, Requirement of excavator- dupers, drilling machines, blasting method etc and other allied machineries are elaborated in the first mining plan and modified mining plan. The same procedure is proposed to be followed to do scientific mining of mineral.

As per MMR 1961, following precautions shall be undertaken during operations of HEMM.

Shovel/ excavator: -

1. Excavators will be provided with efficient warning devices, front & rear lights and efficient brakes.
2. Excavator will be under the charge of a competent person authorized in writing by the manager designated as operator.
3. No person other than the operator or his helper if any will ride on the excavator or even enter the excavator's cabin.
4. No person will be permitted to ride in the bucket of a Shovel/ excavator.
5. No inflammable material will be stored in the excavator housing or cab.
6. Shovel/ excavator dippers will be lowered to the ground during greasing operation.

7. When a Shovel/ excavator is to be moved from one point to another its boom shall be kept in strict alignment with direction of travel while the bucket/ dipper shall be held m above the ground.
8. No Shovel/ excavator will be operated in the position where any part of the machines, suspended loads or lines are brought closer than 3 m to the exposed high voltage line.
9. Every movement of a Shovel/ excavator shall be preceded by warning signals.
10. When not in use, the Shovel/ excavator will be moved to and stood on stable ground, the bucket shall be kept resting on stable ground and will never be left hanging.
11. The Shovel/ excavator will be so spaced that there will be no danger of accident from flying & falling objects.
12. Safety appliances, booms will be examined thoroughly once in a year.
13. Emergency switches, safety limit switches will be examined and tested once in four months.
14. All brakes will be tested for their operation worthiness once in a week.
15. The following signboards will be carried in and around the machine: -

(i) "Warning— Do not enter the working Range of the Machine".

(ii) "Lubricating Prohibited While the Machine in Running Condition".

Duties of Shovel/ excavator operator: -

1. At the commencement of every shift the operator will personally inspect and test the machine, paying special attention to the following details: -

(i) The brakes and every warning device are in working order.

(ii) Lights are in working order.

(iii) The operator will neither take out the machine for work nor will he work the machine unless he is satisfied that it is mechanically shown and in efficient working order.

(iv) The operator will maintained a record of every inspection made in a bond paged book, kept for the purpose and shall sign every entry made there in.

(v) The operator will keep the cab window clean so as to ensure clear vision at all times.

(vi) The operator will not operate the machine when persons are in such proximity as to be endangered.

(vii) Before leaving the machine, the operator will lower the bucket to the ground.

(viii) The operator will not leave his machine during the shift. Whenever, he finishes his work, he will hand over the machine to his relief or lock the excavators cab.

(ix) The operator will not allow any unauthorized person to ride on the machine.

Dumper: -

1. Every dumper will be provided with efficient brakes.
2. Efficient audible warning devices will be provided with the dumpers.
3. The dumper, if required to work after daylight hours, efficient headlights and taillights will be used.
4. Every dumper will be under the charge of a competent person, authorized in writing by the manager.
5. No person, other than the driver or his helper, if any, will ride on a dumper.
6. No person will be permitted to ride in the running board of a dumper.
7. The loaded dumpers will not be reversed on gradients.
8. Sufficient stop blocks will be provided at every tipping point and these will be used on every occasion when material is dumped.
9. Standard traffic rules shall be adopted and followed during movement of all dumpers. They shall be prominently displayed at relevant places in the opencast workings and haulm roads.
10. When not in use, every dumper will be moved to and stood on proper parking places.
11. No person will be permitted to work on a chassis of a dumper, with the body in rest position, until after the dumper body has been securely blocked in position.
12. The mechanical wised mechanism will not be depended upon to whole the body of a dumper in a rest position.
13. No unauthorized person will be permitted to enter or remain in any turning points.
14. While inflating tyres, suitable protective cages shall be used.
15. Tyres will never be inflated by sitting either in the front or on the top of the same.
16. While the vehicle is being loaded / unloaded on gradient, the same will be secured stationary by the parking brake, and other means suitably designed stopper block, which could be placed below the tyres.

17. At least once in every two weeks the brakes of every dumper will be tested as below: -

(a) Service Brake test: - The brake will be tested on a specified gradient and speed when the vehicle is fully loaded. The vehicle should stop within the specified distance when the brake is applied.

(b) Parking brake test: - The parking brake shall be capable to hold the vehicle when it is fully loaded and placed at the maximum gradient. Maximum gradient of the roadway which is permitted only for a period of at least 10 minutes.

(c) A record of such test will be maintained in a bound paged book and will be signed by the competent person carrying out the test. These records will be countered signed by the engineer and manager.

(d) All vehicles shall be tested and examined once at least in every 6 months.

(e) A notice shall be displayed outside every vehicle that **"No Unauthorized Travelling Allowed".**

Duties of dumper operators: -

1. At the commencement of every shift, the operator shall personally inspect and test the machine, paying special attention to the following details: -

(i) Tyre pressure, brakes, horn and the Lights are in working order.

(ii) The driver will neither take out the machine for work nor will he work the machine unless he is satisfied that it is mechanically shown and in efficient working order.

(iii) The driver will maintained a record of every inspection made in a bound paged book, kept for the purpose and shall sign every entry made there in.

(iv) The driver will keep the cab window clean so to ensure clear vision at all times.

(v) Driver will ensure that the gear is in neutral position before stopping the engine. He will park the vehicle: -

(a) In reverse gear, on level roads and down gradients.

(b) In low gear, on up gradients.

(vi) The driver will negotiate downhill gradients in low gear, so that minimum of braking is required.

(vii) The driver will not drive too fast, avoid distractions and drive defensively.

(viii) Before crossing a road / railway line he will reduce his speed looking both directions along the road or railway line and will proceed across the road or line only if it is safe to do so.

(ix) The driver will not operate the dumper in reverse unless he has a clear view of the area behind the vehicle.

(x) The driver will see that : -

(a) The vehicle is not overloaded.

(b) The material is not loaded in a dumper so as to project horizontally beyond the sides of its body.

(xi) The driver will not allow any unauthorized person to ride on the vehicle.

(xii) When there is a poor visibility, the speed of a vehicle will be restricted in a manner that the braking distance is maintained shorter the distance of visibility.

(xiii) The driver will not leave his machine during the shift. When he finishes his work, he will hand over the machine to his reliever or lock the excavators cab.

4.5 Conceptual mine plan parameter:

During the first 5 years mining will be done in north and south blocks by mechanized method of mining forming 10 m high and 10 m wide benches and protective work and blasting studies for the safety of the nearby habitation will be carried out in the North Block.

In view of the proposed planned production of 55, 00,000 MT (ROM) per annum the life of the mine is calculated 24year. However the life may vary depending on the demand and the quality and reserves of the deposit.

The production targets as proposed the approved mining plan were followed. Necessary permission for mechanized mining under MMR'1961from competent Authority has already obtained. The same will continue in the next five year plan also. The formation of benches shall be continued up to the ultimate pit limit after the drilling and blasting of the bench. The boulders shall be sized with the help of rock breaker, excavated and loaded in the trucks/ dumpers by hydraulic Excavators. The mining operations will continue as were done during the last five years .It will comprise of following activities for excavation of mineral as were proposed in the approved mining plan detailed as under.

a) Drilling of "Down-the-Hole" holes as per specified pattern.

b) Blasting of holes

I) Primary Blasting

II) Secondary Blasting – No secondry blasting proposed. Rock breakes will be used to size the bgboulders .Loading of blasted material by deploying hydraulic excavators

c) Transportation of material to Crushers/desinations

4.5.1 Drilling and blasting operations required to blast / dislodge the host rock as well as stone will be undertaken with the help of 110 mm dia crawler mounted drill machine with following drilling and blasting pattern :-s

Sr.no	Particulars	Dimensions with unit
1	Bench Height and width	10 mx10 m
2	Working Bench Width	15-20m
3	Overall Ultimate pit slope	49^{0}
4	Bench Alignment and bench slope	Parallel to each other; 60^{0}
5	Face length	All along the strike length
6	Depth of pit (Below General Ground)	80 m at the end of 10^{th} year
7	Blast hole diameter	100-110 mm
8	Inclination of blast hole	Vertical
9	Width of Haul Road	12m
10	Gradient of haul Road	1 in 16

The detailed mining parameters proposed are as under

Sr.No.	Iteams	Details
i	Method of mining with bench parameters	It is A category open cast mecanised mine with deep hole drilling and blasting. Mining from top to bottom is proposed. Bench height is proposed 10 m in mineral and non working bench width is proposed to be kept more then 10 m.
ii	Drilling	Will be done by 100-110 mm wagon drills 10 m with 10% sub grade drilling. The drilling pattern will be 4mx5m as burden and spacing. The holes will be drilled in rows. Power factor is kept 6.0.
iii	Blasting	Blasting is proposed in day light time. each10 m hole will be charged with 75kg of explosive which will comprise of class II explosive. Non electric ignition delay station NONEL will be used for delayed detonation
iv	Excavation	Excavation is being done by deploing heavy earth moving machinery by making 10 m heigh and more than 10 wide benches. The heigh walls will be kept at 85° inclinations. Face will advance in north to south direction. With the help of shoal,dumpers, dozers, tippers, hydrolicrockbreakers and water sprinklers

		etc.
v	Loading	Loading is proposed by deploying showel,dumpers and tippers etc.
vi	Transportation	Mineral and waste/ associated minerals is being transported by dumpers,tippers loaded by excavators/loaders.
vii	Crushing/screening	No crushing proposed within mine
ix	Ultimate pit limit	282 mRL

Ultimate Size of the pit:

The size of the pits at the conceptual stage in the North block will cover an area of 10.48 h pit in the north of ODR and 9.44 hectares in the south of ODR respectively.

The size of the pit at the conceptual stage in the South block will cover an area of 42.94 hectares..

Final Slope angle:

The deposit dips at 64° to 75° towards south - east. The final slope angle will be 45°.

Ultimate Capacity of dumps:

The quartz, feldspar quartzite and stone are very well exposed, except overburden and inter mixed. The size of the dump during the five years will be about 2.64 hectares up to 6m height.

Post Mining Reclamation plan including a forestation:

Plantation at 3mx3m grid is done and will continue further. Total 9.36 hectares area will be planted. 1870 nos of plants will be planted annually for the next five years. Saplings will be selected with the consultation of Forest Department. Thus total of 9360 nos of plants are proposed during plan period.

Extent of Mechanization

4.5.1 Drilling

It is proposed to use drill machines of 110 mm dia. As per the production target of about 18,333 MT (6790 M^3per day),

a) Tonnage of mineral excavated per hole = 10 m x 4m x 5m x 2.7= 540 T

b) No. of holes required per day= 18333 T/540 T = 33.95 or say 34 Nos

c) Total meter age of drilling/day= 34 holes x10 =340 m

d) Capacity of each drill machine= 10 m per hour or 80 m per shift or 160 m per day

It is estimated that about 34 holes of 10 m depth per day, 340 m drill meter age will be required to maintain the proposed production targets . Therefore at least (three in working ad one stand by) four drill machines of higher drilling rate with availability of 75% of time as well and 70 % utilization hours will be required

The details of machinery and performance will be as under

Sr.no	Details	
1	A machine can drill total of meters in a shift	100-110 m
2	Total drill meters required per day	340 m
3	Total no of machines required per day	3
4	Stand by drill machine	1
5	Total no of machines required	4

Loading Equipment, Haulage and other mining Machinery

The productivity of excavator is decided based on the following consideration i.e. two shifts per day working and 300 working days in a year

	Excavator Category	Capacity
A	Diesel hydraulic shovel	3.5 m3
B	Fill Factor	85 %
C	Tonnage Factor	2.70
D	Availability of excavator	80 %

E	Utilization of excavator	60%

Standard annual productivity of Excavator

Sr.no	Type of excavator	No. of shift
1	3.5 m3 Diesel hydraulic shovel	6
2	25 tonne rear dumper	40

Therefore, the requirement of HEMM i.e. Hydraulic Excavator, Hydraulic Breaker, Terminator Hydraulic Equipment, dumpers, drill machines and dozers have been estimated based on the adopted productivity norms and workload determined by the calendar plan . For calculation of number of dumpers it is the lead from the mine to the destination which will determine the no of dumpers. At least 40 no. of dumpers at an average lead of 2-5 Km will be needed which are already provided by proponent. Considering 55,00,000 MT (ROM) production it proposed to deploy Two hydraulic shovel in conjunction with 40 no. of 25 T dumpers along with two back hoe with combination of Hydraulic Breaker and Terminator. Thus the total population of equipment required will be as under

S. No.	Equipment	Size	Nos
1	Diesel hydraulic Excavator	3.5 cu.m	2
2	Diesel back hoe	3.5 cu.m	2
3.	Hydraulic Breaker		1
4	Terminator Hydraulic Equipment		1
5	Rear dumpers	25T	40
6	Drill	110 mm	5
7	Track chain Dozer	440 HP	1
8	Grader	145 HP	1
9	Crane	40T	1
10	Heavy duty tow truck		1
11	Water tanker with sprinkler & mist generator system	10 KL	4
12	Maintenance van		1

S. No.	Equipment	Size	Nos
13	Tractor	50 HP	1
14	Tractor mounted compressor	80 HP	1
15	Ambulance		1
16	Jeep/Van	Mahindra	2

Quantity of Diesel / Energy fuel Consumption per day: -

S. No.	Equipment	Size	Nos	Total fuel requirement per day
1	Diesel hydraulic Excavator	3.5 cu.m	2	720
2	Diesel back hoe	3.5 cu.m	2	720
3.	Hydraulic Breaker		1	300
4	Terminator Hydraulic Equipment		1	200
5	Rear dumpers	25T	40	1600
6	Drill	110 mm	5	810
7	Track chain Dozer	440 HP	1	144
8	Grader	145 HP	1	144
9	Crane	40T	1	50
10	Heavy duty tow truck		1	50
11	Water tanker with sprinkler & mist generator system	10 KL	4	250
12	Maintenance van		1	30
13	Tractor	50 HP	1	30
14	Tractor mounted compressor	80 HP	1	50

S. No.	Equipment	Size	Nos	Total fuel requirement per day
15	Ambulance		1	10
16	Jeep/Van	Mahindra	2	20
				5128

Any change in the proposed method of mining, drilling and blasting and development of machinery, if so, give details.

The mining is undergoing with mechanized methods of miming and the same will be continued during the next 5 years. No other changes proposed for drilling and blasting.

CHAPTER-5

BLASTING

5. 1 BLASTING PARAMETERS:-

For mining of Quart, Feldspar and Quartzite/stone, drilling and blasting is required. The job of drilling and blasting is of continues nature.

Considering the time frame of mining and total requirement of material, the daily mineral production comes out to 18,333 MT (6790 m3) The above target will be utilized to frame the pattern and size of blast. The blasting parameters are described as below.

Bench height	10 m
Hole depth	10.5m
Hole Diameter	100-115mm
Loading density	8.5 Kg/m
Burden	4m
Spacing	5m
Charge factor	0.5kg/m3
Charge per hole	85 kg
Top Stemming	3m
Volume per hole	200 m3
No. of holes per round	34
Total Explosive to be fired per round	2890 kg
Explossiverequirement per month@6.0MT/kg	76389 kg
Yearly Requirment	916666 kg

The calculation of explosive is done for planned production of 55, 00,000 Tonne (ROM)/Annum. The explosive quantity may reduce proportionately where hydraulic breaker or terminator hydraulic equipment is deployed as these equipment will dislodge the mineral by drilling and hammering actions and no explosives shall be used.

5.2 TYPE OF EXPLOSIVES

Emulsion- Primer charge (20% of charge per hole)

Slurry Explosive--- column charge 80 % of charge per hole Initiation System and minimum charge per delay

Delay ---------- milliseconds delay detonators

Drilling pattern ------ staggered

Firing pattern------- V pattern

5.3 STORAGE OF EXPLOSIVE

The company will construct a licensed magazine for storage of explosives at suitable location. The capacity of the explosive magazine will be:-

Explosive class 220 T.

Detonators 10000 Nos.

fuse 30000 meters

The required permissions shall be obtained from the Explosive Controller under the Indian Explosive Act-1882.

OR

Alternatively, preferably, project proponent may purchase and use the required quantity of explosives from the near bye licensed explosive magazine.

The explosive will be transported by licensed explosive from the magazine to blasting site.

PRECAUTIONS TO BE TAKEN IN STORAGE, HANDLING AND USE OF EXPLOSIVES:

All precautions regarding storage, handling and use of explosives will be followed as per the conditions laid down in Metalliferous Mines Regulations, 1961 and Explosives Act, 1983 and Explosives Rules 1984.

PROTECTIVE EQUIPMENT:

Dust will be generated while drilling shot holes. It is proposed to provide protective equipment such as respirators, goggles, muffles etc. to the operators of drill machines and compressors.

RELEVANT PROVISIONS UNDER MMR-1961 REGARDING BLASTING

Regulation160. Blasters –

The preparation of charges and the charging and stemming of holes shall be carried out by or under the personal supervision of a competent person, in these regulations referred to as a 'blaster'. The blaster shall fire the shots himself.

No person shall be appointed to be a blaster unless he is the holder of Manager's, Foreman's Mate's or Blaster's certificate.

The manger shall fix, from time to time, the maximum number of shots that a blaster may fire in any one shift; and such number shall not unless the Regional Inspector by an order in writing and subject to such conditions as he may specify therein otherwise permits, exceed 80 in case they are fired electrically or by means of an ignite cord and 50 in other cases, and shall be based upon –

the time normally require to prepare and fire a shot in accordance with the provisions of these regulations;

the time required for that blaster to move between places where shots are fired;

the assistance, if any, available to him in the performance of his said duties; and

any other duties assigned to him, whether statutory or otherwise :

Provided that the Director General of Mine Safety may, by an order in writing and subject to such conditions as he may specify, permit the manager to fix the maximum number of shots to be fired by a blaster differently from the limits specified in this sub-regulation.

The number of detonators issued to, and in the possession of, a blaster during his shift shall not exceed the maximum number of shots that he is permitted to fire under sub -regulation (5).

Regulation: 161 Shotfiring tools –

1 Every blaster on duty shall be provided with –

a suitable electric lamp or torch ;

b a tool, made entirely of wood, suitable for charging and stemming shot holes;

c a scraper made of brass or wood suitable for cleaning out shot holes;

d where fuses are used, a knife for cutting off fuses an, unless machine capped fuses are provided, also a pair of suitable crimpers for crimping detonators; and

e where detonators are used, a pricker made of wood or a non-ferrous metal for priming cartridges.

2 No tool or appliance other than that provided as above shall be used by a blaster.

Regulation 162. Drilling, charging, stemming and firing of shot holes –

No drill shall be used for boring a shot hole unless it allows a clearance of at least 0.3 centimeter over the diameter of the cartridge of explosive which it is intended to use.

No shot hole shall be charged before it is thoroughly cleaned.

Before any shot hole is charged, the direction of the hole shall, where practicable, be distinctly marked on the roof or other convenient place.

No detonator shall be inserted into a priming cartridge until immediately before it is to be use. Detonators once inserted into a priming cartridge shall not be taken out.

Unless otherwise permitted by the Chief Inspector by an order in writing and subject to such conditions as he may specify therein, the charge in any shot hole shall consist of one or more complete cartridges of the same diameter and the same type of explosive.

The blaster shall, to the best of his judgment, ensure that no charge in a shot hole is over-charged of under-charged, having regard to the task to be performed.

No shot hole shall be fired by a fuse less than 1.2 meters in length.

Every shot hole shall be stemmed with sufficient an suitable non- inflammable stemming so as to prevent the shot from blowing out. Only sand loosely filled in, or soft clay lightly pressed home, or a compact but not hard mixture of sand and clay or water shall be used as stemming.

In charging or stemming a shot hole, no metallic tool, scraper or rod shall be used; an no explosive shall be forcibly pressed into a hole of insufficient size.

No shot shall be fired except in a properly drilled, charged and stemmed shot hole.

All surplus explosives shall be removed from the vicinity of a shot hole before a light is brought near it for the purpose of lighting the fuse.

As far as practicable, a shot shall be fired by the same blaster who charged it.

In any mine in which explosives other than gunpowder are used, every shot shall, if so required by the Regional Inspector, be fired electrically.

No more than 10 holes shall be fired in one round unless they are fired electrically or by means of an igniter cord.

No shot hole shall be charged except those which are to be fired in that round; and all shot holes which have be charged shall be fired in one round.

Where a large number of shots have to be fired, a shot firing shall, as far as practicable, be carried out between shifts.

No person shall remove any stemming otherwise than by means of water or an approved device, or pull out nay detonator lead or remove any explosive from any charged shot hole.

Regulation 163 Electric Shot firing: – Where shots are fired electrically, the following provisions shall have effect, namely:-

No shot shall be fired except by means of a suitable shot firing apparatus; and the number of shots fired at any one time by the apparatus shall not exceed the number for which it is designed.

Every electrical shot firing apparatus shall be so constructed and used that –

i it can only be operated by a removable handle or plug. This handle or plug shall not be placed in position until a shot is about to be fired and shall be removed as soon as a shot has-been fired; and

ii the firing circuit is made an broken either automatically or bymeans of a push-button switch.

No apparatus shall be used which is defective; an every apparatus shall m once at least in every three months, be cleaned an thoroughly overhauled by a competent person.

2 No current from a signalling, lighting or power circuit shall be used for firing shots.

3 The blaster shall –

(a) retain the key of the firing apparatus in his possession throughout his shift;

(b) use a well- insulated cable of sufficient length to permit him to take proper shelter, and in no case, shall this cable be less than 20 meters in length;

(c) Before coupling the cable to the firing apparatus, couple up the cable himself to the detonator leads;

(d) Take care to prevent the cable from coming into contact with any power or lighting cable or other electrical apparatus;

(e) Take adequate precautions to protect electrical conductors and apparatus from injury;

(f) Himself couple the cable to the firing apparatus; an before doing so, see that all persons in the vicinity have taken proper shelter as provided under regulation 164; and

(g) After firing the shots and before entering the place of firing, disconnect the

Cable from the firing apparatus.

4 Where more than one shot are to be fire at the same time:-

(a) Care shall be taken that all connections are properly made;

(b) All shots if fired belowground shall be connected in series;

(c) The circuit shall be tested either for electrical resistance or for continuity before connecting it to the firing apparatus. Such a test shall be made with an apparatus specifically designed for the purpose and after the provisions of regulation 164 have been complied with; and

(d) The cable to the shot firing apparatus shall be connected last.

GROUND VIBRATION CONTROL MEASURES IN DEEP HOLE BLASTING:

Whenever a blast is conducted the vibration is felt in the form of ground vibration. The ground motion is essentially a wave motion. The particles of the ground through which the blasting/sound wave travels, set themselves to oscillating motions with respect to their rest positions. These waves can affect buildings and structures by forming visible cracks on the surface, because of compression and tension waves and through vertical and horizontal shearing effects. The peak velocity is defined as the rate of change of the amplitude of the particle, which is measured in " millimetres per second". The Peak Particle Velocity (PPV) existing in a place will give an idea as to how powerful the vibration effects are at that location. The peak particle velocity limit for buildings with concrete are 50 millimetres per second.

The limits of PPV in different structures are as under. These are the recommended values by researchers throughout the world. These vibrations due to blasting can be controlled with following measures:

The charge of explosive per hole shall be optimized and be limited to minimum.

During blasting care shall be taken such that the explosive blasted per delay is minimum. This will not only control the vibrations but also will produce good blast results like minimum back break, good heap, less flying fragments.

Blasting practices like plaster shooting shall be avoided to reduce noise, vibration and flying fragments. It is proposed to deploy hydraulic rock breakers to break big boulders.

The vibrations that any structure receives shall be kept minimum and measurements shall be taken frequently.

To reduce the vibrations of heavy earth moving equipment, preventive maintenance of machinery is recommended so that moving parts of machinery are not loose and mountings are of rubber as far as possible.

The machine operators shall be trained to run the machine smoothly such that the vibrations generated due to rough operations are minimized. For example, rough operation of down-the-drill machine produces huge vibrations.

A computer model for blast design to be designed taking into considerations the parameters like spacing, burden, bench height, decking, stemming, sub-grade drilling, angle between floor and free face, angle between floor and hole axis, delay time in seconds between rows.

Optimum considerations of explosive parameters related to the energy per unit length of the explosive column. The lateral resistance parameters reflect the lateral resistance to motion from blocks on either side of block for a given site; this value is a function of blast hole spacing. This parameter ranges from 0.1 to 1.0.

Another parameter is Delay Parameter. This parameter is the site constant value. This is used to take into account the movement of overburden rock, which is affected by delay time and its value varies from 0 to 1.

Note: In addition to above study from CMRI or other reputed institute will also be conducted at two locations for blast vibration monitoring and recommendation of the same will also be followed for control of ground vibration. In addition to this permission from DGMS will also be obtained for blasting and condition stipulated by DGMS in its permission will be implemented.

FLYING FRAGMENTS AND ITS CONTROL MEASURES:

The flying fragments in any mine are caused due to either overcharging or inadequate front row burden or loose stemming. It is found in most of the cases that the flying fragments have high trajectory velocities, by which the pieces of blasted rock are thrown much beyond the danger zone. These flying fragments can be reduced optimizing explosive charge per hole and by conducting muffle blasting.

The geological disturbances and the fissures are one of the reasons of fly rock. It is important to map fissures and joints that can cause problems during drilling and blasting.

To minimize the risk of fly rock, drill holes shall be set out as accurately as possible.

It is very important to follow charging as per design, bottom charge shall be of correct length and the column charge must have the correct charge concentration, appropriate length of stemming be used.

During initiation, using interval time higher than 100 milli seconds between drill holes shall be avoided.

Top initiation shall be avoided as from field observations it is evident that the probability for collar fly rock is greater.

Precautions are required to undertaken to prevent over confined holes, partial ignition failure where a hole in a next row is ignited without the rows in front being ignited, invariably results in greatly increased fly rock.

Where fly rock is likely to eject in spite of all precautions and if blasting required to be done in vicinity of village where danger zone is less than 500 mts, then covering/muffling of holes from sand bags or holes covered with strong net weighed with gunny/sand bags to be used to arrest fly rocks.

Note: In addition to above study from CMRI or other reputed institute will also be conducted at two locations for blast vibration monitoring and recommendation of the same will also be followed for control flying fragments. In addition to this permission from DGMS will also be obtained for blasting and condition stipulated by DGMS in its permission will be implemented.

CHAPTER-6
MINE DRAINAGE

6.1 GENERAL:

Open cast mining projects requires effective arrangements for drainage and provision of adequate dewatering capacity in the pits under mining. In the area under mining water can reach the workings from surface drainage, rainwater and due to seepage through joints and fissures. Therefore, the problem can be solved by preventing drainage water from entering the pits on one hand and pumping out the percolated and direct rain water from the pits on the other hand. The general water table around the lease area at 95 meters below ground.

6.2 DRAINAGE AROUND AND WITHIN MINE:

The proposed area is hilly terrain. The mining area will become a depression during the next five years, which warrant accumulation of water during rainy season. A plan is proposed to prevent the accumulation of such water.

1) Drainage as shown in the mine plan (plate no 5-10) shall be made all round the pit to prevent the entry of surface/ rain water inside the pits.

2) All the benches will be provided with mild inward slope to keep the benches in drained condition. Provision of sumps is provided as shown in plate No 5-9. The lowest bench shall be slightly sloped towards the sump so that the entire drain water goes to the sump.

3) The working faces will be advanced with a mild upward gradient to facilitate the drainage. The water shall be gradually drained from the upper most bench to the lowest bench and then ultimately to the sump.

4) Similarly in the ultimate pit position, large sump will be provided at the pit bottom to accumulate drained water as well as direct rain water.

A few bore wells (4Nos) are proposed to be drilled up to 150m deep and 10 inches diameter areproposed to be drilled in the bottom most levels of the pit to facilitate the faster recharging of water table during the monsoon period when the water is accumulated in the mine. The locations of bore wells are shown in the progressive mine closure plan plate no.11. Necessary filters will be provided to stop the chocking of the bore wells. Specialized designs will be erected around the bores to stop the clogging due to silt and clay material in to the bore well.

6) Following measures shall be taken to prevent fall of side as per mine statute.

Provisions under MMR 1961 regarding Mine Workings (Slope angle, fall of sides, overhangs etc)

Regulation 106. Opencast workings –

In opencast workings, the following precautions shall be observed, namely: -

1 In alluvial soil, morum gravel, clay, debris or other similar ground -

(a)

(i) the sides shall be sloped at an angle of safety not exceeding 45 degrees from the horizontal or such other angle as the Regional Inspector may permit by an order in writing and subject to such conditions as he may specify therein; or

(ii) the sides shall be kept benched and the height of any bench shall not exceed 10.0 mtrs meters and the breadth thereof shall not be less than the height:

Provided that the Regional Inspector may, by an order in writing and subject to such conditions as he may specify therein, exempt from the operation of this clause any working in the case of which special difficulties exist, which in his opinion make compliance with the provisions thereof not reasonably practicable; and

(2)

(a) Where 'float' or other similar deposit is worked by manual means on a sloping face, the face shall be benched and the sides shall be sloped at an angle of not more than 60 degrees from the horizontal. The height of any bench shall not exceed six meters and the breadth thereof shall not be less than the height: Provided that where the ore-body consists of comparatively hard and compact rock, the Regional Inspector may, by an order in writing an subject to such conditions as he may specify therein, permit the height of the bench to be increased up to 7.5 meters while its width is not less than six metres:Provided further that in case of a mine or part where special difficulties exist, the Chief Inspector may, by an order in writing an subject to such conditions as he may specify therein, relax the provisions of this sub-regulation.

(b) Where in any mine or part it is proposed to work by a system of deep-hole blasting and/or with the help of heavy machinery for its digging, excavation and removal in such manner as would not permit of compliance with the requirement of sub-regulation (1) the owner, agent or manager shall, not less than 60days before starting such work, give notice in writing of the method of working to the Chief Inspector and the Regional Inspector; and no such work shall be commenced or carried out except in accordance with such conditions as the Chief Inspector may specify by an order in writing. Every such notice shall be induplicate, and shall give the details of the method of working including the precautions that are proposed to be taken against the anger from falls of sides and material

3 In an excavation in any hard and compact ground or in prospecting trenches or pits, the sides shall be adequately benched, slopped or secured so as to prevent danger from fall of sides.

4 No tree, loose stone or debris shall unless otherwise permitted in writing by the Chief Inspector be allowed to remain within a distance of three metres from the edge or side of the excavation.

5 No person shall undercut any face or side or cause or permit such undercutting as to cause any overhanging.

6.3 DEWATERING:

Since the depth of mining proposed is below the valley level and water table is about 95 m below the general ground surface, there will be no chance of encountering the ground water table during the mining operations. Hence normal-pumping operations will be required during the monsoon season only. The water accumulates within the pits will be due to direct rainfall over the pit and seepage from adjoining areas, if any. No dewatering will be done except in extreme conditions. Water accumulated if any in the pit will be allowed to recharge the water table through recharging wells. Further if need arises for dewatering in the mine it will be done after obtaining the permission from the competent authority.

The average rainfall of the district during all these years is 420 mm only.

6.4.1 An examination of the above reveals that the rainy season extends from June to September. Although in the above period under consideration there has been rainfall in other months also, but it can be considered as stray occurrence and will not after all proposed pumping scheme.

6.4.2 The water to be pumped out from the open pits will be contributed both by direct precipitation over the open pits and seepage. The water due to direct precipitation will depend upon the rainfall and the area of the pit.

6.4.3 Based on the rainfall records, the sumps of the sizes as shown plates No. 5-9 shall be provided at the bottom most bench. During the monsoon period a continuous process of dewatering the sumps shall be there to facilitate the mining at the lower benches.

6.4.5 Based on the Rainfall data it is proposed to have two diesel engine operated water pumps of 25H.P which may dewater 200^3/hour from the pit. The water will be sent to the drain of 0.5mtr depth as shown in the year wise plans Plate No. 5-9. This water will finally go into the natural nallah.

CHAPTER 7

STACKING OF MINERAL REJECTS AND DISPOSAL OF WASTE

7.1 DISPOSAL OF WASTE

Soil: There is a thin soil cover 10-50 cms and weathered rock waste 50-100 cms in the proposed area. Little amount of soil is also generated from joints and cracks. Top soil will be stripped and preserved by stacking. Soil and weathered quartzite/quartz/feldspar will be stacked separately

7.2 MAXIMUM HEIGHT AND SLOPE OF DUMPS

The area ear marked for the stacking the soil mixed finer material of stone is 3200 M2 Plate no 5-9 which can accommodate at least 8000 MT of material. In the present case soil generated shall be sorted out and stacked in separate dump yards. Yearly generation of soil/ fines which only about 250 tones shall be used for plantation and as a upper layer on the dumps. The dump may attain a maximum height of 6 mtr with gentle slope of 30^0 . Around 40% of the soil shall be stacked for future plantation and around 60% shall be used for on-going plantation.

The dump yard proposed for waste/rejects will be of the size of 290mx80mx6m.This can accommodate the entire rejects generated during plan period. About 910 m toe wall (provide dimensions) will be made around dumps and 910 m drain will also made around dump yard to arrest the sediments if any and to allow the rain water to go into natural drain. The annual quantum for construction of retaining walls/ dump yards for soil and mineral will be done in the 1st year itself. The length of the soil stack yard will be 240 mtr all along with height of one meter. Rest of the height will be made in the coming years as per the requirements of dumps. The thickness of the wall will be half meter. The height proposed 6 mtr. Maximum.

Year	Reject/Waste (MT)
Ist	74,000
2nd	30,000
3rd	36,000
4th	34,000
5th	30750
Total	204750

As already the optimum height of dumps shall be kept 6 mtr. with gentle slope of 30^0 for soil stack and with moderate slope of 39^0 for rejects/ inter burden stacks. Around 60% of the

rejects/waste shall be used for construction of toe-walls, parapet wall etc and rest will be stacked.

LAND CHOSEN FOR DISPOSAL OF WASTE AND JUSTIFICATION:

The part of lease area which is not going to be worked in next 15 years, shall be used for stacking of the waste.

CHAPTER 8
USE OF MINERAL

8.1 USE OF MINERALS:-

The massive crystalline quartz is hard and tough and it is very expensive to crush in raw form. But it becomes very brittle on heating and sudden quenching in water; it can be easily crushed or finely grinded.

This quartz is used in manufacturing of fused quartz, Chemicals, apparatuses, white and enamel ware, glass, ceramic abrasives, for acid tower packing, as a filter in various industries.

Quartz found in this area is of refractory and glass grade.

8.2 PHYSICAL AND CHEMICAL SPECIFICATIONS:-

The physical properties of quartz can be summarized as under:

The quartz found in the area is fine grained, milky white cryptocrystalline. No other impurities are visible except some iron stains.

It has hardness of 7 in Moh's scale

It has specific gravity 2.70

It has vitreous luster

It has concoidal to subconcoidal fracture and has no cleavage

It is very resistant to weathering.

Chemical Specifications of quartz for manufacture of glass are as under

Figures in percentage			
Minimum SiO2	Grade-A	Grade-B	Grade-C
Minimum SiO2	99.5	99.5	98.5
Maximum Fe2O3	0.008	0.013	0.03-
Maximum TiO2	0.03	-	-
Chromium Cr2O3	0.0002	0.0002	0.0006

Quartz found in this area is of refractory and glass grade.

8.3 Feldspar: Feldspar is a common raw material used in glass making, ceramics, and to some extent as filler and extender in paint, plastics, rubber. In glass making, alumina from feldspar improves product hardness, durability and resistance to chemical corrosion.

Quartzite and Stone: This is used as construction material.

8.4 MINERAL BENEFICIATION

In view of the availability of direct market for Quartz, Felspar and Quartzite/stone, presently there is no proposal of beneficiation. Run-off-mine (ROM) Minerals will be sold to various industries directly. Quartz & Feldspar will be sold in the form of lumps to the buyers. The Quartzite (Masonry stone) from host rock, which will generated during mining of Quartz and Feldspar shall be sold/disposed of as construction material to the near bye area and crusher clusters.

In the view of its direct use there is no proposal to beneficiate it at present. As no beneficiation of minerals is envisaged, therefore free silica generation shall not be there.

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Feldspar: Feldspar is a common raw material used in glass making, ceramics, and to some extent as filler and extender in paint, plastics, rubber. In glass making, alumina from feldspar improves product hardness, durability and resistance to chemical corrosion.

Quartzite and Stone: This is used as construction material.

9 Nos of Samples from this were got tested and their results are summarized below

Sample No	1	2	3	4	5	6	7	8	10
properties	Felspar	Felspar	Felspar	Quartz	Quartzite	Quartz	Quartzite	Quartz	Quartz
SiO2 %	72.080	72.86	78.710	95.885	93.910	96.765	88.965	92.450	98.425
Al2 O3 %	15.730	15.055	11.885	2.145	2.605	1.085	7.125	4.365	0.895
Fe2O3 %	0.265	0.235	0.105	0.048	0.085	0.310	0.625	0.185	0.00
CaO %	1.035	0.985	1.455	0.520	0.695	0.765	0.995	0.810	0.0
Mg O %	0.255	0.105	0.265	0.065	0.065	0.105	0.145	0.065	0.370
LOI %	0.645	0.615	0.895	0.435	0.385	0.430	0.750	0.560	0.085
Na2O %	6.730	4.110	0.785	0.235	0.835	0.145	0.210	0.850	0.155
K2O %	3.145	5.925	5.795	0.635	1.375	0.295	1.065	0.530	0.017
TiO2 %	0.105	0.105	0.090	0.017	0.025	0.097	0.105	0.085	0.00
Sp. Gravity	2.68	2.685	2.69	2.70	2.69	2.68	2.63	2.71	2.69
Bulk Density gm/cc	2.69	2.84	2.70	2.60	2.80	2.7	2.63	2.70	2.70
Hardness on MOHS scale	6	6	5.5	7	6.5	7	7	6.5	7

CHAPTER 9
MINERAL BENEFICIATION& PROCESSING

In view of the availability of direct market for all minerals produced from this mine in nearby area of Haryana ,Rajasthan and NCR area.There is no proposal to beneficiate it. The same practice is proposed to be continued during the next plan period.

CHAPTER 10
SURFACE TRANSPORT

The transportation of mineral from pit head to the consumer pulverizers, crushers / traders will be carried out by the trucks of the applicant of generally 25 MT Capacity. There is all weather metaled road and then a katcha road right up to mines to dispatch the material from mines to the market/crushers. It will be purchased by the parties at mine site and transported by them through their own arrangement of trucks. The practice is quite sound in the area and ensure continuous lifting of the material. Customers come with transport arrangement of their own.

To accommodate and to ensure smooth production of mineral the following points shall be considered:

Existing Kachcha road which joins mine to metalled road shall be widened, strengthened and shall be maintained regularly so that dumpers of 25 T capacity can ply on it smoothly.

Proper traffic control shall be done at road crossings.

Road crossings shall be wide enough to ensure that dumpers plying on the roads are safe to cross/overtake, where ever necessary.

Along the both side of kachchca road, plantation shall be done as it will arrest the dust and will act as sound barrier to larger extent.

Regular/Daily, water spraying shall be done on main haulage road in South and North Block through water tankers fitted with sprinklers.

CHAPTER -11
SITE SERVICE

11.1 MANAGER'S OFFICE:-

As detailed in the preceding chapter the mine is designed to produce some 55, 00,000tonnes of Quartz & feldspar & Quartzite. The activities shall be supervised by one competent person i.e. Mines Manager, one Mining Mate cum blaster to supervise the drilling and blasting operation. Since this is very large mines. The office of Manager and other supporting staff has already developed.

11.2 CANTEEN -CUM-REST SHELTER:-

In order to provide the rest shelter for the personnel working in the mine and also to provide tea/refreshment etc.as per the Mines act, 1952. The arrangement shall be made to install a rest shelter-cum-canteen as shown in plate no.4 and shall be utilized by the workers. Applicant has already developed a canteen-cum rest shelter.

11.3 STORE

Since the mining operations involve heavy earth moving machinery, a storeroom is alredy provided for day to day operations. No provisions for a separate workshop is being made as the heavy repairs will be carried out elsewhere.

11.4 FIRST AID ROOM:

To provide the first aid for any sort of injuries encountered during the mining operation, one small first aid room is provided. First aid kit and sufficient stock of material / medicines needed for first aid are provided as per requirement. As the mining engineer / Manager and mining mates are qualified first aiders they can provide first aid to the injured on the spot. More ever the Govt. Hospitals is there at Nangal Chaudhary and Narnaul which are just 16 Kms and 30 km. respectively from the mine and necessary medical aid can be provided from there.

11.5 CRÈCHE :

At present provision of crèche is not provided, however in future if women workers are employed , arrangement for a small crèche shall be made as per the requirement.

11.6 V.T. CENTRE

Necessary arrangement are made for conducting refresher course as laid down in Mines vocational training rules.

11.7 MAGAZINE:

Both primary / mass blast and secondary blasting is carried out in the mines . At preset explosive is procured from the authorized source complying with the provisions of Indian Explosives act 1884 .Explosives are and will be transported to site from the magazine by approved explosive van.

All statutory provisions made under the Explosive act and modifications thereof are proposed to be followed

.11.8 ELECTRICITY SUPPLIES:

Presently there is arrangement for supply, at the mine office as well as in mines.

11.9 WATER SUPPLY

The water supply for drinking purpose as well as for dust suppression is done through hired water tankers. The requirement of water for various activities is detailed here below. Water requirement is increased to ensure better control fugitive dust emission and for development of green belt and for afforestation purpose. The water is initially sourced fromand thereafter rain water collected in mine sump.

S. No	Particular	Proposed KLD
1	Dust suppression	36
2	Drinking	2
2	Green Belt/ Plantation	10
3	Domestic	2
	Total Water Requirement	50

CHAPTER 12
EMPLOYMENT POTENTIAL

12.1 GENERAL CONSIDERATION

In this project the mechanized mining is going on for production of building stone. The proposed organizational structure for the project for mining system adopted and the need of effective environment Management Plan. The following technical and non-technical personnel are deployed as per norms :-

1. The mine is worked in three shifts and same will continue in future as well.
2. In estimating the requirement of magazine attendants, and provision of competent person, mates, blaster etc. due consideration has been given to the statutory provisions.

In estimating the requirement of magazine attendants, and provision of competent person, mates, blaster etc. due consideration has been given to the statutory.

Man power requirement and its distribution .As The applicant is working the mine in Two/three shifts. The following manpower is proposed and shall deployed keeping in view the provisions of Mines Act, 1952 and MMR-1961.

12.2 Man power requirement and its distribution.

The following manpower is Deployed and also proposed to continue during next plan period.

S.No.	Designation	Category	Nos
1	Mines manager	Highly skilled	1
2	Assistant Managers	Highly skilled	3
3	Mining Mate cum Blaster	Highly skilled	3
4	Clerical and other staff	Skilled	1
5	Security Guard & Water man	Semi skilled	4

6	Environment Assistance	Skilled	1
7	Diesel hydraulic shovel operator	Highly skilled	4
8	Diesel back hoe operator	Highly skilled	4
9	Rear dumpers operators	Highly skilled	40
10	Drill operators	Highly skilled	4
11	Track chain Dozer operators	Highly skilled	1
12	Grader	Highly skilled	1
13	Crane	Highly skilled	1
14	Heavy duty tow truck	Highly skilled	1
15	Tyre handler	Highly skilled	1
16	Water sprinkler	Skilled	1
17	Maintenance van driver	Skilled	1
18	Tractor operator/driver	Skilled	1
19	Tractor compressor operator	Skilled	1
20	Helpers/labour	Semi skilled	25
	Total		98

In addition to the above mentioned staff rest of the function i.e. supply of explosives, preparation and amendment of plans etc. are performed from the professional on contract basis.

The above mentioned manpower is already deployed by the lessee for Scientific and systematic working of the mine.

CHAPTER- 13
ENVIRONMENT MANAGMENT PLAN

Particulars	Proposal as per approved mining plan	Position at the end of 5th year of Mining Plan Period	Proposal for the next 5 years plan.
Top Soil storage preservation and utilization	Proposed to stack separately as per the approved mining plan dt.18-08-2016.	About 22500 MT soil is generated during last plan period .It was removed and stacked separately. Part of it is used for plantation. Rest is stacked separately. It will be used for progressive reclamation in due course as proposed in the chapter of PMCP.	Proposed to remove separately and stacked for plantation/ reclamation purpose.
Land reclamation and rehabilitation	The mined out area was proposed to be reclaimed after depletion of reserves.	None of the pits has attained the, ultimate pit limit. Therefore the actual land reclamation shall be done at the later stage of mining.	None of the pits has attained the, ultimate pit limit. Therefore the actual land reclamation shall be done at the later stage of mining
Waste dump management	About 1-2% waste is generated which is non salable. Entire reject waste is stacked in stack yard meant for reject waste	About 175432 MT waste/OB was generated during the last plan period. It is stacked inside the lease area	About 204750 MT waste/OB may be generated during the next plan period. The same will be properly stacked and will be used at the time of final/progressive closure plan.Therefore no further management is required except protective measures.
A forestation program	Proposed to plant 1875 no. of trees with survival rate of 70%,(Total plants proposed 9300 during last plan period	Over 10000 no. of plants have been planted (covering about 4.00 ha area) out of which 9630 plants are surviving with survival rate of over 90 %.	The area is mostly rocky or sandy with very poor density of vegetation. Plantation will be carried out around the mine, to arrest the dust at source. It is therefore proposed to cover 3.6 hectare area

			during this plan period at the lease boundary (7.50m buffer zone and the area (benches) where mining is not to be done further. Considering 2500 trees per hectare as a tree density, the applicant will plant 10000 saplings during plan period or 2000 saplings per year. The survival rate is 80%. The dead plants will be replaced by fresh plants during next year and 20% as replenishment during second year. About 4.0 ha additional area will covered under plantation within next five years period.
Quality of Air	Air is unpolluted except the dust generated due to plying of trucks and blasting. It was proposed to spray water on roads to suppress the dust .	Water is sprayed on the kuchha roads regularly. The area is scarce in ground water as well as low rainfall area. Regular air quality Monitoring is done and same is sent to concerned Authorities regularly.	It is proposed that regular air monitoring shall be done and ambient air analysis shall be carried out from time To time. The proposed mining method is not likely to produce much of dust and fugitive emissions to cause damage to ambient air quality of the area.Workerswill be provided with personnel protective equipment like face mask, ear plug/ muffs.For air pollution

			management at the progressive mine closure of mine, green belt will be developed to prevent and control air pollution.*In addition to it is proposed to install two nos of anti smog guns to suppress the dust and other emissions and improve the air quality during the mining.* Regular air quality Monitoring is proposed to be done and same is sent to concerned Authorities regularly.
Quality of Surface and ground water.	Above mining was proposed well above the water table. No course of water encountered. There is no effect on the surface as well as ground water.	Quartz/Stone mining as such does not affect the water regime as neither the surface watercourse is there, nor any ground water table is touched	*Since the depth of mining proposed is below the valley level and water table is about 95 m below the general ground surface, there will be no chance of encountering the ground water table during the mining operations. Hence normal-pumping operations will be required during the monsoon season only. The water accumulates within the pits will be due to direct rainfall over the pit and seepage from adjoining areas, if any. No dewatering will be*

			done except in extreme conditions and that too with the prior permission of competent authority. Water accumulated if any in the pit will be allowed to recharge the water table through recharging wells.
Noise level and vibration fly rock problem and precaution.	As the working were proposed mechanically. There will be some noise	There is limited time for blasting which is only for a few minutes. The machines are repaired properly. The effect of noise level is very limited. Further the area is far away from village population	It is proposed to keep the noise level within the limits by giving proper charging, giving a proper pattern. The entire manpower proposed to be deploy will be provided with necessary safety equipments to safeguard from dust and noise.
Environment Management Plan Budget	It was proposed in the approved EC: (EIA/EMP) that proponent will spent Rs172.35lakhs Capital cost and 458 Lakhs for recurring cost for EMP Purposes	Proponent has done EMP Measures as proposed	It is further proposed to spent more amount during the next plan period for this purpose in consultation of SPCB, Forest Authorities and Gram Panchayat.
Corporate Social Responsibly	As a corporate responsibility following measures along with budget provision ofRs/ 26.55 lakhs was proposed. **Description** — **Amount lacs)** Health check up camps — 3.0 Surveillance programme of the workers — 2.0 Insurance cover of workers — 5.0 Assistance to — 4.5	As a corporate responsibility expenses on account of the following heads was spents **Description** — **Amount (in la** Contribution to gram Panchayat Bayalovillage Development Activities — 4.0 Development of School Library — 0.35 Installation — 4.0	It is proposed to spent Rs 26.55 lakhs in consultation with local authorities (Gram Panchayat/ZilaParishadjfor the benefit of local villagers as part of CSR during the next plan period.

	local schools, scholarship to students		ofWater pump in Bayal		
	Sanitations and drinking water facilities	4.55	Contribution to Bayal village Panchayat for development	6.0	
	Vocational training to persons for income generation	2.50	Medicine and Stationery to School	0.28035	
	Assistance to self help groups	5.0	Development of Library in village	1.36	
	26.55 Lacs.		Construction of sports statdium in Bayal	6.00	
			Development of temple in village	10.0	
			Distribution of food,medicine,maskets during Covid-19	3.0	
			Total	38.99 lakhs	

PART –II
PROGRESSIVE MINE CLOSURE PLAN

1.0 Introduction:-

Vide notification GSR 330(E) date 10-04-2003, MCDR, 1988 has been amended incorporating preparation of Mine Closure Plan. Corresponding amendments has been made in MCDR, 1960. Accordingly Haryana Government has also amended the mineral concession rules which requires the Mine Closure Plan (Progressive & Final) as per chapter 10 of the "Haryana Minor Mineral Concession, Stocking, Transportation of Minerals and Prevention of Illegal Mining Rules, 2012".In the present case as it is a working mine a progressive mine closure plan, as a component of the mining scheme is required. The present rate of production in this mine will require progressive closure of the parts where mineral is fully exhausted/ no more mineable/ economically viable. Such part of the pits will be progressively closed and are proposed for reclamation. *At the proposed pace of work in the next coming years it will not be possible to close down any part except doing protective works like fencing and making of a drain, plantation etc. At the final closure stage which is not yet comining, the maximum part of the mine will become like a water reservoir/lake and it will be used for fissiculture/ Boating site. It can be used as a water body for canal based water supply site. It will help in faster recharging of ground water.*

(A) Name & address of the lessee

Sh. Manmohan Bhadana S/o Sh. Kartar Singh Bhadana R/o V& PO- Anangpur; Distt.- Faridabad (Haryana)

(B) LOCATION OF THE LEASE AREA

District:Mohindergarh

State:Haryana

Taluka:Nangal Chaudhary

Village:BayalBakhrija

(C) EXTENT OF THE LEASE AREA

The mine is located in the revenue estates of Villages BayalinDistt. Mohindergarh,Tehsil-Nangal Chaudhary, Haryana and is about 15 Kms from Nangal Chaudhary . The lease area lies between coordinates as under:

Block 1 (North Block):	Lat: 27°51.485'N to Lat: 27°51.970'N Long: 75°58.642'E to Long: 75° 58.932'E
Block 2 (South Block):	Lat: 27°50'54.20"N to Lat: 27 51.203' N Long: 75°58'37.58"E To Long: 75°59.041' E

The total lease area granted is 76.75 hectares (valid for 50 years from date of grant of lease. The details of extent of area is as follows –

Village	Khasra no.	Area in hect.
Bayal	201,223,224	76.75 hectares

The lease area is located on the mineroad and then a metalled road up to village Bayal and is easily approachable from Narnaul,Nangal Chaudhary, Mohindergarh and other important towns.

(D) PRESENT and proposed LAND USE PATTERN at various stages

Details are given below:

Sr.no	Details	Land use at the start of 1st plan Area in hectares	Present land use Area in hectares	At the end of lease period Area in hectares
1	Pit	0.085	15.00	0.0
2	Dump	0.0	2.64	0.00
3	Road	1.50	1.50	1.06
4	Plantation	0.0	4.0	15.35
5	Infrastructure	0.0	2.60	0.05
6	undisturbed	75.165	51.01	0.0
7	Water body	0.0	0.0	34.12
8	Reclaimed area	0.	0.0	30.29
	Total	76.75	76.75	76.75

(E) METHOD OF MINING:

(Details are given in Chapter 4 of the main Mining plan as well a chapter 4 of this scheme)

The present mining operations are designed to be carried out by open cast mining means. The entire mining operations proposed are mechanized. A part of mining, the loading and transportation up to stack yard shall be done mechanically. It is proposed to load in the trucks/dumpers directly to the destinations and mineral is not put up in this stack yard to avoid the double handling. In the present operation the bench height shall be 10 mtrs. Each bench will advance one by one. While carrying out the mining

operations in accordance with the above provision the overall pit slope shall be maintained the 49^{0}as the mineral bearing rocks being hard and compact.

(F) MINERAL PROCESSING OPERATION:

The quart, quartzite and other minerals are proposed to be sold in raw form in the form of lumps . Same practice is proposed to be continued.

1.1 Reasons for closure:

The progressive mine closure plan has been prepared in compliance of Rule 70 (1) of Haryana Minor Mineral Concession Rules 2012 under MMCR 1986.This is reproduced as under:

Rule 70.(1) Every mineral concession holder shall prepare a Mining Plan along with the Mine Closure Plan (Progressive & Final) and shall not commence mining operations in any area except in accordance with such Mining Plan duly approved by an officer authorized by the Director in this behalf.

As entire mineral is not going to be depleted during the plan period no immediate closure is planned. Therefore no closure plan is proposed at this stage.

1.2 Statutory Obligations:

The lessee is bound to submit the Progressive Mine Closure Plan either with Mining plan or Scheme of Mining Lessee is bound to follow the terms and conditions as will be stipulated in the lease deed /LOI.

In addition to it the rules pertaining to the Protection of Environment i.eEnvironmentAct. Environment Rules and other associated rules for the protection of environment will have to be followed during the course of mining. The rules stipulated in Mines Act, Mines Rules Metalliferous Mines Regulation 1961 and Haryana Mineral Rules, 2012 will be followed.

1.3 Closure plan preparations

Name, address and registration number of the Recognized Qualified Persons who prepared the progressive closure plan and name and address of the executing agency who is involved in the preparation of progressive mine closure plan.

D.C.Yadav RQP/DMG/HRY/2018/03

Lessee will himself implement the closure plan; no outside agency will be involved.

2.0 MINE DESCRIPTION

2.1 General Geology and Local Geology

(Details are given in the Chapter 3 of main mining plan)

2.1.1 Regional Geology

(Details are given in the Chapter 3 of main mining plan)

2.1.2 Local Geology

(Details are given in the Chapter 3 of main mining plan)

2.2 Reserves

(Details are given in the Chapter 3 of main mining plan as well as modified Mining Plan.

2.3 Mining Method:

Mining method to be followed is described in Chapter 4 of mining plan

2.4 Mineral Beneficiation

(Details are given in the Chapter 9 of main mining plan)

3 Review of implementation of mining plan including five years progressive closure plan upto the final closure plan

Mining scheme and Progressive mine closure plan is being submitted for the first time. It will be reviewed after five years and review of implementation will be given in the final closure plan at that time.

4.0 CLOSURE PLAN

4.1 Mined - out land

Land use at various stages is given in the table below:

Table : Land Use at various Stages

Sr.no	Details	Land use at the start of 1st plan Area in hectares	Present land use Area in hectares	At the end of lease period Area in hectares
1	Pit	0.085	15.00	0.0
2	Dump	0.0	2.64	0.00
3	Road	1.50	1.50	1.06
4	Plantation	0.0	4.0	15.35
5	Infrastructure	0.0	2.60	0.05
6	undisturbed	75.165	51.01	0.0
7	Water body	0.0	0.0	34.12
8	Reclaimed area	0.	0.0	30.29
	Total	76.75	76.75	76.75

4.2 Water quality management

There are no water courses in the area except dry nallahs .The precipitated water also flows along the depressions formed in between the outcrop of country rocks. The water table in the area is reported to be about 95 m bgl/ below the ground surface .There is no flow of water in the lease in post monsoon period. Area is having 420 mm rainfall in a year. During rainy season, water will be accumulated the pit which will be drained out and finally it will be sent in to natural drain. A settling tank will be provided so that the finer sediments are settled down. These finer sediments will be collected after rain is over.

The general water table around the lease area is about 95 meters below ground and the same is going down yearly.As reported by lessee and the nearby villagers the water table is receding by about 2-3 meters annually. It is therefore estimated that the same may be about 100 m below the general ground level at the end of 5years.The project proponent shall ensure that the mining operations shall not intersect groundwater table and the mining operations should be restricted at least 2m above the ground water table .

Regular monitoring of ground water level and quality shall be carried out in and around the mine lease area. The monitoring shall be carried out as per the conditions of EC dated 04-05-2018.

4.3 Air Quality Management:

The proposed mining method is not likely to produce much of dust and fugitive emissions to cause damage to ambient air quality of the area. Workers will be provided with personnel protective equipment like facemask, ear plug/ muffs.

For air pollution management at the progressive mine closure of mine, greenbelt will be developed to prevent and control air pollution.

4.4 Waste Management:

As stated in mining method, soil dump yard shall be maintained for stacking the top soil. It is also proposed a stack yard for mineral in case of emergency or downfall in sales. waste is generated/ available at the mine, which will be stacked in a scientific manner and will be used at the progressive closure or final closure as the case may be.

4.5 Top Soil Management

About 22500 MT soil has been generated during last plan period and additional about 10000 MT more may be generated during the current plan period. The entire quantity of soil is proposed to be used for reclamation/plantation on the buffer zone, benches and un-mineralized area .

4.6 Tailing dam management

There is no proposal of beneficiation of mineral. No tailing dam is envisaged.

4.7 Infrastructure:

The infrastructure facilities like site office, first–aid station, rest shelter/ store, drinking water etc. are already established and maintained.

4.8 Disposal of mining machinery:

It is propose to deploy heavy earth moving machineries in the mine. As this plan is for 5 years period and hence during plan period no disposal or decommissioning of machineries is proposed. But at the end of the lease period Small set up of office complex shall be maintained even after expiry of lease, to look after the plantation and other proposed reclamation measures.

Machinery is available on hire basis. Hence no decommissioning of mining machinery is proposed.

4.9 Safety & Security:

Safety measures will be implemented to prevent access to excavation area by un-authorized persons as per Mine Act 1952, MMR 1961.

i. Safety measures will be implemented as per Mine Act1952, MMR1961,MinesRules1955.
ii. Provisions of MMR1961 shall be followed strictly and all roads shall be 12 m wide and have a gradient of not more than 1 in 16.
iii. The bench height will be 9.0 mtr.
iv. Width of working bench will be kept around 15-20 m for ease of operations and provide sufficient room for the movement of equipment.
v. Protective equipment like dust masks, earplugs/ muffs and other equipment shall be provided for use by the work persons.
vi. Notices giving warning to prevent inadvertent entry of persons shall be displayed at all conspicuous places and in particular near mine entries.
vii. Danger signs shall be displayed near the excavations.
viii. Security guards will be posted.
ix. In the event of temporary closer, approaches will be fenced off and notice displayed.

4.10 Disaster Management and Risk Assessment:

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

- The mechanized mining activities in the hilly area may involve any high risk accident due to side falls/collapse, flying stones due to blasting etc.
- The complete mining operation will be carried out under the Management and control of experienced and qualified Mines Manager having Certificate of Competency to manage the mines granted by DGMS.
- All the provisions of Mines Act 1952, MMR 1961 and Mines Rules 1955, Haryana Mineral Rules, 2012 and other laws applicable to mine will strictly be complied with.

- During heavy rainfall the mining activities will be suspended
- All persons in supervisory capacity will be provided with proper communication facilities.

Competent persons will be provided First aid kits which they will always carry.

4.11 Care and Maintenance during Temporary Discontinuance:

In case of any temporary discontinuance due to court order or due to statutory requirement or any other unforeseen circumstance following measures shall be taken for care, maintenance and monitoring of conditions.

- Notice of temporary discontinuance of work in mine shall be given to the DGMS as per the MMR 1961.
- All the mining machinery shall be shifted to a safe place.
- Entrance to the mine or part of the mine, to be discontinued shall be fenced off. Fencing shall be as per the circular 11/1959 from DGMS.
- Security Guards shall be posted for the safety and to prevent any unauthorized entry to the area.
- Carry out regular maintenance of the facilities/area detailed below in such a way as would have been done as if the mines were operation:

  Mine roads and approach roads,

  Fencing on approach roads,

  Checking and maintenance of machines and equipment,

  Drinking water arrangements,

  Mine office, first aid stations etc.

- Competent persons shall inspect the area regularly.
- Air, water and other environmental monitoring shall be carried out as per CPCB and IBM Guideline.
- Care and upkeep of plantation shall be carried out on regular basis.

- Status of the working and status monitoring for re-opening of the mines shall be discussed daily.

In case of discontinuance due to any natural calamities/abnormal conditions, mining operation will be restarted as early as possible after completing rescue work, restoring safety and security, repairs of roads etc.

5.0 ECONOMIC REPERCUSSION OF CLOSURE OF MINE AND MANPOWER RETRENCHMENTS

Lease area has been granted for a period of 50 years . As per the production programme envisaged, at the end of plan period, sufficient reserves would be left available for continuing production activities further. Hence, no I closure is planned at this stage. There will be no effect on the man power as the persons belong to nearby villages and will have an option either to be available for employment for the next contract/ lease or do the agriculture in their fields.

6.0 TIME SCHEDULING FOR ABANDONMENT

The lease area has enormous potential for continuance of operations up to the present contract period.. The details of time schedule of all abandonment will be given at the time of final closer plan.

7.0 ABANDONMENT COST

As at present mining is not going to be closed so abandonment cost could not be assessed. However based on the progressive mine closure activities during the plan period, cost is assessed as given below:

Table: Abandonment Cost

ACTIVITY	YEAR					Rate	Amount (inRs.)
	First	Second	Third	Fourth	Fifth		
Plantation (in no.)	1870	1870	1870	1870	1870	@150 Rs per sapling Including maintenance	225000
Plantation cost	280000	280000	280000	280000	280000		
Wire fencing (meter)1000m	200000	200000	200000	200000	200000	@ of 200 Rs per meter	1000000
Toe walls (m)200m	200000	200000	200000	200000	200000	@ Rs 1000/m	1000000
Drain(m) 250m	125000	125000	125000	125000	125000	@ Rs500/m	625000
	Total						2850000

8.0 FINANCIAL ASSURANCE

Total 76.75 ha area will be put in use up to the end of the plan period. Details of area put in use as given below (As per circular No.4/2006 issued by CCOM, Nagpur following table has been considered for calculation for financial assurance).

Table: Calculation for Financial Assurance

S. No.	Item	Area put on use at start of plan (Ha) (A)	Requirement at the end of plan period (Ha)	Total area put to use (Ha) (B)	Area considered as fully reclaimed & rehabilitation (Ha) (C)	Net area considered for calculation (Ha) D = (B-C)
1.	Area to be excavated	15.00	15.00	30.00	0.0	30.00
2.	Storage for topsoil	1.0	1.0	1.0	0.0	1.0
3.	Overburdon/ dumps	00	1.0	3.64	0.0	3.64
4.	Mineral storage	0.0	0.0	0.0	0.0	0.0
5.	Infrastructure (Workshop, Adm. Building & Road)	2.60	0.20	2.80	0.0	2.80
6.	Green belt	4.0	4.0	8.0	4.0	4.0
7.	Tailing pond	0.0	0.0	0.0	0.0	0.0
8.	Effluent treatment plan	0.0	0.0	0.0	0.0	0.0
9.	Mineral separation plant	0.0	0.0	0.0	0.0	0.0
10.	Township area	0.0	0.0	0.0	0.0	0.0
11.	Others to specify	0.0	0.0	0.0	0.0	0.0
	Total	22.6	21.2	45.44	4.0	41.44

Total 41.44 ha area will be put to use at the end of plan period.However total 76.75 ha area is considered for calculation. The total financial assurance (@15000/- per ha.) will be of Rs11,51,250/- This will be given by lessee as per Rule no 70 (1) (6) amended in 2012 as Surety Bond / Bank Guarantee.

9.0 CERTIFICATE

It is enclosed with the report.

10.0 PLAN AND SECTION

Plan and section are prepared and enclosed with the mining scheme.

Duli Chand Yadav
DMG/HRY/RQP/2018/03

By Speed Post/Online

No. J-11015/10/2017-IA.II (M)
Government of India
Ministry of Environment, Forest and Climate Change
Impact Assessment Division
***

Indira Paryavaran Bhavan,
Vayu Wing, 3rd Floor,
Aliganj, Jorbagh Road,
New Delhi-110 003

E-mail: s.kumar1958@gov.in
Tele: 011-24695304

Dated: 4th May, 2018

To,
M/s Bayal Quartz & Feldspar Mine
Shri Manmohan Bhadana,
S/o Kartar Singh Bhadana
R/O V & PO- Anagarpur
Dist: Faridabad (Haryana)

Sub.: Environment Clearnace to Bayal Quartz & Feldspar Mine of M/s Mr. Manmohan Bhadana, S/o Kartar Singh Bhadana is situated at Khasra No.- 201, 223 & 224 Village Bayal, Taluka- Narnaul, District:- Mahendragarh, Haryana, over an area of 76.75 hectares & rate of production is 55,00,000 TPA (ROM)-Reg.

Ref: Online application No: IA/HR/MIN/62041/2017

Sir,

This has reference to your online application for the above mentioned Environemtal Clerance proposal of **Bayal Quartz & Feldspar Mine** for proposed production of Quartz , Feldspar quartzite & Stone with total production capacity up to 55,00,000 TPA (ROM)in the Mining Lease (76.75 Ha)situated at Khasra No- 201, 223 & 224 Village Bayal, Taluka- Narnaul, District:- Mahendragarh, Haryana . The Project Proponent submitted that the mining lease area is in two blocks (North & South Blocks). The North Block falls between Latitude: 27° 51.485'N to 27° 51.970'N & Longitude: 75° 58.642'E to 75° 58.932'E and South Block falls between Latitude 27°50'54.20"N to 27°51.203' N & Longitude:75°58'37.58"E to 75°59.041' E. The mining lease comes under Survey of India topo-sheet no G43 D13 and G43 E1. The mining lease area falls in seismic zone III.The PP also presented the KML file during the presentation to indicate the location of mine lease on Google Earth/ DSS.

2. The proposal of Term of References (ToR) was considered by the EAC in its meeting held during20-21 February, 2017 wherein the Committee recommended for grant of ToR. The Ministry has issued ToR, vide letter even no. dated May17, 2017. PP has submitted the EIA/EMP Report on 30.11.2017 for appraisal of the Project before EAC.The proposal of EC was earlier considered in EAC meeting held during **December 21-22, 2017** wherein the Committee deferred the proposal and sought requisite information. In this context, the PP vide letter dated **08.02.2018** submitted the informationand accordingly the proposal was re-considered by the EAC in its meeting held during **February 26-27, 2018** wherein the Committee deferred the proposal and sought requisite information. In this context, the PP vide letter dated **21.03.2018** submitted the informationand accordingly the proposal was re-considered by the EAC in its meeting held during **March 22-23, 2018** wherein the Committee **recommended** the proposal for grant of Environmental Clearance for mining of Quartz , Feldspar Quartzite & Stone with total production capacity up to 55,00,000 TPA (ROM) from Bayal Quartz & Feldspar Mine (76.75 Ha) situated at Khasra No.- 201, 223 & 224 Village Bayal, Taluka- Narnaul, District:- Mahendragarh, Haryana.

3. The proponent submitted that the mining lease over an area of 228.60 hectares falling in Khasra Nos 198, 201, 202, 223 & 224 in village Bayal, District: Mahendragarh was granted on 09.07.2002 for a period of 20 years and Quartz and Feldspar, were both considered as Major Minerals as per provisions of Mines & Mineral (Development & Regulation) Act, 1957. As per the subsequent amendment dated 12.01.2015 made by Central Government in the Mines and Minerals (Development & Regulation) Act, 1957 and notification dated 10.02.2015 qua category of minerals, the proponent has submitted that the lease period has been extended up to 08.07.2052 and Quartz & Feldspar have been treated as minor minerals. The proponent submitted that part area of the lease falling under Khasra numbers 198 and 202 (comprising total area of 151.85 hectares) is under Aravalli and cannot be used for mining as per orders dated 18.03.2004 of the Hon'ble Supreme Court in WP (C) 4677 of 1985 in matter of M.C Mehta vsUoI&Ors. Therefore, the proponent submitted letter to DMG, Haryana for surrender of 151.85 ha area falling in Aravalli Plantation area and the same was accepted by DMG, Haryana vide letter no. Gig/Hy/E-2578/279 dated 11.01.2017. The supplementary lease deed falling in village Bayal over an area of 76.75 ha was executed on 12th May, 2017, after surrender of 151.85 Ha (Khasra no 198 & 202 Aravalli Plantation area) and is valid till 08.07.2052 . The EAC is its meeting held on 21-22 December, 2017 observed that the waste proposed by the Project Proponent was masonry stone, which is salable as construction material and has an economic value. The committee was therefore of the view that if the waste has market value, then same needs to be included in lease deed document as the list of minerals to be mined and asked the proponent to submit the revised mining lease deed after inclusion of all the minerals. The Project Proponent submitted the letter No Gig/HY/E-2578/926 dated 23.02.2018 issued by DMG for registration of supplementary lease deed on addition of quartzite and stone. The supplementary lease deed after inclusion of all the minerals viz. Quartz, Feldspar, Quartzite and Stone was executed on 23.02.2018 and valid till 08.07.2052. The Proponent submitted a no objection certificate issued by Nayab Thasildar, Sikar, Rajasthan vide letter No S-P-1 dated 10.01.2018 to the effect that mining lease does not falls under Rajasthan. The Project Proponent submitted the District Survey Report.

4. The Project Proponent submitted that mining plan was approved by Department of Mining and Geology, Govt. of Haryana vide LR No. DMG/HY/MP/Bayal/2017/2733-36 dated 23.06.2017. The mining plan was thereafter modified as per recommendation of EAC made during its meeting held on 21-22 December, 2017 & 27-28 February, 2018vide LR No. DMG/HY/MP/Bayal/2018/493-496 dated 01.02.2018 and LR No. DMG/HY/MP/Bayal/2018/1380 dated 19.03.2018 respectively. The Proponent submitted that as per the modified mining plan the estimated Geological Reserve is 140,905,315 Tonnes and estimated mineable reserve is 12, 6,81,4776 Tonnes. The proposed rate of production is 55, 00,000 TPA (ROM). The anticipated life of mine is 23 years. The mining will be carried out by mechanized opencast mining method. The material will be dislodged with rock breaker & terminator in no blasting zone and in remaining area with drilling & blasting. The excavation of minerals, waste and top soil will be with the help of excavator and transportation with the help of dumpers/tippers. The Project Proponent submitted that there is a thin soil cover 0-50 cm in the proposed area. Little amount of soil is also generated from joints and cracks. Top soil will be stripped and preserved by stacking in separate dump yards. Yearly generations of soil/fines will be 34000 MT (18900 cum) out of which about 250 MT shall be used for plantation on upper layer on the dumps. The proponent submitted that total waste generated during the life of the mine will be 941850Tonne . The waste will be dump separately in the dump yard near pillar number 23 & 24 of south block and ultimately used for backfilling. The proponent submitted municipal wastewater generated at the site will be treated through dedicated septic tanks followed by soak pit. The proponent submitted that total water requirement for the project will be 50 KLD (dust suppression 36 KLD, Drinking & Domestic use 04 KLD, Green Belt/plantation 10 KLD). The proponent submitted that 1870 plant per annum will be planted and at the end of life of mine 11.23 Ha of ML area will be under green belt with tree density 2500 plant/ha, 34.12 Ha will be converted into water reservoir and 30.29 Ha will be backfilled and reclaimed with plantation.

5. The primary baseline data for site specific micro meteorology data, ambient air quality, water quality, noise level, soil and flora & fauna has been collected during Summer Season i.e. from March–May, 2017. The monitoring results of ambient air, surface water, soil, ambient noise and ground water have been reported and no major divergence was observed with respect to concentration values of various parameters between collected samples. The Proponent submitted that Level of Service (LoS) pre project scenario is in category A and post project scenario will be in category B. The noise level in day time is slightly above the residential limit of 55 dB (A) in daytime but less than industrial limit 75 dB (A). The soil is neutral to moderately alkaline in nature. The Ground water quality in and around the core zone is well within the permissible limit. But in Munsnauta village which is 6 Km from the project site the total dissolve solid (TDS) and Total hardness as CaCo3 is exceeded the permissible limit. The proponent submitted that the Ground Water Table (GWT) around Bayal village is located about 346 MASL. The mine working during the plan period will be up to 399 MASL and ground water shall not be intersected. The proponent committed to mine 10 meters above the ground water table i.e. up to 356 MASL. The Committee in its meeting held on 22-23 March, 2018 observed that in the mining lease document it has mentioned that *"A safety margin of two meters shall be maintained above the ground water table and no mining operations shall be permissible below this level unless a specific permission is obtained from the competent authority"* and in the instant case, the PP has already committed to keep a safety margin of 10 meters above the ground water table. Further, during the plan period, as per approved mining plan the mine working will go up to 399 MASL i.e. above the ground water table of the area. Thus, the Committee was of the view that the mine working should be restricted at 356

MASL till the PP submits the detailed hydrogeological study and obtain permission from competent authority for intersecting ground water table, if any, for mining beyond 356 MASL.

6. The Proponent submitted that the Public Hearing / Consultation was conducted on 24.10.2017 and chaired by Dr. Garima Mittal, Deputy Commissioner, Mahendragarh. The advertisement for public hearing was published in English News Paper (Tribune) and Hindi Newspaper (AajSamaj) on 21.09.2017. The various issues raised during the public hearing mainly involve the concerns of villagers as how mining could be possible near habitation, temple and school and what would be the employment and business opportunity for the villagers. The issue raised during public hearing were also considered and discussed during the meeting.The proponent submitted that budget earmarked for the Enterprise Social Commitment (ESC) will be ₹ 26.55 Lakh which include supply of medical equipment to the Govt. hospitals, installation of RO Plant in village Panchayat, Supply of books to Govt. School & libraries, organizing heath camp for villagers, rainwater harvesting structures and installation of roof top solar panel in village Panchayat Bhawan . The Committee recommended that no mining should be carried out within 50 meters of the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs), temple and no mining should be carried out within 100 meters by using explosive from the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs), temple even if, PP obtained permission from DGMS. For mining in the remaining area the proponent should conduct the blast vibration study by engaging CSIR-Central Institute of Mining and Fuel Research (CIMFR), Dhanbad or National Institute of Rock Mechanics (NIRM), Karnataka. The report so obtained should be submitted to DGMS for obtaining the permission for carrying out mining by using explosive. The proponent submitted that the budget earmarked for blasting study would be ₹ 34 Lakh. .

7. The Project Proponent submitted a certificate issued from State Forest Department vide letter no 2946 dated 14.11.2017, wherein, certifying that there is no forest land in the mining lease area and there is no National Park, Wildlife Sanctuary within 10 Km of mining lease area and the project site is outside National Park, sanctuary, Biosphere reserve, Tiger/Elephant Reserve or notified Eco-Sensitive Zone falling within the territory of Haryana Boundary.The Project Proponent submitted that there are 6 shedule-1 species viz. *Indian Peafowl, Black Partridge, Leopard, Chikara, Common Indian Krait and Indian Monitor Lizard* are present in the study area. The project site was inspected on 1-08-2017 by a team comprising of Conservator of Forest (WL), Gurugram, DFO (T), Mahendergarh and DWLP, Gurugram. As per the direction of Forest Department, Govt of Haryana the proponent submitted the Wildlife Conservation Plan to Chief Wildlife Warden on 30.10.2017. The proponent submitted the conservation plan for Sehdule-1 & II species for 35 years with a budgetary provision of ₹ 160 Lakh.

8. The Project Proponent submitted that the Budget earmarked for Environmental Management Plan ₹ 172.35 Lakh (Capital Cost) and ₹ 458.0 Lakh (Recurring). The activates proposed under EMP are a) Environment Monitoring for Air, Noise, Water and Soil Quality, b) Purchase of minimum two water tanker having mist cannon fogger, c) construction of garland drains, d) Green Belt Development along the mine boundary, e) Afforestation & Reclamation activities, f) Rain water harvesting pits, g) mine waste/overburden management and h) Implementation of Conservation plan for schedule-1 species. The Project Proponent submitted that budget earmarked for Management of Labour Camps will be ₹ 28.25 Lakh (Capital) and ₹ 46.0 Lakh (Recurring). The Project Proponent submitted that occupational health and safety measures of the workers including identification of work related health hazards, training on health effect of mineral dust shall be

carried out. Initial and periodical medical examination of each worker and record of the same shall be maintained. The budget earmarked for the occupational health surveillance will be ₹ 2.62 Lakh (Capital) and ₹ 81.31 Lakh (recurring). The Project Proponent submitted to compensate all the 43 identified families within the mining lease and ₹ 6.19 Cr is earmarked under R&R Plan.

9. The Ministry of Environment, Forest & Climate Change has examined the proposal in accordance with the Environmental Impact Assessment Notification, 2006 and further amendments thereto and hereby accords the Environmental Clearance under the provisions thereof to the above **mentioned proposal of M/s Bayal Quartz & Feldspar Mine** for mining of Quartz , Feldspar Quartzite & Stone with total production capacity up to 55,00,000 TPA (ROM) from Bayal Quartz & Feldspar Mine (76.75 Ha) situated at Khasra No.- 201, 223 & 224 Village Bayal, Taluka- Narnaul, District:- Mahendragarh, Haryanasubject to compliance of the followings terms and conditions and environmental safeguards mentioned below:-

A. Specific conditions

i) Environmental clearance is granted subject to final outcome of Hon'ble Supreme Court of India, Hon'ble High Court of Haryana, Hon'ble NGT and any other Court of Law, if any, as may be applicable to this project.

ii) No mining activities will be allowed in forest area, if any, for which the Forest Clearance is not available.

iii) The Project Proponent shall obtain Consent to Operate from the State Pollution Control Board, Haryana and effectively implement all the conditions stipulated therein.

iv)No mining should be carried out within 50 meters of the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs), temple and no mining should be carried out within 100 meters by using explosive from the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs), temple even if, PP obtained permission from DGMS. For mining in the remaining area the proponent should conduct the blast vibration study by engaging CSIR-Central Institute of Mining and Fuel Research (CIMFR), Dhanbad or National Institute of Rock Mechanics (NIRM), Karnataka. The report so obtained should be submitted to DGMS for obtaining the permission for carrying out mining by using explosive.

v) Shelter belt i.e. wind barrier of 30 meter width and consisting of at least 5 tiers around lease facing the habitation/school/public road (if any in the vicinity) shall be raised.

vi)Adequate protection against the dust and other environmental pollution arising due to mining activity shall be made so that human habitation located near the lease is not adversely affected. The status of implementation shall be report to Regional Office, MOEF&CC and SPCB, Haryana.

vii) The proponent should ensure that mine working shall not intersect the ground water table of the area. The mining should be restricted till 356 masl till the PP submits the detailed hydro-geological study and obtained permission from CGWA for intersection of ground water table, if any, for mining beyond 356 masl.

viii) Regular monitoring of ground water level and quality shall be carried out in and around the mine lease by establishing a network of existing wells and constructing new piezometers during the mining operation. The project proponent shall ensure that no natural water course and/or water resources shall be obstructed due to any mining operations. The monitoring shall be carried out four times in a year pre- monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to Ministry of Environment, Forest and Climate Change and its Regional Office, Central Ground Water Authority and Regional Director, Central Ground Water Board.

ix) The Budget earmarked for Environmental Management Plan ₹ 172.35 Lakh (Capital Cost) and ₹ 458.0 Lakh (Recurring) should be kept in separate account (except amount to be submitted to Forest Department for implementation of the conservation plan) and same needs to be audited annually. The activates proposed under EMP are a) Environment Monitoring for Air, Noise, Water and Soil Quality, b) Purchase of minimum two water tanker having mist cannon fogger, c) construction of garland drains, d) Green Belt Development along the mine boundary, e) Afforestation & Reclamation activities, f) Rain water harvesting pits, g) mine waste/overburden management and h) Implementation of Conservation plan for schedule-1 species. The Proponent should submit the detailed report to Regional Office, MoEF&CC on implementation of EMP along with audited report of expenditure incurred; purchase documents, photographs in support of implementation of activities, Geo-location of the monitoring stations etc.

x) The budget earmarked for Management of Labour Camps will be ₹ 28.25 Lakh (Capital) and ₹ 46.0 Lakh (Recurring) and same needs to be kept in a separate account. The account needs to be audited annually and report of the same shall be submitted to Regional Office, MoEF&CC along with supporting documents, photographs and geo-location.

xi) Occupational health and safety measures of the workers including identification of work related health hazards, training on health effect of mineral dust shall be carried out. Initial and periodical medical examination of each worker and record of the same shall be maintained. The budget earmarked for the occupational health surveillance will be ₹ 2.62 Lakh (Capital) and ₹ 81.31 Lakh (recurring). The proponent shall engage a doctor who is well trained in occupational health and has NIOSH B Reader Certification (using the ILO 2000 Classification of Radiographs of Pneumoconiosis). The Project Proponent shall maintain a separate account for budget earmarked for occupational health surveillance plan and the same needs to be audited annually. The annual report of implementation of the occupational health surveillance plan shall be submitted to Regional Office, MoEF&CC. The Project proponent shall increase the budget earmarked for occupational health surveillance plan as per requirement.

xii) The budget earmarked for the Enterprise Social Commitment (ESC) will be ₹ 26.55 Lakh which include supply of medical equipment to the Govt. hospitals, installation of RO Plant in village Panchayat, Supply of books to Govt. School & libraries, organizing heath camp for villagers, rainwater harvesting structures and installation of roof top solar panel in village Panchayat Bhawan. The amount earmarked for ESC should be kept in separate account and same shall to be audited annually. The PP shall submit an annual report of compliance of activities proposed under ESC, to Regional Office, MoEF&CC with audited statement, photographs etc.

xiii) The Project Proponent shall get the blasting studies done by engaging CSIR-Central Institute of Mining and Fuel Research (CIMFR), Dhanbad or National Institute of Rock Mechanics (NIRM), Karnataka or any other institute of national repute before commencement of any blasting operation within 500 meters of the habitation. The budget earmarked for conducting blasting studies will be ₹ 34.0 Lakh. The blasting study report shall be submitted to Ministry of Environment, Forest and Climate Change and its Regional Office within three month of its finalization. The proponent shall monitor ground vibration and air overpressure of each blast and shall keep a record of the same which include logs generated from Blastmate, geo-location of the blast, dated and time of blast, number of holes blasted, charge per holes, explosive used, bench parameters, drill hole parameters etc.

xiv) The Project proponent shall compensate all 43 identified families as per proposed R&R plan. The ₹ 6.19 Cr earmarked for R&R plan shall be kept in separate account and same needs to be audited. The details of the compensation paid to the project affected families shall to be sent to Regional Office, MoEF&CC within one year of the commencement of the mining operation.

B. Standard conditions

i. A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment, Forest and Climate Change 5 years in advance of final mine closure for approval.

ii. This Environmental Clearance is subject to obtaining requisite NBWL Clearance from the Standing Committee of National Board for Wildlife as applicable for this Mining project.

iii. No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment, Forest and Climate Change.

iv. No change in the calendar plan including excavation, quantum of mineral and waste should be made.

v. The project proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of water (surface water and ground water) for the project.

vi. Mining shall be carried out as per the provisions outlined in mining plan approved by Indian Bureau of Mines (IBM)/State Mines and Geology Department as well as by abiding to the guidelines of Directorate General Mines Safety (DGMS).

vii. Project Proponent shall obtain the necessary prior permission from the Central Ground Water Authority (CGWA) in case of intersecting the Ground water table. The intersecting ground water table can only be commence after conducting detailed hydrogeological study and necessary permission from the CGWA. The Report on six monthly basis on changes in Ground water level and quality shall be submitted to the Regional Office of the Ministry, CGWA and State Pollution Control Board.

viii. The lands which are not owned by Proponent, mining will be carried out only after obtaining the consents from all the concerned land owners as per the provisions of the Mineral Concession Rules, 1960 and MMDR Act, 1957.

ix. Digital processing of the entire lease area using remote sensing technique shall be carried out regularly once in three years for monitoring land use pattern and report submitted to Ministry of Environment, Forest and Climate Change its Regional Office.

x. The critical parameters as per the Notification 2009 such as PM_{10}, $PM_{2.5}$, NO_x, and SOx etc. in the ambient air within the impact zone, peak particle velocity at 300m distance or within the nearest habitation, whichever is closer shall be monitored periodically. Further, quality of discharged water shall also be monitored [(TDS, DO, PH and Total Suspended Solids (TSS)]. The monitored data shall be uploaded on the website of the company as well as displayed on a display board at the project site at a suitable location near the main gate of the Company in public domain. The circular No. J-20012/1/2006-IA.II (M) dated 27.05.2009 issued by Ministry of Environment, Forest and Climate Change shall also be referred in this regard for its compliance.

xi. The Proponent shall install online Ambient Air Quality Monitoring System and there should be system for display of digital AAQ data within 03 months at least at three locations as per wind direction. Online provisions of pH and turbidity meters at discharge points of STP and ETP and also at water storage ponds in the mining area may be made. Project Proponent should display the result digitally in front of the main Gate of the mine site.

xii. Effective safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of PM_{10} and $PM_{2.5}$ such as haul road, loading and unloading point and transfer points. Fugitive dust emissions from all the sources shall be controlled regularly. It shall be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard. Monitoring of Ambient Air Quality to be carried out based on the Notification 2009, as amended from time to time by the Central Pollution Control Board.

xiii. Regular monitoring of ground water level and quality shall be carried out in and around the mine lease by establishing a network of existing wells and constructing new piezometers during the mining operation. The project proponent shall ensure that no natural water course and/or water resources shall be obstructed due to any mining operations. The monitoring shall be carried out four times in a year pre- monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to Ministry of Environment, Forest and Climate Change

and its Regional Office, Central Ground Water Authority and Regional Director, Central Ground Water Board.

xiv. Regular monitoring of the flow rate of the springs and perennial nallahs flowing in and around the mine lease shall be carried out and records maintain. The natural water bodies and or streams which are flowing in an around the village, should not be disturbed. The Water Table should be nurtured so as not to go down below the pre-mining period. In case of any water scarcity in the area, the Project Proponent has to provide water to the villagers for their use. A provision for regular monitoring of water table in open dug wall located in village should be incorporated to ascertain the impact of mining over ground water table.

xv. Regular monitoring of water quality upstream and downstream of water bodies shall be carried out and record of monitoring data should be maintained and submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office, Central Ground Water Authority, Regional Director, Central Ground Water Board, State Pollution Control Board and Central Pollution Control Board.

xvi. Transportation of the minerals by road passing through the village shall not be allowed. A 'bypass' road should be constructed (say, leaving a gap of at least 200 meters) for the purpose of transportation of the minerals so that the impact of sound, dust and accidents could be mitigated. The project proponent shall bear the cost towards the widening and strengthening of existing public road network in case the same is proposed to be used for the Project. No road movement should be allowed on existing village road network without appropriately increasing the carrying capacity of such roads.

xvii. The illumination and sound at night at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right for darkness and minimal noise levels at night. PPs must ensure that the biological clock of the villages is not disturbed; by orienting the floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day light/night hours.

xviii. Main haulage road in the mine should be provided with permanent water sprinklers and other roads should be regularly wetted with water tankers fitted with sprinklers. Crusher and material transfer points should invariably be provided with Bag filters and or dry fogging system. Belt-conveyors should be fully covered to avoid air borne dust.

xix. Main haulage road in the mine should be provided with permanent water sprinklers and other roads should be regularly wetted with water tankers fitted with sprinklers. The material transfer points should invariably be provided with Bag filters and or dry fogging system. In

case of Belt-conveyors facilities the system should be fully covered to avoid air borne dust; Use of effective sprinkler system to suppress fugitive dust on haul roads and other transport roads shall be ensured.

xx. Sufficient number of Gullies to be provided for better management of water. Regular Monitoring of pH shall be included in the monitoring plan and report shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office on six monthly basis.

xxi. The pollution due to transportation load on the environment will be effectively controlled and water sprinkling will also be done regularly. Vehicular emissions shall be kept under control and regularly monitored. Project should obtain 'PUC' certificate for all the vehicles from authorized pollution testing centres.

xxii. There shall be planning, developing and implementing facility of rainwater harvesting measures on long term basis and implementation of conservation measures to augment ground water resources in the area in consultation with Central Ground Water Board.

xxiii. The Project Proponent has to take care of gullies formed on slopes. Dump mass should be consolidated with proper filling/leveling with the help of dozer/compactors.

xxiv. The reclamation at waste dump sites shall be ecologically sustainable. Scientific reclamation shall be followed. The local species may be encouraged and species are so chosen that the slope, bottom of the dumps and top of the dumps are able to sustain these species. The aspect of the dump is also a factor which regulates some climatic parameters and allows only species adopted to that micro climate.

xxv. The top soil, if any, shall temporarily be stored at earmarked site(s) only and it should not be kept unutilized for long. The topsoil shall be used for land reclamation and plantation. The over burden (OB) generated during the mining operations shall be stacked at earmarked dump site(s) only and it should not be kept active for a long period of time. The maximum height of the dumps shall not exceed 8m and width 20 m and overall slope of the dumps shall be maintained to 45°. The OB dumps should be scientifically vegetated with suitable native species to prevent erosion and surface run off. In critical areas, use of geo textiles shall be undertaken for stabilization of the dump. The entire excavated area shall be backfilled and afforested. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office on six monthly basis.

xxvi. Catch drains and siltation ponds of appropriate size shall be constructed around the mine working, mineral and OB dumps to prevent run off of water and flow of sediments directly into the river

and other water bodies. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drains shall be regularly desilted particularly after monsoon and maintained properly. The drains, settling tanks and check dams of appropriate size, gradient and length shall be constructed both around the mine pit and over burden dumps to prevent run off of water and flow of sediments directly into the river and other water bodies and sump capacity should be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material. Sedimentation pits shall be constructed at the corners of the garland drains and desilted at regular intervals.

xxvii. Plantation shall be raised in a 7.5 m wide green belt in the safety zone around the mining lease, backfilled and reclaimed area, around water body, along the roads etc. by planting the native species in consultation with the local DFO/Agriculture Department and as per CPCB Guidelines. The density of the trees should be around 2500 plants per ha. Greenbelt shall be developed all along the mine lease area in a phased manner and shall be completed within first five years.

xxviii. Project Proponent shall follow the mitigation measures provided in Office Memorandum No. Z-11013/57/2014-IA.II (M), dated 29th October, 2014, titled "Impact of mining activities on Habitations-Issues related to the mining Projects wherein Habitations and villages are the part of mine lease areas or Habitations and villages are surrounded by the mine lease area".

xxix. The Project Proponent shall make necessary alternative arrangements, where required, in consultation with the State Government to provide alternate areas for livestock grazing, if any. In this context, Project Proponent should implement the directions of the Hon'ble Supreme Court with regard to acquiring grazing land. The sparse trees on such grazing ground, which provide mid-day shelter from the scorching sun, should be scrupulously guarded against felling and plantation of such trees should be promoted.

xxx. The project proponent shall take all precautionary measures during mining operation for conservation and protection of endangered fauna, if any, spotted in the study area. Action plan for conservation of flora and fauna shall be prepared and implemented in consultation with the State Forest and Wildlife Department. A copy of action plan shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office.

xxxi. As per the Company Act, the CSR cost should be 2 % of average net profit of last three years. Hence CSR expenses should be as per the Company Act/Rule for the Socio Economic Development of the neighborhood Habitats which could be planned and executed by the Project Proponent more systematically based on the 'Need based door to door survey' by established Social Institutes/Workers. The report shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office on six monthly basis.

xxxii. Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.

xxxiii. Measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs / muffs.

xxxiv. Industrial waste water (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December, 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.

xxxv. Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.

xxxvi. A separate environmental management cell with suitable qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.

xxxvii. The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office.

xxxviii. The project authorities should inform to the Regional Office regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.

xxxix. The project proponent shall submit six monthly reports on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment, Forest and Climate Change, its Regional Office, Central Pollution Control Board and State Pollution Control Board.

xl. The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full

cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring reports.

xii. A copy of clearance letter will be marked to concerned Panchayat / local NGO, if any, from whom suggestion / representation has been received while processing the proposal.

xiii. State Pollution Control Board should display a copy of the clearance letter at the Regional office, District Industry Centre and Collector's office/ Tehsildar's Office for 30 days.

xiiii. The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment, Forest and Climate Change at www.environmentclearance.nic.inand a copy of the same should be forwarded to the Regional Office.

10. The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.

11. Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

12. The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/ High Court and any other Court of Law relating to the subject matter.

13. Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

(Surendra Kumar)
Scientist 'G'/Adviser

Copy to:-

1. **The Secretary**, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.

2. **The Secretary**, Department of Mines & Geology, Government of Haryana, Chandigarh.

3. **The Secretary**, Department of Environment, Government of Haryana, Chandigarh.

4. **The Secretary**, Department of Forest, Government of Haryana, Chandigarh.

5. **The Chief Wildlife Warden**, Government of Haryana, C-18, Van Bhawan, Sec-6,Panchkula -134109

6. **The Principal Chief Conservator of Forests (C)**, Ministry of Environment, Forest and Climate Change, Regional Office (NZ), Bays No. 24-25, Sector 31 A, Dakshin Marg,Chandigarh - 160030.

7. **The Chairman**, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.

8. **The Chairman**, Haryana Pollution Control Board, C-11, Sector-6, Panchkula, Haryana 134109

9. **The Member Secretary**, Central Ground Water Authority, A-2, W3, Curzon Road Barracks, K.G. Marg, New Delhi-110001.

10. **The Executive Engineer**, Department of Irrigation, Government of Haryana, Sinchai Bhawan, Sector-5, Panchkula , Haryana

11. **The District Collector**, District Mahendragarh, State of Haryana.

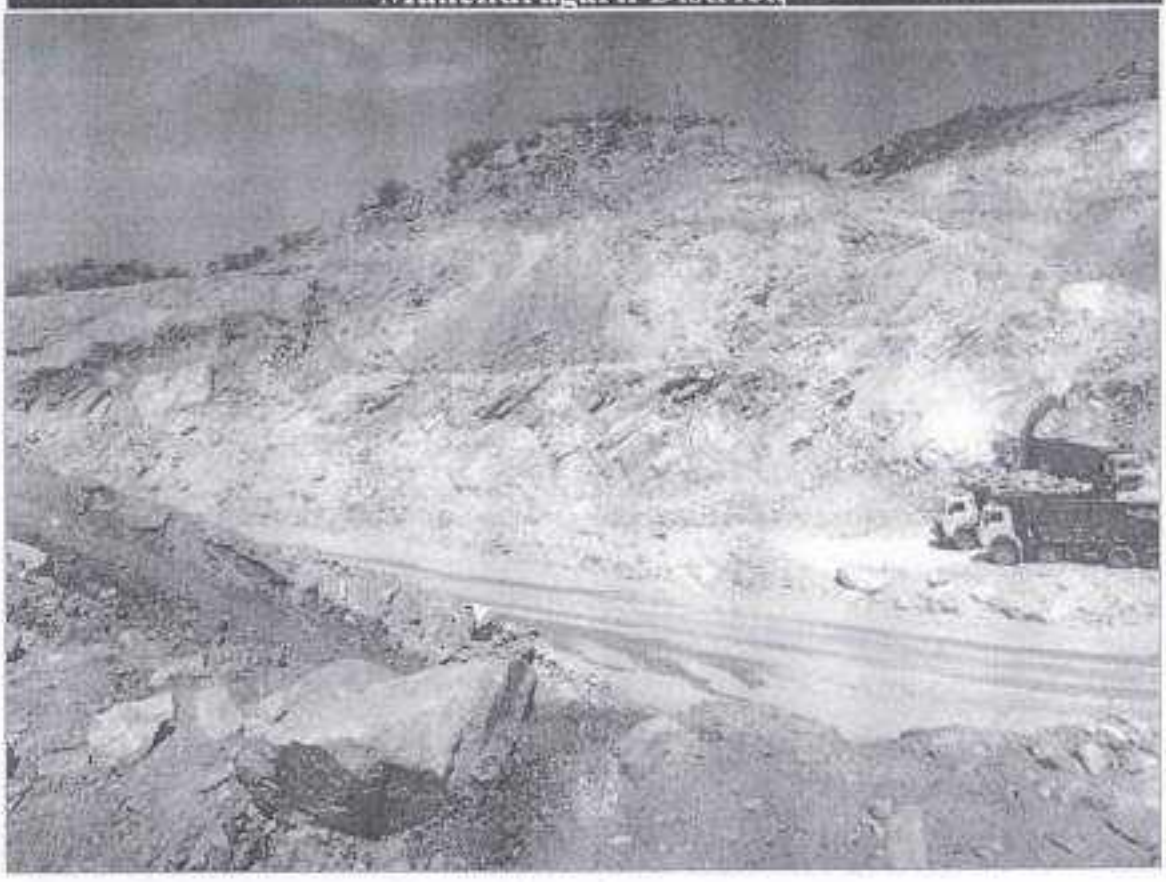
12. Guard File.

13. MoEFCC website.

(Surendra Kumar)
Scientist 'G'/Adviser

Hydrogeological Study Report

Bayal Quartz and Feldspar (Minor Mineral) Mine, Khasra No. 201,223 &224 of Bayal Village, Narnaul Taluk, Mahendragarh District,



PREPARED FOR:

Bayal Quartz and Feldspar Mines, Haryana State

REF: EN.19.050-HG BAYAL MINE (REV. 0)

AUTHOR

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Hydrogeological Study Report

CHAPTER 1

Bayal Quartz and Feldspar (Minor Mineral) Mine, Khasra of Bayal Village, Narnaul Taluk, Mahendragarh District, Haryana State

1.Introduction

Mr. Manmohan Bhadana s/o Shrikartar Singh , hold a mining lease over an area of 76.75 Hectares falling in Khasra nos. 201, 223 & 224 in Bayal village, Mahendragarh which was granted on 09.07.2002 for period of 20 years for mining of Quartz and Feldspar, both as Major Minerals as per provisions of Mines & Mineral (Development & Regulation) Act, 1957. Environmental Clearance was issued on 4th May 2018.

In the Environment Clearance to the above mines, it was stated that detailed hydrogeological study has to be undertaken in and around the mine lease area. Bayal Mines, in order to study the Hydrogeological aspects in and around Mine, entrusted the job of carrying out the Hydrogeological Study to Earthood Services Private Limited, Gurgaon.

The details of Mine area and capacity are given below.

S No	Facility	Area	Capacity
1.	Quartz, Feldspar Mine	76.75 Hectares The area is located in 2 Blocks (North and South block)	55,00,000 TPA

Bayal Quartz and Feldspar (Minor Mineral) Mine located at Khasra no. 201, 223 & 224 of Bayal village, Narnaul Taluk, Mahendragarh District Haryana State.

1.1 Need for the Study

The present Hydrogeological study of the mine depicts the ground water condition of villages falling within the study area covering 5 km radius from the Mine boundary (as per CGWA Guidelines).

The basic data such as the villages falling within the study area and the land use, irrigation water requirement, domestic water requirement, rainfall and aquifer parameters of the study area have been considered for the study. The ground water estimation has been made over an area of 91.62 Sq.km covering 5 km radius for the Mine based on the Ground Water Estimation Committee Methodology – 1997 (GEC-1997) of Government of India.

1.2 Scope of Study

Hydrological and Hydrogeological Studies include assessment of ground water potential, identifying and suggesting recharge measures to augment the ground water sources as per the MoEF and CGWA Guidelines. The study is also focused on the Ground water level in and around the mine lease area and to study the impact of mining on the ground water regime.

1.3 Methodology

To achieve the above scope the following methodology has been adopted

1) Pre-field preparation

- Collection of satellite data, maps and literatures about the aquifer characters etc.,
- Preparation of base map, drainage and water body map, geology map, geomorphology map, soil map, land use map using satellite imagery from available literatures.

2) Field Work

- Field verification of geomorphic features and structures such as fold, fault, fractures and fissures
- Collection of well inventory data & measurement of well depth, water level, yield and water quality

3) Post-Field Interpretation

- Preparation of ground water level zone map, water table contour
- Interpolation and superimposition of the observed data using statistical and standard hydro-geological methods
- Estimation of aquifer parameters
- Study of aquifer within 5 km of the project site (Mine) and preparation of management plan for recharging the aquifer
- Identification of location for construction of recharge structures
- Suggesting recharge structures to augment the ground water sources in around the project site

1.4 Location and Extent of the Study Area

The administrative unit within the study area from the project boundary comprises of 24 villages within 5 km radius from the mine blocks boundary.

The study area (covering 5 km radius) lies in between North Latitude 27° 49' 30" and 27°54'10" and East Longitude of 76° 55'50" and 76°02'00" and forms part of the Survey of India Topo Sheet Nos. 45 M/13, 55 A/1.

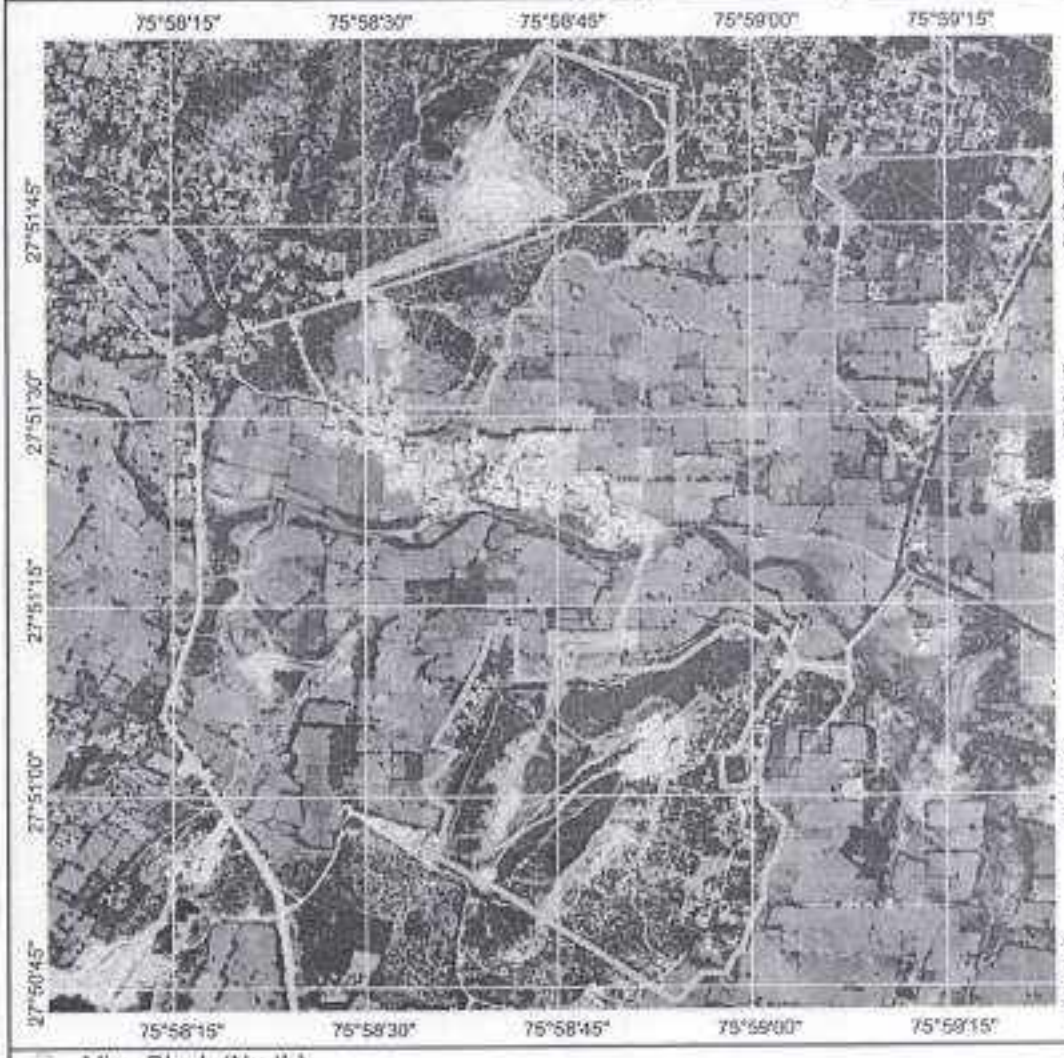
The mine blocks falls in 45 M/13. The total aerial extent of the study area covering 5 km radius from the Mine is **91.62 Sq.km.**

The details of study area (covering 10 km radius) are given below.

Feature	Details
Mines	Mine Blocks located at Khasra No. 201, 223 & 224 of Bayal village, Narnaul Taluk, Mahendragarh District Haryana State
Topography	Hilly (Mines located in the Hill)
SOI Toposheet	45 M/13, 55 A/1
Above Mean Sea level	Height point 480 m amsl and Lowest point 370m amsl
Nearest habitation	Bayal village
Nearest Town	Nangal Chowdhary
Nearest Highway	Inter State Highway of Haryana& Rajasthan
Nearest Railway Station	Rewat

High resolution satellite imagery showing the mine blocks and the SOI topo maps presented in Plates 1 & 2:

Bayal Quartz and Feldspar (Minor Mineral) Mine Khasra of Bayal Village, Narnaul Taluk, Mahendragarh District, Haryana State
High Resollution Satellite Imagery Showing Project Site 1:15000



Mine Block (North)
Mine Block (South)

Block 1 (North Block)	Latitude : 27°51.485' N to 27°51.970'N Longitude: 75°58.642' E to 75°58.932'E
Block 2 (South Block)	Latitude : 27°50.54.20' N to 27°51.203'N Longitude: 75°58.37.58' E to 75°59.041'E

Plate – 1 - High resolution Satellite Imagery showing the mine blocks. The Satellite imagery showing the present condition of excavated mine blocks. The small nallah (Stream) is bisecting the two mine blocks. Image also clearly shows that the mine blocks are in the hill. There is no major habitation in the vicinity of the mine blocks.

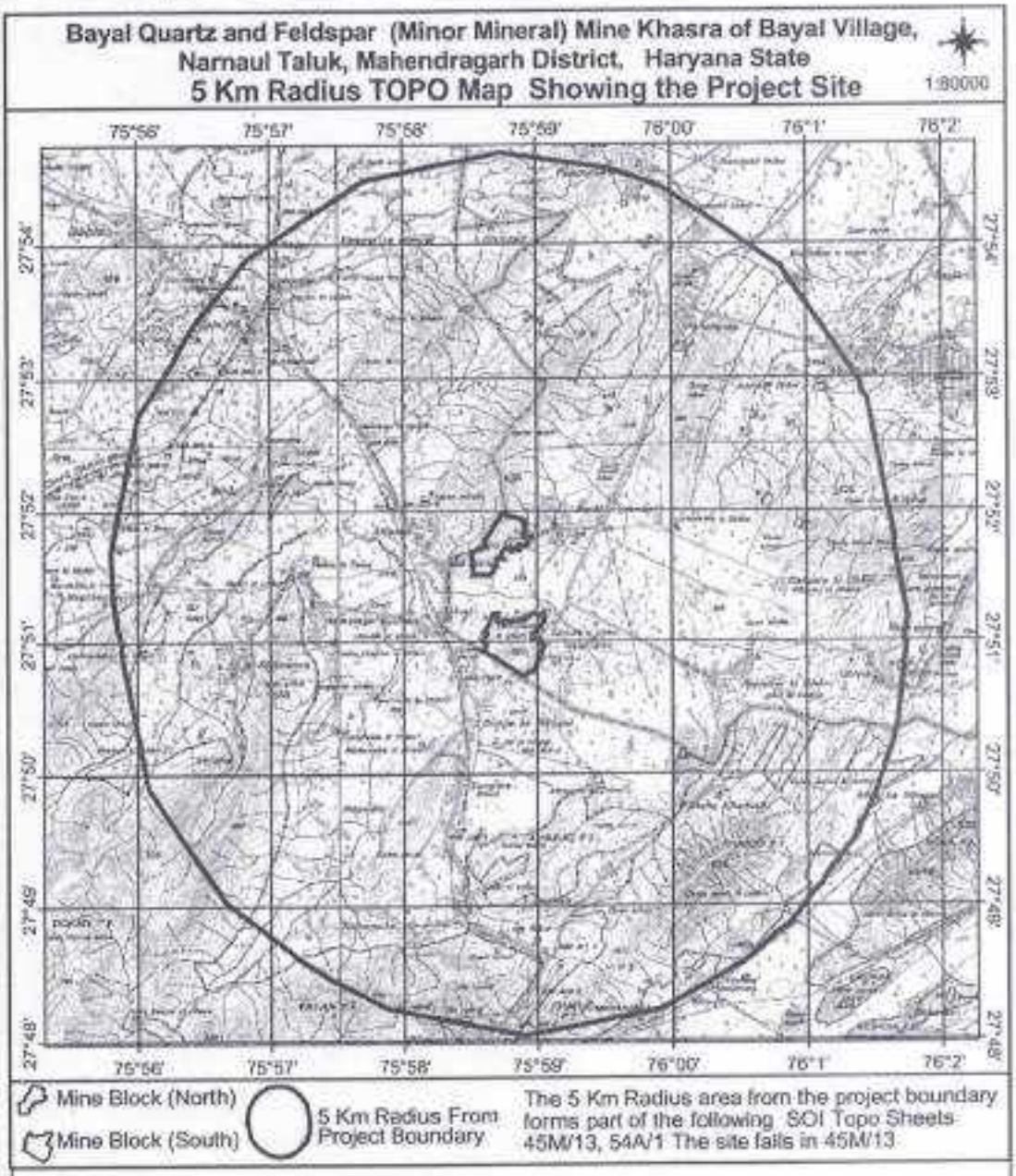


Plate – 2 - Survey of India topo sheet showing the mine blocks. The 5 km radius boundary from the mine blocks falls in 2 toposheets. Hills and the plains are visible in the vicinity of the mine blocks.

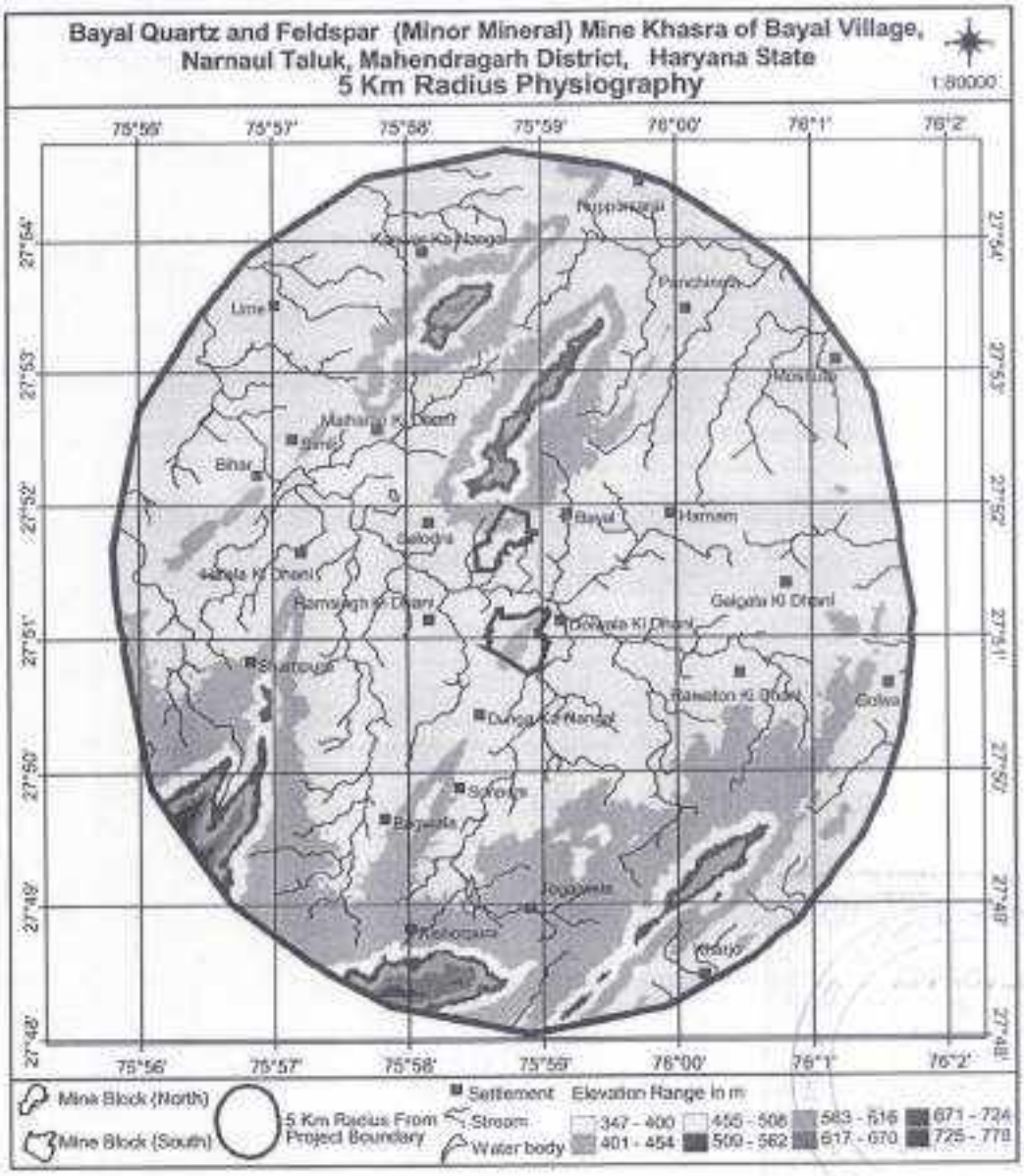
Photograph of Mine Block - North

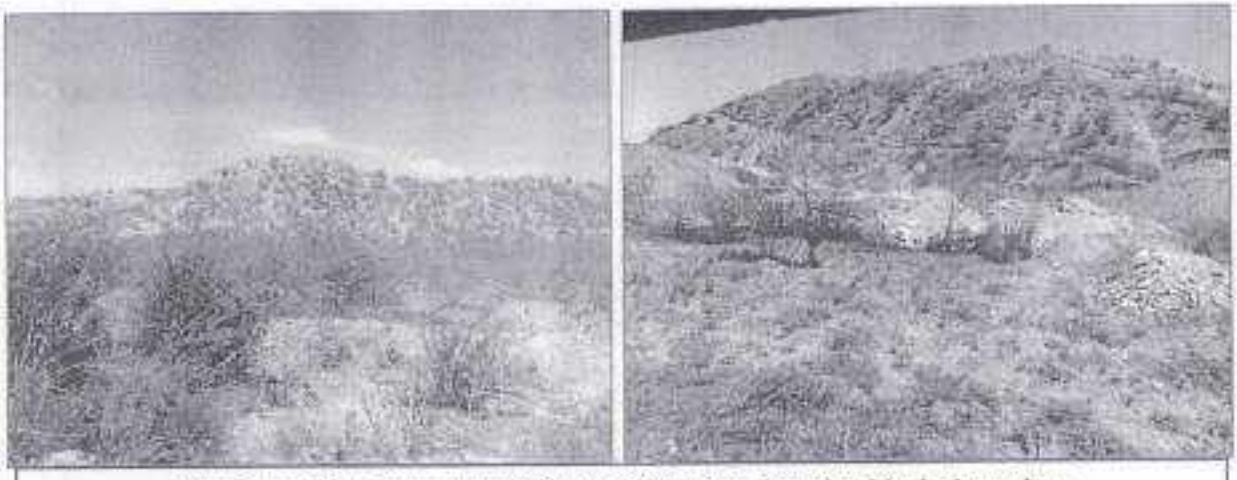
Photograph of Mine Block - South

Photograph of Mining Operations

1.5 Physiography

The study area exhibits undulating terrain and the maximum elevation is observed in the northern boundary of mine block north and southern part of 5 km radius. The minimum and maximum elevation of the study area of 5 km radius is 347 m and 778 m amsl (above mean sea level) respectively. Both the blocks of the mine are located relatively in higher elevation. The minimum and maximum elevation of the Mine is 374 & 471 m above mean sea level respectively. Physiographic map is presented in Plate-3:





Physiographic features within 5 km radius from the mine blocks boundary

1.6 Drainage and Water Bodies

There is no perennial river in Haryana States joining the Indus Basin. Most of the rivers have turned seasonal and carry floodwaters during monsoon.

There is no major river system within 5 km radius from the mines. The streams are only seasonal and very lean flow in the river during the monsoon period. Some years flash flood reported in the rivers. There are no major reservoirs / Dam or irrigation tanks in the 5 km radius study area.

No diversion of streams due to mining activity has taken place. The mining activity has not abstracted the free flow of water in the streams during the rainy seasons.

The Drainage map is presented in Plate-4:

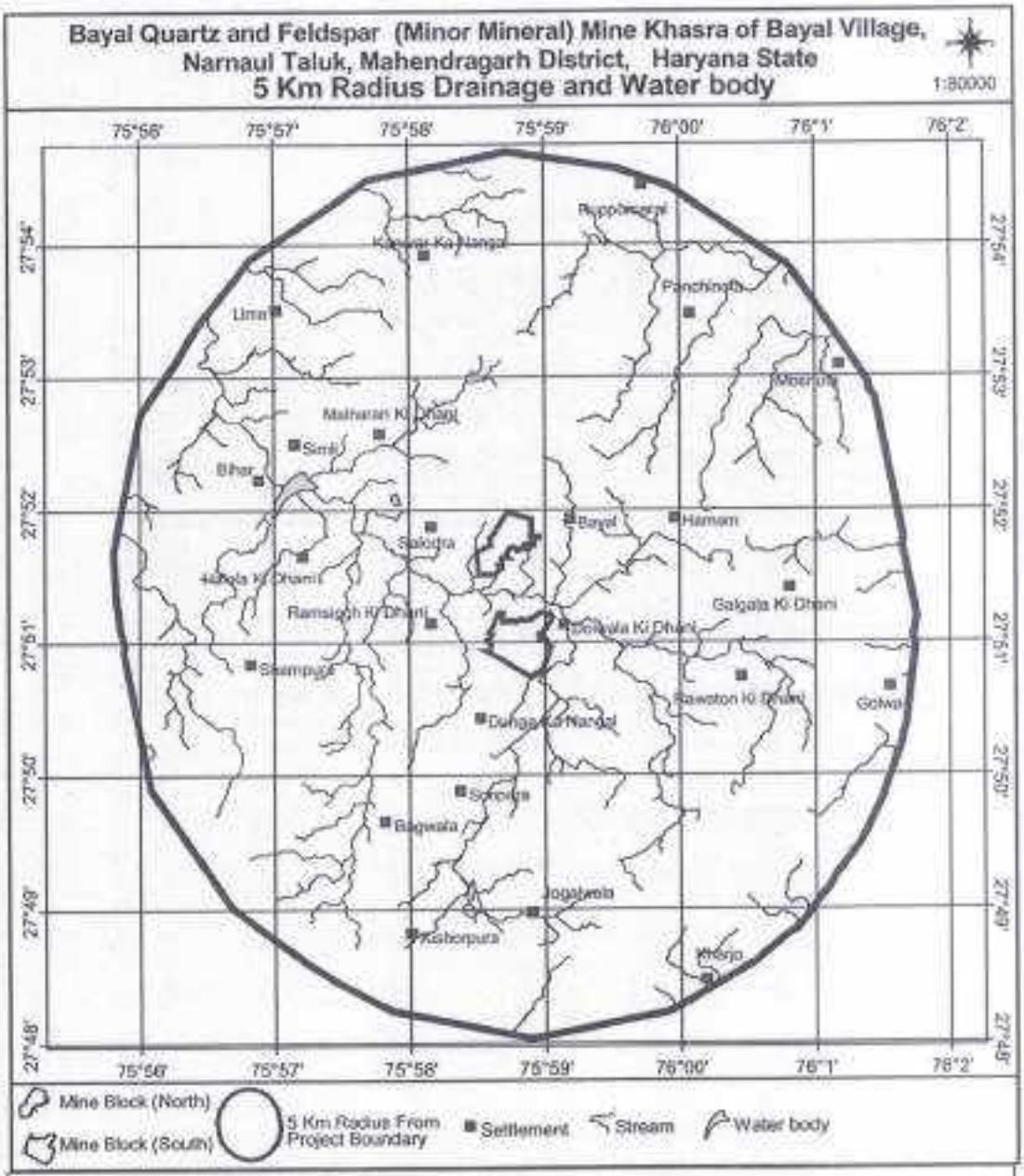


Plate – 4

5 km radius drainage map shows that the streams are dendritic to sub-dendritic. The rivers are seasonal. A stream bisecting the two mine blocks. The mining activity has not affected the flow of water during the monsoon seasons.

1.7 Climate and Rainfall

The climate of Mahendragarh District can be classified as tropical steppe, semi-arid and hot which is mainly dry with very hot summer and cold winter except during monsoon season when moist air of oceanic origin penetrates into the district. There are four seasons in a year. The hot weather season starts from mid March to last week of the June followed by the south- west monsoon which lasts up to September. The transition period from September to October forms the post-monsoon season. The winter season starts late in November and remains up to first week of March.

The normal annual rainfall of the District is 500 mm which is unevenly distributed over the area 26 days. The south west monsoon sets in from last week of June and withdraws in end of September, contributed about 84% of annual rainfall. July and August are the wettest months. Rest 16% rainfall is received during non-monsoon period in the wake of western disturbances and thunder storms. Generally rainfall in the district increases from southwest to northeast.

The Monthly rainfall data for the period 2013 -18 for Mahendragarh District collected from IMD is presented below.

From the rainfall data it is inferred that the study area is one of the poor rainfall area / rain shadow region of Haryana State.

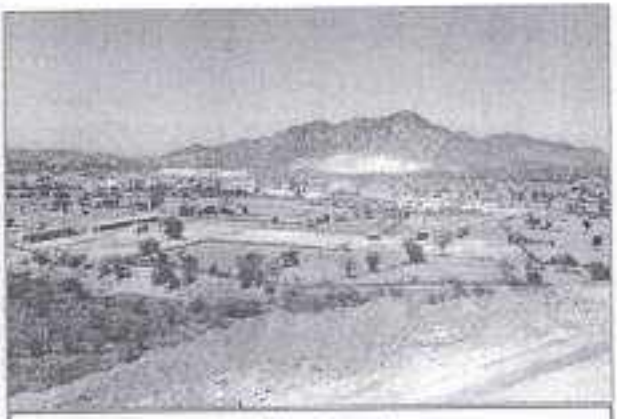
Rainfall Data

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	Total
2013	25	68	0	0	0	23.4	91.1	157	41.6	0.1	1	0	407.7
2014	0	13	23.2	23	8.9	56	54.1	39.9	49.8	23.8	0	1.8	293.6
2015	9.8	0	57.9	23.4	0.3	40.7	76.1	43.9	14.4	7.2	0	0	273.7
2016	0	0	9	0	37.9	49.9	157	131	2.2	0	0	0	386.4
2017	17.2	0	3.3	8	33.5	147	73	58.9	35.9	0	0	1.6	378.8
2018	7.8	2.3	50.6	24.3	1.1	42.2	76.9	44.6	16.2	7.8	0	1.1	274.9
Average	**10.0**	**13.9**	**24.0**	**13.1**	**13.6**	**59.9**	**88.0**	**79.2**	**26.7**	**6.5**	**0.2**	**0.8**	**335.85**

1.8 Land use Pattern

The land use in the village reflects the socio-economic conditions of the people in addition to the natural environmental factors. The land use is also one of the prime parameters to be considered for the ground water estimation. Primarily, 5 Km radius from the mine blocks form part of scrub forest. The second major land use is land with or without scrub. The crop land occupies less area in the plains. Rain fed agriculture is observed in the area. During the site visit, it has been observed that most of the area is not irrigated and left as fallow land. Very less area is irrigated by ground water as the ground water availability is poor. River or tank based irrigation systems have not been observed in the area.

Land with Scrub



Fallow Land

Barren Land

Scrub Forest

1.8.1 Land Use of Mines area

S.No	Type of Land Use	Area in Ha
1	Quarry Area	0.085
2	Infrastructure (Road . material handling / stock yard)	0.00
3	Road	1.50
4	Agriculture	0.00
5	Plantation	0.00
6	Water body	0.00
7	Habitation	0.00
8	Undisturbed Land	75.165
9	OB Dump	0.00
Total		**76.75**

After all the statuary clearance, mining operations is underway and the present land use has changed in the mine lease area.

1.9 Geology

The regional stratigraphic sequence of Mahendragarh District and southern part of Haryana State is as follows:

Delhi System	Ajabharh Series	Biotitic Schist, phyllites, Quartzites
		Biotitic Schist, phyllites, Qquartzites,
		Impure limestone, & Claciphyres
	Alwar Series	Dolomite, Quartizite, Arkoses
		Conglomerates and mica schist with bedded Lavas
	Railo Series	Railo limestone and marble, Railo Quartzites.

Out of the above sequence of formations, Quartzite associated with vein of Quartz and Feldspar belongs to Alwar series of Delhi System are exposed in the study area.

1.9.1 Geology of the Study Area

The study area including the mine lease area comprises of Alluvium (Top soil), Quartz mixed with Quartzite, Feldspar mixed with Quartzite, Amphibolites and Micaceous phyllite with quartize of Delhi Super group.

No soil exposure is observed on the top of the hill ie., in the mine lease area. However, in the foot hills reddish brown soil extends from 0.5m to 2.0m. The quartz and Feldspar beneath the soil cover.

The strike of the quartzite formation varies from N20-250 E to S 200-250 west dip of 65 to 70 southeast. The ground water movement takes place along the strike of the formation.

The geological formation of as per Geological Survey of India (GSI) is as follows:

Geological Notation as per GSI	Geological Formation
Pt12dabp4	Massive Quartzite
oPt2i49	Amphibolite / Meta – Basic Rock
Quq7	Quaternary, fine sand silt and clay
yPt3di1	Acid / Basic Intrusive

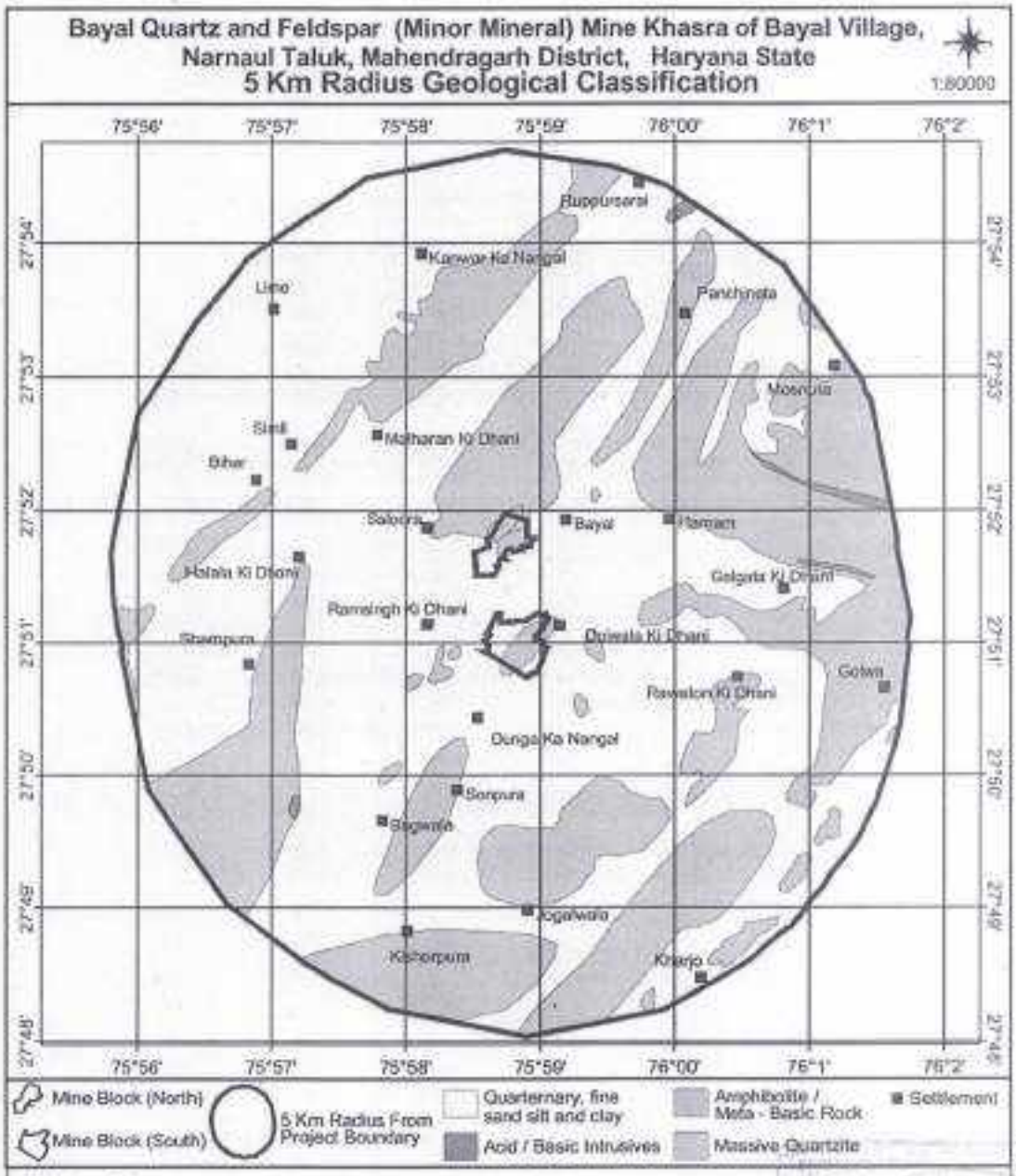


Plate – 5

The geology map obtained from Geological Survey India (GSI) for 5 km radius area depicts that most of the area is composed of Massive Quartzite. No Minor fractures exist in Quartzite and infiltration of rain water in quartzite is poor.

1.10 Geomorphology and Structure

The land forms / geomorphic units and structures such as fractures, fissures and faults have been interpreted from the recent satellite image. All the landform / geomorphic units and structures occurring in the study area are mapped.

The geomorphology and structures of the area play a vital role in identifying the ground water potential zones. The following geomorphic units have been interpreted.

1. Pediment - Denudational Origin
2. Highly Dissected Hills - Denudational Origin

The Pediment is poor respect of ground water occurrence and movement. The Mine is located in highly dissected hills.

Apart from the above there are numerous fractures occur in and around the project site. The fractures are the good ground water conduit. High yielding bore wells / open wells are expected in the intersection of fractures. Within 1 km radius from the Mine boundary, there are fracture systems. However, the fractures are deep seated which is confirmed by geophysical survey results and bore well drilling results. The bore wells located in and around the mines area exhibits deep seated fractures.

The Satellite Imagery, and the Geomorphology and structure maps are presented in Plate 6 &7:

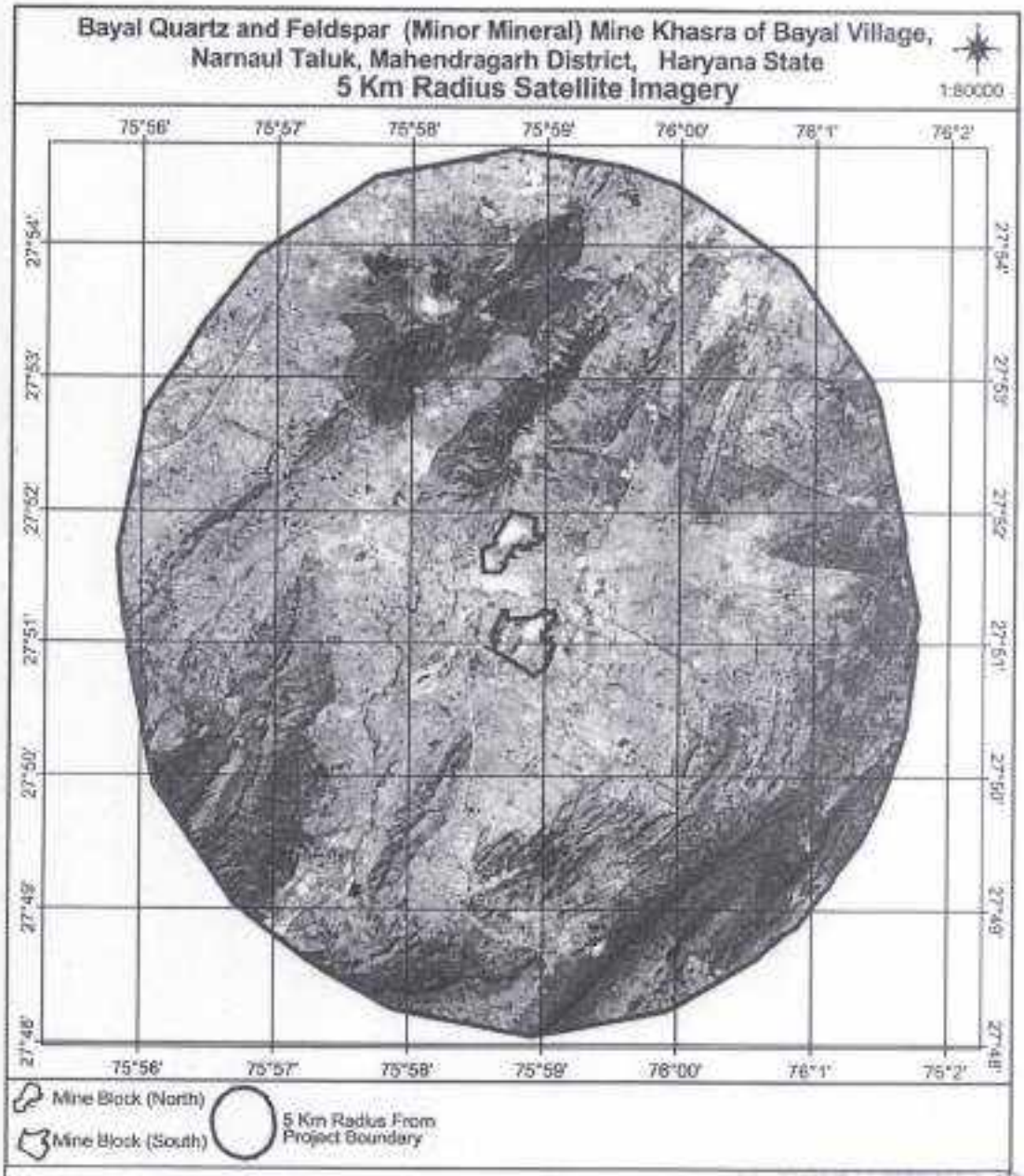


Plate – 6

The recent Satellite imagery (April-2019) shows different land use pattern surrounding the mines area. Imagery also exhibits the structural disturbances and the orientation of hills within the study area.

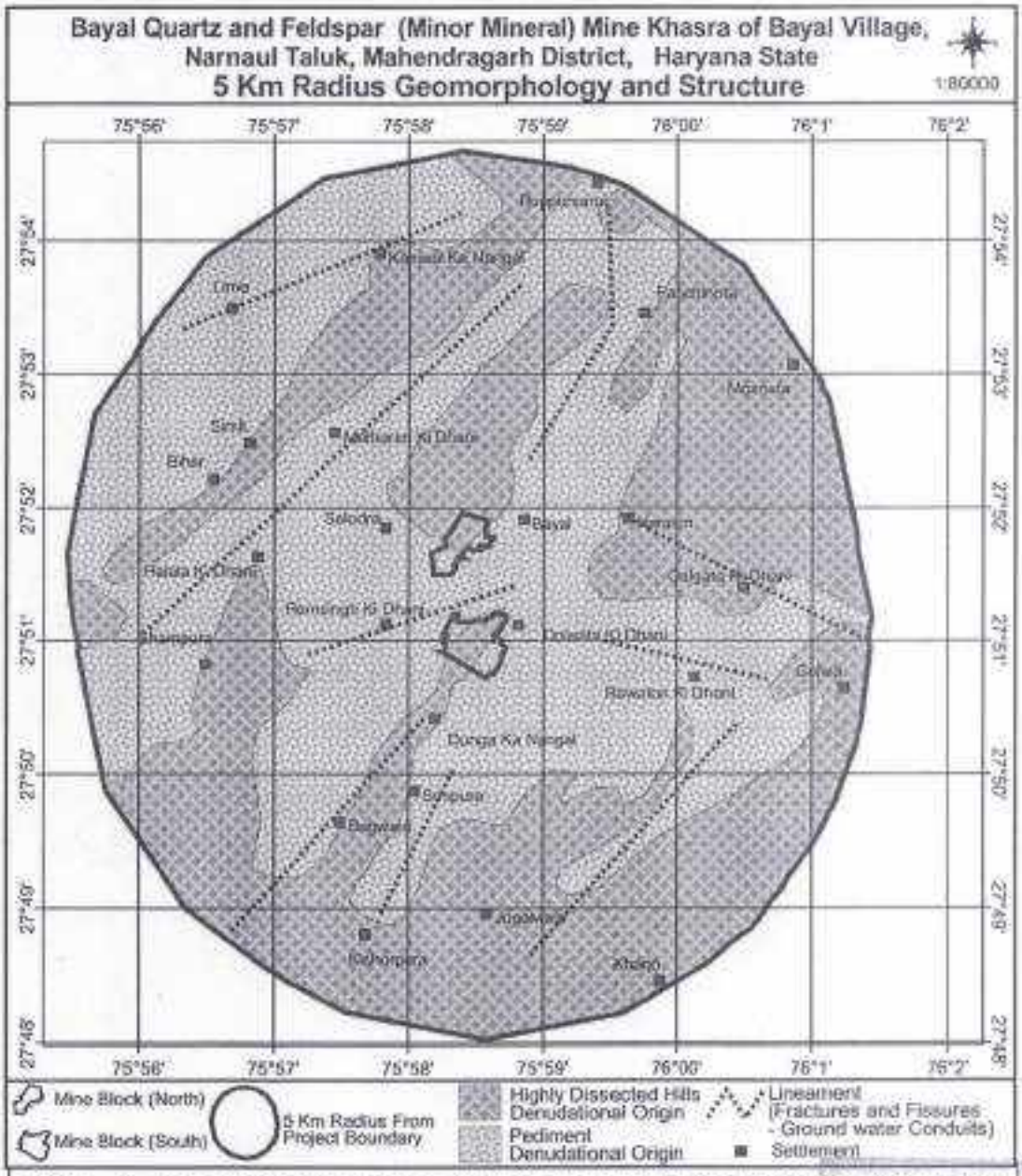


Plate – 6- The geomorphic features and the structures such as fractures, fissures are interpreted using satellite imagery. The entire 5 km radius area covered by 2 geomorphic units such as highly dissected hills and pediment. Both the geomorphic units are mostly acts as runoff zone. The occurrence and movement of ground water is controlled by the fractures and fissures.

1.11 Regional Hydrogeology

The Study area is underlain by alluvium and Hard formations,. In hard rock area the depth of bore holes ranges between 70 to 200 m and the water bearing zones in weathered fractured quartzite and limestone were tapped. The discharge of tube wells varies between 100 to 1000 lpm (Liters per Minutes) with 8m to 20m draw down in lime stone aquifers whereas, in other hard rock aquifers the yield varies between 30-300 lpm.

The generalized aquifer parameters of geological formations of District have been estimated by the State ground water government department is given below:

Formation	Transmissivity (T) m^2/day
Sedimentary (Alluvium)	90-300
Hard rock	20-70

The study area forms part of hard compact formation. The occurrence and movement of ground water in this area is controlled by fractures and fissures.

1.11.1 Hydrogeology of the Study Area

The ground water levels have been observed in the study area during the study period of April 2016 (During Field visit 02 - 03 April 2019). Ground water level has been observed in 7 bore wells in the study area. During the ground water level observation / measurement, the locations of the wells were captured using Trimble Global Positioning System (GPS). Using the GPS data, the location were marked on the map.

The bore well depth varies between 130 -330 m and the static water level is around 86-96 m below ground level. It is also observed the spring depth (Depth at which the ground water encounters) is around 110 – 160 m. from the legacy data. The yield of deeper fractures in and around mine area is relatively high. It is very clear that the deeper fracture system (blow 120 m) is very active

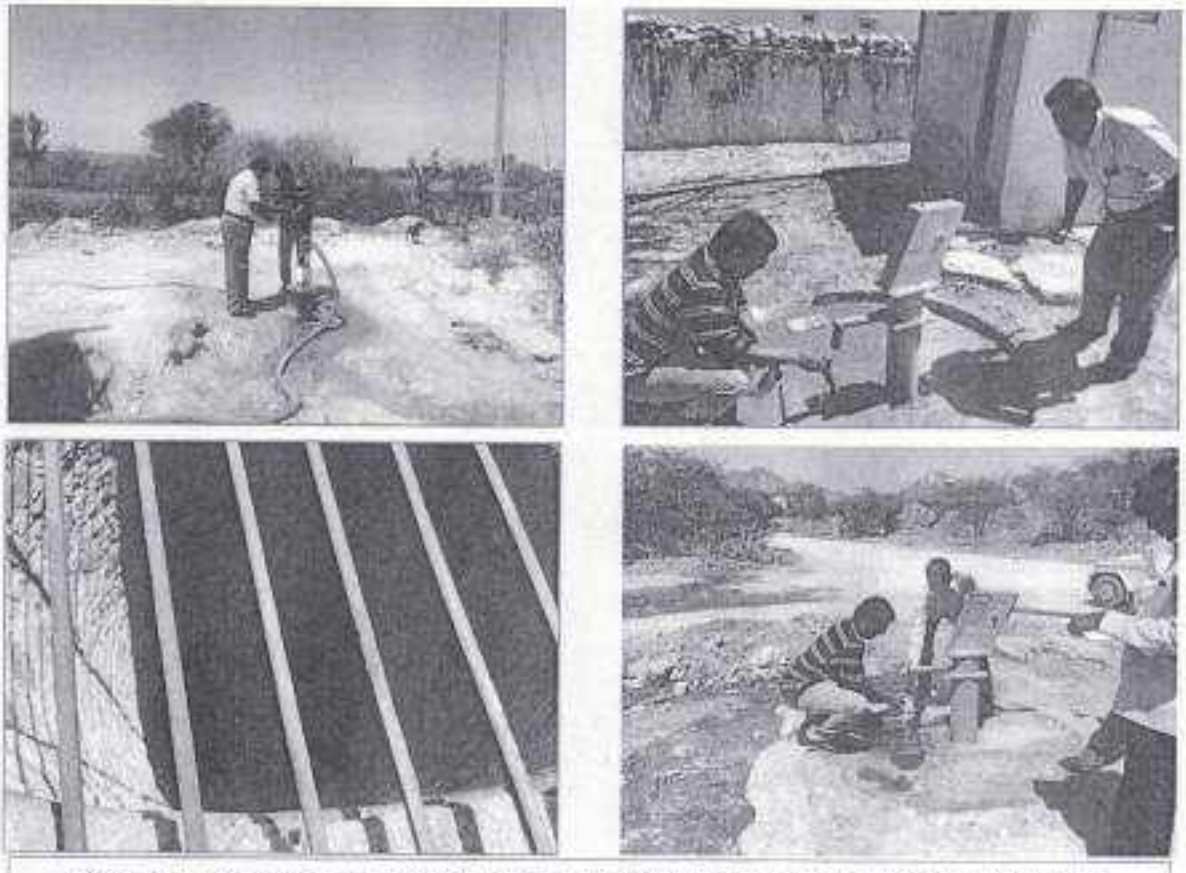
Based on the ground water level data, ground water level zones and ground water table (Ground water table = Mean Sea Level – water level below ground level) have been developed and presented below. From the ground water level zone map it is clear that moderately deepest water level zone of 95.5 - 96.0 m is observed in the central part of the study area (in and around the mine) and it is also noticed that relatively, Moderately shallow water level zones occupied surrounding the mines area.

During the study period, it is observed that the Mine area falls in 95.5-96.0 m ground water level zones. The area is tectonically highly disturbed zone; hence the behavior of ground water movement is highly disturbed. During the drilling of bore well the spring stuck below 110 - 160 m. After drilling, the static water level raises to 86-96 m.

No spring is observed above 110 m within 10 km of the mines boundary. The ground water level from the fractured aquifer which is under pressure will rise in the bore well till the pressure in the aquifer water is equal to hydrostatic pressure. The above clearly indicates that the ground water level observed in the bore wells are due to the upward leaky condition of the fractured aquifer from deeper depths. Moderate steep hydraulic gradient is observed in the mine area.

Ground water level observed locations, Depth and Ground water level in m

No	Location	Latitude	Longitude	Depth in m	Static water level in m	Fractured depth (Spring Depth in m)	Yield in liters /minutes
1	Bore well in Southern Block	27° 51' 16.308"	75° 58' 49.613"	330	96	160	350
2	Bore well in Southern Block	27° 51' 13.151"	75° 58' 44.717"	260	92	140	260
3	Open well	27° 51' 11.02"	75° 58' 45.93"	22	22 m Dry		
4	Near Bhagwala Village	27° 49' 10.42"	75° 57' 37.958"	140	86	120	100
5	Raickeen Wala Village	27° 50' 20.069"	75° 58' 26.346"	130	88	110	100
6	Salodra	27° 51' 57.143"	75° 58' 5.308"	130	90	115	80
7	Lima	27° 51' 43.798"	75° 59' 7.951"	140	89	110	90



Photograph showing the ground water and quality measurement during the field visit

1.11.2. Location of Piezometer

In order to monitor the ground water level variations due to the mining activities, 2 Piezometers are recommended (one in the upstream side and another in the down stream side) based on the ground water flow directions – given in Plate - 11. Before drilling the bore wells for piezometers detailed geophysical investigation has to be under taken.

Bayal Quartz and Feldspar (Minor Mineral) Mine Khasra of Bayal Village, Narnaul Taluk, Mahendragarh District, Haryana State
High Resollution Satellite Imagery Showing location of Piezometer 1:15000

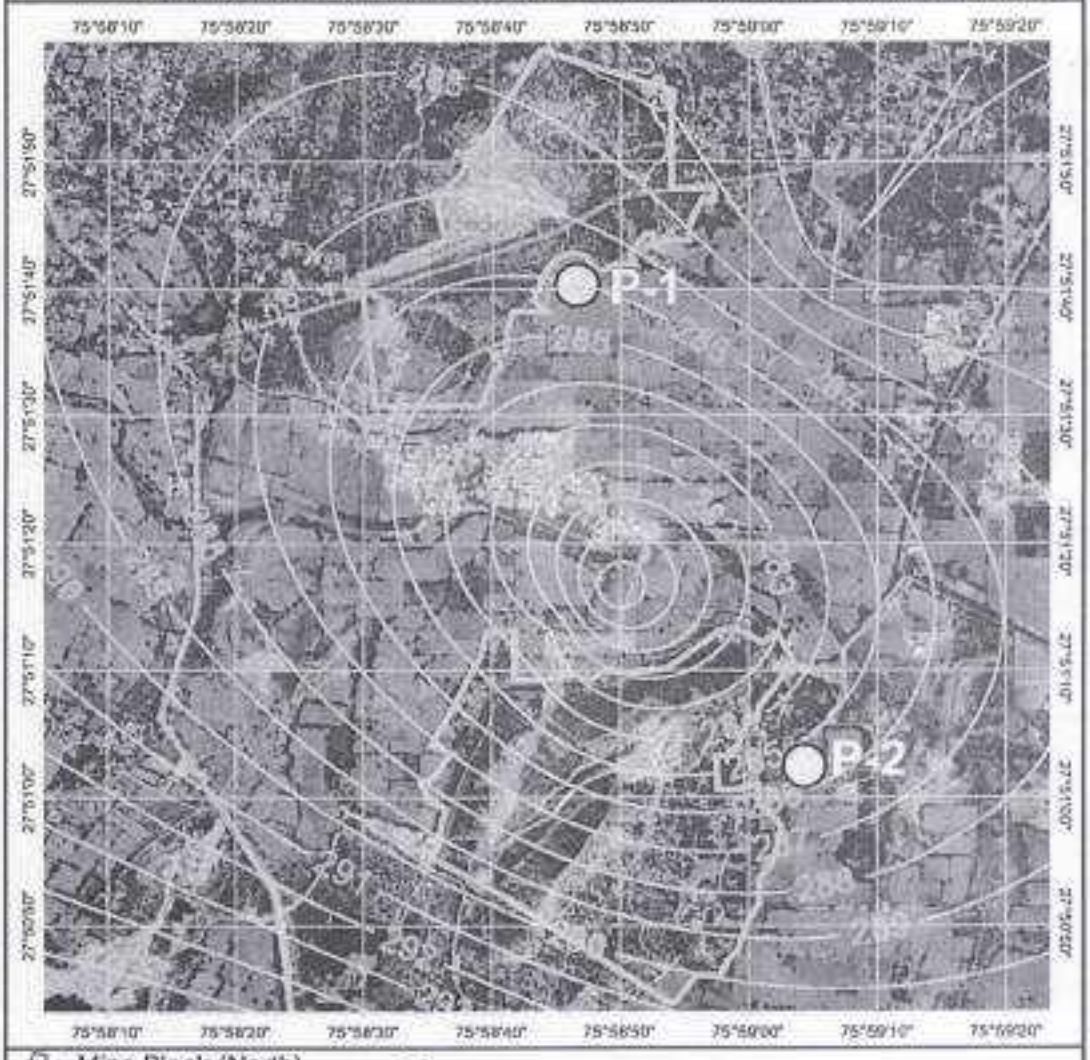


Plate – 11-Location of **Piezometer Latitude and Longitude**

P-1	**Piezometer 1**	**27°51'40.29"N**	**75°58'46.64"E**
P-2	**Piezometer 2**	**27°51'02.46"N**	**75°59'04.43"E**

APPROVED
Deepak Kumar
Team Leader

1.12 Estimation of Ground Water Potential – 5 km around Mines Area

The estimation of ground water potential has been made based on the Ground water Estimation Committee (GEC) norms 2015 of Government of India. The study area has been considered for the estimation of ground water potential. The estimation is made based on the Rain fall infiltration Factor method. The specific yield, infiltration factors have been considered as per the recommendations given by the estimation committee.

The computation of ground water potential estimation as per the estimation committee norms for Rainfall infiltration factor method is as follows:

Monsoon Recharge

Normal Rainfall Recharge – Ri mon = A X If X Rf

Ri_mon = Rainfall recharge during monsoon

A = Area

If = Infiltration factor

Rf = Rainfall

Recharge from other uses – Ro mon = Rc+Rsw+Rgw+Rt+Rwc

Ro mon = Recharge from other uses (infiltration and seepages)

Rc = Canal Seepage

Rsw= Return seepage from surface water irrigation

Rgw= Return seepage from ground water irrigation

Rt = Recharge from Tank

Rwc= Recharge from water conservation Structures

Ground water Draft – Dg mon = Ird+Dd+Id

Dg mon = Gross ground water draft in monsoon season

Ird = Irrigation Draft

Dd = Domestic Draft

Id = Industrial Draft

Non-Monsoon Recharge

Normal Rainfall Recharge – Ri nm = A X If X Rf

Ri_nm = Rainfall recharge during monsoon

A = Area

If = Infiltration factor

Rf = Rainfall

Recharge from other uses – Ro nm = Rc+Rsw+Rgw+Rt+Rwc

Ro nm = Recharge from other uses (infiltration and seepages)

Rc = Canal Seepage

Rsw= Return seepage from surface water irrigation

Rgw= Return seepage from ground water irrigation

Rt = Recharge from Tank

Rwc= Recharge from water conservation Structures

Ground water Draft – Dg nm = Ird+Dd+Id

Dg nm = Gross ground water draft in Non monsoon season

Ird = Irrigation Draft

Dd = Domestic Draft

Id = Industrial Draft

ARGWS-Annual Replenishable Ground Water Resources = **Ri_mon + Ri_nm**

ANDnm-Allocation of Natural Discharge during non-monsoon period= 10%

NAGW-Net Annual Ground Water availability = ARGWS-ANDnm

SGWD-Stage of Ground water Development:

(Dg mon+Dgnm)/NAGWX100

The ground water estimation has been made considering the following:

- Actual monsoon and non-monsoon rainfall data of Mahendragarh Distirct 5 years from the Indian Meteorological Department
- Geological formation based infiltration factor
- Infiltration factor of 2% for silty sand and Quartzite (as per estimation committee norms)
- Streamlet flowing within 5 km radius and its contribution to the ground water system
- Computation of Ground water draft considering crop water requirement
- Norms for return flow from irrigation based on the source of irrigation i.e. ground water or surface water, type of crops and depth to water table below ground level
- Allocation for domestic and industrial water supply based on population density and relative load on ground water
- Deeper aquifer system has not been considered for the ground water estimation

1.12.1. Ground Water Scenario

1. Recharge from rainfall during monsoon season in Ham =	170.35
2. Recharge from other sources during monsoon season in Ham =	126.34
3. Recharge from rainfall during Non-monsoon season in Ham =	32.45
4. Recharge from other sources during Non-monsoon season in Ham =	63.95
5. Total annual ground water recharge =	393.09

6. Natural discharge during non-monsoon in Ham =	39.31
7. Net Ground water availability Ham =	353.78
8 .Existing gross ground water draft for irrigation	165.05
9 Existing ground water draft for domestic water supply Ham =	4.96
10 Existing ground water draft for all uses in Ham	170.01
11 Allocation for domestic requirement up to next 25 years in Ham =	6.45
12.Net ground water availability for further development in Ham =	216.63
13.Stage of ground water development in percentage =	45
Categorization	**Safe**

Source: Estimation based on Field data

The above estimation clearly states that the Categorization of the study area "Safe"

The stage of ground water development is 48%.

1.12.2.Ground Water Estimation – Narnaul Taluk

(As per Estimation Committee Report - 2013)

As per the ground water resource estimation (CGWB Report) the Narnaul Taluk has been categorized as **'SAFE'** Taluk where the stage of ground water development is 49%. The net ground water resource of Narnaul taluk is as follows:

Net Ground Water Availability (ham)	Existing Gross Ground Water Draft for Irrigation (ham)	Existing Gross Ground Water Draft for Domestic and Industrial Water Supply (ham)	Existing Ground Water Draft for All Uses (ham)	Provision for Domestic and Industrial Requirement Supply to Next 25 Years (ham)	Net Ground Water Availability fFor Future Development (ham)	Stage of Ground Water Development (%)
3726	1694	116	1715	108	24	49

The Narnaul Taluk was over exploited during 2011 and it has become safe during 2013

1.13. Water Requirement for the Mines

The Quantity of water requirement for the mine is 50 KLD. The total water requirement is as follows.

Activity	Proposed Ground water Requirement (m^3/day)	Annual Requirement (m^3/year) (340 Days)
Dust Suppression	36	12240
Drinking	2	680
Green Belt / Plantation	10	3400
Domestic	2	680
Grand total	50	17000

Source: Mine Plan

In order to meet the requirement 2 bore well were drilled in the mines area. The bore well depths are 330 and 260 m respectively. The fracture depth of the bore wells are 160 and 140 m. The drilling yield reported as 350 lpm and 260 lpm. To assess the yield of the bore well and under sand the fractured aquifer parameters, pumping test has been conducted during the field visit.

The quality of water (TDS) has been tested in the field using TDSScan and the quality of bore well water found to be within drinking water standards.

CHAPTER

2

2. Evaluation of Aquifer Parameters

Pumping test is the most accurate reliable and commonly used method to evaluate the hydraulic parameters of an aquifer, efficiency of a well / bore well, safer operational rates of pumping and selection of suitable pump. The methods of a pumping test are highly varying in its application. The main objective of pumping test is to determine the aquifer parameters such as Transmissivity (T), Storage Co-efficient (S) Hydraulic Conductivity (K), Well Performance and Safe Yield for execution of water supply.

In order to evaluate the aquifer characteristics, constant discharge test has been conducted in the existing bore well for the pumping test purpose. The draw down and recovery have been observed in the pumping well. The draw down and recovery has been measured.

Pumping Test Methodology

- The constant discharge test has been carried out with the help of tripod and accessories like 5 HP pump and electronic water level indicator etc.,
- During the pumping test, discharge has been measured by volumetric methods and ground water level has been measured using electronic indicator.
- Draw down and recovery have been measured both bore wells and observation wells.

The most important part of the pumping test is measuring the depth of water level at different stages. This could be achieved using the electronic water level indicator. During the initial stage of pumping the frequency of water level measurement should be

at closer time intervals and in the later part of the pumping the frequency may be at larger intervals. The time duration adopted for measuring the water level as follows.

Constant Discharge Test		Recovery Test	
Time since Pumping started (minute)	Time intervals (minute)	Time since Pumping stopped (minute)	Time interval in (minute)
0-10	1	0-20	1
10-20	2	980	After 980 Minutes
20-50	5		

Recovery Test

Recovery test involves measuring the water level rise after pumping is stopped. Recovery rest is used to calculate the transmissivity value of the aquifer as well as to check the results of the draw down data. The duration of recovery test conducted is 20 minutes. (Recovery was again measured after 24 Hours)

Results of the Pumping Test

Depth of Bore Well	330 m
Static Water level	96 m
Pump capacity	5 HP
Discharge in lpm	100 lpm
Time	50 minutes
Drawdown	45 m
Rate of recovery	In 24 Hours 90 % recovery of static water level was attained

Estimation of Safe Yield of the Borewell

In order to estimate the average yield of the bore well the water level recovery data has been used. The calculation is as follows:

$Q = 0.7\ TH/1.281$

Where

Q – Safe Yield cum/day

T – Transmissivity Sq.m/day

H – Available Draw down in m

Optimum yield of the Bore well is **40 m^3/day**

Safe Yield of the bore well worked out to be 40 m^3/day at the rate of 115 lpm discharge for 80 m drawdown for 6 hours of pumping. The total requirement of 50 m^3/day can be met out by the available 2 bore wells.

The pumping test reveals that the drawdown was very drastic initially (25 m in 15 min) subsequently the draw down was low. The above shows that initial draw down due to the stored water discharge not from the aquifer. Later part of draw down indicates that the discharge is from the fractured aquifer.

CHAPTER

3

3. Prediction of Ground Water Inflow in to the Mines

In general the digging of any Mine below the ground water yielding zone will create lowering of water table in the surrounding area due to the development of cone of depression. The Radius of Influence depends on the depth of the water table and the quantum of dewatering of the Mines.

Year wise Mine Production and development Plant:

S.No	Year	Depth from in m RL	Depth to in mRL	Depth in m
1	Year 1	471	444	27
2	Year 2	444	426	18
3	Year 3	426	417	9
4	Year 4	417	408	9
5	Year 5	408	399	9
Total				72

It is proposed to mine to a depth of 72 m below RL of 471m. At the end of 5 years period the mined RL would be around 399 m. The calculated reserves are as follows:

Quartz	Up to 355 mRL
Feldspar	Up to 340 mRL

The Total estimated depth of reserved is **131 m below RL of 471m.**

In order to mine the total reserved of Quartz and Feldspar (up to 340mRL / MSL) the ground water inflow assessment has been made based on the data collected from State and Central Government Department and field observations made during the site visit.

Static Water level

Static water level refers to the level of water in a well under normal, undisturbed, no-pumping conditions. Static water level is best determined when the well has not been pumped for several hours prior to measuring.

Piezometric level

Thus, 'Piezometric level' is an imaginary position to which the water level will rise in a borewell tapping a confined / Fractured aquifer. Piezometric level in two dimensions is called 'piezometric surface'.

Ground water inflow depth:

Normally, the ground water inflow depth for the mining projects, the static water level and the piezometric level of the well in the surrounding area are not considered. The water struck depth (first spring depth) of the bore wells are considered for the calculation of ground water inflow in to the mine pit.

The drilling logs of the bore wells will depict the exact depth of the spring depth in the bore wells located in the fractured aquifer (Hard rock).

In the mine pit, the water collected due to the surface runoff from rainfall and the seepage water from the dump may not be considered as ground water. The above water is considered as storage water / accumulated water (during pumping the water in the mine pit may have no connectivity with the regional aquifer of the area). No cone of depression may develop around the mine pit.

On the contrary, the mine pit excavated beyond the fracture depth (which yields water to the bore wells) the ground water inflow occurs.

Ground water Scenario in and around the Mines:

During the Field Visit, the open well and bore well in and around the mines area has been studied. The details area are as follows:

No	Location	Latitude	Longitude	MSL In m	Depth in m	Diameter in mm	Static water level in m	Fractured depth (Spring Depth in m)	Yield in liters /minutes
1	Bore well in Southern Block	27° 51' 16.308"	75° 58' 49.613"	374	330	200	96	160	350
2	Bore well in Southern Block	27° 51' 13.151"	75° 58' 44.717"	375	260	200	92	140	260
3	Open well	27° 51' 11.02"	75° 58' 45.93"	376	22	6 m	22 m Dry		
4	Near Bhagwala Village	27° 49' 10.42"	75° 57' 37.958"	402	140	150	86	120	100
5	Raickeen Wala Village	27° 50' 20.069"	75° 58' 26.346"	390	130	150	88	110	100
6	Salodra	27° 51' 57.143"	75° 58' 5.308"	379	130	150	90	115	80
7	Lima	27° 51' 43.798"	75° 59' 7.951"	380	140	150	89	110	90

From the above, it is clear that the bore well depth varies between 130-330 m and the static water level is around 86-96 m below ground level. It is also observed the spring depth (Depth at which the ground water encounters) is around 110 – 160 m. The yield of deeper fractures in and around mine area is relatively high. It is very clear that the deeper fracture system (blow 120 m) is very active.

The analysis of the data collected during field visit reveals that the inflow of ground water in to the mines would be below 80 m from the ground level. The below table shows the depth to water level above mean sea level in m (AMSL) and depth to spring / fracture above mean sea level in m (AMSL)

The ground water level monitored by Central Ground Water Board (CGWB) has been collected and analysed. Bayal CGWB observation well location is the nearest location to the mine blocks which is about 2 km. The ground water levels of the CGWB observation well for the period of May 2016 and November 2016 was 26.75 m and 18.50 m below ground level respectively. Considering the elevation at Bayal CGWB observation well location, which is 2 km from the mines block, the water table (water table AMSL = MSL-Static water level) at Bayal village would be around 333 m above mean sea level during May 2016 and 346 m amsl during November 2016. Since the study area is heterogeneous, composed of only secondary porosity (no uniform porosity and permeability) the ground water level at the mine site is much deeper than Bayal village. Considering the above and the ground water level at mine site, it is clear that the reserve depth is much above the ground water table. The digital elevation model showing the mines and CGWB observation well is presented in Plate -11

S.No	Location	Latitude	Longitude	MSL In m	Depth to water level in m (AMSL)	Depth to spring / fracture (AMSL)
1	Bore well in Southern Block	27° 51' 16.308"	75° 58' 49.613"	374	278	214
2	Bore well in Southern Block	27° 51' 13.151"	75° 58' 44.717"	375	283	235
3	Near Bhagwala Village	27° 49' 10.42"	75° 57' 37.958"	402	316	282
4	Raickeen Wala Village	27° 50' 20.069"	75° 58' 26.346"	390	302	280
5	Salodra	27° 51' 57.143"	75° 58' 5.308"	379	289	264
6	Lima	27° 51' 43.798"	75° 59' 7.951"	380	291	270

The table above indicates that the mining up to **320 m above mean sea level (AMSL) is safe (However, the reserve depth is estimated up to 340m)** which would not intersect the ground water. Since the mine pit is open, the rainwater and seepage from the mine dump may accumulate in the mine pit which requires pumping. The pumping of stored or accumulated water in the mine pit would not create cone of depression.

Ground water inflow Estimation:

The depletion of shallower deposits has led to a considerable increase in the economic working depth of Open Pit Mining. As a consequence, many Surface Mining operations are now being carried out below the ground water table.

When a Pit penetrates into an aquifer, the significant amount of ground water flow occurs to the Pit. Therefore, the large volume of water must be pumped to provide a dry mining condition.

Recognition of ground water regime in and around the Mine Pit and hydraulic prosperities of layers in the Mine vicinity is important to control water inflows to Mine. To design an effective dewatering system for the Mine Pit, the modeling of water related problems and prediction of water inflow into the Mine Pit is necessary.

The results of such simulations have been used to develop an appropriate water management strategy in order to minimize the operational problems below the water surface and long-term environmental problems, in the feasibility stage of mine design.

When Mining Operations are to be carried out below the water table, Mine operators potentially face with two important water-related problems.

These are the amount and pressure of groundwater that could flow into an Open Pit and the effect of pore water pressure on the stability of an Open Pit are high.

The amount of water inflow into a Mine Pit is very important for development of a Mine-dewatering program. Numerical models can provide a more realistic representation of the interaction between groundwater systems and Mine excavations.

Governing Equation of Inflow Model

The governing partial differential equation for a two dimensional saturated/ unsaturated flow condition can be obtained by coupling the Darcy's law and continuity equation

(Freeze and Cherry, 1979) as given below:

$$\frac{\partial}{\partial x}(K_x \frac{\partial h}{\partial x}) + \frac{\partial}{\partial y}(K_y \frac{\partial h}{\partial y}) = C\frac{\partial}{\partial t}(h) + Q$$

where, K_x and K_y are the hydraulic conductivities in the X and Y directions respectively, Q is the recharge or discharge per unit volume, H is the hydraulic head and t is the time. The hydraulic head is correlated to the volumetric water content (θ) using the following equation:

$$\frac{\partial \theta}{\partial t} = C\frac{\partial h}{\partial t}$$

where C is the slope of the water storage curve.

Prediction of Ground Water Inflow in the Mine

In order to predict the groundwater inflow to a deep Open Pit Mine, two analytical equations were used. The first analytical equation was presented by Vandersluis et al. (1995). This equation is used in arid and semiarid areas where precipitation is generally limited and water inflow to a Pit in an unconfined aquifer is normally controlled by horizontal ground water inflow.

Analytical Equation presented by Vandersluis et al. (1995)

$$Q = \frac{366.1 \times K\,(2H\Delta - h)\Delta h}{\log(R + r) - \log r_o}$$

The second analytical equation quoted in Krusseman and De Ridder (1979) and Singh et al. (1985) is based on well hydraulics and can be used for estimation of steady state inflow rate to an Open Pit Mine. This equation was derived from Thiem-Dupuit equation and can be applied for unconfined aquifer. Analytical Equation presented by Krusseman and De Ridder (1979) and Singh et al. (1985)

$$Q = \frac{\pi K(H^2 - h^2)}{\ln(\frac{R}{r})}$$

The Radius of Influence R is reduced to:

$R = 5755(HK)^{0.5}$

In above equations:

Q = groundwater inflow (m^3/day)

K = permeability of the unconfined aquifer (m/day)

H = potentiometeric surface or initial water table elevation (m)

R = radius of influence (m)

0 = reduced radius of the Open Pit by level (m)

h = potentiometric surface elevation at a specific point (m)

p = radius of the Pit at the desired level (m)

Δh = drawdown at the desired level (m)

The above calculation has been used to evaluate the inflow in to the Mine Pits located in Bayal mines area.

Results

The maximum and minimum static water level in and around the mine pits are 86 and 96 m respectively. The water bearing fractures encountered at depth of 110-160 m. (water struck below 110 m from the fracture systems). The above has been ascertained at the time of drilling of bore well. The same has also been ascertained during the pumping test. Hence upto 110 m from ground level has been considered as non-inflow zone. The inflow for different benches of the Mine Pit has been estimated and results are as follows.

Mine North and South Block– Ground Water Cumulative Inflow

5 years Period

Bench 1-8 (Up to Five Years) - Depth From 471 to 399 m AMSL (RL) (Ground Water Level at 86 m and Water bearing fracture depth 110 m) No Ground water inflow		
$Q=\frac{\pi K(H^2-h^2)}{\ln(\frac{R}{r_p})}$		**Cumulative Inflow into the Mine (m^3/day)**
T = Transmissivity of the Aquifer (m^2/day)	0	0
K =Permeability of the Unconfined Aquifer (m/s)	0	
H = Potentiometric surface or Initial Water Table Elevation (m)	0	
R = Radius of Influence (m)		
h = Potentiometric Surface Elevation at a Specific Point (m)	0	
rp = Radius of the Pit at the Desired Level (Sq.m)	0	
Q = Ground Water Inflow (m^3/day)	**0**	
Estimation of inflow up to the reserved depth of 340 m		
399 – 340 m AMSL (RL) No ground water inflow		
T = Transmissivity of the Aquifer (m^2/day)	0	0
K =Permeability of the Unconfined Aquifer (m/s)	0	
H = Potentiometric surface or Initial Water Table Elevation (m)	0	
R = Radius of Influence (m)		
h = Potentiometric Surface Elevation at a Specific Point (m)	0	
rp = Radius of the Pit at the Desired Level (Sq.m)	0	
Q = Ground Water Inflow (m^3/day)	**0**	

340-320 m AMSL (RL) Ground water inflow expected at 320 m		
T = Transmissivity of the Aquifer (m^2/day)	0.6	948
K =Permeability of the Unconfined Aquifer (m/s)	0.00000069	
H = Potentiometric surface or Initial Water Table Elevation (m)	320	
R = Radius of Influence (m)	1200	
h = Potentiometric Surface Elevation at a Specific Point (m)	310	
rp = Radius of the Pit at the Desired Level (Sq.m)	343	
Q = Ground Water Inflow (m^3/day)	**948**	

Ground Water Cumulative Inflow

Description	Ground water inflow (m^3/day)	Cumulative Inflow into the Mine (m^3/day)
Bench 1-8 (Up to Five Years) - Depth From 471 to 399 m AMSL (RL) (Ground Water Level at 86 m and Water bearing fracture depth 110 m) No Ground water inflow	Nil	Nil
Estimation of inflow up to the reserved depth of 340 m. 399 – 340 m AMSL (RL) No ground water inflow	Nil	Nil
340-320 m AMSL (RS) Ground water inflow expected at 320 m	948	948

The 5 years mines workable depth is 399 m RL. The ground water level and fractured depth data indicate that there is no ground water inflow in the mine pit.

From the analysis it is clear that mining up to 320 m above mean sea level (AMSL) is safe (However, the reserve depth is estimated up to 340m) which would not intersect the ground water. Since the mine pit is open, the rainwater and seepage from the mine dump may accumulate in the mine pit which requires pumping. The pumping of stored or accumulated water in the mine pit would not create cone of depression. Below 320m RL ground water inflow is expected from the fracture system. Hence, it is advisable that the mining operations may be restricted up to the depth of 340 m RL.

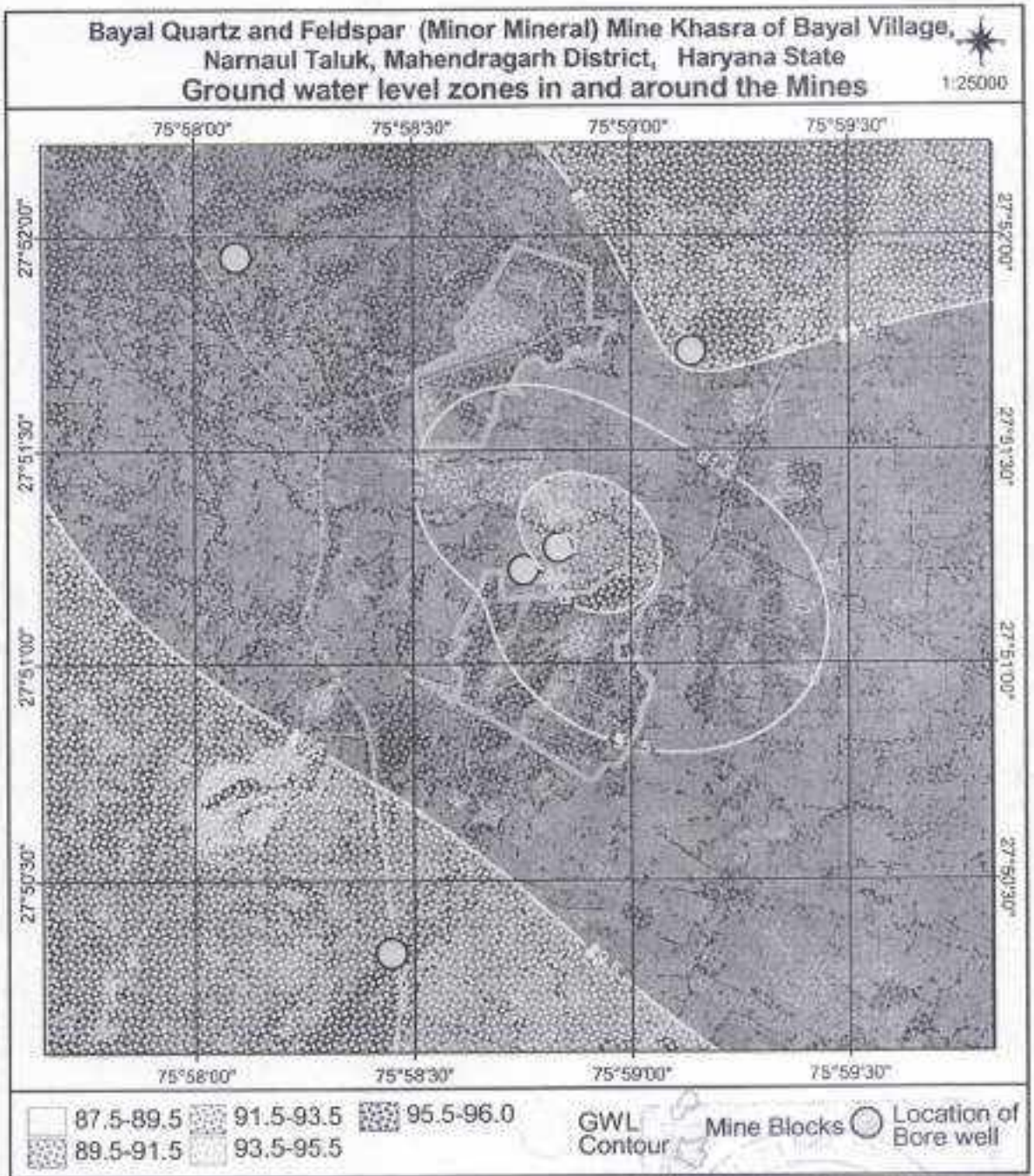


Plate – 8 The above spatial distribution of ground water level zones depicts that the mines area falls in the ground water level zones of 89.5 to 96.0. The mining operations are taking place in the relatively elevated area.

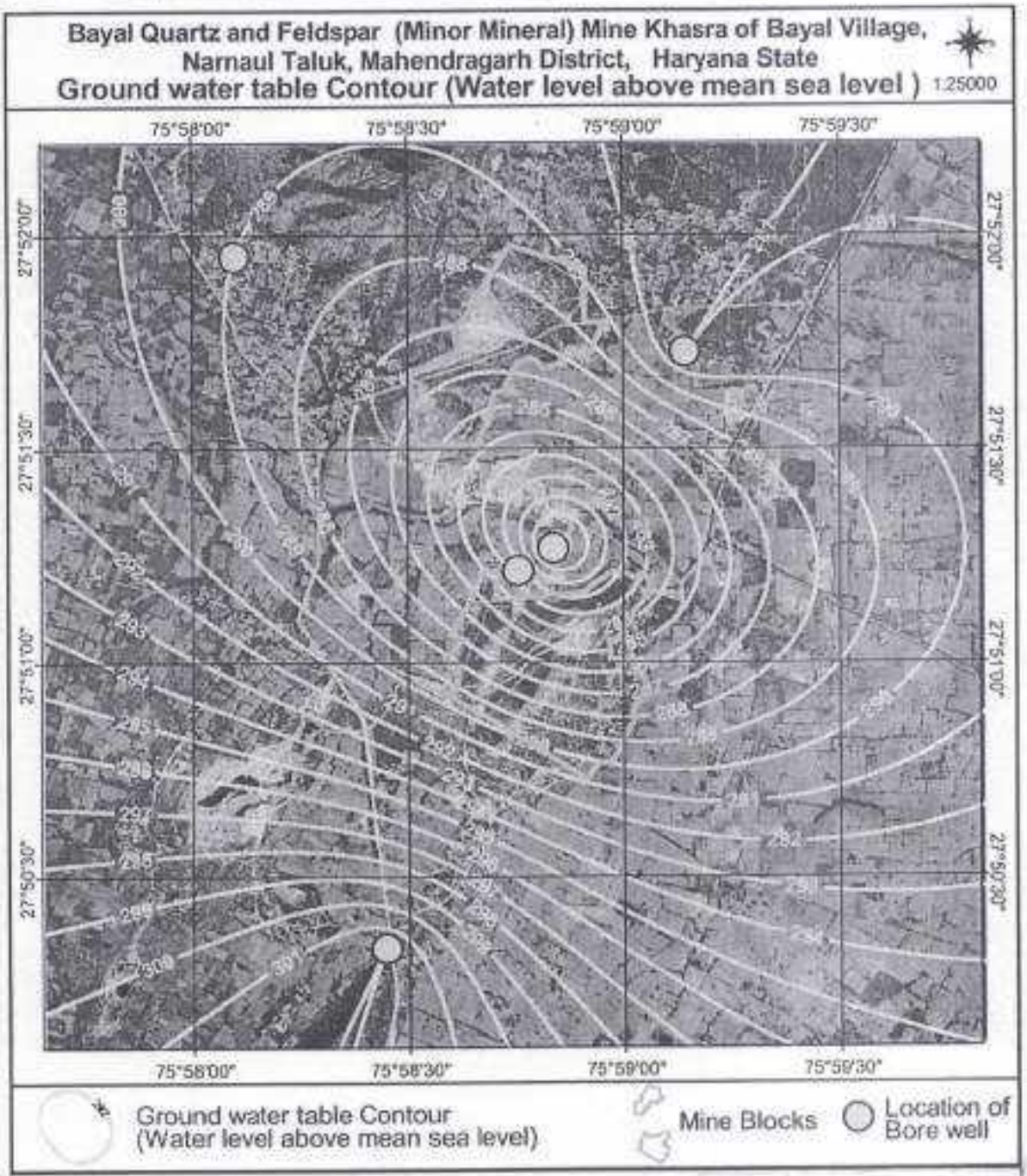


Plate –9 The above contour map shows the ground water table zone (Ground water level above mean sea level). In the mines area the average ground water table is around 320 m amsl (RL). The estimated reserve depth is around 340 m amls (RL). Hence the ground water table is much below ie., 20m below the mine reserve.

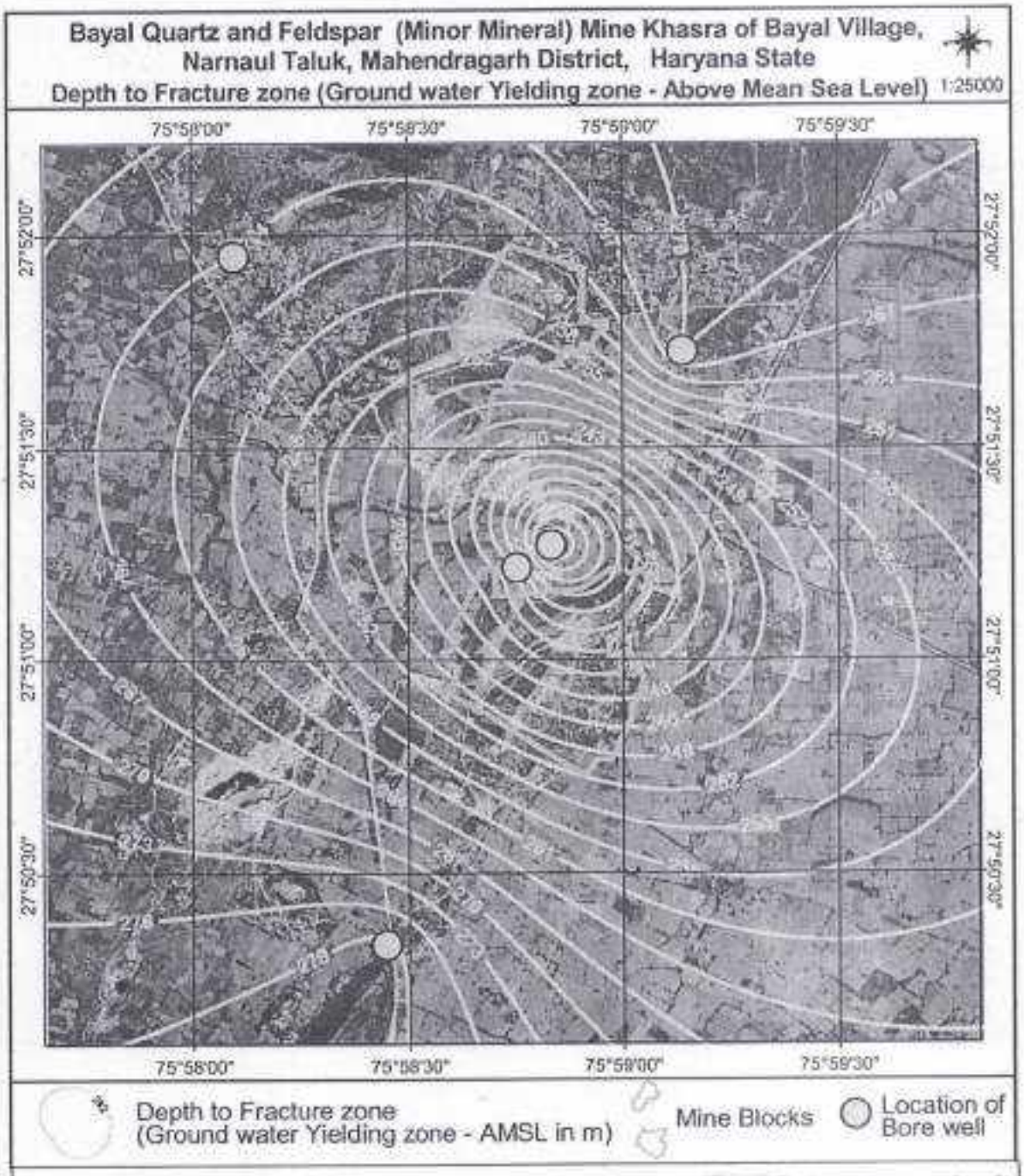


Plate – 10 The depth to fracture zone (Ground water yielding zone) above mean sea level contour has been constructed. The above contour map shows the fracture depth ie., ground water yielding zone. In the mines area the average fracture depth is around 250 m amsl (RL). The estimated reserve depth is around 340 m amsl (RL). The water yielding zone is much below the estimated reserve.

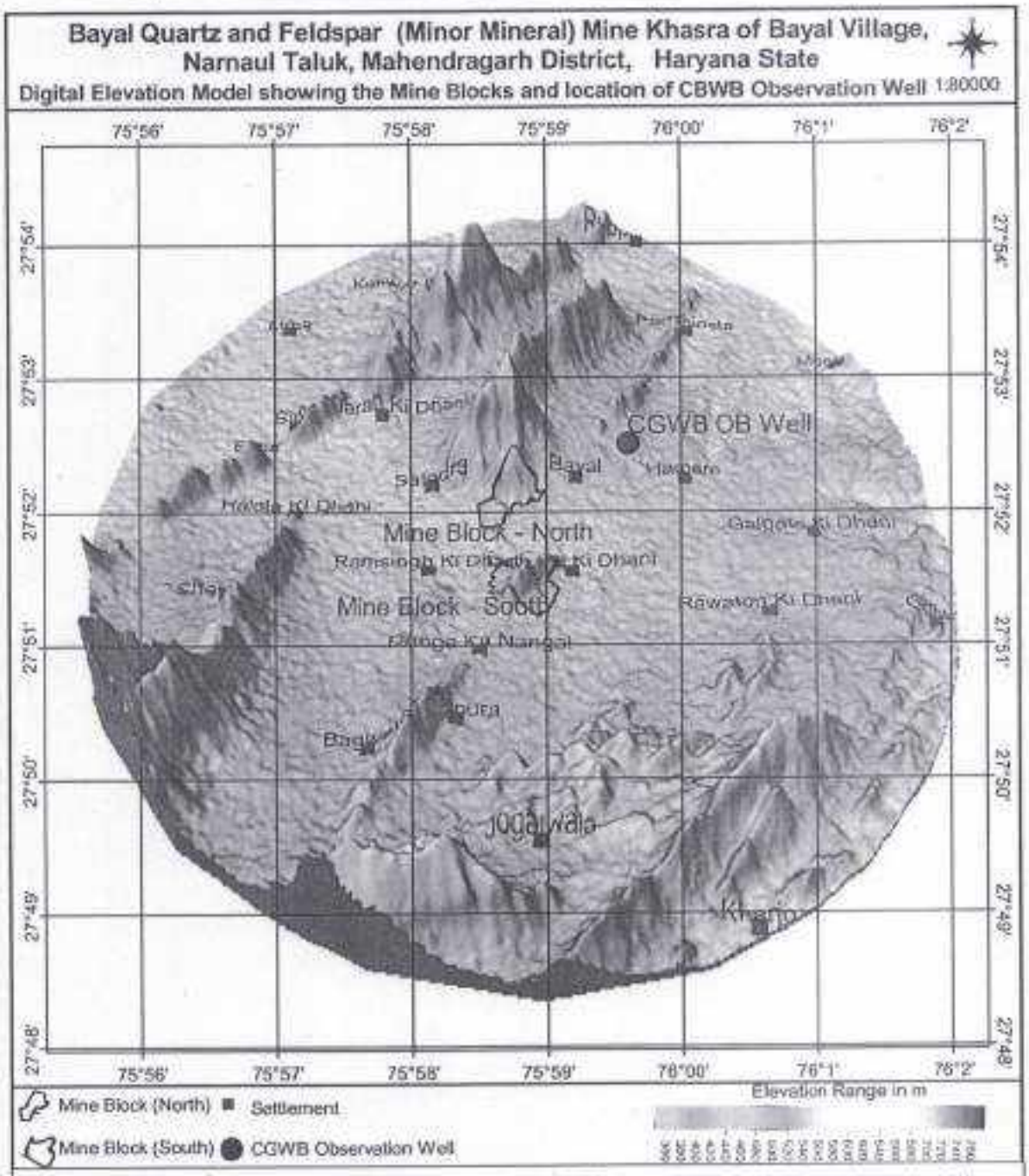


Plate – 11 The Digital Elevation Model derived from Carto-DEM showing the Mines location and the CGWB Observation locations. It is clear that the mines and observation wells located 2 km apart and the mines are located relatively located at higher altitude.

The above interpretation and analysis of primary and secondary data clearly reveals the following:

1) Mine blocks are located in the hilly area
2) The ground water level is much deeper in the plains and no inflow of ground water observed in the excavated mine pits (36 m from the hill top)
3) Considering the ground water table and the depth to fracture depth (water yielding zone) the reserve depth is much above.
4) Hence mining up the total reserve depth of 340m RL may not intersect the ground water table.
5) However, the rainfall storage in the excavated mine pit and the seepage from the mine dump has to be dewatered for the smooth operation of mining activity.
6) The dewatering operation of the dead storage (storage due to rainfall over the mine pit and seepage mine dump) may not develop cone of depressions which may not affect the ground water in the nearby drinking and irrigation wells.

CHAPTER

4

4. Ground Water Recharge Measures around the Mines

The Ground water assessment studies around 5 km radius zone reveals that the area is safe as per estimation committee norms. The mine area is located in the safe Taluk. In order to protect the ground water of the study area, artificial recharge measures in and around the Mine has to be taken up. This would ameliorate the ground water levels of the area and also to prevent over exploitation.

Watershed based runoff has been estimated covering the mines area. Based on the normal rainfall the quantity of runoff generated using Soil Conservation Services (SCS) Method.

Watershed has been delineated using the Carto-DEM data and the estimation has been made. Based on the availability of runoff water artificial recharge structures have been suggested.

The area of watershed is 30.85 Sq.km. Based on the land use and the soil characteristics, the estimated CN value is 80. The month wise runoff for the period from 2013 to 2018 has been estimated and presented in the table below:

The watershed map is presented in Plate - 12

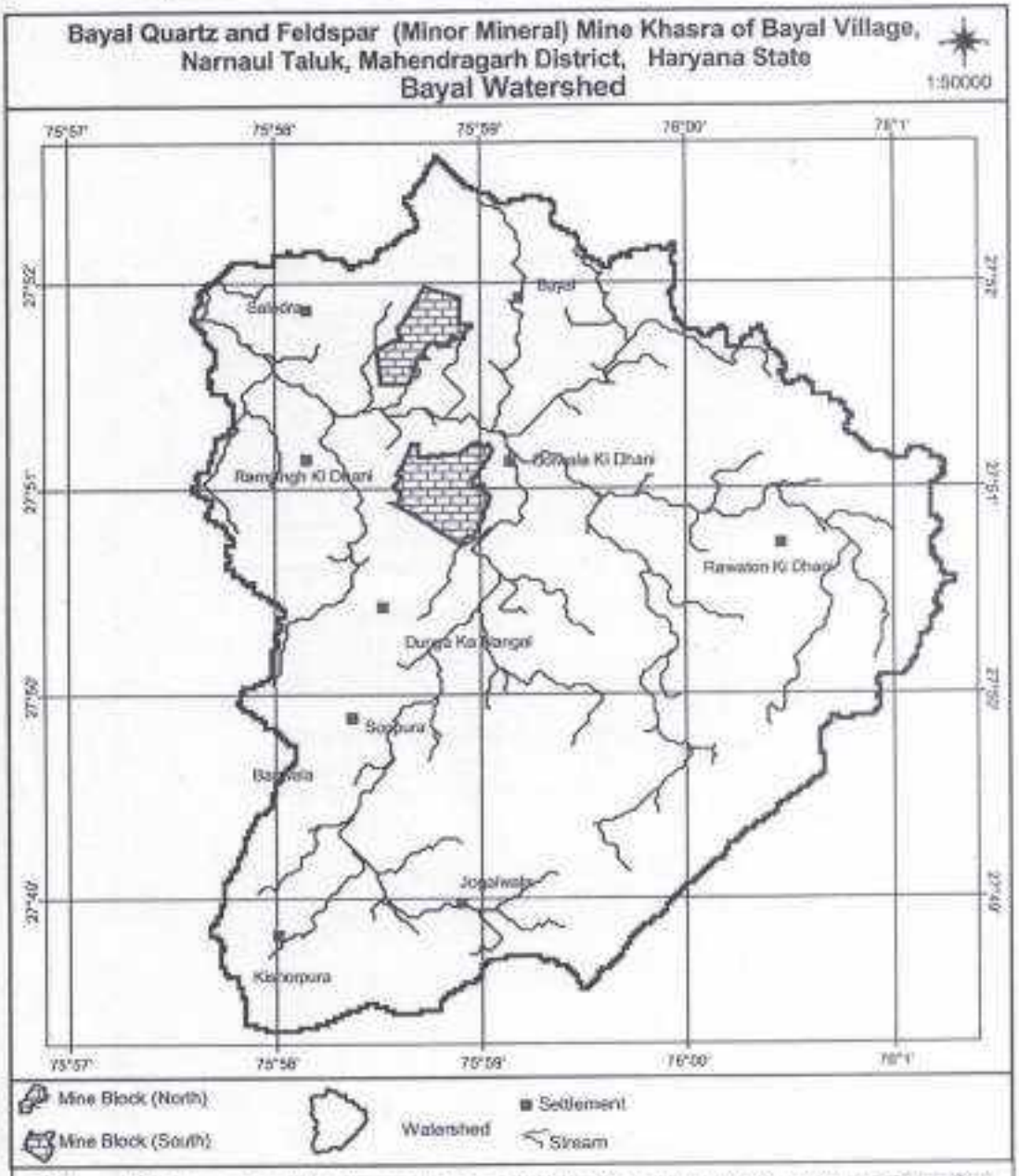


Plate – 12 shows the Bayal watershed covering *the mine blocks. The streams flow towards north west.*

Bayal Watershed						
Area of watershed Sq.km				CN		
30.85				80		
Month	Runoff in MCM					
	2013	2014	2015	2016	2017	2018
January	0.06	0	0.00	0	0.01	0.01
February	0.80	0.00	0	0	0	0.06
March	0	0.05	0.58	0.01	0.05	0.44
April	0	0.04	0.05	0	0.01	0.06
May	0	0.01	0.09	0.22	0.16	0.08
June	0.05	0.54	0.26	0.42	2.82	0.29
July	1.34	0.50	0.98	3.08	0.91	1.00
August	3.10	0.25	0.32	2.37	0.60	0.33
September	0.28	0.42	0.00	0.06	0.19	0.01
October	0.10	0.05	0.02	0	0	0.01
November	0.08	0	0	0	0	0
December	0	0.07	0	0	0.07	0.08
Total	**5.80**	**1.94**	**2.30**	**6.17**	**4.82**	**2.36**

From the above table it is clear that there is considerable quantity of runoff is available. The runoff water can very well be harvested within the watershed area. Based on the runoff, in 3 locations, check dam with recharge bore wells have been suggested. As corporate social responsibility, the corporate may create the recharge structures.

The location of recharge structures marked on the map and the same is presented in Plate – 13

The Schematic diagram of Check dam and the recharge bore well is presented as annexure

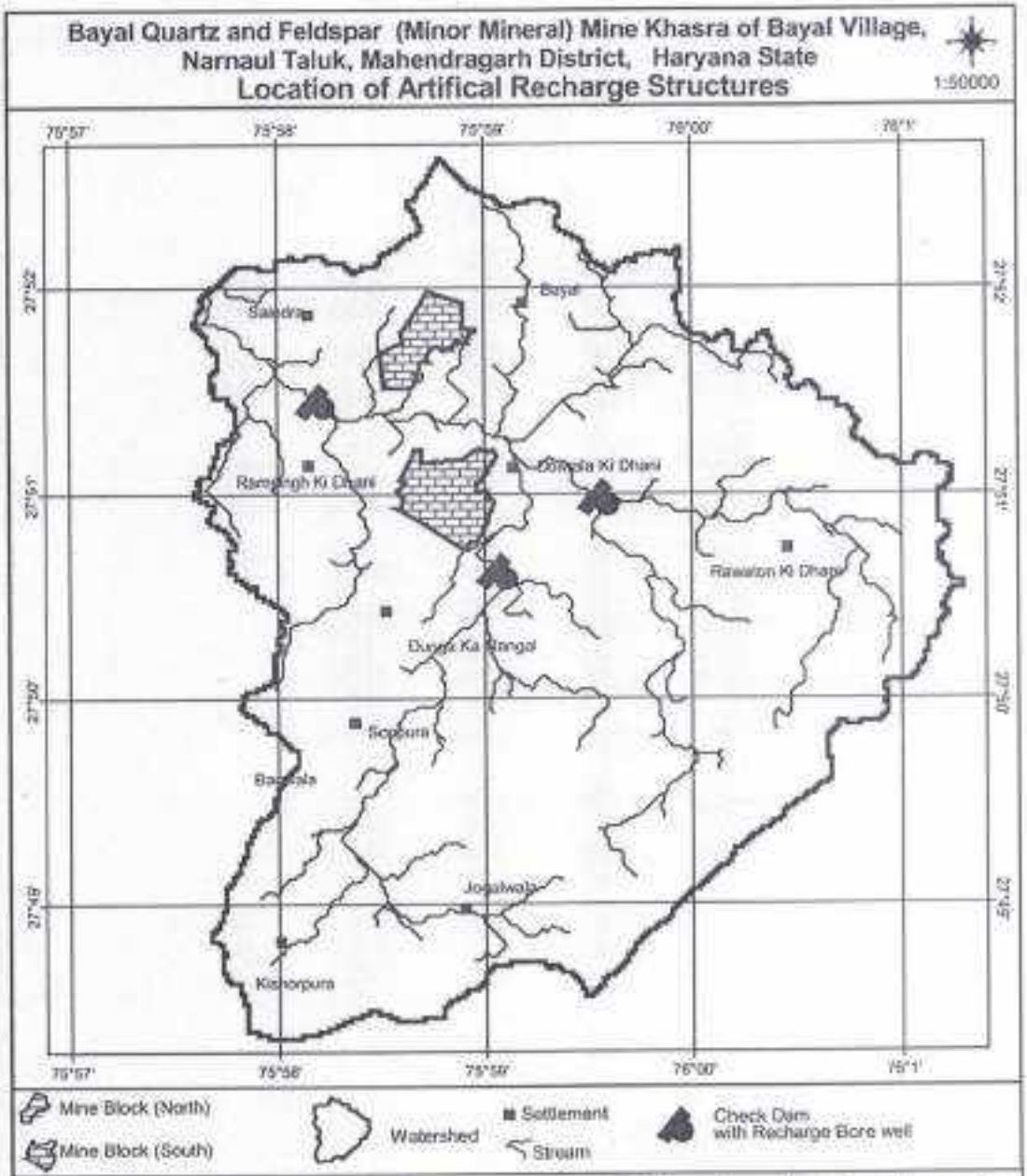
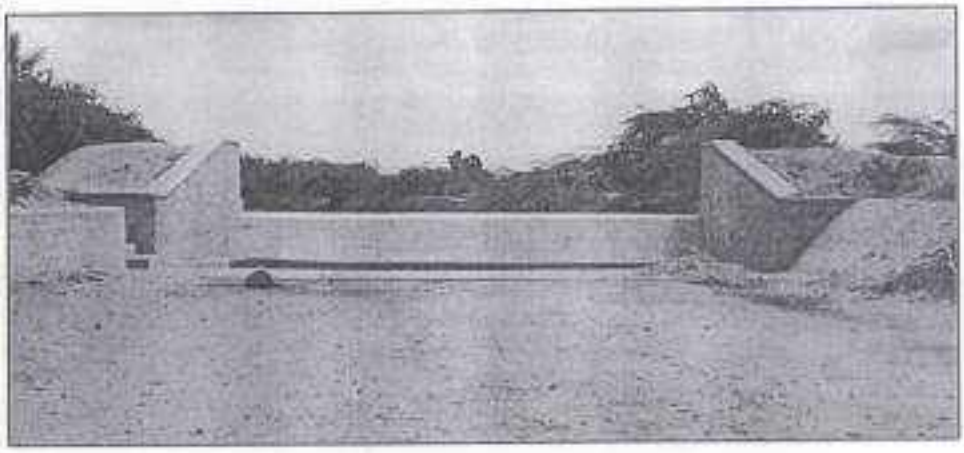
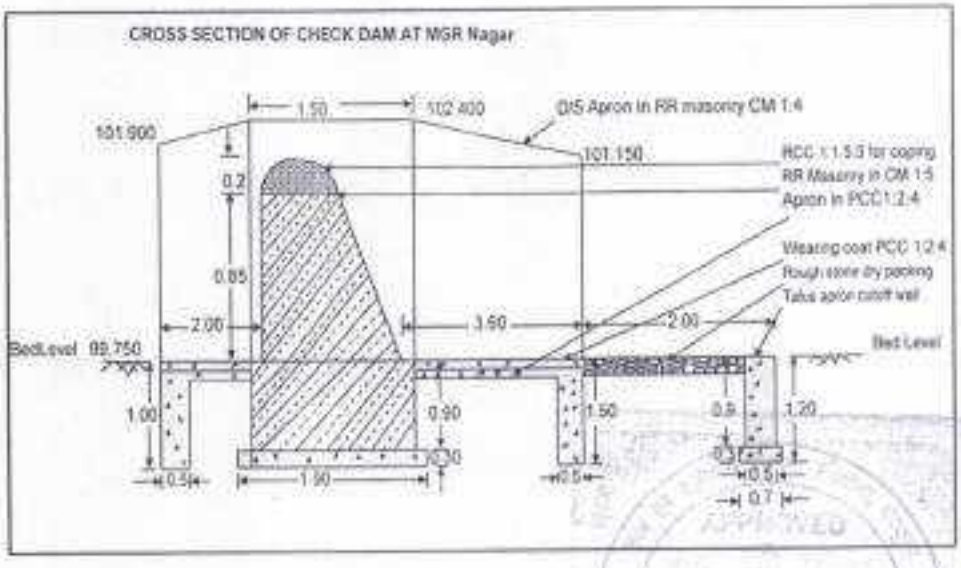


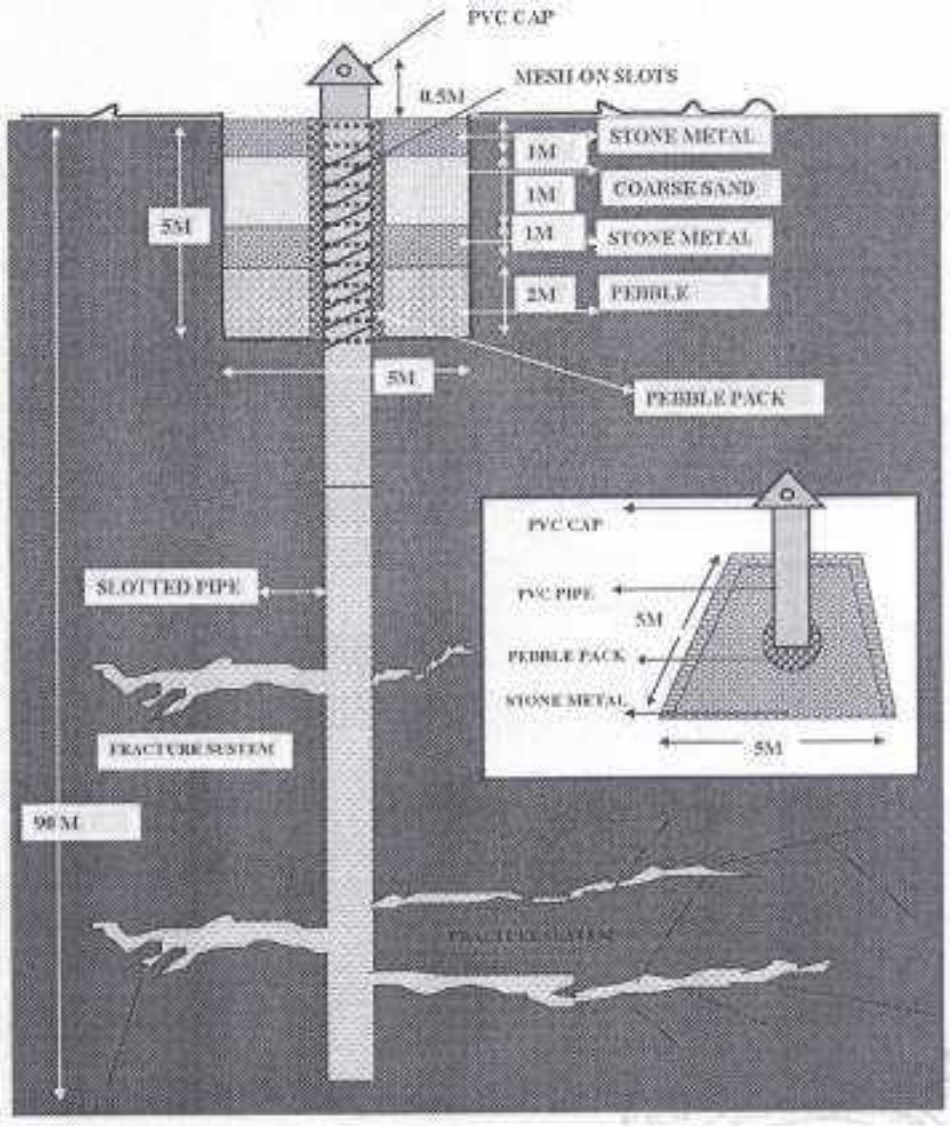
Plate – 13 shows location of recharge structures. In 3 locations the check dam with recharge bore wells are suggested.

Check Dam and its Design





DESIGN OF RECHARGE TRENCH WITH BORE WELL



CHAPTER

5

5. Discussion and Recommendation

The mine lease area is 76.75 Hectares. The mines are located in two blocks such as north block and south block.

The administrative unit within the study area from the project boundary comprises of 24 villages within 5 km radius from the mine blocks boundary.

The study area (covering 5 km radius) lies in between North Latitude 27° 49' 30" and 27°54'10" and East Longitude 76° 55'50" and 76°02'00" and forms part of the Survey of India Topo Sheet Nos. 45 M/13, 55 A/1.

The mine blocks falls in 45 M/13. The total aerial extent of the study area covering 5 km radius from the Mine is **91.62 Sq.km.**

Both the blocks of the mine are located relatively higher elevation. The minimum and maximum elevation of the Mine is 374 & 471 m above mean sea level respectively.

There is no major river system within 5 km radius from the mines. The streams are only seasonal and very lean flow in the river during the monsoon period.

There are no major reservoirs / Dam or irrigation tanks in 5 km radius study area.

No diversion of streams due to mining activity has taken place. The mining activity has not abstracted the free flow of water in the streams during the rainy seasons.

The normal annual rainfall of the District is 500 mm which is unevenly distributed over the area 26 days. Generally rainfall in the district increases from southwest to northeast.

Primarily, 5 km radius from the mine blocks farm part of scrub forest. The second major land use is land with or without scrub. The crop land occupies less area in the plains. Rain fed agriculture is observed in the area.

Very less area is irrigated by ground water as the ground water availability is poor. River or tank based irrigation systems are not observed in the area.

The study area including the mine lease area comprised of Alluvium (Top soil), Quartz mixed with Quartzite, Feldspar mixed with Quartzite, Amphibolites and Micaceous phyllite with quartize of Delhi Super group.

No soil exposure on the top of the hill ie., in the mine lease area

The strike of the quartzite formation varies from N20-250 E to S 200-250 west dip of 65 to 70 southeast. The ground water movement takes place along with the strike of the formation.

Geomorphologically, the study area covered by Pediment which is poor respect of ground water occurrence and movement. The Mine is located in highly dissected hills.

Apart from the above there are numerous fractures occur in and around the project site. The fractures are the good ground water conduit.

High yielding bore wells / open wells are expected in the intersection of fractures. Within 1 km radius from the Mine boundary, there are fracture systems. However, the fractures are deep seated which is confirmed by geophysical survey results and bore well drilling results. The bore wells located in and around the mines area exhibits deep seated fractures.

The bore well depth varies between 130m - 330 m and the static water level is around 86m -96 m below ground level. It is also observed the spring depth (Depth at which the ground water encounters) is around 110m – 160 m.

The yield of deeper fractures in and around mine area is relatively high. It is very clear that the deeper fracture system (below 120 m) is very active

Ground water level of the Mine area falls in 95.5 - 96.0 m zones during the study period. The area is tectonically highly disturbed zone, hence the behavior of ground water movement is highly disturbed.

During the drilling of bore well the spring stuck below 110- 160 m. After drilling, the static water level raises to 86-96 m.

No spring is observed above 110 m within 10 km of the mines boundary. The above clearly indicates that the ground water level observed in the bore wells are due to the upward leaky condition of the fractured aquifer from deeper depths.

In order to monitor the ground water level variations due to the mining activities, installations of 2 Piezometers are recommended (one in the upstream side and another in the downstream side) based on the ground water flow directions.

Before drilling the bore wells for piezometer detailed geophysical investigation has to be under taken.

The ground water estimation within 5 km radius indicates that the Categorization of the study area "Safe" The stage of ground water development is 48%.

As per the ground water resource estimation (CGWB Report) Narnaul Taluk has been categorized as 'SAFE' Taluk where the stage of ground water development is 49%.

Narnaul Taluk was over exploited during 2011 and it has become safe during 2013

The Quantity of water requirement for the Mine is 50 KLD. The total water requirement is as follows.

In order to meet the requirement of 2 bore well were drilled in the mines area. The bore well depths are 330 and 260 m respectively. The fracture depth of the bore wells are 160 and 140 m. The drilling yield reported as 350 lpm and 260 lpm.

The quality of water (TDS) has been tested in the field using TDSScan and the quality of bore well water found to be within drinking water standards

Pumping test in one of the bore well shows that Safe Yield of the bore well is **40 m^3/day** at the rate of 115 lpm discharge for 80 m drawdown for 6 hours of pumping. **The total requirement of 50 m^3/day can be met out by the available 2 bore wells.**

The pumping test reveals that the drawdown was very drastic initially (25 m in 15 m) subsequently the draw down was low. The above shows that initial draw down due to the stored water discharge not from the aquifer. Later part of draw down indicates that the discharge is from the fractured aquifer.

Bayal CGWB observation well location is the nearest location to the mine blocks which is about 2 Km.

The ground water levels of the CGWB observation well for the period of May 2016 and November 2016 was 26.75 m and 18.50 m below ground level respectively.

Considering the elevation at Bayal CGWB observation well location, which is 2 km from the mines block, the water table (water table AMSL = MSL-Static water level) at Bayal village would be around 333 m above mean sea level during May 2016 and 346 m amsl during November 2016.

Since the study area is heterogeneous, composed of only secondary porosity (no uniform porosity and permeability) the ground water level at the mine site is much deeper than Bayal village.

Considering the above and the ground water level at mine site, it is clear that the reserve depth is much above the ground water table

The prediction of ground water inflow in to the mines depicts as follows:

1) **Mine blocks are located in the hilly area**
2) **The ground water level is much deep in the plains and no inflow of ground water observed in the excavated mine pits (36 m from the hill top)**
3) **Considering the ground water table and the depth to fracture depth (water yielding zone) the reserve depth is much above.**
4) ***Hence mining up the total reserve depth of 340m RL may not intersect the ground water table.***
5) **However, the rainfall storage in the excavated mine pit and the seepage from the mine dump has to be dewatered for the smooth operation of mining activity.**
6) **The dewatering operation of the dead storage (storage due to rainfall over the mine pit and seepage mine dump) may not develop cone of depressions which may not affect the ground water in the nearby drinking and irrigation wells.**

The Ground water assessment studies around 5 km radius zone reveals that the area is safe as per estimation committee norms.

In order to protect the ground water of the study area, artificial recharge measures in and around the mine has to be taken up. This would ameliorate the ground water levels of the area and also to prevent over exploitation.

Watershed based runoff has been estimated covering the mines area. Based on the normal rainfall the quantity of runoff generated using Soil Conservation Services (SCS) Method.

Watershed has been delineated using the Carto-DEM data and the estimation has been made. Based on the availability of runoff water artificial recharge structures have been suggested.

The area of watershed is 30.85 Sq.km. Based on the land use and the soil characteristics, the estimated CN value is 80.

There is considerable quantity of runoff is available. The runoff water can be harvested very well within the watershed area.

Based on the runoff, in **3 locations, check dam with recharge bore wells** have been suggested. As corporate social responsibility, the corporate may create the recharge structures.

ANNEXURE- 3

CONSENT LETTER/, UNDERTAKING/CERTIFICATE FROM APPLICANT

01. I ,Manmohan Singh Bhadana, hereby authorize Sh. D.C.Yadav RQP DMG/HRY/RQP/2018/03 & S.N.Sharma QP to prepare the Mining Scheme including Progressive Mine closure Plan under Haryana Minor Mineral Concession, Stocking,Transporting of Minerals and prevention of Illegal Mining Rules 2012,in respect of Minor Mineral Mines of" Stone along with associated minor minerals" of Bayal over an area of 76.75 Hectares (Area in hectares area); District- Mohindergarh State –Haryana . I request The Director Mines and Geology, Govt. of Haryana to make further correspondence regarding modification/corrections of the mining scheme with the said RQP on the following address:-

D.C.Yadav

282 Sector 11-D,Faridabad (Haryana)

09416214247

Mail id- dcyadav7@gmail.com

We hereby undertake that all modifications/updating as made in the Mining Scheme by the said RQP be deemed to have been made with our consent and shall be acceptable on us and binding in all respects.

02. It is certified that CCOM Circular No.2/2010 will be implemented and complied with when an authorized agency is approved by the State Govt.

03. It is certified that the progressive Mine closure plan of Bayal uartz ,and feldspar mine of Sh.Manmohan Bhadana over an area o 76.75 ha complies all statutory rules Regulations, orders made by the Central or The State Government, Courts etc. which have been taken into consideration and where any specific permission is required the lessee will approach the concerned authorities. The information furnished in the mining Scheme & progressive mine closure plan is true and correct to the best of my knowledge and records.

04. The provisions of Mines Act, Rules & Regulations made there under have been observed in this Mining Plan and whenever specific permission is required the applicant will approach the Director General of Mines Safety. Other standards prescribed by DGMS in respect of Miners health will be strictly implemented

Place:

Date: Signature of the applicant/Authorized Signatory

CERTIFICATE

I D.C.Yadav RQP hereby certify that,

1. "The provisions of Haryana Minor Mineral Concession, Stocking, Transportation of Minerals and Prevention of Illegal Mining Rules, 2012 have been observed in the Mining Scheme including Progressive Mine Closure Plan for Minor mineral mines of "Bayal over an area of 76.75 ha for Quartz,Felspar and Quartzite/stone Minor Minerals in Village- BayalDistrict- Narnaul, State- Haryana of Sh. Manmohan Bhadana and wherever specific permission is required the applicant will approach the concerned authorities of Department of Mines & Geology for granting the permission."

2. It is also certified that the provisions of Mines Act, Rules and Regulations made there under have been observed in the aforesaid Mining Plan including Progressive Mine Closure Plan and wherever specific permissions are required the applicant will approach the Director General of Mines Safety.

3. It is further certified that the aforesaid Mining Plan Including Progressive Mine Closure Plan is prepared as per the copies of the records and documents provided by licensee and information given as per discussions held with applicants' representative.

4. It is also certified that the information furnished in the aforesaid Mining Plan including Progressive Mine Closure Plan are true and correct to the best of my knowledge & belief and in case of default the approval would be withdrawn.

5. It is also certified that the plans and sections are prepared based on the lease map authenticated by the State Governments.

Duli Chand Yadav
D.C.YADAV/RQP/2018/03

Place :Faridabad

Date :

ANNEXURE-4

No. 138

THE UNIVERSITY OF JODHPUR

PROVISIONAL CERTIFICATE

Roll No. 16 Enrolment No. Jo '76/167.

It is certified that SATYA NARAYAN SHARMA

Son/Daughter of KRISHNA CHANDRA had pursued a course of study in this University for the Degree of Bachelor of Engineering (MINING)

and found qualified for the degree on having passed the Final Examination held in OCT 1981.

He/She secured 2052 marks out of 3170 marks in the aggregate and was placed in FIRST Division.

JODHPUR, the 13 May 1982

REGISTRAR

NOTE : The printed certificate/diploma of passing the examination will be issued to him/her in due course at the Convocation.

ANNEXURE-4

GOVERNMENT OF HARYANA

DIRECTORATE OF MINES AND GEOLOGY, HARYANA,
30-BAYS BUILDING, SECTOR 17, CHANDIGARH.

CERTIFICATE OF RECOGNITION AS A QUALIFIED PERSON TO PREPARE MINING PLAN/SCHEME OF MINING FOR MINOR MINERAL MINES

(Under Rule 67 of Haryana Minor Mineral Concession, Stocking, Transportation of Minerals and Prevention of Illegal Mining Rules, 2012)

Shri Duli Chand Yadav S/o Shri Ramji Lal, resident of village Dhani Bania Wali, PO Nangal Chaudhary, District Mahendergarh having given satisfactory evidence of his qualifications and experience, is hereby granted recognition under Rule 67 of the Haryana Minor Mineral Concession, Stocking, Transportation of Minerals and Prevention of Illegal Mining Rules, 2012, as a "Qualified Person" to prepare Mining Plans/Scheme of Mining in respect of minor minerals mines in the State of Haryana.

2. His registration No. is DMG/HRY/RQP/2018/03.

3. This recognition shall be valid for a period of ten years ending on 26.04.2028

Place : Chandigarh
Dated : 26.04.2018

(Sanjay [illegible])
Director,
Mines & Geology, Haryana,
Chandigarh.

GUJRATI MINERALS LABORATORY

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SPECIALIST IN

METAL, MINERALS, ORES, CHEMICALS, FERTILIZERS, WATER/EFFLUENTS
SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

ANALYSIS CERTIFICATE

Ref. No. 8048 /21/O Date 22.12.2021

1. Name of the Party	:	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	:	LUMPS - NORTH-II-NNE
Sample Collected by Party		

RESULTS OF ANALYSIS

SiO_2	72.080	%
Al_2O_3	15.730	%
Fe_2O_3	00.265	%
CaO	01.035	%
MgO	00.255	%
LOI	00.645	%
Na_2O	06.730	%
K_2O	03.145	%
TiO_2	00.105	%
Cr_2O_3	00.000	%
WHITENESS	34.000	%
L VALUE	64.500	%
A VALUE	+04.600	%
B VALUE	+08.600	%
SPECIFIC GRAVITY	02.680	
BULK DENSITY	02.695	gm/cc
HARDNESS	6	ON MOH'S SCALE
WHITENESS	48.500	%
BRIGHTNESS	46.100	%

For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

GUJRATI MINERALS LABORATORY

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SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

Ref. No 8044 /21/O

ANALYSIS CERTIFICATE

Date 22.12.2021

1. Name of the Party	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	LUMPS - FELDSPAR DUMP
	Sample Collected by Party

RESULTS OF ANALYSIS

SiO_2	72.860	%
Al_2O_3	15.055	%
Fe_2O_3	00.235	%
CaO	00.985	%
MgO	00.105	%
LOI	00.615	%
Na_2O	04.110	%
K_2O	05.925	%
TiO_2	00.105	%
Cr_2O_3	00.000	%
WHITENESS	18.000	%
L VALUE	48.500	%
A VALUE	+06.500	%
B VALUE	+05.500	%
SPECIFIC GRAVITY	02.685	
BULK DENSITY	02.840	gm/cc
HARDNESS	6	ON MOH'S SCALE
WHITENESS	64.500	%
BRIGHTNESS	61.700	%

For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

GUJRATI MINERALS LABORATORY

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SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

ANALYSIS CERTIFICATE

Ref. No 5050 /21/O Date 22.12.2021

1. Name of the Party	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	LUMPS - SOUTH NORTH EAST
Sample Collected by Party	

RESULTS OF ANALYSIS

SiO_2	78.710	%
Al_2O_3	11.885	%
Fe_2O_3	00.105	%
CaO	01.455	%
MgO	00.265	%
LOI	00.895	%
Na_2O	00.785	%
K_2O	05.795	%
TiO_2	00.090	%
Cr_2O_3	00.000	%
WHITENESS	45.000	%
L VALUE	73.700	%
A VALUE	+04.500	%
B VALUE	+10.500	%
SPECIFIC GRAVITY	02.690	
BULK DENSITY	02.720	gm/cc
HARDNESS	5.5	ON MOH'S SCALE
WHITENESS	63.500	%
BRIGHTNESS	60.800	%

For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

GUJRATI MINERALS LABORATORY

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SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

ANALYSIS CERTIFICATE

Ref. No. 8043 /21/O

Date 22.12.2021

1. Name of the Party	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	LUMPS SOUTH BOTTOM
Sample Collected by Party	

RESULTS OF ANALYSIS

SiO_2	95.825	%
Al_2O_3	02.145	%
Fe_2O_3	00.062	%
CaO	00.520	%
MgO	00.065	%
LOI	00.435	%
Na_2O	00.235	%
K_2O	00.525	%
TiO_2	00.037	%
Cr_2O_3	00.000	%
WHITENESS	70.000	%
L VALUE	85.500	%
A VALUE	+02.000	%
B VALUE	+06.500	%
SPECIFIC GRAVITY	02.705	
BULK DENSITY	02.810	gm/cc
HARDNESS	7	ON MOH'S SCALE
WHITENESS	79.000	%
BRIGHTNESS	76.800	%

For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

GUJRATI MINERALS LABORATORY

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SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

ANALYSIS CERTIFICATE

Ref. No 8054 /21/O Date 22.12.2021

1. Name of the Party	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	LUMPS - 12
	Sample Collected by Party

RESULTS OF ANALYSIS

SiO_2	93.910	%
Al_2O_3	02.605	%
Fe_2O_3	00.085	%
CaO	00.695	%
MgO	00.065	%
LOI	00.385	%
Na_2O	00.835	%
K_2O	01.375	%
TiO_2	00.025	%
Cr_2O_3	00.000	%
WHITENESS	72.000	%
L VALUE	86.700	%
A VALUE	+03.400	%
B VALUE	+05.000	%
SPECIFIC GRAVITY	02.695	
BULK DENSITY	02.810	gm/cc
HARDNESS	6.5	ON MOH'S SCALE
WHITENESS	78.500	%
BRIGHTNESS	75.700	%

For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

GUJRATI MINERALS LABORATORY

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SPECIALIST IN

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SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

ANALYSIS CERTIFICATE

Ref. No. 8053 /21/O Date 22.12.2021

1. Name of the Party	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	LUMPS - WEST HILL - LOOSE
	Sample Collected by Party

RESULTS OF ANALYSIS

SiO_2	96.765	%
Al_2O_3	01.085	%
Fe_2O_3	00.310	%
CaO	00.765	%
MgO	00.105	%
LOI	00.430	%
Na_2O	00.145	%
K_2O	00.295	%
TiO_2	00.097	%
Cr_2O_3	00.000	%
WHITENESS	33.000	%
L VALUE	63.500	%
A VALUE	+09.500	%
B VALUE	+10.500	%
SPECIFIC GRAVITY	02.685	
BULK DENSITY	02.755	gm/cc
HARDNESS	7	ON MOH'S SCALE
WHITENESS	56.500	%
BRIGHTNESS	53.100	%

For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result

GUJRATI MINERALS LABORATORY

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SPECIALIST IN

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SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

ANALYSIS CERTIFICATE

Ref. No. 8052 /21/O Date. 22.12.2021

1. Name of the Party	RAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	LUMPS . WEST HILL - I -SIZE
Sample Collected by Party	

RESULTS OF ANALYSIS

SiO_2	68.965	%
Al_2O_3	07.125	%
Fe_2O_3	00.625	%
CaO	00.995	%
MgO	00.145	%
LOI	00.750	%
Na_2O	00.010	%
K_2O	01.065	%
TiO_2	00.105	%
Cr_2O_3	00.000	%
WHITENESS	17.000	%
L VALUE	45.700	%
A VALUE	+09.800	%
B VALUE	+09.500	%
SPECIFIC GRAVITY	02.630	
BULK DENSITY	02.645	gm/cc
HARDNESS	7	ON MOH'S SCALE
WHITENESS	40.500	%
BRIGHTNESS	38.100	%

For. GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

GUJRATI MINERALS LABORATORY

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SPECIALIST IN

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SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

ANALYSIS CERTIFICATE

Ref. No. 8051 /21/O

Date 22.12.2021

1. Name of the Party	:	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	:	LUMPS - SOUTH TOP MIDDLE
Sample Collected by Party		

RESULTS OF ANALYSIS

SiO_2	92.450	%
Al_2O_3	04.365	%
Fe_2O_3	00.185	%
CaO	00.810	%
MgO	00.065	%
LOI	00.560	%
Na_2O	00.850	%
K_2O	00.530	%
TiO_2	00.085	%
Cr_2O_3	00.000	%
WHITENESS	43.000	%
L VALUE	71.500	%
A VALUE	+05.800	%
B VALUE	+09.500	%
SPECIFIC GRAVITY	02.710	
BULK DENSITY	02.790	gm/cc
HARDNESS	6.5	ON MOH'S SCALE
WHITENESS	64.500	%
BRIGHTNESS	61.900	%

For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

GUJRATI MINERALS LABORATORY

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SPECIALIST IN

METAL, MINERALS, ORES, CHEMICALS, FERTILIZERS, WATER/EFFLUENTS
SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

ANALYSIS CERTIFICATE

Ref. No. 8049 /21/0 Date 22.12.2021

1. Name of the Party	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	LUMPS - SOUTH BLACK
	Sample Collected by Party

RESULTS OF ANALYSIS

SiO_2	55.065	%
Al_2O_3	23.765	%
Fe_2O_3	08.975	%
CaO	02.710	%
MgO	03.035	%
LOI	01.975	%
Na_2O	00.895	%
K_2O	01.365	%
TiO_2	02.145	%
Cr_2O_3	00.000	%
WHITENESS	01.300	%
L VALUE	20.500	%
A VALUE	+02.200	%
B VALUE	+01.000	%
SPECIFIC GRAVITY	02.655	
BULK DENSITY	02.980	gm/cc
HARDNESS	2	ON MOH'S SCALE
WHITENESS	22.500	%
BRIGHTNESS	19.100	%

For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

GUJRATI MINERALS LABORATORY

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SPECIALIST IN

METAL, MINERALS, ORES, CHEMICALS, FERTILIZERS, WATER/EFFLUENTS
SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

ANALYSIS CERTIFICATE

Ref. No. 8047 /21/O

Date 22.12.2021

1. Name of the Party	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	LUMPS NORTH-I-NNE
Sample Collected by Party	

RESULTS OF ANALYSIS

SiO_2	98.425	%
Al_2O_3	00.895	%
Fe_2O_3	00.040	%
CaO	00.000	%
MgO	00.000	%
LOI	00.370	%
Na_2O	00.085	%
K_2O	00.155	%
TiO_2	00.017	%
Cr_2O_3	00.000	%
WHITENESS	75.000	%
L VALUE	88.500	%
A VALUE	+02.500	%
B VALUE	+05.300	%
SPECIFIC GRAVITY	02.695	
BULK DENSITY	02.705	gm/cc
HARDNESS	7	ON MOH'S SCALE
WHITENESS	79.500	%
BRIGHTNESS	77.200	%

For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

GUJRATI MINERALS LABORATORY

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SPECIALIST IN

METAL, MINERALS, ORES, CHEMICALS, FERTILIZERS, WATER/EFFLUENTS
SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

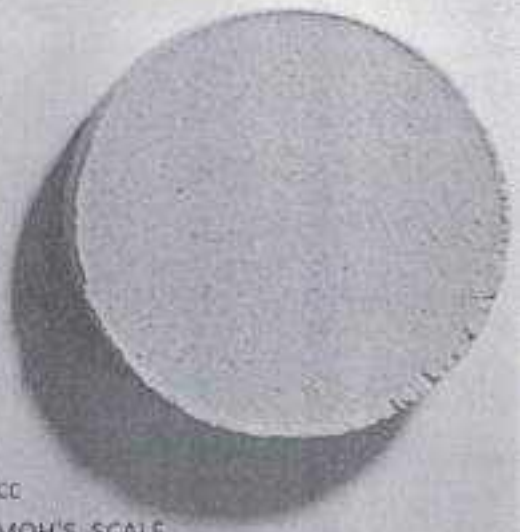
ANALYSIS CERTIFICATE

Ref. No. 8046 /21/O Date 22.12.2021

1. Name of the Party	:	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	:	LUMPS - EAST HILL
		Sample Collected by Party

RESULTS OF ANALYSIS

SiO_2	96.350	%
Al_2O_3	01.325	%
Fe_2O_3	00.365	%
CaO	00.695	%
MgO	00.055	%
LOI	00.395	%
Na_2O	00.310	%
K_2O	00.435	%
TiO_2	00.055	%
Cr_2O_3	00.000	%
WHITENESS	45.800	%
L VALUE	73.300	%
A VALUE	+06.000	%
B VALUE	+09.500	%
SPECIFIC GRAVITY	02.670	
BULK DENSITY	02.755	gm/cc
HARDNESS	7	ON MOH'S SCALE
WHITENESS	49.500	%
BRIGHTNESS	47.100	%



For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

GUJRATI MINERALS LABORATORY

LABORATORY : 5, RIICO Commercial Complex, Ajmer Road, BEAWAR-305 901 (Raj.)
Ph. : (01462) 227077, 228043, 94130 43214, Fax No. : 01462-228095, Mobile : 98290-72135

SPECIALISTS IN

METAL, MINERALS, ORES, CHEMICALS, FERTILIZERS, WATER/EFFLUENTS
SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

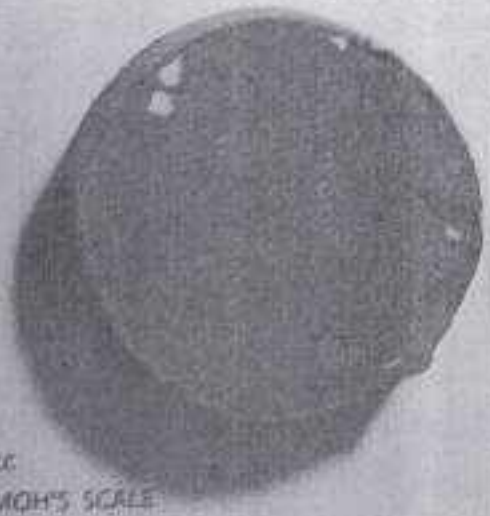
ANALYSIS CERTIFICATE

Ref. No. 3045 /21/0 Date 27.12.2021

1. Name of the Party	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	GRAINS - SCREENED SAND
	Sample Collected by Party

RESULTS OF ANALYSIS

SiO_2	71.410	%
Al_2O_3	07.535	%
Fe_2O_3	00.815	%
CaO	04.165	%
MgO	00.730	%
LOI	03.210	%
Na_2O	01.145	%
K_2O	00.850	%
TiO_2	00.030	%
Cr_2O_3	00.000	%
WHITENESS	10.000	%
L VALUE	38.500	%
A VALUE	+05.800	%
B VALUE	+11.000	%
SPECIFIC GRAVITY	02.605	
BULK DENSITY	01.995	gm/cc
HARDNESS	7	ON MOH'S SCALE
WHITENESS	23.500	%
BRIGHTNESS	20.100	%



For : GUJRATI MINERALS LABORATORY

Chemist

Samples will be preserved up to one month from the date of submission of result.

Annex-1

Registered

From

The Director General,
Mines and Geology, Haryana,
1st Floor, 30-Bays Building, Sector-17, Chandigarh.

APPROVED
P. K. Sharma
S.M.E.

To

Shri Manmohan Bhadana S/o Sh. Kartar Singh.
V.P.O. Anangpur,
Tehsil and District Faridabad.

Memo No. Glg/Hy/E-2578/279
Dated Chandigarh, the 11.01.2017

Subject:- Permission for Surrender part Area of 155.85 hectares out of total area of 228.60 in Village Bayal, Tehsil Narnaul, District Mahendergarh and retain remaining area of 76.75 hectares - regarding.

Reference your letter dated 03.10.2016 on the subject noted above.

2. You were granted mining area over **228.60 hectares** comprising of khasra nos. 198, 201, 202, 223 and 224 of land in village **Bayal** district Mahendegarh for the period of 20 years w.ef. 09.07.2002 for mining of **Quartz** and **Felspar** (both as major minerals) in accordance with prevailing provisions of Mines & Mineral (D&R) Act, 1957 and rules namely Mineral Concession Rules, 1960.

3. You vide your letter under reference informed that a part area of 151.85 hectares falling under Khasra nos. **198** and **202** has been reported to be covered under Aravalli Project Plantation where mining can not be undertaken as per orders dated 18.03.2004 of Hon'ble Supreme Court passed in WP (c) 4677 of 1985 -M.C. Mehta v/s Uol and Others.

You sought to surrender said part of 151.85 hectares covered under Aravalli Project Plantation and to retain the remaining area of 76.75 hectares falling under Khasra No. 201, 223 and 224 of the lease in village Bayal, district Mahenderagh.

4. As communicated vide this office memo No.Glg/HY/E-2578/3639 dated 08.07.2016 you are aware that the status qua your lease period and category of minerals granted on lease already stands changed as per latest amendment dated 12.01.2015 made by the Central Government in the Mines and Minerals (Development & Regulation) Act, 1957 and rules framed there in. Now the area of mining

(iv) The boundary pillars at the requisite distance over the area of mining to be retained shall be got erected and the GPS readings of each of the pillar shall also be recorded and intimated to the department;

(v) The Scheme of Mining/ Mining Plan for the area of 76.75 hectares to be retained on Lease shall be got prepared through RQP and got approved from the authorised officer of the department as per provisions of State Rules, 2012.

Mining Officer
for Director General, Mines and Geology,
Haryana

Endst No. Glg/Hy/E-2578/**280** Dated: **11.01.2017**

A copy is forwarded to the Deputy Commissioner Mahendergarh at Narnaul for information and necessary action.

Sd/-
Mining Officer
for Director General, Mines and Geology,
Haryana

Endst No. Glg/Hy/E-2578/**281** Dated:**11.01.2017**

A copy is forwarded to the Mining Officer Narnaul for information and necessary action he is advised to get the area of 76.75 hectares falling under Khasra No. 201,223 and 224 in village Bayal district Mahendergarh being retained on mining lease demarcated with the help of Revenue Department in the presence representative of the lease holder as well as Forest Department.

Sd/-
Mining Officer
for Director General, Mines and Geology,
Haryana

By Speed Post/Online

No. J-11015/10/2017-IA.II (M)
Government of India
Ministry of Environment, Forest and Climate Change
Impact Assessment Division
***

Indira Paryavaran Bhavan,
Vayu Wing, 3rd Floor,
Aliganj, Jorbagh Road,
New Delhi-110 003

E-mail: s.kumar1958@gov.in
Tele: 011-24695304

Dated: 4th May, 2018

To,
M/s Bayal Quartz & Feldspar Mine
Shri Manmohan Bhadana,
S/o Kartar Singh Bhadana
R/O V & PO- Anaganpur
Dist: Faridabad (Haryana)

Sub.: Environment Clearnace to Bayal Quartz & Feldspar Mine of M/s Mr. Manmohan Bhadana, S/o Kartar Singh Bhadana is situated at Khasra No.- 201, 223 & 224 Village Bayal, Taluka- Narnaul, District:- Mahendragarh, Haryana, over an area of 76.75 hectares & rate of production is 55,00,000 TPA (ROM)-Reg.

Ref: Online application No: IA/HR/MIN/62041/2017

Sir,

This has reference to your online application for the above mentioned Environemtal Clerance proposal of **Bayal Quartz & Feldspar Mine** for proposed production of Quartz , Feldspar quartzite & Stone with total production capacity up to 55,00,000 TPA (ROM)in the Mining Lease (76.75 Ha)situated at Khasra No- 201, 223 & 224 Village Bayal, Taluka- Narnaul, District:- Mahendragarh, Haryana . The Project Proponent submitted that the mining lease area is in two blocks (North & South Blocks). The North Block falls between Latitude: 27° 51.485'N to 27° 51.970'N & Longitude: 75° 58.642'E to 75° 58.932'E and South Block falls between Latitude 27°50'54.20"N to $27^0$51.203' N & Longitude:75°58'37.58"E to $75^0$59.041' E. The mining lease comes under Survey of India topo-sheet no G43 D13 and G43 E1. The mining lease area falls in seismic zone III.The PP also presented the KML file during the presentation to indicate the location of mine lease on Google Earth/ DSS.

2. The proposal of Term of References (ToR) was considered by the EAC in its meeting held during20-21 February, 2017 wherein the Committee recommended for grant of ToR. The Ministry has issued ToR, vide letter even no. dated May17, 2017. PP has submitted the EIA/EMP Report on 30.11.2017 for appraisal of the Project before EAC.The proposal of EC was earlier considered in EAC meeting held during **December 21-22, 2017** wherein the Committee deferred the proposal and sought requisite information. In this context, the PP vide letter dated **08.02.2018** submitted the informationand accordingly the proposal was re-considered by the EAC in its meeting held during **February 26-27, 2018** wherein the Committee deferred the proposal and sought requisite information. In this context, the PP vide letter dated **21.03.2018** submitted the informationand accordingly the proposal was re-considered by the EAC in its meeting held during **March 22-23, 2018** wherein the Committee **recommended** the proposal for grant of Environmental Clearance for mining of Quartz , Feldspar Quartzite & Stone with total production capacity up to 55,00,000 TPA (ROM) from Bayal Quartz & Feldspar Mine (76.75 Ha) situated at Khasra No.- 201, 223 & 224 Village Bayal, Taluka- Narnaul, District:- Mahendragarh, Haryana.

3. The proponent submitted that the mining lease over an area of 228.60 hectares falling in Khasra Nos 198, 201, 202, 223 & 224 in village Bayal, District: Mahendragarh was granted on 09.07.2002 for a period of 20 years and Quartz and Feldspar, were both considered as Major Minerals as per provisions of Mines & Mineral (Development & Regulation) Act, 1957. As per the subsequent amendment dated 12.01.2015 made by Central Government in the Mines and Minerals (Development & Regulation) Act, 1957 and notification dated 10.02.2015 qua category of minerals, the proponent has submitted that the lease period has been extended up to 08.07.2052 and Quartz & Feldspar have been treated as minor minerals. The proponent submitted that part area of the lease falling under Khasra numbers 198 and 202 (comprising total area of 151.85 hectares) is under Aravalli and cannot be used for mining as per orders dated 18.03.2004 of the Hon'ble Supreme Court in WP (C) 4677 of 1985 in matter of M.C Mehta vsUoI&Ors. Therefore, the proponent submitted letter to DMG, Haryana for surrender of 151.85 ha area falling in Aravalli Plantation area and the same was accepted by DMG, Haryana vide letter no. Glg/Hy/E-2578/279 dated 11.01.2017. The supplementary lease deed falling in village Bayal over an area of 76.75 ha was executed on 12th May, 2017, after surrender of 151.85 Ha (Khasra no 198 & 202 Aravalli Plantation area) and is valid till 08.07.2052 . The EAC is its meeting held on 21-22 December, 2017 observed that the waste proposed by the Project Proponent was masonry stone, which is salable as construction material and has an economic value. The committee was therefore of the view that if the waste has market value, then same needs to be included in lease deed document as the list of minerals to be mined and asked the proponent to submit the revised mining lease deed after inclusion of all the minerals. The Project Proponent submitted the letter No Glg/HY/E-2578/926 dated 23.02.2018 issued by DMG for registration of supplementary lease deed on addition of quartzite and stone. The supplementary lease deed after inclusion of all the minerals viz. Quartz, Feldspar, Quartzite and Stone was executed on 23.02.2018 and valid till 08.07.2052. The Proponent submitted a no objection certificate issued by Nayab Thasildar, Sikar, Rajasthan vide letter No S-P-1 dated 10.01.2018 to the effect that mining lease does not falls under Rajasthan. The Project Proponent submitted the District Survey Report.

4. The Project Proponent submitted that mining plan was approved by Department of Mining and Geology, Govt. of Haryana vide LR No. DMG/HY/MP/Bayal/2017/2733-36 dated 23.06.2017. The mining plan was thereafter modified as per recommendation of EAC made during its meeting held on 21-22 December, 2017 & 27-28 February, 2018vide LR No. DMG/HY/MP/Bayal/2018/493-496 dated 01.02.2018 and LR No. DMG/HY/MP/Bayal/2018/1380 dated 19.03.2018 respectively. The Proponent submitted that as per the modified mining plan the estimated Geological Reserve is 140,905,315 Tonnes and estimated mineable reserve is 12, 6,81,4776 Tonnes. The proposed rate of production is 55, 00,000 TPA (ROM). The anticipated life of mine is 23 years. The mining will be carried out by mechanized opencast mining method. The material will be dislodged with rock breaker & terminator in no blasting zone and in remaining area with drilling & blasting. The excavation of minerals, waste and top soil will be with the help of excavator and transportation with the help of dumpers/tippers. The Project Proponent submitted that there is a thin soil cover 0-50 cm in the proposed area. Little amount of soil is also generated from joints and cracks. Top soil will be stripped and preserved by stacking in separate dump yards. Yearly generations of soil/fines will be 34000 MT (18900 cum) out of which about 250 MT shall be used for plantation on upper layer on the dumps. The proponent submitted that total waste generated during the life of the mine will be 941850Tonne . The waste will be dump separately in the dump yard near pillar number 23 & 24 of south block and ultimately used for backfilling. The proponent submitted municipal wastewater generated at the site will be treated through dedicated septic tanks followed by soak pit. The proponent submitted that total water requirement for the project will be 50 KLD (dust suppression 36 KLD, Drinking & Domestic use 04 KLD, Green Belt/plantation 10 KLD). The proponent submitted that 1870 plant per annum will be planted and at the end of life of mine 11.23 Ha of ML area will be under green belt with tree density 2500 plant/ha, 34.12 Ha will be converted into water reservoir and 30.29 Ha will be backfilled and reclaimed with plantation.

5. The primary baseline data for site specific micro meteorology data, ambient air quality, water quality, noise level, soil and flora & fauna has been collected during Summer Season i.e. from March–May, 2017. The monitoring results of ambient air, surface water, soil, ambient noise and ground water have been reported and no major divergence was observed with respect to concentration values of various parameters between collected samples. The Proponent submitted that Level of Service (LoS) pre project scenario is in category A and post project scenario will be in category B. The noise level in day time is slightly above the residential limit of 55 dB (A) in daytime but less than industrial limit 75 dB (A). The soil is neutral to moderately alkaline in nature. The Ground water quality in and around the core zone is well within the permissible limit. But in Munsnauta village which is 6 Km from the project site the total dissolve solid (TDS) and Total hardness as CaCo3 is exceeded the permissible limit. The proponent submitted that the Ground Water Table (GWT) around Bayal village is located about 346 MASL. The mine working during the plan period will be up to 399 MASL and ground water shall not be intersected. The proponent committed to mine 10 meters above the ground water table i.e. up to 356 MASL. The Committee in its meeting held on 22-23 March, 2018 observed that in the mining lease document it has mentioned that *"A safety margin of two meters shall be maintained above the ground water table and no mining operations shall be permissible below this level unless a specific permission is obtained from the competent authority"* and in the instant case, the PP has already committed to keep a safety margin of 10 meters above the ground water table. Further, during the plan period, as per approved mining plan the mine working will go up to 399 MASL i.e. above the ground water table of the area. Thus, the Committee was of the view that the mine working should be restricted at 356

MASL till the PP submits the detailed hydrogeological study and obtain permission from competent authority for intersecting ground water table, if any, for mining beyond 356 MASL.

6. The Proponent submitted that the Public Hearing / Consultation was conducted on 24.10.2017 and chaired by Dr. Garima Mittal, Deputy Commissioner, Mahendragarh. The advertisement for public hearing was published in English News Paper (Tribune) and Hindi Newspaper (AajSamaj) on 21.09.2017. The various issues raised during the public hearing mainly involve the concerns of villagers as how mining could be possible near habitation, temple and school and what would be the employment and business opportunity for the villagers. The issue raised during public hearing were also considered and discussed during the meeting.The proponent submitted that budget earmarked for the Enterprise Social Commitment (ESC) will be ₹ 26.55 Lakh which include supply of medical equipment to the Govt. hospitals, installation of RO Plant in village Panchayat, Supply of books to Govt. School & libraries, organizing heath camp for villagers, rainwater harvesting structures and installation of roof top solar panel in village Panchayat Bhawan . The Committee recommended that no mining should be carried out within 50 meters of the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs), temple and no mining should be carried out within 100 meters by using explosive from the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs), temple even if, PP obtained permission from DGMS. For mining in the remaining area the proponent should conduct the blast vibration study by engaging CSIR-Central Institute of Mining and Fuel Research (CIMFR), Dhanbad or National Institute of Rock Mechanics (NIRM), Karnataka. The report so obtained should be submitted to DGMS for obtaining the permission for carrying out mining by using explosive. The proponent submitted that the budget earmarked for blasting study would be ₹ 34 Lakh. .

7. The Project Proponent submitted a certificate issued from State Forest Department vide letter no 2946 dated 14.11.2017, wherein, certifying that there is no forest land in the mining lease area and there is no National Park, Wildlife Sanctuary within 10 Km of mining lease area and the project site is outside National Park, sanctuary, Biosphere reserve, Tiger/Elephant Reserve or notified Eco-Sensitive Zone falling within the territory of Haryana Boundary.The Project Proponent submitted that there are 6 shedule-1 species viz. *Indian Peafowl, Black Partridge, Leopard, Chikara, Common Indian Krait and Indian Monitor Lizard* are present in the study area. The project site was inspected on 1-08-2017 by a team comprising of Conservator of Forest (WL), Gurugram, DFO (T), Mahendergarh and DWLP, Gurugram. As per the direction of Forest Department, Govt of Haryana the proponent submitted the Wildlife Conservation Plan to Chief Wildlife Warden on 30.10.2017. The proponent submitted the conservation plan for Sehdule-1 & II species for 35 years with a budgetary provision of ₹ 160 Lakh.

8. The Project Proponent submitted that the Budget earmarked for Environmental Management Plan ₹ 172.35 Lakh (Capital Cost) and ₹ 458.0 Lakh (Recurring). The activates proposed under EMP are a) Environment Monitoring for Air, Noise, Water and Soil Quality, b) Purchase of minimum two water tanker having mist cannon fogger, c) construction of garland drains, d) Green Belt Development along the mine boundary, e) Afforestation & Reclamation activities, f) Rain water harvesting pits, g) mine waste/overburden management and h) Implementation of Conservation plan for schedule-1 species. The Project Proponent submitted that budget earmarked for Management of Labour Camps will be ₹ 28.25 Lakh (Capital) and ₹ 46.0 Lakh (Recurring). The Project Proponent submitted that occupational health and safety measures of the workers including identification of work related health hazards, training on health effect of mineral dust shall be

carried out. Initial and periodical medical examination of each worker and record of the same shall be maintained. The budget earmarked for the occupational health surveillance will be ₹ 2.62 Lakh (Capital) and ₹ 81.31 Lakh (recurring). The Project Proponent submitted to compensate all the 43 identified families within the mining lease and ₹ 6.19 Cr is earmarked under R&R Plan.

9. The Ministry of Environment, Forest & Climate Change has examined the proposal in accordance with the Environmental Impact Assessment Notification, 2006 and further amendments thereto and hereby accords the Environmental Clearance under the provisions thereof to the above **mentioned proposal of M/s Bayal Quartz & Feldspar Mine** for mining of Quartz , Feldspar Quartzite & Stone with total production capacity up to 55,00,000 TPA (ROM) from Bayal Quartz & Feldspar Mine (76.75 Ha) situated at Khasra No.- 201, 223 & 224 Village Bayal, Taluka- Narnaul, District:- Mahendragarh, Haryanasubject to compliance of the followings terms and conditions and environmental safeguards mentioned below:-

A. Specific conditions

i) Environmental clearance is granted subject to final outcome of Hon'ble Supreme Court of India, Hon'ble High Court of Haryana, Hon'ble NGT and any other Court of Law, if any, as may be applicable to this project.

ii) No mining activities will be allowed in forest area, if any, for which the Forest Clearance is not available.

iii) The Project Proponent shall obtain Consent to Operate from the State Pollution Control Board, Haryana and effectively implement all the conditions stipulated therein.

iv)No mining should be carried out within 50 meters of the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs), temple and no mining should be carried out within 100 meters by using explosive from the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs), temple even if, PP obtained permission from DGMS. For mining in the remaining area the proponent should conduct the blast vibration study by engaging CSIR-Central Institute of Mining and Fuel Research (CIMFR), Dhanbad or National Institute of Rock Mechanics (NIRM), Karnataka. The report so obtained should be submitted to DGMS for obtaining the permission for carrying out mining by using explosive.

v) Shelter belt i.e. wind barrier of 30 meter width and consisting of at least 5 tiers around lease facing the habitation/school/public road (if any in the vicinity) shall be raised.

vi)Adequate protection against the dust and other environmental pollution arising due to mining activity shall be made so that human habitation located near the lease is not adversely affected. The status of implementation shall be report to Regional Office, MOEF&CC and SPCB, Haryana.

vii) The proponent should ensure that mine working shall not intersect the ground water table of the area. The mining should be restricted till 356 masl till the PP submits the detailed hydro-geological study and obtained permission from CGWA for intersection of ground water table, if any, for mining beyond 356 masl.

viii) Regular monitoring of ground water level and quality shall be carried out in and around the mine lease by establishing a network of existing wells and constructing new piezometers during the mining operation. The project proponent shall ensure that no natural water course and/or water resources shall be obstructed due to any mining operations. The monitoring shall be carried out four times in a year pre- monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to Ministry of Environment, Forest and Climate Change and its Regional Office, Central Ground Water Authority and Regional Director, Central Ground Water Board.

ix) The Budget earmarked for Environmental Management Plan ₹ 172.35 Lakh (Capital Cost) and ₹ 458.0 Lakh (Recurring) should be kept in separate account (except amount to be submitted to Forest Department for implementation of the conservation plan) and same needs to be audited annually. The activates proposed under EMP are a) Environment Monitoring for Air, Noise, Water and Soil Quality, b) Purchase of minimum two water tanker having mist cannon fogger, c) construction of garland drains, d) Green Belt Development along the mine boundary, e) Afforestation & Reclamation activities, f) Rain water harvesting pits, g) mine waste/overburden management and h) Implementation of Conservation plan for schedule-1 species. The Proponent should submit the detailed report to Regional Office, MoEF&CC on implementation of EMP along with audited report of expenditure incurred; purchase documents, photographs in support of implementation of activities, Geo-location of the monitoring stations etc.

x) The budget earmarked for Management of Labour Camps will be ₹ 28.25 Lakh (Capital) and ₹ 46.0 Lakh (Recurring) and same needs to be kept in a separate account. The account needs to be audited annually and report of the same shall be submitted to Regional Office, MoEF&CC along with supporting documents, photographs and geo-location.

xi) Occupational health and safety measures of the workers including identification of work related health hazards, training on health effect of mineral dust shall be carried out. Initial and periodical medical examination of each worker and record of the same shall be maintained. The budget earmarked for the occupational health surveillance will be ₹ 2.62 Lakh (Capital) and ₹ 81.31 Lakh (recurring). The proponent shall engage a doctor who is well trained in occupational health and has NIOSH B Reader Certification (using the ILO 2000 Classification of Radiographs of Pneumoconiosis). The Project Proponent shall maintain a separate account for budget earmarked for occupational health surveillance plan and the same needs to be audited annually. The annual report of implementation of the occupational health surveillance plan shall be submitted to Regional Office, MoEF&CC. The Project proponent shall increase the budget earmarked for occupational health surveillance plan as per requirement.

xii) The budget earmarked for the Enterprise Social Commitment (ESC) will be ₹ 26.55 Lakh which include supply of medical equipment to the Govt. hospitals, installation of RO Plant in village Panchayat, Supply of books to Govt. School & libraries, organizing heath camp for villagers, rainwater harvesting structures and installation of roof top solar panel in village Panchayat Bhawan. The amount earmarked for ESC should be kept in separate account and same shall to be audited annually. The PP shall submit an annual report of compliance of activities proposed under ESC, to Regional Office, MoEF&CC with audited statement, photographs etc.

xiii) The Project Proponent shall get the blasting studies done by engaging CSIR-Central Institute of Mining and Fuel Research (CIMFR), Dhanbad or National Institute of Rock Mechanics (NIRM), Karnataka or any other institute of national repute before commencement of any blasting operation within 500 meters of the habitation. The budget earmarked for conducting blasting studies will be ₹ 34.0 Lakh. The blasting study report shall be submitted to Ministry of Environment, Forest and Climate Change and its Regional Office within three month of its finalization. The proponent shall monitor ground vibration and air overpressure of each blast and shall keep a record of the same which include logs generated from Blastmate, geo-location of the blast, dated and time of blast, number of holes blasted, charge per holes, explosive used, bench parameters, drill hole parameters etc.

xiv) The Project proponent shall compensate all 43 identified families as per proposed R&R plan. The ₹ 6.19 Cr earmarked for R&R plan shall be kept in separate account and same needs to be audited. The details of the compensation paid to the project affected families shall to be sent to Regional Office, MoEF&CC within one year of the commencement of the mining operation.

B. Standard conditions

i. A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment, Forest and Climate Change 5 years in advance of final mine closure for approval.

ii. This Environmental Clearance is subject to obtaining requisite NBWL Clearance from the Standing Committee of National Board for Wildlife as applicable for this Mining project.

iii. No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment, Forest and Climate Change.

iv. No change in the calendar plan including excavation, quantum of mineral and waste should be made.

v. The project proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of water (surface water and ground water) for the project.

vi. Mining shall be carried out as per the provisions outlined in mining plan approved by Indian Bureau of Mines (IBM)/State Mines and Geology Department as well as by abiding to the guidelines of Directorate General Mines Safety (DGMS).

vii. Project Proponent shall obtain the necessary prior permission from the Central Ground Water Authority (CGWA) in case of intersecting the Ground water table. The intersecting ground water table can only be commence after conducting detailed hydrogeological study and necessary permission from the CGWA. The Report on six monthly basis on changes in Ground water level and quality shall be submitted to the Regional Office of the Ministry, CGWA and State Pollution Control Board.

viii. The lands which are not owned by Proponent, mining will be carried out only after obtaining the consents from all the concerned land owners as per the provisions of the Mineral Concession Rules, 1960 and MMDR Act, 1957.

ix. Digital processing of the entire lease area using remote sensing technique shall be carried out regularly once in three years for monitoring land use pattern and report submitted to Ministry of Environment, Forest and Climate Change its Regional Office.

x. The critical parameters as per the Notification 2009 such as PM_{10}, $PM_{2.5}$, NO_x, and SOx etc. in the ambient air within the impact zone, peak particle velocity at 300m distance or within the nearest habitation, whichever is closer shall be monitored periodically. Further, quality of discharged water shall also be monitored [(TDS, DO, PH and Total Suspended Solids (TSS)]. The monitored data shall be uploaded on the website of the company as well as displayed on a display board at the project site at a suitable location near the main gate of the Company in public domain. The circular No. J-20012/1/2006-IA.II (M) dated 27.05.2009 issued by Ministry of Environment, Forest and Climate Change shall also be referred in this regard for its compliance.

xi. The Proponent shall install online Ambient Air Quality Monitoring System and there should be system for display of digital AAQ data within 03 months at least at three locations as per wind direction. Online provisions of pH and turbidity meters at discharge points of STP and ETP and also at water storage ponds in the mining area may be made. Project Proponent should display the result digitally in front of the main Gate of the mine site.

xii. Effective safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of PM_{10} and $PM_{2.5}$ such as haul road, loading and unloading point and transfer points. Fugitive dust emissions from all the sources shall be controlled regularly. It shall be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard. Monitoring of Ambient Air Quality to be carried out based on the Notification 2009, as amended from time to time by the Central Pollution Control Board.

xiii. Regular monitoring of ground water level and quality shall be carried out in and around the mine lease by establishing a network of existing wells and constructing new piezometers during the mining operation. The project proponent shall ensure that no natural water course and/or water resources shall be obstructed due to any mining operations. The monitoring shall be carried out four times in a year pre- monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to Ministry of Environment, Forest and Climate Change

and its Regional Office, Central Ground Water Authority and Regional Director, Central Ground Water Board.

xiv. Regular monitoring of the flow rate of the springs and perennial nallahs flowing in and around the mine lease shall be carried out and records maintain. The natural water bodies and or streams which are flowing in an around the village, should not be disturbed. The Water Table should be nurtured so as not to go down below the pre-mining period. In case of any water scarcity in the area, the Project Proponent has to provide water to the villagers for their use. A provision for regular monitoring of water table in open dug wall located in village should be incorporated to ascertain the impact of mining over ground water table.

xv. Regular monitoring of water quality upstream and downstream of water bodies shall be carried out and record of monitoring data should be maintained and submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office, Central Ground Water Authority, Regional Director, Central Ground Water Board, State Pollution Control Board and Central Pollution Control Board.

xvi. Transportation of the minerals by road passing through the village shall not be allowed. A 'bypass' road should be constructed (say, leaving a gap of at least 200 meters) for the purpose of transportation of the minerals so that the impact of sound, dust and accidents could be mitigated. The project proponent shall bear the cost towards the widening and strengthening of existing public road network in case the same is proposed to be used for the Project. No road movement should be allowed on existing village road network without appropriately increasing the carrying capacity of such roads.

xvii. The illumination and sound at night at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right for darkness and minimal noise levels at night. PPs must ensure that the biological clock of the villages is not disturbed; by orienting the floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day light/night hours.

xviii. Main haulage road in the mine should be provided with permanent water sprinklers and other roads should be regularly wetted with water tankers fitted with sprinklers. Crusher and material transfer points should invariably be provided with Bag filters and or dry fogging system. Belt-conveyors should be fully covered to avoid air borne dust.

xix. Main haulage road in the mine should be provided with permanent water sprinklers and other roads should be regularly wetted with water tankers fitted with sprinklers. The material transfer points should invariably be provided with Bag filters and or dry fogging system. In

case of Belt-conveyors facilities the system should be fully covered to avoid air borne dust; Use of effective sprinkler system to suppress fugitive dust on haul roads and other transport roads shall be ensured.

xx. Sufficient number of Gullies to be provided for better management of water. Regular Monitoring of pH shall be included in the monitoring plan and report shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office on six monthly basis.

xxi. The pollution due to transportation load on the environment will be effectively controlled and water sprinkling will also be done regularly. Vehicular emissions shall be kept under control and regularly monitored. Project should obtain 'PUC' certificate for all the vehicles from authorized pollution testing centres.

xxii. There shall be planning, developing and implementing facility of rainwater harvesting measures on long term basis and implementation of conservation measures to augment ground water resources in the area in consultation with Central Ground Water Board.

xxiii. The Project Proponent has to take care of gullies formed on slopes. Dump mass should be consolidated with proper filling/leveling with the help of dozer/compactors.

xxiv. The reclamation at waste dump sites shall be ecologically sustainable. Scientific reclamation shall be followed. The local species may be encouraged and species are so chosen that the slope, bottom of the dumps and top of the dumps are able to sustain these species. The aspect of the dump is also a factor which regulates some climatic parameters and allows only species adopted to that micro climate.

xxv. The top soil, if any, shall temporarily be stored at earmarked site(s) only and it should not be kept unutilized for long. The topsoil shall be used for land reclamation and plantation. The over burden (OB) generated during the mining operations shall be stacked at earmarked dump site(s) only and it should not be kept active for a long period of time. The maximum height of the dumps shall not exceed 8m and width 20 m and overall slope of the dumps shall be maintained to 45^0. The OB dumps should be scientifically vegetated with suitable native species to prevent erosion and surface run off. In critical areas, use of geo textiles shall be undertaken for stabilization of the dump. The entire excavated area shall be backfilled and afforested. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office on six monthly basis.

xxvi. Catch drains and siltation ponds of appropriate size shall be constructed around the mine working, mineral and OB dumps to prevent run off of water and flow of sediments directly into the river

and other water bodies. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drains shall be regularly desilted particularly after monsoon and maintained properly. The drains, settling tanks and check dams of appropriate size, gradient and length shall be constructed both around the mine pit and over burden dumps to prevent run off of water and flow of sediments directly into the river and other water bodies and sump capacity should be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material. Sedimentation pits shall be constructed at the corners of the garland drains and desilted at regular intervals.

xxvii. Plantation shall be raised in a 7.5 m wide green belt in the safety zone around the mining lease, backfilled and reclaimed area, around water body, along the roads etc. by planting the native species in consultation with the local DFO/Agriculture Department and as per CPCB Guidelines. The density of the trees should be around 2500 plants per ha. Greenbelt shall be developed all along the mine lease area in a phased manner and shall be completed within first five years.

xxviii. Project Proponent shall follow the mitigation measures provided in Office Memorandum No. Z-11013/57/2014-IA.II (M), dated 29th October, 2014, titled "Impact of mining activities on Habitations-Issues related to the mining Projects wherein Habitations and villages are the part of mine lease areas or Habitations and villages are surrounded by the mine lease area".

xxix. The Project Proponent shall make necessary alternative arrangements, where required, in consultation with the State Government to provide alternate areas for livestock grazing, if any. In this context, Project Proponent should implement the directions of the Hon'ble Supreme Court with regard to acquiring grazing land. The sparse trees on such grazing ground, which provide mid-day shelter from the scorching sun, should be scrupulously guarded against felling and plantation of such trees should be promoted.

xxx. The project proponent shall take all precautionary measures during mining operation for conservation and protection of endangered fauna, if any, spotted in the study area. Action plan for conservation of flora and fauna shall be prepared and implemented in consultation with the State Forest and Wildlife Department. A copy of action plan shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office.

xxxi. As per the Company Act, the CSR cost should be 2 % of average net profit of last three years. Hence CSR expenses should be as per the Company Act/Rule for the Socio Economic Development of the neighborhood Habitats which could be planned and executed by the Project Proponent more systematically based on the 'Need based door to door survey' by established Social Institutes/Workers. The report shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office on six monthly basis.

xxxii. Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.

xxxiii. Measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs / muffs.

xxxiv. Industrial waste water (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December, 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.

xxxv. Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.

xxxvi. A separate environmental management cell with suitable qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.

xxxvii. The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office.

xxxviii. The project authorities should inform to the Regional Office regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.

xxxix. The project proponent shall submit six monthly reports on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment, Forest and Climate Change, its Regional Office, Central Pollution Control Board and State Pollution Control Board.

xl. The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full

cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring reports.

xli. A copy of clearance letter will be marked to concerned Panchayat / local NGO, if any, from whom suggestion / representation has been received while processing the proposal.

xlii. State Pollution Control Board should display a copy of the clearance letter at the Regional office, District Industry Centre and Collector's office/ Tehsildar's Office for 30 days.

xliii. The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment, Forest and Climate Change at www.environmentclearance.nic.inand a copy of the same should be forwarded to the Regional Office.

10. The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.

11. Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

12. The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/ High Court and any other Court of Law relating to the subject matter.

13. Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

4/5/18

(Surendra Kumar)
Scientist 'G'/Adviser

Copy to:-

1. **The Secretary**, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.

2. **The Secretary**, Department of Mines & Geology, Government of Haryana, Chandigarh.

3. **The Secretary**, Department of Environment, Government of Haryana, Chandigarh.

4. **The Secretary**, Department of Forest, Government of Haryana, Chandigarh.

5. **The Chief Wildlife Warden**, Government of Haryana, C-18, Van Bhawan, Sec-6,Panchkula -134109

6. **The Principal Chief Conservator of Forests (C)**, Ministry of Environment, Forest and Climate Change, Regional Office (NZ), Bays No. 24-25, Sector 31 A, Dakshin Marg,Chandigarh – 160030

7. **The Chairman**, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.

8. **The Chairman**, Haryana Pollution Control Board, C-11, Sector-6, Panchkula, Haryana 134109

9. **The Member Secretary**, Central Ground Water Authority, A-2, W3, Curzon Road Barracks, K.G. Marg, New Delhi-110001.

10. **The Executive Engineer**, Department of Irrigation, Government of Haryana, Sinchai Bhawan, Sector-5, Panchkula , Haryana

11. **The District Collector**, District Mahendragarh, State of Haryana.

12. Guard File.

13. MoEFCC website.

4/5/18

(Surendra Kumar)
Scientist 'G'/Adviser

HARYANA STATE POLLUTION CONTROL BOARD
Lala Nemi Chand Singhal Enc. Sohna Road, Near Hanuman Mandir, Dharuhera Ph. 01274-244440-41(O)
Website: www.hspcb.gov.in E-Mail - hspcb.pkl@sifymail.com
Telephone No.: 0172-2577870-73

No. HSPCB/Consent/ : 313100418MAHCTE5322799 **Dated:16/05/2018**

To.

M/s : BAYAL QUARTZ AND FELDSPAR MINE
KHASRA NO. 201, 223 & 224, VILLAGE-BAYAL, TEHSIL-NANGAL CHAUDHARY, DISTRICT-MOHINDERGARH
MAHENDRAGARH
123023

Sub. : Grant of consent to Establish to M/s BAYAL QUARTZ AND FELDSPAR MINE

Please refer to your application no. 5322799 received on dated 2018-05-15 in regional office Dharuhera.
With reference to your above application for consent to establish,M/s BAYAL QUARTZ AND FELDSPAR MINE is here by granted consent as per following specification/Terms and conditions.

Consent Under	AIR/WATER
Period of consent	16/05/2018 - 15/05/2023
Industry Type	Mining and ore beneficiation
Category	RED
Investment(In Lakh)	324.100006
Total Land Area (Sq. meter)	767500.0
Total Builtup Area (Sq. meter)	767500.0
Quantity of effluent	
1. Trade	0.0 KL/Day
2. Domestic	0.3 KL/Day
Number of outlets	1.0
Mode of discharge	
1. Domestic	Septic Tank
2. Trade	NA
Permissible Domestic Effluent Parameters	
1. NA	
Permissible Trade Effluent Parameters	
1. NA	mg/l
Number of stacks	1

Height of stack	
1. ATTACHED TO DG SET	3 meters
Permissible Emission parameters	
1. PM10	100 mg/m3
2. PM2.5	60 mg/m3
Capacity of boiler	
1. N.A.	Ton/hr
Type of Furnace	
1. N.A.	
Type of Fuel	
1. Diesel	0.05 KL/day

Regional Officer, Dharuhera

Haryana State Pollution Control Board.

Terms and conditions

1. The industry has declared that the quantity of effluent shall be 0.3 KL/Day i.e 0KL/Day for Trade Effluent, 0 KL/Day for Cooling, 0.3 KL/Day for Domestic and the same should not exceed .

2. The above 'Consent to Establish' is valid for 60 months from the date of its issue to be extended for another one year at the discretion of the Board or till the time the unit starts its trial production whichever is earlier. The unit will have to set up the plant and obtain consent during this period.

3. The officer/official of the Board shall have the right to access and inspection of the industry in connection with the various processes and the treatment facilities being provided simultaneously with the construction of building/machinery. The effluent should conform the effluent standards as applicable

4. That necessary arrangement shall be made by the industry for the control of Air Pollution before commissioning the plant. The emitted pollutants will meet the emission and other standards as laid/will be prescribed by the Board from time to time.

5. The applicant will obtain consent under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21/22 of the Air (Prevention & Control of Pollution) Act,1981 as amended to-date-even before starting trial production

6. The above Consent to Establish is further subject to the conditions that the unit complies with all the laws/rules/decisions and competent directions of the Board/Government and its functionaries in all respects before commissioning of the operation and during its actual working strictly.

7. No in-process or post-process objectionable emission or the effluent will be allowed, if the scheme furnished by the unit turns out to be defective in any actual experience

8. The Electricity Department will give only temporary connection and permanent connection to the unit will be given after verifying the consent granted by the Board, both under Water Act and Air Act.

9. Unit will raise the stack height of DG Set/Boiler as per Board's norms.

10. Unit will maintain proper logbook of Water meter/sub meter before/after commissioning.

11. That in the case of an industry or any other process the activity is located in an area approved and that in case the activity is sited in an residential or institutional or commercial or agricultural area, the necessary permission for siting such industry and process in an residential or institutional or commercial or agricultural area or controlled area under Town and Country Planning laws CLU or Municipal laws has to be obtained from the competent Authority in law permitting this deviation and be submitted in original with the request for consent to operate.

12. That there is no discharge directly or indirectly from the unit or the process into any interstate river or Yamuna River or River Ghaggar.

13. That the industry or the unit concerned is not sited within any prohibited distances according to the Environmental Laws and Rules, Notification, Orders and Policies of Central Pollution control Board and Haryana State Pollution Control Board.

14. That of the unit is discharging its sewage or trade effluent into the public sewer meant to receive trade effluent from industries etc. then the permission of the Competent Authority owing and operating such public sewer giving permission letter to his unit shall be submitted at time of consent to operate.

15. That if at any time, there is adverse report from any adjoining neighbor or any other aggrieved party or Municipal Committee or Zila Parishad or any other public body against the unit's pollution; the Consent to Establish so granted shall be revoked.

16. That all the financial dues required under the rules and policies of the Board have been deposited in full by the unit for this Consent to Establish.

17. In case of change of name from previous Consent to Establish granted, fresh Consent to Establish fee shall be levied.

18. Industry should adopt water conservation measures to ensure minimum consumption of water in their Process. Ground water based proposals of new industries should get clearance from Central Ground Water Authority for scientific development of previous resource.

19. That the unit will take all other clearances from concerned agencies, whenever required.

20. That the unit will not change its process without the prior permission of the Board.

21. That the Consent to Establish so granted will be invalid, if the unit falls in Aravali Area or non conforming area.

22. That the unit will comply with the Hazardous Waste Management Rules and will also make the non-leachate pit for storage of Hazardous waste and will undertake not to dispose off the same except for pit in their own premises or with the authorized disposal authority.

23. That the unit will submit an undertaking that it will comply with all the specific and general conditions as imposed in the above Consent to Establish within 30 days failing which Consent to Establish will be revoked.

24. That unit will obtain EIA from MoEF, if required at any stage.

25. In case of unit does not comply with the above conditions within the stipulated period, Consent to Establish will be revoked.

26. That unit will obtain consent to operate from the board before the start of product activity.

Specific Conditions

Other Conditions :

1. The unit will strictly comply with all the general and specific conditions of EC granted by MOEF Govt. of India vide letter J-11015/10/2017-IA.II(M) dated 04.05.2018. The unit will obtained all requisite mandatory NOC / clearance from all the concerned departments. 3. The unit will obtained CTO under Water Act 1974, Air Act, 1981 & HWM Rules from the Board before starting its operation. 4. The unit will strictly comply with the prescribed norms under EP Act, 1986. 5. The unit will abide by all the directions / orders issued from time to time by all the court i.e. District Courts, Hon'ble Punjab & Haryana High Court, Chandigarh, Hon'ble NGT and Hon'ble Supreme Court of India w.r.t. mining projects.

Regional Officer, Dharuhera

Haryana State Pollution Control Board.

Annexure-11

HARYANA STATE POLLUTION CONTROL BOARD

Lala Nemi Chand Singhal Enc.Sohna Road, Near Hanuman Mandir,Dharuhera Ph. 01274-244440-41(O) Email:- hspcbrodr@gmail.com

E-mail: hspcb@hry.nic.in

No. HSPCB/Consent/ : 313100422MAHCTO25082187 **Dated:25/07/2022**

To.

M/s :BAYAL QUARTZ AND FELDSPAR MINE

KHASRA NO. 201, 223 & 224, VILLAGE-BAYAL, TEHSIL-NANGAL CHAUDHARY, DISTRICT-MOHINDERGARH

Subject: Grant of consent to operate to M/s BAYAL QUARTZ AND FELDSPAR MINE .

Please refer to your application no. 25082187 received on dated 2022-06-10 in regional office Dharuhera.With reference to your above application for consent to operate,M/s BAYAL QUARTZ AND FELDSPAR MINE is here by granted consent as per following specification/Terms and conditions.

Consent Under	BOTH
Period of consent	01/10/2022 - 30/09/2025
Industry Type	Mining and ore beneficiation
Category	RED
Investment(In Lakh)	323.0
Total Land Area(Sq. meter)	767500.0
Total Builtup Area(Sq. meter)	767500.0
Quantity of effluent	
1. Trade	0.0 KL/Day
2. Domestic	0.3 KL/Day
Number of outlets	1.0
Mode of discharge	
1. Domestic	Septic Tank
2. Trade	
Domestic Effluent Parameters	
1. NA	
Trade Effluent Parameters	
1. NA	
Number of stacks	1
Height of stack	
1. Attached to DG set	3 m
Emission parameters	
1. SPM	100 mg/m3
2. SPM	60 mg/m3

3. SOX	80 mg/m3
4. NOX	80 mg/m3
Product Details	
1. Mining of stone alongwith Assos. Minor Minerals	18333 Metric Tonnes/day
Capacity of boiler	
1. NA	Ton/hr
Type of Furnace	
1. Na	
Type of Fuel	
1. Electricity	Kilowatt/day
Raw Material Details	
Mining of stone alongwith Assos. Minor Minerals	18333 Metric Tonnes/Day

Regional Officer, Dharuhera
Haryana State Pollution Control Board.

Terms and conditions

1. The applicants shall maintain good house keeping both within factory and in the premises. All hose pipelines values, storage tanks etc. shall be leak proof. In plant allowable pollutants levels, if specified by State Board should be met strictly.
2. The applicant/company shall comply with and carry out directive/orders issued by the Board in this consent order at all subsequent times without negligence of his /its part. The applicant/company shall be liable for such legal action against him as per provision of the law/act in case of violation of any order/directives. Issued at any time and or non compliance of the terms and conditions of his consent order.
3. The applicant shall make an application for grant of consent at least 90 days before the date of expiry of this consent.
4. Necessary fee as prescribed for obtaining renewal consent shall be paid by the applicant alongwith the consent application.
5. If due to any technological improvement or otherwise this Board is of opinion that all or any of the conditions referred to above required variation (including the change of any control equipment either in whole or in part) this Board shall after giving the applicant an opportunity of being heard vary all or such condition and there upon the applicant shall be bound to comply with the conditions so varied.
6. The industry shall provide adequate arrangement for fighting the accidental leakages, discharge of any pollutants gas/liquids from the vessels, mechanical equipment etc. which are likely to cause environment pollution.
7. The industry shall comply noise pollution (Regulation and control) Rules, 2000.
8. The industry shall comply all the direction/Rules/Instructions as may be issued by the MOEF/CPCB/HSPCB from time to time.
9. The industry shall ensure that various characteristics of the effluents remain within the tolerance limits as specified in EPA Standard and as amended from time to time and at no time

the concentration of any characteristics should exceed these limits for discharge.
10. The industry would immediately submit the revised application to the Board in the event of any change in the raw material in process, mode of treatment/discharge of effluent. In case of change of process at any stage during the consent period, the industry shall submit fresh consent application alongwith the consent to operate fee, if found due, which may be on any account and that shall be paid by the industry and the industry would immediately submit the consent application to the Board in the event of any change during the year in the raw material, quantity, quality of the effluent, mode of discharge, treatment facilities etc.
11. The officer/official of the Board shall reserve the right to access for the inspection of the industry in connection with the various process and the treatment facilities. The consent to operate is subject to review by the Board at any time.
12. Permissible limits for any pollutants mentioned in the consent to operate order should not exceed the concentration permitted in the effluent by the Board.
13. The industry shall pay the balance fee, in case it is found due from the industry at any time later on.
14. If the industry fails to adhere to any of the conditions of this consent to operate order, the consent to operate so granted shall automatically lapse.
15. If the industry is closed temporarily at its own, they shall inform the Board and obtain permission before restart of the unit.
16. The industry shall comply all the Directions/ Rules/Instructions issued from time to time by the Board.

HARYANA STATE

Specific Conditions :

1. The unit will comply with provision of all applicable Acts/Rules/Direction of the Board / CPCB/ CAQM along with general conditions of the board. 2. The unit will maintain its APCM / dust suppression system in well working condition. 3. The unit will plant & maintain trees within & outside the premises. 4. The proponent shall maintain online ambient air quality monitoring system & submit its compliance report in this office. 5. As per the company act, the CSR cost should be 2% of average net profit of last three years. Hence CSR expenses should be as per the company act/rule for the socio Economic Development of the neighborhood Habitats which could be planned and executed by the project proponent more systematically based on the “Need based door to door survey” by establishment social institutes/workers. 6. The unit will strictly comply with all the conditions of EC granted by MoEF&CC, CTE & CTO granted by the Board and in case of non compliance of the conditions, the CTO shall be revoked without giving any more opportunity. 7. The unit will abide by all the directions / orders issued from time to time by all the court i.e. District Courts, Hon'ble Punjab & Haryana High Court, Chandigarh, Hon'ble NGT and Hon'ble Supreme Court of India w.r.t. mining projects. 9. Unit will deposit balance CTO fee if found pending at on later stage as per prescribed schedule.

Regional Officer, Dharuhera
Haryana State Pollution Control Board.

Annexure-12

13/11/2025

OFFICE OF THE
SUPERINTENDENT OF POLICE, MAHENDERGARH (HARYANA)
Phone-01282-251022, Fax No. 01282-251288
Email. ID –spnrl@hry.nic.in

Azadi Ka Amrit Mahotsav

To

Regional Officer,
Haryana State Pollution Control Board,
Brahma Tower (1st Floor), Ram Nagar Colony,
Opp. Housing Board, Narnaul.

No. 21524 Dated 10/11/25

Subject : Regarding Original Application No. 1140/2024 titled as Sumit Kumar Varsus State of Haryana in Hon'ble NGT, New Delhi.

Memo.

Kindly refer to your office No. HSPCB/MG/2024 -1060 dated 24.12.2024, on the subject noted above.

2. In this regard, it is submitted that required information regarding details of illegal mining activities, on which FIRs have been registered and FIR registered specially in Bayal area for last 5 years are as under :-

Year-2020

Total cases registered	Put in court	Cancelled	Untrace
11	05	03	03

Year-2021

Total cases registered	Put in court	Cancel'ed	Untrace
116	94	14	08

Year-2022

Total cases registered	Put in court	Cancelled	Untrace
153	138	06	09

Year-2023

Total cases registered	Put in court	Cancelled	Untrace	U.I.
91	84	02	05	01

Year-2024

Total cases registered	Put in court	Cancelled	Untrace
02	-	-	02

Illegal mining cases registered in the area of Bayal PS Nangal Choudhary during last 5 years.

Sr. NO.	FIR No.	Dated	Under Section	Police Station	Status	No. of accuse d in FIR	No. of accused arrested
1	98	28.3.21	379,188 IPC & 4(1), 4(1)A M.M. ACT	N.Chy	PC7.12.21	1	1
2	234	6.7.21	379 IPC & 21(1) MM ACT	N.Chy	PC17.5.22	01 Unknown	1
3	268	30.7.21	379,188 IPC & 21(1) MM ACT	N.Chy	PC20.12.21	2	2
4	269	30.7.21	379,188 IPC & 21(1) MM ACT	N.Chy	PC23.11.21	1	1
5	99	15.4.22	188,379 IPC &21 (1) MM ACT	N.Chy	PC25.5.22	2	2
6	102	16.4.22	188/379 IPC &21 (1) MM ACT	N.Chy	PC21.12.23	2	1

Superintendent of Police,
Mahendergarh.

Annexure-13

Gmail

HSPCB RO MG Mahendragarh <hspcbromg@gmail.com>

Regarding Original Application No. 1140/2024 titled as Sumit Kumar Versus State of Haryana in Hon'ble NGT, New Delhi.

Manoj Kumar <sdm-nangalchaudhary@hry.gov.in> Tue, Feb 25, 2025 at 2:46 PM
To: hspcbromg <hspcbromg@gmail.com>

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329K

प्रेषक

उपमण्डल अधिकारी(ना0),
नांगल चौधरी।

प्रेषित

श्रेत्रिय अधिकारी प्रदूषण कन्ट्रोल बोर्ड,
महेन्द्रगढ।

यादि क्रमांक 148 /एम.सी. दिनांक 21/2/25

विषयः— **Regarding Original Application No. 1140/2024 titled as Sumit Kumar Versus State of Haryana in Hon'ble NGT, New Delhi.**

उपरोक्त विषय के सन्दर्भ में।

विषयाधीन मामले में आपको भेजकर अनुरोध है कि तहसीलदार, नांगल चौधरी के कार्यालय के पत्र क्रमाकं 731/का.का. दिनांक 19.02.2025 की रिपोर्ट आपको आवश्यक आगामी कार्यवाही हेतु प्रेषित है।

संलग्न— तहसीलदार रिपोर्ट।

उपमण्डल अधिकारी(ना0),
नांगल चौधरी।

नीमान जी,

मुताबिक आदेश ग्राम बामल में पहुंचकर खसरा नं. 198-202 का मौका देखा गया मौके के मुताबिक उपरोक्त खसरा नं. में कुछ मकानात बने हुए हैं M/s बामल कुवार्टज एण्ड फिल्ड स्पेमर माइन्स ने उपरोक्त खसरा नम्बर में उपरोक्त कम्पनी ने कोई खनन नहीं किया हुआ है। खसरा नं. 202 से हास्पिटल 5 मीटर स्कूल 80 मीटर की दूरी के लगभग है व खसरा नम्बर 198 से स्कूल 550 मीटर हास्पिटल 650 मीटर की दूरी के लगभग है खसरा नं. 198-202 में M/s बामल कुवार्टज एण्ड फिल्डस्पेमर माईन्स के ग्राम बामल में कम्पनी के नाम कोई भी स्टोन क्रेशर नहीं है। खसरा नं. 201 में खनन कार्य गतिविधि से हास्पिटल की दूरी 400 मीटर स्कूल की दूरी 350 मीटर के लगभग है व खनन कार्य की गतिविधि से मकानात की दूरी 100 मीटर के लगभग तसदीक होती है। रिपोर्ट सेवा में पेश है।

श्रीमानजी [illegible] विनम्रपूर्वक है सागामी आदेश हेतु

पेश है।

19/12/25

नि.स.ओ.
नितानपुर

19/12/25

पत्रांक 73/ का०का० दिनांक 19-02-2025

मूलकप में भीमान् उपमण्डल अधिकारी (ना०) नागल जैसी को लेखन अनुरोध है कि रिपोर्ट फील्ड स्टाफ अनुसार गाँव बामल के खसरा नम्बर 198-202 में कुछ मकानात बने हुए हैं/ M/S बामल कुवार्टज एण्ड फेलस्पार माईन्स ने उपरोक्त खसरा नम्बर में उपरोक्त कम्पनी ने कोई खनन नहीं किया हुआ है/ खसरा नम्बर 202 से हॉस्पिटल 5 मीटर, स्कूल 80 मीटर की दूरी के लगभग है/ खसरा नम्बर 198 से स्कूल 550 मीटर, हॉस्पिटल 650 मीटर की दूरी के लगभग है/ खसरा नम्बर 198-202 में M/S बामल कुवार्टज एण्ड फेलस्पार माईन्स के ग्राम बामल में कम्पनी के नाम कोई भी स्टोन क्रेशर नहीं है/ खसरा नं० 201 में खनन कार्य गतिविधि से हॉस्पिटल की दूरी 400 मीटर स्कूल की दूरी 350 मीटर के लगभग है। खनन कार्य गतिविधि से मकानात की दूरी 100 मीटर के लगभग तसदीक होती है/ रिपोर्ट सेवा में पेश है/

तसीलदार
नाचाल चौधरी

Haryana State Pollution Control Board

Regional Office, Mahendragarh at Narnaul,
Brahma Tower (1st Floor), Ram Nagar Colony, Opp. Housing Board,
Narnaul- 123001, Distt. Mahendragarh
Tele Fax: 01282-299004, E-Mail: hspcbromg@gmail.com

LiFE Lifestyle For Environment

No. HSPCB/MG/2025 1188 Dated 10/1/2025

Reminder-I
Most Urgent- NGT Matter

To

The Superintendent of Police,
Mahendragarh at Narnaul.

Sub.- Regarding Original Application No. 1140/2024 titled as Sumit Kumar Versus State of Haryana in Hon'ble NGT, New Delhi.

Ref.- Hon'ble NGT order dated 19.11.2024 and this office letter No. 1060-1065 dated 24.12.2024

In this connection, it is submitted that applicant Sumit Kumar has filed an Original Application No. 1140 of 2024 before Hon'ble National Green Tribunal, New Delhi. In compliance of Hon'ble NGT order dated 19.11.2024, CPCB being nodal authority Sh. Narender Sharma, Regional Director, CPCB, Chandigarh, and other members of joint committee has conducted the site visit on 19.12.2024 & desired the information related to your departments vide letter under reference but till date no reply has been received.

During inspection, details of illegal mining activities reported to and by your department in the District Mahendragarh and Bayal area during last five years along with action taken by your department.

Keeping in view of above, you are once again requested to kindly provide the urgent information to this office at the earliest, so that further action could be taken in this matter and report could be submitted before the Hon'ble NGT.

DA: As above.

Regional Officer
Mahendragarh Region

A copy of the above is forwarded through email to the following for kind information please: -

1. The Divisional Forest Officer, Mahendragarh.
2. The Mining Officer, Mines and Geology Department, Narnaul
3. Sh. Narender Sharma, Scientist "F" & Regional Director, CPCB, Chandigarh
4. The SEE, Coordination Cell (HQ), HSPCB, Panchkula
5. The Sub Divisional Magistrate, Nangal Chaudhary, Distt. Mahendragarh

Regional Officer
Mahendragarh Region

Confidential

CSIR-CENTRAL INSTITUTE OF MINING & FUEL RESEARCH

(Council of Scientific & Industrial Research)

BARWA ROAD, DHANBAD – 826 015

REPORT ON

Advice for optimization of blast design parameters at Bayal Quartz and Feldspar Mine to control ground vibration and air overpressure within safe limit for the safety of surrounding houses/structures with improved production and productivity

Project Code: CNP/4718/2018-19 **August 2018**

CSIR-CENTRAL INSTITUTE OF MINING & FUEL RESEARCH
(Council of Scientific & Industrial Research)
BARWA ROAD, DHANBAD – 826 015

REPORT ON

Advice for optimization of blast design parameters at Bayal quartz and feldspar mine to control ground vibration and air overpressure within safe limit for the safety of surrounding houses/structures with improved production and productivity

BY

Dr. M. P. Roy,	**Principal Scientist & Project Leader**
Dr. R. K. Paswan,	**Scientist**
Mr. V. K. Himanshu,	**Scientist**
Mr. Suraj Kumar,	**Technical Officer**
Dr. M. M. Singh,	**Head & Co-ordinator**
Dr. P. K. Singh,	**Director & HORG**

Project Code: CNP/4718/2018-19 **August 2018**

NOTE

This report is meant for internal use of the sponsor of the study and it should not be published in full or part by the sponsor. It should not be communicated or circulated to outside parties except concern departments. However, CSIR-CIMFR reserves the right to publish the results of the investigation for the benefit of the mining industry.

The recommendations are based on the results of investigation carried out at Bayal Quartz and Feldspar Mines. It is hoped that the recommendations will be implemented to get the optimum results without hampering production, productivity and safety of the mine. The recommendations are guidelines, which should be implemented in letter and spirit.

Since, the day-to-day blasting operations are not in the control of CSIR-CIMFR, the research team will not be held responsible for any untoward incident caused due to blasting.

SIGNATURE OF THE PROJECT PROPONENTS

02/08/18
(Dr. R. K. Paswan)
Scientist

02/08/2018
(Dr. M. P. Roy)
Principal Scientist & Project Leader

CSIR-CIMFR AUTHORISED SIGNATORIES

3/8/18
(Dr. V. K. Kalyani)
Sr. Principal Scientist & HOS
Project Monitoring & Evaluation Cell

03/08/2018
(Dr. R. V. K. Singh)
Chief Scientist & HORG
Business Development & Industrial Liaison

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EXECUTIVE SUMMARY

This report relates to the scientific study conducted by CSIR- Central Institute of Mining & Fuel Research (CIMFR), Dhanbad to study and advice for optimization of blast design parameters at Bayal Quartz and Feldspar Mines to control ground vibration and air overpressure within safe limits for the safety of structures in the periphery of the mine with improved production and productivity. The study involved monitoring of impact of blast conducted with varying blast designs and charging patterns on the nearby structures and in the periphery of mine. In addition to these studies, the qualities check of the explosives and its accessories were also performed. The results of investigation, analyses of data and recommendations, made thereof, are summarised below:

- Altogether, ten blasts were conducted at different benches of the 'A' Block and 'B' Block of Bayal Quartz and Feldspar Mines and attempt were made to record 40 blasts induced ground vibration data.
- Maximum vibration (in terms of peak particle velocity, PPV) recorded was 7.674 mm/s with associated dominant peak frequency of 22.13 Hz at 50 m backside from blasting site. The explosives weight per delay and total explosive detonated were 16.7 kg and 167 Kg respectively. The PPV recorded at 150 m from the same blast was0.741 mm/s with dominant peak frequency of 8.875 Hz. Fast attenuations in the vibration level were recorded.
- The maximum air over-pressure recorded was 114.2 dB(L) at 50 m due to the blast conducted at 2nd bench of 'A' Block. In this blast, explosives detonated in a blasting round and explosive weights per delay were 167 kg and 16.7 kg respectively. The recorded air over-pressure from the same blast at 150 m was 101.9 dB(L). Proper stemming and the Nonel initiation system reduces the air over-pressure to a greater extent and improves the blasting performance too.
- There was no ejection of flyrock in any of the blast. Pyrotechnic (Nonel) Initiation systems were used to conduct all the ten blasts. Nonel initiation systems have advantage in detonation of blast holes from the bottom of the hole at floor levels if the detonators are placed accordingly.
- All the recorded data (blast vibrations, air over pressures and flyrocks) were well within the safe limits at the concerned houses/structures. The dominant peak frequencies of ground vibrations were in the range of 4.62 to 70 Hz. FFT analyses of blast vibration frequencies confirmed that concentration of dominant frequencies were in between 8.875 Hz and 23.13 Hz. Hence, the safe level of vibration has been taken as 5 mm/s for the houses/structures not belonging to the owner and for 10 mm/s for structures belonging to owner as per DGMS standard.
- Propagation equation for the prediction of blast vibration has been established and is given as Equation 1. The permissible explosive weight per delay may be computed

from the Equation to contain vibration within safe limit for distances of houses/structures concerned. For convenience, the recommended explosive weight per delay and Total explosive weight has been computed and is given in Table A3 & Table A5. For ready reference, the predicted value of PPVs with respective maximum explosive weight per delay is given in Table A4.

- The delay interval between the holes in a row should be 17 ms whereas between the rows, it should be 42 ms or more depending upon the number of rows and effective burden in front of the particular hole. If the numbers of rows are more than two, the delay interval between rows should be increased by 20% in successive rows.

- The in-the-hole VOD of Neo Prime Special Slurry cartridge explosives of M/s Special Blast Limited, Shakti Power Blast cartridge explosives of M/s Super Shiv Shakti Chemicals (P) Ltd. and Raj Blast Super Explosive of M/s Rajasthan Explosive Chemicals Pvt. Ltd. were recorded to determine the optimal value for better energy utilization in terms of improved fragmentation with minimising blast induced ground vibration. The recorded VODs were in the range of 3612 m/s to 4199 m/s.

- The scattering test were performed for Nonel surface delays and down the hole delays of M/s Economic Explosives Ltd. The excessive scattering was recorded in the TLDs of 25 ms and 42 ms. This is a serious concern for getting desired blast results. It is recommended to take-up the issue of excessive scattering to the suppliers.

- The fragmentation achieved in most of the blasts were excellent. The blasted muck pile was properly distributed for loading and negligible back-breaks were noticed. Fragmentation analyses was done for the blast conducted at 1st bench of 'A' Block. The average mean size of the block was 99.4 mm (diameter of an equivalent sphere) and the most common size of the blocks are 500 mm (diameter of an equivalent sphere). The maximum size of the boulder found in the analyses was of 1.56 m (diameter of an equivalent sphere).

- The recommended blast designs should be followed for day-to-day blasting operations for safe and efficient blasting operations. The blast designs Annexure as Figures A1-A4, will ensure the safety of the houses/structures, life of human beings and other property in the periphery of the mines.

1. Introduction

The management of M/s Bayal Quartz and Feldspar Mine, Narnaul, Haryana entrusted CSIR- Central Institute of Mining & Fuel Research (CIMFR), Dhanbad through E-mail dated May 30, 2018 for a scientific study and advice for optimization of blast design parameters at Bayal Quartz and Feldspar Mine to control ground vibration and air overpressure within safe limits for the safety of structures in the periphery of the mine with improved production and productivity.

The Rock Excavation Engineering division team of CSIR- Central Institute of Mining & Fuel Research, Dhanbad carried out field investigations during July 16-21, 2016. Altogether, 10 blasts were conducted and 40 blast induced ground vibration and air over-pressure/noise were monitored at various locations in the periphery of the 'A' Block and 'B' Block of the Bayal Quartz and Feldspar Mine, Narnaul, Haryana.

2. Location and geology

The mining lease area is in Bayal village, Mahendragarh district, Haryana. The lease area can be approached by road from Narnaul via SH-17 up to Nangal Chaudhry and thereafter by MDR. The mining lease area is in Bayal village, Mahendragarh district. Rajasthan Haryana state border is adjacent to the site. The lease area is not continuous but is segregated in north and south blocks by 600 m. The rocks exposed in the proposed area and surrounding areas belong to Alwar Series of Delhi super group. Quartzite associated with vein of Quartz and Feldspar belongs to Alwar series of Delhi system are exposed in the area. The sequence of rock formations belonging to Delhi Super group are found in the lease area have Alluvium, Quartz mixed with Quartzite, Feldspar mixed with Quartzite, Amphibolites and Micaceous Phyllite with Quartzite. Micaceous phyllite is the country rock in this area. The quartz has intruded in to the country rock i.e. micaceousphyllite and quartzite and is itself sheared at the margins.

The general strike of the quartize formation is N20°-25° E to S20°-25°W with dips of 45° to 60° due East. The strike and dip of the quartize bands is not uniform since there are structural disturbances and intrudes and mix with Quartz and Feldspar. The lease area is consists of ridges and valleys. The highest point in the lease area is recorded to be 480 mRL and lowest point recorded is 370 mRL. The lease area does not have any water body. There are dry nalas in which water flows during rains for a short duration, otherwise they remain dry for the rest of the months. The rain water from these nalas drains either into local Johars or in agriculture fields. The overview of Mining site from the top benches of 'B' Block of Bayal Quartz and Feldspar Mines, Narnaul, Haryana is presented in Photograph 1.

Photograph 1. The overview of Mining site from the top benches of 'B' Block of Bayal Quartz and Feldspar Mines, Narnaul, Haryana.

3. Instrumentations

Blast induced vibrations were monitored by seismographs namely MiniMate Plus, MiniMate Blaster and MiniMate DS-077 (Made in Canada by M/s Instantel Inc.). MiniMate plus are eight as well as four channels seismographs provided with two/one tri-axial transducer(s) for monitoring of vibration (in mm/s) and two/one channel(s) for monitoring of air over-pressure/noise in dB(L). MiniMate Blaster and MiniMate DS-077 are four channels seismographs provided with one tri-axial transducer for monitoring vibration (in mm/s) and one channel for monitoring of air over-pressure/noise in dB(L). All the seismographs record vibration in three directions i.e. Longitudinal (L), Vertical (V) and Transverse (T). They also record principal frequency of vibration and compute the peak vector sum of the vibration.

The rock fragmentation analyses were carried out with the help of WipFrag software of M/s WipWare Inc., Canada. Video camera was deployed to document the ejection of flyrocks, if any, and blast detonation sequences.

The in-the-hole velocities of detonation (VODs) of explosives were determined with the help of MicroTrap (Made in Canada by M/s MREL Speciality Explosives Product Limited). MicroTrap II is single channel data logger which records continuous VOD of explosives in the blast hole at the time of detonation.

Blaster's Ranger II™ high speed digital video camera (made in Canada by M/s MREL Group of Companies Limited) was used to identify the location of the first rock movement and the shape of the face movement; the firing sequence of the blast; the occurrence of gas venting at the face; the degree of confinement due to stemming; the occurrence and location of misfires;

the nature of the muck-pile formation; the onset time for rock movement (both at the face and at the top of the bench); the acceleration, velocity and direction of flyrock travel from the face and the top of the bench; the hole venting and stemming ejection velocities; the actual hole/deck delay times; and the casting range of the muck.

4. Blasting details

Ten blasts including three blasts in 'B' block and rest seven blasts in 'A' block were conducted during the study period. The number of blast holes detonated in production blasting varied from 8 to 40. The diameters of blast holes were 100 mm. The depth of blast holes varied from 6 to 9 m and the explosives loaded in a hole varied from 14 to 41.7 kg. The explosives weight per delay ranged between 28 and 83.4 kg. Total explosive weight detonated in a blast round varied between 167 and 668 kg. The vibration measuring distances varied from 30 to 450 m. Details of blast design parameters experimented during the period of investigation are given in Annexure as Table A1.

Vibrations were monitored in terms of peak particle velocity (PPV) that varied from 0.524 mm/s to 7.674 mm/s depending upon the distance of measuring transducers of seismographs from the blasting face and the amount of explosives detonated in particular delay of the blast. The recorded levels of air over-pressure ranged from 93.9 dB(L) to 114.2 dB(L). Recorded blast induced ground vibrations and air over-pressure are presented in Annexure as Table A2.

There was no ejection of flying fragments and back breaks recorded in any blast. The location of the first rock movement, the profile of the face movement and ejection of rock, if any, were monitored for each blast with the help of video camera. Photograph 2 depicts the view of the charging and connection of the blast face at 2nd bench of 'A' Block on 21.07.2018.

Photograph 2. View of the charging and connection at 2nd bench of 'A' Block on 21.07.2018.

5. Analyses of recorded vibration data

Attempts were made to record 40 blast induced ground vibrations data. The recorded vibration data were grouped together for statistical analysis. An empirical relationship has been established correlating the maximum explosive weight per delay (Q_{max} in kg), distance of vibration measuring transducers from the blasting face (R in m) and recorded peak particle velocity (v in mm/s) for all the quarries in combination as well as individually. The established equation for the mine in combined form is:

$$v = 510.11 \left(\frac{R}{\sqrt{Q_{max}}}\right)^{-1.688} \quad (1)$$

Correlation co-efficient = 90.5 %

Where,

v = Peak particle velocity (mm/s)

R = Distance between vibration monitoring point and blasting face (m)

Q_{max} = Maximum explosive weight per delay (kg)

The above equation is site specific and applicable only for 'A' block and 'B' block of M/s Bayal Quartz and Feldspar Mine, Narnaul, Haryana. It may be used to compute the maximum explosive weight to be detonated in a delay for distances of concerned structures from the blasting site. For convenience, the recommended explosive weight per delay has been computed and is given in Table A3. The regression plot of vibration data recorded at their respective scaled distances is presented in Figure 1.

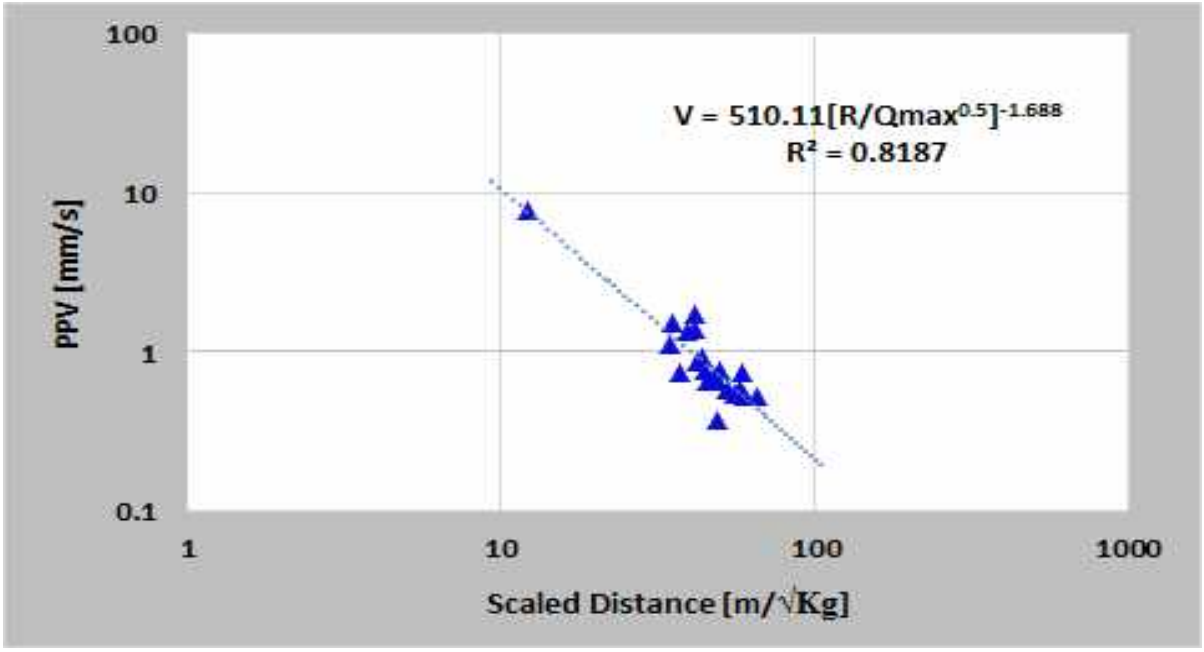


Figure 1. Regression plot of recorded PPV with their respective scaled distances.

5.1 Frequency of blast vibration

The dominant peak frequencies of ground vibrations were in the range of 4.62 to 70 Hz. Fast Fourier Transform (FFT) analyses of blast vibration frequencies confirmed that concentration of dominant frequencies were in between 8.875 Hz and 23.13 Hz. The plot of recorded dominant frequencies at various distances is presented in Figure 2. Most of the vibration measuring stations were on compact ground surfaces.

The blast wave signature recorded at 250 m (PPV= 1.503 mm/s) is depicted in Figure 3. The Fast Fourier Transform (FFT) analysis of frequencies of the vibration signatures shown in Figure 3 is depicted in Figure 4. The blast wave signature recorded at the house of Shree Laxami Narayan Ji and the blast was conducted at 1st bench of 'B' block on 16.07.2018 at 250 m to detect the attenuation characteristic of wave. The blast wave signature recorded behind blast free face at a distance of 50 m from the blasting site of 'A' block is presented in Figure 5. The Fast Fourier Transform (FFT) analysis of frequencies of the vibration signatures shown in Figure 5 is depicted in Figure 6. It is evident from the Figures 4 & 6 that high frequency vibrations were recorded in blasting. The view of blast vibration monitoring near the houses of Doyala village and Syalodra village from the blasts conducted at 'A' Block and 'B' Block of Bayal Quartz and Feldspar Mine are shown in Photograph 3 & 4 respectively.

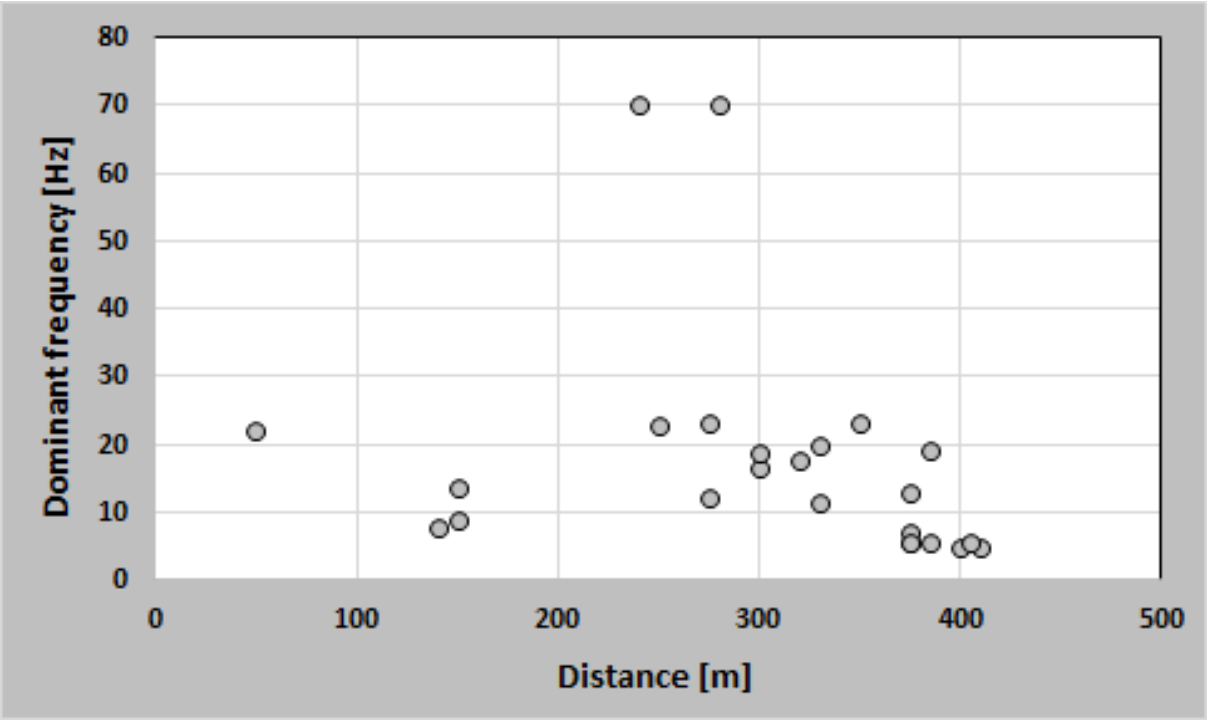


Figure 2. Plot of dominant frequencies of blast waves recorded at various locations in the periphery of the Bayal Quartz and Feldspar Mine, Haryana.

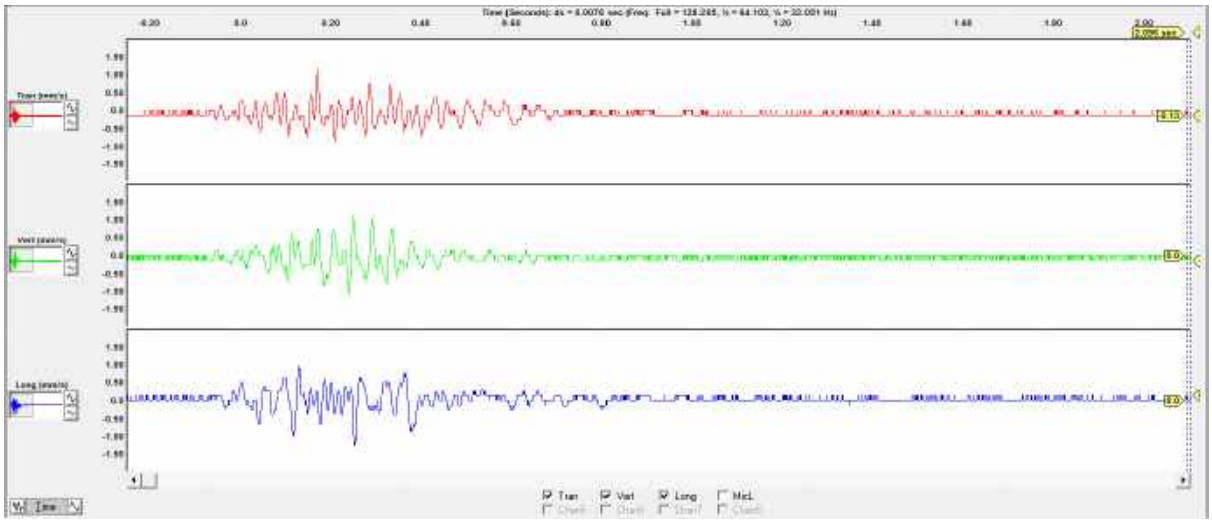


Figure 3. Blast wave signature recorded at 250 m (House of Shree Laxmi Narayan Ji) from the blast conducted at 'B' Block on 16.07.2018.

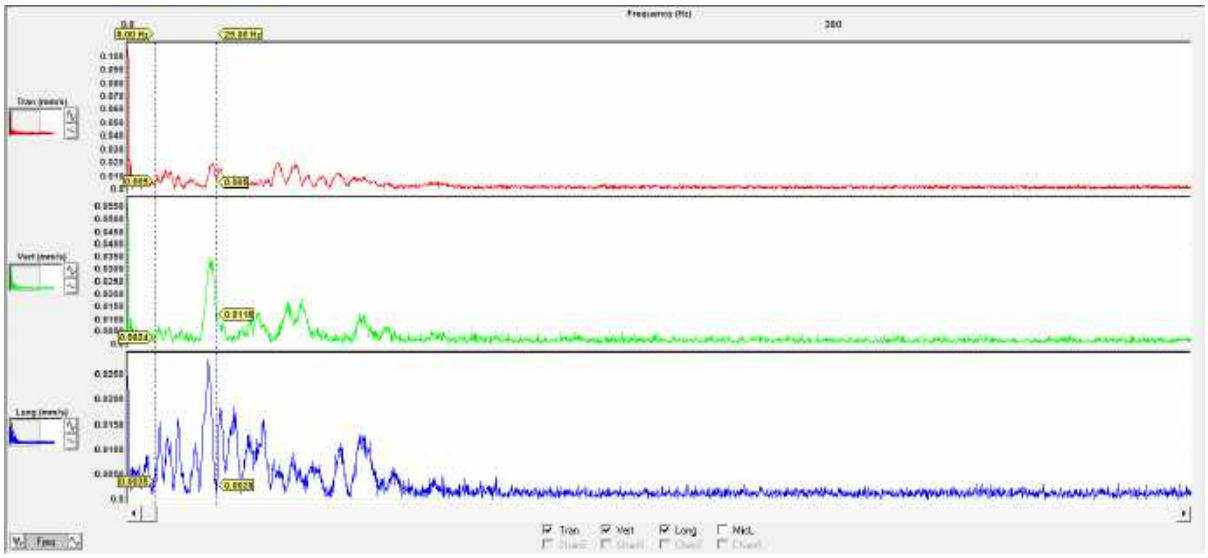


Figure 4. FFT analyses of frequencies of vibration presented in Figure 3.

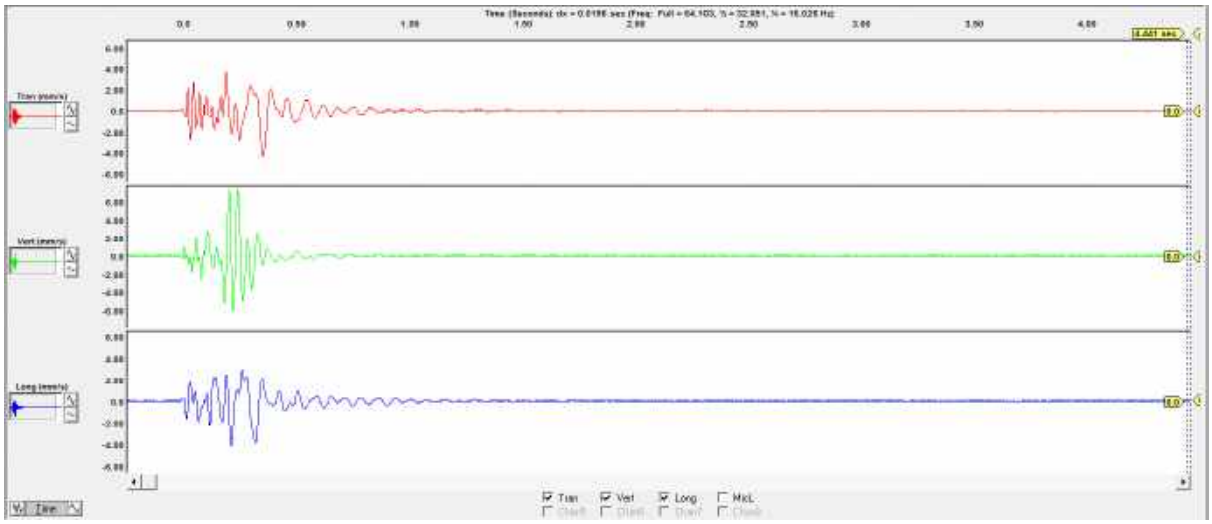


Figure 5. Blast wave signature recorded behind blast free face at 50 m from the blast conducted at 'A' Block 2nd bench on 20.07.2018.

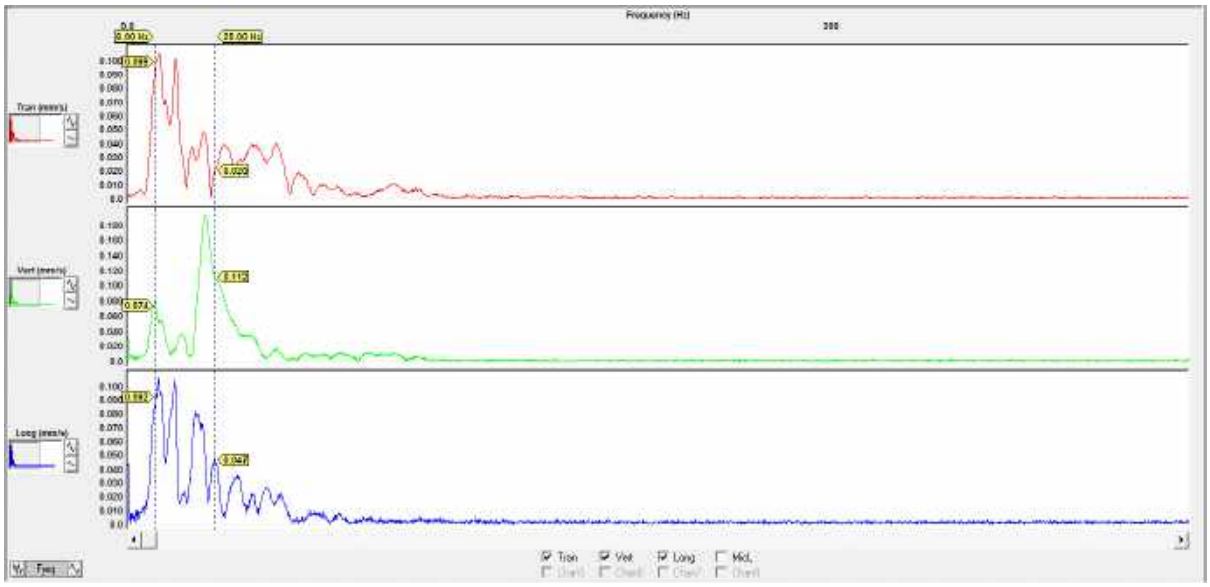


Figure 6. FFT analyses of frequencies of vibration presented in Figure 5.

Photograph 3. Monitoring of blast vibration at different houses of Doyala village, near 'B' Block of Bayal Quartz and Feldspar Mine, Haryana.

Photograph 4. Monitoring of blast vibration at different houses of Syalodra village, near 'A' Block of Bayal Quartz and Feldspar Mine, Haryana.

6. Existing vibration standard and criteria to prevent damage

Peak particle velocity (PPV) has been globally used in practice for assessment of blast induced damage to the structures. Different countries adopt different standards depending on their type of industrial/residential buildings. In India, presently DGMS technical circular 7 of 1997 is considered as vibration standard for the safety of surface structures in mining areas. The DGMS standard is given in Table 1.

Table 1. DGMS technical circular 7 of 1997 concerning to blast vibration standard in mm/s.

Type of structure	Dominant excitation frequency, Hz		
	< 8 Hz	8-25 Hz	> 25 Hz
(A) Buildings/structures not belong to the owner			
1. Domestic houses/structures (Kuchcha, brick & cement)	5	10	15
2. Industrial buildings	10	20	25
3. Objects of historical importance and sensitive structures	2	5	10
(B) Buildings belonging to owner with limited span of life			
1. Domestic houses/structures	10	15	25
2. Industrial buildings	15	25	50

7. Air over-pressure/noise

Air overpressure in the mining or quarrying context is the superposition of a number of impulsive air pressures as a result of the detonation of explosive in the ground. Air over-pressure can be measured in pressure unit as well as sound pressure level (SPL).

$$SPL\ (dB) = 20 \log (p/p_o) \qquad (6)$$

Where, p = measured over-pressure in Pascal (pa)
p_o = reference pressure level of the lowest sound that can be heard, i.e., zero

$dB = 2 \times 10^{-5}$ pa.

United State Bureau of Mines (USBM) has correlated the damage due to air over-pressure. The recommended values are given below in:

Over-pressure (dB)	Over-pressure (KPa)	Air Blast Effects
177	14	All windows break
170	6	Most windows break
150	0.63	Some windows break
140	0.20	Some large plate glass windows may break, desk and windows rattle
136	0.13	USBM interim limit for allowable air blast
126	0.05	Complaints likely

The maximum level of air over-pressure recorded was 114.2 dB(L) at 50 m due to blasting conducted at 2nd bench of 'A' Block on 20.07.2018. In this blast 10 blast holes were loaded with 167 kg of explosives and were fired with the explosives weight per delay of 16.7 kg. The threshold level of air over pressure/noise is 136 dB(L) as per USBM standard.

8. Monitoring of in-the-hole velocity of detonation (VOD) of explosives

The performance of explosives depends upon a number of parameters and VOD is one of the important parameters. The detonation pressure associated with the reaction zone of a detonating explosive is directly proportional to the square of its VOD. It is measured in the C-J plane, behind the detonation front, during propagation through the explosive column. The detonation pressure (P_d) can be estimated by the following formula.

$$P_d = \frac{1}{2}\rho_e (VOD)^2 10^{-6} \qquad (7)$$

Where,

P_d = Detonation pressure (MPa)
ρ_e = Density of explosive (kg/m^3)
VOD = Velocity of detonation (m/s)

Uniform in-the-hole VOD of explosive is essentially required throughout the blast holes in order to produce sufficient detonation pressure to the blasthole walls. Booster is provided in the explosive column at bottom to sustain and maintain the VOD for the uniform breakage of rock. The continuous in-the-hole VOD of Neo Prime Special Slurry cartridge explosives of M/s Special Blast Limited, Shakti Power Blast cartridge explosives of M/s Super Shiv Shakti Chemicals (P) Ltd. and Raj Blast Super Explosive of M/s Rajasthan Explosive Chemicals Pvt. Ltd. were recorded to determine the optimal value for better energy utilization in terms of improved fragmentation with minimising blast induced ground vibration. The recorded VODs were in the range of 3612 m/s to 4199 m/s. The recorded in-the-hole VODs of

different suppliers is given in Table 2. The traces of in-the-hole VOD of explosives recorded are depicted in Figure 7, 8, 9 & 10.

Table 2. Recorded velocity of detonation of explosives being used at Bayal Quartz & Feldspar Mines, Haryana.

Explosives tested for VOD	Recorded VOD	Remarks
Neo Prime Special Slurry cartridge explosives of M/s Special Blast Limited,	3919 – 4199 m/s	In-the-hole VOD
Shakti Power Blast cartridge explosives of M/s Super Shiv Shakti Chemicals (P) Ltd.	4166 m/s	In-the-hole VOD
Raj Blast Super Explosive of M/s Rajasthan Explosive Chemicals Pvt. Ltd.	3612 m/s	In-the-hole VOD

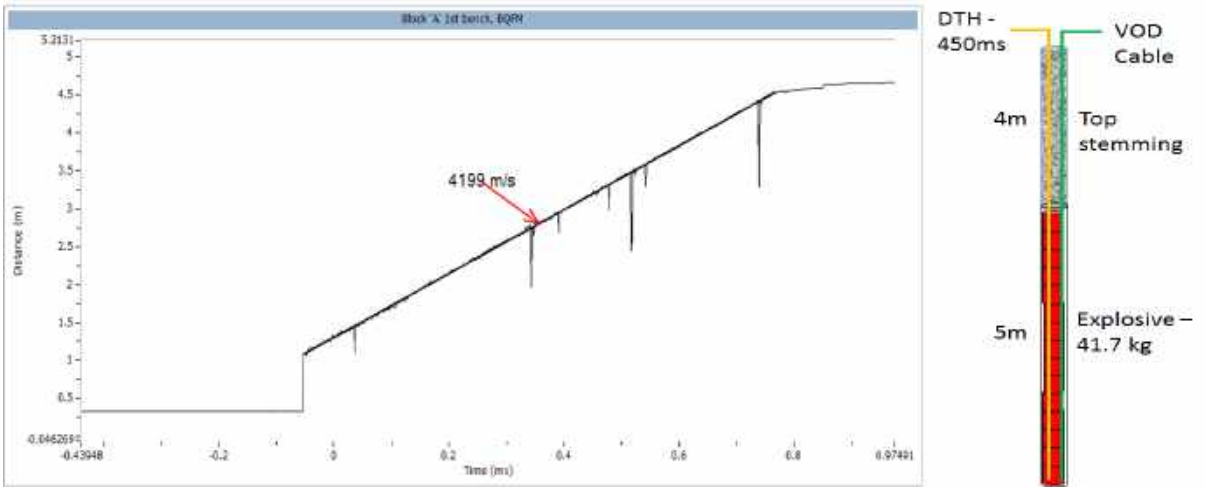


Figure 7. In-the-hole VOD of Neo Prime Slurry Explosive of M/s Special Blast Ltd. recorded on 18.07.2018 at 1st bench of Block ‘B’, Bayal Quartz & Feldspar Mines, Haryana.

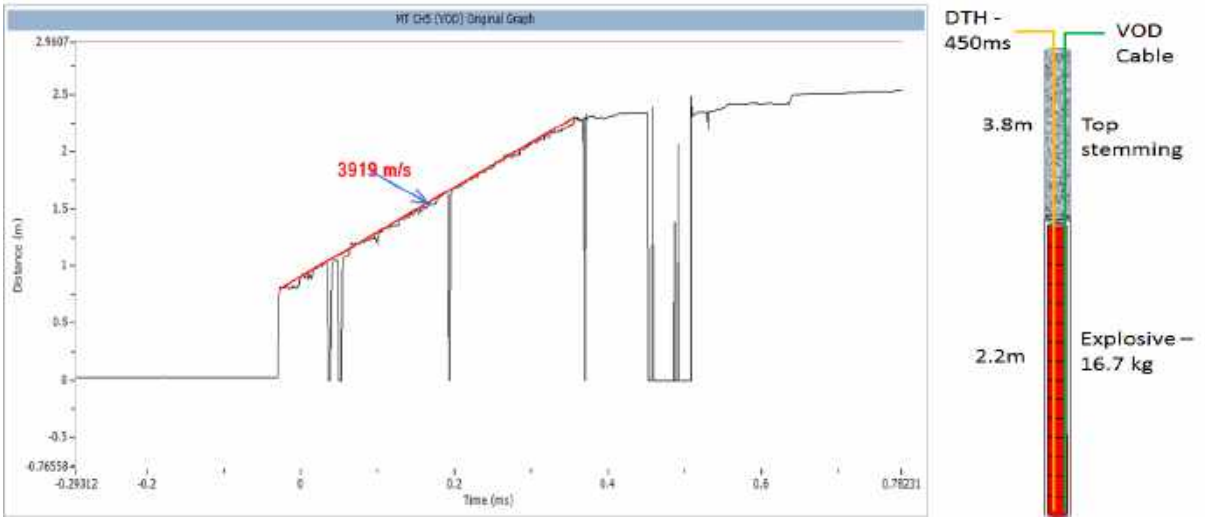


Figure 8. In-the-hole VOD of Neo Prime Slurry Explosive of M/s Special Blast Ltd. recorded on 21.07.2018 at 1st bench of Block ‘A’, Bayal Quartz & Feldspar Mines, Haryana.

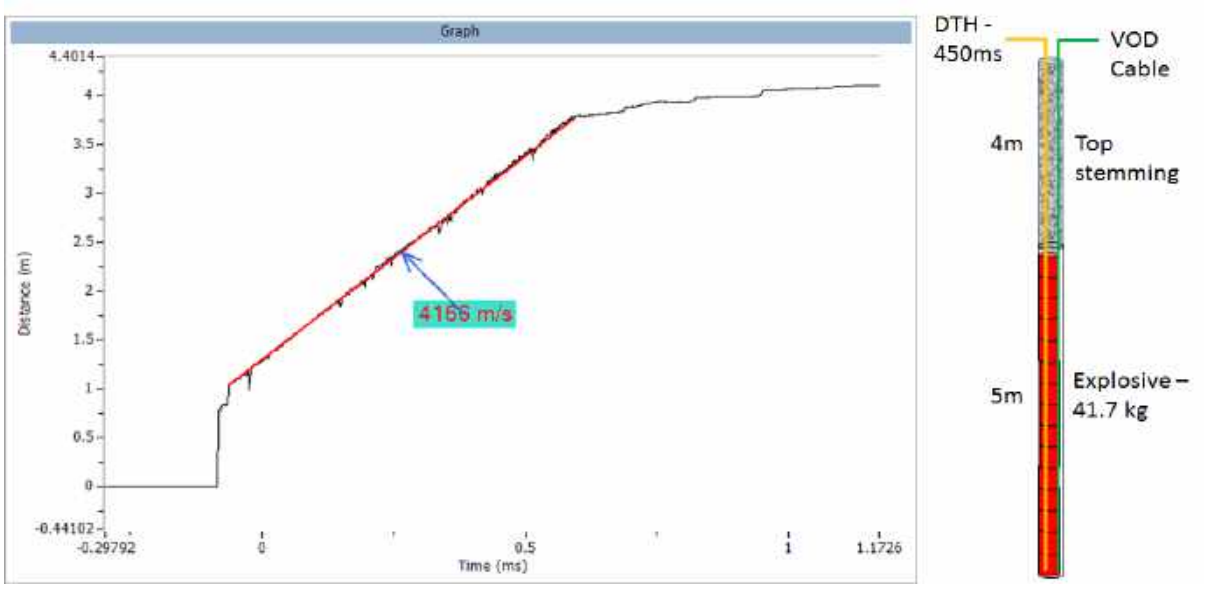


Figure 9. In-the-hole VOD of Shakti Power Blast cartridge explosives of M/s Super Shiv Shakti Chemicals (P) Ltd. recorded on 19.07.2018 at 1st bench of Block 'A', Bayal Quartz & Feldspar Mines, Haryana.

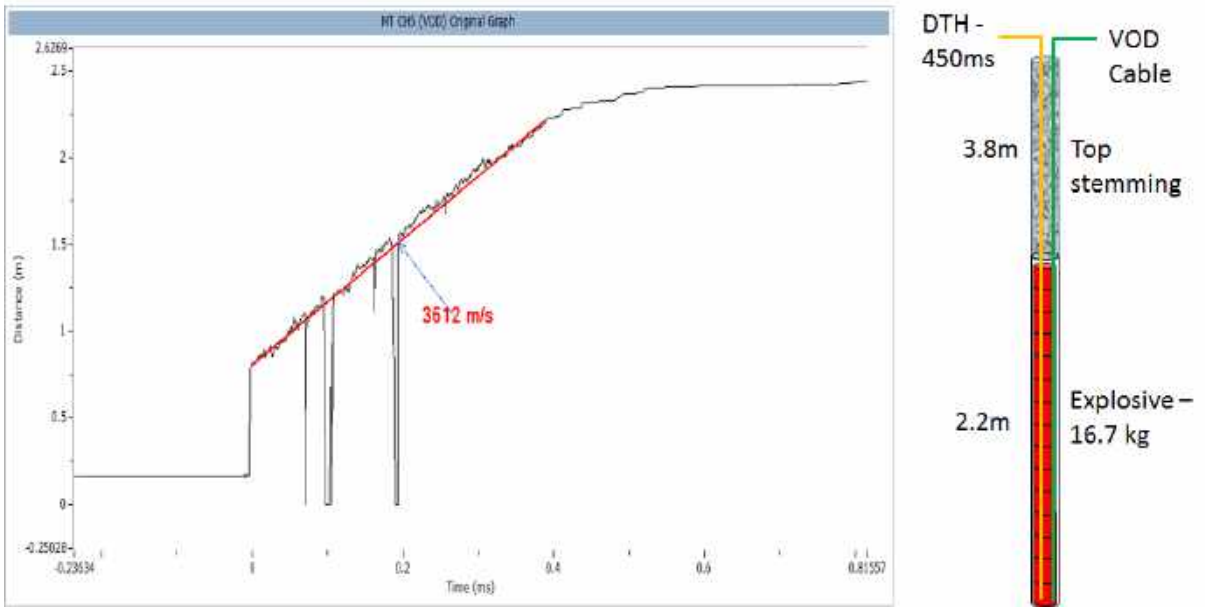


Figure 10. In-the-hole VOD of Raj Blast Super Explosive of M/s Rajasthan Explosive Chemicals Pvt. Ltd. recorded on 20.07.2018 at 2nd bench of Block 'A', Bayal Quartz & Feldspar Mines, Haryana.

9. Quality test of blasting accessories

The qualities of Nonel initiation systems were tested with the help of Blaster Ranger II, High Speed Colour Video camera (at 250 fps). Tests were performed for the surface delays of 17ms, 25ms & 42 ms and down the hole delay (DTH) of 450ms of M/s Economic Explosives Ltd. The arrangement of delays for the scattering test is presented in photograph 5. The analysis of recorded high speed video with the help of Proanalyst Software is depicted in Figure 11. The results of scattering are presented in Table 3.

Photograph 5. View of NONEL delay detonators connection for delaydetonator scattering test with the help of Blaster Ranger-II, High Speed Colour Video Camera.

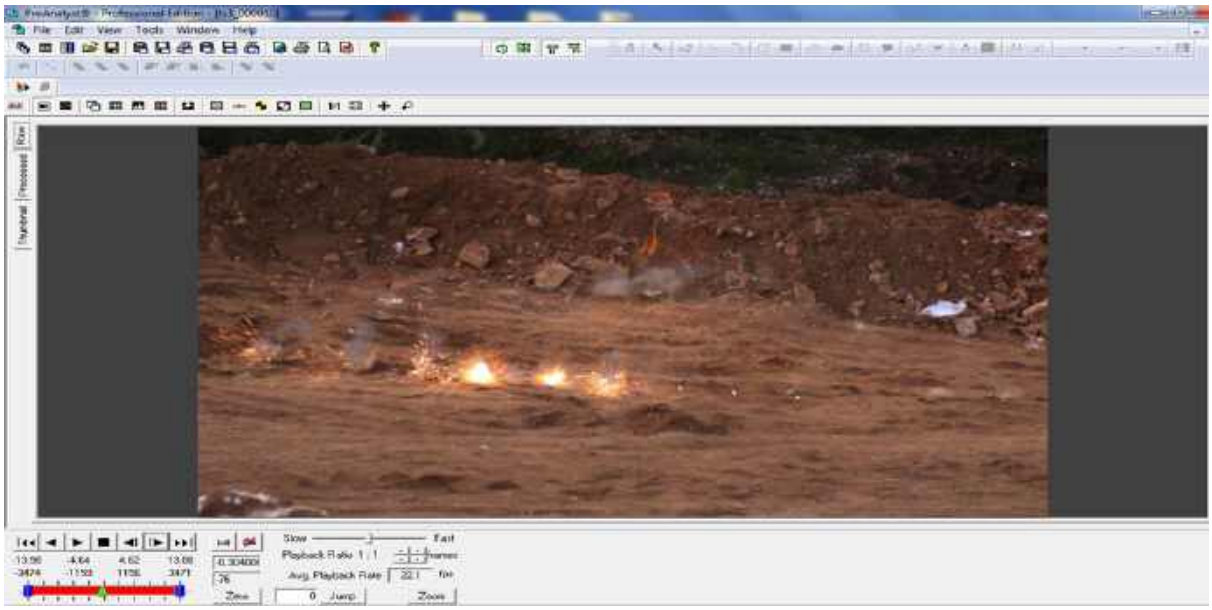


Figure 11. The analysis of recorded high speed video with the help of Proanalyst Software

Table 3. Quality test and results of surface and down-the-hole delays of M/s Economic Explosives Ltd.

Date	TLD/DTH	Designed Firing Time [ms]	Actual Firing Time [ms]	Scattering	% Scattering
18.07.2018	TLD	17	16	-1	-5.9
18.07.2018	TLD	17	16	-1	-5.9
18.07.2018	TLD	17	16	-1	-5.9
18.07.2018	TLD	25	28	3	12.0
18.07.2018	TLD	25	32	7	28.0
18.07.2018	TLD	25	24	-1	-4.0
18.07.2018	TLD	42	48	6	14.3
18.07.2018	TLD	42	52	10	23.8
18.07.2018	TLD	42	44	2	4.8
18.07.2018	DTH	450	452	2	0.4
18.07.2018	DTH	450	468	18	4.0
18.07.2018	DTH	450	456	6	1.3

10. Flyrocks

Flyrocks are the undesirable ejection of rock particles projected beyond the normal blast area. It is generated when there is insufficient stemming, too much explosive energy for a fixed amount of burden, or poor delay timing pattern, or explosives loaded in voids, mud seams.

The primary means of controlling flyrocks is through proper blast design and optimum delay timing between two detonations. Any pattern which over-confines the explosives or one with insufficient stemming tends to cause material to be thrown up in the air rather than allowing any horizontal movement. None of the blasts ejected flying fragments. The detonation of blast was very ideal and achieved blasting face was without back breaks in most of the time. It was demonstrated and experiment that stemming to burden ratio of 0.7 or more did not cause ejection of flying fragments. Hence, to reduce the generation of boulders from the top portion of the face, stemming length should be 0.7 times of burden.

11. Rock fragmentation analyses

The fragmentation analysis were carried out for all the blasts and the output of the analyses are in the form of number of exposed fragmented blocks, maximum, minimum and mean size of the fragmented blocks, sieve analysis as per the requirement i.e. at different percentile size viz. D_{10}, D_{25}, D_{50}, D_{75}& D_{90}. (Percentile sizes: for example D_{10} is the ten-percentile, the value for which 10% by weight of the sample is finer and 90% coarser. In terms of sieving, D_{10} is the size of sieve opening through which 10% by weight of the sample would pass).

The fragmentations achieved from the blasts were very good. Negligible back-breaks were noticed. The blasted muck pile was properly distributed for loading. The fragmentation analysis process and results of one of the blast conducted at 2^{nd} bench of ‘A’ Block (Photograph 6) on 18.07.2018 are depicted in Figures 12 & 13. The average mean size of the block is 99.4 mm (diameter of an equivalent sphere) and the most common size of the block is 500 mm (diameter of an equivalent sphere). The maximum size of the boulder found in the analysis is of 1.56 m (diameter of an equivalent sphere). The boulders were generated from the stemming part of the holes and was a result of liberation of rock along joint and/or fracture planes.

Photograph 6. Fragmented view of the blast conducted at 2nd bench of 'A' Block, Bayal Quartz and Feldspar Mines, Narnaul, Haryana on 18.07.2018.

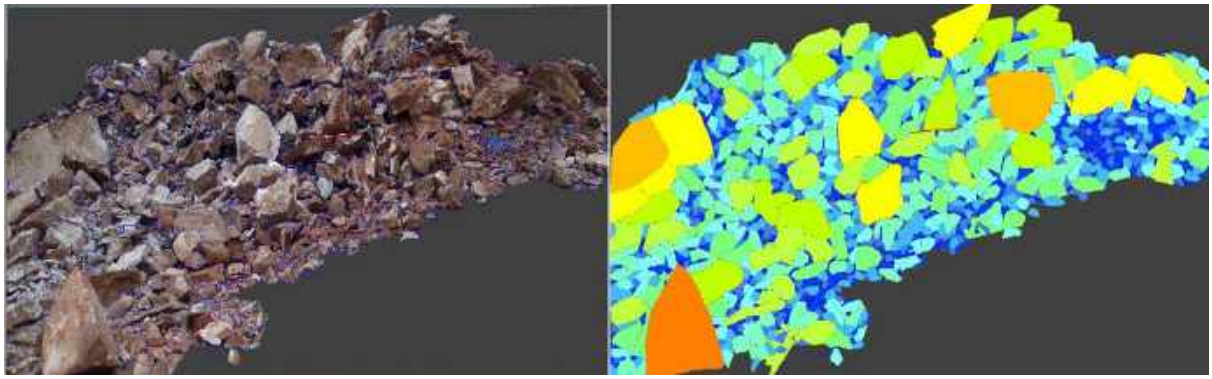


Figure 12. Netting and countering of block sizes of fragments at 2nd bench of 'A' Block shown in Photograph 6.

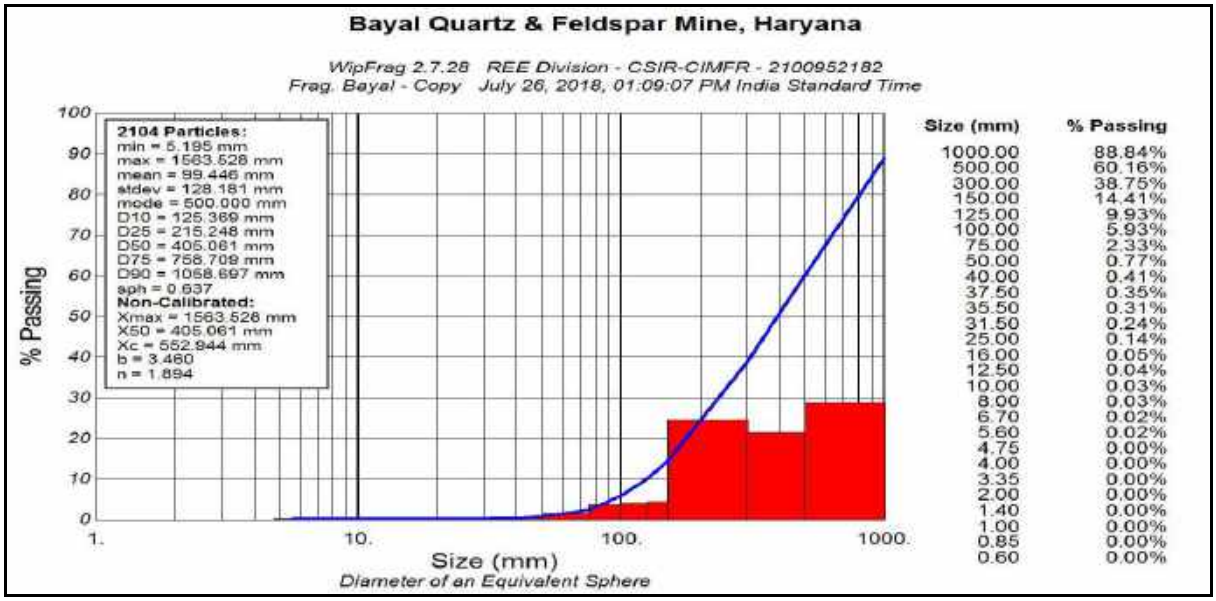


Figure 13. Histogram and cumulative size curve view of fragmented block sizes at 2nd bench of 'A' Block, Bayal Quartz & Feldspar Mines, Narnaul, Haryana.

12. Human response to blasting

The tolerance and reactions of human beings to vibrations are important when standards are based on annoyance, interference, work proficiency and health. Human beings notice and react to blast induced vibrations at levels that are lower than the damage thresholds.

It is impossible to establish a vibration level where nobody will complain. There are always some persons in a population who will complain no matter how small the disturbance is. Several researchers recognized that the duration of the vibration was critical. Most evident was that a higher level could be tolerated if the event was of short duration. Consequently, steady state vibration data could not be realistically applied to blasting except for events that exceed several seconds duration.

13. Results and discussions

The maximum vibration recorded in terms of peak particle velocity (PPV) was 7.674 mm/s at 50 m on the ground surface behind the blasting face. The associated dominant peak frequency was 22.13 Hz. This magnitude of vibration was due to detonation of 167 kg of explosives loaded in 10 holes in two rows and fired with maximum charge weight per delay of 16.7 kg. The PPV recorded at 150 m from the same blast was 0.741 mm/s with dominant peak frequency of 8.875 Hz. It indicates that attenuation of vibration is very fast.

The vibrations recorded in the different locations of the periphery of the mine were of low amplitude and short duration. The persistence of vibration was in most of the cases less than 1 second. A few recorded blast waveforms at different locations are given in the Annexure which indicates low amplitude and short duration blast events. The existing practice of blasting will not cause any damage to the houses and structures in the periphery of the mine.

The dominant peak frequencies of ground vibrations were in the range of 4.62 Hz to 70 Hz. Fast Fourier Transform (FFT) analyses of blast vibration frequencies confirmed that concentration of dominant frequencies were in between 8.875 Hz and 23.13 Hz. So, the safe level of vibration has been taken as 5 mm/s for the houses/structures of Doyala and Syalodra villages considering the greater safety whereas for structures belonging to owner has been taken as 10 mm/s as per DGMS standard. The maximum explosives to be fired in a delay for the safety of residential houses at various distances from the blasting site may be computed from the Equation 1. For ready references, the maximum permissible explosive weight per delay and Total explosive weight to be detonated in blast round has been computed and is given in Annexure as Table A3 & Table A5 respectively.

The maximum air over-pressure recorded was 114.2 dB(L) at 50 m due to the blast conducted at 2nd bench of ‘A’ Block on 20.07.2018 by detonation of 167 kg of explosives in 10 holes. It was 10.9 dB (L) at 150 m from the same blast. All the blasts were initiated using Pyrotechnic initiation system. The blasts initiated with electronic and Nonel initiation system generated

significantly lower level of air over-pressure compared to detonating fuse initiation system. There was no ejection of flyrock in any of the blasts.

The methods for removal of toe were discussed with mine officials and were successfully implemented. It was also advised and demonstrated to provide one jump delay at the end of opposite of the flank of intonation to control end breaks. The charging pattern of holes and importance of bottom initiation over the top initiation were discussed with mine officials.

The recorded vibration and air over-pressure data and subsequent analyses revealed that blasting may be performed at 100 m from the nearest house in the periphery of the mine with suggested blast design and charging pattern. The blast designs have been recommended for blasting operations to be conducted at 100 m and beyond from the nearest house or other structures of the periphery of the mine. The recommended blast designs are given as Figures A1-A4. The recommended explosive weights per delay for various distances of the concerned locations up to 500 m are computed and are presented in Table A3.

The deployment of 100 mm drill diameter machines at all the benches of 5.5-9.5m will help in proper loading of explosives in holes without decking and will help enable in formation of smooth run-off of velocity of detonation of explosives and will yield desired fragmentation.

14. Conclusions and recommendations

- Maximum vibration recorded was 7.674 mm/s with associated dominant peak frequency of 22.13 Hz at 50 m from blasting site. The explosives weight per delay was 16.7 kg. The PPV recorded at 150 m from the same blast was 0.741 mm/s with dominant peak frequency of 8.875 Hz. Fast attenuation of vibration were encountered.

- The maximum air over-pressure recorded was 114.2 dB(L) at 50 m due to the blast conducted at 2nd bench of ‘A’ Block on 20.07.2018. In this blast, explosives detonated in a blasting round and explosives weight per delay was 167 and 16.7 kg respectively. The recorded air over-pressure from the same blast at 150 m was 101.9 dB(L). The Electronic and Nonel initiation system reduces the air over-pressure to a greater extent and improves the blasting performance too. There was no ejection of flyrock in any of the blast.

- All the recorded data (blast vibrations, air over pressures, flyrocks) were well within the safe limits at the houses/structures concerned. The dominant peak frequencies of ground vibrations were in the range of 4.62 Hz to 70 Hz. Fast Fourier Transform (FFT) analyses of blast vibration frequencies confirmed that concentration of dominant frequencies were in between 8.875 Hz and 23.13 Hz..

- Propagation equation for the prediction of blast vibration has been established for the mine and given as Equation 1. The permissible explosive weight per delay may be computed from the Equation to contain vibration within safe limits for distances of houses/structures concerned. For convenience, the recommended explosive weight per delay and Total explosive weight has been computed and is given in Table A3 & Table A5. For ready reference, the predicted value of PPVs with respective maximum explosive weight per delay is given in Table A4.

- Attempts were made to record the vibration at nearest houses of Doyala and Syalodra villages in most of the blasts. The recorded vibration and air over-pressure data and subsequent analyses revealed that blasting may be performed at 100 m from the nearest house in the periphery of the mine with suggested blast design and charging pattern without compromising on the safety and stability of the structures and life of human beings. The blast designs have been recommended for blasting operations to be conducted at 100 m and beyond from the nearest houses or other structures in the periphery of the mine.

- The in-the-hole VOD of Neo Prime Special Slurry cartridge explosives of M/s Special Blast Limited, Shakti Power Blast cartridge explosives of M/s Super Shiv Shakti Chemicals (P) Ltd. and Raj Blast Super Explosive of M/s Rajasthan Explosive Chemicals Pvt. Ltd. were recorded to determine the optimal value for better energy utilization in terms of improved fragmentation with minimising blast induced ground vibration. The recorded VODs were in the range of 3612 m/s to 4199 m/s.

- The scattering test were performed for Nonel surface delays and down the hole delays of M/s Economic Explosives Ltd. The excessive scattering was recorded in the TLDs of 25 ms and 42 ms. This is a serious concern for getting desired blast results. It is recommended to take-up the issue of excessive scattering to the suppliers.

- The delay interval between the holes in a row should be 17 ms whereas between the rows, it should be 42 ms or more depending upon the number of rows and effective burden. If the numbers of rows are more than two, the delay interval between rows should be increased by 20% in successive rows.

- The recommended blast designs should be followed for day-to-day blasting operations for safe and efficient blasting operations. The blast designs given in Annexure as Figures A1-A4, will ensure the safety of the houses/structures, life of human beings and other property in the periphery of the mine.

Acknowledgements

The research team is thankful to Shri P. Sangwan, Owner, Bayal Quartz & Feldspar Mines, Narnaul, Haryana for sponsoring the study. The sincere co-operation and help extended to the team by the following officials in completing the study successfully are also thankfully acknowledged.

Shri D. K. Singh,	Mines Manager
Shri Sushanta Bhoi	Assistant Nanager
Shri Deepak Padhi	Foreman
Shri Birendra Rout	Mine Mate

The research team also expresses their gratitude to the inhabitants of Doyala and Syalodra villages for their co-operation in blast vibration and air overpressure monitoring.

ANNEXURE

Table A1. Summary of blasts performed during the period of study at Bayal Quartz & Feldspar Mines, Narnaul, Haryana.

S. No.	Date of Blast	Location of blast	No. of holes	Hole dia. [mm]	Hole depth [m]	Burden × Spacing [m]	Decking [m]	Top Stemm-ing [m]	Avg. explosive per hole [kg]	Total explosive weight [kg]	Type of Explosives	Remarks
1	16.07.2018	1st bench of 'B' Block South	21	100	7.0 – 8.5	3 × 3	Nil	4.2-5.4	19.5–25.0	475	Neoprime Slurry explosive of M/s Special Blast Ltd.	DTH - 450 ms, TLD – 25 ms & 42 ms
2	17.07.2018	1st bench of 'B' Block South	21	100	6.0	3 × 3	Nil	3.8	16.7	340	Shakti Power Blast of M/s Super Shivshakti Chemicals (P) Ltd.	DTH - 450 ms, TLD – 25 ms & 42 ms
3	17.07.2018	3rd bench of 'B' Block South	20	100	6.0	2.5 × 3	Nil	3.8	16.7	334	Shakti Power Blast of M/s Super Shivshakti Chemicals (P) Ltd.	DTH - 450 ms, TLD – 25 ms & 42 ms
4	18.07.2018	2nd bench of 'A' Block	16	100	9.0	3 × 3.5	Nil	4.0	41.7	667	Neoprime Slurry explosive of M/s Special Blast Ltd.	DTH - 450 ms, TLD – 17 ms & 25 ms
5	18.07.2018	1st bench of 'A' Block	10	100	9.0	3 × 3	Nil	4.0	41.7	417	Neoprime Slurry explosive of M/s Special Blast Ltd.	DTH - 450 ms, TLD – 17 ms & 25 ms
6	19.07.2018	2nd bench of 'A' Block	25	100	6	3 × 3	Nil	4.0	14	348	Neoprime Slurry explosive of M/s Special Blast Ltd.	DTH - 450 ms, TLD – 25 ms & 42 ms
7	19.07.2018	1st bench of 'A' Block	8	100	9	3 × 3	Nil	3.0	41.7	334	Neoprime Slurry explosive of M/s Special Blast Ltd.	DTH - 450 ms, TLD – 25 ms & 42 ms
8	20.07.2018	2nd bench of 'A' Block	10	100	6	3 × 3	Nil	3.8	16.7	167	Raj Blast Super of M/s Rajasthan	DTH - 450 ms, TLD – 25 ms & 42 ms

											Explosives & Chemicals Pvt. Ltd.	
9	20.07.2018	2nd bench of 'A' Block	10	100	6	3 × 3	Nil	3.8	16.7	167	Raj Blast Super of M/s Rajasthan Explosives & Chemicals Pvt. Ltd.	DTH - 450 ms, TLD – 25 ms & 42 ms
10	21.07.2018	1st bench of 'A' Block	40	100	6	3 × 3	Nil	3.6	16.7	668	Neoprime Slurry explosive of M/s Special Blast Ltd.	DTH - 450 ms, TLD – 25 ms & 42 ms

Table A2. Blast induced vibration monitored at different locations in and around Bayal Quartz & Feldspar Mines, Narnaul, Haryana.

Blast No.	**Location of Blast**	**Total explosives detonated in round [Kg]**	**Maximum explosives weight per delay [Kg]**	**Location of measuring instruments**	**Distance of measuring point from blasting face [m]**	**Peak particle velocity (PPV) [mm/s]**	**Dominant peak frequency [Hz]**	**Air over-pressure/ noise [dB (L)]**
1	1st bench of 'B' Block South	475	25×2 = 50	❖ House of Shri Laxami Narayan Ji	250	1.503	22.75	110.9
				❖ House of Shri Laksharam Ji	275	1.332	23.13	108.6
				❖ House of Shri Mishralal Ji	350	0.773	23.0	107.0
				❖ House of Shri Papppu Ji	400	< 0.5	-	-
2	1st bench of 'B' Block South	340	16.7×2 = 33.4	❖ House of Shri Dan Singh Ji	240	1.704	70.0	< 88
				❖ House of Shri Laksharam Ji	280	0.648	70.0	< 88
				❖ House of Shri Jagdish Ji	300	0.582	16.63	< 88
				❖ House of Shri Mishralal Ji	320	0.539	17.63	< 88
3	3rd bench of 'B' Block South	334	16.7×2 = 33.4	❖ House of Shri Mishralia Ji	275	0.696	12.0	97.4
				❖ House of Shri Dan Singh Ji	300	0.582	18.75	93.9
				❖ House of Shri Laksharam Ji	330	0.582	19.75	95.9
				❖ House of Shri Jagdish Ji	330	0.582	11.5	95.9
4	2nd bench of 'A' Block	667	41.7×2 = 83.4	❖ House of Shri Rishpal Ji	400	0.925	4.62	105.5
				❖ House of Shri Kisan Saini Ji	410	0.648	4.62	104.9
				❖ House of Shri Ramswaroop Ji	430	< 0.5	-	-
				❖ House of Shri Manipal Ji	450	< 0.5	-	-

5	1st bench of 'A' Block	417	41.7×2 = 83.4	❖ House of Shri Kisan Saini Ji ❖ House of Shri Rishpal Ji ❖ House of Shri Ramswaroop Ji ❖ House of Shri Manipal Ji	375 385 405 425	1.408 0.861 0.773 < 0.5	5.62 5.50 5.37 -	109.9 109.9 104.2 -
6	2nd bench of 'A' Block	348	14×2 = 28	❖ House of Shri Rishpal Ji ❖ House of Shri Kisan Saini Ji ❖ House of Shri Ramswaroop Ji ❖ House of Shri Manipal Ji	385 395 420 440	< 0.5 < 0.5 < 0.5 < 0.5	- - - -	- - - -
7	1st bench of 'A' Block	334	41.7×1 = 41.7	❖ House of Shri Rishpal Ji ❖ House of Shri Kisan Saini Ji ❖ House of Shri Ramswaroop Ji ❖ House of Shri Manipal Ji	375 385 405 425	0.730 0.524 < 0.5 < 0.5	13 19 - -	114.1 113.5 - -
8	2nd bench of 'A' Block	167	16.7×1 = 16.7	❖ Behind Blast Free Face ❖ Behind Blast Free Face ❖ House of Shri Rishpal Ji ❖ House of Shri Kisan Saini Ji	50 150 385 425	7.674 0.741 < 0.5 < 0.5	22.13 8.875 - -	114.2 101.9 - -
9	2nd bench of 'A' Block	167	16.7×1 = 16.7	❖ Behind Blast Free Face ❖ Behind Blast Free Face ❖ House of Shri Rishpal Ji ❖ House of Shri Kisan Saini Ji	140 200 375 415	1.114 0.568 < 0.5 <0.5	7.75 6.875 - -	103.5 100.0 - -
10	1st bench of 'A' Block	668	16.7×2 = 33.4	❖ Behind Blast Free Face ❖ House of Shri Kisan Saini Ji ❖ House of Shri Rishpal Ji ❖ House of Shri Ramswaroop Ji	150 375 390 420	0.684 0.524 < 0.5 < 0.5	13.5 5.5 - -	108.0 106.5 - -

Table A3. Recommended explosives weight per delay to be detonated in a blasting round for the safety of houses/structures taking peak particle velocity 5 mm/s for the structures not belonging to Owner and 10 mm/s for the structures belonging to the owner as safe limit for Bayal Quartz & Feldspar Mine, Narnaul, Haryana as per DGMS standard.

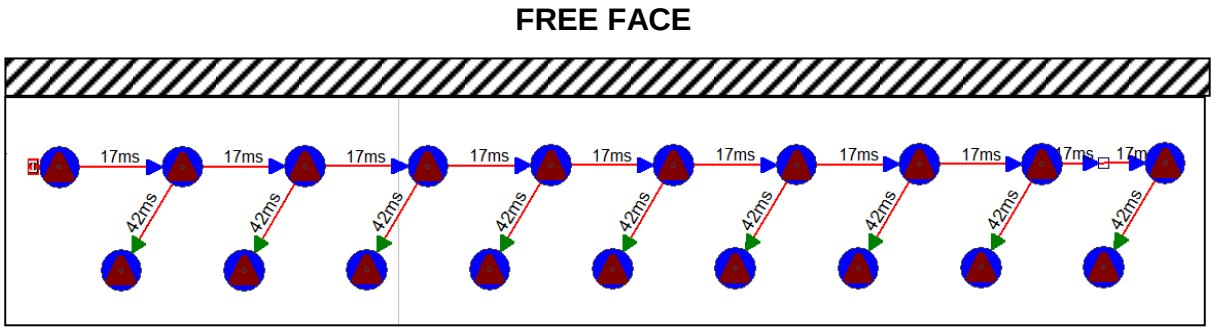
Distance of structures from the blast face [m]	Maximum explosive weight to be detonated in a delay at Bayal Quartz & Feldspar Mine [kg]	
	Taking 5 mm/s PPV as safe limit of vibration	Taking 10 mm/s PPV as safe limit of vibration
100	42	95
125	65	148
150	94	213
175	128	290
200	167	379
225	211	480
250	261	592
275	315	717
300	375	853
350	511	1161
400	667	1516
450	844	1919
500	1042	2369

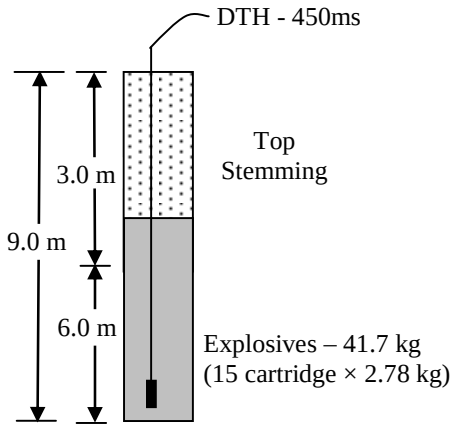
Table A4. Predicted peak particle velocity levels at various distance due to detonation of explosive weight per delay of 14, 17, 25, 42 & 50 kg at Bayal Quartz & Feldspar Mine, Narnaul, Haryana.

Distance of structures from the blast face [m]	**Predicted peak particle velocity levels [mm/s]**				
	14 kg	***17 kg***	***25 kg***	***42 kg***	***50 kg***
100	1.99	2.35	3.25	5.03	5.83
125	1.37	1.61	2.23	3.45	4.00
150	1.00	1.18	1.64	2.54	2.94
175	0.77	0.91	1.26	1.96	2.27
200	0.62	0.73	1.01	1.56	1.81
225	0.51	0.60	0.83	1.28	1.48
250	0.42	0.50	0.69	1.07	1.24
275	0.36	0.43	0.59	0.91	1.06
300	0.31	0.37	0.51	0.79	0.91
350	0.24	0.28	0.39	0.61	0.70
400	0.19	0.23	0.31	0.48	0.56
450	0.16	0.19	0.26	0.40	0.46
500	0.13	0.15	0.21	0.33	0.39

Table A5. Recommended Total explosives weight in a round to be detonated in a blasting round for the safety of houses/structures taking peak particle velocity 5 mm/s for the structures not belonging to Owner and 10 mm/s for the structures belonging to the owner as safe limit for Bayal Quartz & Feldspar Mine, Narnaul, Haryana as per DGMS standard.

Distance of structures from the blast face [m]	Total explosives weight to be detonated in a blasting round [kg]	
	taking 5 mm/s as safe limit of vibration	taking 10 mm/s as safe limit of vibration
100	534	1389
125	834	2171
150	1201	3126
175	1635	4255
200	2135	5558
225	2702	7034
250	3336	8684
275	4036	10507
300	4804	12505
350	6538	17020
400	8540	22230
450	10808	28135
500	13343	34735

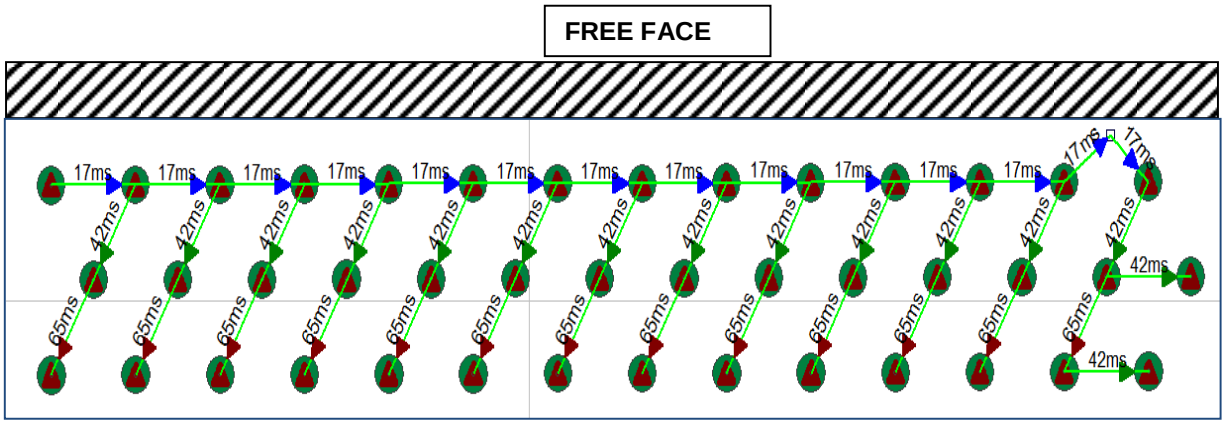


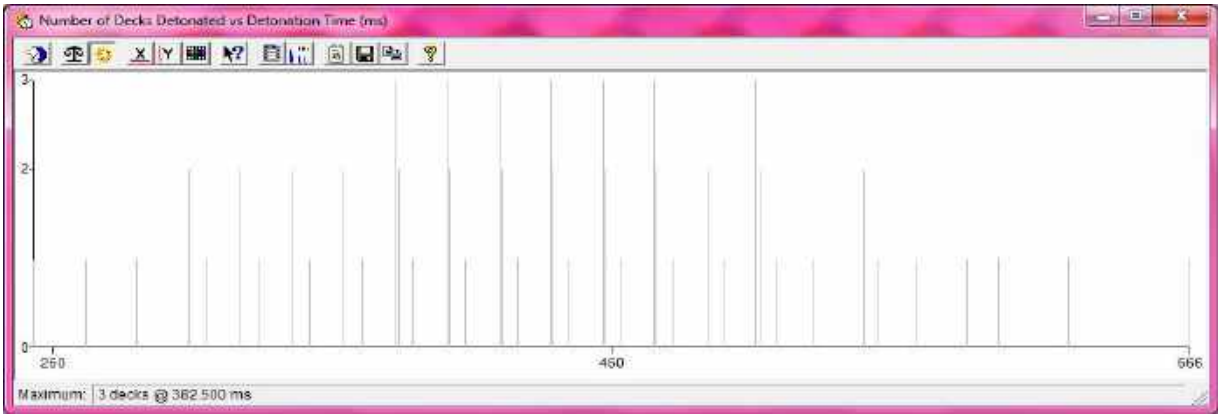


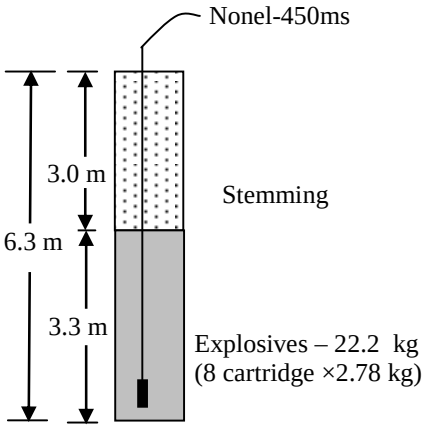
BLAST GEOMETRY

Hole diameter	: 100 mm
No. of holes	: 19
Bench height	: 8.5 m
Hole depth	: 9.0 m
Burden	: 3.0 m
Spacing	: 3.5 m
Explosives per hole	: 41.7 kg
Maximum charge per delay	: 41.7 kg (1 hole)
Designed charge factor	: 0.47 kg/m^3

Figure A1. Recommended blast design, time contours and charging pattern of holes for 8.5 m bench at Bayal Quartz & Feldspar Mine, when blasting is to be conducted at and beyond 100 m.



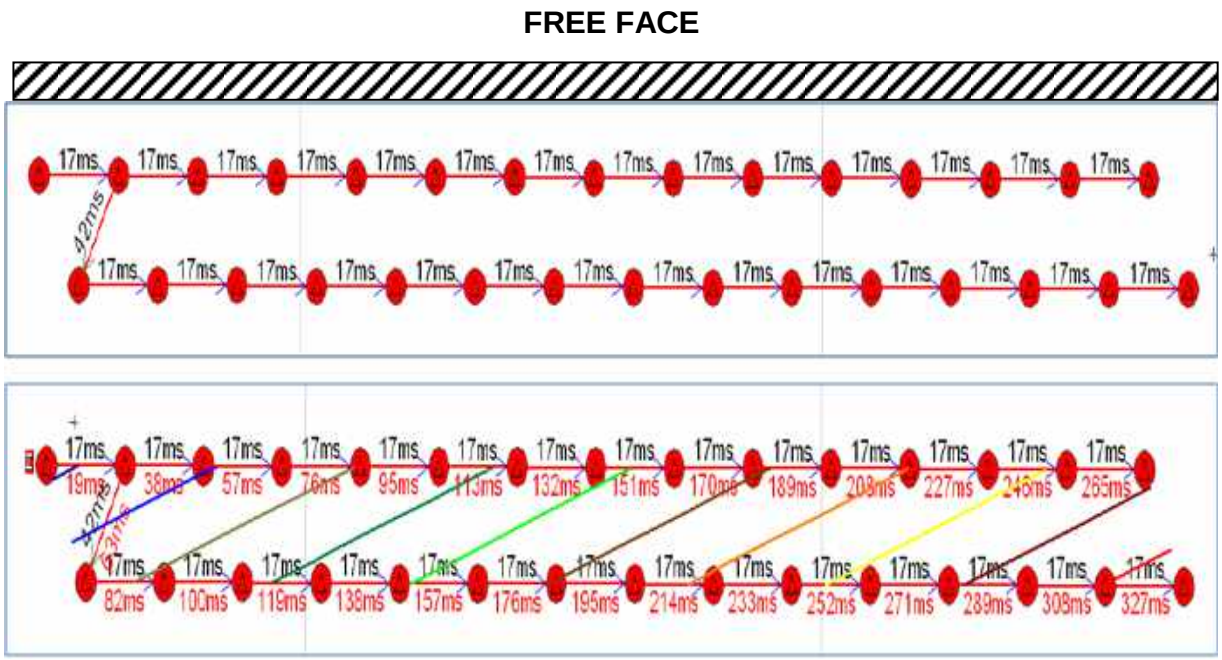


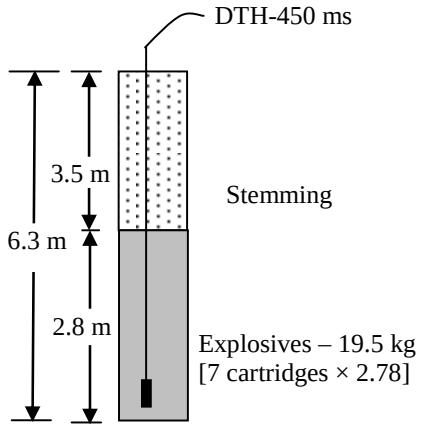


BLAST GEOMETRY

Hole diameter	: 100 mm
No. of holes	: 42
Bench height	: 6.0 m
Hole depth	: 6.3 m
Burden	: 2.5 m
Spacing	: 3.0 m
Explosive per hole	: 22.2 kg
Maximum charge per delay	: 66.6 kg (3 holes)
Designed charge factor	: 0.49 kg/m^3

Figure A2. Recommended blast design, time contours and charging pattern of holes for 6.0 m bench at Bayal Quartz & Feldspar Mine, when blasting is to be conducted at and bevond 100 m.

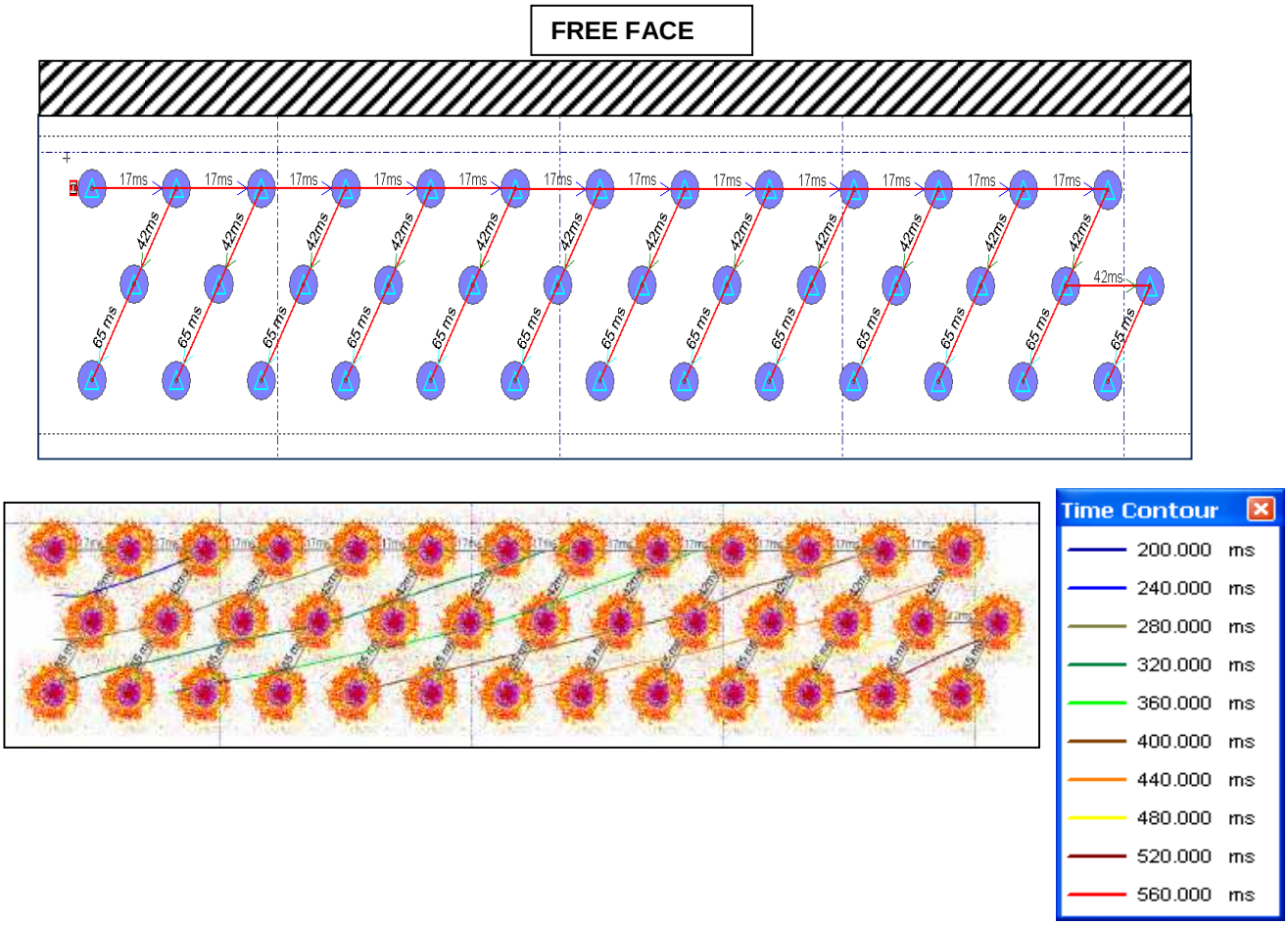


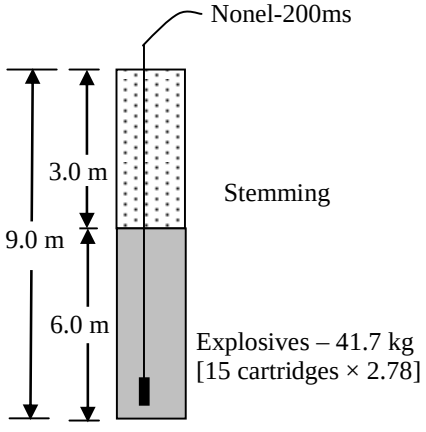


BLAST GEOMETRY

Hole diameter	: 100 mm
No. of holes	: 30
Bench height	: 6.0 m
Hole depth	: 6.3 m
Burden	: 2.8 m
Spacing	: 3.2 m
Explosive per hole	: 19.5 kg
Maximum charge per delay	: 39 kg [2 holes]
Designed charge factor	: 0.36 kg/m^3

Figure A3. Recommended blast design and charging pattern of holes for 6.0 m bench (Soft starta) at Bayal Quartz & Feldspar Mine, when blasting is to be conducted at and beyond 100 m





BLAST GEOMETRY

Hole diameter	: 100 mm
No. of holes	: 39
Bench height	: 8.5 m
Hole depth	: 9.0 m
Burden	: 3.2 m
Spacing	: 3.8 m
Explosive per hole	: 41.7 kg
Maximum charge per delay	: 83.4 kg (2 holes)
Designed charge factor	: 0.40 kg/m^3

Figure A4. Recommended blast design, time contours and charging pattern of holes for 8.5 m bench (Soft starta) at Bayal Quartz & Feldspar Mine, when blasting is to be conducted beyond 175 m.

Instantel

Event Report

Date/Time	Long at 14:39:11 July 16, 2018
Trigger Source	Geo: 0.510 mm/s
Range	Geo: 254.0 mm/s
Record Time	5.0 sec at 1024 sps

Serial Number	BE20377 V 10.60-8.17 MiniMate Plus
Battery Level	6.2 Volts
Unit Calibration	April 18, 2018 by CIMFR Dhanbad
File Name	V377HI4G.PB0

Notes
Location: On ground surface
Client: Bayal Quartzite & Feldspar Mine
User Name: REE, CSIR-CIMFR, Dhannbad
General:

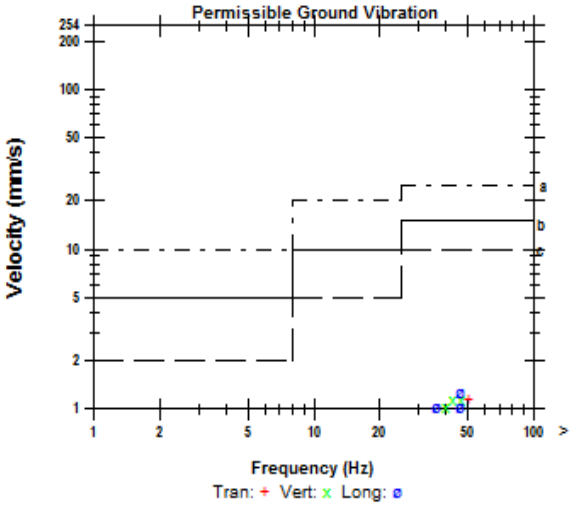
Extended Notes
Blast optimization study at Bayal Quartzite & Feldspar Mine, Hariyana.

Microphone	Linear Weighting
PSPL	110.9 dB(L) at 0.617 sec
ZC Freq	18 Hz
Channel Test	Passed (Freq = 20.1 Hz Amp = 462 mv)

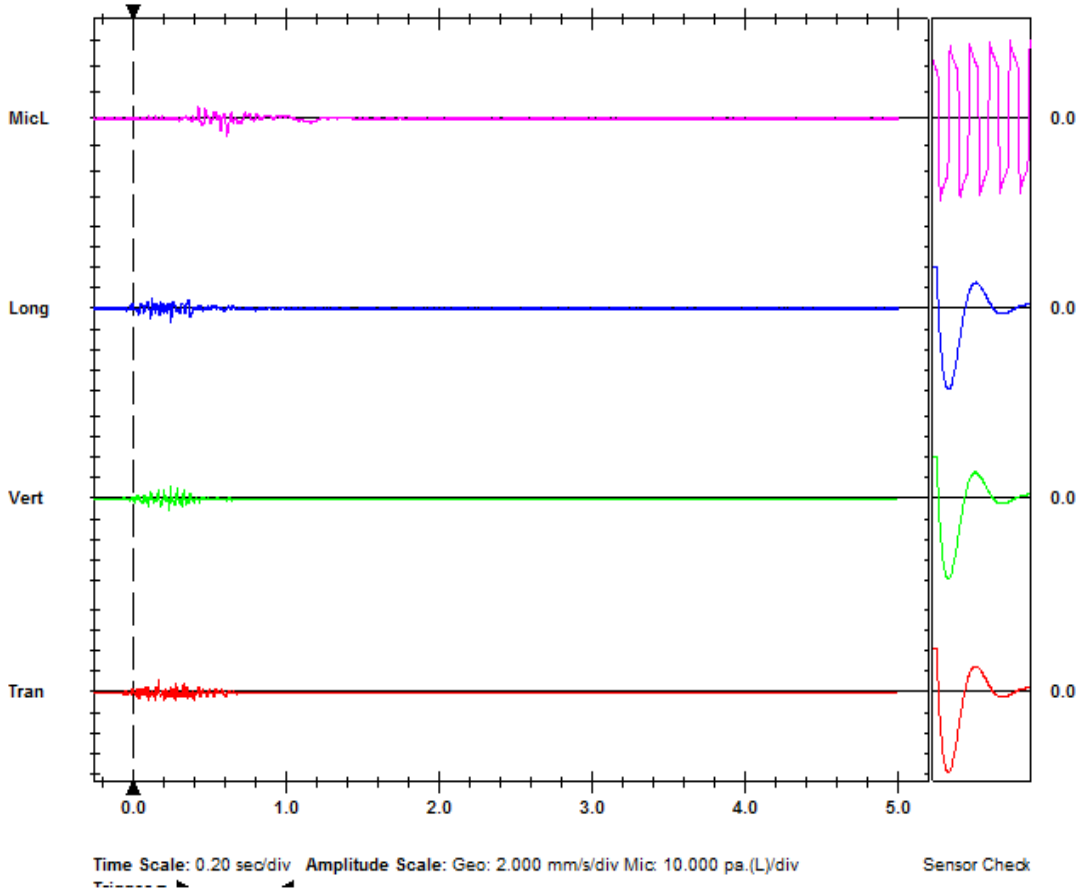
	Tran	Vert	Long	
PPV	1.143	1.143	1.270	mm/s
ZC Freq	51	43	47	Hz
Time (Rel. to Trig)	0.170	0.240	0.253	sec
Peak Acceleration	0.040	0.040	0.040	g
Peak Displacement	0.004	0.006	0.006	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.5	7.4	Hz
Overswing Ratio	3.5	3.4	3.5	

Peak Vector Sum 1.503 mm/s at 0.253 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 10.000 pa.(L)/div Sensor Check

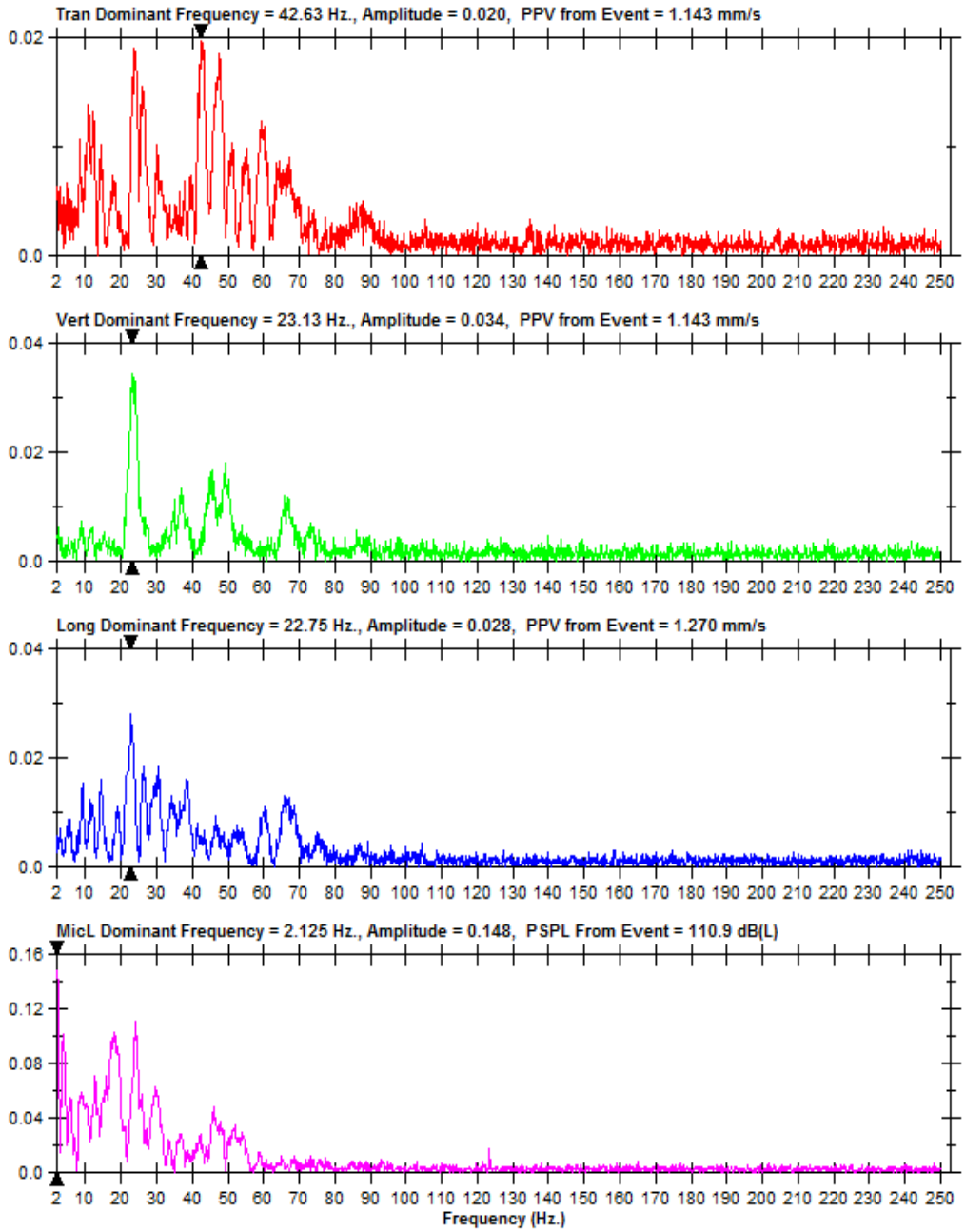
Instantel

FFT Report

Date/Time	Long at 14:39:11 July 16, 2018	**Serial Number**	BE20377 V 10.60-8.17 MiniMate Plus
Trigger Source	Geo: 0.510 mm/s	**Battery Level**	6.2 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	April 18, 2018 by CIMFR Dhanbad
Record Time	5.0 sec at 1024 sps	**File Name**	V377HI4G.PB0

Notes
Location: On ground surface
Client: Bayal Quartzite & Feldspar Mine
User Name: REE, CSIR-CIMFR, Dhannbad
General:

Extended Notes
Blast optimization study at Bayal Quartzite & Feldspar Mine, Hariyana.



Instantel

Event Report

Date/Time	Long at 17:56:40 July 18, 2018
Trigger Source	Geo: 0.510 mm/s
Range	Geo: 254.0 mm/s
Record Time	5.0 sec at 1024 sps

Serial Number	BE20377 V 10.60-8.17 MiniMate Plus
Battery Level	6.3 Volts
Unit Calibration	April 18, 2018 by CIMFR Dhanbad
File Name	V377HI8F.6G0

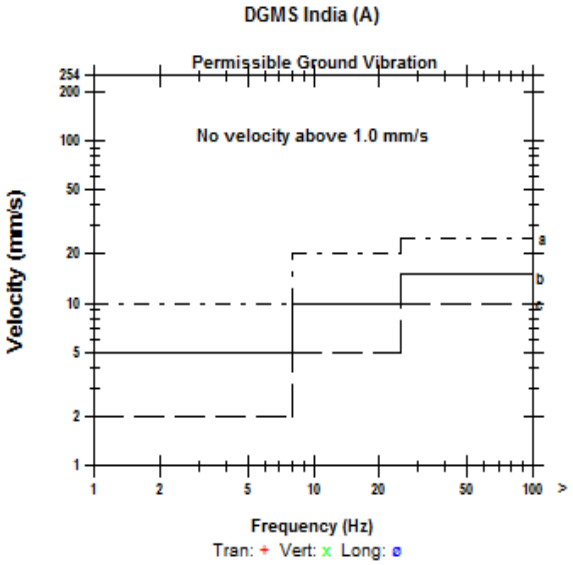
Notes
Location: On ground surface
Client: Bayal Quartzite & Feldspar Mine
User Name: REE, CSIR-CIMFR, Dhannbad
General:

Extended Notes
Blast optimization study at Bayal Quartzite & Feldspar Mine, Hariyana.

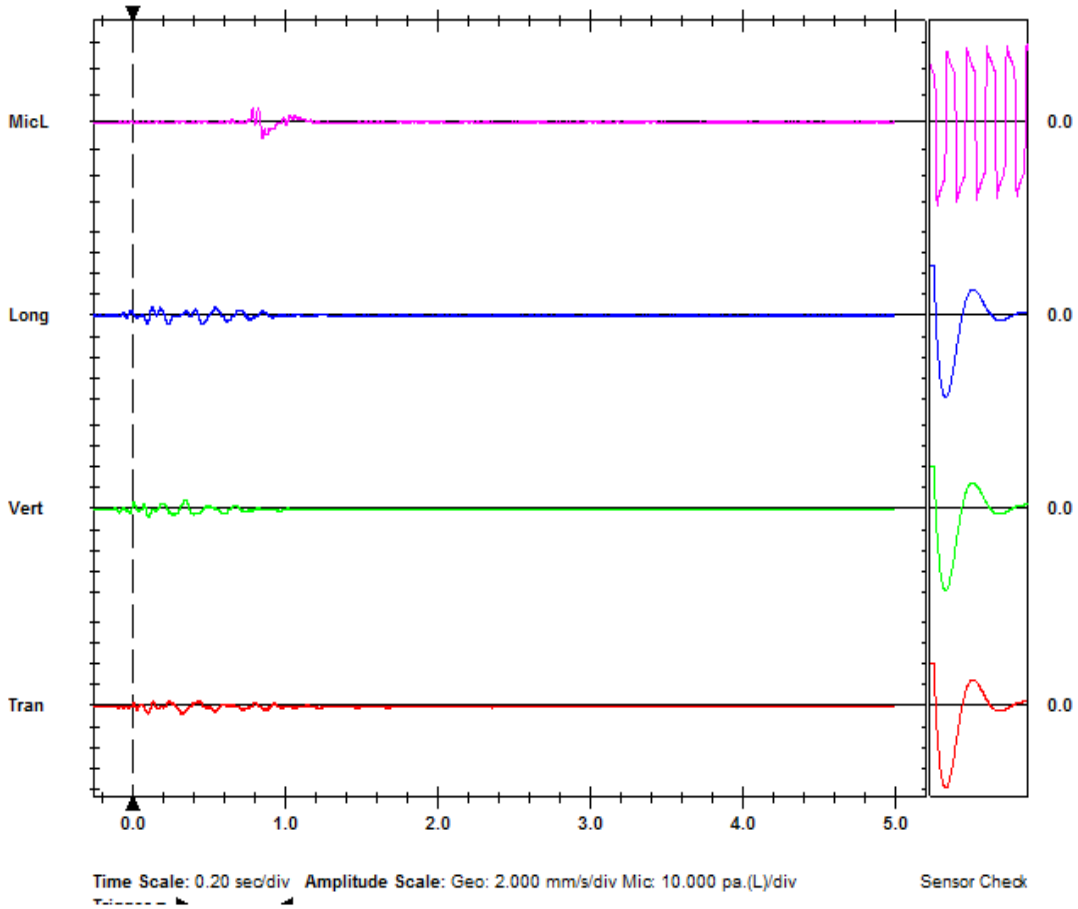
Microphone	Linear Weighting
PSPL	109.9 dB(L) at 0.852 sec
ZC Freq	4.6 Hz
Channel Test	Passed (Freq = 20.1 Hz Amp = 536 mv)

	Tran	Vert	Long	
PPV	0.762	0.889	0.889	mm/s
ZC Freq	11	15	13	Hz
Time (Rel. to Trig)	0.102	0.104	0.098	sec
Peak Acceleration	0.013	0.013	0.027	g
Peak Displacement	0.018	0.017	0.016	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.5	7.4	Hz
Overswing Ratio	3.5	3.5	3.5	

Peak Vector Sum 1.408 mm/s at 0.104 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 10.000 pa.(L)/div Sensor Check

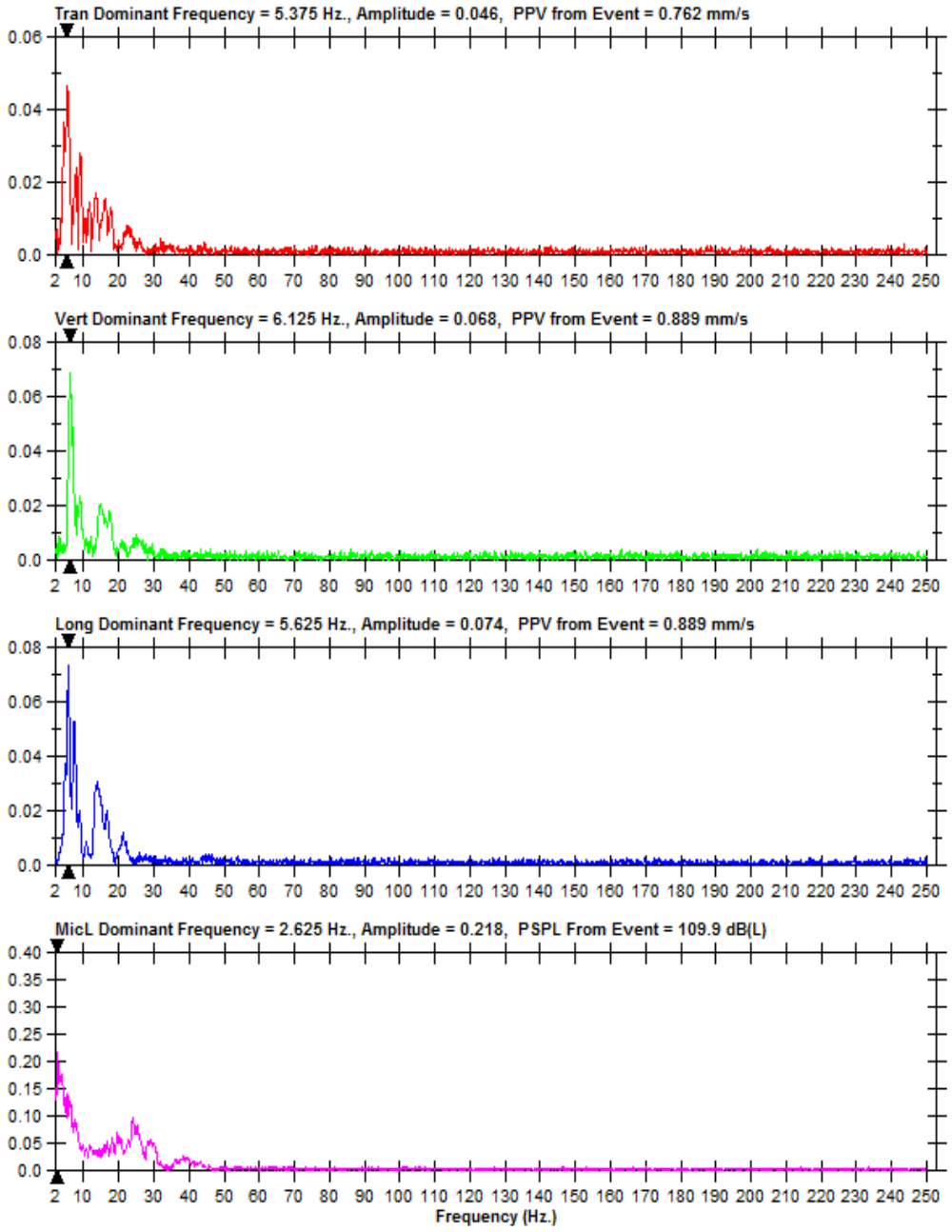
Instantel

FFT Report

Date/Time	Long at 17:56:40 July 18, 2018	**Serial Number**	BE20377 V 10.60-8.17 MiniMate Plus
Trigger Source	Geo: 0.510 mm/s	**Battery Level**	6.3 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	April 18, 2018 by CIMFR Dhanbad
Record Time	5.0 sec at 1024 sps	**File Name**	V377HI8F.6G0

Notes
Location: On ground surface
Client: Bayal Quartzite & Feldspar Mine
User Name: REE, CSIR-CIMFR, Dhannbad
General:

Extended Notes
Blast optimization study at Bayal Quartzite & Feldspar Mine, Hariyana.



Instantel

Event Report

Date/Time	Vert at 17:21:23 July 20, 2018
Trigger Source	Geo: 0.510 mm/s
Range	Geo: 254.0 mm/s
Record Time	5.0 sec at 1024 sps

Serial Number	BE20374 V 10.60-8.17 MiniMate Plus
Battery Level	6.3 Volts
Unit Calibration	April 18, 2018 by CIMFR Dhanbad
File Name	V374HIC2.VN0

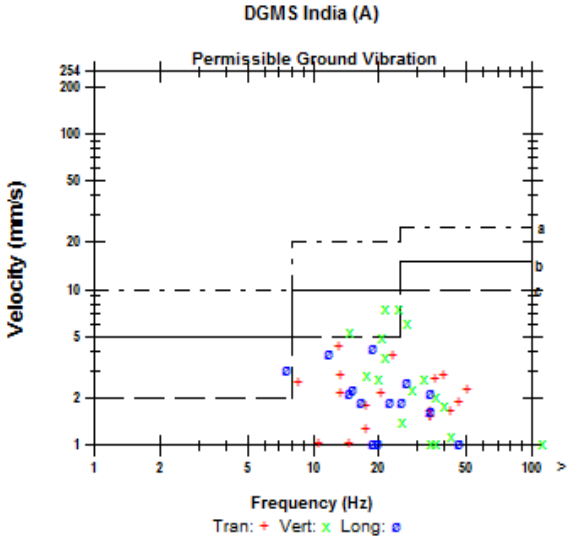
Notes
Location: On ground surface
Client: Bayal Quartzite & Feldspar Mine
User Name: REE Division, CSIR-CIMFR, Dhanbbad
General:

Extended Notes
Blast optimization study at Bayal Quartzite & Feldspar Mine, Hariyana.

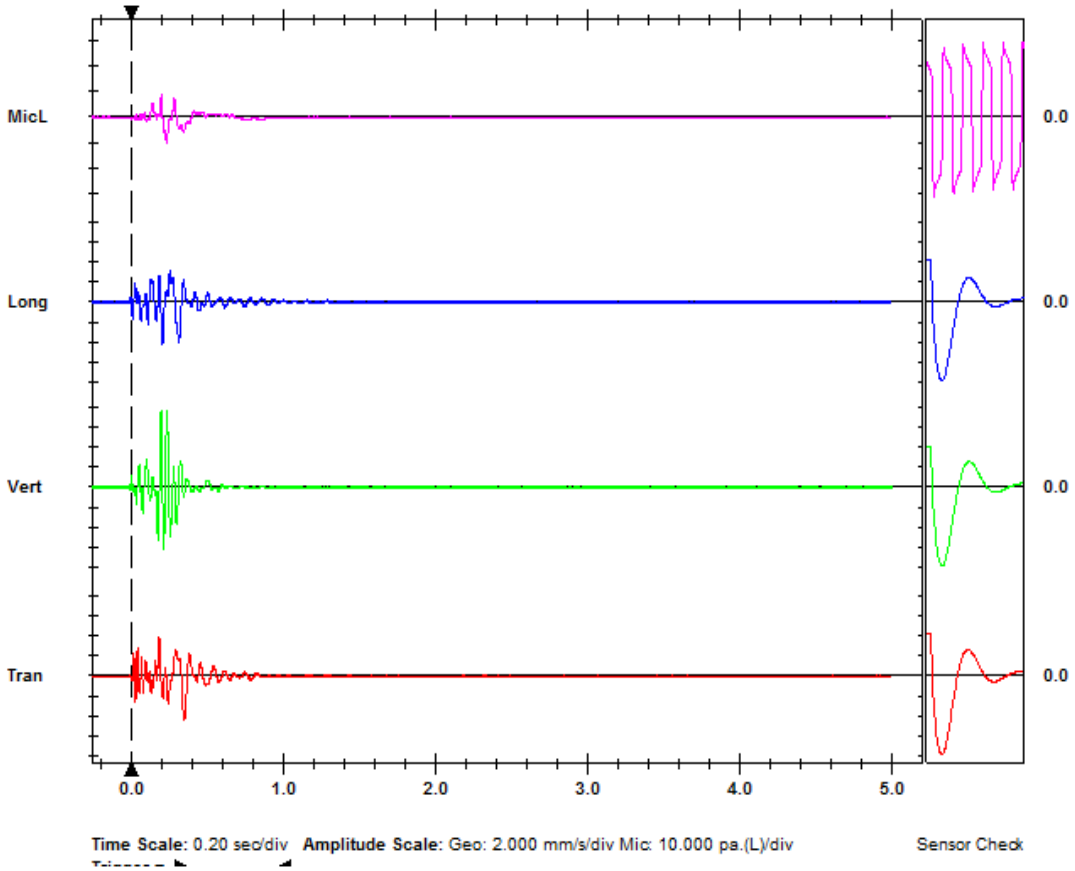
Microphone	Linear Weighting
PSPL	114.2 dB(L) at 0.235 sec
ZC Freq	8.1 Hz
Channel Test	Passed (Freq = 20.1 Hz Amp = 486 mv)

	Tran	Vert	Long	
PPV	4.318	7.493	4.191	mm/s
ZC Freq	13	24	19	Hz
Time (Rel. to Trig)	0.351	0.200	0.208	sec
Peak Acceleration	0.093	0.133	0.053	g
Peak Displacement	0.051	0.055	0.052	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.7	7.5	7.5	Hz
Overswing Ratio	3.3	3.4	3.6	

Peak Vector Sum 7.674 mm/s at 0.239 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 10.000 pa.(L)/div Sensor Check

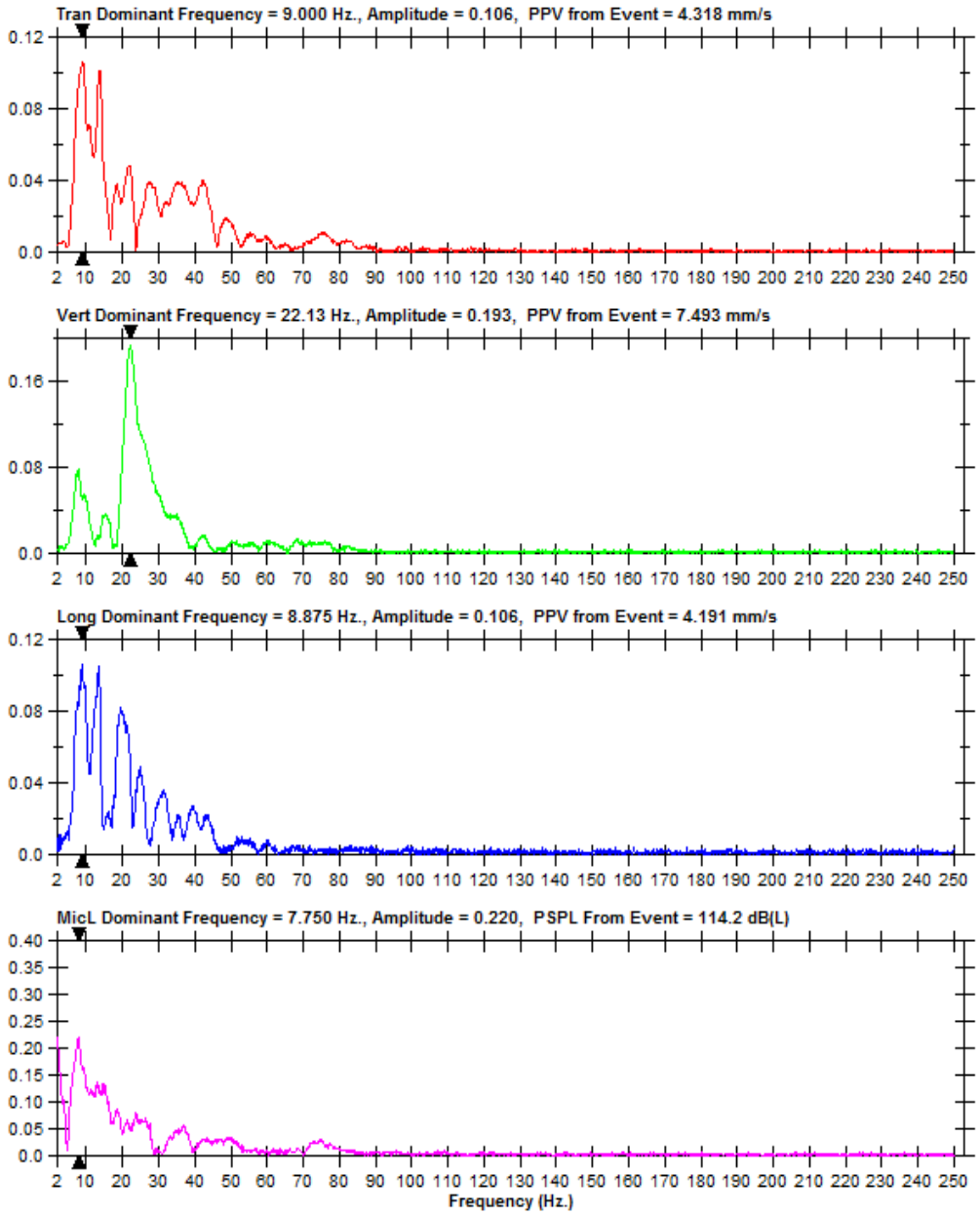
Instantel

FFT Report

Date/Time	Vert at 17:21:23 July 20, 2018	**Serial Number**	BE20374 V 10.60-8.17 MiniMate Plus
Trigger Source	Geo: 0.510 mm/s	**Battery Level**	6.3 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	April 18, 2018 by CIMFR Dhanbad
Record Time	5.0 sec at 1024 sps	**File Name**	V374HIC2.VN0

Notes
Location: On ground surface
Client: Bayal Quartzite & Feldspar Mine
User Name: REE Division, CSIR-CIMFR, Dhanbbad
General:

Extended Notes
Blast optimization study at Bayal Quartzite & Feldspar Mine, Hariyana.



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CSIR-CENTRAL INSTITUTE OF MINING & FUEL RESEARCH

(Council of Scientific & Industrial Research)

BARWA ROAD, DHANBAD – 826 001

REPORT ON

Advice for designing of blasting parameters at Bayal Quartz and Feldspar Mine, Haryana to control ground vibration and air overpressure within safe limit for the safety of surrounding houses/structures beyond 200 m with improved production and productivity

Project Code: CNP/5073/2021-22 **September 2021**

सीएसआईआर- केन्द्रीय खनन एवं ईंधन अनुसंधान संस्थान
CSIR-Central Institute of Mining and Fuel Research
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद / Council of Scientific & Industrial Research)
(अंतर्गत वैज्ञानिक तथा औद्योगिक अनुसंधान विभाग, विज्ञान और प्रौद्योगिकी मंत्रालय,भारत सरकार)
(Under the Department of Scientific & Industrial Research, Ministry of Science & Technology, Govt. of India)
बरवा रोड, धनबाद - 826015, झारखण्ड, भारत / Barwa Road, Dhanbad - 826015, Jharkhand, India
(आई एस ओ 9001 प्रमाणित संस्थान / ISO 9001 Certified Institute)

Recommended blast dimensional parameters along with permissible charge per delay/hole, total charge and no. of holes to be detonated in a blasting round for different locations at Bayal Quartz and Feldspar Mine, Haryana

Subject: Submission of additional table with reference to the submitted study report titled "Advice for designing of blasting parameters at **Bayal Quartz and Feldspar Mine, Haryana** to control ground vibration and air overpressure within safe limit for the safety of surrounding houses/structures beyond 200 m with improved production and productivity (Project No: CNP/5073/2021-22, September (2021)

S/N	Distance of structures from blast face (m)	Hole Dia. (mm)	Hole Depth (m)	Burden (m) × Spacing (m)	Charge per hole (kg)	No of holes	Maximum Charge per delay (kg)	Total Explosive (kg)
1	50-100	100	5	2 × 2.5	17	20	11-43	429
2	100-125	100	5	2 × 2.5	17	32	43-67	670
3	125-150	100	6	2 × 2.5	22	35	67-97	965
4	150-175	100	6	2 × 2.5	22	48	97-132	1314
5	175-200	100	7	2 × 2.5	30	46	132-172	1716
6	200-225	100	7	2 × 2.5	30	58	172-218	2172
7	225-250	100	8	2.5 × 3.0	41	52	218-269	2681
8	250-275	100	8	2.5 × 3.0	41	63	269-325	3244
9	275-300	100	9	2.5 × 3.0	44	70	325-387	3861
10	300-350	100	9	2.5 × 3.0	44	96	387-528	5255

15/09/2021

(Ashish Kumar Vishwakarma)
Technical Officer
Rock Excavation Engineering Division
CSIR-CIMFR, Dhanbad

M R Roy 15/09/2021

(Murari Prasad Roy)
Sr. Principal Scientist & Project Co-ordinator
Rock Excavation Engineering Division
CSIR-CIMFR, Dhanbad

CSIR-CENTRAL INSTITUTE OF MINING & FUEL RESEARCH
(Council of Scientific & Industrial Research)
BARWA ROAD, DHANBAD – 826 001

REPORT ON

Advice for designing of blasting parameters at Bayal Quartz and Feldspar Mine, Haryana to control ground vibration and air overpressure within safe limit for the safety of surrounding houses/structures beyond 200 m with improved production and productivity

BY

Dr. M. P. Roy,	**Sr. Pr. Scientist & Project Leader**
Mr. V. K. Himanshu,	**Scientist**
Dr. R. K. Paswan,	**Scientist**
Mr. R. S. Yadav,	**Sr. Technical Officer**
Mr. P. Hembram	**Technical Officer**
Mr. Suraj Kumar,	**Technical Officer**
Mr. A. P. Kaushik,	**Technical Officer**
Mr. A.K. Vishwakarma	**Technical Officer**
Dr. C. Sawmliana,	**Sr. Pr. Scientist, Project Co-ordinator & HOS**
Dr. P. K. Singh,	**Director & HORG**

Project Code: CNP/5073/2021-22 **September 2021**

Report on

Advice for designing of blasting parameters at Bayal Quartz and Feldspar Mine, Haryana to control ground vibration and air overpressure within safe limit for the safety of surrounding houses/structures beyond 200 m with improved production and productivity

Project No.: CNP/5073/2021-22

This report is meant for internal use of your organization only and it should not be published in full or part by your organization. It should not be communicated or circulated to outside parties except concerned departments. However, CSIR-CIMFR reserves the right to publish the results of the investigations for the benefit of the industry. The conclusions and recommendations are based on the results of investigations. It is hoped that the recommendations will be implemented to get the optimum results without hampering production, productivity and safety. The recommendations are the guidelines, which should be implemented in letter and spirit.

Since the day-to-day blasting operations are not under the control of CSIR-CIMFR, the research team will not be held responsible for any untoward incidence caused by blasting.

SIGNATURE OF THE PROJECT PROPONENTS

(Murari P. Roy) 08/09/2021
Sr. Principal Scientist & Project Leader

08/09/2021
HOS, Rock Excavation Engineering

CSIR-CIMFR AUTHORISED SIGNATORIES

08/09/2021
P. K. Mishra)
Sr. Principal Scientist & HOS
Project Planning and Monitoring

08/09/2021
(R. V. K. Singh)
Chief Scientist & Coordinator
Project Planning and Industry Interface

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EXECUTIVE SUMMARY

This report relates to the scientific study conducted by CSIR- Central Institute of Mining & Fuel Research (CIMFR), Dhanbad to study and advice for optimization of blast design parameters at Bayal Quartz and Feldspar Mines to control ground vibration and air overpressure within safe limits for the safety of structures in the periphery of the mine with improved production and productivity. The study involved monitoring of impact of blast conducted with varying blast designs and charging patterns on the nearby structures and in the periphery of mine. In addition to these studies, the qualities check of the explosives and its accessories were also performed. The results of investigation, analyses of data and recommendations, made thereof, are summarised below:

- Altogether, eleven blasts were conducted at different benches of the 'A' Block and 'B' Block of Bayal Quartz and Feldspar Mines and attempt were made to record 44 blasts induced ground vibration data.

- Maximum vibration (in terms of peak particle velocity, PPV) of 11.11 mm/s with associated dominant peak frequency of 24.38 Hz was recorded at back side of blast free face (at 65 m) in all the trial blasts. In this blast, the explosives weight per delay and total explosive detonated were 58 kg and 725 Kg respectively. The PPV recorded at 95 m from the same blast was 7.705 mm/s with dominant peak frequency of 16.25 Hz was recorded.

- Maximum vibration recorded at different residential structures not belonging to Mine owner due to trial blast conducted at 'A' Block of Bayal Quartz and Feldspar Mines was 1.648 mm/s with associated dominant peak frequency of 27.63 Hz. The monitoring location was towards Bayal village at a distance of 235 m from the blasting face. The explosives weight per delay and total explosive detonated were 44 kg and 333 Kg respectively.

- Maximum vibration recorded at different residential structures not belonging to Mine owner due to blast conducted at 'B' Block of Bayal Quartz and Feldspar Mines was 2.825 mm/s with associated dominant peak frequency of 87.63 Hz. The monitoring location was near Bhartri Temple of Doyala village at a distance of 190 m from the blast location. The explosives weight per delay and total explosive detonated were 44 kg and 550 Kg respectively.

- The maximum air over-pressure recorded was 127.2 dB(L) at 265 m due to the blast conducted at Top bench of 'A' Block. In this blast, explosives detonated in a blasting round and explosive weights per delay were 333 kg and 41 kg respectively. Proper stemming and the Nonel initiation system reduces the air over-pressure to a greater extent and improves the blasting performance too.

- There was no ejection of flyrock in any of the blast. Pyrotechnic (Nonel) Initiation systems were used to conduct all the eleven blasts. Nonel initiation systems have advantage in detonation of blast holes from the bottom of the hole at floor levels if the detonators are placed accordingly.

- All the recorded data (blast vibrations, air over pressures and flyrock) were well within the safe limits at the concerned houses/structures. The dominant peak frequencies of ground vibrations were in the range of 5.875 to 96.25 Hz. The analyses of blast vibration frequencies confirmed that concentration of dominant frequencies were in between 8.875 Hz and 50.55 Hz. Hence, the safe level of vibration has been taken as 5 mm/s for the houses/structures not belonging to the owner and for 10 mm/s for structures belonging to owner as per DGMS standard.

- Propagation equation for the prediction of blast vibration has been established and is given as Equation 1. The permissible explosive weight per delay may be computed from the Equation to contain vibration within safe limit for distances of houses/structures concerned. For convenience, the recommended explosive weight per delay and Total explosive weight has been computed and is given in Table A3 & Table A5. For ready reference, the predicted value of PPVs with respective maximum explosive weight per delay is given in Table A4.

- The delay interval between the holes in a row should be 17ms whereas between the rows, it should be 42ms /59ms/67ms or more depending upon the number of rows and effective burden in front of the particular hole. If the numbers of rows are more than two, the delay interval between rows should be increased by 20% in successive rows.

- The in-the-hole VOD of Slurry cartridge prime explosives of M/s Indo Gulf Industries Limited and M/s M/s Special Blast Limited (SBL) were recorded to determine the optimal value for better energy utilization in terms of improved fragmentation with reduced level of ground vibration. The recorded VODs were in the range of 3401 m/s to 3670 m/s.

- The recommended blast designs should be followed for day-to-day blasting operations for safe and efficient blasting operations. The blast designs Annexure as Figures A1-A2, will ensure the safety of the houses/structures, life of human beings and other property in the periphery of the mines.

1. Introduction

The management of M/s Bayal Quartz and Feldspar Mine, Narnaul, Haryana entrusted CSIR-Central Institute of Mining & Fuel Research (CIMFR), Dhanbad through E-mail dated August 27, 2021 for a scientific study and advice for optimization of blast design parameters at Bayal Quartz and Feldspar Mine to control ground vibration and air overpressure within safe limits for the safety of structures in the periphery of the mine with improved production and productivity.

The Rock Excavation Engineering division team of CSIR- Central Institute of Mining & Fuel Research, Dhanbad carried out field investigations during Aug 31-Sep 2, 2021. Altogether, 11 blasts were conducted and 44 blast induced ground vibration and air over-pressure/noise were monitored at various locations in the periphery of the 'A' Block and 'B' Block of the Bayal Quartz and Feldspar Mine, Narnaul, Haryana.

2. Location and geology

The mining lease area is in Bayal village, Mahendragarh district, Haryana. The lease area can be approached by road from Narnaul via SH-17 up to Nangal Chaudhry and thereafter by MDR. The mining lease area is in Bayal village, Mahendragarh district. Rajasthan Haryana state border is adjacent to the site. The lease area is not continuous but is segregated in north and south blocks by 600 m. The rocks exposed in the proposed area and surrounding areas belong to Alwar Series of Delhi super group. Quartzite associated with vein of Quartz and Feldspar belongs to Alwar series of Delhi system are exposed in the area. The sequence of rock formations belonging to Delhi Super group are found in the lease area have Alluvium, Quartz mixed with Quartzite, Feldspar mixed with Quartzite, Amphibolites and Micaceous Phyllite with Quartzite. Micaceous phyllite is the country rock in this area. The quartz has intruded in to the country rock i.e. micaceousphyllite and quartzite and is itself sheared at the margins.

The general strike of the quartize formation is N20°-25° E to S20°-25°W with dips of 45° to 60° due East. The strike and dip of the quartize bands is not uniform since there are structural disturbances and intrudes and mix with Quartz and Feldspar. The lease area is consists of ridges and valleys. The highest point in the lease area is recorded to be 480 mRL and lowest point recorded is 370 mRL. The lease area does not have any water body. There are dry nalas in which water flows during rains for a short duration, otherwise they remain dry for the rest of the months. The rain water from these nalas drains either into local Johars or in agriculture fields. The overview of Mining site from the top benches of 'B' Block of Bayal Quartz and Feldspar Mines, Narnaul, Haryana is presented in Photograph 1.

Photograph 1. The overview of Mining site of ‘A’ Block and ‘B’ Block of Bayal Quartz and Feldspar Mines, Narnaul, Haryana.

3. Instrumentations

Blast induced vibrations were monitored by seismographs namely Micromate, Minimate and Minimate Blaster (Made in Canada by M/s Instantel Inc.). Minimate is eight as well as four channels seismographs provided with two/one tri-axial transducer(s) for monitoring of vibration (in mm/s) and two/one channel(s) for monitoring of air over-pressure/noise in dB(L). Minimate Blaster and Micromate are four channels seismographs provided with one tri-axial transducer for monitoring vibration (in mm/s) and one channel for monitoring of air over-pressure/noise in dB(L). All the seismographs record vibration in three directions i.e. Longitudinal (L), Vertical (V) and Transverse (T). They also record principal frequency of vibration and compute the peak vector sum of the vibration.

The in-the-hole velocities of detonation (VODs) of explosives were determined with the help of VODMate (Made in Canada by M/s Instantel Inc.). VODMate is double channel data logger which records continuous VOD of explosives in the blast hole at the time of detonation.

4. Blasting details

Eleven blasts including eight blasts in ‘B’ block and rest Three blasts in ‘A’ block were conducted during the study period. The number of blast holes detonated in production blasting varied from 8 to 27. The diameters of blast holes were 100 mm. The depth of blast holes varied from 3 to 10 m and the explosives loaded in a hole varied from 19 to 42 kg. The explosives weight per delay ranged between 41 and 66 kg. Total explosive weight detonated in a blast round varied between 200 and 725 kg. The vibration measuring distances varied from 65 to 1020 m. Details of blast design parameters experimented during the period of investigation are given in Annexure as Table A1.

Vibrations were monitored in terms of peak particle velocity (PPV) that varied from 0.42 mm/s to 11.11 mm/s depending upon the distance of measuring transducers of seismographs from the blasting face and the amount of explosives detonated in particular delay of the blast. The recorded levels of air over-pressure ranged from 91.24 dB(L) to 127.2 dB(L). Recorded blast induced ground vibrations and air over-pressure are presented in Annexure as Table A2.

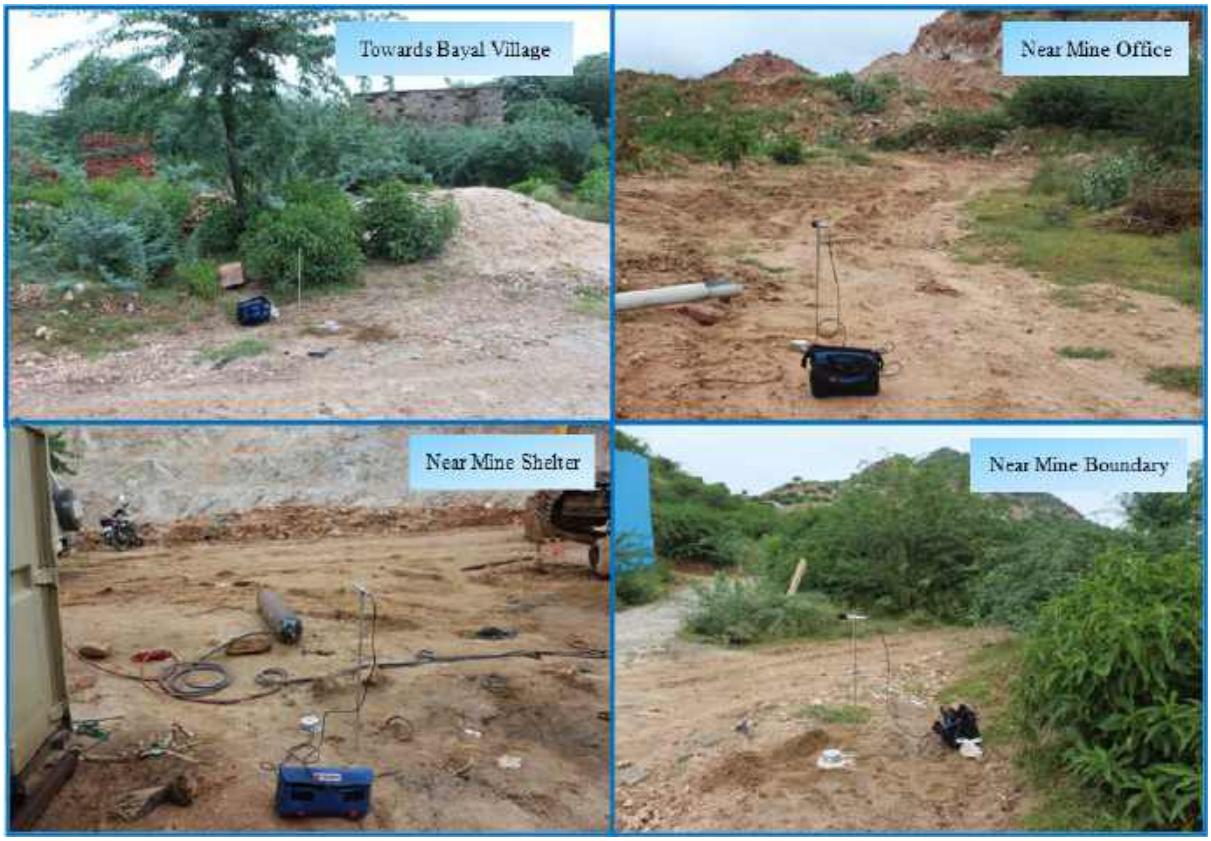
There was no ejection of flying fragments and back breaks recorded in any blast. The location of the first rock movement, the profile of the face movement and ejection of rock, if any, were monitored for each blast with the help of video camera. Photograph 2 depicts the view of the charging and connection of the blast face at Bottom bench of 'B' Block on 31.08.2021.

Photograph 2. View of the charging and connection of the blast conducted at bottom bench of 'B' Block on 31.08.2021.

4.1 Monitoring of Ground Vibration and Air Overpressure/Noise

Blast induced ground vibration and air overpressure were monitored by placement of seismographs near different surface structures in and around the 'A' Block and 'B' Block of Bayal Quartz and Feldspar Mines. The seismographs were placed at different locations viz. at Doyala panchayat road, near Bhartri temple (Doyala village), behind Bhartri temple (Doyala village), near crusher plant (Doyala village), near mine boundary, near main road (Bayal village), near mine office ('A' and 'B' Block), near workshop container ('B' Block), at house of Mr. Ramniwas (Panchnauta village), at house of Mr. Sheeshram (Panchnauta village), near mine shelter ('A' Block), towards Bayal village, near weigh bridge ('A' and 'B' Block), at house of Mr. Rameshwar (Doyala village) and at house of Mr. Ajit Singh (Bayal village) as shown in Photograph 3 and photograph 4 respectively.

Photograph 3. Monitoring of blast vibration at different houses of Doyala village, near 'B' Block of Bayal Quartz and Feldspar Mine, Haryana.



Photograph 4. Monitoring of blast vibration at different houses structures near 'A' Block of Bayal Quartz and Feldspar Mine, Haryana.

5. Analyses of recorded vibration data

Attempts were made to record 44 blast induced ground vibrations data. The recorded vibration data were grouped together for statistical analysis. An empirical relationship has been established correlating the maximum explosive weight per delay (Q_{max} in kg), distance of vibration measuring transducers from the blasting face (R in m) and recorded peak particle velocity (V in mm/s) for all the quarries in combination as well as individually. The established equation for the mine in combined form is:

$$V = 244.2\left(\frac{R}{\sqrt{Q_{max}}}\right)^{-1.427} \quad (1)$$

Correlation co-efficient = 87.4 %

Where,

V = Peak particle velocity (mm/s)

R = Distance between vibration monitoring point and blasting face (m)

Q_{max} = Maximum explosive weight per delay (kg)

The above equation is site specific and applicable only for 'A' block and 'B' block of M/s Bayal Quartz and Feldspar Mine, Narnaul, Haryana. It may be used to compute the maximum explosive weight to be detonated in a delay for distances of concerned structures from the blasting site. For convenience, the recommended explosive weight per delay has been computed and is given in Table A3. The regression plot of vibration data recorded at their respective scaled distances is presented in Figure 1.

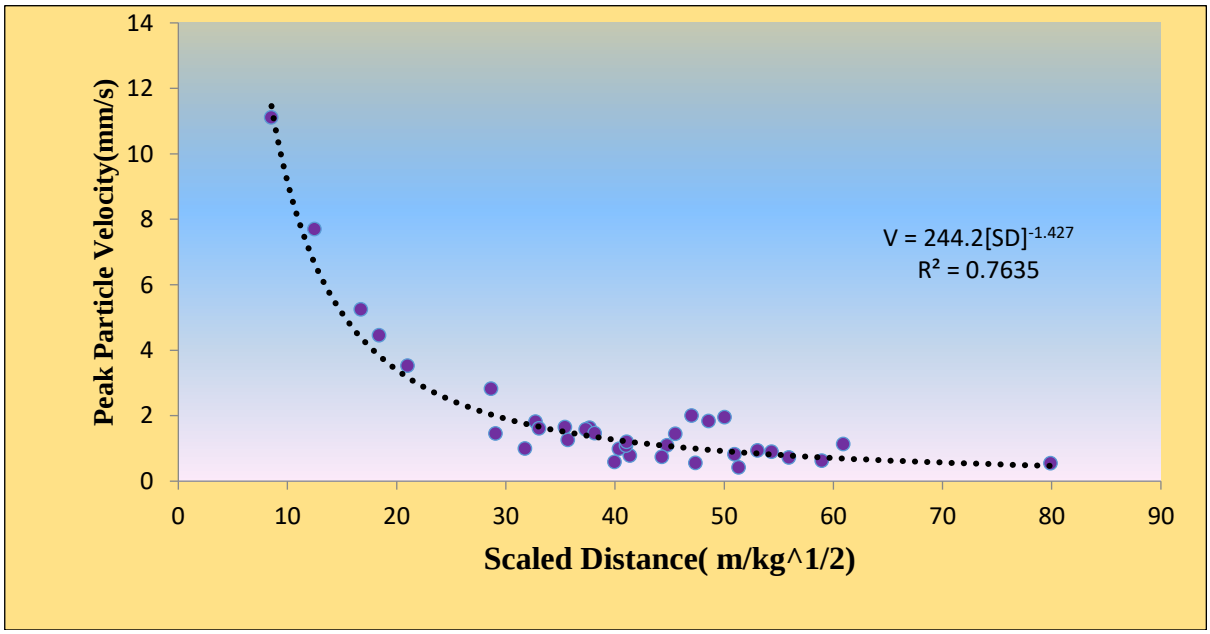


Figure 1. Regression plot of recorded PPV with their respective scaled distances.

5.1 Frequency of blast vibration

The dominant peak frequencies of ground vibrations were in the range of 5.875 to 96.25 Hz. Fast Fourier Transform (FFT) analyses of blast vibration frequencies confirmed that concentration of dominant frequencies was in between 8.875 Hz and 50.55 Hz. The plot of recorded dominant frequencies at various distances is presented in Figure 2. Most of the vibration measuring stations were on compact ground surfaces.

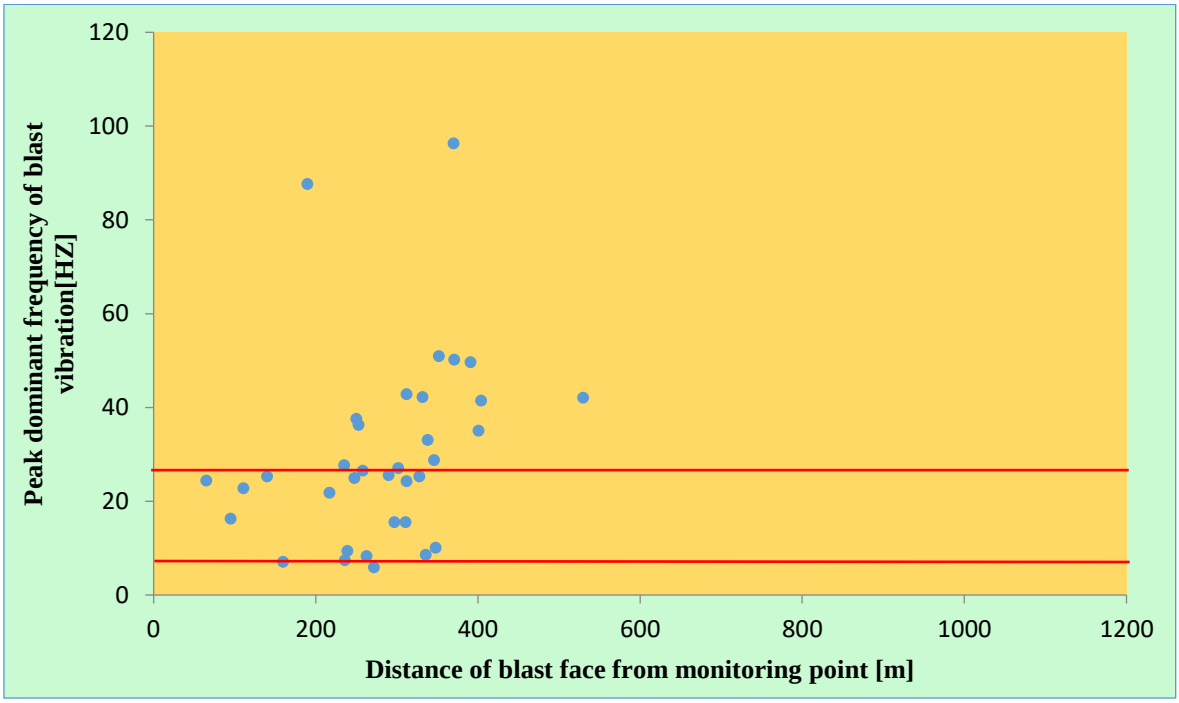


Figure 2. Plot of dominant frequencies of blast waves recorded at various locations in the periphery of the Bayal Quartz and Feldspar Mine, Haryana.

The blast wave signature recorded at 65 m (PPV= 11.11 mm/s) is depicted in Figure 3. The Fast Fourier Transform (FFT) analysis of frequencies of the vibration signatures shown in Figure 3 is depicted in Figure 4. The blast wave signature recorded at 235 m towards Bayal village due to the blast conducted at 'A' block is presented in Figure 5. The Fast Fourier Transform (FFT) analysis of frequencies of the vibration signatures shown in Figure 5 is depicted in Figure 6. The view of blast vibration monitoring near the Bhartri Temple at a distance of 190 m of Doyala village from the blasts conducted at 'B' Block is shown in Photograph 7 and its Fast Fourier Transform (FFT) analysis of frequencies is presented in Figure 8. Vibrations were also tried to record at the complaint house (Mr. Ajit Singh) located beyond 890 m from the blasts conducted at 'B' block on 02.09.2021. The trigger level of seismograph was set 0.25 mm/s in order to record the minimum possible vibration level. The instrument was not trigged in all three said blasts conducted on 02.09.2021.

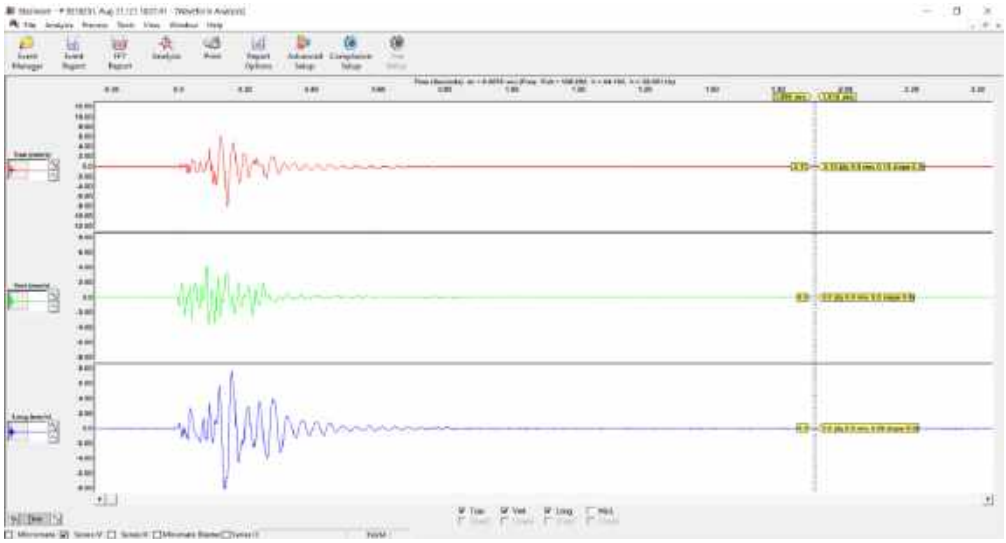


Figure 3. Blast wave signature recorded at 65 m from the blast conducted at ‘A’ Block on 31.08.2021.

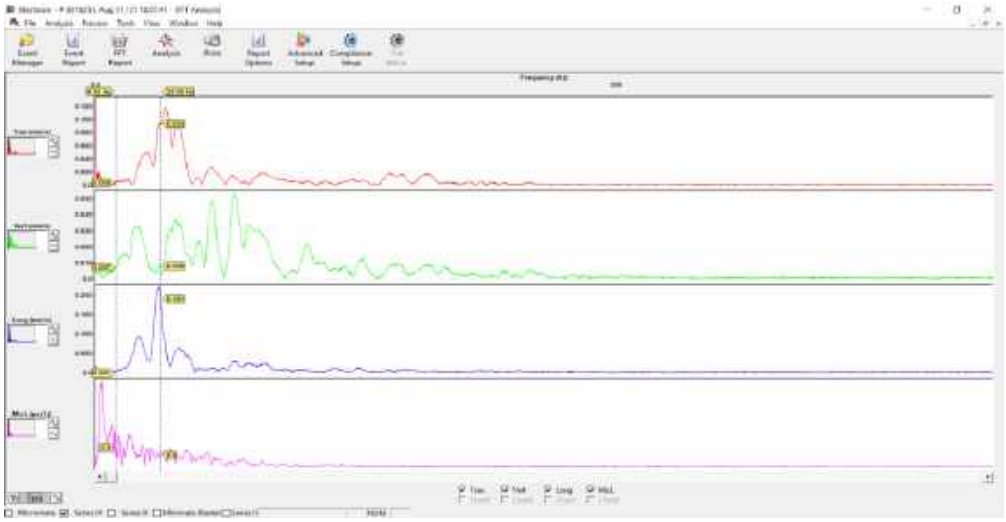


Figure 4. FFT analyses of frequencies of vibration presented in Figure 3.

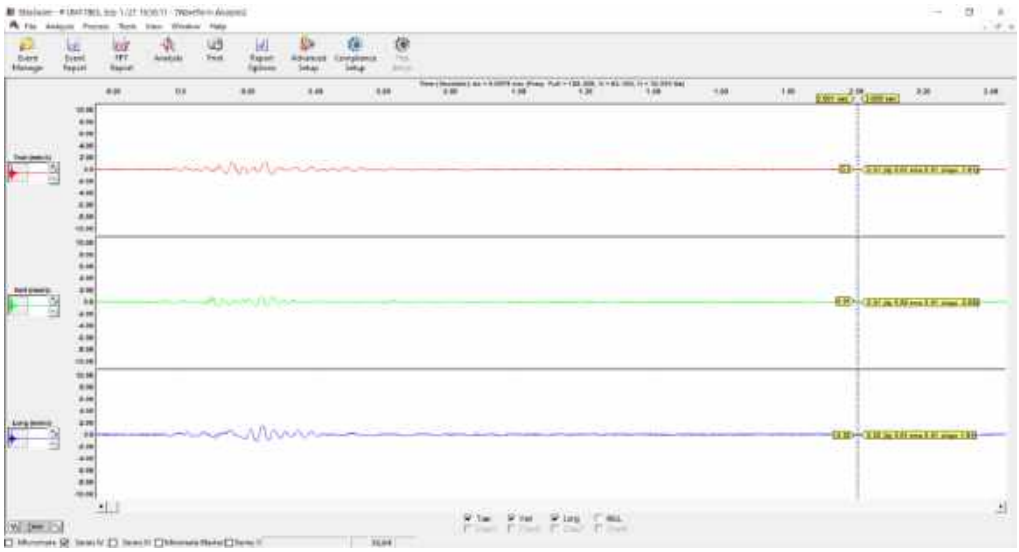


Figure 5. Blast wave signature recorded at 235 m towards Bayal village from the blast conducted at ‘A’ Block Bottom bench on 01.09.2021.

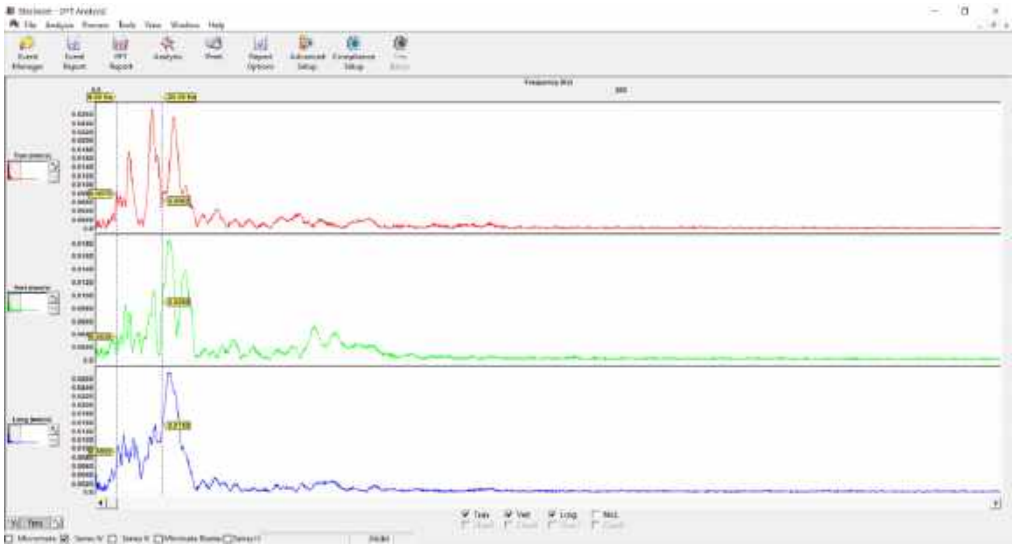


Figure 6. FFT analyses of frequencies of vibration presented in Figure 5.

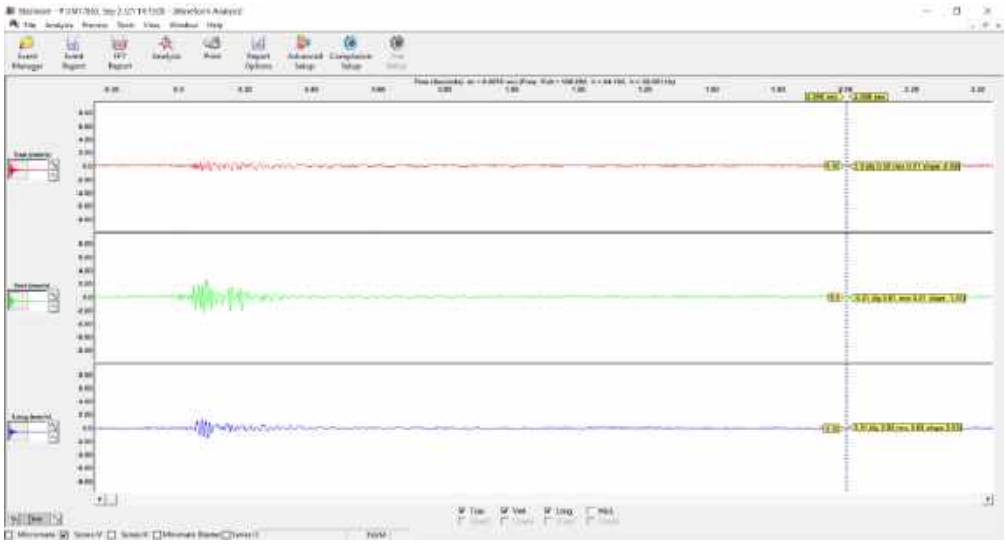


Figure 7. Blast wave signature recorded at Bhartri Temple, Doyala village at a distance of 190 m from the blast conducted at ‘B’ Block Bottom bench on 02.09.2021.

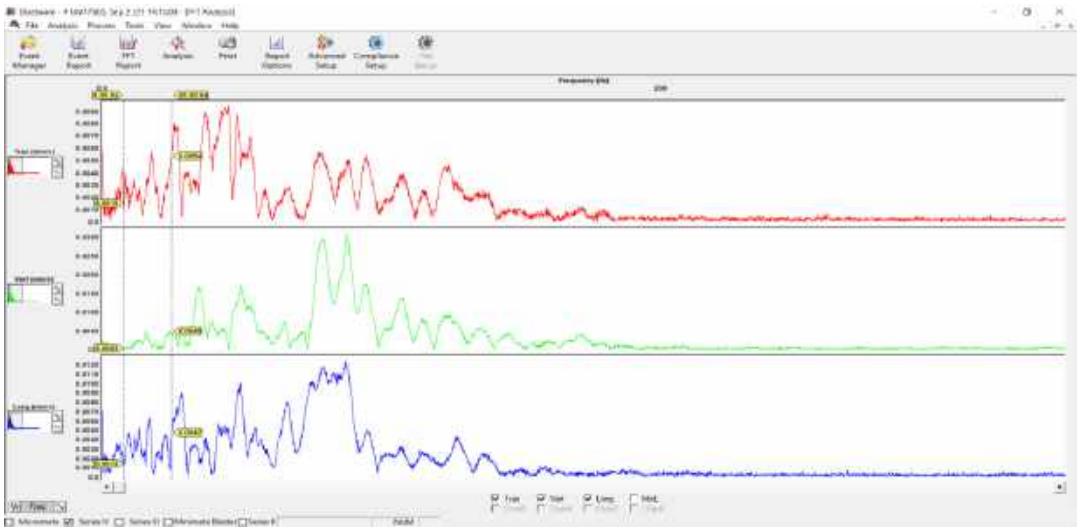


Figure 8. FFT analyses of frequencies of vibration presented in Figure 7.

6. Existing vibration standard and criteria to prevent damage

Peak particle velocity (PPV) has been globally used in practice for assessment of blast induced damage to the structures. Different countries adopt different standards depending on their type of industrial/residential buildings. In India, presently DGMS technical circular 7 of 1997 is considered as vibration standard for the safety of surface structures in mining areas. The DGMS standard is given in Table 1.

Table 1. DGMS technical circular 7 of 1997 concerning to blast vibration standard in mm/s.

Type of structure	Dominant excitation frequency, Hz		
	< 8 Hz	8-25 Hz	> 25 Hz
(A) Buildings/structures not belong to the owner			
1. Domestic houses/structures (Kuchcha, brick & cement)	5	10	15
2. Industrial buildings	10	20	25
3. Objects of historical importance and sensitive structures	2	5	10
(B) Buildings belonging to owner with limited span of life			
1. Domestic houses/structures	10	15	25
2. Industrial buildings	15	25	50

7. Air over-pressure/noise

Air overpressure in the mining or quarrying context is the superposition of a number of impulsive air pressures as a result of the detonation of explosive in the ground. Air over-pressure can be measured in pressure unit as well as sound pressure level (SPL).

$$SPL\ (dB) = 20 \log (p/p_o) \qquad (2)$$

Where, p = Measured over-pressure in Pascal (pa)
p_o = Reference pressure level of the lowest sound that can be heard, i.e., zero dB $=2 \times 10^{-5}$ pa.

United State Bureau of Mines (USBM) has correlated the damage due to air over-pressure. The recommended values are given below in:

Over-pressure (dB)	Over-pressure (kPa)	Air Blast Effects
177	14	All windows break
170	6	Most windows break
150	0.63	Some windows break
140	0.20	Some large plate glass windows may break, desk and windows rattle
136	**0.13**	**USBM interim limit for allowable air blast**
126	0.05	Complaints likely

The maximum level of air over-pressure recorded was 127.2 dB(L) at 265 m due to blasting conducted at Top bench of 'A' Block on 01.09.2021. In this blast 8 blast holes were loaded with 333 kg of explosives and were fired with the explosives weight per delay of 41 kg. The threshold level of air over pressure/noise is 136 dB(L) as per USBM standard.

8. Monitoring of in-the-hole velocity of detonation (VOD) of explosives

The performance of explosives depends upon a number of parameters and VOD is one of the important parameters. The detonation pressure associated with the reaction zone of a detonating explosive is directly proportional to the square of its VOD. It is measured in the C-J plane, behind the detonation front, during propagation through the explosive column. The detonation pressure (P_d) can be estimated by the following formula.

$$P_d = \frac{1}{2}\rho_e (VOD)^2 10^{-6} \qquad (3)$$

Where,

P_d = Detonation pressure (MPa)

ρ_e = Density of explosive (kg/m^3)

VOD = Velocity of detonation (m/s)

Uniform in-the-hole VOD of explosive is essentially required throughout the blast holes in order to produce sufficient detonation pressure to the blasthole walls. Booster is provided in the explosive column at bottom to sustain and maintain the VOD for the uniform breakage of rock. The continuous in-the-hole VOD of Slurry cartridge explosives of M/s Indo Gulf Industries Limited and Neo Blast Special Cartridge of M/s SBL were recorded to determine the optimal value for better energy utilization in terms of improved fragmentation with minimising blast induced ground vibration. The recorded VODs were in the range of 3401 m/s to 3670 m/s. The recorded in-the-hole VODs of different suppliers is given in Table 2. The traces of in-the-hole VOD of M/s Indo Gulf Industries Limited recorded are depicted in Figure 9.

Table 2. Recorded velocity of detonation of explosives being used at Bayal Quartz & Feldspar Mines, Haryana.

Explosives tested for VOD	Recorded VOD	Remarks
Neo Prime Special Slurry cartridge explosives of M/s Special Blast Limited,	3401-3670 m/s	In-the-hole VOD
IGIL explosive of M/s Indo Gulf Industries Limited	3476 m/s	In-the-hole VOD

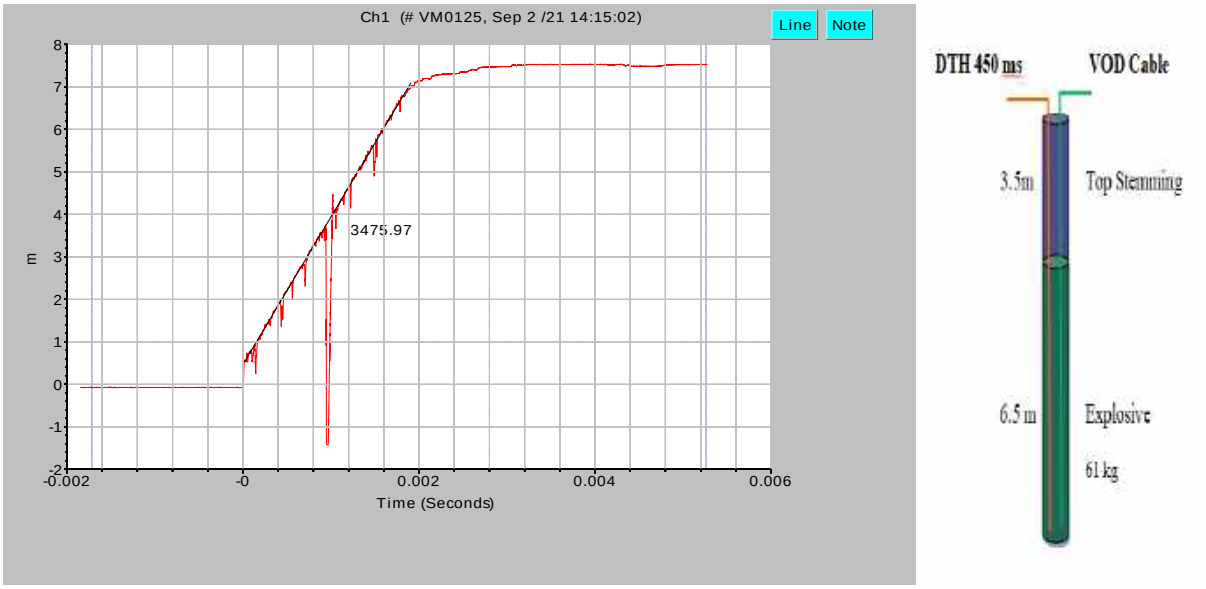


Figure 9. In-the-hole VOD of Slurry Explosive of M/s Indo Gulf Industries Limited recorded on 02.09.2021 at blasting shelter bench of 'B' Block, Bayal Quartz & Feldspar Mines, Haryana.

9. Flyrock

Flyrock are the undesirable ejection of rock particles projected beyond the normal blast area. It is generated when there is insufficient stemming, too much explosive energy for a fixed amount of burden, or poor delay timing pattern, or explosives loaded in voids, mud seams.

The primary means of controlling flyrock is through proper blast design and optimum delay timing between two detonations. Any pattern which over-confines the explosives or one with insufficient stemming tends to cause material to be thrown up in the air rather than allowing any horizontal movement. None of the blasts ejected flying fragments. The detonation of blast was very ideal and achieved blasting face was without back breaks in most of the time. It was demonstrated and experiment that stemming to burden ratio of 0.7 or more did not cause ejection of flying fragments. Hence, to reduce the generation of boulders from the top portion of the face, stemming length should be 0.7 times of burden.

10. Rock fragmentation analyses

The fragmentation analysis were carried out for all the blasts and the output of the analyses are in the form of number of exposed fragmented blocks, maximum, minimum and mean size of the fragmented blocks, sieve analysis as per the requirement i.e. at different percentile size viz. D_{10}, D_{25}, D_{50}, D_{75}& D_{90}. (Percentile sizes: for example D_{10} is the ten-percentile, the value for which 10% by weight of the sample is finer and 90% coarser. In terms of sieving, D_{10} is the size of sieve opening through which 10% by weight of the sample would pass).

The fragmentations achieved from the blasts were very good. The blasted muck pile was properly distributed for loading. The fragmentation analysis process and results of one of the blast conducted at Dump road bench of 'B' block (Photograph 5) on 31.08.2021 is depicted in Figures 10 & 11. The average mean size of the block is 95.614 mm (diameter of an equivalent sphere) and the most common size of the block is 500 mm (diameter of an equivalent sphere). The maximum size of the boulder found in the analysis is of 1.178 m (diameter of an equivalent sphere). The boulders were generated from the stemming part of the holes and were a result of liberation of rock along joint and/or fracture planes.

Photograph 5. Fragmented view of the blast conducted at Dump road bench of 'B' Block, Bayal Quartz and Feldspar Mines, Narnaul, Haryana on 31.08.2021.

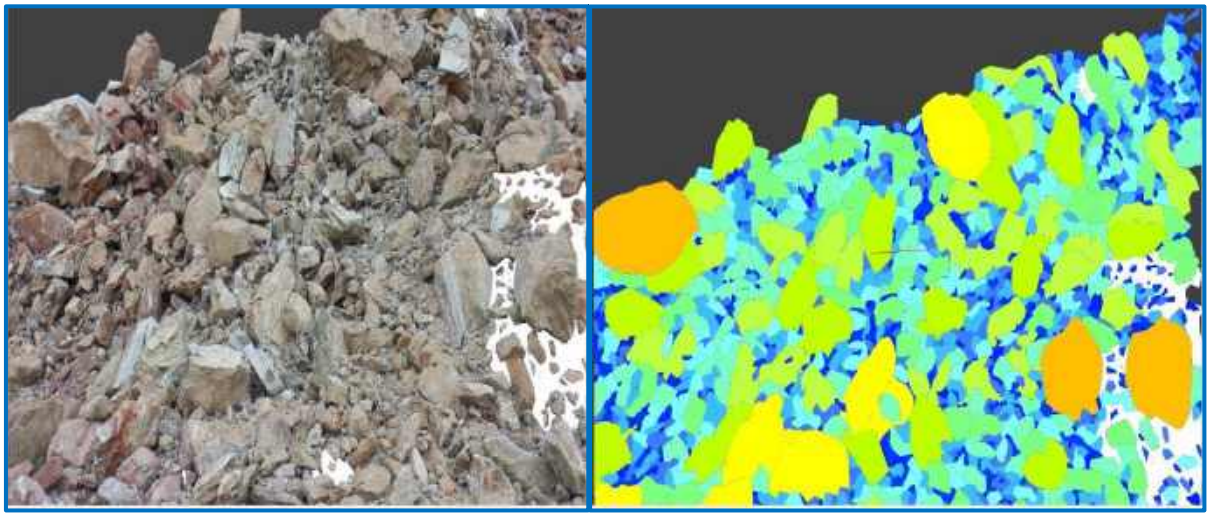


Figure 10. Netting and countering of block sizes of fragments at Dump road bench of 'B' Blockshown in Photograph 4.

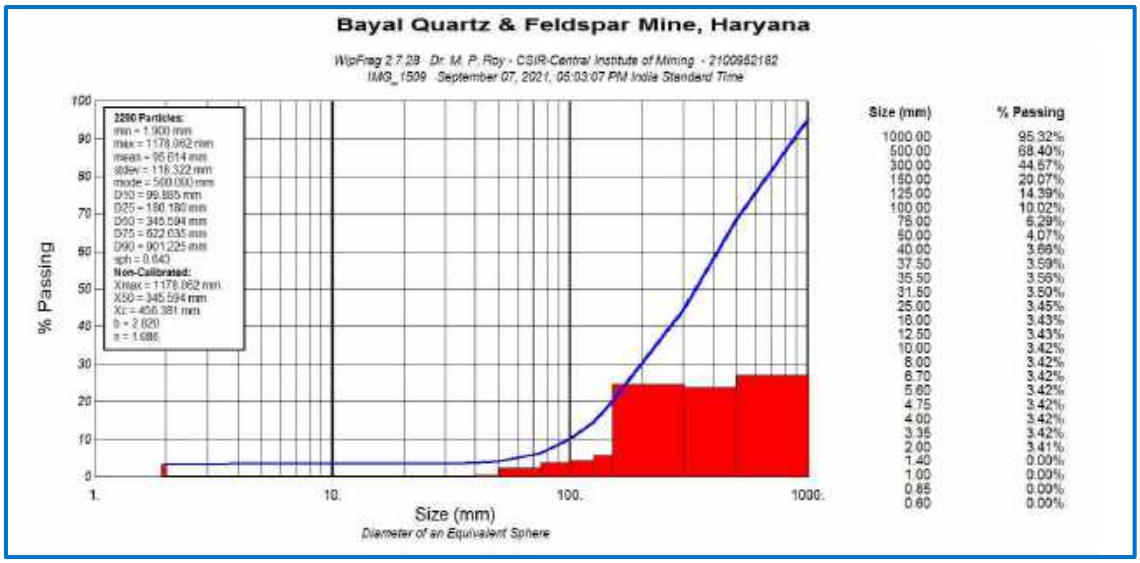


Figure 11. Histogram and cumulative size curve view of fragmented block sizes at Dump road bench of 'B' Block, Bayal Quartz & Feldspar Mines, Narnaul, Haryana.

11. Human response to blasting

The tolerance and reactions of human beings to vibrations are important when standards are based on annoyance, interference, work proficiency and health. Human beings notice and react to blast induced vibrations at levels that are lower than the damage thresholds.

It is impossible to establish a vibration level where nobody will complain. There are always some persons in a population who will complain no matter how small the disturbance is. Several researchers recognized that the duration of the vibration was critical. Most evident was that a higher level could be tolerated if the event was of short duration. Consequently, steady state vibration data could not be realistically applied to blasting except for events that exceed several seconds duration.

12. Causes of cracks in structures other than blasting

Most structures have cracks of some kind due to normal environmental stress. When blasting comes in to the area it usually gets credit for these environmentally induced cracks. Cracking is a normal occurrence in the walls and ceilings of structures, and the causes are multiple, ranging from poor construction to normal environmental stress, such as thermal stress, wind etc. The Small Home, Published by the Architects Small Home Services, Bureau of the United State Bureau of Mines, US gave a list of reasons for the development of crack in the buildings other than blasting. These are as follows:

- Failure to make the footings wide enough.
- Width of footings not made proportional to loads to carry.
- The posts in the basement not provided with separate footings.
- Not enough cement used in the concrete.

- Dirty sand or gravel used in the concrete.
- Failure to protect beams and sills from rotting through dampness.
- Setting floor joists one end on masonry and the other end on wood.
- Wooden beams used to support masonry over openings.
- Braces omitted in wooden walls.
- Drainage water from roof not carried away from foundations.
- Sub-flooring omitted.
- Poor materials used in plasters.
- Plaster applied too thin.
- Metal reinforcement omitted in plaster at corner.
- Sub-soil drainage not carried away from walls.
- First coat of plaster not properly keyed to backing.
- Floor joints placed too far apart.
- Wood beams spanned too long between posts.
- Failure to use double joists under unsupported partitions.

13. Results and discussions

The maximum vibration recorded in terms of peak particle velocity (PPV) was 11.11 mm/s at 65 m on the ground surface backside from blasting site. The associated dominant peak frequency was 24.38 Hz. This magnitude of vibration was due to detonation of 725 kg of explosives loaded in 27 holes in two rows and fired with maximum charge weight per delay of 58 kg. The PPV recorded at 95 m from the same blast was 7.705 mm/s with dominant peak frequency of 16.25 Hz. It indicates that attenuation of vibration is very fast.

The vibrations recorded in the different locations of the periphery of the mine were of low amplitude and short duration. The persistence of vibration was in most of the cases less than one (01) second. A few recorded blast waveforms at different locations are given in the Annexure which indicates low amplitude and short duration blast events. The existing practice of blasting will not cause any damage to the houses and structures in the periphery of the mine.

The dominant peak frequencies of ground vibrations were in the range of 5.875 to 96.25Hz. Fast Fourier Transform (FFT) analyses of blast vibration frequencies confirmed that concentration of dominant frequencies was in between 8.875 Hz and 50.55 Hz. So, the safe level of vibration has been taken as 5 mm/s for the houses/structures of Doyala, Bayal and Panchnauta Village villages considering the greater safety whereas for structures belonging to owner has been taken as 10 mm/s as per DGMS standard. The maximum explosives to be fired in a delay for the safety of residential houses at various distances from the blasting site may be computed from the Equation 1. For ready references, the maximum permissible explosive weight per delay and Total explosive weight to be detonated in blast round has been computed and is given in Annexure as Table A3 & Table A5 respectively.

The maximum air over-pressure recorded was 127.2 dB(L) at 265 m due to the blast conducted at Top bench of 'A' Block on 01.09.2021 by detonation of 333 kg of explosives in 8 holes. All the blasts were initiated using Pyrotechnic initiation system. The blasts initiated with electronic and Nonel initiation system generated significantly lower level of air over-pressure compared to detonating fuse initiation system. There was no ejection of flyrock in any of the blasts.

The recorded vibration and air over-pressure data and subsequent analyses revealed that blasting may be performed at 200 m from the nearest house in the periphery of the mine with suggested blast design and charging pattern. The blast designs have been recommended for blasting operations to be conducted at 100 m and beyond from the nearest house or other structures of the periphery of the mine. The recommended blast designs are given in Annexure as Figures A1-A2. The recommended explosive weights per delay for various distances of the concerned locations up to 500 m are computed and are presented in Annexure as Table A3.

The deployment of 100 mm drill diameter machines at all the benches of 6.0-9.5m will help in proper loading of explosives in holes without decking and will help enable in formation of smooth run-off of velocity of detonation of explosives and will yield desired fragmentation.

14. Conclusions and recommendations

- Maximum vibration (in terms of peak particle velocity, PPV) of 11.11 mm/s with associated dominant peak frequency of 24.38 Hz was recorded at back side of blast free face (at 65 m) in all the trial blasts. In this blast, the explosives weight per delay and total explosive detonated were 58 kg and 725 Kg respectively. The PPV recorded at 95 m from the same blast was 7.705 mm/s with dominant peak frequency of 16.25 Hz was recorded.

- Maximum vibration recorded at different residential structures not belonging to Mine owner due to trial blast conducted at 'A' Block of Bayal Quartz and Feldspar Mines was 1.648 mm/s with associated dominant peak frequency of 27.63 Hz. The monitoring location was towards Bayal village at a distance of 235 m from the blasting face. The explosives weight per delay and total explosive detonated were 44 kg and 333 Kg respectively.

- Maximum vibration recorded at different residential structures not belonging to Mine owner due to blast conducted at 'B' Block of Bayal Quartz and Feldspar Mines was 2.825 mm/s with associated dominant peak frequency of 87.63 Hz. The monitoring location was near Bhartri Temple of Doyala village at a distance of 190 m from the blast location. The explosives weight per delay and total explosive detonated were 44 kg and 550 Kg respectively.

- The maximum air over-pressure recorded was 127.2 dB(L) at 265 m due to the blast conducted at Top bench of 'A' Block. In this blast, explosives detonated in a blasting round and explosive weights per delay were 333 kg and 41 kg respectively. Proper stemming and the Nonel initiation system reduces the air over-pressure to a greater extent and improves the blasting performance too.

- All the recorded data (blast vibrations, air over pressures and flyrock) were well within the safe limits at the concerned houses/structures. The dominant peak frequencies of ground vibrations were in the range of 5.875 to 96.25 Hz. The analyses of blast vibration frequencies confirmed that concentration of dominant frequencies were in between 8.875 Hz and 50.55 Hz. Hence, the safe level of vibration has been taken as 5 mm/s for the houses/structures not belonging to the owner and for 10 mm/s for structures belonging to owner as per DGMS standard.

- Propagation equation for the prediction of blast vibration has been established and is given as Equation 1. The permissible explosive weight per delay may be computed from the Equation to contain vibration within safe limit for distances of houses/structures concerned. For convenience, the recommended explosive weight per delay and Total explosive weight has been computed and is given in Table A3 & Table A5. For ready reference, the predicted value of PPVs with respective maximum explosive weight per delay is given in Table A4.

- Attempts were made to record. the vibration at nearest houses of Doyala, Bayal and Panchnauta villages. in most of the blasts. The recorded vibration and air over-pressure data and subsequent analyses revealed that blasting may be performed at 200 m from the nearest house in the periphery of the mine with suggested blast design and charging pattern. The blast designs have been recommended for blasting operations to be conducted at 100 m and beyond from the nearest house or other structures of the periphery of the mine. The recommended blast designs are given as Figures A1-A2. The recommended explosive weights per delay for various distances of the concerned locations up to 500 m are computed and are presented in Table A3.

- The delay interval between the holes in a row should be 17ms whereas between the rows, it should be 42ms /59ms/67ms or more depending upon the number of rows and effective burden in front of the particular hole. If the numbers of rows are more than two, the delay interval between rows should be increased by 20% in successive rows.

- The in-the-hole VOD of Slurry cartridge prime explosives of M/s Indo Gulf Industries Limited and M/s M/s Special Blast Limited (SBL) were recorded to determine the optimal value for better energy utilization in terms of improved fragmentation with reduced level of ground vibration. The recorded VODs were in the range of 3401 m/s to 3670 m/s.

- The recommended blast designs should be followed for day-to-day blasting operations for safe and efficient blasting operations. The blast designs Annexure as Figures A1-A2, will ensure the safety of the houses/structures, life of human beings and other property in the periphery of the mines.

Acknowledgements

The research team is thankful to Shri P. Sangwan, Owner, Bayal Quartz & Feldspar Mines, Narnaul, Haryana for sponsoring the study. The sincere co-operation and help extended to Sanjeev Kumar, Manager and his team in completing the study successfully are also thankfully acknowledged. The research team also expresses their gratitude to the inhabitants of Doyala, Bayal and Panchnauta villages for their co-operation in blast vibration and air over pressure monitoring.

ANNEXURE

Table A1. Summary of blasts performed during the period of study at Bayal Quartz & Feldspar Mines, Narnaul, Haryana.

Blast No.	Date of blast	Location of blast	No. of holes	Hole dia. [mm]	Hole depth [m]	Burden [m] × Spacing [m]	No. of deck	Average Top Stemming [m]	Explosives	
									Explosives per hole [kg]	Total explosives detonated [kg]
1.	31/8/2021	Bottom Bench ‘B’ Block	26	100	6	2×2.5	Nil	3-3.5	22	578
2.	31/8/2021	Dump Road Bench ‘B’ Block	9	100	6	2×2.5	Nil	3-3.5	22	200
3.	31/8/2021	Bottom Bench ‘A’ Block	27	100	6-9	2×2.5	Nil	3-3.5	27	725
4.	01/09/2021	Bottom bench ‘B’ Block	23	100	6	2×2.5	Nil	3-3.5	22	512
5.	01/09/2021	Blasting Shelter bench ‘B’ Block	15	100	6	2×2.5	Nil	3-3.5	22	333
6.	01/09/2021	Dump Road Bench ‘B’ Block	22	100	6-10	2×2.5	Nil	3-3.5	19	428
7.	01/09/2021	Bottom bench ‘A’ Block	15	100	6	2×2.5	Nil	3-3.5	22	333
8.	01/09/2021	Top bench Block ‘A’	8	100	9	2×2.5	Nil	3-3.5	42	333
9.	02/09/2021	Bottom bench ‘B’ Block	27	100	6	2×2.5	Nil	3-3.5	20	550
10.	02/09/2021	Blasting Shelter Bench ‘B’ Block	25	100	3-10	2×2.5	Nil	3-3.5	20	503
11.	02/09/2021	Dump Road Bench ‘B’ Block	18	100	9	2×2.5	Nil	3-3.5	26	461

Table A2. Blast induced vibration monitored at different locations in and around Bayal Quartz & Feldspar Mines, Narnaul, Haryana.

Blast No.	Date of blast	Location of blast	Total explosives fired in the round [kg]	Max^{m} explosives weight per delay [kg]	Location of vibration measuring transducer	Distance of monitoring point from the blasting face [m]	Peak particle velocity (PPV) [mm/s]	Dominant Frequency [Hz]	AOP
1.	31/8/2021	Bottom Bench ‘B’ Block	578	44	❖ At Doyala Panchayat Road	250	1.635	37.50	110.0
					❖ Near Bhartri Temple, Doyala Village	300	1.092	15.50	107.5
					❖ Behind Temple, Doyala Village	340	0.823	33.00	105.5
					❖ Near Crusher Plant, Doyala Village	420	<0.50	-	-
2.	31/8/2021	Dump Road Bench ‘B’ Block	200	44	❖ Near Bhartri Temple, Doyala Village	520	<0.5	-	-
					❖ Behind Temple, Doyala Village	570	<0.5	-	-
					❖ At Doyala Panchayat Road	585	<0.5	-	-
					❖ Near Crusher Plant, Doyala Village	655	<0.5	-	-
3.	31/8/2021	Bottom Bench ‘A’ Block	725	58	❖ At Bottom bench	65	11.11	24.38	122.0
					❖ Near Shelter	95	7.705	16.25	124.3
					❖ Near Mine Boundary	140	4.455	25.25	117.8
					❖ Near Main Road	160	3.525	7.00	100.0
4.	01/09/2021	Bottom bench ‘B’ Block	512	44	❖ Near Mine Office	310	2.004	42.75	108
					❖ Near Workshop container	330	1.951	42.13	105.5
					❖ House of Mr. Ramniwas, Panchnauta Village	405	1.136	41.38	101.1
					❖ House of Mr. Sheeshram, Panchnauta Village	530	0.547	42.00	95.0
5.	01/09/2021	Blasting Shelter bench ‘B’ block	333	44	❖ Near Mine Office	300	1.442	27.00	109.2
					❖ House of Mr. Ramniwas, Panchnauta Village	370	0.719	50.13	107.9
					❖ Near Workshop container	390	0.622	49.63	111.2
					❖ House of Mr. Sheeshram, Panchnauta Village	520	<0.5	-	-
6.	01/09/2021	Dump Road Bench ‘B’ Block	428	66	❖ Near Workshop container	235	1.454	7.375	115.4
					❖ Near Mine Office	290	1.264	25.50	112.0
					❖ House of Mr. Ramniwas, Panchnauta Village	330	0.986	25.25	110.1
					❖ House of Mr. Sheeshram, Panchnauta Village	335	0.786	8.50	94.94

7.	01/09/2021	Bottom bench 'A' Block	333	44	❖ Near Mine Shelter ❖ Near Mine Office ❖ Towards Bayal Village ❖ Near weigh bridge	110 220 235 270	5.250 1.821 1.648 1.085	22.75 21.75 27.63 5.875	118.6 107.5 105.8 107.5
8.	01/09/2021	Top bench 'A' Block	333	41	❖ Near Mine Office ❖ Near Mine Shelter ❖ Towards Bayal Village ❖ Near weigh bridge	240 265 310 350	1.837 1.198 1.585 0.898	15.50 8.250 9.375 10.00	124.0 127.2 112.7 122.0
9.	02/09/2021	Bottom bench 'B' Block	550	44	❖ Near Bhartri Temple ❖ House of Mr. Rameshwar, Doyala Village ❖ Near Workshop container ❖ House of Mr. Ajit Singh, Bayal Village	190 255 350 890	2.825 1.462 0.933 <0.25	87.63 36.25 50.88 -	100.0 105.0 107.5 -
10.	02/09/2021	Blasting Shelter Bench 'B' Block	503	61	❖ Near Workshop container ❖ House of Mr. Rameshwar, Doyala Village ❖ Near Bhartri Temple ❖ House of Mr. Ajit Singh, Bayal Village	260 345 370 970	1.611 0.739 0.561 <0.25	26.50 28.75 96.25 -	113.3 95.06 111.3 -
11.	02/09/2021	Dump Road Bench 'B' Block	461	61	❖ Near Workshop container ❖ House of Mr. Rameshwar, Doyala Village ❖ Near BhartriTemple ❖ House of Mr. Ajit Singh, Bayal Village	250 310 400 1020	1.00 0.585 0.42 <0.25	24.88 24.25 35.0 -	114.4 91.24 101.5 -

Table A3. Recommended explosives weight per delay to be detonated in a blasting round for the safety of houses/structures taking peak particle velocity 5 mm/s for the structures not belonging to Owner and 10 mm/s for the structures belonging to the owner as safe limit for Bayal Quartz & Feldspar Mine, Narnaul, Haryana as per DGMS standard.

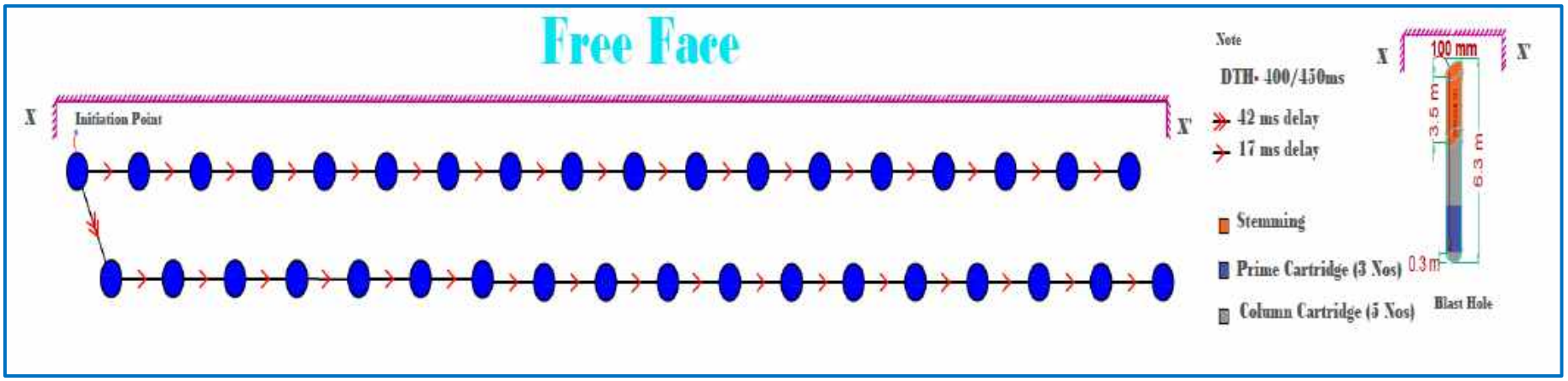
Distance of structures from the blast face [m]	Maximum explosive weight to be detonated in a delay at Bayal Quartz & Feldspar Mine [kg]	
	Taking 5 mm/s PPV as safe limit of vibration	Taking 10 mm/s PPV as safe limit of vibration
100	43	114
125	67	178
150	97	256
175	132	348
200	172	455
225	218	576
250	269	711
275	325	860
300	387	1024
350	528	1393
400	689	1820
450	872	2304
500	1076	1077

Table A4. Predicted peak particle velocity levels at various distance due to detonation of explosive weight per delay of 14, 17, 25, 43 & 50 kg at Bayal Quartz & Feldspar Mine, Narnaul, Haryana.

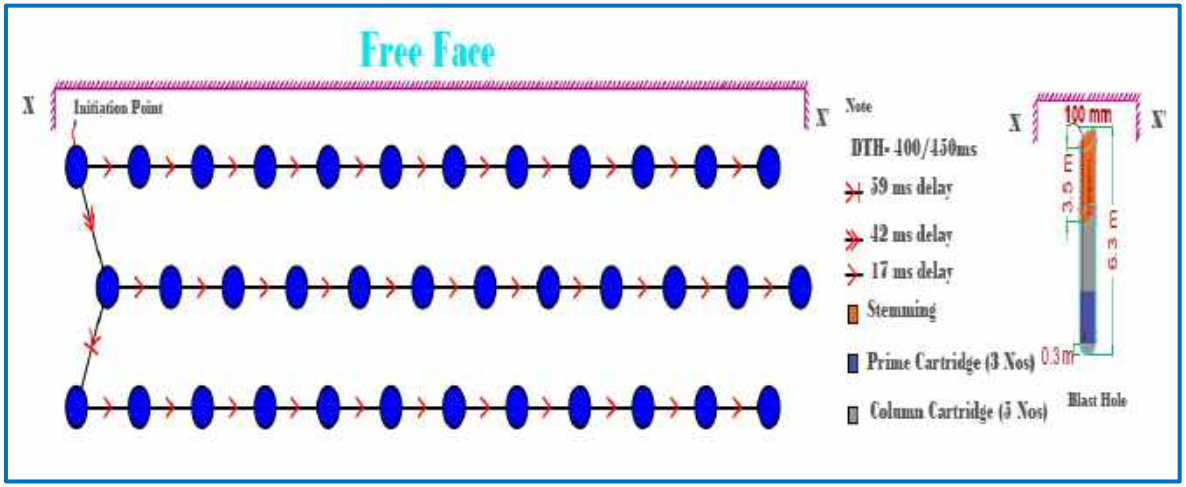
Distance of structures from the blast face [m]	**Predicted peak particle velocity levels [mm/s]**				
	14 kg	***17 kg***	***25 kg***	***43 kg***	***50 kg***
100	0.485	0.553	0.720	1.042	1.154
125	0.357	0.408	0.531	0.768	0.851
150	0.279	0.318	0.414	0.599	0.664
175	0.226	0.258	0.335	0.485	0.538
200	0.188	0.215	0.280	0.405	0.448
225	0.160	0.183	0.238	0.345	0.382
250	0.139	0.158	0.206	0.298	0.331
275	0.122	0.139	0.181	0.262	0.290
300	0.108	0.124	0.161	0.233	0.258
350	0.088	0.100	0.130	0.189	0.209
400	0.073	0.083	0.109	0.157	0.174
450	0.062	0.071	0.092	0.134	0.148
500	0.054	0.062	0.080	0.116	0.129

Table A5. Recommended Total explosives weight in a round to be detonated in a blasting round for the safety of houses/structures taking peak particle velocity 5 mm/s for the structures not belonging to Owner and 10 mm/s for the structures belonging to the owner as safe limit for Bayal Quartz & Feldspar Mine, Narnaul, Haryana as per DGMS standard.

Distance of structures from the blast face [m]	Total explosives weight to be detonated in a blasting round [kg]	
	taking 5 mm/s as safe limit of vibration	taking 10 mm/s as safe limit of vibration
100	429	1185
125	670	1852
150	965	2667
175	1314	3630
200	1716	4741
225	2172	6001
250	2681	7408
275	3244	8964
300	3861	10668
350	5255	14521
400	6864	18966
450	8687	24003
500	10725	29634



A-2 Rows

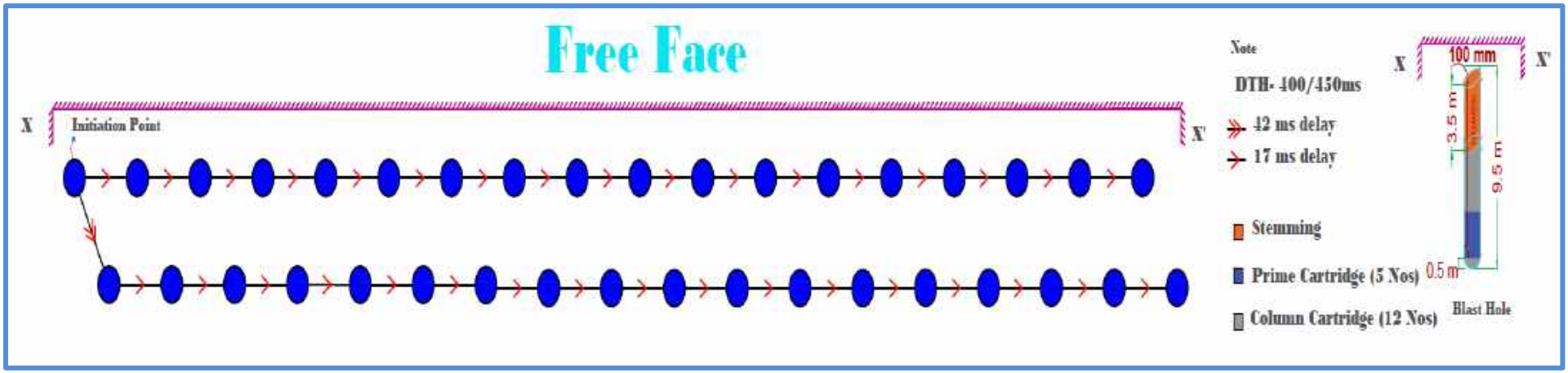


B-3 Rows

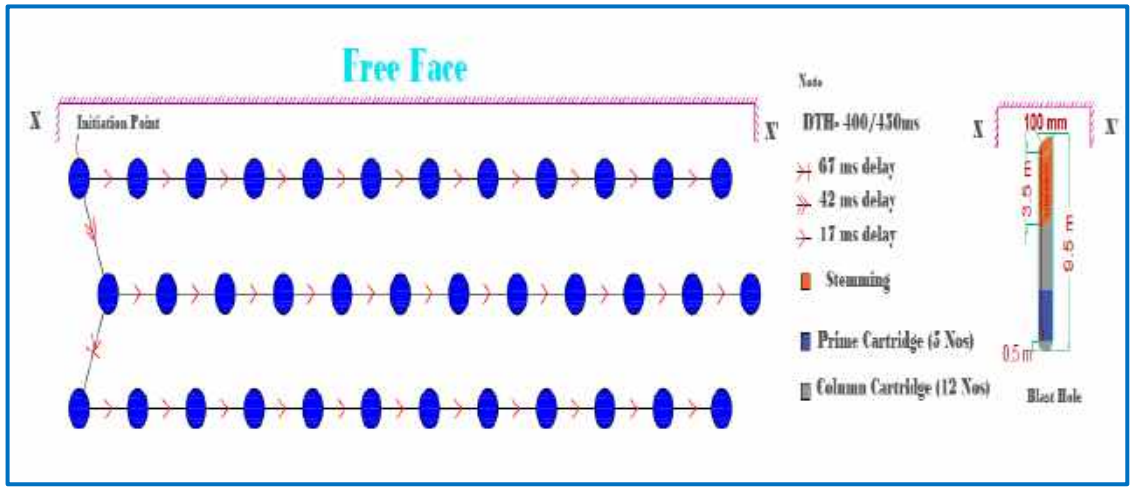
BLAST GEOMETRY

Hole diameter	: 100 mm
No. of holes	: 76
Bench height	: 6.0 m
Hole depth	: 6.3 m
Burden	: 2.0 m
Spacing	: 2.5 m
Explosives per hole	: 22.24 kg
Maximum charge per delay	: 22.24 kg (A) & 44.28 kg (B)
Designed charge factor	: 0.74 kg/m^3

Figure A1. Recommended blast design, delay sequences and charging pattern of holes for 6.0 m bench at Bayal Quartz & Feldspar Mine.



A-2 Rows



B-3 Rows

BLAST GEOMETRY

Hole diameter	: 100 mm
No. of holes	: 36
Bench height	: 9.0 m
Hole depth	: 9.5 m
Burden	: 2.5 m
Spacing	: 3.0 m
Explosives per hole	: 47 kg
Maximum charge per delay	: 47 kg (A) & 94 kg (B)
Designed charge factor	: 0.70 kg/m^3

Figure A2. Recommended blast design, delay sequences and charging pattern of holes for 9.0 m bench at Bayal Quartz & Feldspar Mine.

Instantel

Event Report

Date/Time Vert at 18:07:41 August 31, 2021
Trigger Source Geo: 0.510 mm/s
Range Geo: 254.0 mm/s
Record Time 5.0 sec at 1024 sps

Serial Number BE18251 V 10.72-1.1 Minimate Blaster
Battery Level 6.3 Volts
Unit Calibration June 30, 2021 by CIMFR Dhanbad
File Name T251J4VJ.OT0

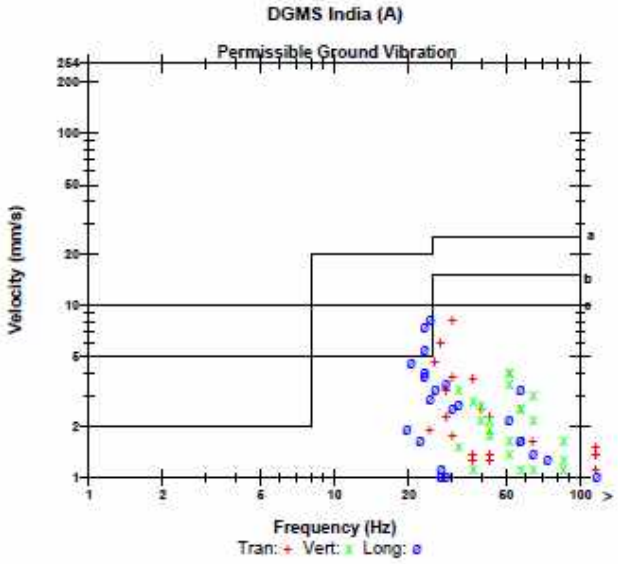
Notes
Location: On ground surface
Client: M/s Bayal Quartz and Feldspar Mine, Haryana
User Name: CSIR-CIMFR, Dhanbad
General:

Extended Notes
Advice for designing of blasting parameters at Bayal quartz and feldspar mine, Haryana to control ground vibration and air overpressure within safe limit for the safety of surrounding houses/structures beyond 200 m with improved production and productivity.

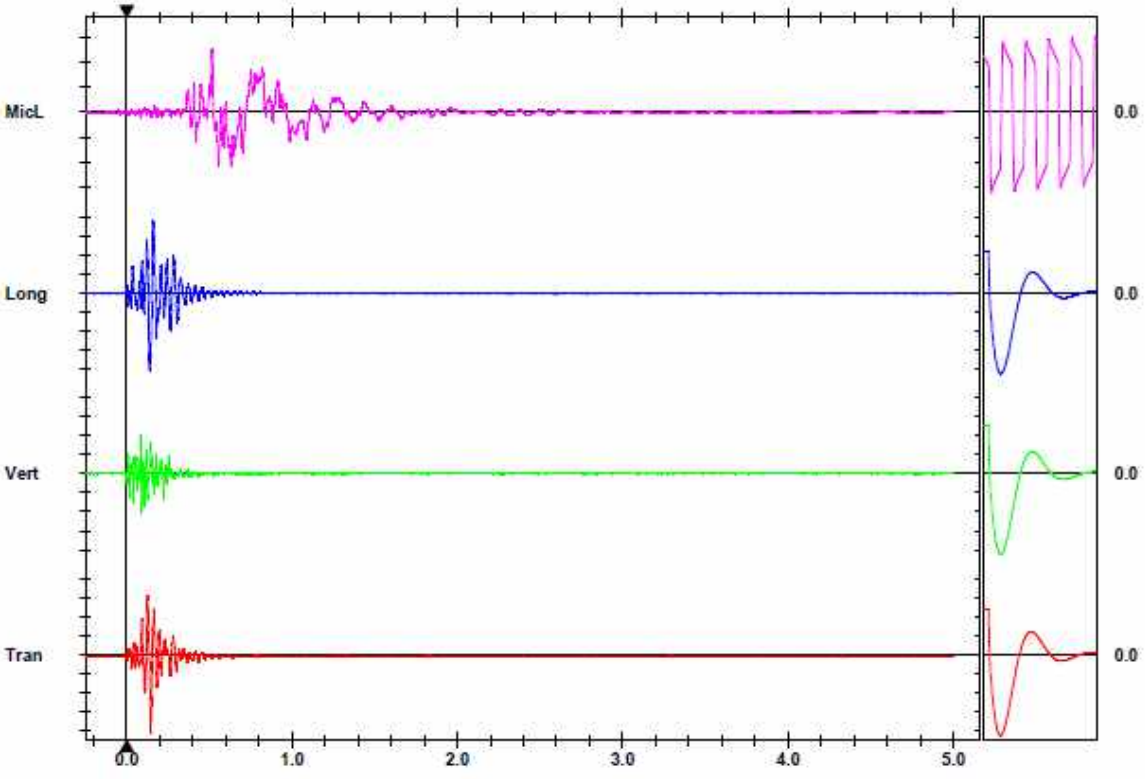
Microphone Linear Weighting
PSPL 122.0 dB(L) at 0.516 sec
ZC Freq 15 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 487 mv)

	Tran	Vert	Long	
PPV	8.255	4.064	8.255	mm/s
ZC Freq	30	51	24	Hz
Time (Rel. to Trig)	0.146	0.084	0.138	sec
Peak Acceleration	0.159	0.212	0.172	g
Peak Displacement	0.039	0.016	0.057	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.7	7.5	7.4	Hz
Overswing Ratio	3.6	3.7	4.0	

Peak Vector Sum 11.11 mm/s at 0.146 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



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Trigger =

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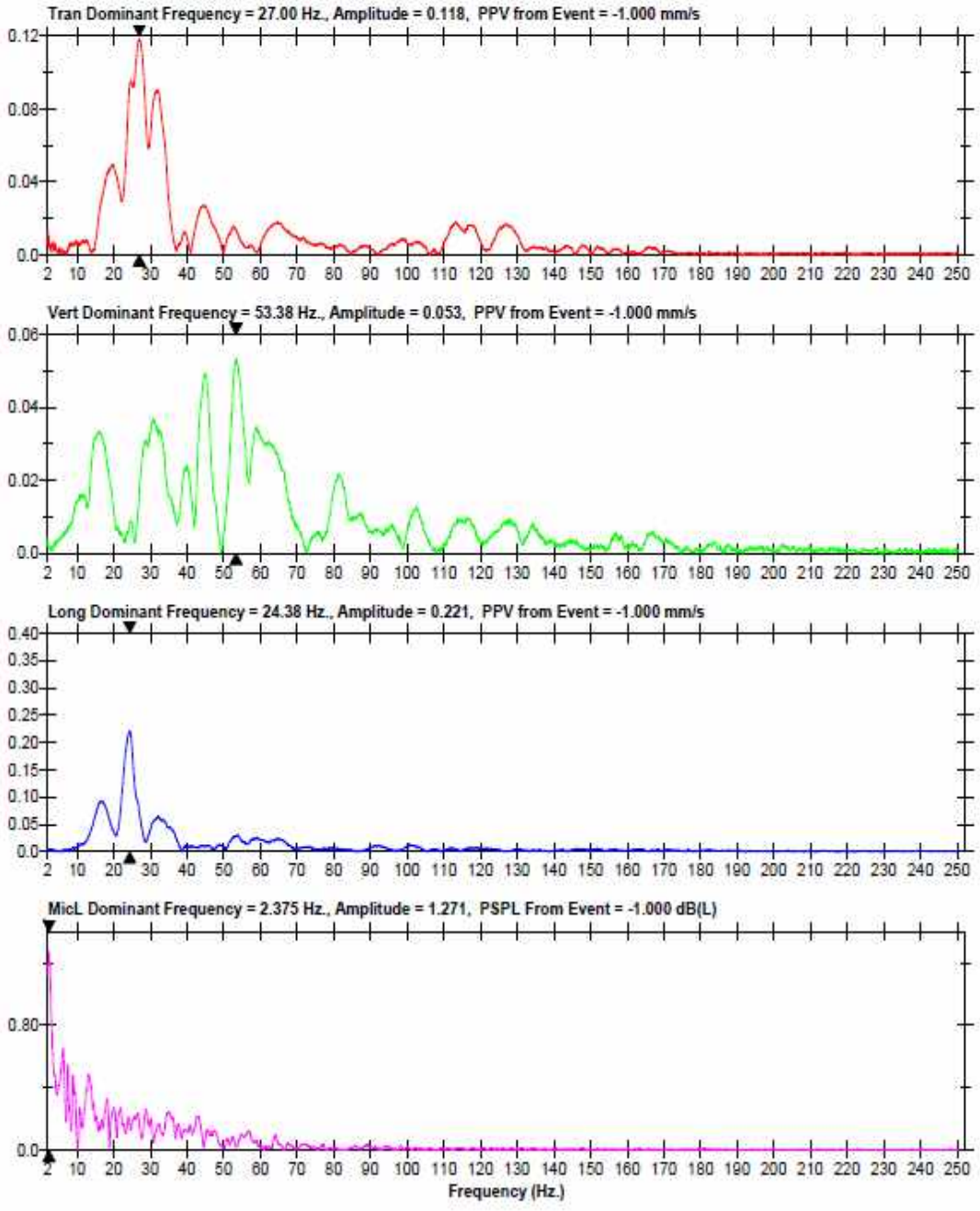
FFT Report

Date/Time	Vert at 18:07:41 August 31, 2021	**Serial Number**	BE18251 V 10.72-1.1 Minimate Blaster
Trigger Source	Geo: 0.510 mm/s	**Battery Level**	6.3 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	June 30, 2021 by CIMFR Dhanbad
Record Time	5.0 sec at 1024 sps	**File Name**	T251J4VJ.OT0

Notes
Location: On ground surface
Client: M/s Bayal Quartz and Feldspar Mine, Haryana
User Name: CSIR-CIMFR, Dhanbad
General:

Extended Notes
Advice for designing of blasting parameters at Bayal quartz and feldspar mine, Haryana to control ground vibration and air overpressure within safe limit for the safety of surrounding houses/structures beyond 200 m with improved production and productivity.



Instantel

Event Report

Date/Time	Vert at 14:15:00 September 2, 2021
Trigger Source	Geo: 0.300 mm/s
Range	Geo: 254.0 mm/s
Record Time	5.0 sec at 2048 sps
Operator/Setup:	Operator/Micromate .MMB

Serial Number	UM17865 V 10-90 Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	April 16, 2021 by UES New Delhi
File Name	UM17865_20210902141500.IDFW

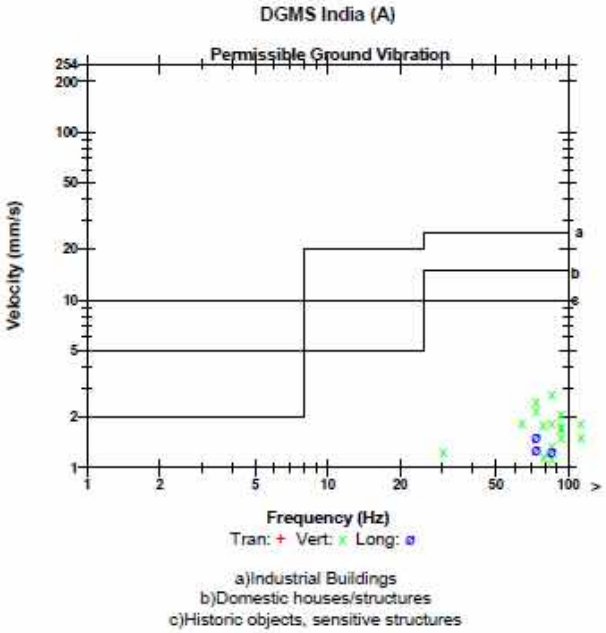
Notes
Location: On ground surface
Client: M/s Bayal Quartz and Feldspar Mine, Haryana
User Name: CSIR-CIMFR Dhanbad
General:

Extended Notes
SAdvice for designing of blasting parameters at Bayal quartz and feldspar mine, Haryana to control ground vibration and air overpressure within safe limit for the safety of surrounding houses/structures beyond 200 m with improved production and productivity.

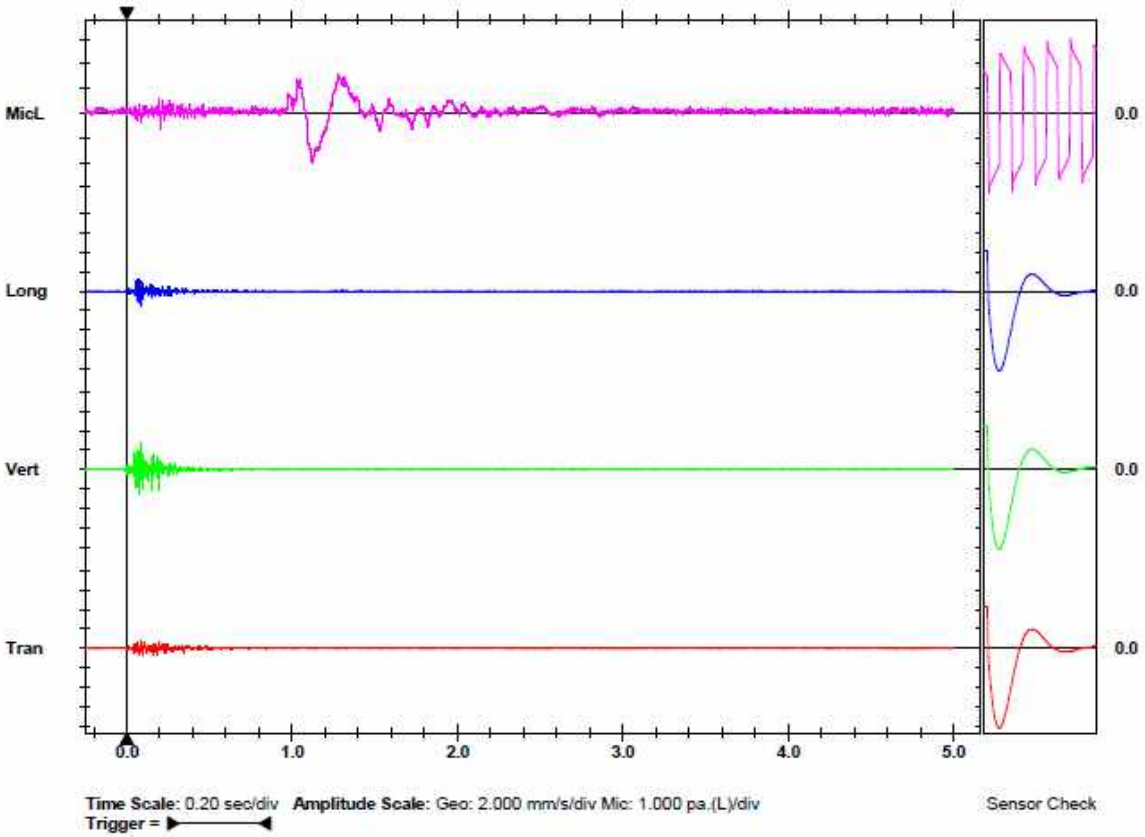
Microphone	Linear Weighting
PSPL	100.0 dB(L) at 1.121 sec
ZC Freq	3.5 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1160 mv)

	Tran	Vert	Long	
PPV	0.757	2.759	1.521	mm/s
ZC Freq	68	85	73	Hz
Time (Rel. to Trig)	0.096	0.083	0.087	sec
Peak Acceleration	0.048	0.196	0.076	g
Peak Displacement	0.002	0.005	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	4.2	4.0	4.8	

Peak Vector Sum 2.825 mm/s at 0.083 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



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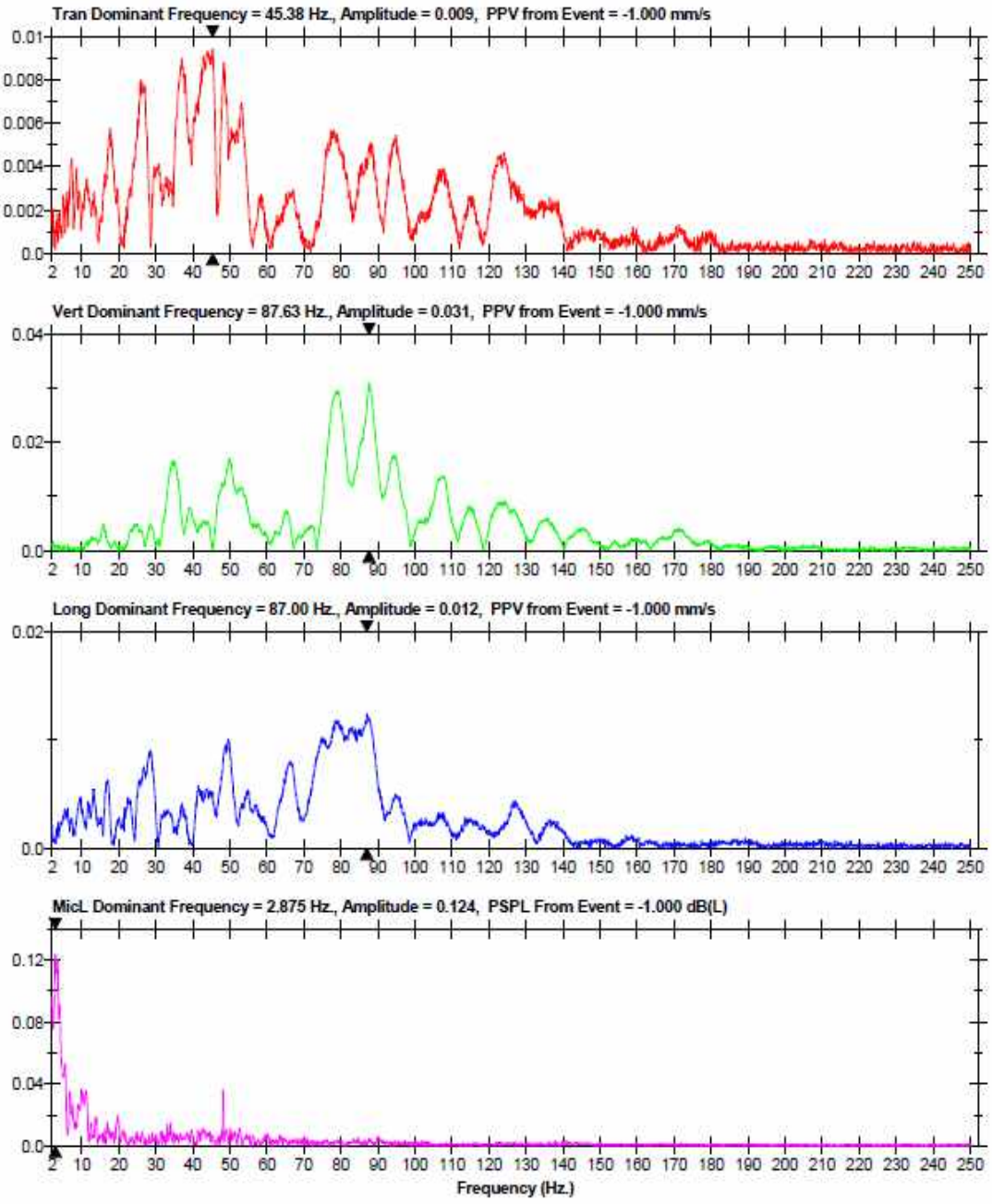
FFT Report

Date/Time	Vert at 14:15:00 September 2, 2021	**Serial Number**	UM17865 V 10-90 Micromate ISEE
Trigger Source	Geo: 0.300 mm/s	**Battery Level**	3.8 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	April 16, 2021 by UES New Delhi
Record Time	5.0 sec at 2048 sps	**File Name**	UM17865_20210902141500.IDFW
Operator/Setup:	Operator/Micromate .MMB		

Notes
Location: On ground surface
Client: M/s Bayal Q uartz and Feldspar Mine, Haryana
User Name: CSIR-CIMFR Dhanbad
General:

Extended Notes
SAdvice for designing of blasting parameters at Bayal quartz and feldspar mine, Haryana to control ground vibration and air overpressure within safe limit for the safety of surrounding houses/structures beyond 200 m with improved production and productivity.



Instantel

Event Report

Date/Time Tran at 16:56:11 September 1, 2021
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Range Geo: 254.0 mm/s
Record Time 5.0 sec at 2048 sps
Operator/Setup: Operator/Micromate .MMB

Serial Number UM17865 V 10-90 Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration April 16, 2021 by UES New Delhi
File Name UM17865_20210901165611.IDFW

Notes
Location: On ground surface
Client: M/s Bayal Quartz and Feldspar Mine, Haryana
User Name: CSIR-CIMFR Dhanbad
General:

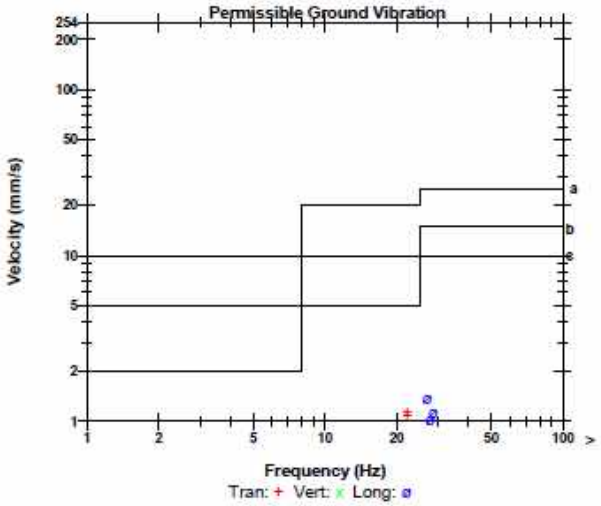
Extended Notes
SAdvice for designing of blasting parameters at Bayal quartz and feldspar mine, Haryana to control ground vibration and air overpressure within safe limit for the safety of surrounding houses/structures beyond 200 m with improved production and productivity.

Microphone Linear Weighting
PSPL 105.8 dB(L) at 0.813 sec
ZC Freq 7.6 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 1226 mv)

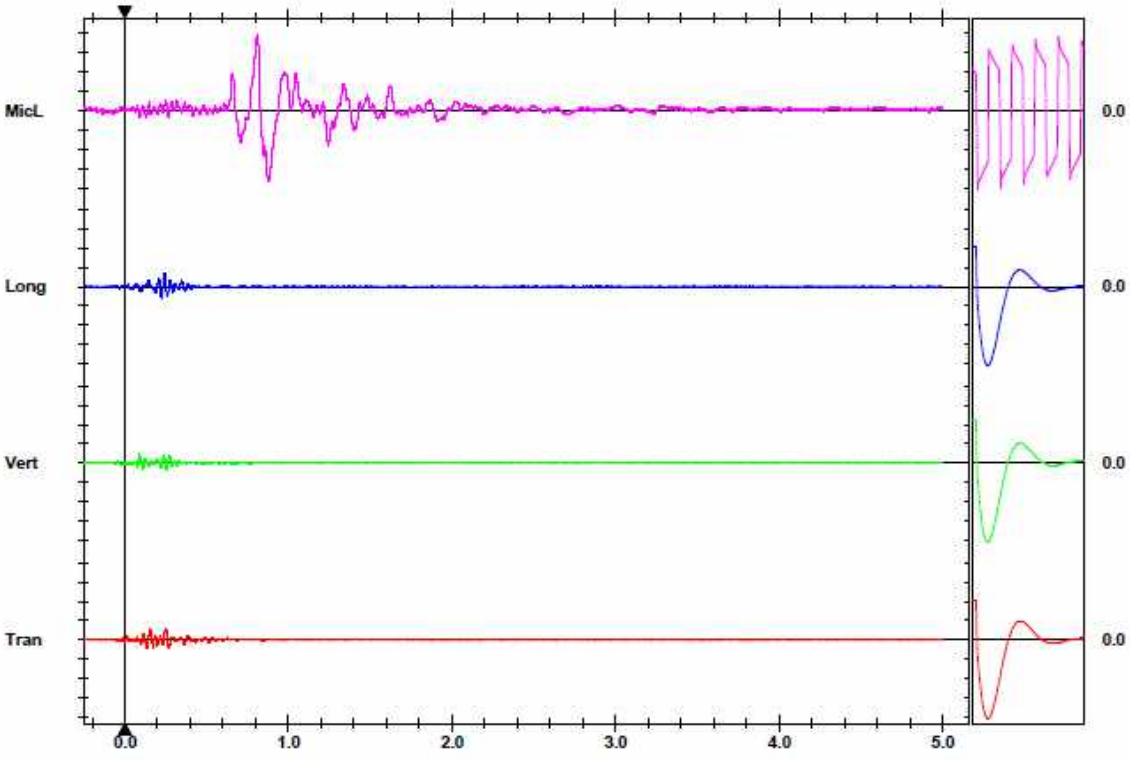
	Tran	Vert	Long	
PPV	1.135	0.906	1.387	mm/s
ZC Freq	22	28	27	Hz
Time (Rel. to Trig)	0.153	0.089	0.243	sec
Peak Acceleration	0.030	0.043	0.033	g
Peak Displacement	0.008	0.004	0.009	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	4.3	4.0	4.8	

Peak Vector Sum 1.648 mm/s at 0.244 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



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Sensor Check

Printed: September 9, 2021 (V 10.74)

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FFT Report

Date/Time	Tran at 16:56:11 September 1, 2021	**Serial Number**	UM17865 V 10-90 Micromate ISEE
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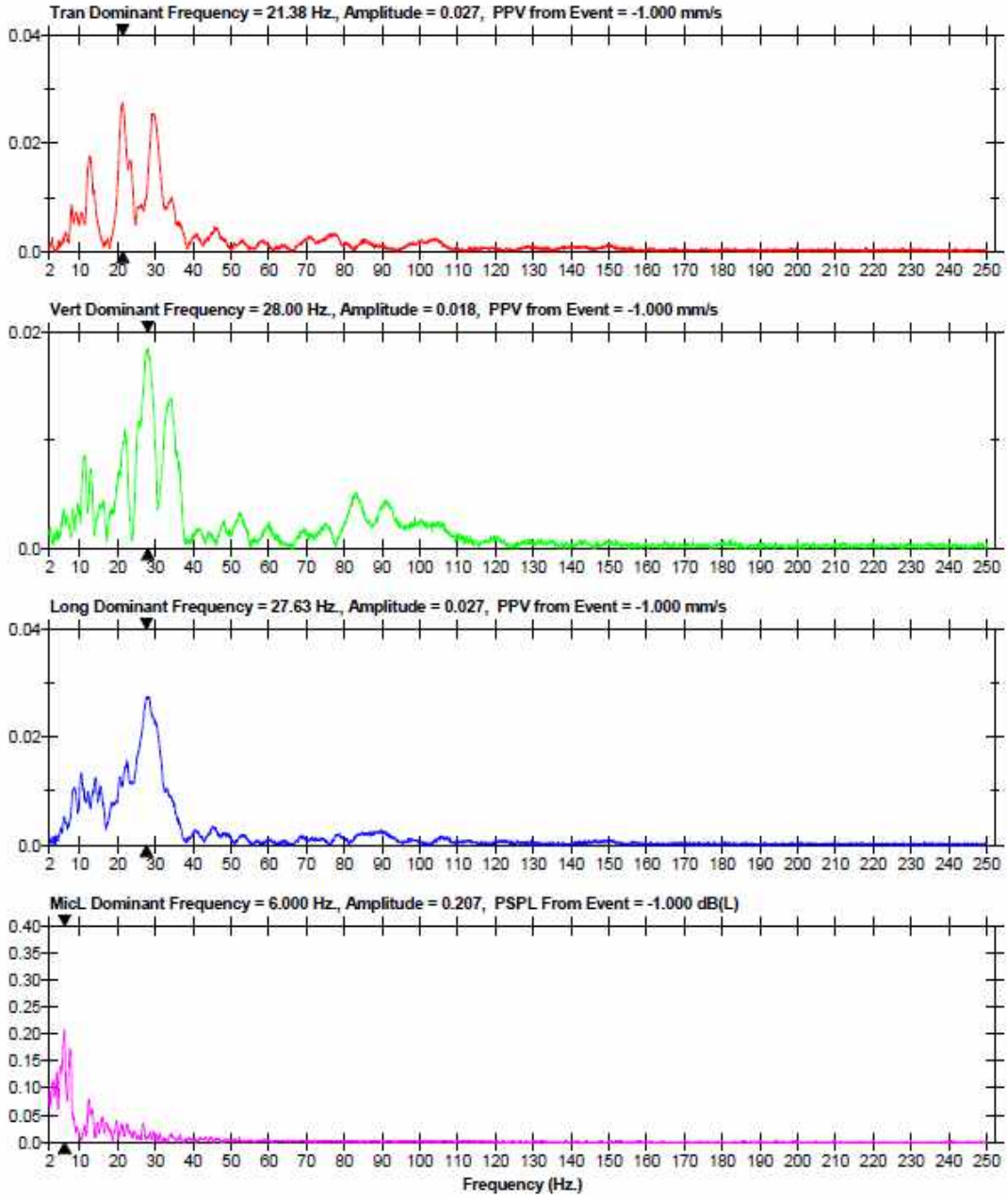
Range	Geo: 254.0 mm/s	**Unit Calibration**	April 16, 2021 by UES New Delhi
Record Time	5.0 sec at 2048 sps	**File Name**	UM17865_20210901165611.IDFW
Operator/Setup:	Operator/Micromate .MMB		

Notes
Location: On ground surface
Client: M/s Bayal Quartz and Feldspar Mine, Haryana
User Name: CSIR-CIMFR Dhanbad
General:

Extended Notes
SAdvice for designing of blasting parameters at Bayal quartz and feldspar mine, Haryana to control ground vibration and air overpressure within safe limit for the safety of surrounding houses/structures beyond 200 m with improved production and productivity.



Instantel

Event Report

Date/Time Tran at 16:55:44 September 1, 2021
Trigger Source Geo: 0.510 mm/s
Range Geo: 254.0 mm/s
Record Time 5.0 sec at 1024 sps

Serial Number BE18251 V 10.72-1.1 Minimate Blaster
Battery Level 6.3 Volts
Unit Calibration June 30, 2021 by CIMFR Dhanbad
File Name T251J4XB.0W0

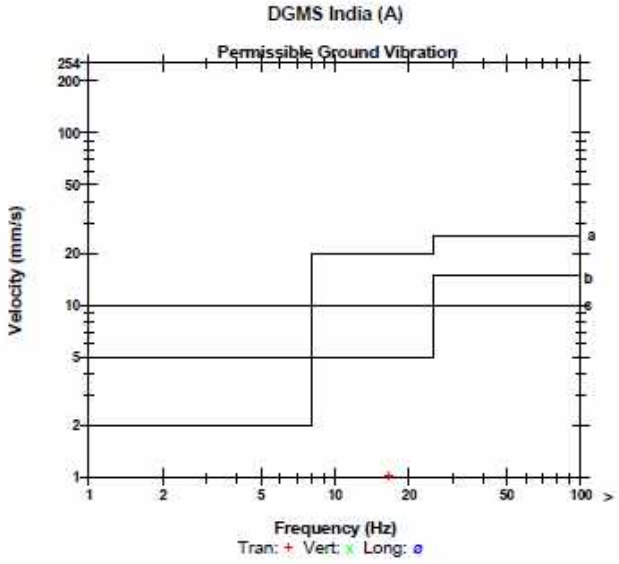
Notes
Location: On ground surface
Client: M/s Bayal Quartz and Feldspar Mine, Haryana
User Name: CSIR-CIMFR, Dhanbad
General:

Extended Notes
Advice for designing of blasting parameters at Bayal quartz and feldspar mine, Haryana to control ground vibration and air overpressure within safe limit for the safety of surrounding houses/structures beyond 200 m with improved production and productivity.

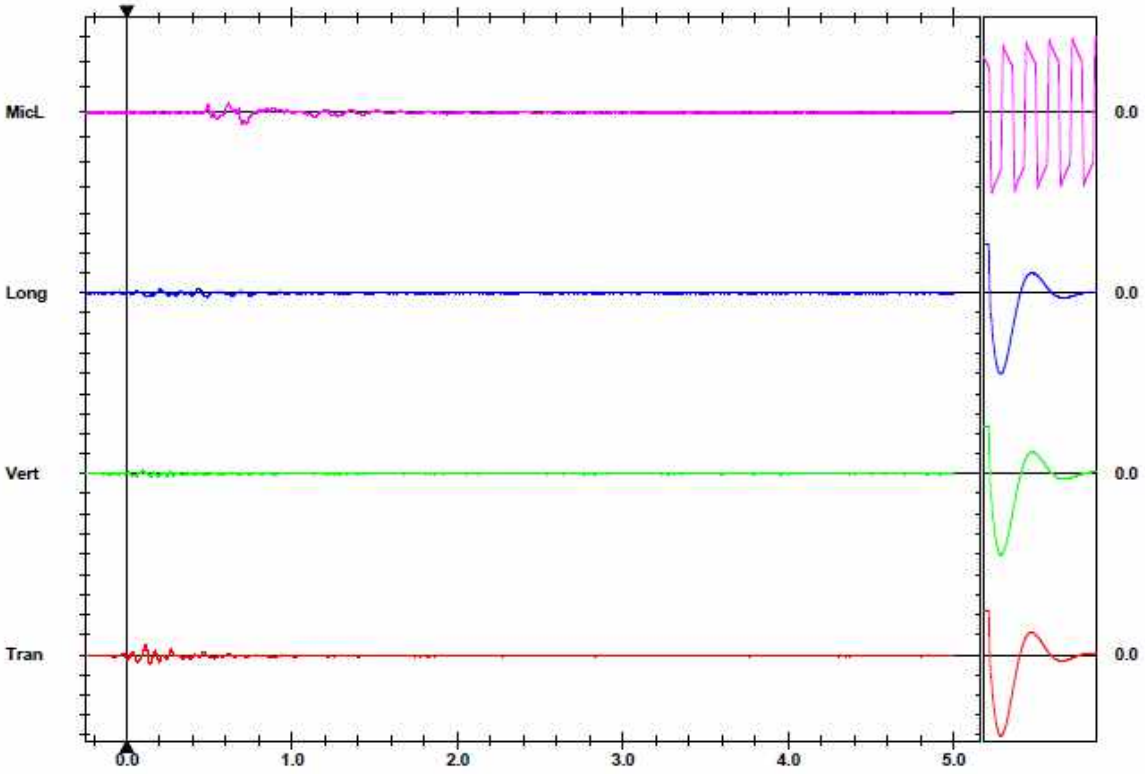
Microphone Linear Weighting
PSPL 107.5 dB(L) at 0.695 sec
ZC Freq 6.2 Hz
Channel Test Passed (Freq = 20.1 Hz Amp = 510 mv)

	Tran	Vert	Long	
PPV	1.016	0.381	0.508	mm/s
ZC Freq	17	51	13	Hz
Time (Rel. to Trig)	0.113	0.058	0.481	sec
Peak Acceleration	0.013	0.027	0.027	g
Peak Displacement	0.010	0.002	0.006	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.4	7.5	Hz
Overswing Ratio	3.7	3.8	4.1	

Peak Vector Sum 1.085 mm/s at 0.114 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 10.000 pa.(L)/div
Trigger =

Sensor Check

Printed: September 6, 2021 (V 10.74)

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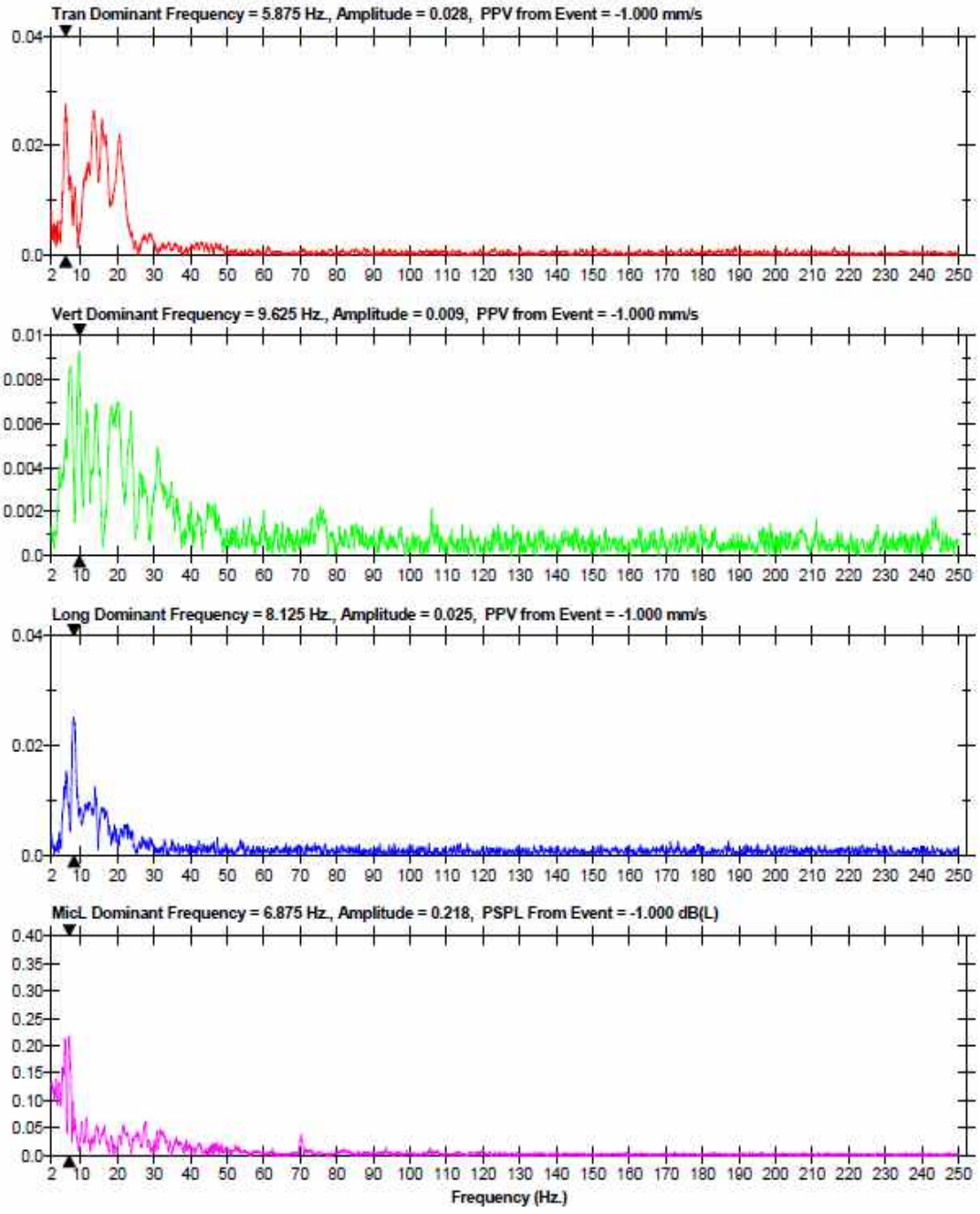
Instantel

FFT Report

Date/Time	Tran at 16:55:44 September 1, 2021	**Serial Number**	BE18251 V 10.72-1.1 Minimate Blaster
Trigger Source	Geo: 0.510 mm/s	**Battery Level**	6.3 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	June 30, 2021 by CIMFR Dhanbad
Record Time	5.0 sec at 1024 sps	**File Name**	T251J4XB.0W0

Notes
Location: On ground surface
Client: M/s Bayal Quartz and Feldspar Mine, Haryana
User Name: CSIR-CIMFR, Dhanbad
General:

Extended Notes
Advice for designing of blasting parameters at Bayal quartz and feldspar mine, Haryana to control ground vibration and air overpressure within safe limit for the safety of surrounding houses/structures beyond 200 m with improved production and productivity.



सीएसआईआर- केन्द्रीय खनन एवं ईंधन अनुसंधान संस्थान
CSIR-Central Institute of Mining and Fuel Research
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद / Council of Scientific & Industrial Research)
(अंतर्गत वैज्ञानिक तथा औद्योगिक अनुसंधान विभाग, विज्ञान और प्रौद्योगिकी मंत्रालय,भारत सरकार)
(Under the Department of Scientific & Industrial Research, Ministry of Science & Technology, Govt. of India)
बरवा रोड, धनबाद - 826015, झारखण्ड, भारत / Barwa Road, Dhanbad - 826015, Jharkhand, India
(आई एस ओ 9001 प्रमाणित संस्थान / ISO 9001 Certified Institute)

Speed post

To
Shri Pramesh Sangwan
Owner of the Mine
Bayal Quartz & Feldspar Mines
Huda Sector 1, Near Khaitanath Complex
House no. 196P
Narnaul, Mahendra Garh
Haryana- 123001

CIMFR/REE/Bayal/01/2024 /246
May 27, 2024

Subject: Submission of project report with reference to Blast vibration study conducted at Bayal Quartz & Feldspar Mines during February 07-11, 2024.

Dear Sir

Please find enclosed 2 copies of the report on "Advice for optimization of blast design parameters at Bayal Quartz & Feldspar Mines to control ground vibration and air overpressure within safe limit for the safety of surrounding houses/structures falling within 300 but beyond 100 m from the place of blasting".

The Customer Satisfaction & Evaluation form is also enclosed for your making. Kindly return back the said form to the undersigned after your remarks.

If you have any query, please feel free to write to us.

Thanking you,

Yours faithfully,

M L Roy 27/05/2024

(Dr. Murari P Roy)
Chief Scientist & Project Leader
Rock Excavation Engineering Division
CSIR-CIMFR, Dhanbad
E-mail: mproy@cimfr.nic.in & mproy14@yahoo.com

Encl.: a/a

CUSTOMER SATISFACTION EVALUATION UNIT
(Council of Scientific & Industrial Research)
NCL CAMPUS, Dr. HOMI BHABHA ROAD, PUNE – 411008
Telefax: (020) 2589 3104 Tel. (020) 2589 3718 e-mail: cseu@vsnl.com

CUSTOMER SATISFACTION FEEDBACK FORM

CSIR Laboratory Name: CENTRAL INSTITUTE OF MINING & FUEL RESEARCH, DHANBAD

Project Title: Advice for optimization of blast design parameters at Bayal Quartz & Feldspar Mines to control ground vibration and air overpressure within safe limit for the safety of surrounding houses/structures falling within 300 but beyond 100 m from the place of blasting.

Project Leader: Dr. Murari P Roy, Chief Scientist

Sponsor: Bayal Quartz & Feldspar Mines
Hoda, Narnaul, Mohindergarh
Haryana-123 001

Project ID No.: CNP/5236/2023-24

Project cost : Rs. 10,85,600/- (Including GST)

Project Completion Date (dd/mm/yyyy): 29.07.2025

Customer is requested to tick (✓) mark in the following format at the appropriate box

FEATURES	GRADES			
	A	B	C	D
Achieving the objectives As stated in agreement	More than that stated	As stated	Less than that stated but significant	Insignificant Achievement
Adherence to Work Plan As in Agreement OR as Reschedule	Ahead of schedule OR On schedule in spite of major constraints	On schedule	Behind schedule due to major constraints	Behind Schedule
Output accomplishment or performance improvement	Accomplishment as is committed, it meets the customer's business need with its application clearly defined	Accomplishment: as is committed, it meets the customers' business need but its application is not clearly defined	Accompli-shment: as committed but does not meet customer's business needs	Accomplishment in the report is not as committed in the proposal
Usability of the Innovation / output of the project	It is Readily Usable: has significant Impact and for a prolonged period	It is Readily Usable: has significant impact but not for Prolonged period	It is Readily Usable; but its use does not have significant impact	Innovation or Output is not Readily Usable

Name of the Customer:

Date: **Signature**

Confidential

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CSIR - CENTRAL INSTITUTE OF MINING AND FUEL RESEARCH

(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद/*Council of Scientific & Industrial Research)*

Barwa Road, Dhanbad – 826 001

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The Innovation Engine of India

Report on

ब्लास्टिंग की जगह से 300 मीटर के भीतर लेकिन 100 मीटर से अधिक दूरी पर आने वाले आसपास के घरों/संरचनाओं की सुरक्षा के लिए सुरक्षित सीमा के भीतर जमीन के कंपन और हवा के अधिक दबाव को नियंत्रित करने के लिए बयाल क्वार्ट्ज और फेल्डस्पार खदानों में ब्लास्ट डिजाइन मापदंडों के अनुकूलन की सलाह

Advice for optimization of blast design parameters at Bayal Quartz & Feldspar Mines to control ground vibration and air overpressure within safe limit for the safety of surrounding houses/structures falling within 300 but beyond 100 m from the place of blasting

प्रायोजक/Sponsor: **बायल क्वार्ट्ज़ एवं फेल्डस्पार खदान** */ M/s Bayal Quartz & Feldspar Mines*

PROJECT NO.: CNP/5236/2023-24 **MAY 2024**

सीएसआईआर - केंद्रीय खनन एवं ईंधन अनुसंधान संस्थान

CSIR - CENTRAL INSTITUTE OF MINING AND FUEL RESEARCH

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Barwa Road, Dhanbad – 826 001

Report on

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Advice for optimization of blast design parameters at Bayal Quartz & Feldspar Mines to control ground vibration and air overpressure within safe limit for the safety of surrounding houses/structures falling within 300 but beyond 100 m from the place of blasting

By

Dr. Murari P Roy	**Chief Scientist & Project Leader**
Mr. R. S. Yadav	**Sr. Technical Officer & Co-Project Leader**
Dr. V. K. Himanshu	**Senior Scientist**
Dr. R. K. Paswan	**Senior Scientist**
Mr. Suraj Kumar	**Technical Officer**
Mr. A K Vishwakarma	**Technical officer**
Dr. C. Sawmliana	**Chief Scientist & HoS**
Prof. A. K. Mishra	**Director, HORG & Project Co-ordinator**

PROJECT NO.: CNP/5236/2023-24 **MAY 2024**

Project Title

ब्लास्टिंग की जगह से 300 मीटर के भीतर लेकिन 100 मीटर से अधिक दूरी पर आने वाले आसपास के घरों/संरचनाओं की सुरक्षा के लिए सुरक्षित सीमा के भीतर जमीन के कंपन और हवा के अधिक दबाव को नियंत्रित करने के लिए बयाल क्वार्ट्ज और फेल्डस्पार खदानों में ब्लास्ट डिजाइन मापदंडों के अनुकूलन की सलाह

Advice for optimization of blast design parameters at Bayal Quartz & Feldspar Mines to control ground vibration and air overpressure within safe limit for the safety of surrounding houses/structures falling within 300 but beyond 100 m from the place of blasting

Project No.: CNP/5236/2023-24

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SIGNATURE OF THE PROJECT PROPONENTS

(Rama Shankar Yadav) Sr. Technical Officer and Co-Project Leader	(Murari Prasad Roy) Chief Scientist and Project Leader	(C Sawmliana) Chief Scientist & HoS

CSIR-CIMFR AUTHORISED SIGNATORIES

(Niraj Kumar) Sr. Principal Scientist and HoS, Project Planning and Monitoring	(J K Pandey) Chief Scientist and Co-ordinator, Project Planning and Industry Interface

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EXECUTIVE SUMMARY

This report relates to the scientific study conducted by CSIR- Central Institute of Mining & Fuel Research (CIMFR), Dhanbad to study and advice for optimization of blast design parameters at Bayal Quartz and Feldspar Mines to control ground vibration and air overpressure within safe limits for the safety of structures in the periphery of the mine with improved production and productivity. The study involved monitoring of impact of blast conducted with varying blast designs and charging patterns on the nearby structures and in the periphery of mine. The results of investigation, analyses of data and recommendations, made thereof, are summarised below:

- Altogether, twenty-three blasts were conducted at different benches of the 'A' Block and 'B' Block of Bayal Quartz and Feldspar Mines and attempt were made to record 68 blasts induced ground vibration data.
- Maximum vibration (in terms of peak particle velocity, PPV) of 12.33 mm/s with associated dominant peak frequency of 23.25 Hz was recorded at 2nd bench towards Bayal weigh bridge (at 84 m) in all the trial blasts. In this blast, the explosives weight per delay and total explosive detonated were 125 kg and 750 Kg respectively. The PPV recorded at 150 m from the same blast at Bayal mine Work shop was 6.140 mm/s with dominant peak frequency of 24.25 Hz.
- Maximum vibration recorded at different residential structures not belonging to Mine owner due to blast conducted at 'B' Block of Bayal Quartz and Feldspar Mines was 4.280 mm/s with associated dominant peak frequency of 17.0 Hz. The monitoring location was Bhomiya Baba Temple at a distance of 240 m from the blast location. The explosives weight per delay and total explosive detonated were 135 kg and 1625 Kg respectively.
- Maximum vibration of 4.589 mm/s with associated dominant peak frequency of 12 Hz was recorded at 2nd bench within mine right side of the face (at 82 m) in all the trial blasts. In this blast, the explosives weight per delay and total explosive detonated were 46 kg and 413 Kg respectively.
- Maximum vibration recorded at different residential structures not belonging to Mine owner due to trial blast conducted at 'A' Block of Bayal Quartz and Feldspar Mines was 3.988 mm/s with associated dominant peak frequency of 28.19 Hz. The monitoring location was behind Jeen Mata Temple (beside stairs) at a distance of 127 m from the blasting face. The explosives weight per delay and total explosive detonated were 50 kg and 350 Kg respectively.
- The air overpressure/noise recorded were in the range of 91.77 dB(L) to 123.9 dB(L). The maximum air over-pressure recorded was 123.9 dB(L) at 250 m due to the blast conducted at 4th Bench of 'B' Block. In this blast, explosives detonated in a blasting round and explosive weights per delay were 1525 kg and 127 kg respectively. Proper stemming and the Nonel initiation system reduce the air over-pressure to a greater extent and improves the blasting performance too.

- There was no ejection of flyrock in any of the blast. Pyrotechnic (Nonel) Initiation systems were used to conduct all the twenty-three blasts. Nonel initiation systems have advantage in detonation of blast holes from the bottom of the hole at floor levels if the detonators are placed accordingly.

- All the recorded data (blast vibrations, air over pressures and flyrock) were well within the safe limits at the concerned houses/structures. The dominant peak frequencies of ground vibrations were in the range of 8.375 to 77.5 Hz. The analyses of blast vibration frequencies confirmed that concentration of dominant frequencies were in between 9.25 Hz and 27.88 Hz. **Hence, the safe level of vibration has been taken as 10 mm/s for the houses/structures not belonging to the owner and for 15 mm/s for structures belonging to owner as per DGMS standard**. **Additionally, the safe level of vibration for the sensitive structure (temple) may be considered as 5 mm/s.**

- The propagation equation for the prediction of blast vibration has been established at 95% confidence level and given as Equation 1. The permissible explosive weight per delay may be computed from the Equation to contain vibration within safe limit for distances of houses/structures concerned. For convenience, the recommended explosive weight per delay and Total explosive weight has been computed and is given in Table A3 & Table A5. For ready reference, the predicted value of PPVs with respective maximum explosive weight per delay is given in Table A4.

- The delay interval between the holes in a row should be 17ms whereas between the rows, it should be 42ms /59ms/67ms or more depending upon the number of rows and effective burden in front of the particular hole. If the numbers of rows are more than two, the delay interval between rows should be increased by 20% in successive rows.

- The recommended blast designs should be followed for day-to-day blasting operations for safe and efficient blasting operations. The blast designs Annexure as Figures A1-A6, will ensure the safety of the houses/structures, life of human beings and other property in the periphery of the mines.

1. Introduction

The management of M/s Bayal Quartz and Feldspar Mine, Narnaul, Haryana entrusted CSIR-Central Institute of Mining & Fuel Research (CIMFR), Dhanbad through E-mail dated December 12, 2023 for a scientific study and advice for optimization of blast design parameters at Bayal Quartz and Feldspar Mine to control ground vibration and air overpressure within safe limits for the safety of structures in the periphery of the mine with improved production and productivity.

The team of Rock Excavation Engineering Research Group of CSIR- Central Institute of Mining & Fuel Research, Dhanbad carried out field investigations during February 07-11, 2024. Altogether, 23 blasts were conducted and 64 blast induced ground vibration and air over-pressure/noise data were recorded at various locations in the periphery of the 'A' Block and 'B' Block of the Bayal Quartz and Feldspar Mine, Narnaul, Haryana.

2. Location and Geology

The mining lease area is in Bayal village, Mahendragarh district, Haryana. The lease area can be approached by road from Narnaul via SH-17 up to Nangal Chaudhry and thereafter by MDR. The mining lease area is in Bayal village, Mahendragarh district. Rajasthan Haryana state border is adjacent to the site. The lease area is not continuous but is segregated in north and south blocks by 600 m. The rocks exposed in the proposed area and surrounding areas belong to Alwar Series of Delhi super group. Quartzite associated with vein of Quartz and Feldspar belongs to Alwar series of Delhi system are exposed in the area. The sequence of rock formations belonging to Delhi Super group are found in the lease area have Alluvium, Quartz mixed with Quartzite, Feldspar mixed with Quartzite, Amphibolites and Micaceous Phyllite with Quartzite. Micaceous phyllite is the country rock in this area. The quartz has intruded in to the country rock i.e. micaceousphyllite and quartzite and is itself sheared at the margins.

The general strike of the quartzite formation is N20°-25° E to S20°-25°W with dips of 45° to 60° due East. The strike and dip of the quartize bands is not uniform since there are structural disturbances and intrudes and mix with Quartz and Feldspar. The lease area is consisting of ridges and valleys. The highest point in the lease area is recorded to be 480 mRL and lowest point recorded is 370 mRL. The lease area does not have any water body. There are dry nalas in which water flows during rains for a short duration, otherwise they remain dry for the rest of the months. The rain water from these nalas drains either into local Johars or in agriculture fields. The overview of Mining site from the top benches of 'A & B' Block of Bayal Quartz and Feldspar Mines, Narnaul, Haryana is presented in Photograph 1.

Photograph 1. The overview of Mining site of 'A' Block and 'B' Block of Bayal Quartz and Feldspar Mines, Narnaul, Haryana.

3. Instrumentations

Blast induced vibrations were monitored by seismographs namely Micromate, MiniMate and MiniMate Blaster (Made in Canada by M/s Instantel Inc.). MiniMate is eight as well as four channels seismographs provided with two/one tri-axial transducer(s) for monitoring of vibration (in mm/s) and two/one channel(s) for monitoring of air over-pressure/noise in dB(L). MiniMate Blaster and Micromate are four channels seismographs provided with one tri-axial transducer for monitoring vibration (in mm/s) and one channel for monitoring of air over-pressure/noise in dB(L). All the seismographs record vibration in three directions i.e. Longitudinal (L), Vertical (V) and Transverse (T). They also record principal frequency of vibration and compute the peak vector sum of the vibration.

4. Blasting details

Twenty-three (23) blasts including eighteen blasts in 'B' block and rest Five blasts in 'A' block were conducted during the study period. The number of blast holes detonated in production blasting varied from 5 to 15. The diameters of blast holes were 120 mm. The depth of blast holes varied from 6 to 18 m and the explosives loaded in a hole varied from 30 to 135 kg. The explosives weight per delay ranged between 30 and 135 kg. Total explosive weight detonated in a blast round varied between 350 and 1625 kg. The vibration measuring distances varied from 82 to 588 m. Details of blast design parameters experimented during the period of investigation are given in Annexure as Table A1.

Vibrations were monitored in terms of peak particle velocity (PPV) that varied from 0.582 to 12.33 mm/s at 'B' Block and 0.676 mm/s to 4.589 mm/s at 'A' Block depending upon the distance of measuring transducers of seismographs from the blasting face and the total weight

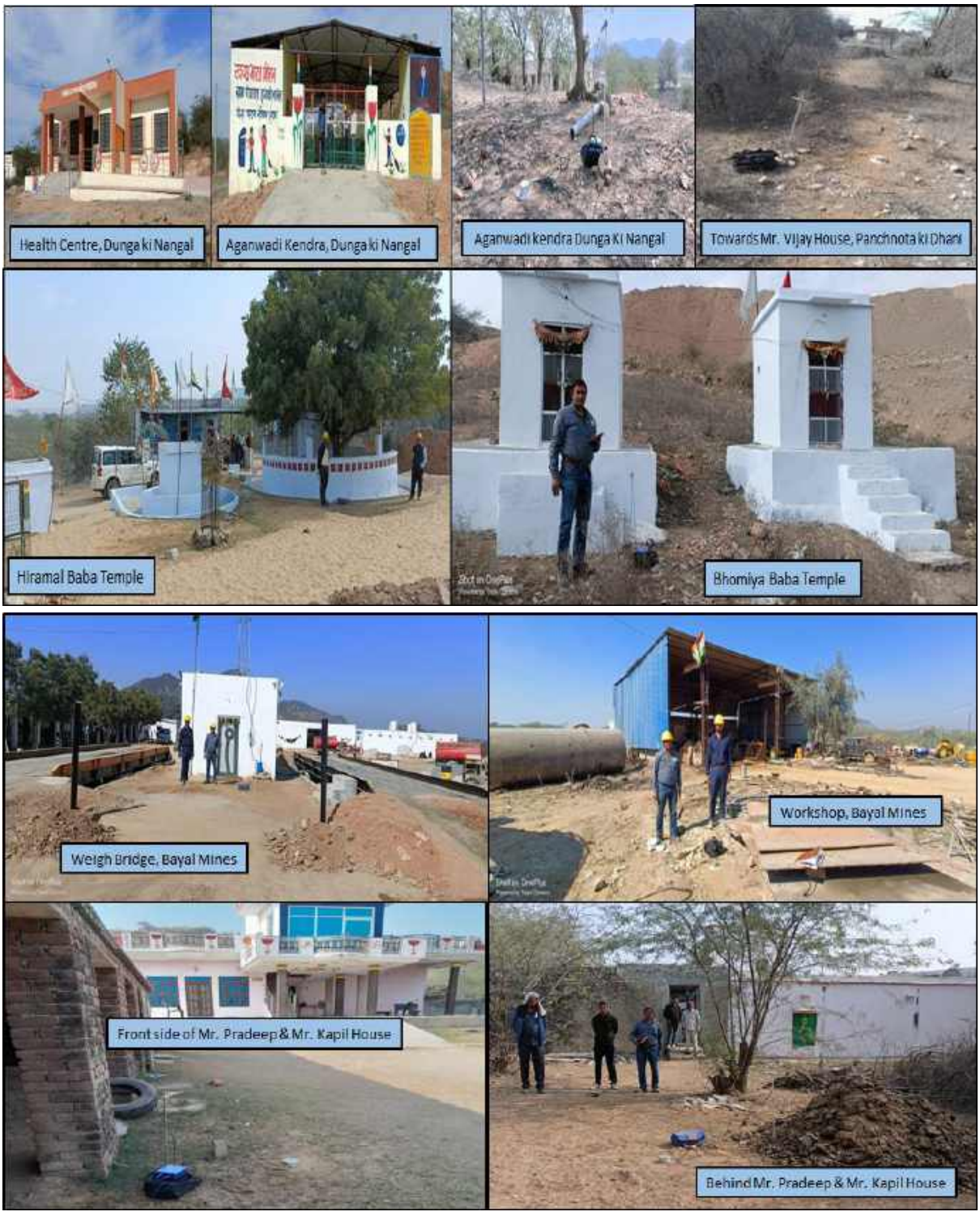
of explosives detonated in particular delay of the blast. The recorded levels of air over-pressure ranged from 91.77 dB(L) to 123.9 dB(L). Recorded blast induced ground vibrations and air over-pressure are presented in Annexure as Table A2.

There was no ejection of flying fragments and back breaks recorded in any blast. The location of the first rock movement, the profile of the face movement and ejection of rock, if any, were monitored for each blast with the help of video camera. Photograph 2 depicts the view of the charging and connection of the blast face at 'A' Block and 'B' Block of Bayal Quartz & Feldspar Mines.

Photograph 2. View of the charging and connection of the blast conducted at 'A' Block and 'B' Block of Bayal Quartz & Feldspar Mines.

4.1 Monitoring of Ground Vibration and Air Overpressure/Noise

Blast induced ground vibration and air overpressure/noise were monitored by placement of seismographs near different surface structures in and around the 'A' Block and 'B' Block of Bayal Quartz and Feldspar Mines. The seismographs were placed at different locations viz. at 'B' Block: Donga Ki Nangal Anganwadi Kendra, Panchnota Ki Dhani towards Mr. Vijay House, Hiramal Baba Temple, Bhomiya Baba Temple, Weigh Bridge, Workshop, Front and back side of Mr. Pradeep & Kapil house and at 'A' Block: Jeen Mata temple, Behind Jeen Mata Temple towards Bayal village, Weighing Bridge and second Bench towards mine office as shown in Photograph 3 and photograph 4 respectively.



Photograph 3. Monitoring of blast vibration at different houses structures near 'B' Block of Bayal Quartz and Feldspar Mine, Haryana.

Photograph 4. Monitoring of blast vibration at different structure of 'A' Block of Bayal Quartz and Feldspar Mine, Haryana.

5. Analyses of recorded vibration data

Ground vibrations data recorded were grouped together for statistical analysis. An empirical relationship has been established correlating the maximum explosives weight per delay (Q_{max} in kg), the distance of vibration measuring transducers from the blasting face (R in m), and recorded peak particle velocity (V in mm/s). The established equation for Bayal Quartz & Feldspar Mine (A & B Blocks) is presented as equations:

$$V = 233.9\left[\frac{R}{\sqrt{Q_{max}}}\right]^{-1.224} \qquad \text{(Equation 1)}$$

Correlation co-efficient (R) = 86.3 %

Coefficient of determination (R^2) = 0.745

Where,

V = Peak particle velocity (mm/s)

R = Distance between vibration monitoring point and blasting face (m)

Q_{max} = Maximum explosive weight per delay (kg)

The above equation is site specific and applicable only for 'A' block and 'B' block of M/s Bayal Quartz and Feldspar Mine, Narnaul, Haryana. It may be used to compute the maximum explosive weight to be detonated in a delay for distances of concerned structures from the blasting site. For convenience, the recommended explosive weight per delay has been computed and is given in Table A3. The regression plot of vibration data recorded at their respective scaled distances is presented in Figure 1.

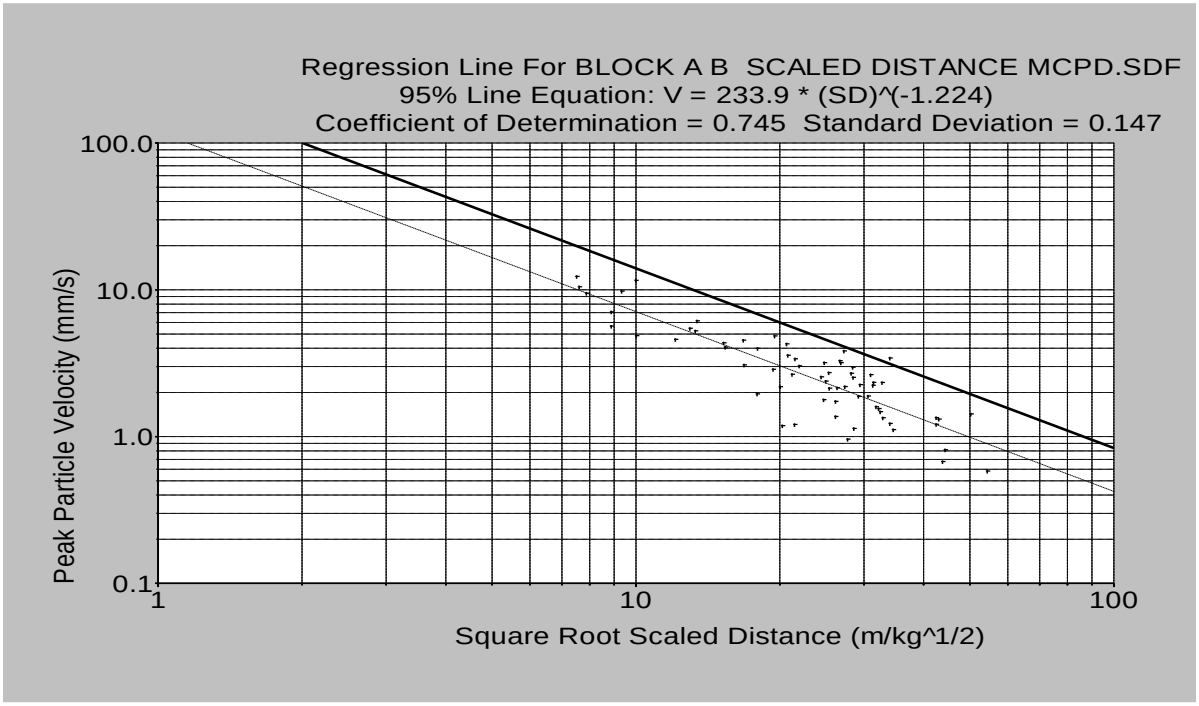


Figure 1. Regression plot of recorded PPV with their respective scaled distances.

5.1 Frequency of blast vibration

The dominant peak frequencies of ground vibrations were in the range of 83.375 to 77.5 Hz. Fast Fourier Transform (FFT) analyses of blast vibration frequencies confirmed that concentration of dominant frequencies was in between 9.25 Hz and 27.88 Hz. The plot of recorded dominant frequencies at various distances is presented in Figure 2. Most of the vibration measuring stations were on compact ground surfaces.

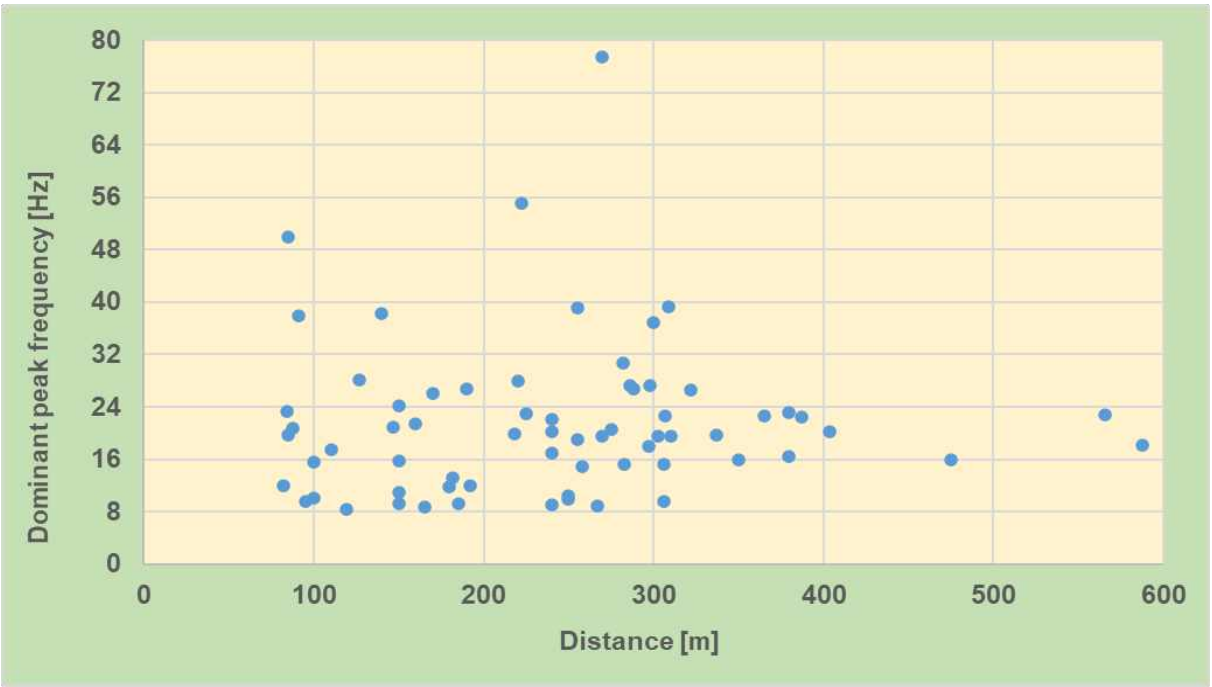


Figure 2. Plot of dominant frequencies of blast waves recorded at various locations in the periphery of the Bayal Quartz and Feldspar Mine, Haryana.

The blast wave signature recorded behind the Jeen Mata Temple besides stairs at 127 m due to blast conducted at 'A' block is depicted in Figure 3. The Fast Fourier Transform (FFT) analysis of frequencies of the vibration signatures shown in Figure 3 is depicted in Figure 4. The blast wave signature recorded at 240 m near Bhomiya Baba Temple due to the blast conducted at 'B' block is presented in Figure 5. The Fast Fourier Transform (FFT) analysis of frequencies of the vibration signatures shown in Figure 5 is depicted in Figure 6.

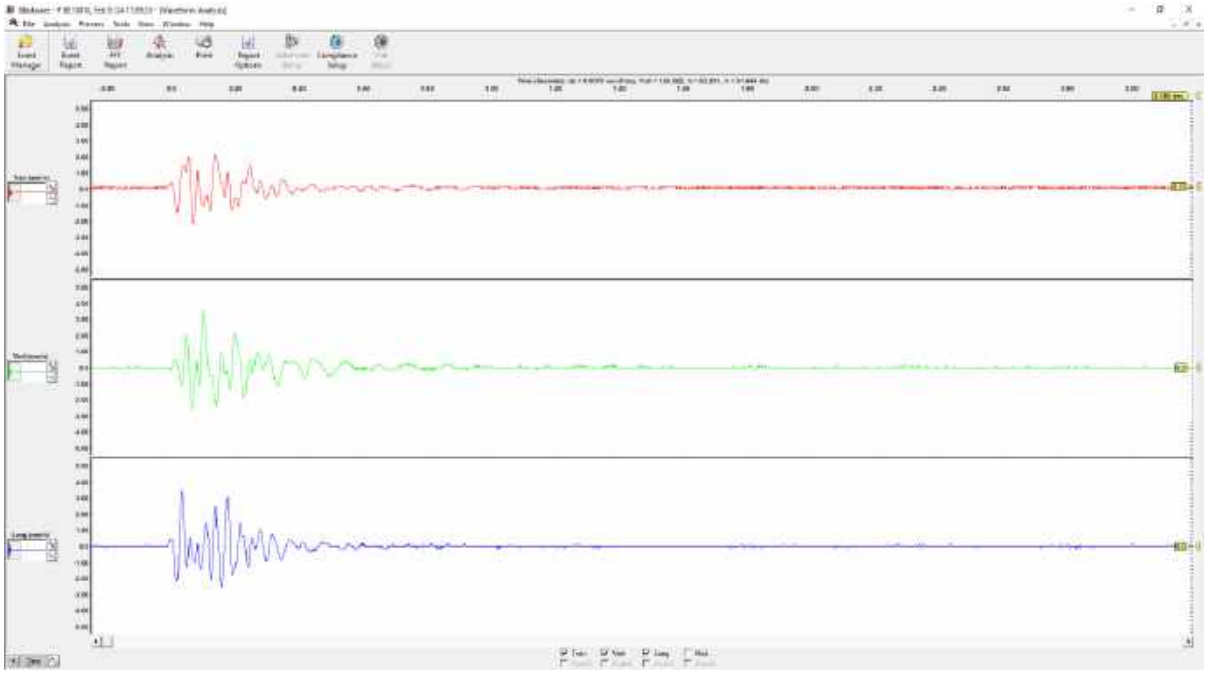


Figure 3. Blast wave signature recorded at 127 m from the blast conducted at 'A' Block of Bayal Quartz and Feldspar Mines on 09.02.2024.

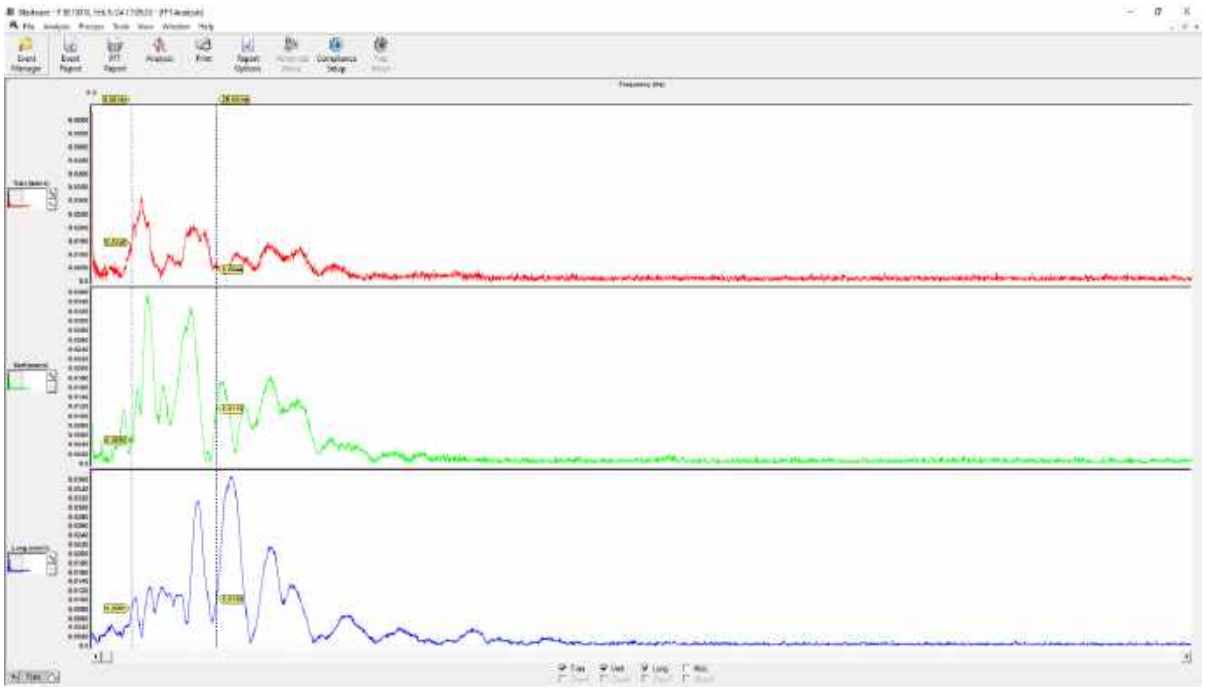


Figure 4. FFT analyses of frequencies of vibration presented in Figure 3.

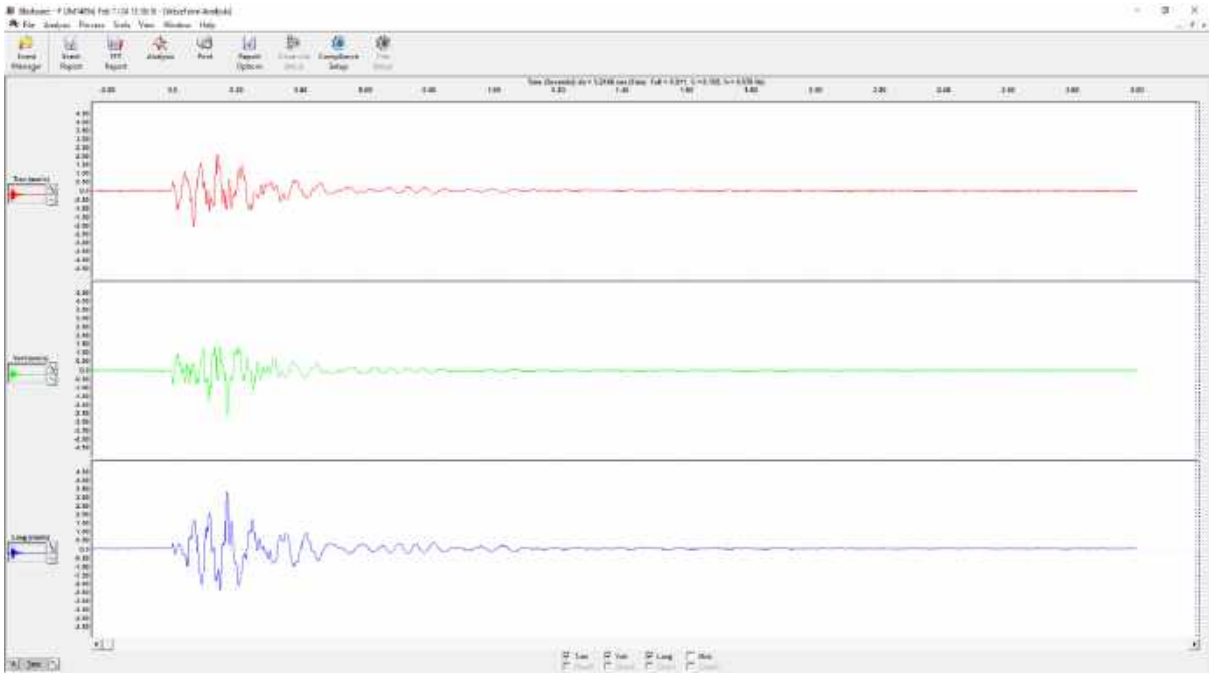


Figure 5. Blast wave signature recorded at 240 m from the blast conducted at 'B' Block of Bayal Quartz and Feldspar Mines on 07.02.2024.

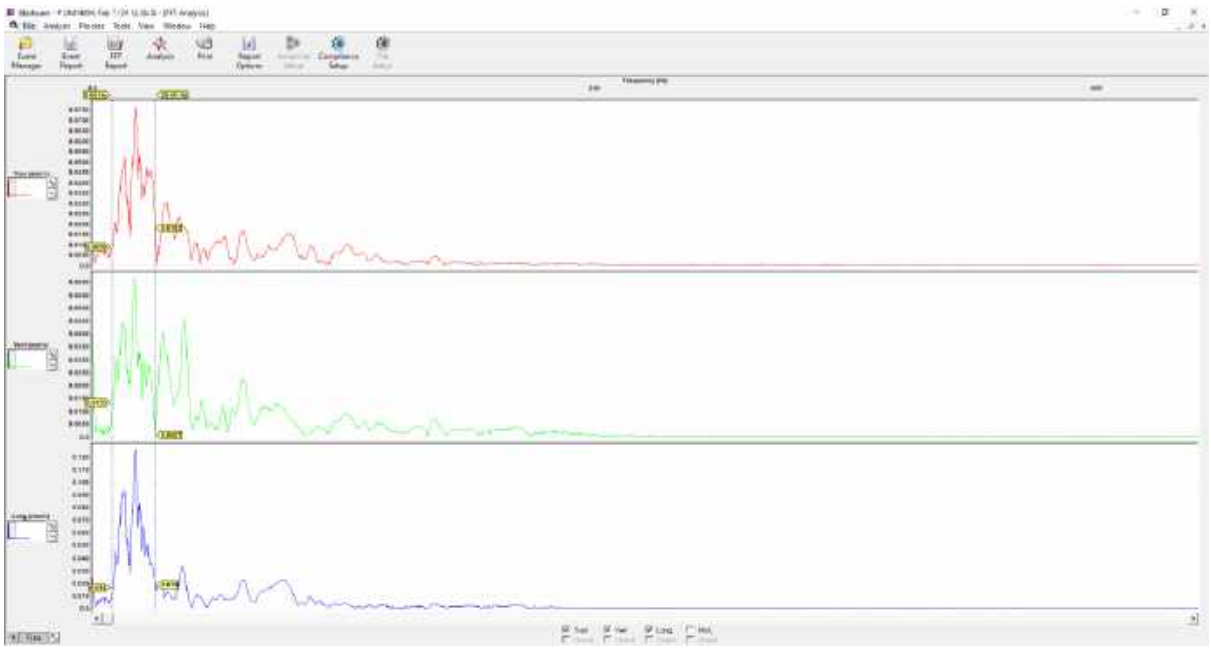


Figure 6. FFT analyses of frequencies of vibration presented in Figure 5.

6. Existing vibration standard and criteria to prevent damage

Peak particle velocity (PPV) has been globally used in practice for assessment of blast induced damage to the structures. Different countries adopt different standards depending on their type of industrial/residential buildings. In India, presently DGMS technical circular 7 of 1997 is considered as vibration standard for the safety of surface structures in mining areas. The DGMS standard is given in Table 1.

Table 1. DGMS technical circular 7 of 1997 concerning to blast vibration standard in mm/s.

Type of structure	Dominant excitation frequency, Hz		
	< 8 Hz	8-25 Hz	> 25 Hz
(A) Buildings/structures not belong to the owner			
1. Domestic houses/structures (Kuchcha, brick & cement)	5	10	15
2. Industrial buildings	10	20	25
3. Objects of historical importance and sensitive structures	2	5	10
(B) Buildings belonging to owner with limited span of life			
1. Domestic houses/structures	10	15	25
2. Industrial buildings	15	25	50

7. Air over-pressure/noise and Standards

Air blast overpressure in the mining or quarrying context is the superposition of a number of impulsive air pressures as a result of the detonation of explosive in the ground. Air over-pressure can be measured in pressure unit as well as sound pressure level (SPL).

$$SPL\ (dB) = 20 \log (p/p_o) \quad \text{.... (2)}$$

Where,

p = measured over-pressure in Pascal (pa)

p_o = reference pressure level of the lowest sound that can be heard, i.e.,

zero dB = 2×10^{-5} pa.

The maximum air over-pressures recorded was 123.9 dB(L) at 250 m from the blast conducted at the 4th bench of 'B' Block, M/s Bayal Quartz and Feldspar mines. Air overpressure generated due to blasting generally causes minor structural damage such as glass window breakage. No major structural damage is usually reported due to air overpressure unlike in the case of ground vibration. Presently, no standard / regulation or guidelines are available in India by the regulatory agencies regarding the permissible levels of air overpressure and noise from blasting operation. The typical air overpressure limits as given by Oriard (2002) and the limits recommended by United States Bureau of Mines (USBM) for surface mine blasting are given in Table 2 and Table 3 respectively. Table 4 shows Central Pollution Control Board (CPCB), India's permissible levels for noise exposure for work zone area as prescribed under Model Rules of Factories Act, 1948.

Table 2. Typical air overpressure criteria (After Oriard, 2002)

171 dB	General window breakage
151 dB	Occasional window breakage
140 dB	Long-term history of application as a safe project specification
134 dB	Bureau of Mines recommendation a study of large-scale surface mine blasting

Table 3. Air overpressure limits recommended by USBM for surface mining (RI 8485)

134 dB	0.1 Hz high pass measuring system
133 dB	2.0 Hz high pass measuring system
129 dB	6.0 Hz high pass measuring system
105 dB	C-slow weighting scale on a sound level meter
(Events less than or equal to 2 – sec duration)	

Table 4. Central Pollution Control Board (CPCB) permissible levels for noise exposure for work zone area.

Peak sound pressure in dB	Permitted number of impulse or impact/day
140	100
135	315
130	1000
125	3160
120	10000

Note: *1. No exposure in excess of 140 dB peak sound pressure level is permitted.*

2. For any peak sound pressure level falling in between any figure and the next higher or lower figure as indicated in column 1, the permitted number of impulses or impacts per day is to be determined by extrapolation.

8. Flyrock occurrence and control measures

Flyrock are the undesirable ejection of rock particles projected beyond the normal blast area. It is generated when there is insufficient stemming, too much explosive energy for a fixed amount of burden, or poor delay timing pattern, or explosives loaded in voids, mud seams.

The primary means of controlling flyrock is through proper blast design and optimum delay timing between two detonations. Any pattern which over-confines the explosives or one with insufficient stemming tends to cause material to be thrown up in the air rather than allowing any horizontal movement. None of the blasts ejected flying fragments. The detonation of blast was very ideal and achieved blasting face was without back breaks in most of the blasts. It was demonstrated and experiment that stemming to burden ratio of 0.7 or more did not cause ejection of flying fragments. Hence, to reduce the generation of boulders from the top portion of the face, stemming length should be 0.7 times of burden.

8.1 Flyrock Results and Observations

In all the experimental blasts, no flying fragments were observed or recorded. The throws of the blasted materials were also controlled and restricted within the blasting area only. The control of flyrock was achieved mainly by implementing proper blast design patterns along with their strict supervision and guidance of the total blasting operations. On the basis of observations made during field investigations as well as from the analyses of data, the

following suggestions and recommendations are made, as additional precautions for future, to control flyrock.

- The primary means of controlling flyrock is through proper blast design and delay timing. The consistency of the burden, especially the front row burden (distance between the first rows to free face) should be maintained properly.
- While loading a shot, the blaster must be aware of his true powder factor in terms of the amount of explosive to be charged for the quantity of rock to be fragmented. Charging of excessive explosive quantity should be avoided.
- The blasting site should always be inspected before marking the holes. If any open joints and bedding planes are present in the bench, an adjustment should be made in the drilling pattern.
- The holes should be drilled in conformity of the face. Wherever possible, vertical holes should be preferred against the inclined holes.
- Before loading, blasting officials should always check the blasthole depths and ensure that the holes are drilled as per the blast design.
- Any change in the blast design should carefully be considered from the standpoint of its potential effect on flyrock.
- All loosened pieces of the rock from the blasting site should be cleared before charging. Statutory provisions should be strictly implemented.

9.0 Suggested Controlled Blast Design Parameters

Based on the frequency of ground vibration recorded during the experimental trials, the safe limits of ground vibration for the safety of structures available near ‘A’ Block and ‘B’ Block of Bayal Quartz and Feldspar Mines is 10 mm/s and 15 mm/s for the structure not belonging and belonging to the owner respectively based on DGMS standard. The said standard further suggested the safe limit of vibration for the safety of sensitive structures (Temple) as 2 mm/s and 5 mm/s, if the dominant peak frequency lies within 8 Hz and in between 8-25 Hz.

The safe blasting parameters has been developed based on computed results. Details of the recommended blast design parameters is given in Table 5. The Cartridge explosive and Nonel should be used for controlled blasting operations at the mine. Detonating cord may be used to connect explosives deck (Down-the-hole delay) in order to provide same delays for better fragmentation. The delay between two holes in a row (Inter Hole Delay) should be 17ms or 25ms and the delay between two rows (Inter-Row Delay) should be minimum of 42ms. This Inter-Row delay should be increased in a sequential way i.e., 42ms, 59ms, 67ms, 84ms etc. depending on numbers of rows to be blasted.

Drill cuttings were used for stemming materials and found to be very effective for controlling flyrock. Flyrock was completely controlled in all the trial blasts. However, it is also recommended to use muffing arrangement for the blasting zone of 100 to 200 m from the residential houses. For muffling arrangement, each hole can be covered with either using conveyor belts or wire-mesh along with two or three sandbags.

Table 5. Details of the recommended blast design parameters for different distance of the house/structures from the blasting locations.

Blast design parameters	**Distance of sensitive structures and domestic houses/structures from the blasts**					
	Safe limit of vibration – 5 mm/s	**Safe limit of vibration – 10 mm/s**				
	100 – 200 m	**100 – 200 m**	**200-300 m**	**300-500 m**	**More than 500 m**	
Bench height/ Hole depth (m)	4.0/4.3	6.0/6.5	8/8.5	10/10.5	12/13	15/16
Hole diameter (mm)	100	100	100	100	100 to 115	115 to 160
Burden (m)	2	2.5	2.5	2.5	2.5	2.5
Spacing (m)	3	3.0	3.0	3.0	3.0	3.0
Pattern of holes	Staggered	Stagg-ered	Stagg-ered	Stagg-ered	Staggered	Staggered
No. of rows	1	1	1-2	1-3	1-3	1-3
No. of holes	8	10	15	15	15	20
Maximum charge/ delay (kg)	16.7 – 25	27.5-33.3	41.7-47.2	47.2-52.8	58.3-63.9	66.7-75
Total charge per round (kg)	133-200	275-333	626 - 708	708-792	875- 959	1334 - 1500
Initiation System	Nonel	Nonel	Nonel	Nonel	Nonel	Nonel

10. Human response to blasting

The tolerance and reactions of human beings to vibrations are important when standards are based on annoyance, interference, work proficiency and health. Human beings notice and react to blast induced vibrations at levels that are lower than the damage thresholds.

It is impossible to establish a vibration level where nobody will complain. There are always some persons in a population who will complain no matter how small the disturbance is. Several researchers recognized that the duration of the vibration was critical. Most evident was that a higher level could be tolerated if the event was of short duration. Consequently, steady state vibration data could not be realistically applied to blasting except for events that exceed several seconds duration.

11. Causes of cracks in structures other than blasting

Most structures have cracks of some kind due to normal environmental stress. When blasting comes in to the area it usually gets credit for these environmentally induced cracks. Cracking is a normal occurrence in the walls and ceilings of structures, and the causes are multiple, ranging from poor construction to normal environmental stress, such as thermal stress, wind etc. The Small Home, Published by the Architects Small Home Services, Bureau of the United State Bureau of Mines, US gave a list of reasons for the development of crack in the buildings other than blasting. These are as follows:

- Failure to make the footings wide enough.
- Width of footings not made proportional to loads to carry.
- The posts in the basement not provided with separate footings.
- Not enough cement used in the concrete.
- Dirty sand or gravel used in the concrete.
- Failure to protect beams and sills from rotting through dampness.
- Setting floor joists one end on masonry and the other end on wood.
- Wooden beams used to support masonry over openings.
- Braces omitted in wooden walls.
- Drainage water from roof not carried away from foundations.
- Sub-flooring omitted.
- Poor materials used in plasters.
- Plaster applied too thin.
- Metal reinforcement omitted in plaster at corner.
- Sub-soil drainage not carried away from walls.
- First coat of plaster not properly keyed to backing.
- Floor joints placed too far apart.
- Wood beams spanned too long between posts.
- Failure to use double joists under unsupported partitions.

12. Conclusions and recommendations

❖ Maximum vibration (in terms of peak particle velocity, PPV) of 12.33 mm/s with associated dominant peak frequency of 23.25 Hz was recorded at 2nd bench towards Bayal weigh bridge (at 84 m) in all the trial blasts. In this blast, the explosives weight per delay and total explosive detonated were 125 kg and 750 Kg respectively. The PPV recorded at 150 m from the same blast at Bayal mine Work shop was 6.140 mm/s with dominant peak frequency of 24.25 Hz.

❖ Maximum vibration recorded at different residential structures not belonging to Mine owner due to blast conducted at ‘B’ Block of Bayal Quartz and Feldspar Mines was 4.280 mm/s with associated dominant peak frequency of 17.0 Hz. The monitoring location was Bhomiya baba Temple at a distance of 240 m from the blast location. The explosives weight per delay and total explosive detonated were 135 kg and 1625 Kg respectively.

- Maximum vibration of 4.589 mm/s with associated dominant peak frequency of 12 Hz was recorded at 2nd bench within mine right side of the face (at 82 m) in all the trial blasts. In this blast, the explosives weight per delay and total explosive detonated were 46 kg and 413 Kg respectively.

- Maximum vibration recorded at different residential structures not belonging to Mine owner due to trial blast conducted at 'A' Block of Bayal Quartz and Feldspar Mines was 3.988 mm/s with associated dominant peak frequency of 28.19 Hz. The monitoring location was behind Jeen Mata Temple (beside stairs) at a distance of 127 m from the blasting face. The explosives weight per delay and total explosive detonated were 50 kg and 350 Kg respectively.

- The air overpressure/noise recorded were in the range of 91.77 dB(L) to 123.9 dB(L). The maximum air over-pressure recorded was 123.9 dB(L) at 250 m due to the blast conducted at 4th Bench of 'B' Block. In this blast, explosives detonated in a blasting round and explosive weights per delay were 1525 kg and 127 kg respectively. Proper stemming and the Nonel initiation system reduce the air over-pressure to a greater extent and improves the blasting performance too.

- There was no ejection of flyrock in any of the blast. Pyrotechnic (Nonel) Initiation systems were used to conduct all the twenty-three blasts. Nonel initiation systems have advantage in detonation of blast holes from the bottom of the hole at floor levels if the detonators are placed accordingly.

- All the recorded data (blast vibrations, air over pressures and flyrock) were well within the safe limits at the concerned houses/structures. The dominant peak frequencies of ground vibrations were in the range of 8.375 to 77.5 Hz. The analyses of blast vibration frequencies confirmed that concentration of dominant frequencies were in between 9.25 Hz and 27.88 Hz. Hence, the safe level of vibration has been taken as 10 mm/s for the houses/structures not belonging to the owner and for 15 mm/s for structures belonging to owner as per DGMS standard. Additionally, the safe level of vibration for the sensitive structure (temple) may be considered as 5 mm/s.

- The propagation equation for the prediction of blast vibration has been established at 95% confidence level and given as Equation 1. The permissible explosive weight per delay may be computed from the Equation to contain vibration within safe limit for distances of houses/structures concerned. For convenience, the recommended explosive weight per delay and Total explosive weight has been computed and is given in Table A3 & Table A5. For ready reference, the predicted value of PPVs with respective maximum explosive weight per delay is given in Table A4.

- The recommended blast designs should be followed for day-to-day blasting operations for safe and efficient blasting operations. The blast designs Annexure as Figures A1-A6, will ensure the safety of the houses/structures, life of human beings and other property in the periphery of the mines.

Acknowledgements

The research team is thankful to the management of Bayal Quartz & Feldspar Mines, Narnaul, Haryana for sponsoring the study. The sincere co-operation and help extended to Sri Pramesh Singh Sangwan, Sri Sanjeev Kumar, Mine Manager and his team in completing the study successfully are also thankfully acknowledged. The research team also expresses their gratitude to the inhabitants of houses for their co-operation in blast vibration and air over pressure monitoring.

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Table A1. Summary of blasts performed during the period of study at Bayal Quartz & Feldspar Mines, Narnaul, Haryana.

Blast No.	Date of blast	Location of blast	No. of holes	Hole dia. [mm]	Hole depth [m]	Burden [m] × Spacing [m]	No. of deck	Average Top Stemming [m]	Explosives	
									Average Explosives per hole [kg]	Total explosives detonated [kg]
1.	07/02/2024	6th Bench Block 'B' N27^0 51′ 053″ E 075^0 58′ 806″ EL370m	10	120	16-17	2.5×3	Nil	3	125	1250
2.	07/02/2024	4th Bench Block 'B' N 27^0 50′ 886″ E075^0 58′ 733″ EL370m	12	120	18	2.5×3	Nil	3	135	1625
3.	07/02/2024	3rd Bench Block 'B' N27^0 50′ 863″ E075^0 58′ 734″ EL 402m	10	120	18	2.5×3	Nil	3	100	1000
4.	07/02/2024	Top bench Block 'A' N27^0 51′ 895″ E075^0 58′ 742″ EL 448m	15	120	6-9	2.5×3	Nil	2.5	50	675
5.	08/02/2024	7th Bench Block 'B' N27^0 50′ 987″ E075^0 59′ 783″ EL 355m	11	120	18	2.5×3	Nil	3	125	1375
6.	08/02/2024	5th Bench Block 'B' N27^0 50′ 920″ E 075^0 58′730″ EL 375m	9	120	18	2.5×3	Nil	3	125	1125
7.	08/02/2024	2nd Bench Block 'B' N 27^0 50′ 861″ E 075^0 58′ 705″EL 407m	12	120	18	2.5×3	Nil	3	127	1525
8.	08/02/2024	1st Bench east side, Block 'A' N 27^0 51′ 894″ E 075^0 58′ 762″EL 413m	15	120	6	2.5×3	Nil	2.5	30	450
9.	09/02/2024	5th Bench Block 'B' N 27^0 50′ 899″ E 075^0 58′ 739″EL 376m	5	120	15	2.5×3	Nil	3	90	450
10.	09/02/2024	3th Bench Block 'B' N 27^0 50′ 877″ E 075^0 58′ 712″EL 404m	10	120	15-18	2.5×3	Nil	3	127	1475
11.	09/02/2024	2nd Bench Block 'B' N 27^0 50′ 869″ E 075^0 58′696″ EL 406m	11	120	9-12	2.5×3	Nil	3	80	875

12.	09/02/2024	2nd Bench south west corner Block 'B' N 27^0 50′ 839″ E 075^0 58′ 749″EL 411m	9	120	12-15	2.5×3	Nil	3	90	725
13.	09/02/2024	1st Bench east side of the mines Block 'A' N 27^0 51′ 894″ E 075^0 58′ 762″EL 415m	7	120	9	2.5×3	Nil	3	50	350
14.	10/02/2024	7th Bench Block 'B' N 27^0 50′ 960″ E 075^0 58′ 775″EL 350m	6	120	18	2.5×3	Nil	3	125	750
15.	10/02/2024	5th Bench Block 'B' N 27^0 50′ 974″ E 075^0 58′ 761″EL 372m	7	120	12	2.5×3	Nil	2.5	83	600
16.	10/02/2024	4th Bench Block 'B' N 27^0 50′ 886″ E 075^0 58′ 747″EL 381m	12	120	18	2.5×3	Nil	3	127	1525
17.	10/02/2024	3rd Bench Block 'B' N 27^0 50′ 877″ E 075^0 58′ 710″EL 400m	6	120	18	2.5×3	Nil	3.5	117	700
18.	10/02/2024	6rd Bench west, Block 'A' N 27^0 51′ 831″ E 075^0 58′ 681″EL 362m	8	120	17	2.5×3	01	3	106	850
19.	11/02/2024	7th Bench Block 'B' N 27^0 50′ 955″ E 075^0 58′ 778″EL356m	13	120	15	2.5×3	01	3	83	1075
20.	11/02/2024	5th Bench Block 'B' N 27^0 50′ 999″ E 075^0 58′ 727″EL381m	7	120	12	2.5×3	01	3	72	506
21.	11/02/2024	4th Bench Block 'B' N 27^0 50′ 879″ E 075^0 58′ 737″EL385m	10	120	12	2.5×3	01	3	60	600
22.	11/02/2024	3th Bench Block 'B' N 27^0 50′ 889″ E 075^0 58′ 770″EL396m	11	120	14	2.5×3	01	2.5	89	975
23.	11/02/2024	1st Bench East, Block 'A' N 27^0 51′ 900″ E 075^0 58′ 757″EL 427m	9	120	9	2.5×3	01	3	46	413

Table A2. Blast induced vibration monitored at different locations in and around Bayal Quartz & Feldspar Mines, Narnaul, Haryana.

Blast No.	Date of blast	Location of blast	Total explosives fired in the round [kg]	Max^{m} explosives weight per delay [kg]	Location of vibration measuring transducer	Distance of monitoring point from the blasting face [m]	Peak particle velocity (PPV) [mm/s]	Dominant Frequency [Hz]	AOP
1.	07/2/2024	6th Bench Block 'B'	1250	125	❖ At 2nd Bench south west corner within mine ❖ Bhomiya Baba Temple ❖ Hiramal Baba Temple	85 240 310	10.47 1.209 0.959	19.69 20.25 19.50	108.9 114.9 117.2
2.	07/2/2024	4th Bench Block 'B'	1625	135	❖ Bhomiya Baba Temple ❖ At 2nd Bench south west corner within mine ❖ Hiramal Baba Temple	240 250 255	4.280 3.384 3.029	17.00 9.875 19.00	113.1 106.7 112.8
3.	07/2/2024	3rd Bench Block 'B'	1000	100	❖ At 2nd Bench south west corner within mine ❖ Bhomiya Baba Temple ❖ Hiramal Baba Temple	267 282 306	3.283 2.697 1.888	8.938 30.75 9.5	111.5 111.7 112
4.	07/2/2024	Top bench Block 'A'	675	50	❖ At 2nd Bench within mine ❖ Towards mine office ❖ At mine office	119 150 185	3.077 2.654 1.369	8.375 9.25 9.25	120.7 92.44 107.9
5.	08/02/2024	7th Bench Block 'B'	1375	125	❖ At 2nd Bench west side corner within mine ❖ Panchnota ki Dhani towards Mr. Vijay House ❖ Donga ki Nangal near Anganwadi Kendra	218 283 475	4.843 2.725 1.346	19.88 15.25 15.88	115.7 <115 <115
6.	08/02/2024	5th Bench Block 'B'	1125	125	❖ At 2nd Bench west side corner within mine ❖ Donga ki Nangal near Anganwadi Kendra ❖ Panchnota ki Dhani towards Mr. Vijay House	88 350 380	9.472 2.234 1.228	20.69 15.88 16.50	121.4 <115 <115
7.	08/02/2024	2nd Bench Block 'B'	1525	127	❖ At 2nd Bench west side corner within mine ❖ Donga ki Nangal near Anganwadi Kendra ❖ Panchnota ki Dhani towards Mr. Vijay House	100 286 322	5.647 2.133 1.136	15.63 27.25 26.50	118.2 <115 <115
8.	08/02/2024	1st Bench east side Block 'A'	450	30	❖ At 2nd Bench within mine ❖ Towards mine office ❖ At mine office	160 180 240	1.88 1.342 0.676	21.44 11.88 9.00	122.9 <115 <115

9.	09/2/2024	5th Bench Block 'B'	450	90	❖ 2nd Bench south west corner within mine ❖ Beside Mr. Rosan Lal Hawaldar Old House ❖ Beside Mr. Rosan Lal Hawaldar New House	95 298 270	4.866 2.338 2.528	9.5 27.25 77.5	118.4 106.5 <100
10.	09/2/2024	3th Bench Block 'B'	1475	127	❖ 2nd Bench south west corner within mine ❖ Beside Mr. Rosan Lal Hawaldar New House ❖ Beside Mr. Rosan Lal Hawaldar Old House	100 275 297	7.075 2.551 2.148	10.0 20.63 17.94	120 <100 110
11.	09/2/2024	2nd Bench Block 'B'	875	80	❖ 2nd Bench south west corner within mine ❖ Beside Mr. Rosan Lal Hawaldar Old House ❖ Beside Mr. Rosan Lal Hawaldar New House	150 288 309	4.534 1.55 1.115	11.0 26.69 39.38	121.1 111.2 <100
12.	09/2/2024	2nd Bench south west corner Block 'B'	725	90	❖ 2nd Bench south west corner within mine ❖ Beside Mr. Rosan Lal Hawaldar Old House ❖ Beside Mr. Rosan Lal Hawaldar New House	190 170 192	2.185 1.951 1.186	26.69 26.0 12.0	109.2 91.77 115.4
13.	09/2/2024	1st Bench east side of the mines Block 'A'	350	50	❖ Behind Jeen Mata Temple besids stairs ❖ Behind Jeen Mata Temple besids stairs ❖ Behind Jeen Mata Temple towards Bayal village	127 147 500	3.988 3.578 <0.5	28.19 20.88 -	108.0 103.4 -
14.	10/02/2024	7th Bench Block 'B'	750	125	❖ 2nd Bench towards Bayal weighing Bridge ❖ Work shoap at Bayal Mine ❖ At Bayal Mine weighing Bridge	84 150 380	12.33 6.140 3.429	23.25 24.25 23.19	123.1 105.4 114.8
15.	10/02/2024	5th Bench Block 'B'	600	83	❖ 2nd Bench towards Bayal weighing Bridge ❖ Work shoap at Bayal Mine ❖ At Bayal Mine weighing Bridge	91 140 404	11.58 4.065 0.813	37.88 38.25 20.25	114.2 93.92 107.5
16.	10/02/2024	4th Bench Block 'B'	1525	127	❖ 2nd Bench towards Bayal weighing Bridge ❖ Work shoap at Bayal Mine ❖ At Bayal Mine weighing Bridge	250 307 566	5.250 3.825 1.426	10.5 22.63 22.75	123.9 95.18 103.5
17.	10/02/2024	3rd Bench Block 'B'	700	117	❖ 2nd Bench towards Bayal weighing Bridge ❖ Work shoap at Bayal Mine ❖ At Bayal Mine weighing Bridge	165 270 588	4.347 2.385 0.582	8.75 19.50 18.19	115.8 103.2 118.3

436

18.	10/02/2024	6rd Bench west side of the mine Block 'A'	850	106	❖ At Jeen Mata Temple ❖ Behind Jeen Mata Temple towards Bayal village ❖ Behind Jeen Mata Temple towards Bayal village	255 303 337	3.188 2.256 2.333	39.13 19.50 19.75	108.4 100.1 <100
19.	11/02/2024	7th Bench Block 'B'	1075	83	❖ At 3rd Bench towards Bayal workshope within mines ❖ Behiend Mr. Kapil and Pradeep house ❖ Infront of Mr. Kapil and Pradeep house	85 225 387	9.773 1.783 1.211	49.88 22.94 22.50	109.3 102.8 <100
20.	11/02/2024	5th Bench Block 'B'	506	72	❖ At 3rd Bench towards Bayal workshope within mines ❖ Behiend Mr. Kapil and Pradeep house ❖ Infront of Mr. Kapil and Pradeep house	110 222 365	5.458 1.737 1.315	17.50 55.13 22.63	112.3 109.5 <100
21.	11/02/2024	4th Bench Block 'B'	600	60	❖ At 3rd Bench towards Bayal workshope within mines ❖ Behiend Mr. Kapil and Pradeep house ❖ Infront of Mr. Kapil and Pradeep house	150 220 240	2.868 2.965 2.639	15.75 27.88 22.13	120.6 108 <100
22.	11/02/2024	3th Bench Block 'B'	975	89	❖ At 3rd Bench towards Bayal workshope within mines ❖ Behiend Mr. Kapil and Pradeep house ❖ Infront of Mr. Kapil and Pradeep house	306 258 300	1.477 2.189 1.597	15.20 14.81 36.88	116 106.5 <100
23.	11/02/2024	1st Bench east side of the mines Block 'A'	413	46	❖ At 2nd Bench within mine right side of the face ❖ At mine office ❖ At Weighing Bridge of the mine	82 182 490	4.589 3.184 <0.5	12.00 13.25 -	100.6 122.6 -

437

Table A3. Recommended explosives weight per delay to be detonated in a blasting round for the safety of sensitive structure taking peak particle velocity (PPV) of 2 mm/s and 5 mm/s and for domestic houses/structures taking PPV of 10 mm/s and 15 mm/s as safe limit of vibration for Bayal Quartz & Feldspar Mine, Narnaul, Haryana as per DGMS standard.

Distance of structures from the blast face [m]	**Maximum explosive weight to be detonated in a delay at Bayal Quartz & Feldspar Mine [kg]**			
	Taking 2 mm/s PPV as safe limit of vibration for the safety of sensitive structure, when dominant peak frequency is less than 8 Hz	Taking 5 mm/s PPV as safe limit of vibration for the safety of sensitive structure, when dominant peak frequency is in between 8-25 Hz	Taking 10 mm/s PPV as safe limit of vibration for the safety of houses/structure not belonging to owner, when dominant peak frequency is in between 8-25 Hz	Taking 15 mm/s PPV as safe limit of vibration for the safety of houses/structure belonging to owner, when dominant peak frequency is in between 8-25 Hz
100	4.2	18.7	58	112
125	6.5	29.2	91	176
150	9.4	42.0	130	253
175	12.8	57.2	177	344
200	16.7	74.7	232	450
225	21.1	94.5	293	569
250	26.1	116.7	362	702
275	31.6	141.2	438	850
300	37.6	168.0	522	1012
325	44.1	197.2	612	1187
350	51.2	228.7	710	1377
375	58.7	262.5	815	1581
400	66.8	298.7	927	1798
450	84.6	378.1	1173	2276
500	104.4	466.7	1449	2810

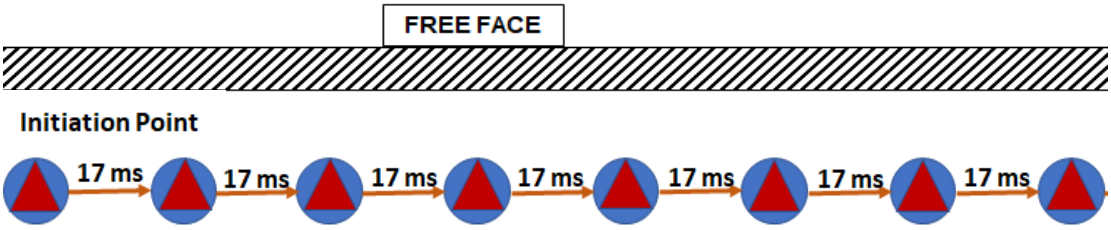
Table A4. Predicted peak particle velocity levels at various distance due to detonation of explosive weight per delay of 30, 50, 60, 70, 80 & 100 kg at Bayal Quartz & Feldspar Mine, Narnaul, Haryana.

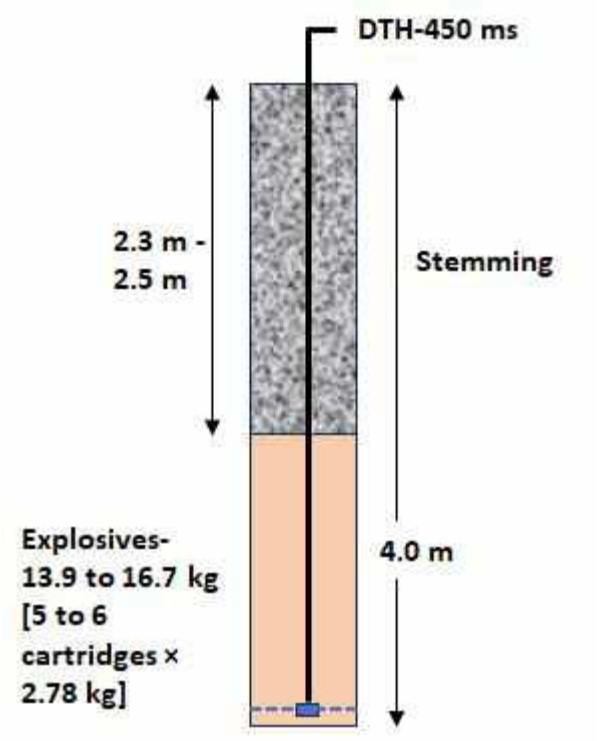
Distance of structures from the blast face [m]	**Predicted peak particle velocity levels [mm/s]**					
	30 kg	**50 kg**	**60 kg**	**70 kg**	**80 kg**	**100 kg**
100	6.68	9.14	10.22	11.23	12.18	13.96
125	5.09	6.95	7.77	8.54	9.27	10.63
150	4.07	5.56	6.22	6.83	7.42	8.50
175	3.37	4.61	5.15	5.66	6.14	7.04
200	2.86	3.91	4.37	4.81	5.22	5.98
225	2.48	3.39	3.79	4.16	4.51	5.18
250	2.18	2.98	3.33	3.66	3.97	4.55
275	1.94	2.65	2.96	3.25	3.53	4.05
300	1.74	2.38	2.66	2.93	3.17	3.64

325	1.58	2.16	2.41	2.65	2.88	3.30
350	1.44	1.97	2.20	2.42	2.63	3.01
375	1.33	1.81	2.03	2.23	2.42	2.77
400	1.22	1.67	1.87	2.06	2.23	2.56
450	1.06	1.45	1.62	1.78	1.93	2.22
500	0.93	1.27	1.42	1.57	1.70	1.95

Table A5. Recommended Total explosives weight in a round to be detonated in a blasting round for the safety of houses/structures taking peak particle velocity 10 mm/s for the structures not belonging to Owner and 15 mm/s for the structures belonging to the owner as safe limit for Bayal Quartz & Feldspar Mine, Narnaul, Haryana as per DGMS standard.

Distance of structures from the blast face [m]	**Total explosives weight to be detonated in a blasting round [kg]**			
	Taking 2 mm/s PPV as safe limit of vibration for the safety of sensitive structure, when dominant peak frequency is less than 8 Hz	Taking 5 mm/s PPV as safe limit of vibration for the safety of sensitive structure, when dominant peak frequency is in between 8-25 Hz	Taking 10 mm/s PPV as safe limit of vibration for the safety of houses/structure not belonging to owner, when dominant peak frequency is in between 8-25 Hz	Taking 15 mm/s PPV as safe limit of vibration for the safety of houses/structure belonging to owner, when dominant peak frequency is in between 8-25 Hz
100	27	137	483	988
125	43	213	754	1544
150	61	307	1086	2224
175	83	418	1478	3027
200	109	546	1930	3954
225	138	691	2443	5004
250	170	853	3016	6178
275	206	1032	3649	7475
300	245	1229	4343	8896
325	288	1442	5097	10440
350	334	1672	5911	12108
375	383	1920	6786	13900
400	436	2184	7721	15815
450	552	2764	9772	20016
500	681	3413	12064	24711

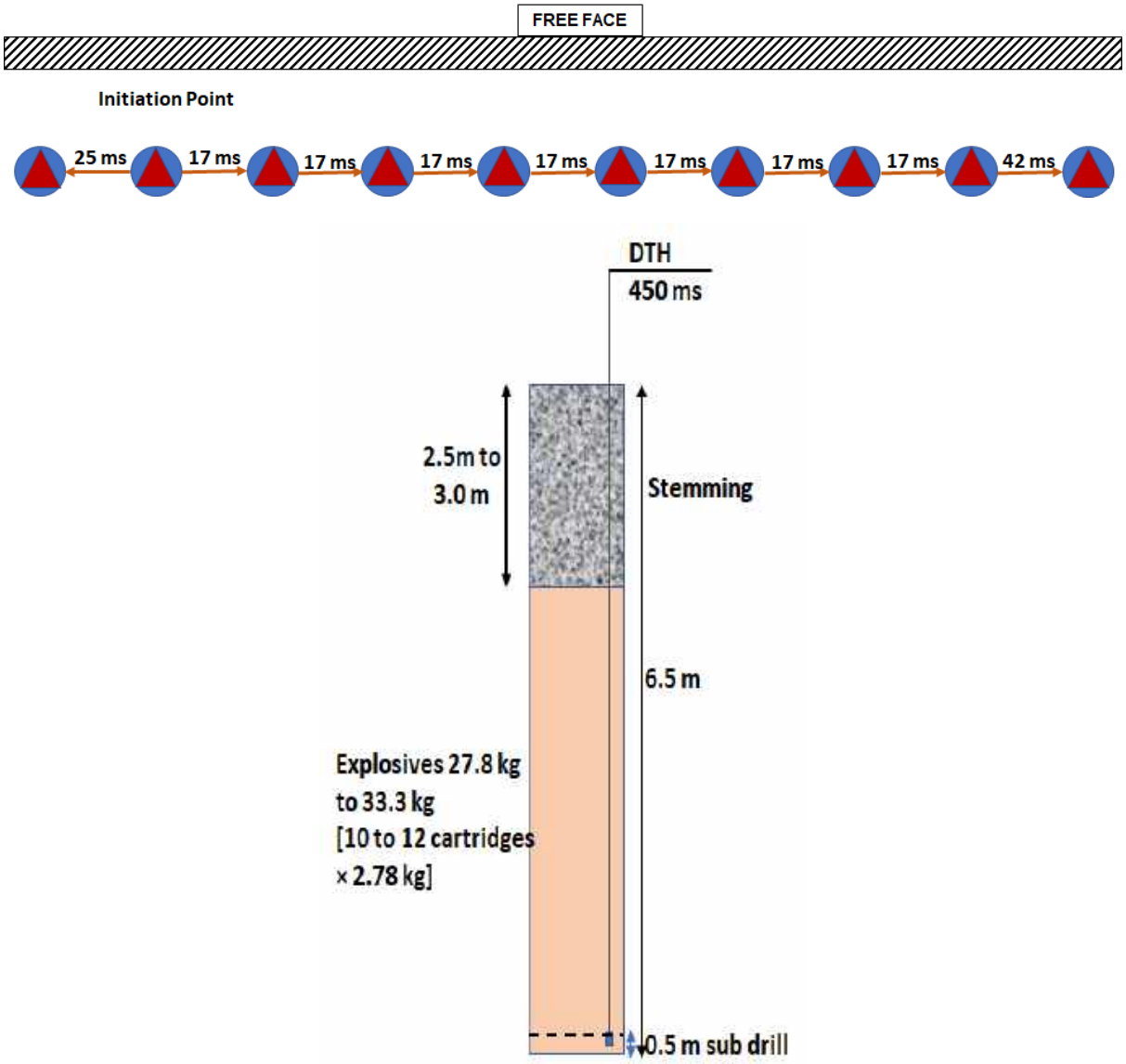




BLAST GEOMETRY

Hole diameter	: 100 mm
No. of holes	: 8
Bench height	: 4.0 m
Hole depth	: 4.3 m
Burden	: 2.0 m
Spacing	: 2.5 m
Explosive per hole	: 13.9 - 16.7 kg
Maximum charge per delay	: 16.7 kg (1 holes)
Designed charge factor	: 0.70 to 0.84 kg/m^3

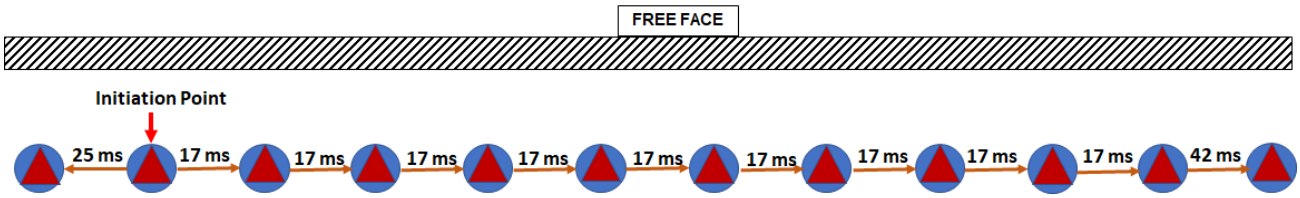
Figure A1. Recommended blast design and charging pattern of holes for 4.0 m bench for Block A & B of Bayal Quartz & Feldspar Mine.

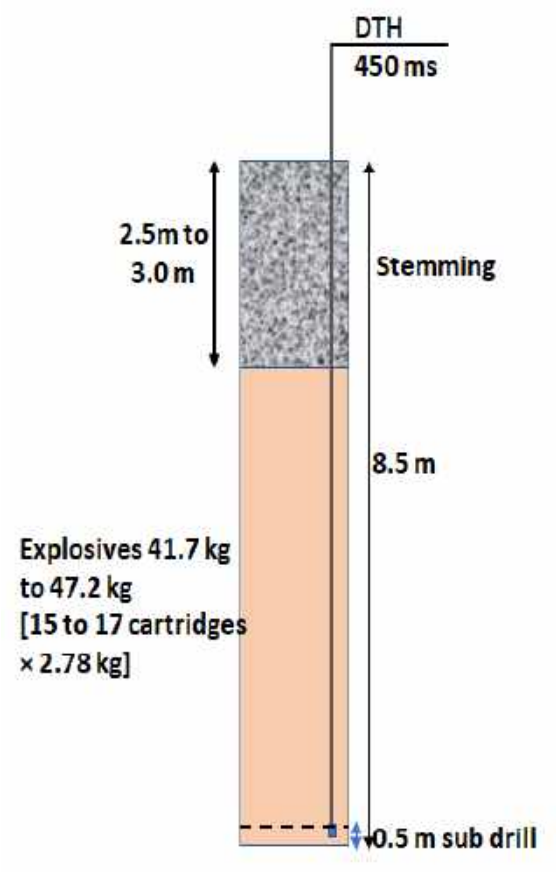


BLAST GEOMETRY

Hole diameter	: 100 mm
No. of holes	: 10
Bench height	: 6.0 m
Hole depth	: 6.5 m
Burden	: 2.5 m
Spacing	: 3.0 m
Explosive per hole	: 27.8 to 33.3 kg
Maximum charge per delay	: 27.5 to 33.3kg (1 holes)
Designed charge factor	: 0.62 to 0.74 kg/m^3

Figure A2. Recommended blast design and charging pattern of holes for 6.0 m bench for Block A & B of Bayal Quartz & Feldspar Mine.

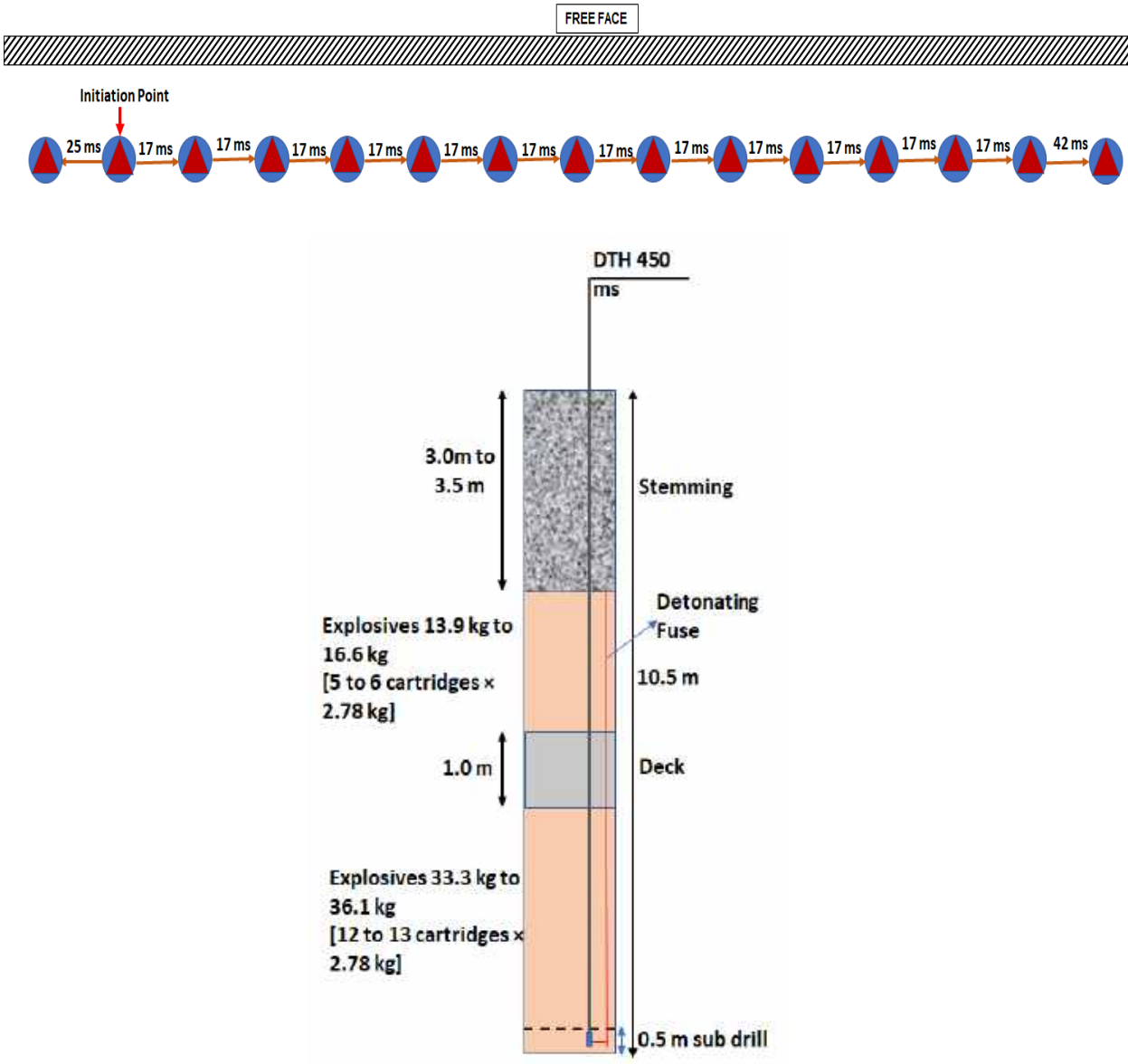




BLAST GEOMETRY

Hole diameter	: 100 mm
No. of holes	: 12
Bench height	: 8.0 m
Hole depth	: 8.5 m
Burden	: 2.5 m
Spacing	: 3.0 m
Explosive per hole	: 41.7 to 47.2 kg
Maximum charge per delay	: 41.7 to 47.2kg (1 holes)
Designed charge factor	: 0.7 to 0.79 kg/m^3

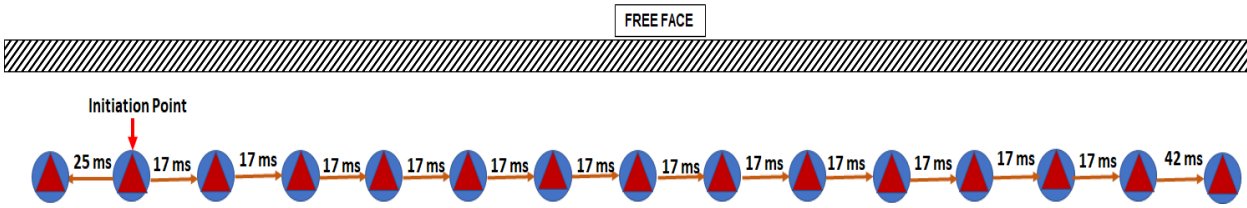
Figure A3. Recommended blast design and charging pattern of holes for 8.0 m bench for Block A & B of Bayal Quartz & Feldspar Mine.

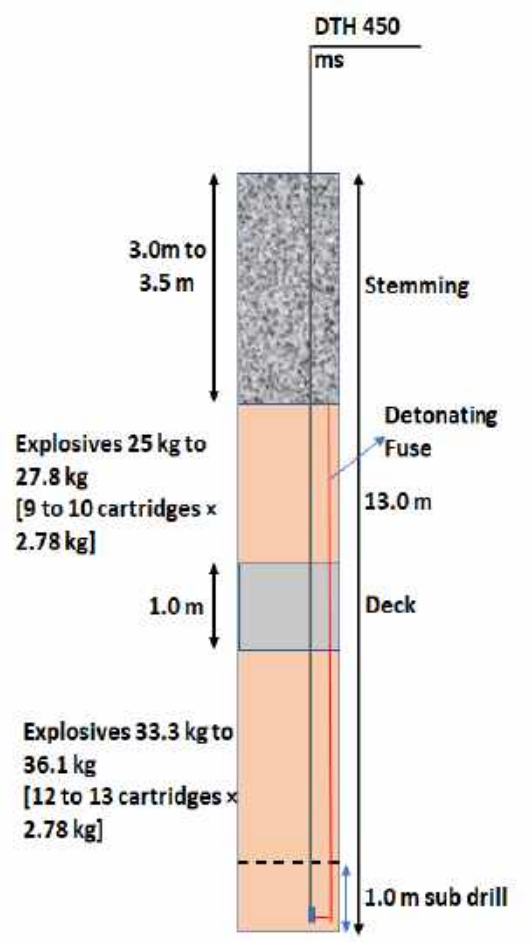


BLAST GEOMETRY

Hole diameter	: 100 mm
No. of holes	: 15
Bench height	: 10.0 m
Hole depth	: 10.5 m
Burden	: 2.5 m
Spacing	: 3.0 m
Explosive per hole	: 47.2 to 52.8 kg
Maximum charge per delay	: 47.2 to 52.8 kg (1 holes)
Designed charge factor	: 0.63 to 0.70 kg/m^3

Figure A4. Recommended blast design and charging pattern of holes for 10.0 m bench for Block A & B of Bayal Quartz & Feldspar Mine.

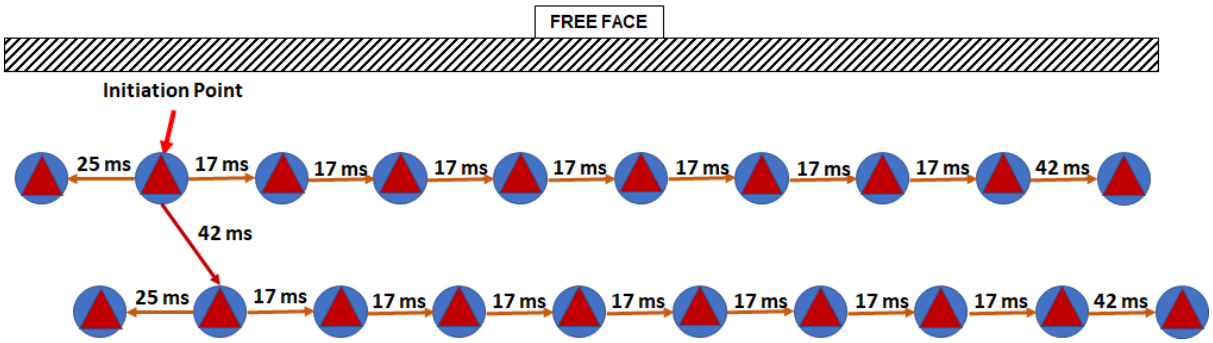


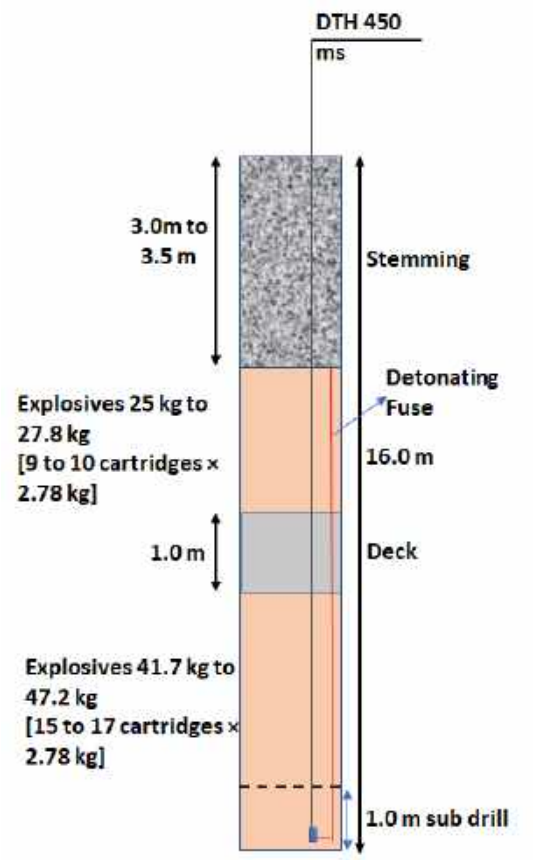


BLAST GEOMETRY

Hole diameter	: 100 mm
No. of holes	: 15
Bench height	: 12.0 m
Hole depth	: 13.0 m
Burden	: 2.5 m
Spacing	: 3.0 m
Explosive per hole	: 58.3 to 63.9 kg
Maximum charge per delay	: 58.3 to 63.9 kg (1 holes)
Designed charge factor	: 0.65 to 0.71 kg/m^3

Figure A5. Recommended blast design and charging pattern of holes for 12.0 m bench for Block B of Bayal Quartz & Feldspar Mine.





BLAST GEOMETRY

Hole diameter	: 100 mm
No. of holes	: 20
Bench height	: 15.0 m
Hole depth	: 16.0 m
Burden	: 2.5 m
Spacing	: 3.0 m
Explosive per hole	: 66.7 to 75 kg
Maximum charge per delay	: 66.7 to 75 kg (1 holes)
Designed charge factor	: 0.59 to 0.67kg/m^3

Figure A6. Recommended blast design and charging pattern of holes for 15.0 m bench for Block B of Bayal Quartz & Feldspar Mine.

Instantel

Event Report

Date/Time	Vert at 13:36:10 February 7, 2024
Trigger Source	Geo: 0.500 mm/s, Mic: 131.0 dB(L)
Range	Geo: 254.0 mm/s
Record Time	3.0 sec at 4096 sps
Operator/Setup:	Operator/Bayal.MMB

Serial Number	UM14894 V 10-89 Micromate ISEE
Battery Level	3.7 Volts
Unit Calibration	June 26, 2023 by UES New Delhi
File Name	UM14894_20240207133610.IDFW
Scaled Distance	673.5 (213.0 m, 0.1 kg)

GPS Location	**Latitude**	**Longitude**
Source:	027 51.835 N	075 58.775 E
Sensor1:	027 51.808 N	075 58.847 E
Distance:	127.9 m	

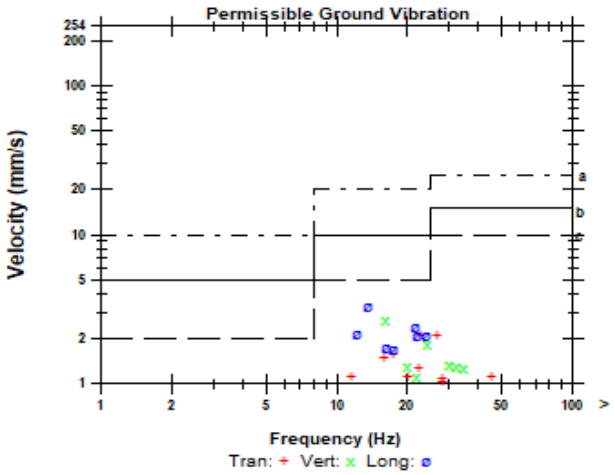
Notes
Location: BAYAL
Client: BAYAL QUARTZ
User Name: BAYAL MINES
General:

Microphone	Linear Weighting
PSPL	113.1 dB(L) at 0.816 sec
ZC Freq	8.1 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1277 mv)

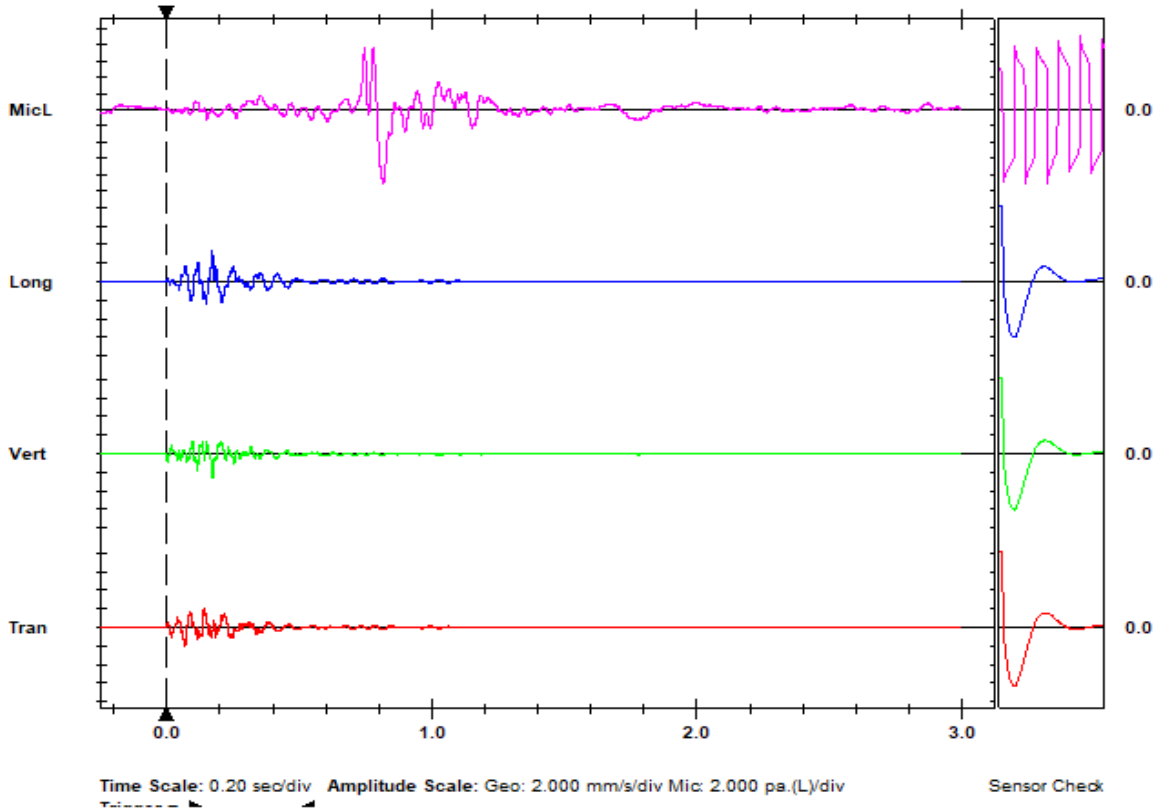
	Tran	**Vert**	**Long**	
PPV	2.112	2.648	3.342	mm/s
ZC Freq	23.0	16.1	13.7	Hz
Time (Rel. to Trig)	0.068	0.171	0.170	sec
Peak Acceleration	0.076	0.095	0.102	g
Peak Displacement	0.013	0.016	0.022	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.3	7.5	Hz
Overswing Ratio	4.3	4.6	4.0	

Peak Vector Sum 4.280 mm/s at 0.170 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



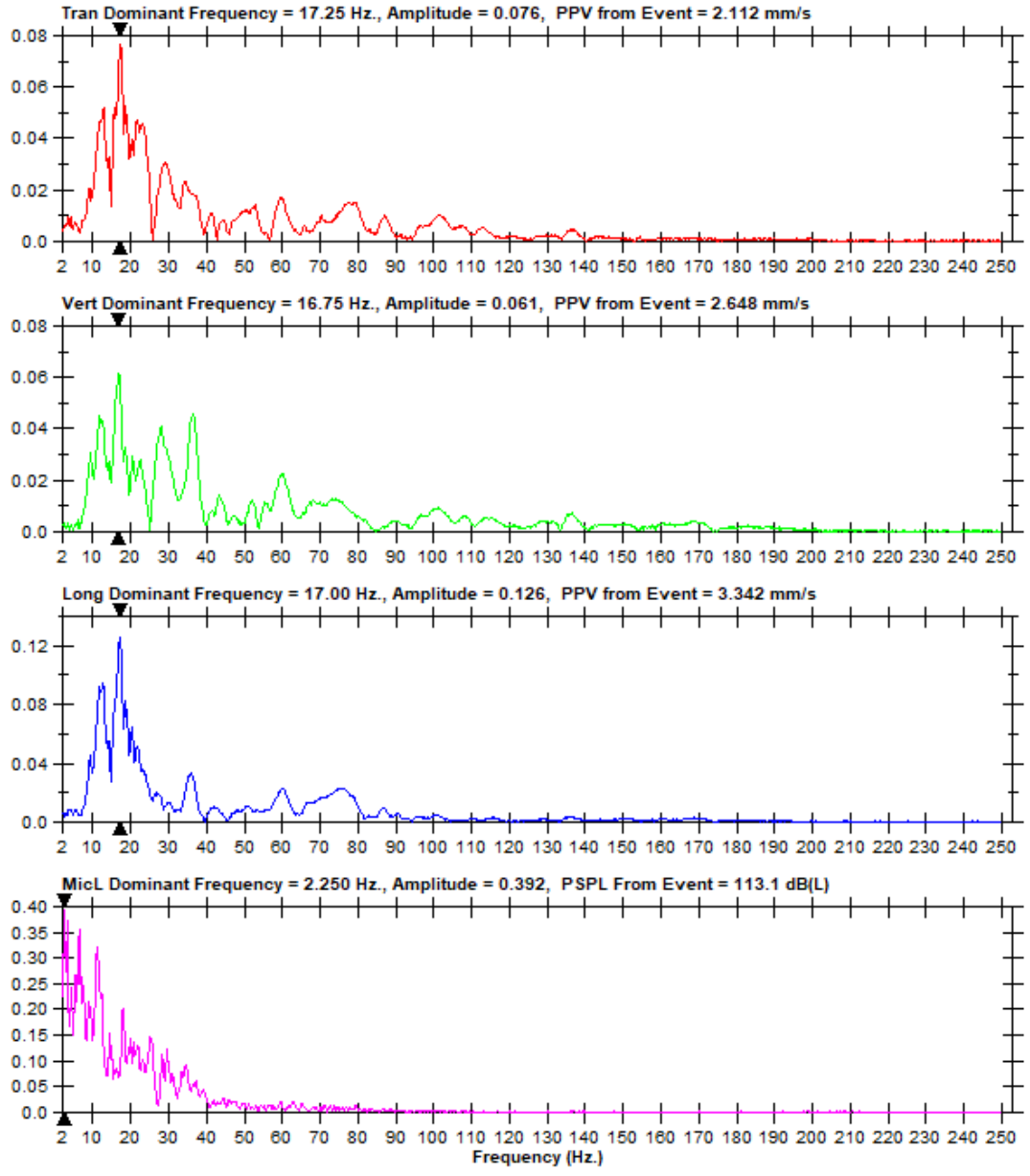
Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 2.000 pa.(L)/div Sensor Check

Instantel

FFT Report

Date/Time	Vert at 13:36:10 February 7, 2024	**Serial Number**	UM14894 V 10-89 Micromate ISEE
Trigger Source	Geo: 0.500 mm/s, Mic: 131.0 dB(L)	**Battery Level**	3.7 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	June 26, 2023 by UES New Delhi
Record Time	3.0 sec at 4096 sps	**File Name**	UM14894_20240207133610.IDFW
Operator/Setup:	Operator/Bayal.MMB	**Scaled Distance**	673.5 (213.0 m, 0.1 kg)

Notes
Location: BAYAL
Client: BAYAL QUARTZ
User Name: BAYAL MINES
General:



Instantel

Event Report

Date/Time	Vert at 14:16:11 February 8, 2024
Trigger Source	Geo: 0.510 mm/s
Range	Geo: 254.0 mm/s
Record Time	10.0 sec at 1024 sps

Serial Number	BE10010 V 10.72-1.1 Minimate Blaster
Battery Level	6.2 Volts
Unit Calibration	January 17, 2024 by CIMFR Dhanbad
File Name	L010KEP8.YZ0

Notes
Location: On Ground Surface
Client: Bayal Quartz & Feldspar Mines Narnaul HR
User Name: REE DIVISION, CSIR-CIMFR, DHANBAD
General:

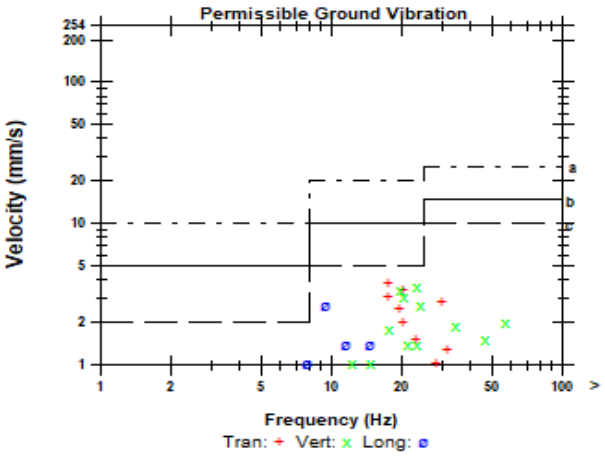
Extended Notes
Blast Vibration Study At Bayal Quartz & Feldspar Mines Narnaul, Mahendragarh, Haaryana-123001

Microphone	Linear Weighting
PSPL	115.7 dB(L) at 0.609 sec
ZC Freq	2.5 Hz
Channel Test	Passed (Freq = 20.1 Hz Amp = 491 mv)

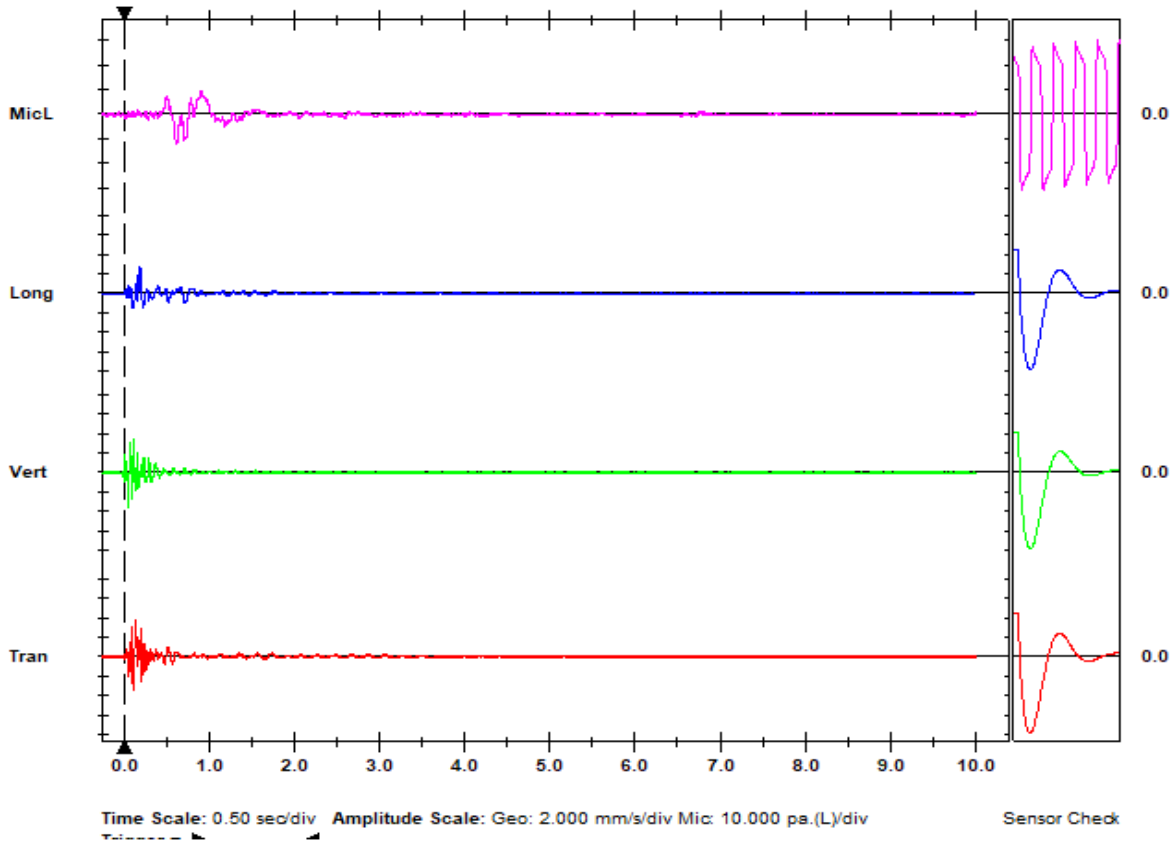
	Tran	Vert	Long	
PPV	3.810	3.556	2.667	mm/s
ZC Freq	18	23	9.5	Hz
Time (Rel. to Trig)	0.146	0.055	0.193	sec
Peak Acceleration	0.080	0.080	0.040	g
Peak Displacement	0.034	0.024	0.031	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.4	7.5	Hz
Overswing Ratio	3.6	4.0	3.5	

Peak Vector Sum 4.843 mm/s at 0.118 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 10.000 pa.(L)/div Sensor Check

Instantel

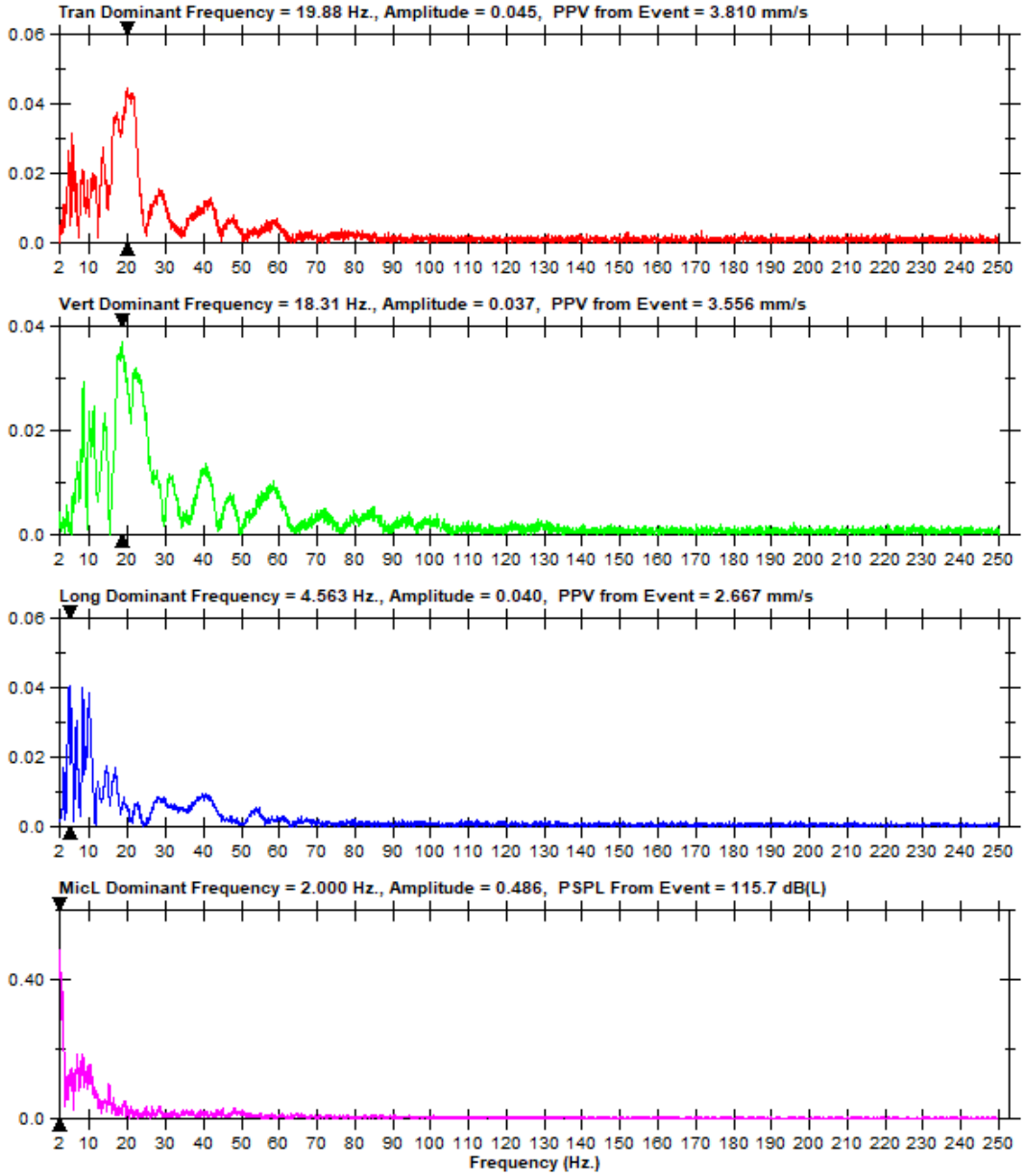
FFT Report

Date/Time	Vert at 14:16:11 February 8, 2024
Trigger Source	Geo: 0.510 mm/s
Range	Geo: 254.0 mm/s
Record Time	10.0 sec at 1024 sps

Serial Number	BE10010 V 10.72-1.1 Minimate Blaster
Battery Level	6.2 Volts
Unit Calibration	January 17, 2024 by CIMFR Dhanbad
File Name	L010KEP8.YZ0

Notes
Location: On Ground Surface
Client: Bayal Quartz & Feldspar Mines Narnaul HR
User Name: REE DIVISION, CSIR-CIMFR, DHANBAD
General:

Extended Notes
Blast Vibration Study At Bayal Quartz & Feldspar Mines Narnaul, Mahendragarh, Haaryana-123001



Instantel

Event Report

Date/Time	Long at 17:09:20 February 9, 2024
Trigger Source	Geo: 0.510 mm/s
Range	Geo: 254.0 mm/s
Record Time	10.0 sec at 1024 sps

Serial Number	BE10010 V 10.72-1.1 Minimate Blaster
Battery Level	6.1 Volts
Unit Calibration	January 17, 2024 by CIMFR Dhanbad
File Name	L010KERB.NK0

Notes
Location: On Ground Surface
Client: Bayal Quartz & Feldspar Mines Narnaul HR
User Name: REE DIVISION, CSIR-CIMFR, DHANBAD
General:

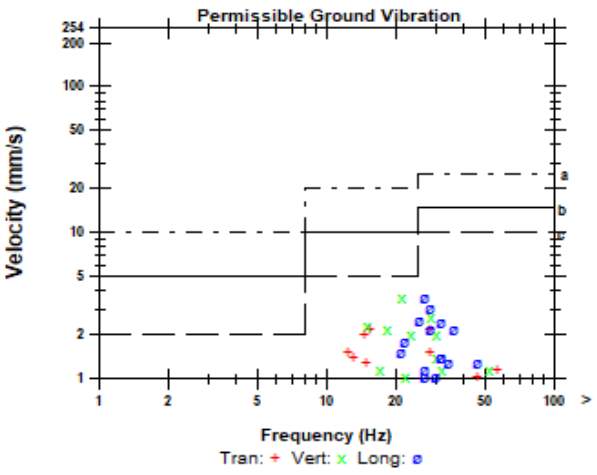
Extended Notes
Blast Vibration Study At Bayal Quartz & Feldspar Mines Narnaul, Mahendragarh, Haaryana-123001

Microphone	Linear Weighting
PSPL	108.0 dB(L) at 0.415 sec
ZC Freq	9.5 Hz
Channel Test	Passed (Freq = 20.1 Hz Amp = 509 mv)

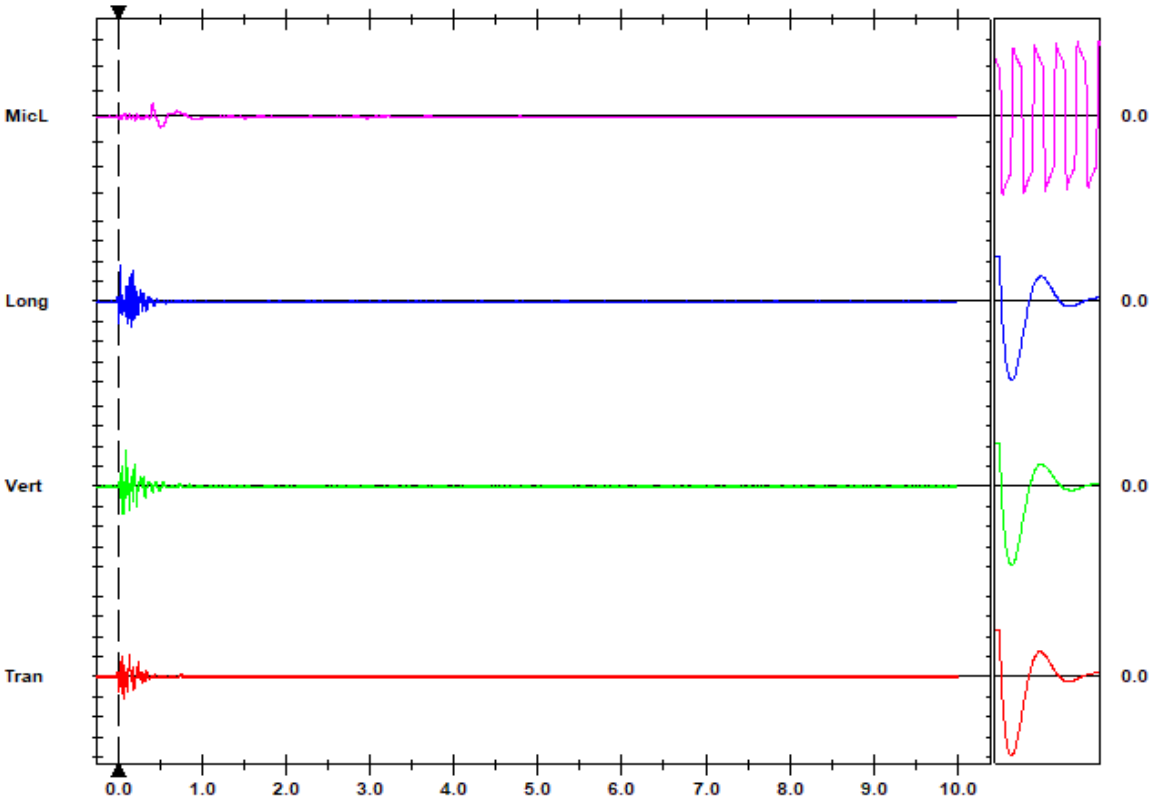
	Tran	Vert	Long	
PPV	2.159	3.556	3.556	mm/s
ZC Freq	28	21	27	Hz
Time (Rel. to Trig)	0.066	0.100	0.031	sec
Peak Acceleration	0.053	0.066	0.066	g
Peak Displacement	0.022	0.025	0.020	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.4	7.5	Hz
Overswing Ratio	3.5	4.0	3.5	

Peak Vector Sum 3.988 mm/s at 0.031 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 10.000 pa.(L)/div Sensor Check

Instantel

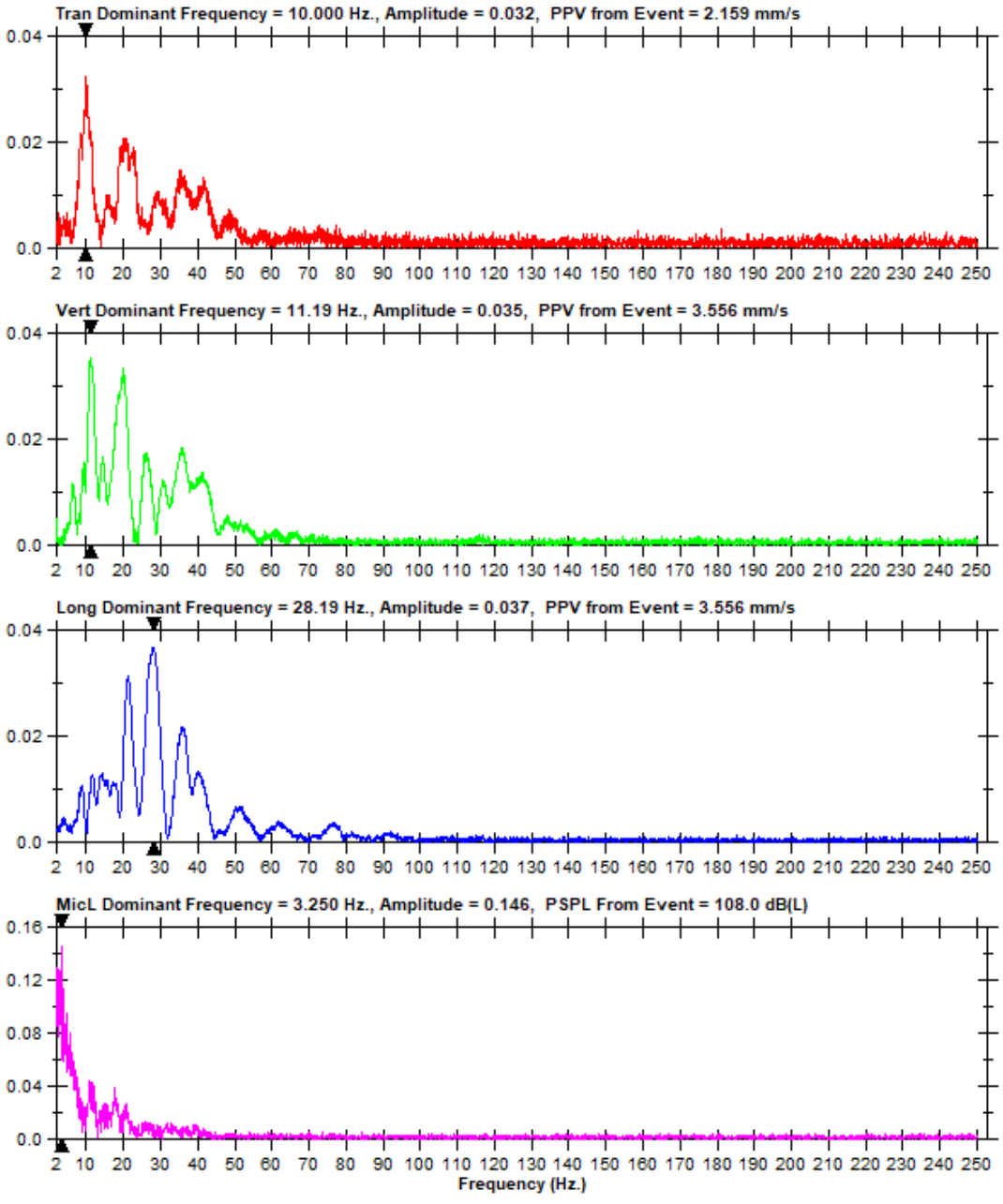
FFT Report

Date/Time	Long at 17:09:20 February 9, 2024
Trigger Source	Geo: 0.510 mm/s
Range	Geo: 254.0 mm/s
Record Time	10.0 sec at 1024 sps

Serial Number	BE10010 V 10.72-1.1 Minimate Blaster
Battery Level	6.1 Volts
Unit Calibration	January 17, 2024 by CIMFR Dhanbad
File Name	L010KERB.NK0

Notes
Location: On Ground Surface
Client: Bayal Quartz & Feldspar Mines Narnaul HR
User Name: REE DIVISION, CSIR-CIMFR, DHANBAD
General:

Extended Notes
Blast Vibration Study At Bayal Quartz & Feldspar Mines Narnaul, Mahendragarh, Haaryana-123001



Instantel

Event Report

Date/Time	Vert at 14:16:22 February 9, 2024
Trigger Source	Geo: 0.510 mm/s
Range	Geo: 254.0 mm/s
Record Time	5.0 sec at 1024 sps
Operator/Setup:	Operator/Gare Palma.mmb

Serial Number	UM17866 V 10-90 Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	January 18, 2024 by CIMFR Dhanbad
File Name	UM17866_20240209141622.IDFW

Notes
Location: On Ground Surface
Client: Bayal Quartz & Feldspar Mines, Haryana
User Name: REE Division, CSIR-CIMFR, Dhanbad
General:

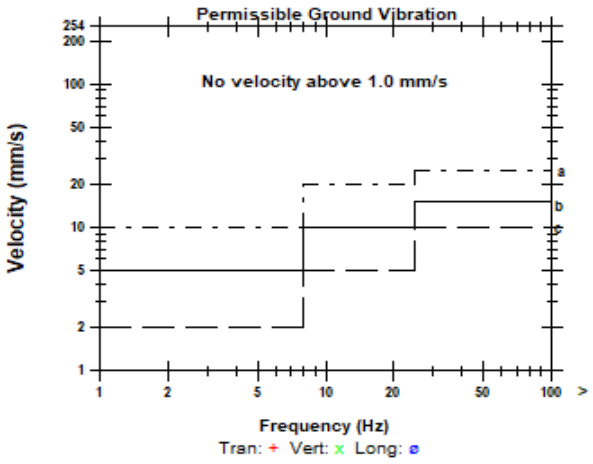
Extended Notes
Blast Vibration Study At Blast Vibration Study At Bayal Quartz & Feldspar Mines Narnaul, Mahendragarh, Haaryana-123001

Microphone	Linear Weighting
PSPL	<88 dB(L)
ZC Freq	24 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1250 mv)

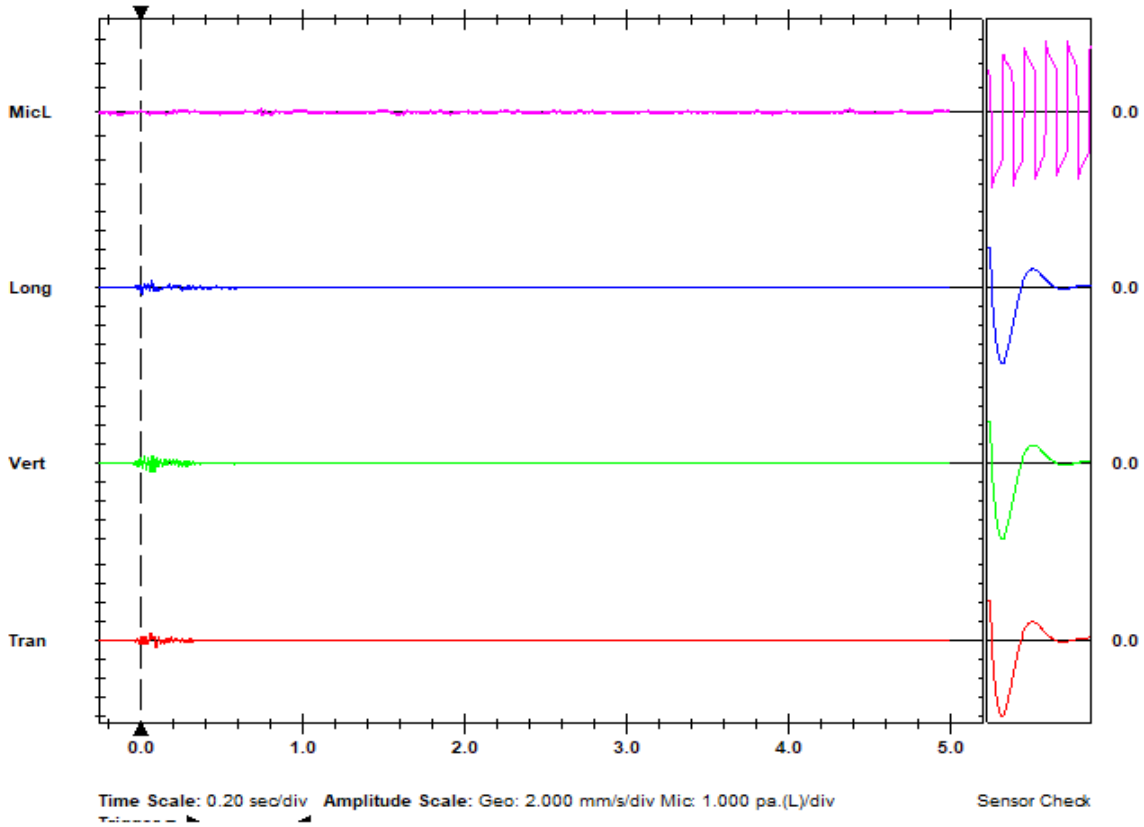
	Tran	Vert	Long	
PPV	0.804	0.914	0.670	mm/s
ZC Freq	27	37	32	Hz
Time (Rel. to Trig)	0.101	0.090	0.014	sec
Peak Acceleration	0.023	0.024	0.016	g
Peak Displacement	0.007	0.004	0.005	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.1	7.3	Hz
Overswing Ratio	4.3	4.4	4.4	

Peak Vector Sum 1.115 mm/s at 0.066 sec
N/A: Not Applicable

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 1.000 pa.(L)/div Sensor Check

Instantel

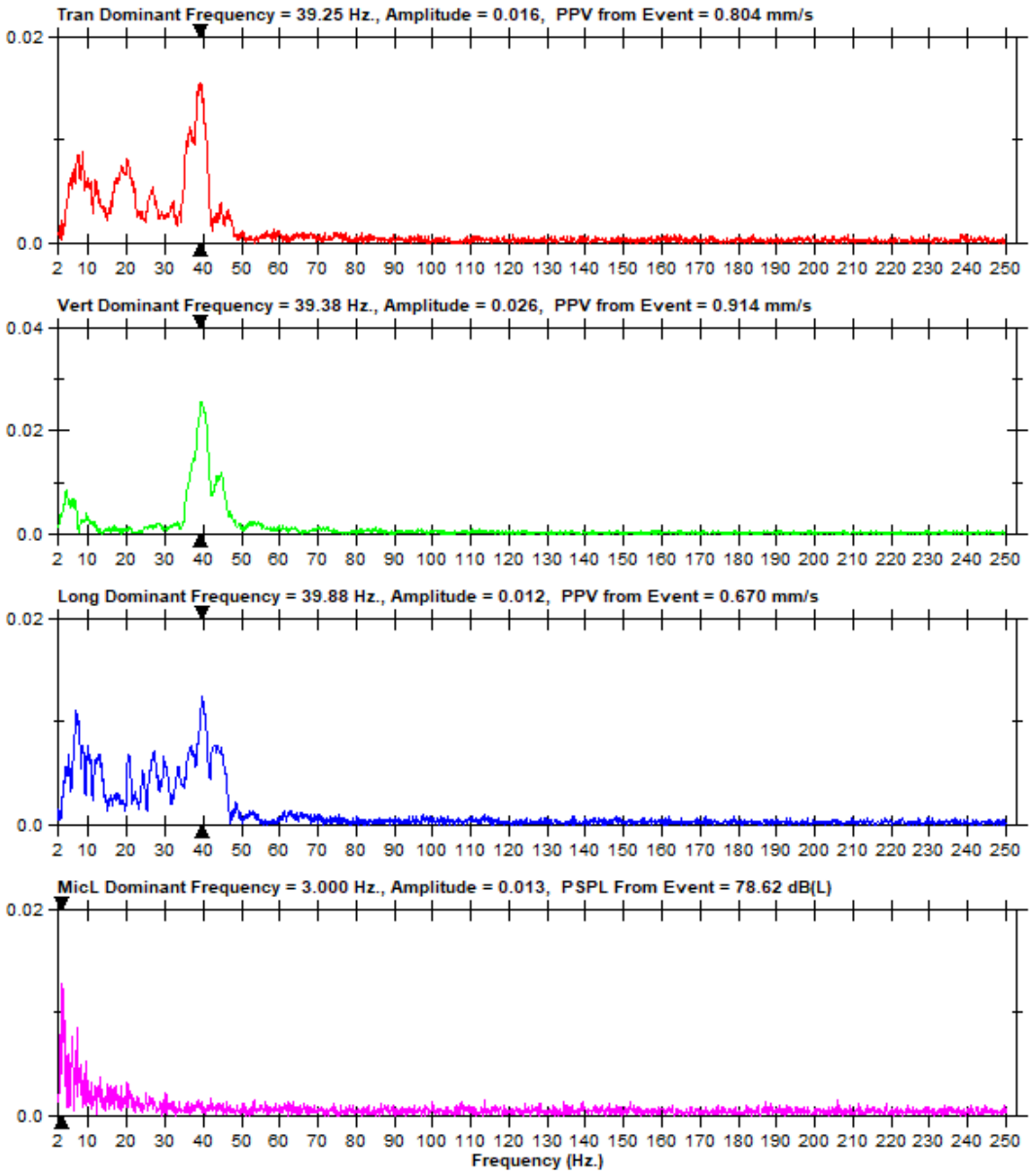
FFT Report

Date/Time	Vert at 14:16:22 February 9, 2024
Trigger Source	Geo: 0.510 mm/s
Range	Geo: 254.0 mm/s
Record Time	5.0 sec at 1024 sps
Operator/Setup:	Operator/Gare Palma.mmb

Serial Number	UM17866 V 10-90 Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	January 18, 2024 by CIMFR Dhanbad
File Name	UM17866_20240209141622.IDFW

Notes
Location: On Ground Surface
Client: Bayal Quartz & Feldspar Mines, Haryana
User Name: REE Division, CSIR-CIMFR, Dhanbad
General:

Extended Notes
Blast Vibration Study At Blast Vibration Study At Bayal Quartz & Feldspar Mines Narnaul, Mahendragarh, Haaryana-123001



Instantel

Event Report

Date/Time	Vert at 14:02:15 February 10, 2024
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	4.0 sec at 1024 sps
Operator/Setup:	Operator/Bayal.mmb

Serial Number	UM14894 V 10-89 Micromate ISEE
Battery Level	3.6 Volts
Unit Calibration	June 26, 2023 by UES New Delhi
File Name	UM14894_20240210140215.IDFW

Notes
Location: On ground surface BAYAL
Client: Bayal Quartz & Feldspar Mines Narnaul HR
User Name: CSIR-CIMFR
General:

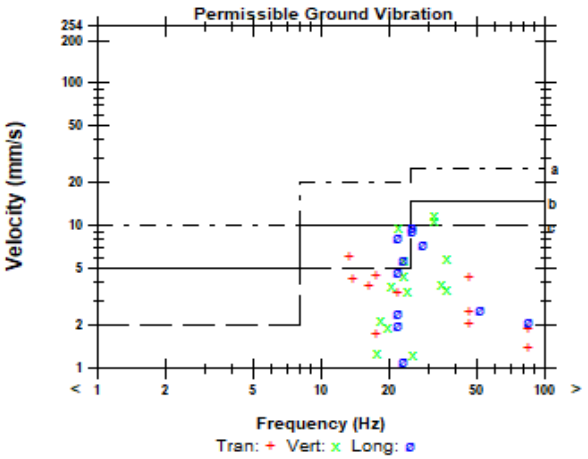
Extended Notes
Blast Vibration Study At Bayal Quartz & Feldspar Mines Narnaul, Mahendragarh, Haaryana-123001

Microphone	Linear Weighting
PSPL	123.1 dB(L) at 0.425 sec
ZC Freq	7.2 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1251 mv)

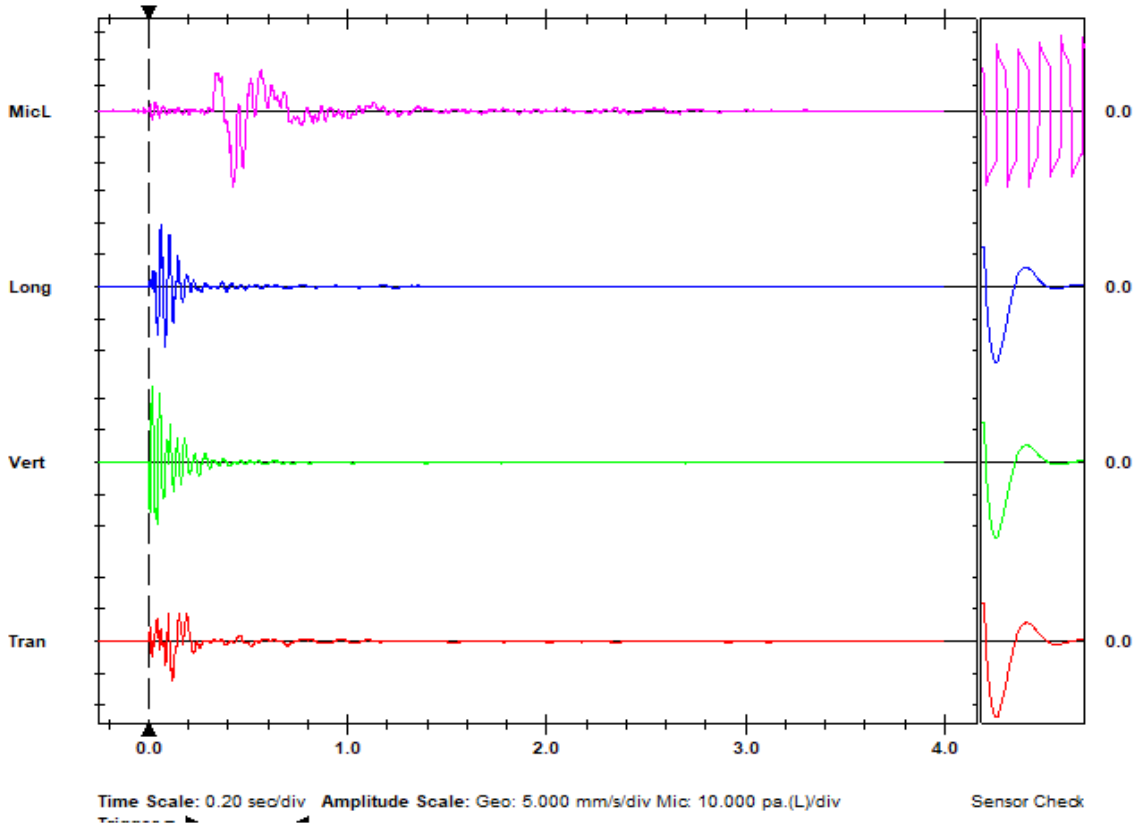
	Tran	Vert	Long	
PPV	6.171	11.75	9.718	mm/s
ZC Freq	13	32	26	Hz
Time (Rel. to Trig)	0.121	0.019	0.062	sec
Peak Acceleration	0.188	0.337	0.360	g
Peak Displacement	0.062	0.075	0.061	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.1	7.3	7.5	Hz
Overswing Ratio	4.3	4.8	4.1	

Peak Vector Sum 12.33 mm/s at 0.044 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 5.000 mm/s/div Mic: 10.000 pa.(L)/div Sensor Check

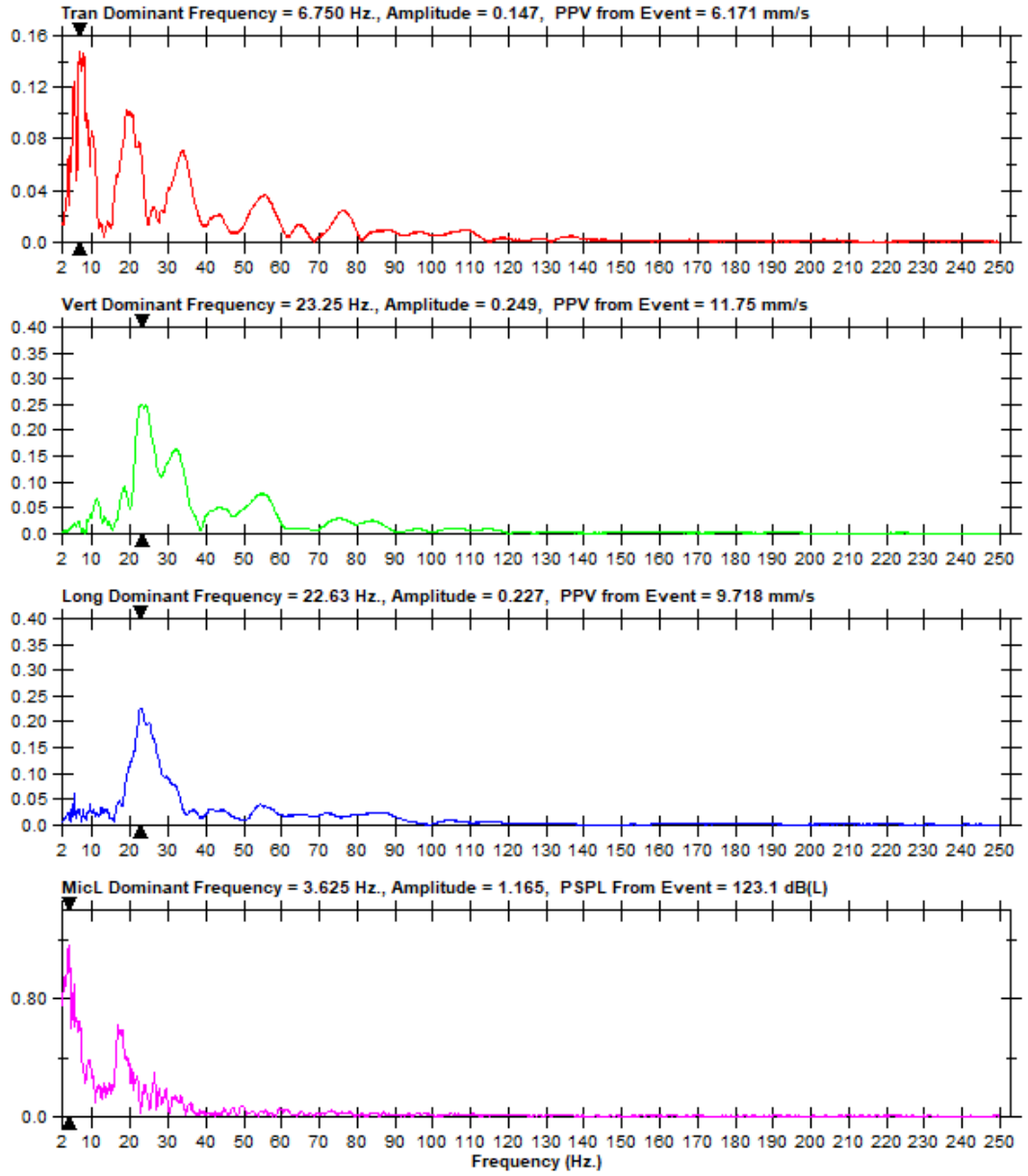
Instantel

FFT Report

Date/Time	Vert at 14:02:15 February 10, 2024	**Serial Number**	UM14894 V 10-89 Micromate ISEE
Trigger Source	Geo: 0.500 mm/s	**Battery Level**	3.6 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	June 26, 2023 by UES New Delhi
Record Time	4.0 sec at 1024 sps	**File Name**	UM14894_20240210140215.IDFW
Operator/Setup:	Operator/Bayal.mmb		

Notes
Location: On ground surface BAYAL
Client: Bayal Quartz & Feldspar Mines Narnaul HR
User Name: CSIR-CIMFR
General:

Extended Notes
Blast Vibration Study At Bayal Quartz & Feldspar Mines Narnaul, Mahendragarh, Haaryana-123001



Instantel

Event Report

Date/Time	Vert at 14:49:13 February 11, 2024
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	4.0 sec at 1024 sps
Operator/Setup:	Operator/Bayal.mmb

Serial Number	UM14894 V 10-89 Micromate ISEE
Battery Level	3.5 Volts
Unit Calibration	June 26, 2023 by UES New Delhi
File Name	UM14894_20240211144913.IDFW

Notes
Location: On ground surface BAYAL
Client: Bayal Quartz & Feldspar Mines Narnaul HR
User Name: CSIR-CIMFR
General:

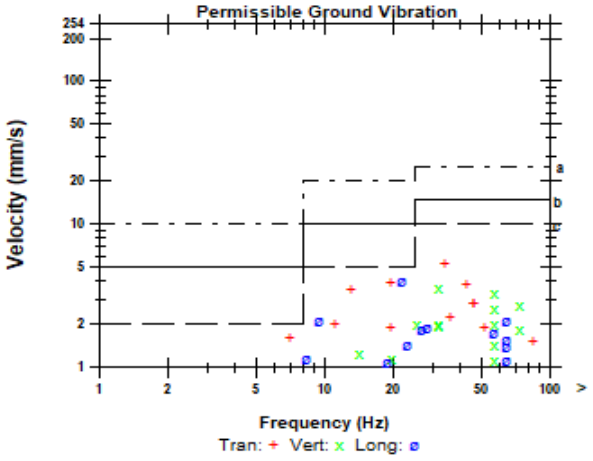
Extended Notes
Blast Vibration Study At Bayal Quartz & Feldspar Mines Narnaul, Mahendragarh, Haaryana-123001

Microphone	Linear Weighting
PSPL	112.3 dB(L) at 0.521 sec
ZC Freq	9.5 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1236 mv)

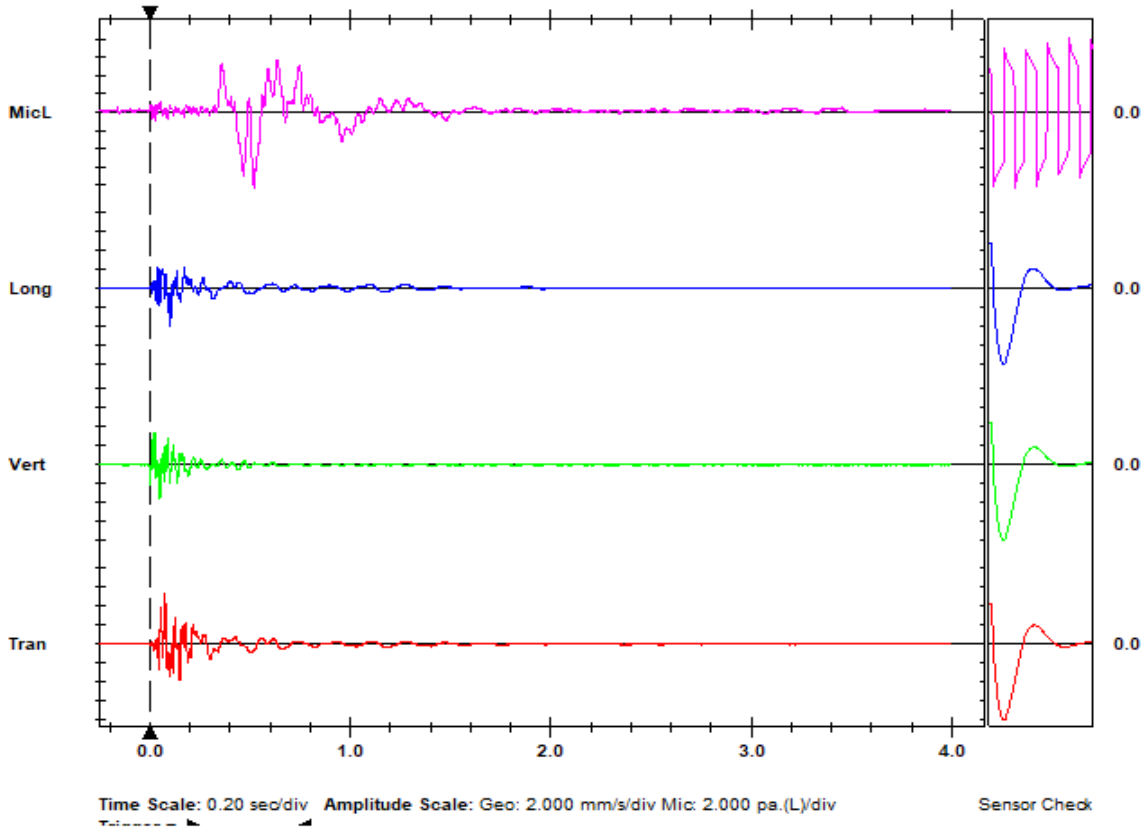
	Tran	Vert	Long	
PPV	5.328	3.578	3.972	mm/s
ZC Freq	34	32	22	Hz
Time (Rel. to Trig)	0.075	0.051	0.103	sec
Peak Acceleration	0.116	0.108	0.081	g
Peak Displacement	0.034	0.017	0.023	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.1	7.3	7.5	Hz
Overswing Ratio	4.4	4.8	4.1	

Peak Vector Sum 5.458 mm/s at 0.075 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 2.000 pa.(L)/div Sensor Check

Instantel

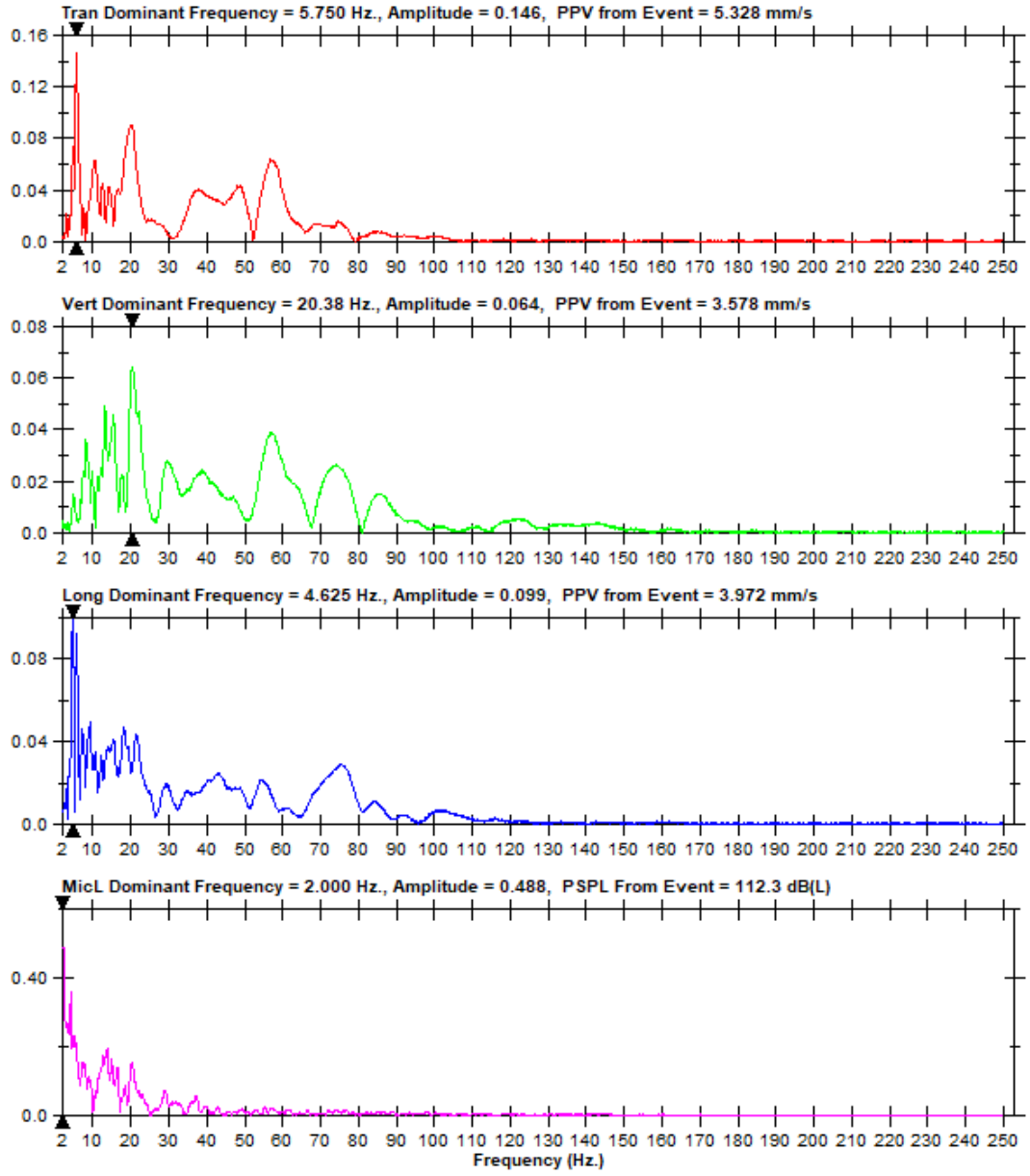
FFT Report

Date/Time	Vert at 14:49:13 February 11, 2024
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	4.0 sec at 1024 sps
Operator/Setup:	Operator/Bayal.mmb

Serial Number	UM14894 V 10-89 Micromate ISEE
Battery Level	3.5 Volts
Unit Calibration	June 26, 2023 by UES New Delhi
File Name	UM14894_20240211144913.IDFW

Notes
Location: On ground surface BAYAL
Client: Bayal Quartz & Feldspar Mines Narnaul HR
User Name: CSIR-CIMFR
General:

Extended Notes
Blast Vibration Study At Bayal Quartz & Feldspar Mines Narnaul, Mahendragarh, Haaryana-123001



Instantel

Event Report 458 Block - A①

Instantel

Date/Time	Vert at 17:33:26 January 18, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	5.599 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

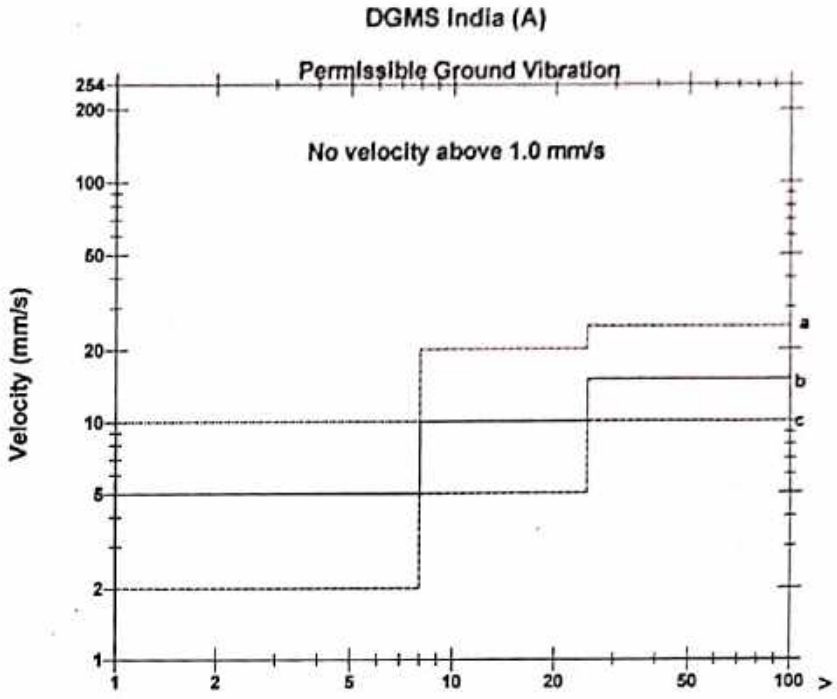
Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

GPS Location	Latitude	Longitude
Source:	027 51.863 N	075 58.748 E
Sensor1:	027 51.818 N	075 58.827 E
Distance:	154.1 m	

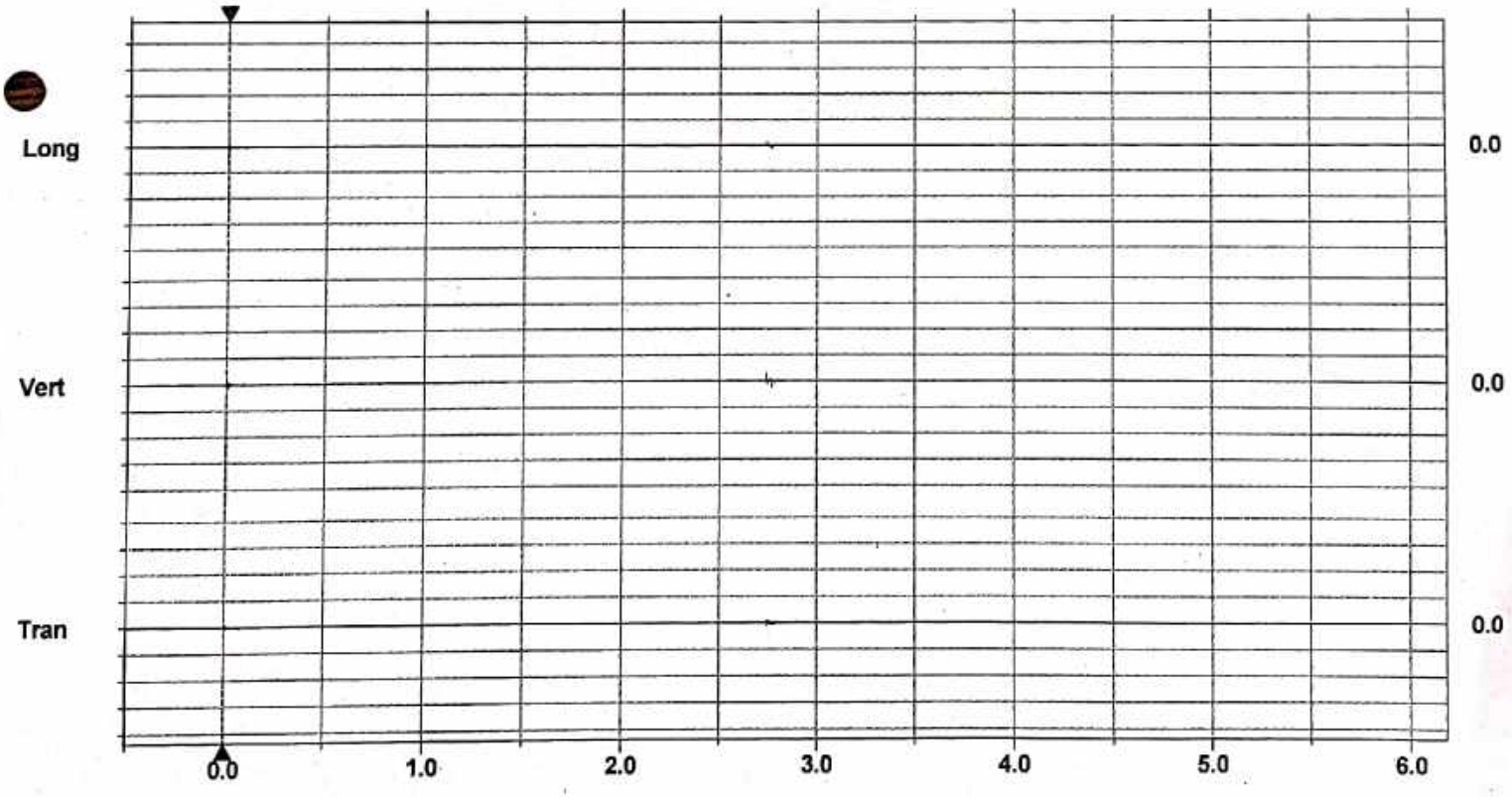
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.252	0.623	0.418	mm/s
ZC Freq	114	57	>200	Hz
Time (Rel. to Trig)	2.747	2.740	-0.001	sec
Peak Acceleration	0.020	0.067	0.059	g
Peak Displacement	0.001	0.002	0.001	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 0.650 mm/s at 2.740 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: January 19, 2025 (V 10.72 - 10.72)

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Instantel **Event Report** Instantel

Date/Time	Long at 17:54:12 January 19, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.152 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10.90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	_TEMP EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

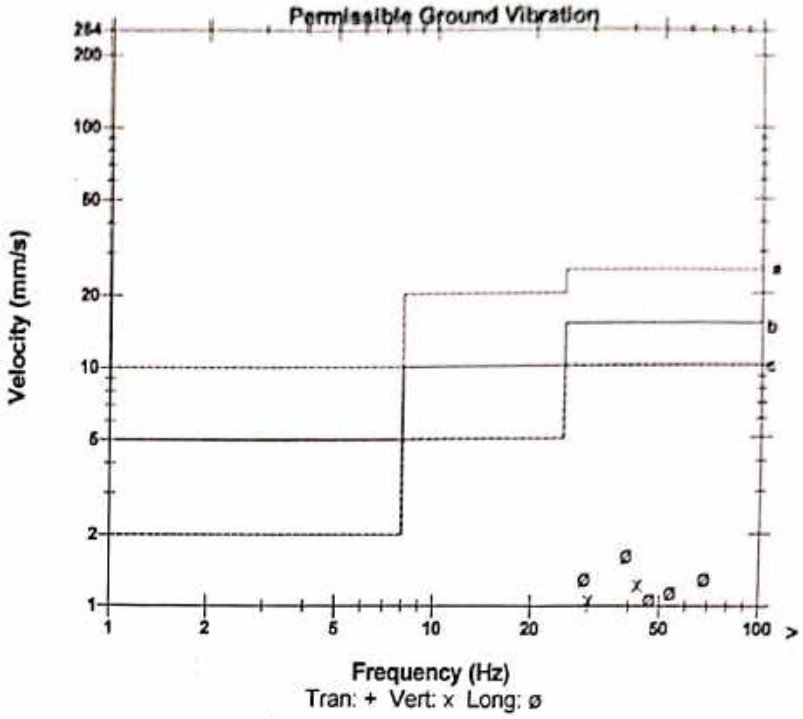
GPS Location	**Latitude**	**Longitude**
Source:	027 51.863 N	075 58.748 E
Sensor1:	027 51.818 N	075 58.827 E
Distance:	154.1 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

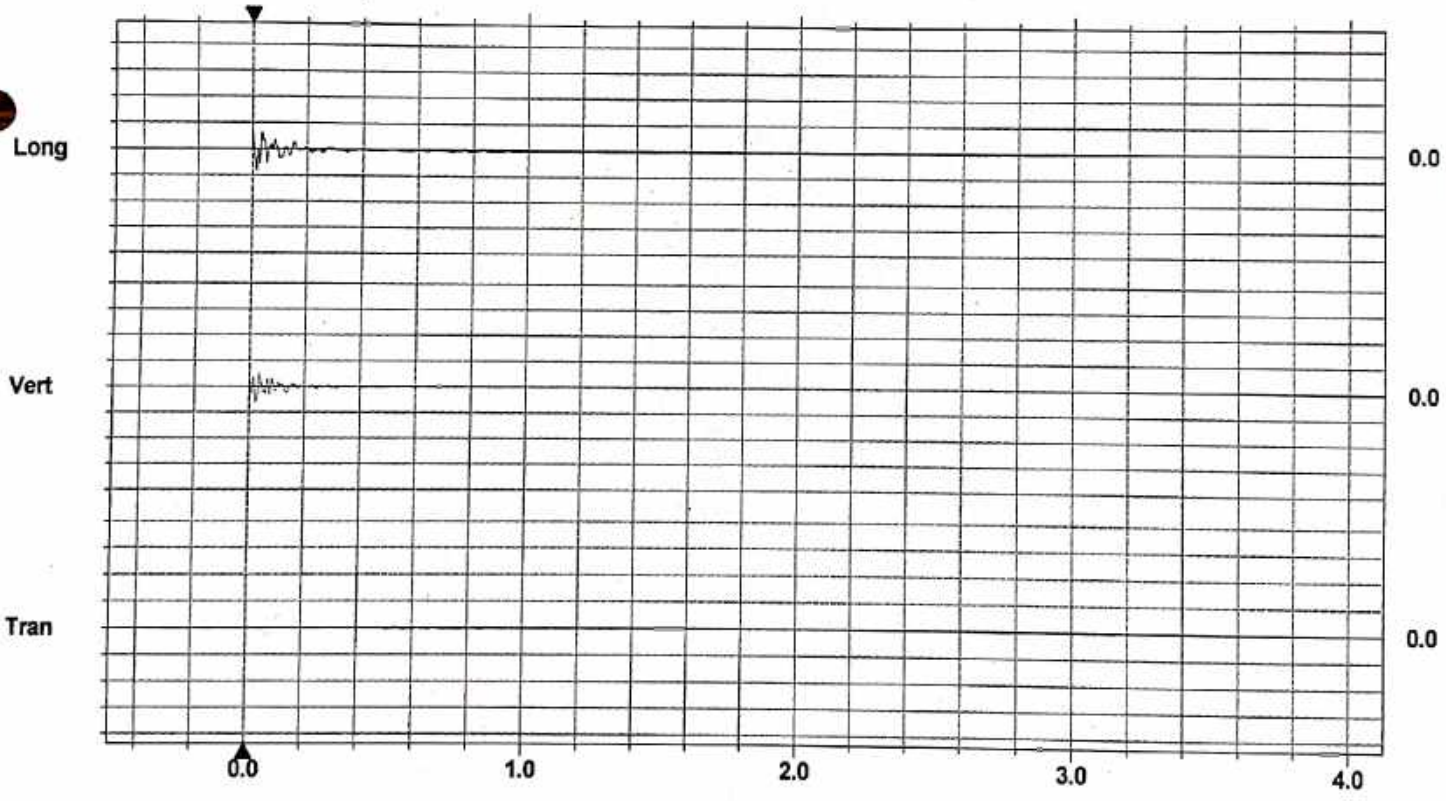
	Tran	**Vert**	**Long**	
PPV	0.102	1.237	1.632	mm/s
ZC Freq	18.0	43	39	Hz
Time (Rel. to Trig)	0.567	0.023	0.013	sec
Peak Acceleration	0.015	0.051	0.271	g
Peak Displacement	0.001	0.005	0.009	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.668 mm/s at 0.013 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

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Date/Time	Tran at 17:31:13 January 20, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.178 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10.90F B Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

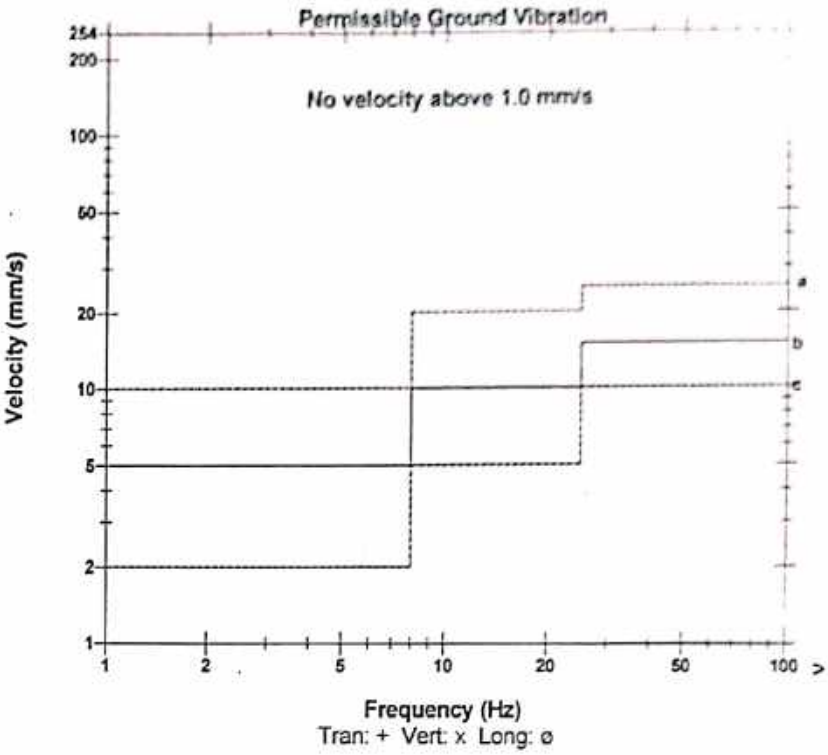
GPS Location	**Latitude**	**Longitude**
Source:	027 51.863 N	075 58.748 E
Sensor1:	027 51.818 N	075 58.827 E
Distance:	154.1 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	0.646	0.757	0.741	mm/s
Freq	33	38	32	Hz
Time (Rel. to Trig)	0.222	0.208	0.142	sec
Peak Acceleration	0.018	0.026	0.021	g
Peak Displacement	0.004	0.004	0.004	mm
Sensor Check	Check	Check	Check	

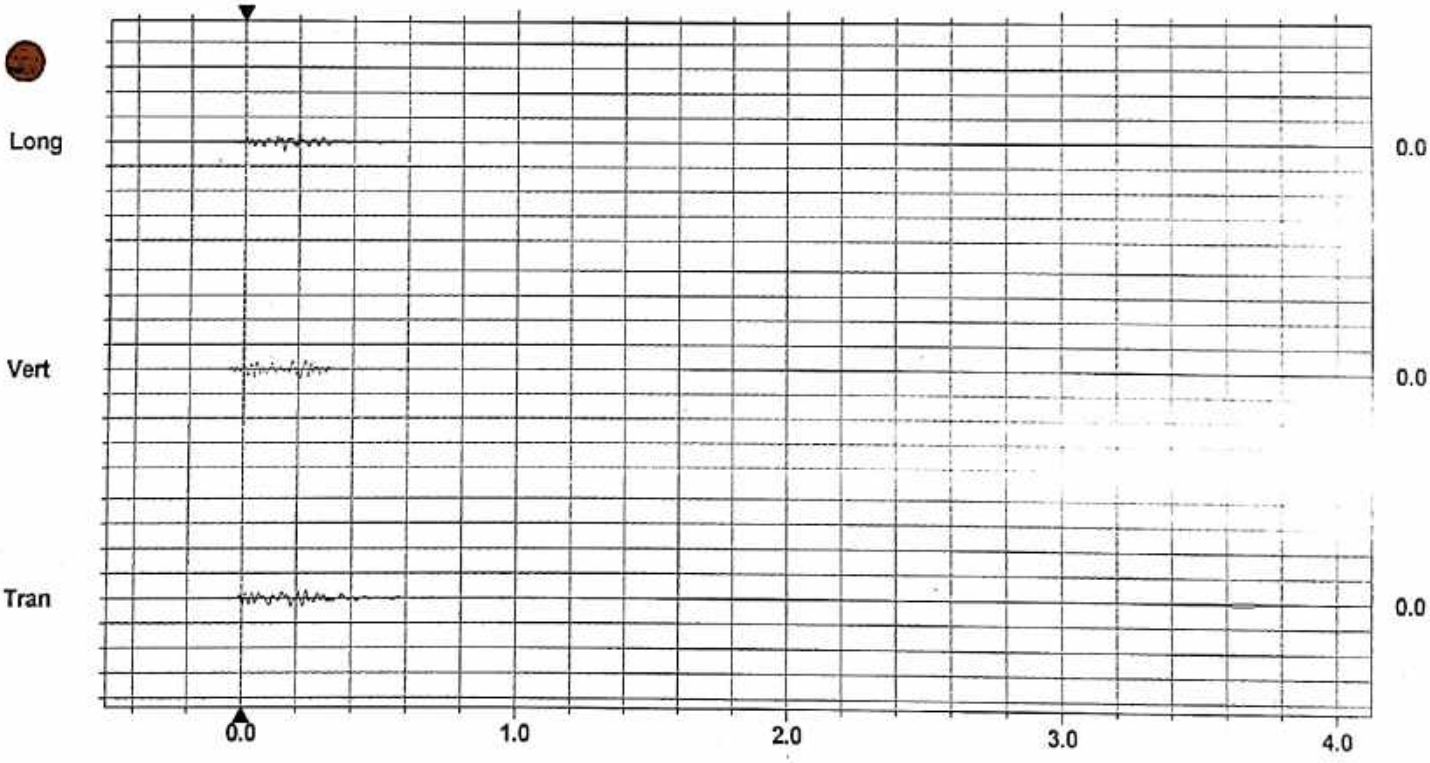
Peak Vector Sum 0.914 mm/s at 0.208 sec

DGMS India (A)



Frequency (Hz)
Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶——◀

Printed: January 21, 2025 (V 10.72 - 10.72)

Format © 1995-2014 Xmark Corporation

Date/Time	Vert at 17:57:14 January 21, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.019 sec (Auto+3Sec) at 2048 spS
Operator/Setup:	Operator/Bayal Mines MMB

GPS Location	Latitude	Longitude
Source	027 51 863 N	075 58 748 E
Sensor1	027 51 818 N	075 58 827 E
Distance	154.1 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Serial Number	UM14994 V 15.60F8 Micromate ISEE
	Battery Level	3.8 Volts
	Unit Calibration	June 28, 2024 by UES New Delhi
	File Name	TEMP.EVT
	Scaled Distance	487.4 (154.1 m, 0.1 kg)

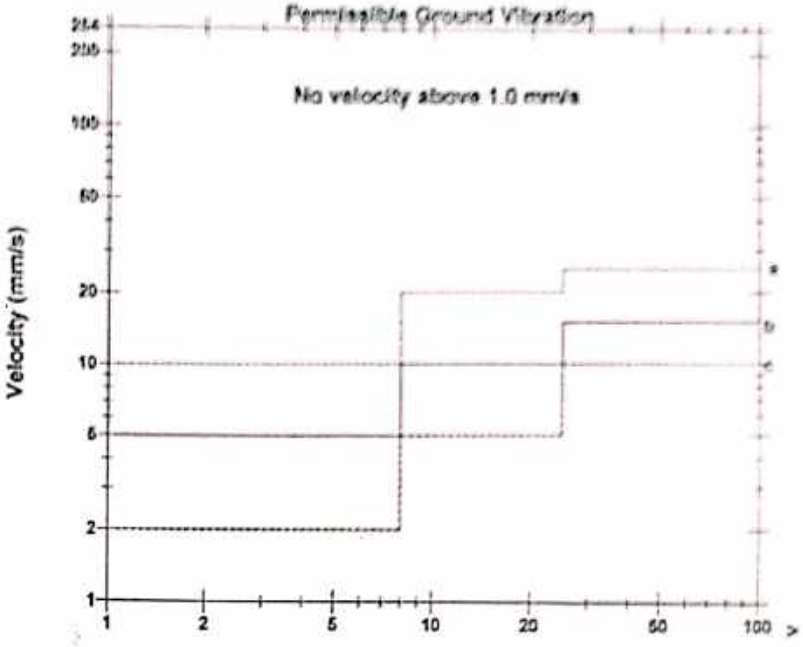
	Tran	Vert	Long	
PPV	0.276	0.977	0.292	mm/s
Freq	41	54	25	Hz
Time (Rel. to Trig)	0.021	0.005	0.006	sec
Peak Acceleration	0.023	0.051	0.018	g
Peak Displacement	0.001	0.002	0.001	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 0.994 mm/s at 0.006 sec

DGMS India (A)

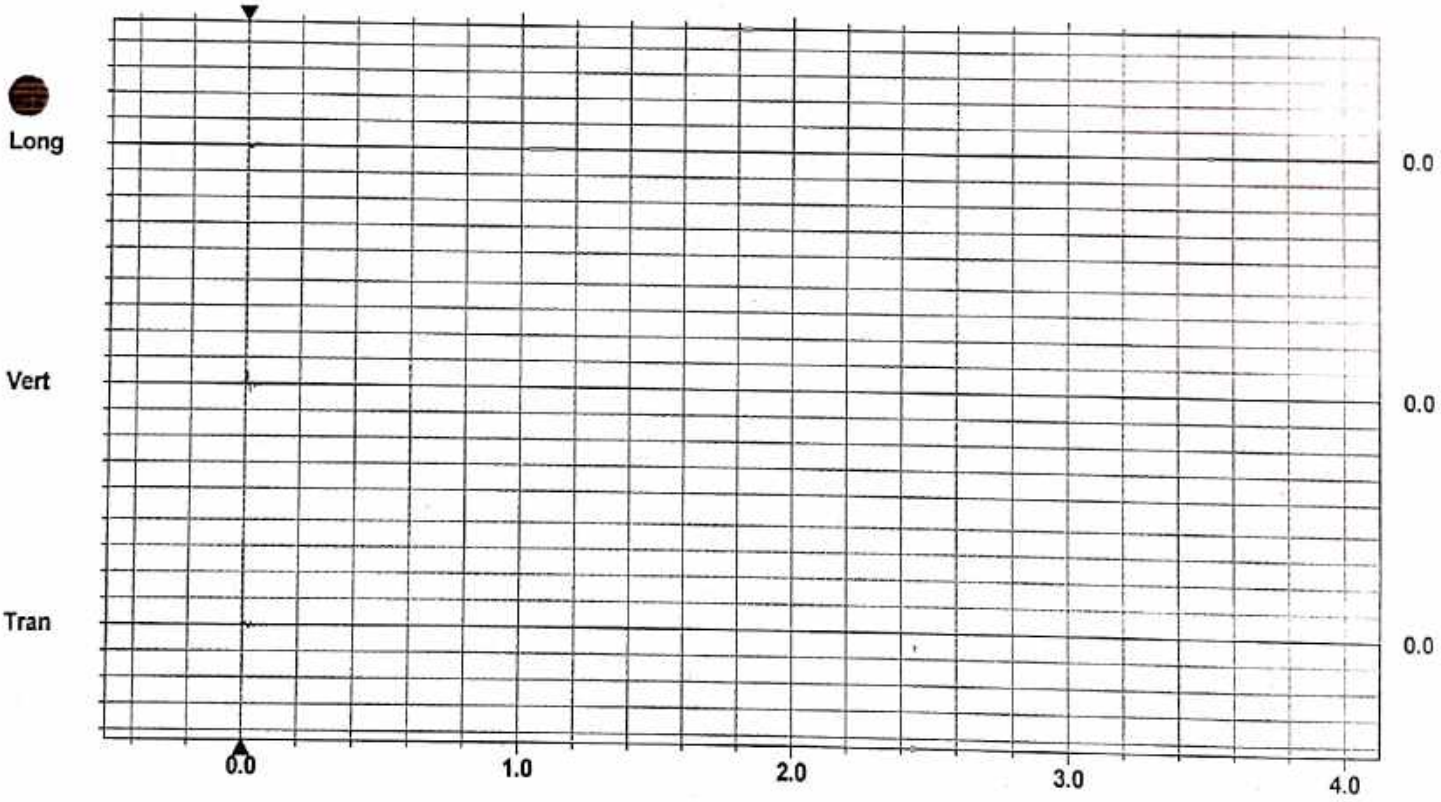
Permissible Ground Vibration

No velocity above 1.0 mm/s



Frequency (Hz)
Tran: + Vert: x Long: o

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: January 22, 2025 (V 10.72 - 10.72)

Format © 1995-2014 Xmark Corporation

Instantel **Event Report** BLOCK - P6 Instantel

Date/Time	Long at 17:57:40 January 22, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.155 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14864 V 10.60FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	_TEMP.EVT
Scaled Distance	467.4 (154.1 m, 0.1 kg)

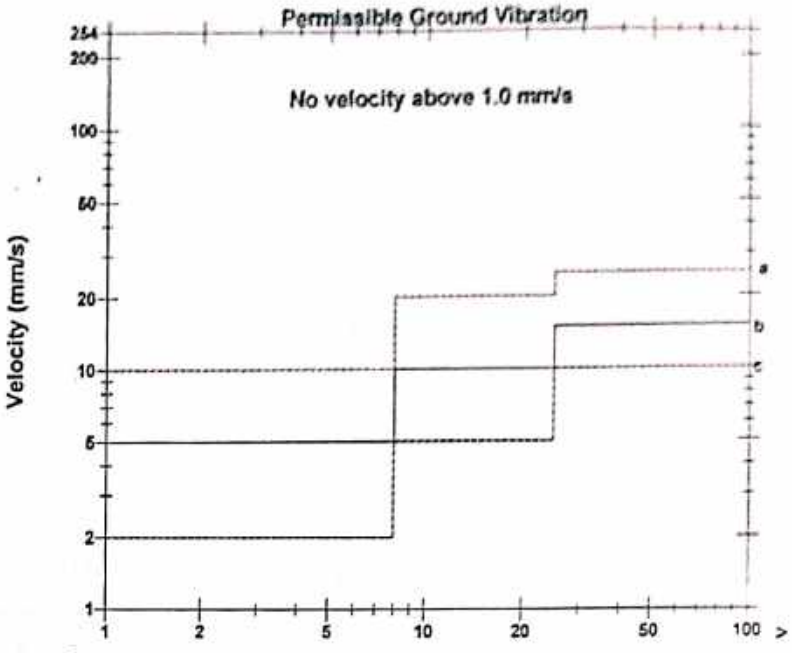
GPS Location	**Latitude**	**Longitude**
Source:	027 51.863 N	075 58.748 E
Sensor1:	027 51.818 N	075 58.827 E
Distance:	154.1 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.654	0.457	0.962	mm/s
Zero Freq	29	47	24	Hz
Time (Rel. to Trig)	0.031	0.020	0.216	sec
Peak Acceleration	0.018	0.018	0.020	g
Peak Displacement	0.004	0.002	0.006	mm
Sensor Check	Passed	Passed	Passed	

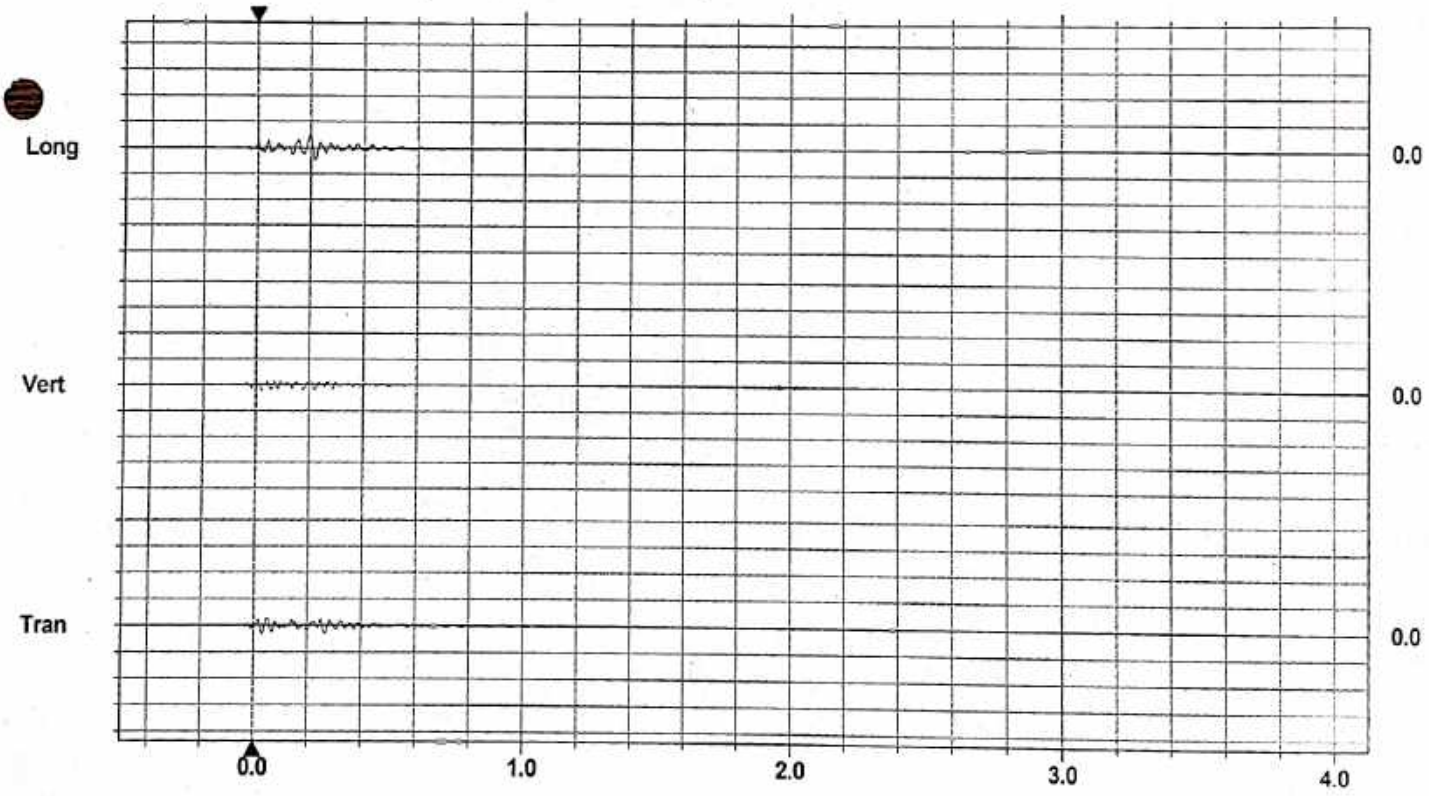
Peak Vector Sum 1.029 mm/s at 0.198 sec

DGMS India (A)



Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: January 23, 2025 (V 10.72 - 10.72)

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Instantel

Event Report

Instantel

Date/Time	Vert at 17:42:42 January 24, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.313 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMD

GPS Location	Latitude	Longitude
Source:	027 51.863 N	075 58.748 E
Sensor1:	027 51.818 N	075 58.827 E
Distance:	154.1 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

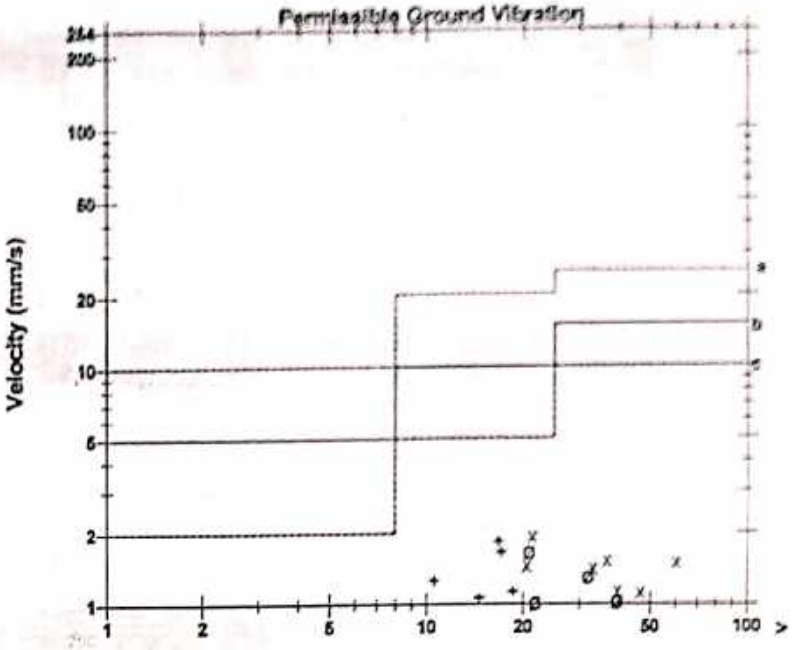
	Tran	Vert	Long	
PPV	1.829	1.939	1.663	mm/s
Freq	16.8	21	21	Hz
Time (Rel. to Trig)	0.200	0.121	0.132	sec
Peak Acceleration	0.031	0.056	0.044	g
Peak Displacement	0.017	0.010	0.009	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.087 mm/s at 0.146 sec

Serial Number	UM 14624 V 10.00 B Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 28, 2024 by UES New Delhi
File Name	TEMP.EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

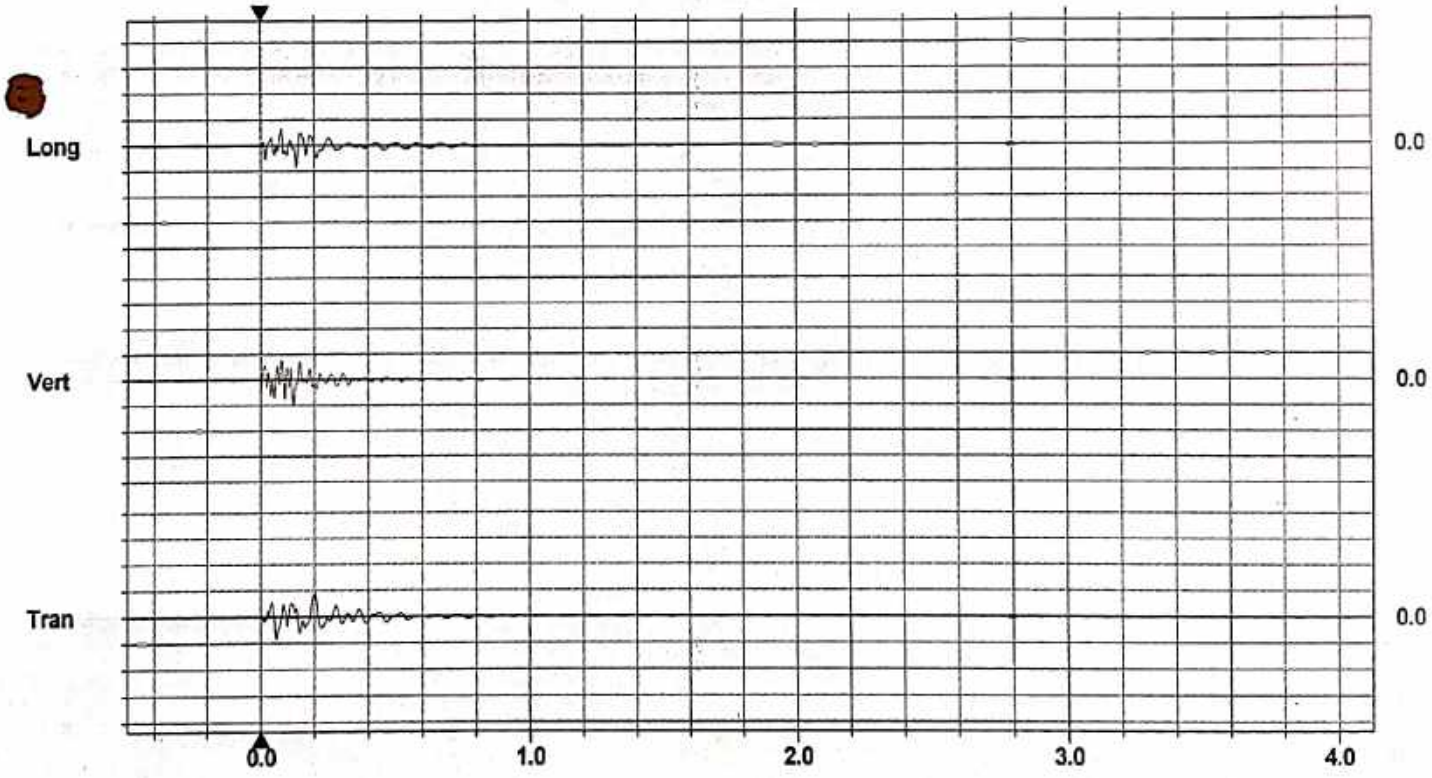
DGMS India (A)

Permissible Ground Vibration



Frequency (Hz)
Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: January 25, 2025 (V 10.72 - 10.72)

Format © 1995-2014 Xmark Corporation

Date/Time	Vert at 17:35:13 January 26, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.048 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	467.4 (154.1 m, 0.1 kg)

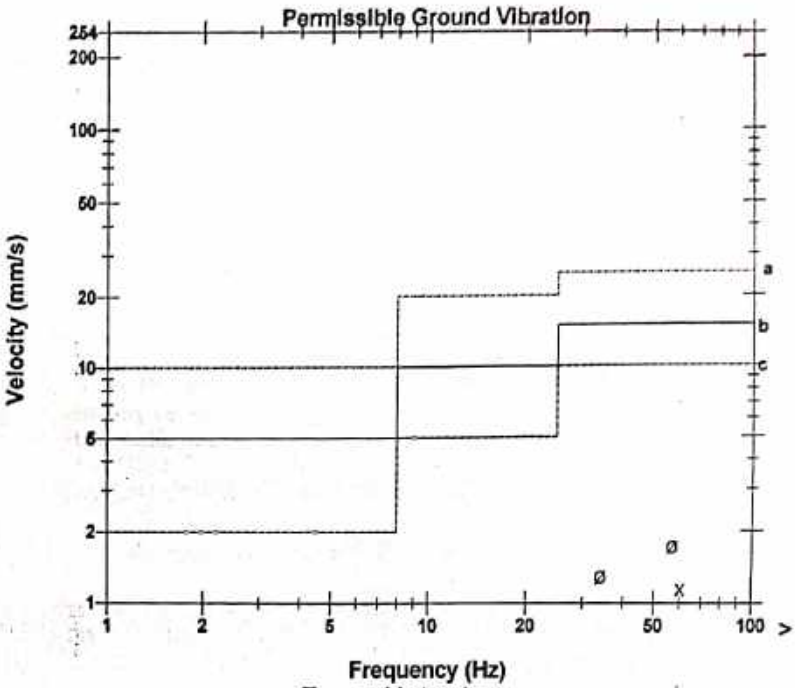
GPS Location	**Latitude**	**Longitude**
Source:	027 51.863 N	075 58.748 E
Sensor1:	027 51.818 N	075 58.827 E
Distance:	154.1 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

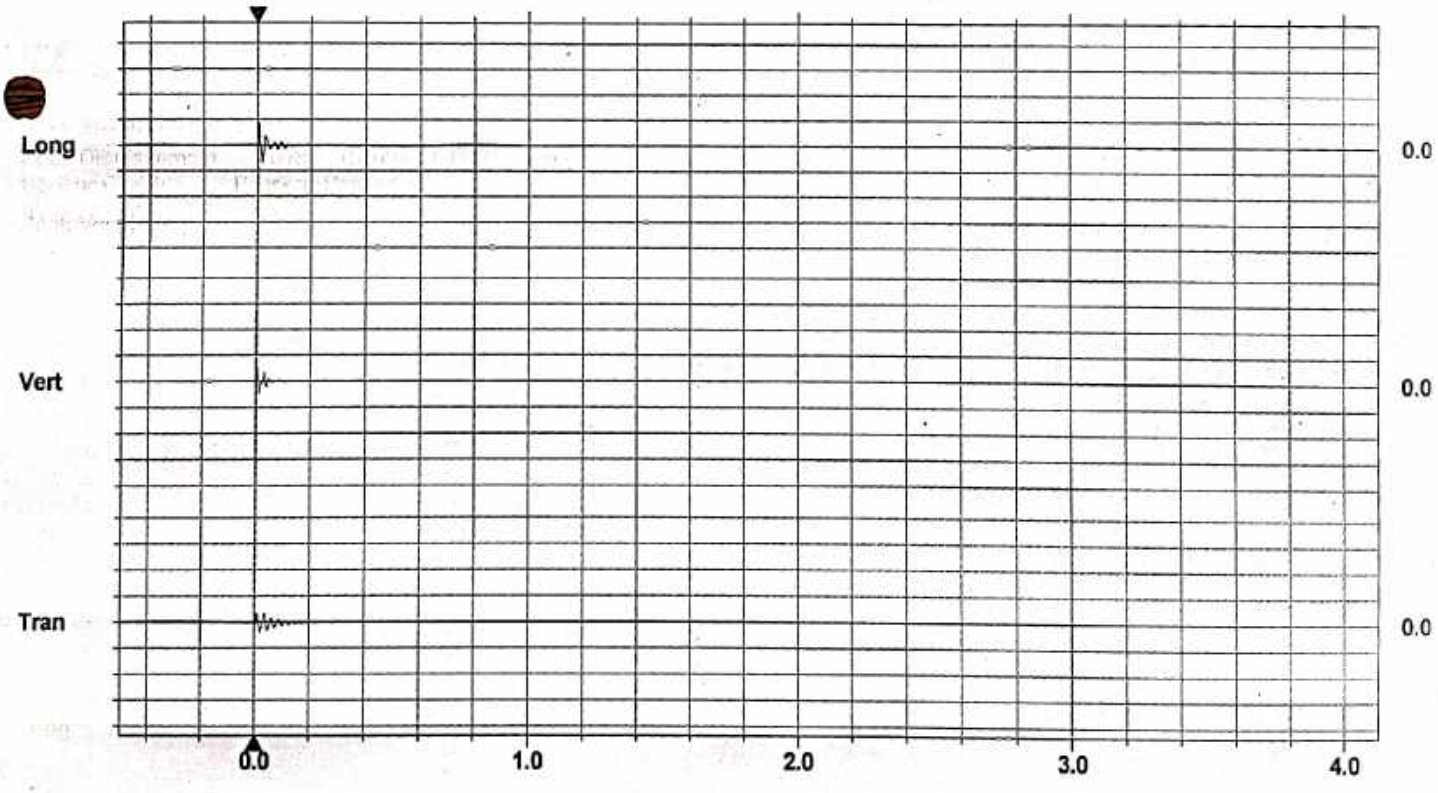
	Tran	Vert	Long	
PPV	0.788	1.151	1.734	mm/s
Freq	33	60	57	Hz
Time (Rel. to Trig)	0.019	0.002	0.004	sec
Peak Acceleration	0.033	0.049	0.074	g
Peak Displacement	0.013	0.003	0.009	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.884 mm/s at 0.004 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: January 26, 2025 (V 10.72 - 10.72) Format © 1995-2014 Xmark Corporation

Instantel **Event Report** Instantel

Date/Time	Tran at 17:57:51 January 26, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.237 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10.90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	TEMP.EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

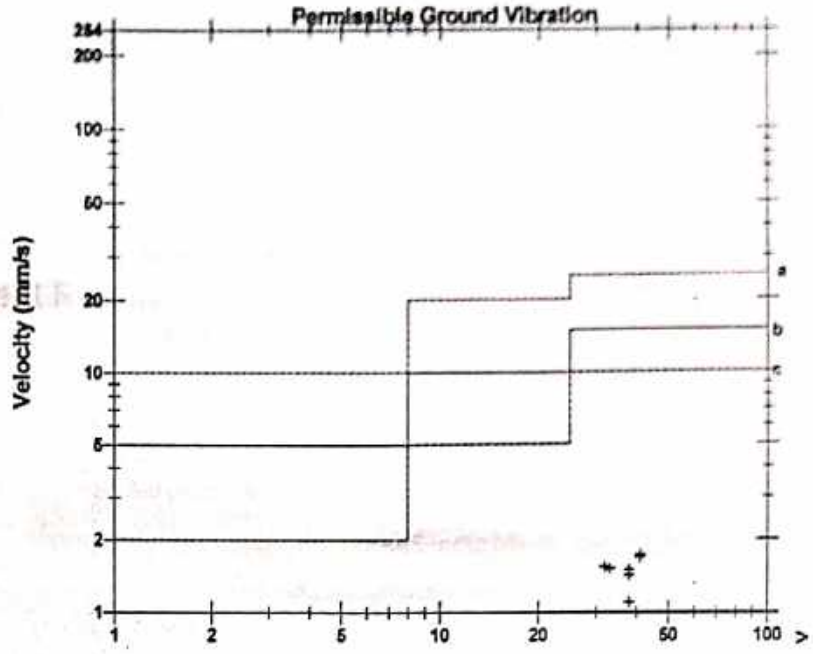
GPS Location	Latitude	Longitude
Source:	027 51.863 N	075 58.748 E
Sensor1:	027 51.818 N	075 58.827 E
Distance:	154.1 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

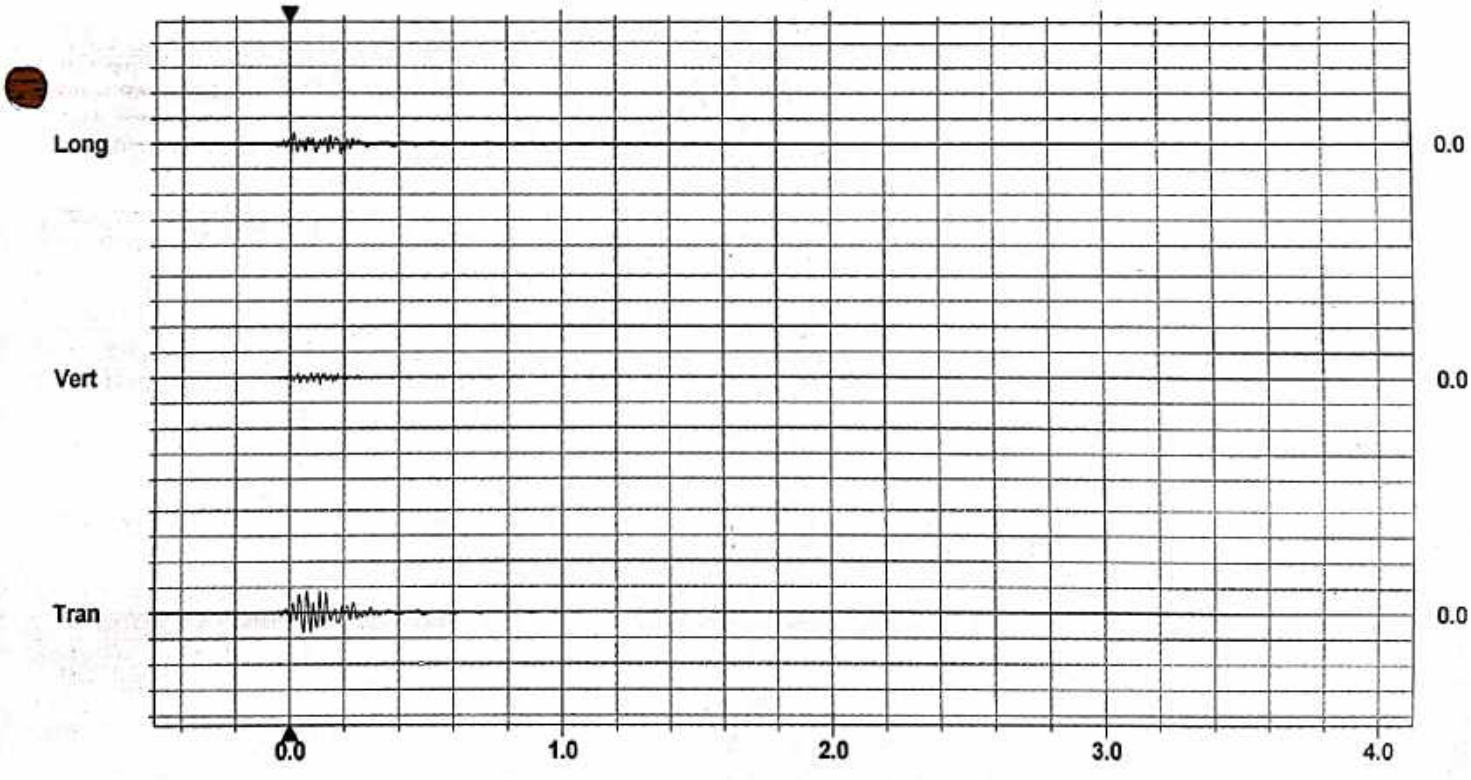
	Tran	Vert	Long	
PPV	1.718	0.481	0.906	mm/s
ZC Freq	41	57	43	Hz
Time (Rel. to Trig)	0.063	0.109	0.012	sec
Peak Acceleration	0.048	0.021	0.030	g
Peak Displacement	0.007	0.002	0.005	mm
Sensor Check	Passed	Check	Passed	

Peak Vector Sum 1.817 mm/s at 0.063 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: January 27, 2025 (V 10.72 - 10.72)

Format © 1995-2014 Xmark Corporation

Date/Time	Vert at 18:21:23 January 27, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.0 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

GPS Location	**Latitude**	**Longitude**
Source:	027 51.863 N	075 58.748 E
Sensor1:	027 51.818 N	075 58.827 E
Distance:	154.1 m	

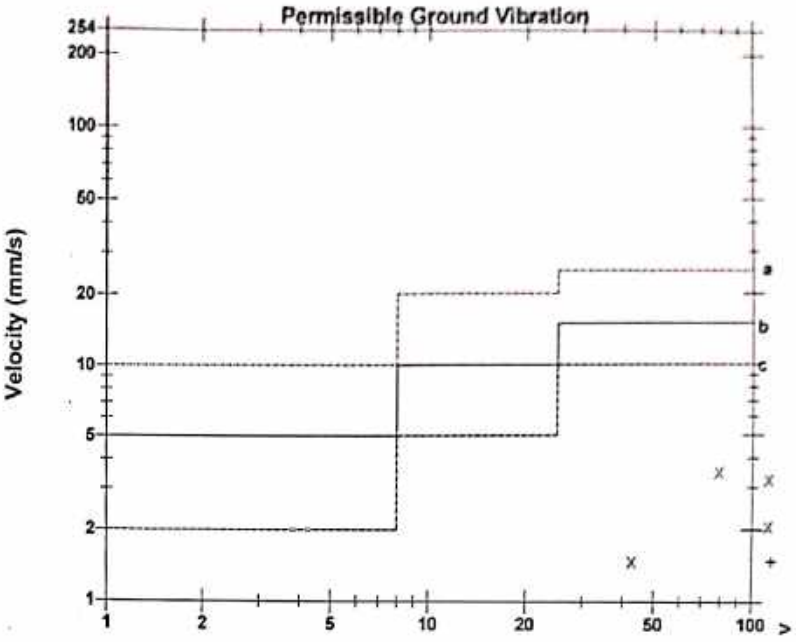
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

Serial Number	UM14894 V 10.90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	_TEMP.EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

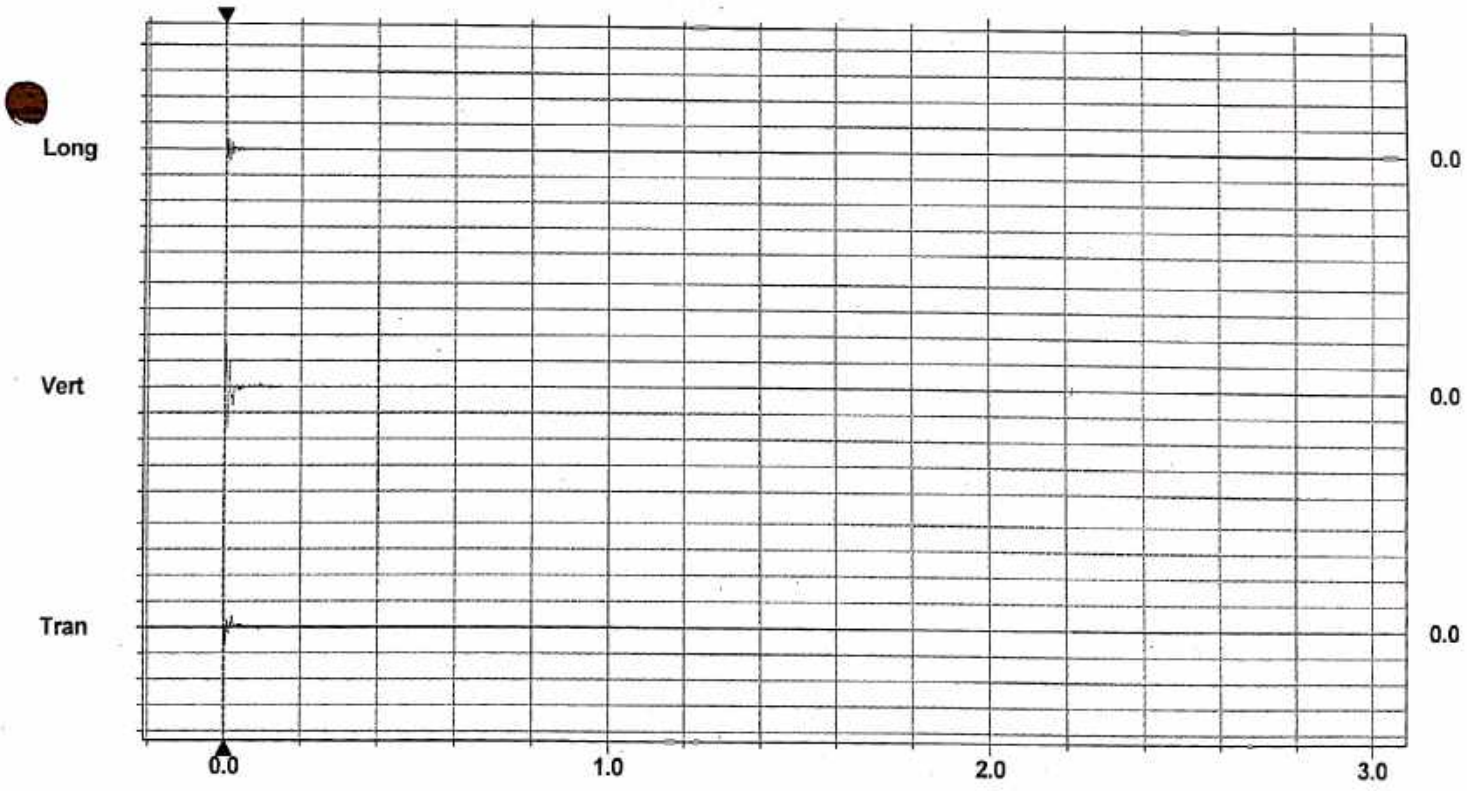
	Tran	**Vert**	**Long**	
PPV	1.466	3.515	0.835	mm/s
ZC Freq	102	79	93	Hz
Time (Rel. to Trig)	0.003	0.003	0.010	sec
Peak Acceleration	0.087	0.313	0.094	g
Peak Displacement	0.003	0.006	0.001	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 3.856 mm/s at 0.003 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

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Instantel **Event Report** Instantel

Date/Time	Tran at 17:17:34 January 28, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.258 sec (Auto+3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

GPS Location	**Latitude**	**Longitude**
Source	027 51 883 N	075 58 748 E
Sensor1	027 51 818 N	075 58 827 E
Distance	154.1 m	

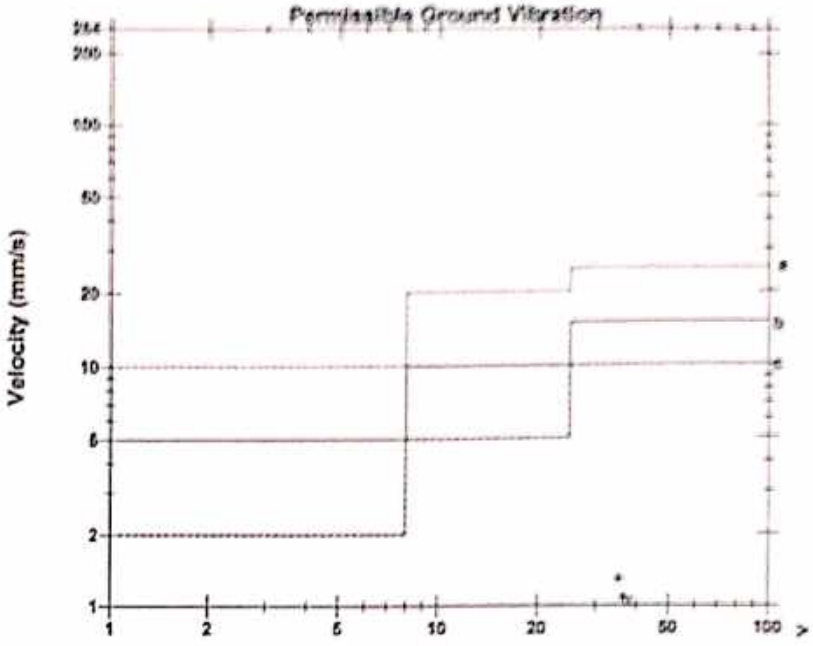
Notes
Location: Near Bayal Mines Blasting to 200 mtr
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	1.285	1.048	0.733	mm/s
Freq	35	38	33	Hz
Time (Rel. to Trig)	0.134	0.081	0.148	sec
Peak Acceleration	0.030	0.033	0.025	g
Peak Displacement	0.005	0.004	0.003	mm
Sensor Check	Passed	Passed	Passed	

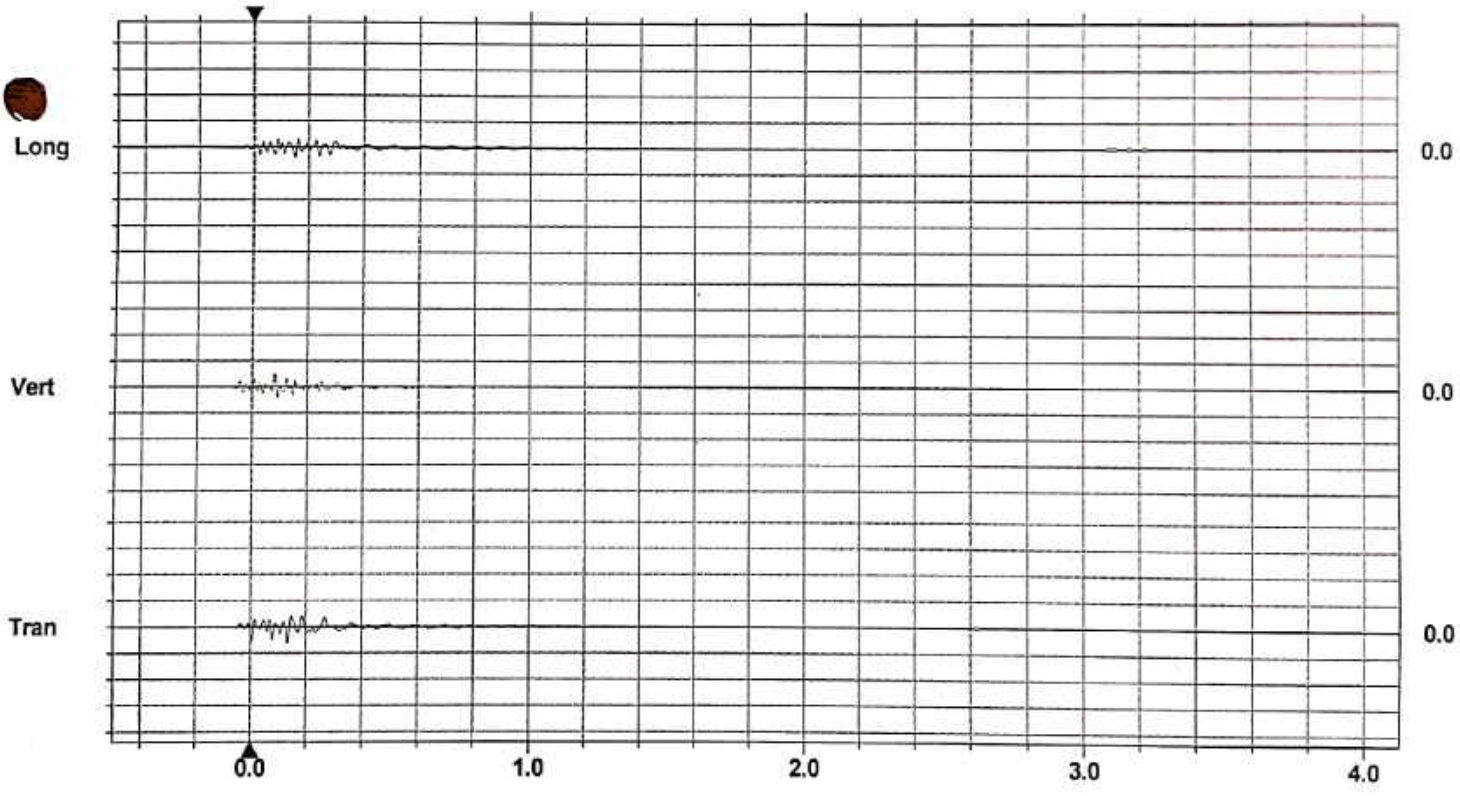
Peak Vector Sum 1.370 mm/s at 0.079 sec

Serial Number	UM14864 V 10.90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	TEMP 6.VT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: January 29, 2025 (V 10.72 - 10.72)

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Instantel

Event Report

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Instantel

Date/Time	Vert at 17:12:20 January 29, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.211 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MM8

GPS Location	Latitude	Longitude
Source	027 51 865 N	075 56 748 E
Sensor1	027 51 818 N	075 56 827 E
Distance	154.1 m	

Serial Number	UM14664 V 10.60 FB Micromate IISE
Battery Level	5.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	TEMP.EVT
Scaled Distance	480.4 (154.1 m, 0.1 kg)

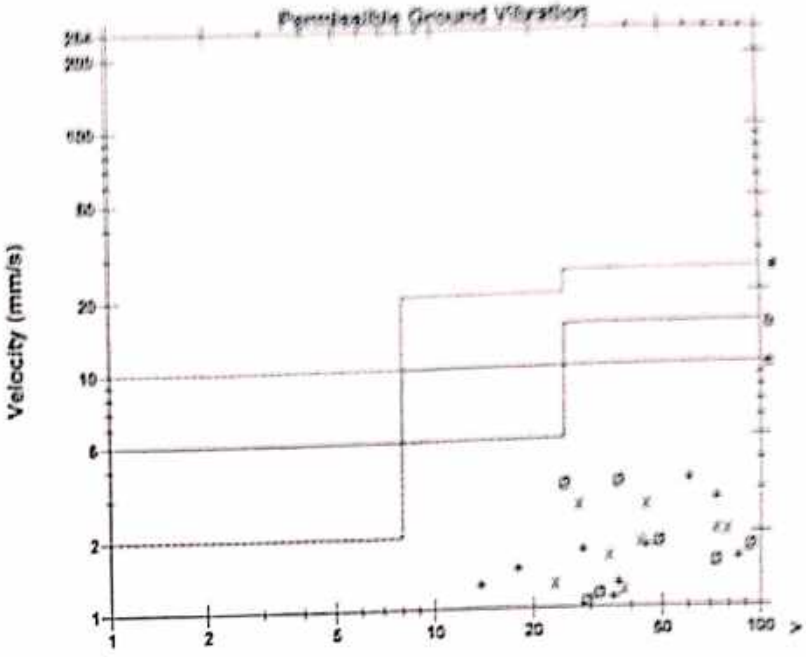
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	3.318	2.680	3.326	mm/s
ZC Freq	60	28	37	Hz
Time (Rel. to Trig)	0.029	0.021	0.042	sec
Peak Acceleration	0.140	0.114	0.120	g
Peak Displacement	0.012	0.013	0.014	mm
Sensor Check	Passed	Passed	Passed	

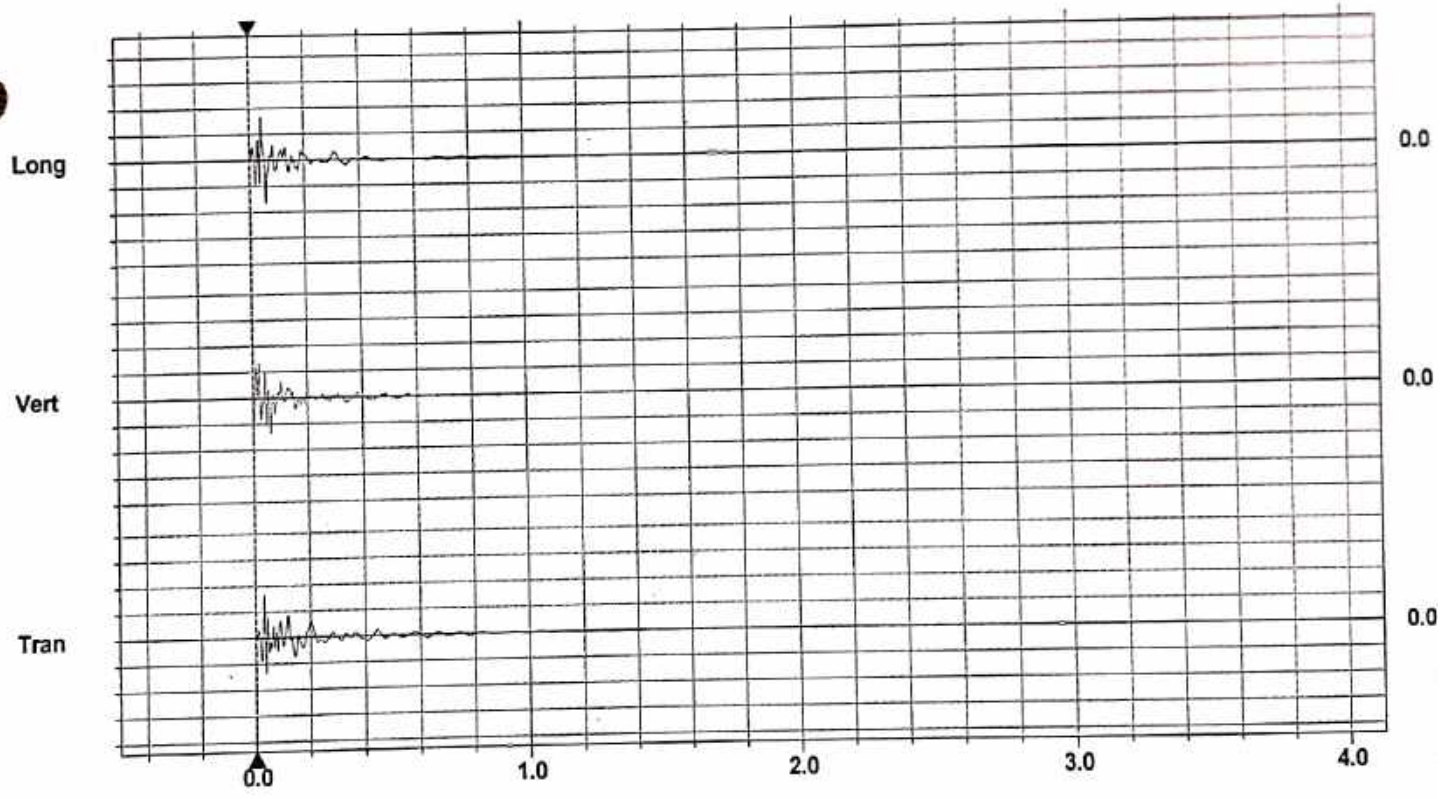
Peak Vector Sum 4.109 mm/s at 0.043 sec

DGMS India (A)

Permissible Ground Vibration



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div
Trigger =

Printed: January 30, 2025 (V 10.72 - 10.72)

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Date/Time	Vert at 17:16:52 January 31, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.568 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

GPS Location	Latitude	Longitude
Source:	027 51.863 N	075 58.748 E
Sensor1:	027 51.818 N	075 58.827 E
Distance:	154.1 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

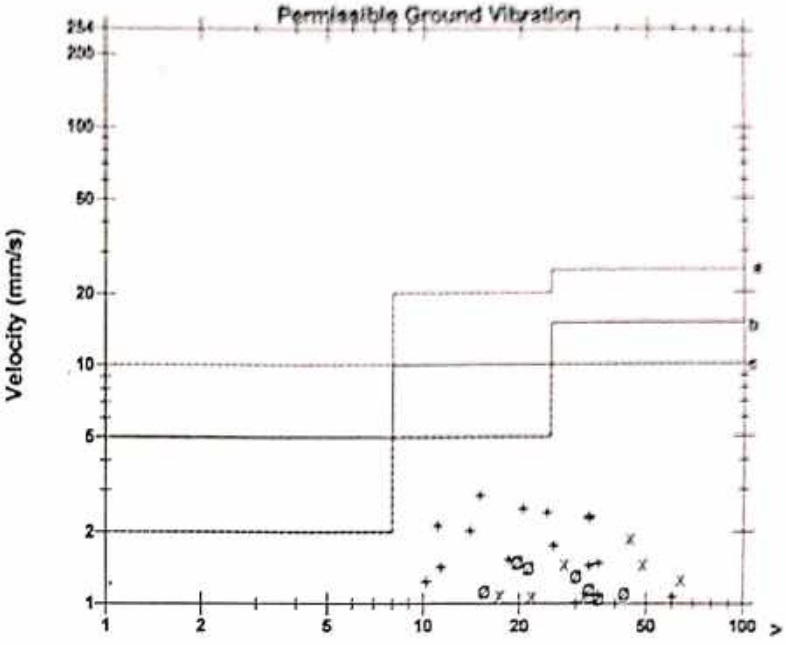
	Tran	Vert	Long	
[redacted]	2.830	1.884	1.505	mm/s
Freq	15.1	45	19.7	Hz
Time (Rel. to Trig)	0.289	0.052	0.300	sec
Peak Acceleration	0.056	0.063	0.039	g
Peak Displacement	0.022	0.008	0.011	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 3.234 mm/s at 0.289 sec

Serial Number	UM14894 V 10.90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 28, 2024 by UES New Delhi
File Name	...TEMP.EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

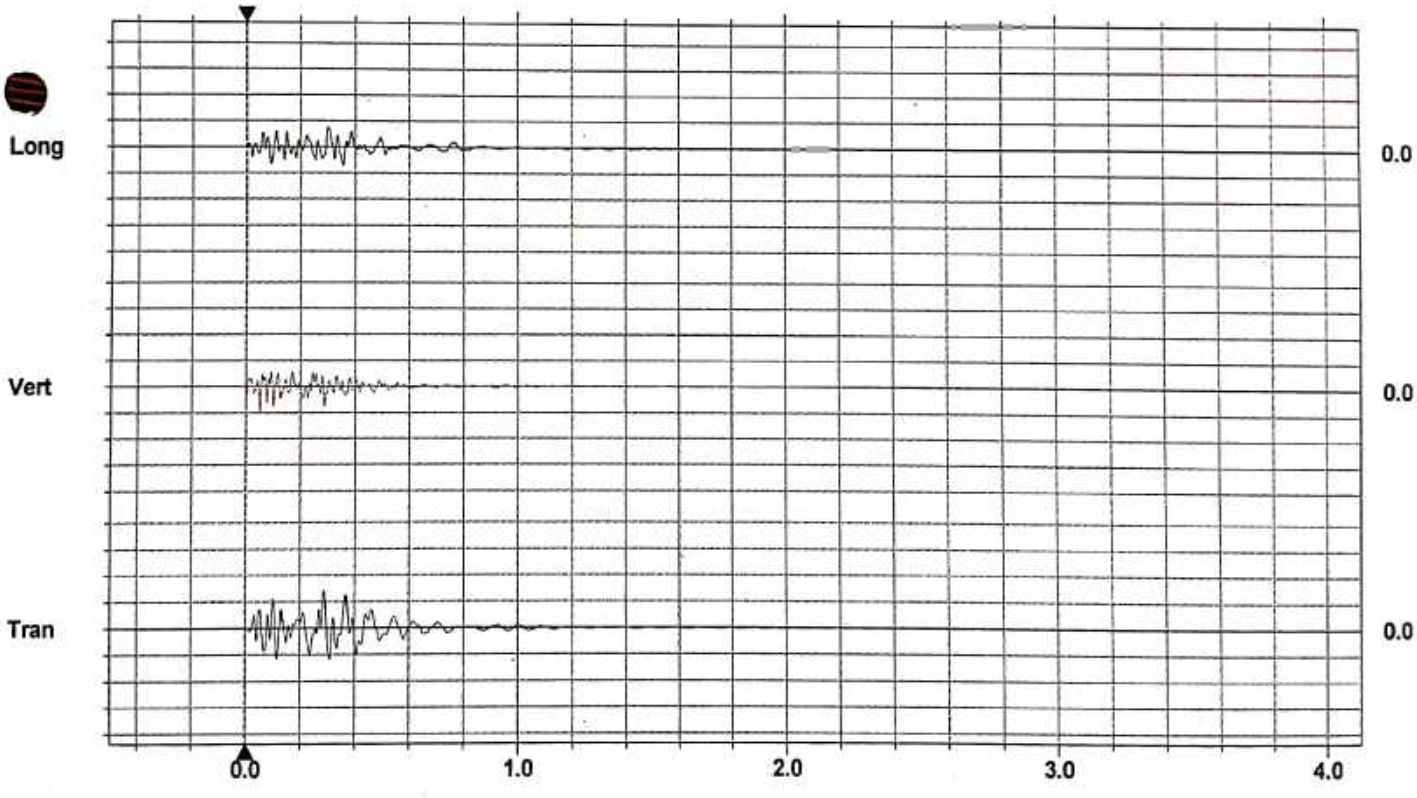
DGMS India (A)

Permissible Ground Vibration



Frequency (Hz)
Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

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Date/Time	Vert at 17:17:31 January 31, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.021 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

GPS Location	Latitude	Longitude
Source	027 51 883 N	075 58 748 E
Sensor1	027 51 818 N	075 58 827 E
Distance	154.1 m	

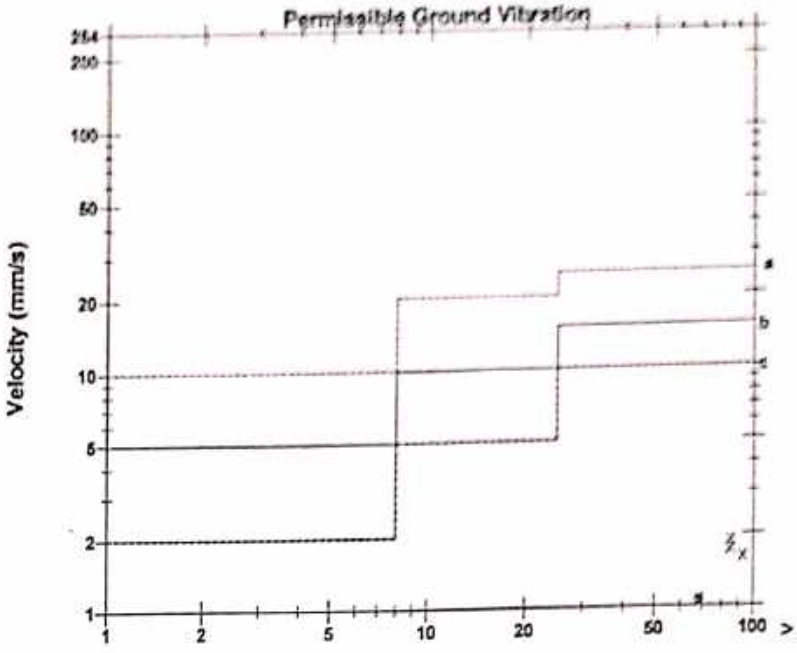
Serial Number	UM14894 V 10.60FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	TEMP.EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	1.056	1.892	0.883	mm/s
Freq	68	85	93	Hz
Time (Rel. to Trig)	0.002	0.002	0.007	sec
Peak Acceleration	0.054	0.158	0.061	g
Peak Displacement	0.002	0.003	0.002	mm
Sensor Check	Passed	Passed	Passed	

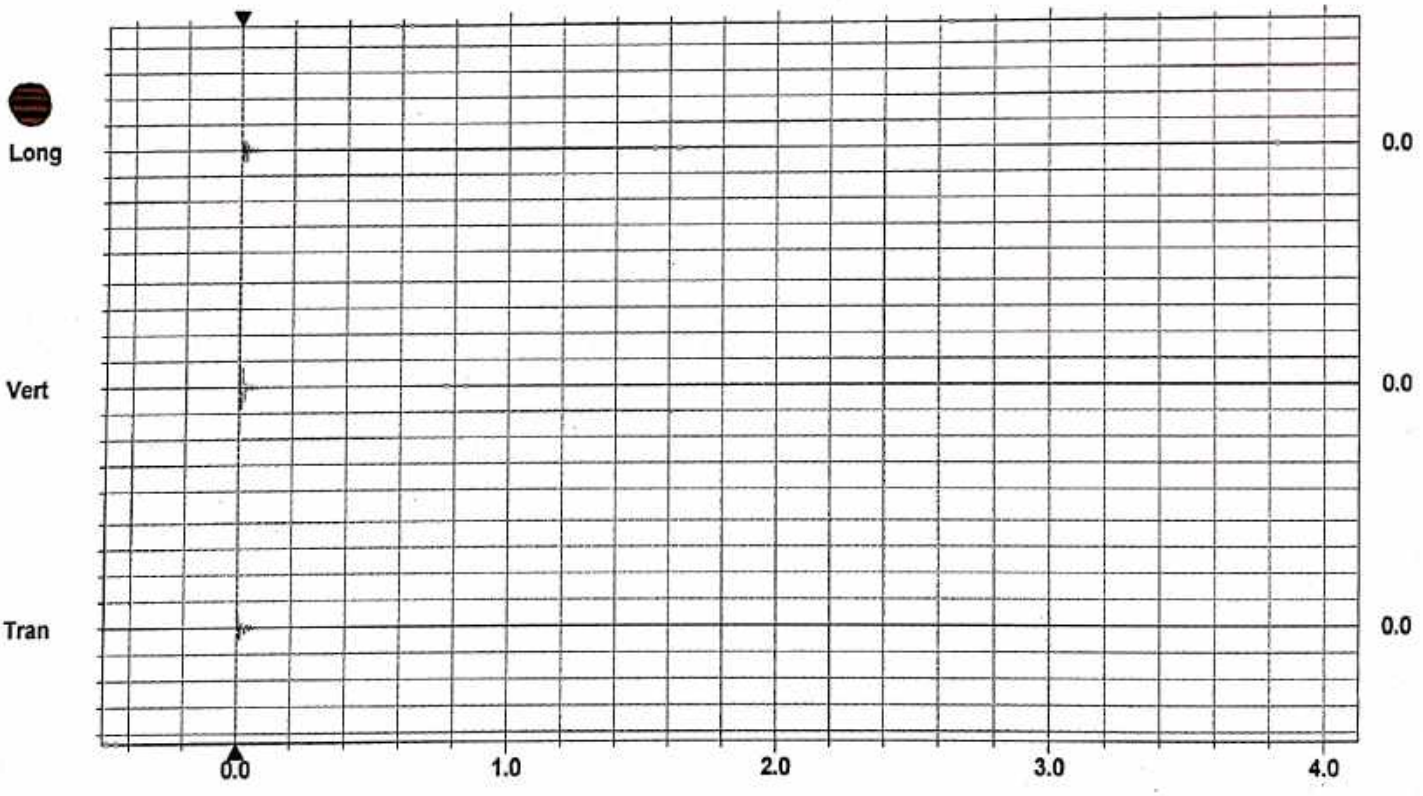
Peak Vector Sum 2.216 mm/s at 0.002 sec

DGMS India (A)



Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: February 1, 2025 (V 10.72 - 10.72)

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Date/Time	Vert at 17:02:24 February 2, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	2.75 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10.90F B Micromate ISEE
Battery Level	3.6 Volts
Unit Calibration	June 28, 2024 by UES New Delhi
File Name	TEMP EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

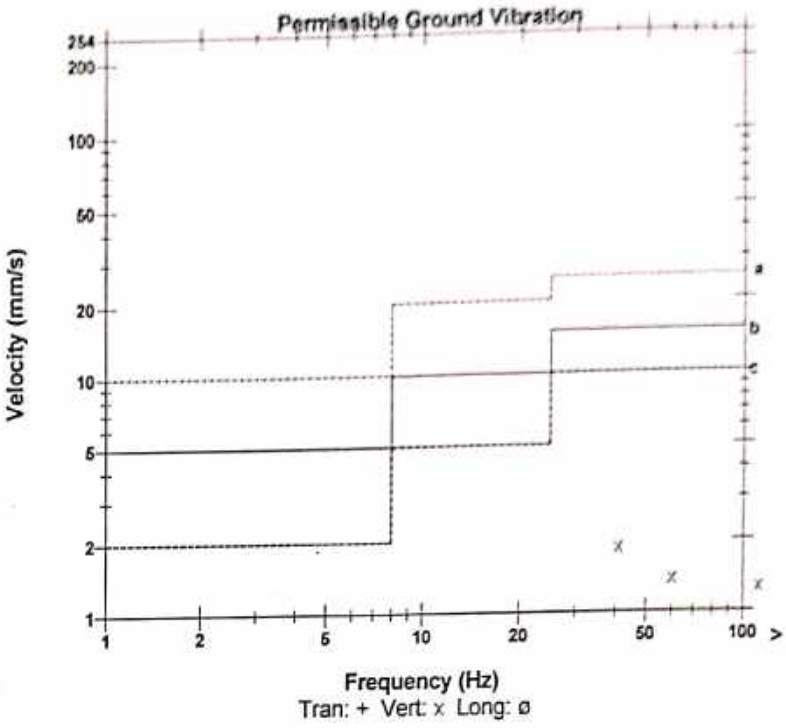
GPS Location	Latitude	Longitude
Source:	027 51.863 N	075 58.748 E
Sensor1:	027 51.818 N	075 58.827 E
Distance:	154.1 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

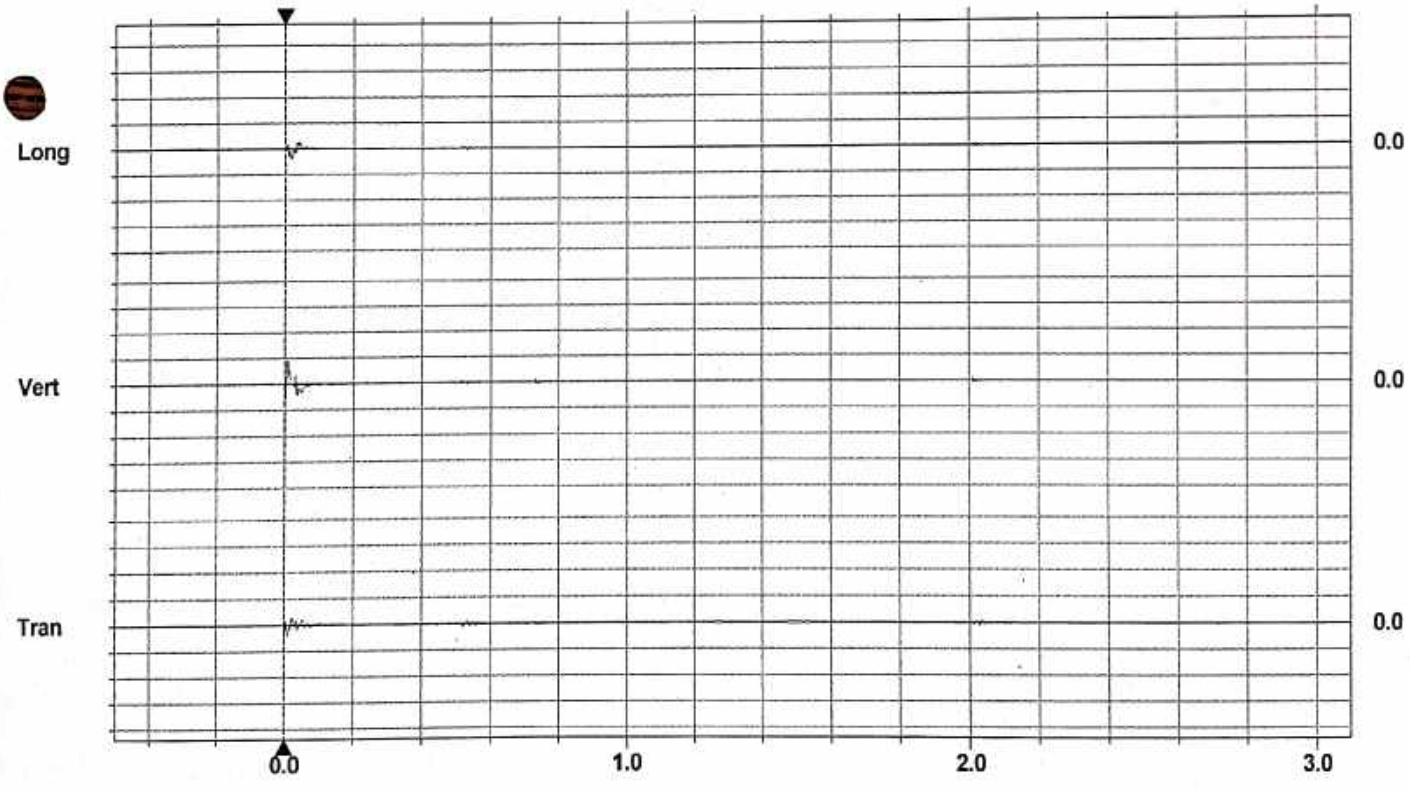
	Tran	Vert	Long	
PPV	0.788	1.876	0.765	mm/s
Freq	38	41	22	Hz
Time (Rel. to Trig)	0.009	0.006	0.018	sec
Peak Acceleration	0.059	0.193	0.056	g
Peak Displacement	0.003	0.007	0.004	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.000 mm/s at 0.010 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶——◀

Printed: February 3, 2025 (V 10.72 - 10.72) Format © 1995-2014 Xmark Corporation

Date/Time	Long at 17:15:31 February 3, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.197 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

GPS Location	**Latitude**	**Longitude**
Source:	027 51.863 N	075 58.748 E
Sensor1:	027 51.818 N	075 58.827 E
Distance:	154.1 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

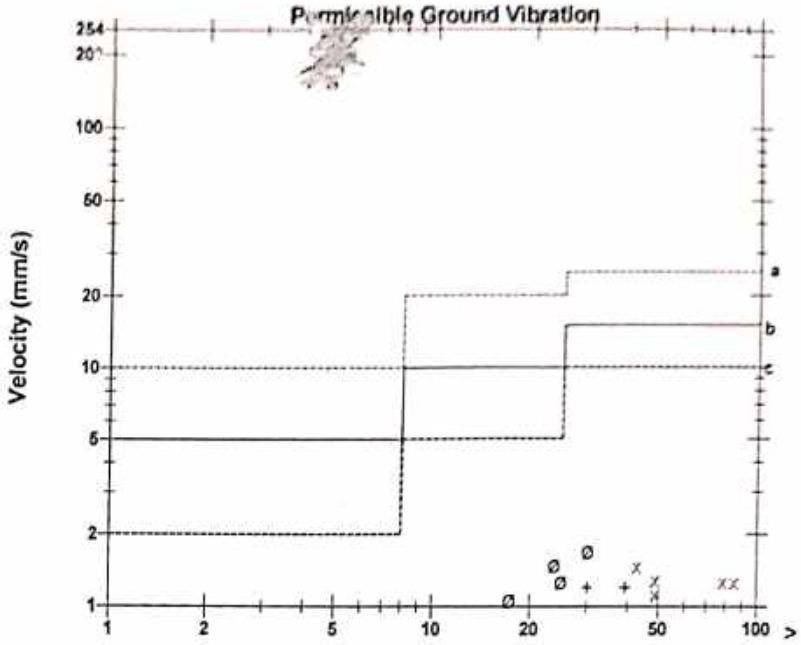
Serial Number	UM14694 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	_TEMP.EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

	Tran	**Vert**	**Long**	
PPV	1.190	1.466	1.702	mm/s
ZC Freq	39	43	30	Hz
Time (Rel. to Trig)	0.086	0.060	0.019	sec
Peak Acceleration	0.035	0.072	0.043	g
Peak Displacement	0.006	0.005	0.008	mm
Sensor Check	Passed	Passed	Passed	

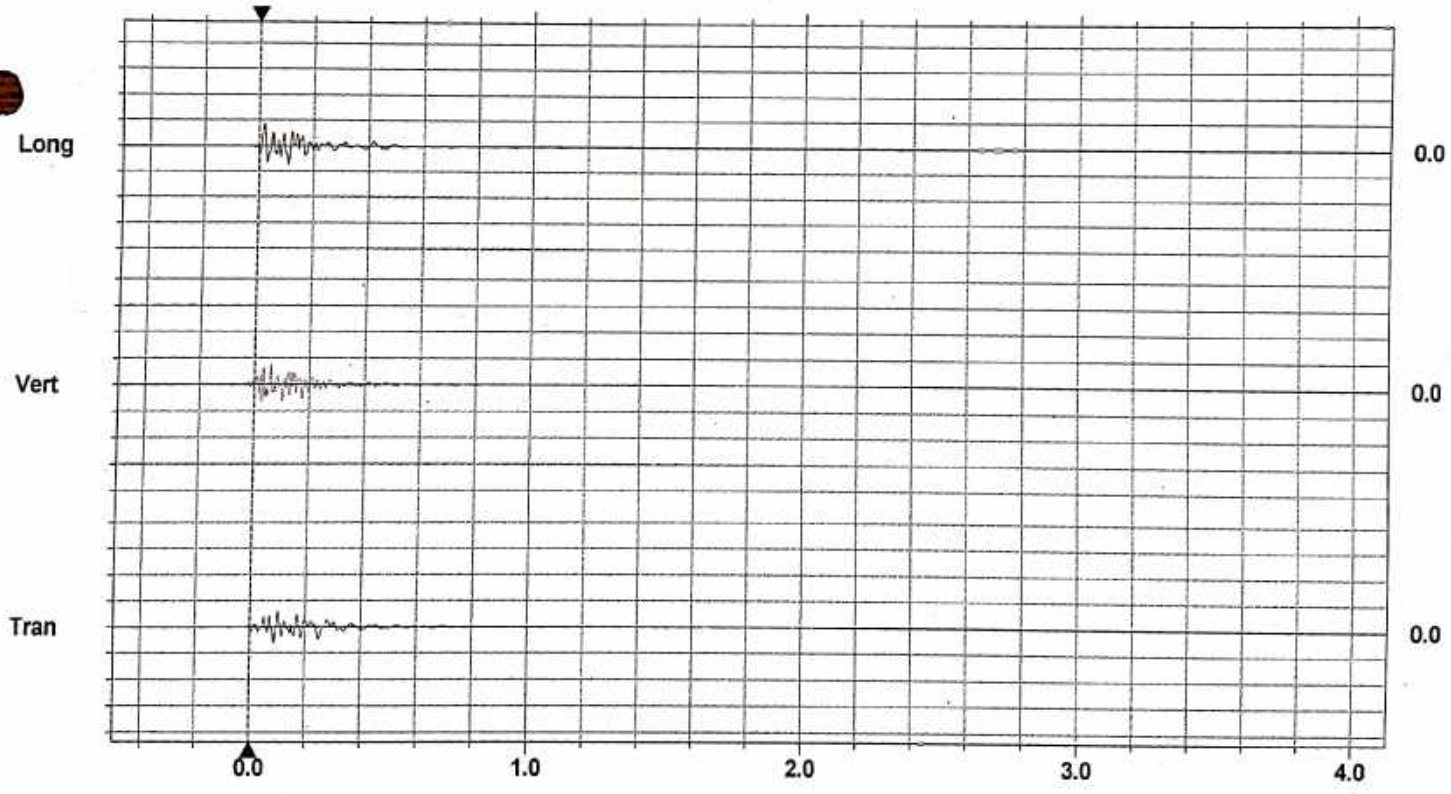
Peak Vector Sum 1.767 mm/s at 0.100 sec

DGMS India (A)

Permissible Ground Vibration



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: February 4, 2025 (V 10.72 - 10.72)

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Instantel

Event Report 473 Block - B (D

Instantel

Date/Time	Vert at 16:57:14 February 4, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.224 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

GPS Location	Latitude	Longitude
Source:	027 51.863 N	075 58.748 E
Sensor1:	027 51.818 N	075 58.627 E
Distance:	154.1 m	

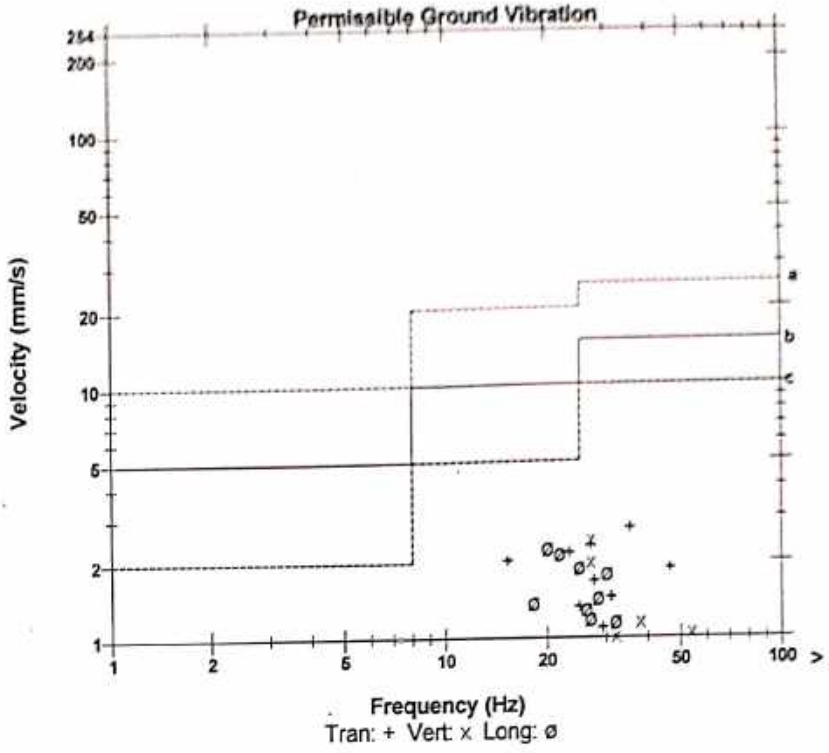
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
Peak	2.711	2.443	2.278	mm/s
Zero Freq	35	27	20	Hz
Time (Rel. to Trig)	0.109	0.021	0.045	sec
Peak Acceleration	0.058	0.076	0.053	g
Peak Displacement	0.014	0.012	0.017	mm
Sensor Check	Check	Check	Check	

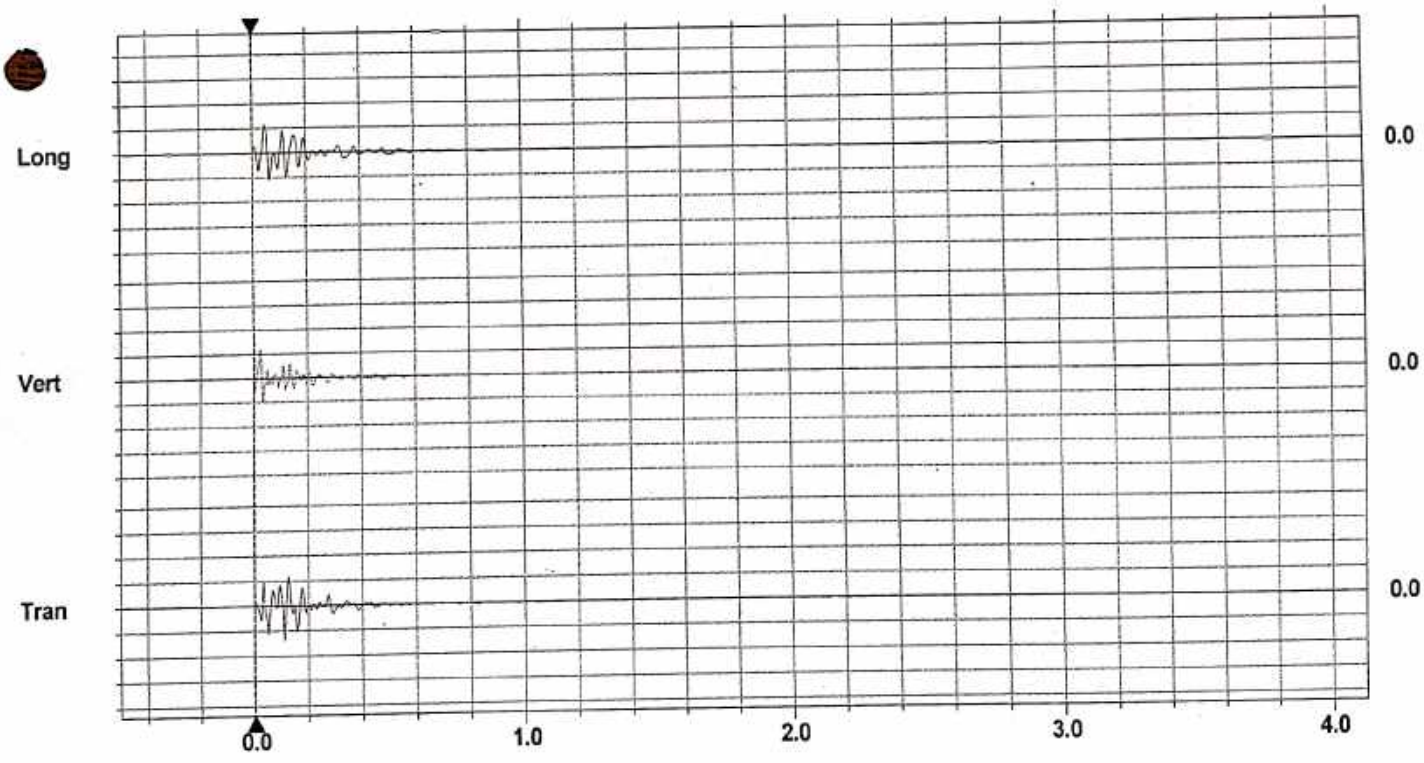
Peak Vector Sum 3.117 mm/s at 0.110 sec

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: February 5, 2025 (V 10.72 - 10.72)

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Instantel

Event Report

Instantel

474

Date/Time	Vert at 17:33:17 February 5, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	2.75 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

GPS Location	**Latitude**	**Longitude**
Source	027 51 863 N	075 58 748 E
Sensor1	027 51 818 N	075 58 827 E
Distance	154.1 m	

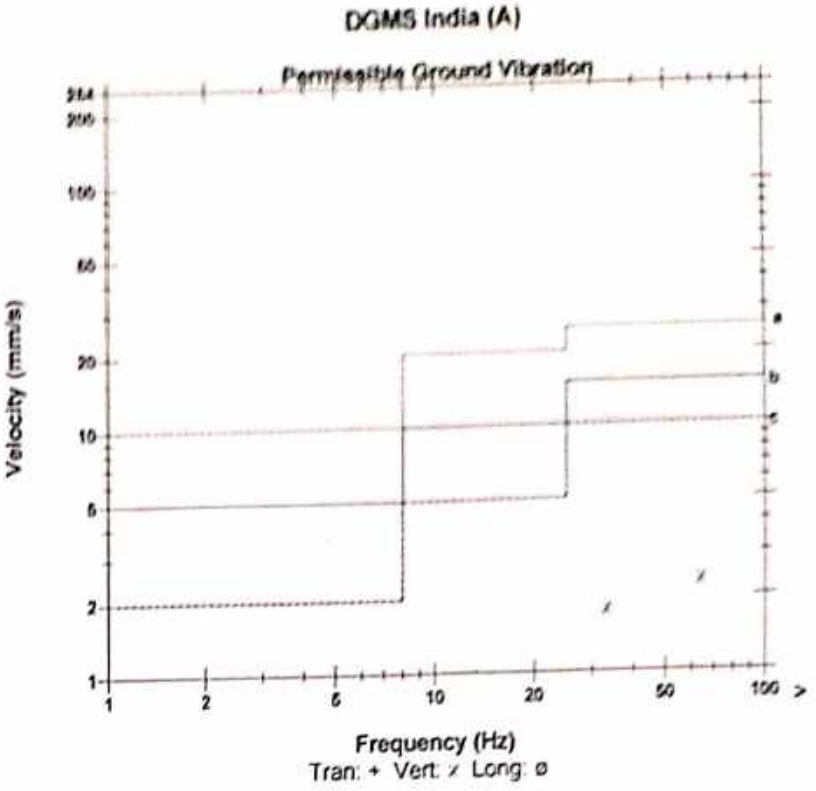
Notes

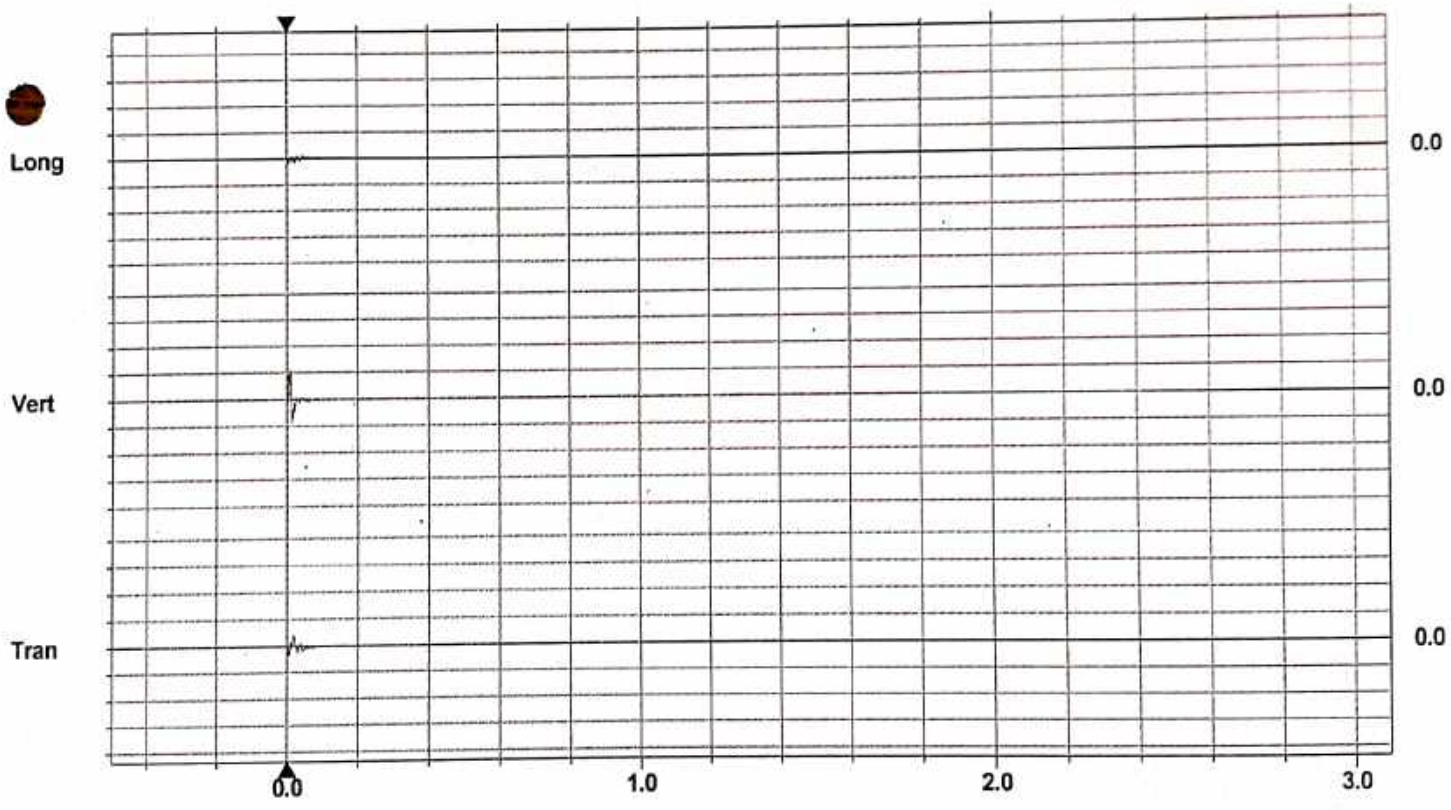
Location	Near Bayal Mines Blasting to 200 mtr
Client	Bayal Mines
User Name	Bayal Mines
General	

	Tran	**Vert**	**Long**	
[redacted]	0.843	2.333	0.386	mm/s
Zero Freq	43	64	114	Hz
Time (Rel. to Trig)	0.018	0.005	0.022	sec
Peak Acceleration	0.038	0.222	0.030	g
Peak Displacement	0.002	0.005	0.001	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.442 mm/s at 0.005 sec

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	TEMP.EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

Printed: February 6, 2025 (V 10.72 - 10.72)

Format © 1995-2014 Xmark Corporation

Date/Time	Vert at 17:05:15 February 6, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.279 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

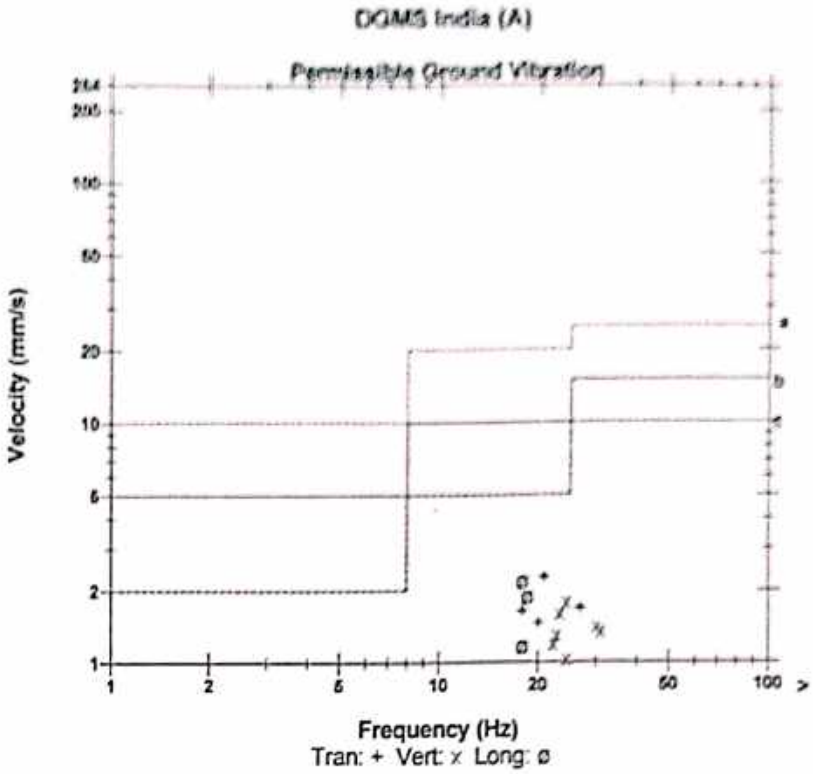
GPS Location	Latitude	Longitude
Source	027 51 863 N	075 58 748 E
Sensor1	027 51 818 N	075 58 827 E
Distance	154.1 m	

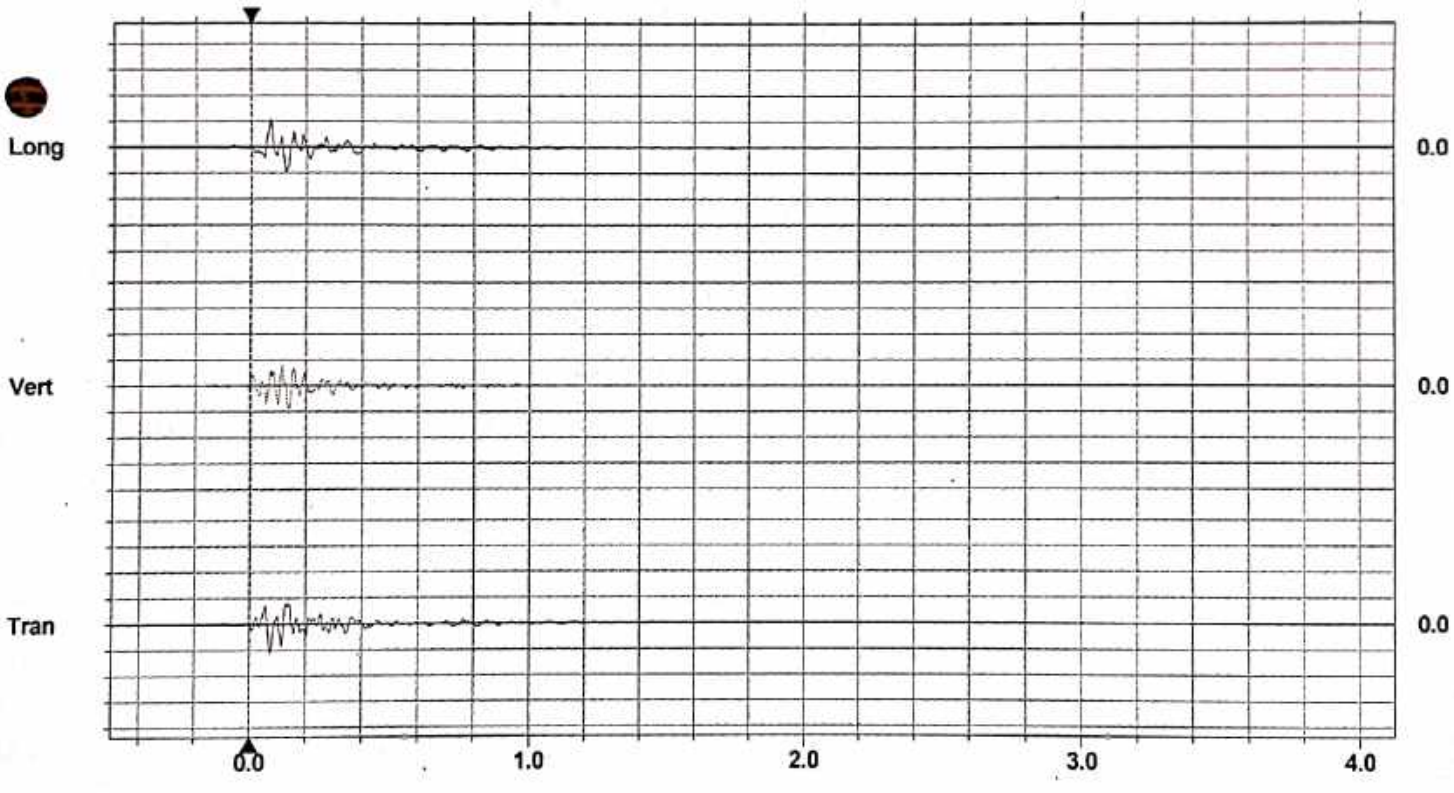
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General

	Tran	Vert	Long	
PPV	2.270	1.797	2.191	mm/s
Freq	21	24	18.0	Hz
Time (Rel. to Trig)	0.073	0.139	0.069	sec
Peak Acceleration	0.043	0.039	0.031	g
Peak Displacement	0.017	0.012	0.017	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 3.195 mm/s at 0.072 sec

Serial Number	UM14694 V 10.90FB Micromate IDEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	TEMP.EVT
Scaled Distance	457.4 (154.1 m, 0.1 kg)





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Format © 1995-2014 Xmark Corporation

Date/Time	Tran at 17:23:54 February 7, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.183 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

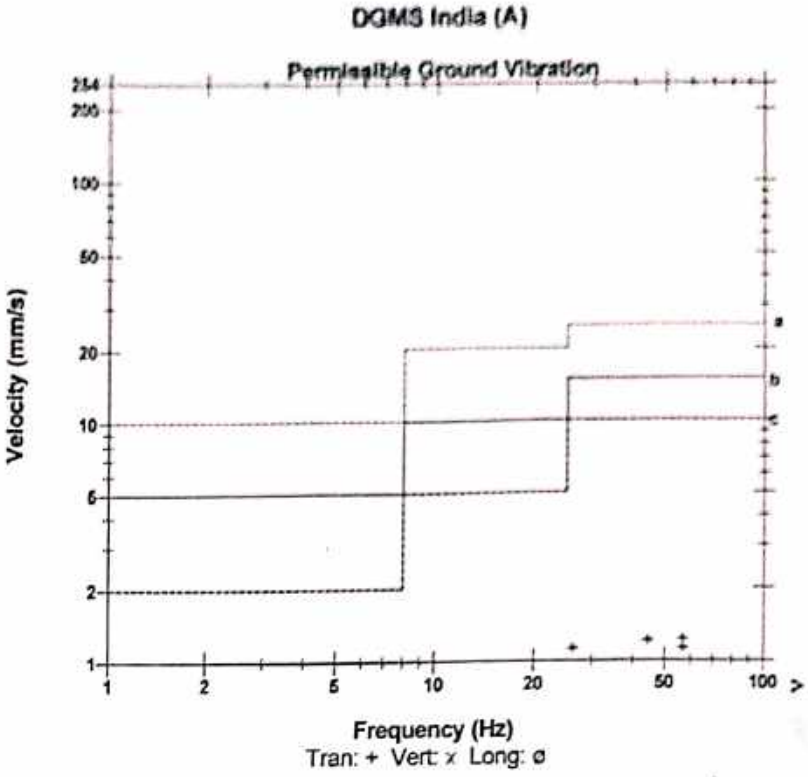
Serial Number	UM14894 V 10.90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	TEMP.EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

GPS Location	**Latitude**	**Longitude**
Source	027 51 863 N	075 58 748 E
Sensor1	027 51 818 N	075 58 827 E
Distance	154.1 m	

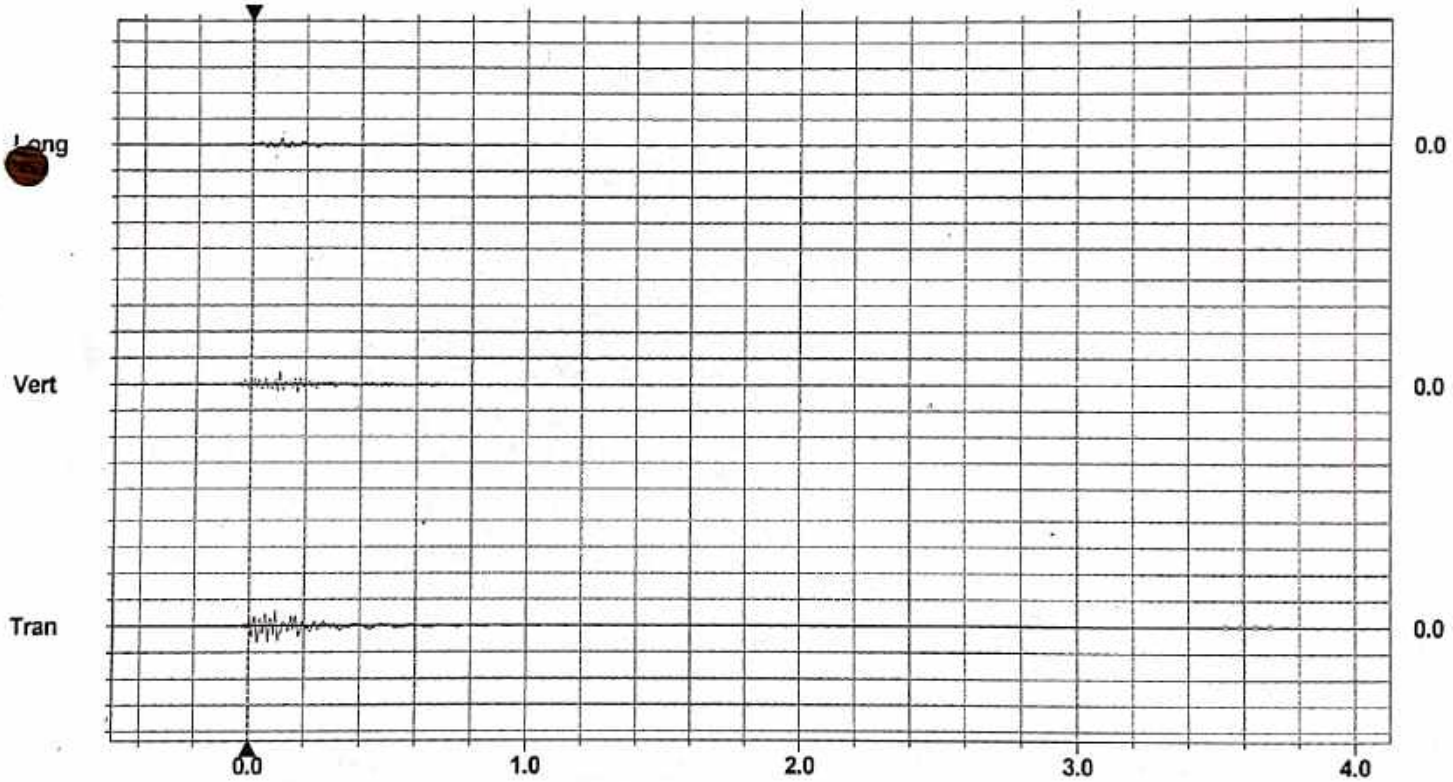
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	1.214	0.906	0.497	mm/s
ZC Freq	57	51	30	Hz
Time (Rel. to Trig)	0.068	0.104	0.106	sec
Peak Acceleration	0.043	0.031	0.013	g
Peak Displacement	0.006	0.003	0.002	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.509 mm/s at 0.104 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶——◀

Printed: February 8, 2025 (V 10.72 - 10.72)

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Date/Time	Long at 17:45:21 February 8, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	2.5 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14864 V 10.90F B Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 20, 2024 by UES New Delhi
File Name	TEMP.EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

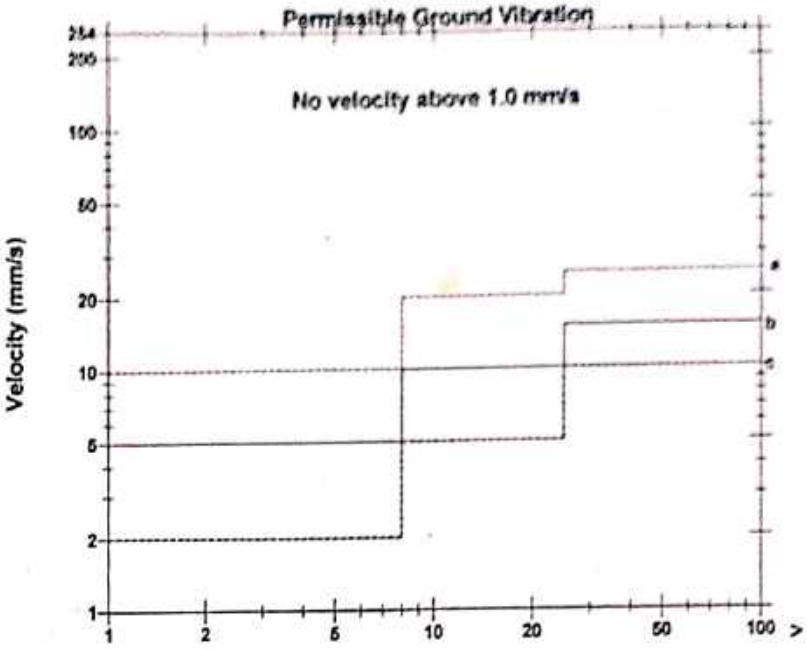
GPS Location	**Latitude**	**Longitude**
Source:	027 51 863 N	075 58 748 E
Sensor1:	027 51 818 N	075 58 827 E
Distance:	154.1 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	0.725	0.221	0.859	mm/s
ZC Freq	31	38	25	Hz
Time (Rel. to Trig)	0.078	0.137	0.063	sec
Peak Acceleration	0.016	0.010	0.016	g
Peak Displacement	0.003	0.001	0.005	mm
Sensor Check	Passed	Passed	Passed	

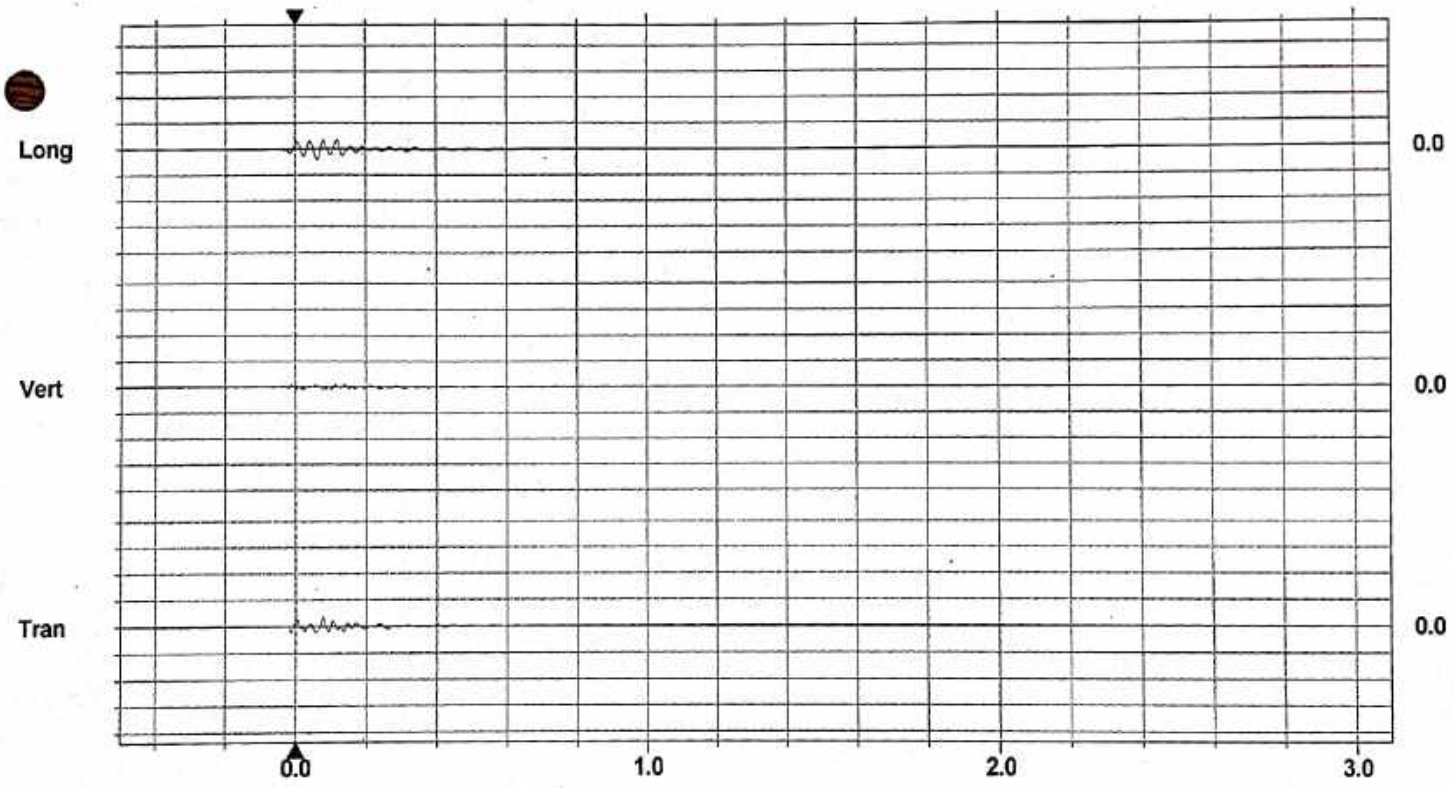
Peak Vector Sum 0.955 mm/s at 0.080 sec

DGMS India (A)



Frequency (Hz)
Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

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Date/Time	Tran at 17:41:12 February 10, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.174 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14694 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	TEMP EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

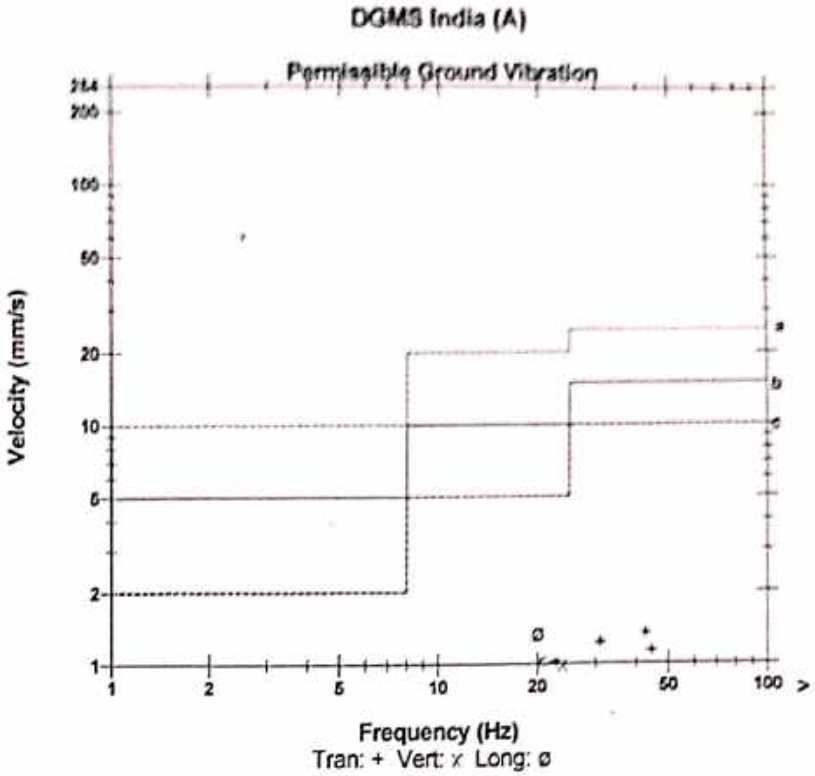
GPS Location	**Latitude**	**Longitude**
Source	027 51 883 N	075 58 748 E
Sensor1	027 51 818 N	075 58 827 E
Distance	154.1 m	

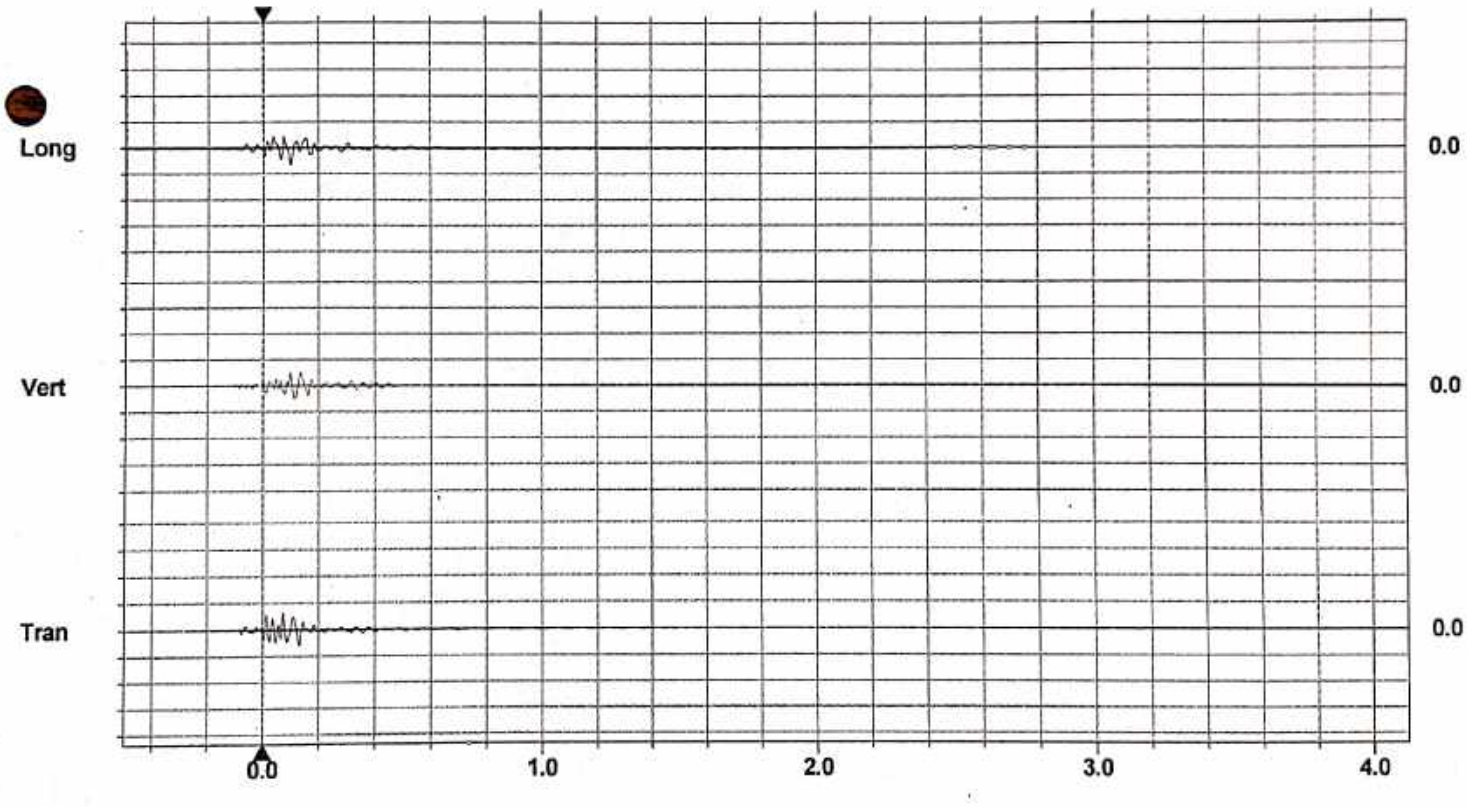
Notes

Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	1.332	1.033	1.340	mm/s
Freq	43	20	20	Hz
Time (Rel. to Trig)	0.073	0.136	0.099	sec
Peak Acceleration	0.035	0.025	0.033	g
Peak Displacement	0.006	0.007	0.008	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.674 mm/s at 0.098 sec





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Instantel **Event Report** Blast - A0 Instantel

Date/Time	Tran at 17:38:56 February 9, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.127 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

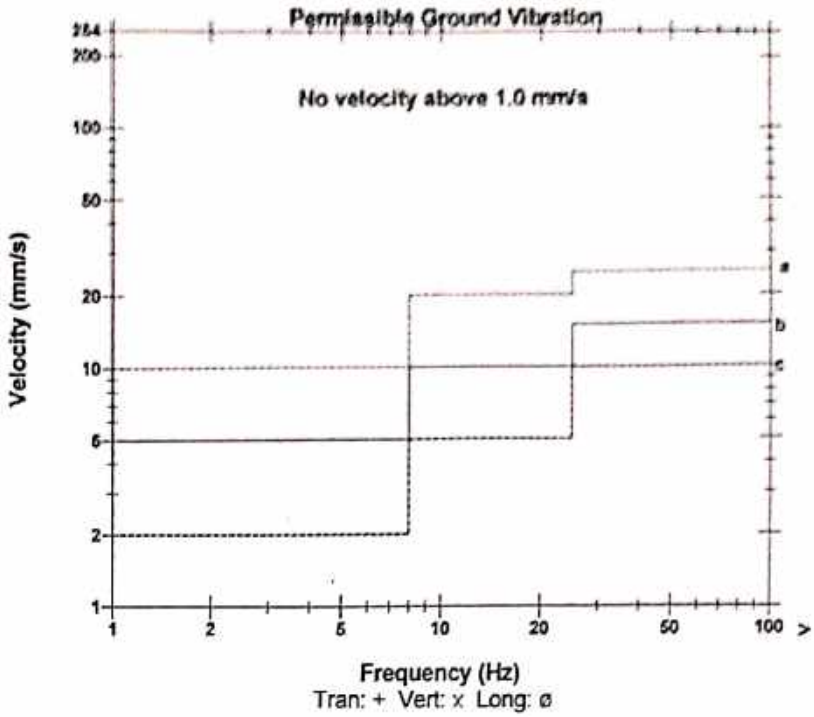
Serial Number	UM14894 V 10.90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	TEMP.EVT
Scaled Distance	467.4 (154.1 m, 0.1 kg)

GPS Location	**Latitude**	**Longitude**
Source:	027 51 863 N	075 58 748 E
Sensor1:	027 51 818 N	075 58 827 E
Distance:	154.1 m	

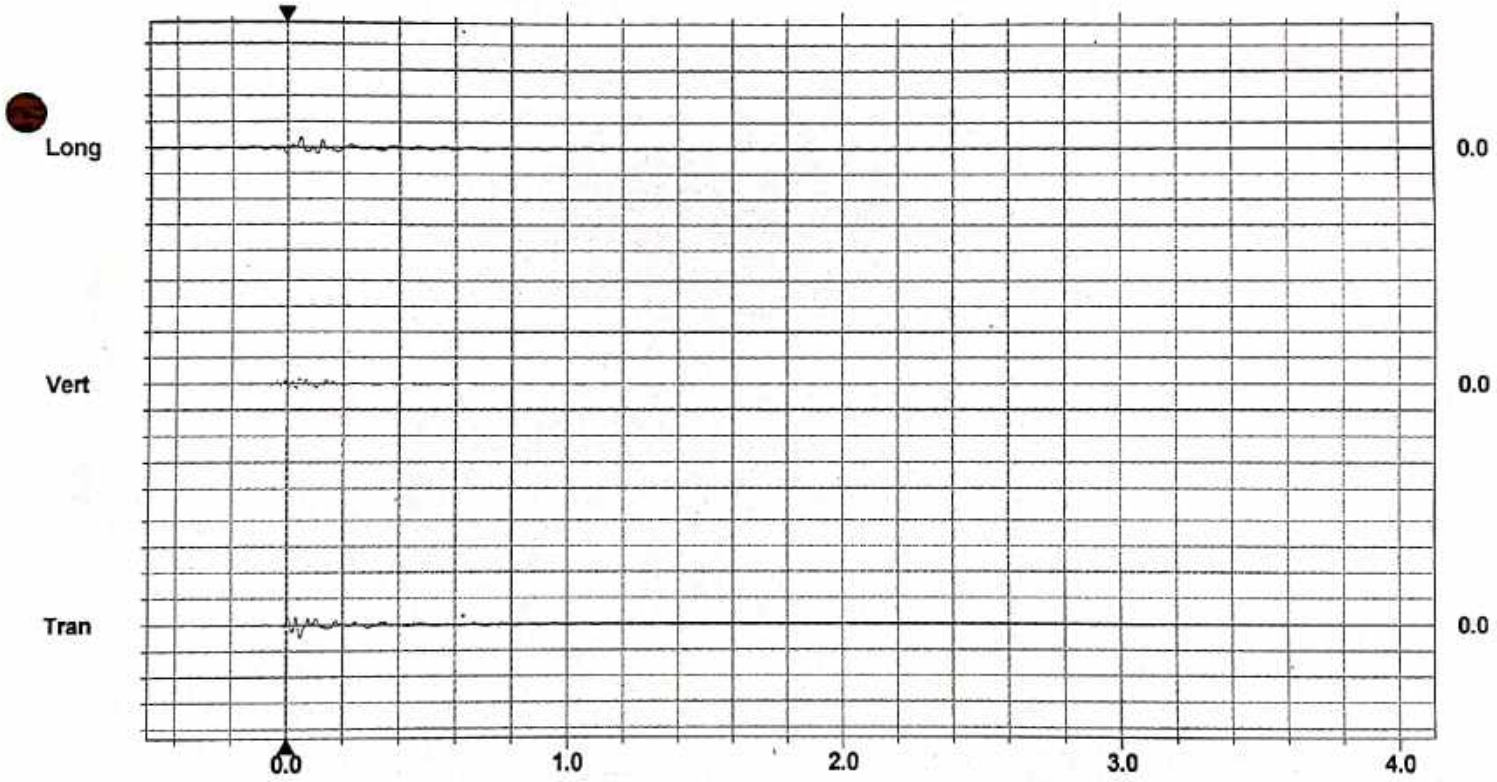
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.985	0.473	0.851	mm/s
ZC Freq	16.8	28	9.4	Hz
Time (Rel. to Trig)	0.047	0.003	0.047	sec
Peak Acceleration	0.021	0.021	0.018	g
Peak Displacement	0.007	0.003	0.008	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.332 mm/s at 0.047 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

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Instantel **Event Report** 9.12.25 Instantel

Date/Time	Vert at 17:51:58 February 11, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.017 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14994 V 10.60F B Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

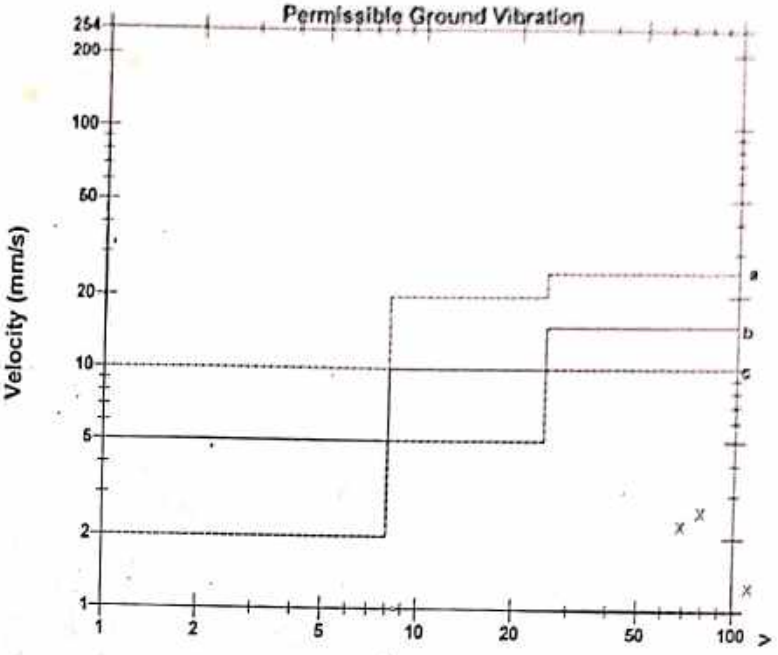
GPS Location	**Latitude**	**Longitude**
Source:	027 51.883 N	075 58.748 E
Sensor1:	027 51.818 N	075 58.827 E
Distance:	154.1 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

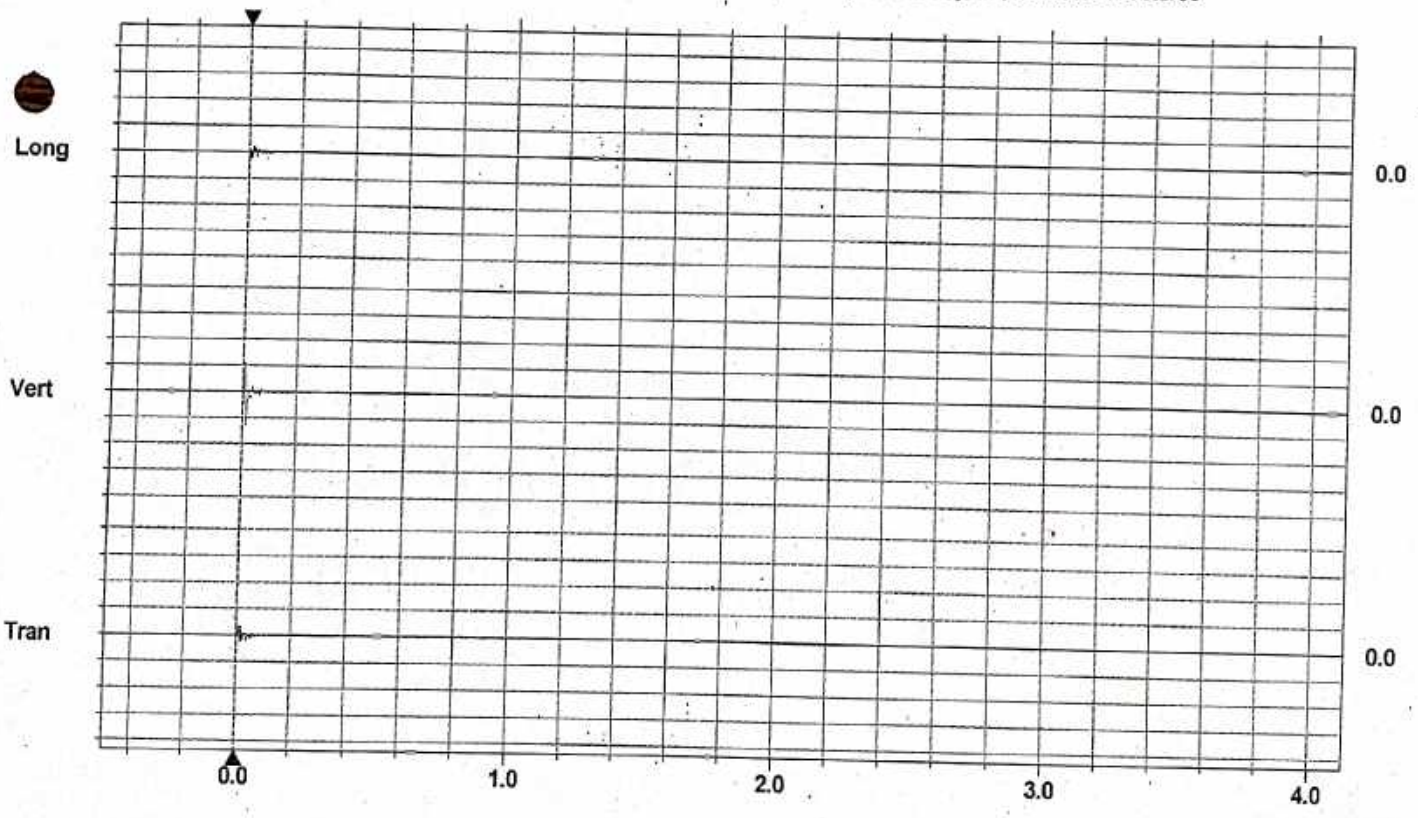
	Tran	Vert	Long	
PPV	0.725	2.601	0.497	mm/s
Freq	102	79	73	Hz
Time (Rel. to Trig)	0.016	0.014	0.009	sec
Peak Acceleration	0.071	0.178	0.043	g
Peak Displacement	0.001	0.006	0.001	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.604 mm/s at 0.014 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: February 12, 2025 (V 10.72 - 10.72)

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Instantel **Event Report** Instantel

Date/Time	Vert at 17:47:40 February 12, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.373 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

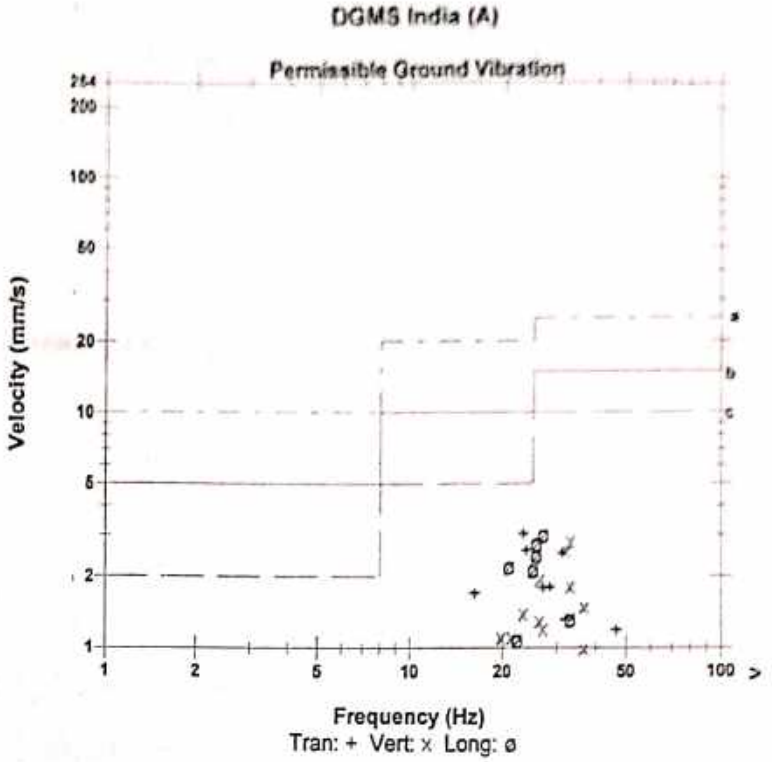
GPS Location	Latitude	Longitude
Source:	027 51.863 N	075 58.748 E
Sensor1:	027 51.818 N	075 58.827 E
Distance:	154.1 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

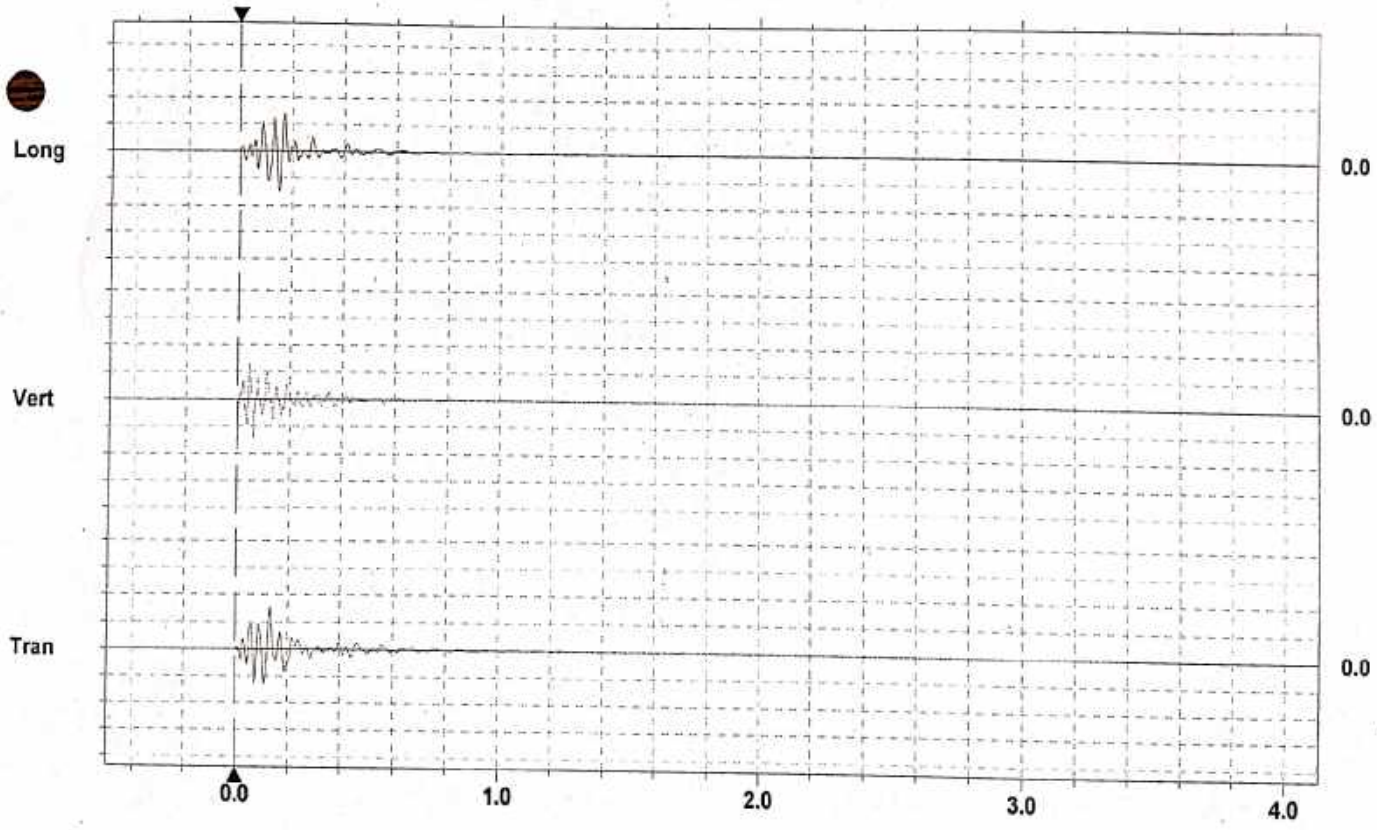
	Serial Number	UM14694 V 10.60F B Micromate ISEE
	Battery Level	3.8 Volts
	Unit Calibration	June 26, 2024 by UES New Delhi
	File Name	__TEMP.EVT
	Scaled Distance	487.4 (154.1 m, 0.1 kg)

	Tran	Vert	Long	
PPV	3.035	2.822	3.003	mm/s
Zero Freq	23	33	27	Hz
Time (Rel. to Trig)	0.132	0.062	0.151	sec
Peak Acceleration	0.061	0.090	0.053	g
Peak Displacement	0.018	0.011	0.017	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 4.035 mm/s at 0.132 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: February 13, 2025 (V 10.72 - 10.72)

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Instantel

Event Report Blast - A (1)

Instantel

482

Date/Time	Vert at 17:42:39 February 14, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.0 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14694 V 10-90FB Micromate ISEE
Battery Level	3.7 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

GPS Location	**Latitude**	**Longitude**
Source:	027 51.863 N	075 58.748 E
Sensor1:	027 51.818 N	075 58.827 E
Distance:	154.1 m	

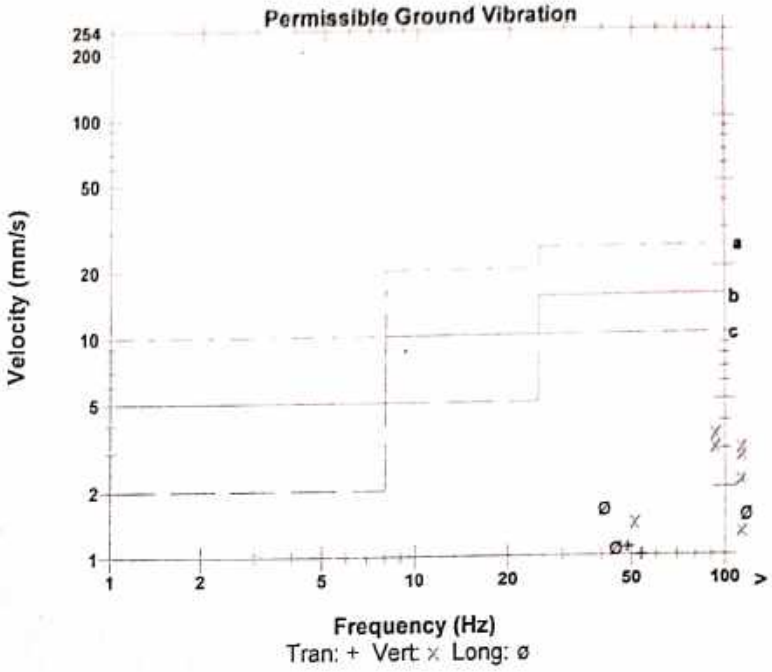
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	1.088	3.515	1.647	mm/s
ZC Freq	49	93	41	Hz
Time (Rel. to Trig)	0.015	0.018	0.006	sec
Peak Acceleration	0.161	0.434	0.189	g
Peak Displacement	0.002	0.005	0.004	mm
Sensor Check	Passed	Passed	Passed	

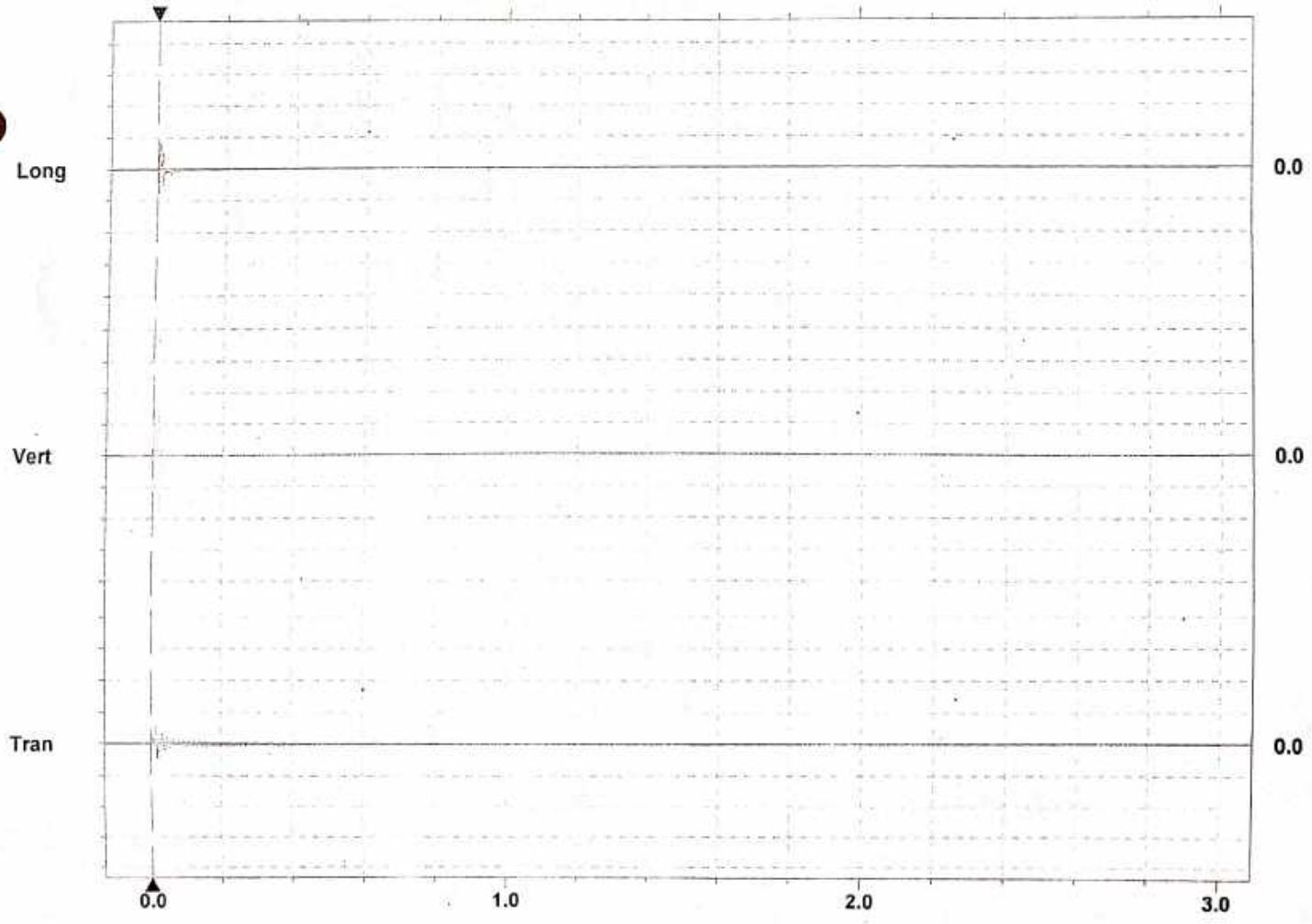
Peak Vector Sum 3.681 mm/s at 0.018 sec

DGMS India (A)

Permissible Ground Vibration



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶—— ——◀

Printed: February 15, 2025 (V 10.72 - 10.72)
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Instantel

Event Report

483

Instantel

Date/Time	Vert at 17:55:39 February 15, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.019 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.7 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

GPS Location	**Latitude**	**Longitude**
Source:	027 51.863 N	075 58.748 E
Sensor1:	027 51.818 N	075 58.827 E
Distance:	154.1 m	

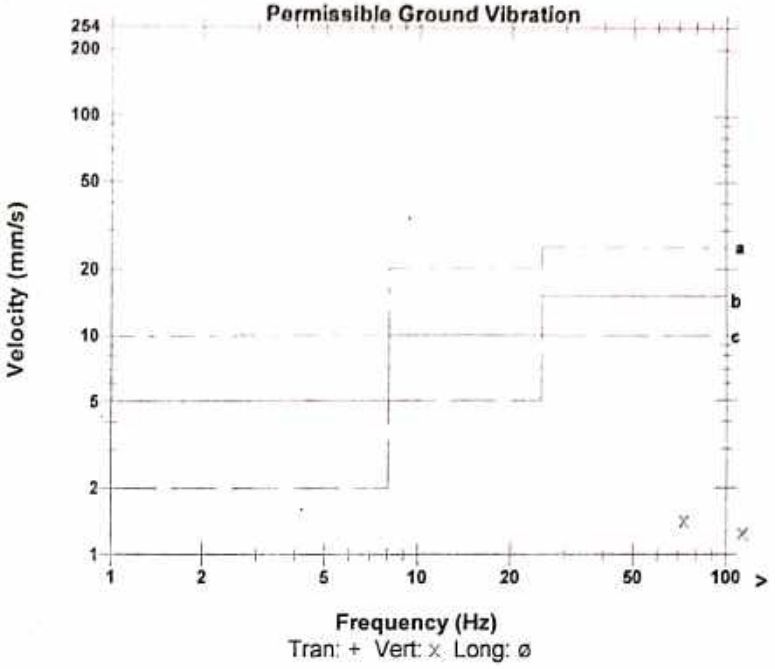
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	0.465	1.434	0.520	mm/s
ZC Freq	146	73	49	Hz
Time (Rel. to Trig)	0.011	0.008	0.007	sec
Peak Acceleration	0.043	0.107	0.049	g
Peak Displacement	0.001	0.003	0.002	mm
Sensor Check	Passed	Passed	Passed	

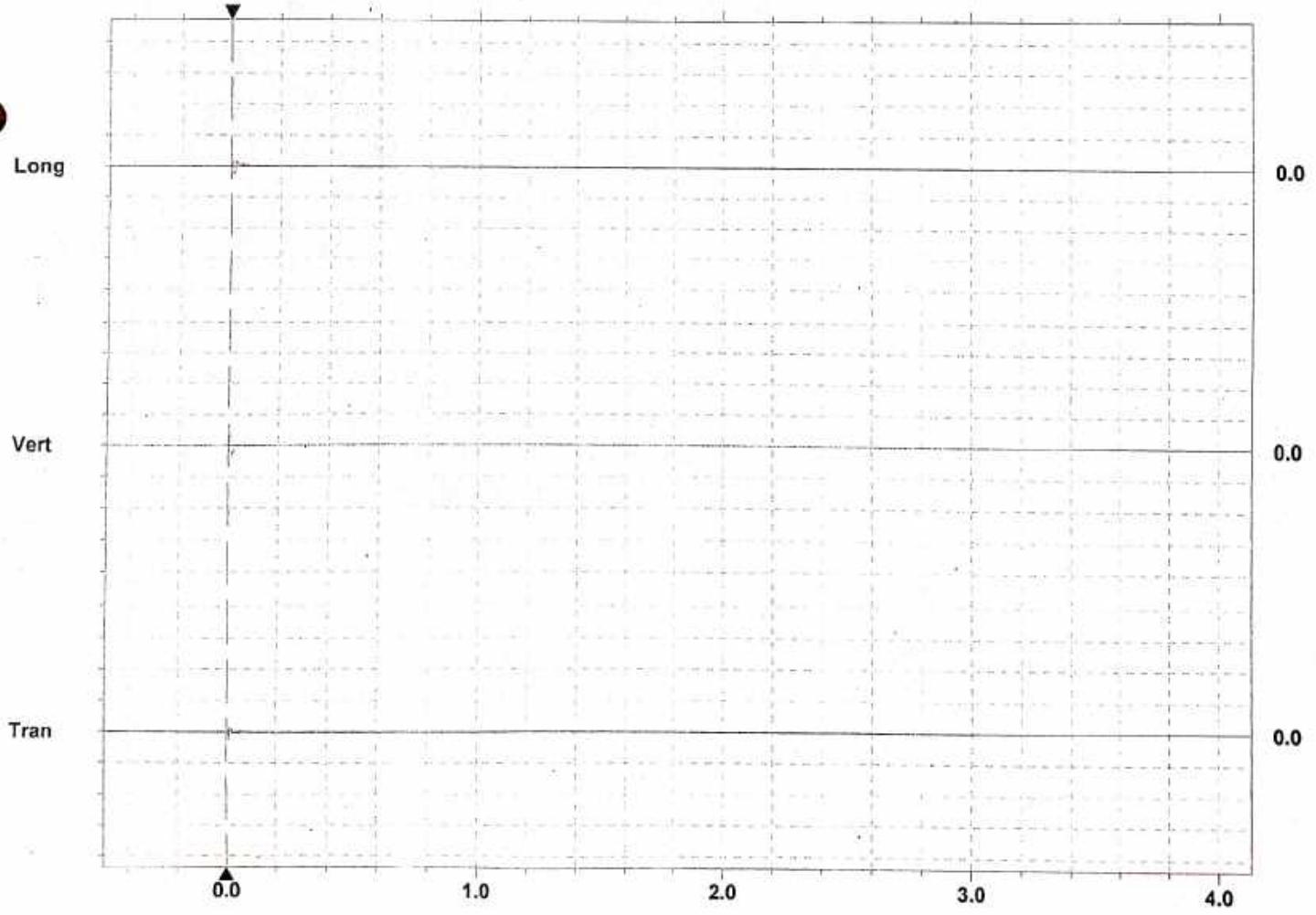
Peak Vector Sum 1.559 mm/s at 0.008 sec

DGMS India (A)

Permissible Ground Vibration



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶ ◀

466

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Instantel

Event Report

484

Instantel

Date/Time	Tran at 18:01:44 February 17, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.0 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

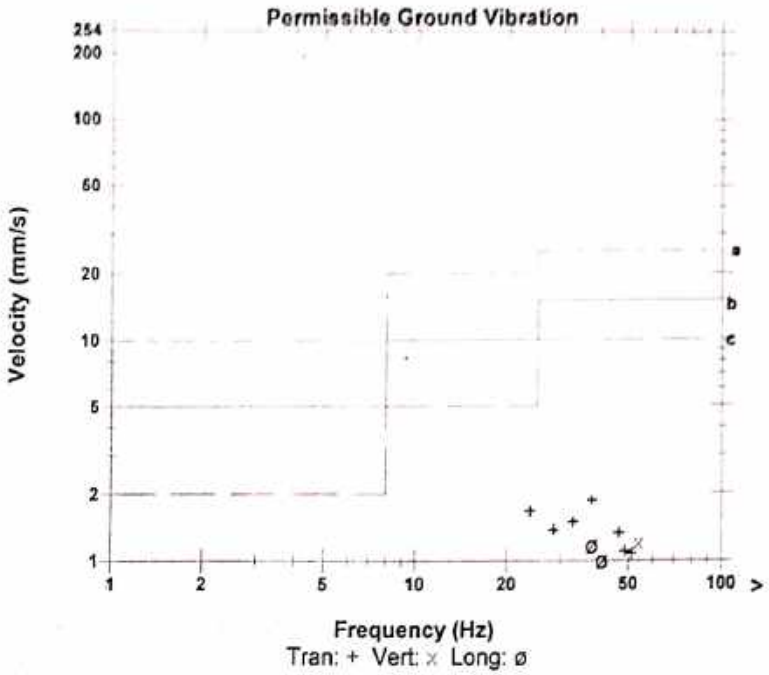
GPS Location	**Latitude**	**Longitude**
Source:	027 51.863 N	075 58.748 E
Sensor1:	027 51.818 N	075 58.827 E
Distance:	154.1 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

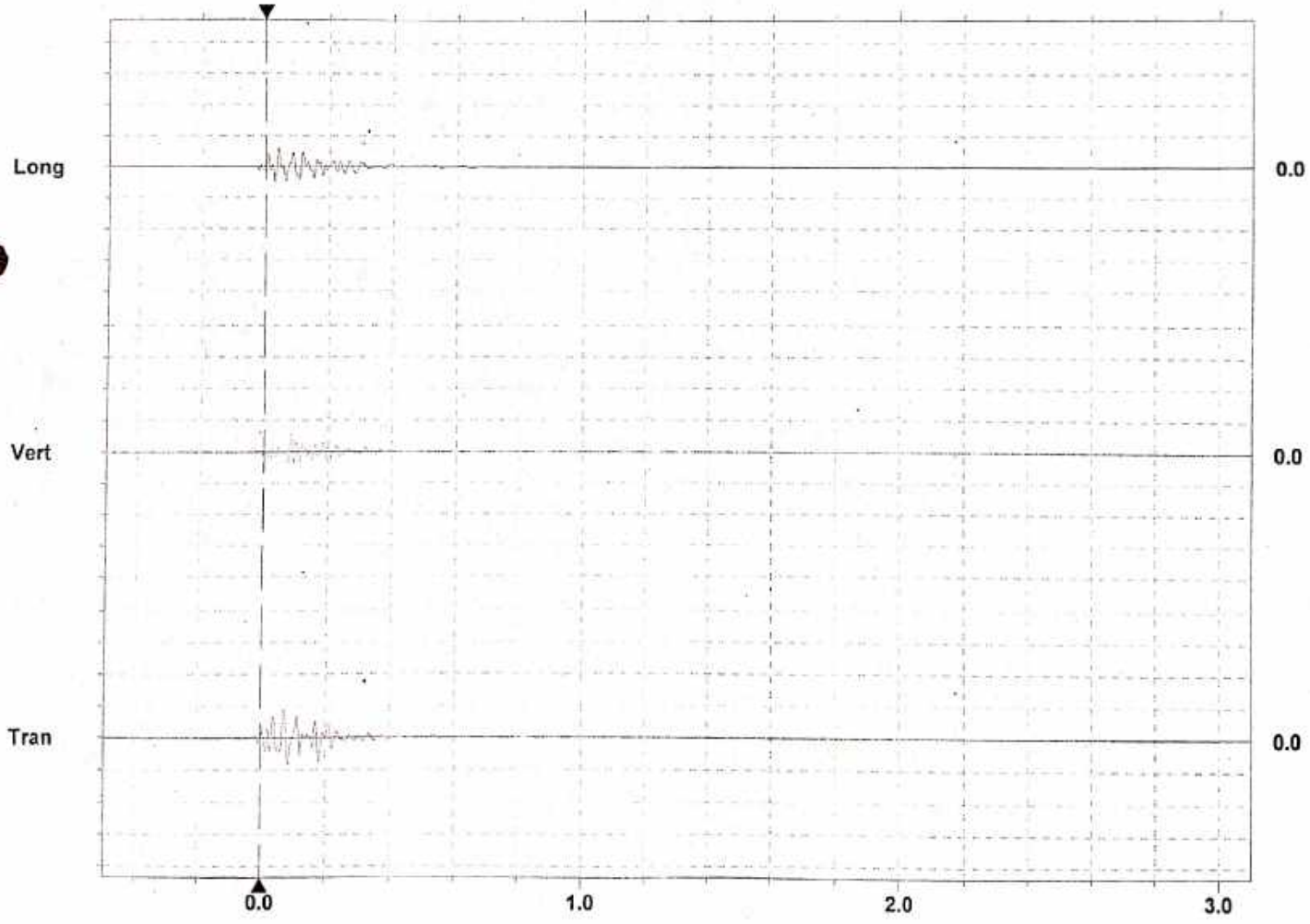
	Tran	**Vert**	**Long**	
PPV	1.868	1.198	1.167	mm/s
ZC Freq	38	54	38	Hz
Time (Rel. to Trig)	0.073	0.084	0.040	sec
Peak Acceleration	0.046	0.039	0.035	g
Peak Displacement	0.008	0.004	0.005	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.216 mm/s at 0.085 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶—— ——◀

Instantel **Event Report** 9161 - n 0 Instantel

485

Date/Time	Vert at 17:56:48 February 18, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.034 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP EVT
Scaled Distance	487.4 (154.1 m, 0.1 kg)

GPS Location	**Latitude**	**Longitude**
Source:	027 51.863 N	075 58.748 E
Sensor1:	027 51.818 N	075 58.827 E
Distance:	154.1 m	

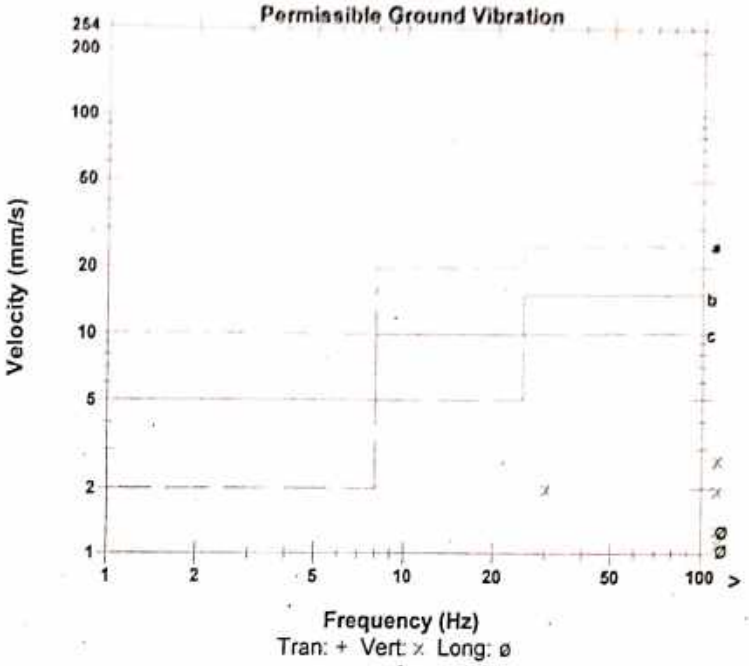
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	0.583	2.680	1.285	mm/s
ZC Freq	93	102	102	Hz
Time (Rel. to Trig)	0.030	0.006	0.006	sec
Peak Acceleration	0.039	0.181	0.086	g
Peak Displacement	0.001	0.004	0.002	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 3.026 mm/s at 0.006 sec

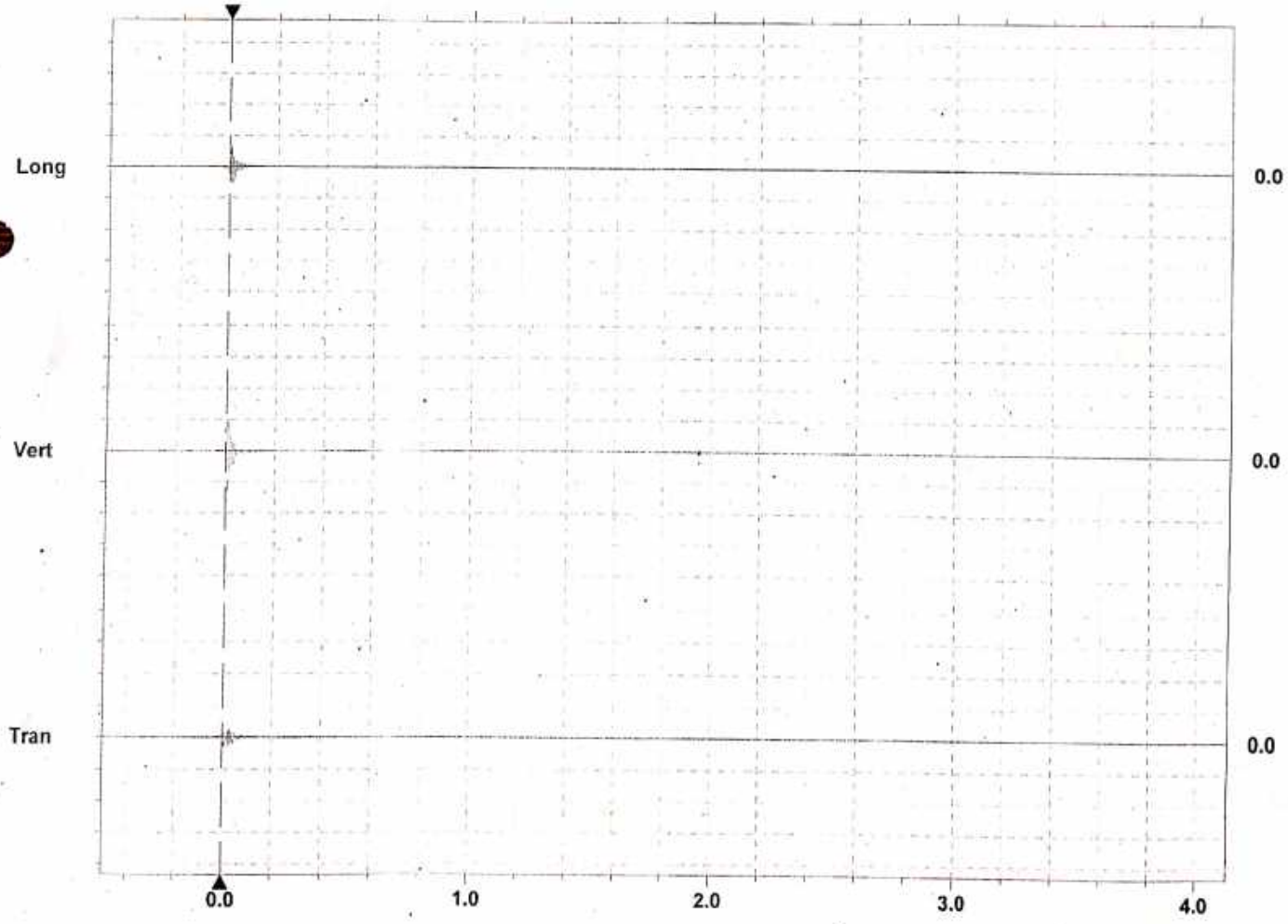
DGMS India (A)

Permissible Ground Vibration



Frequency (Hz)
Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶ ◀

468

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Instantel

Event Report

486

Block-B

Instantel

Date/Time	Long at 13:16:53 January 18, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.327 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	465.0 (153.4 m, 0.1 kg)

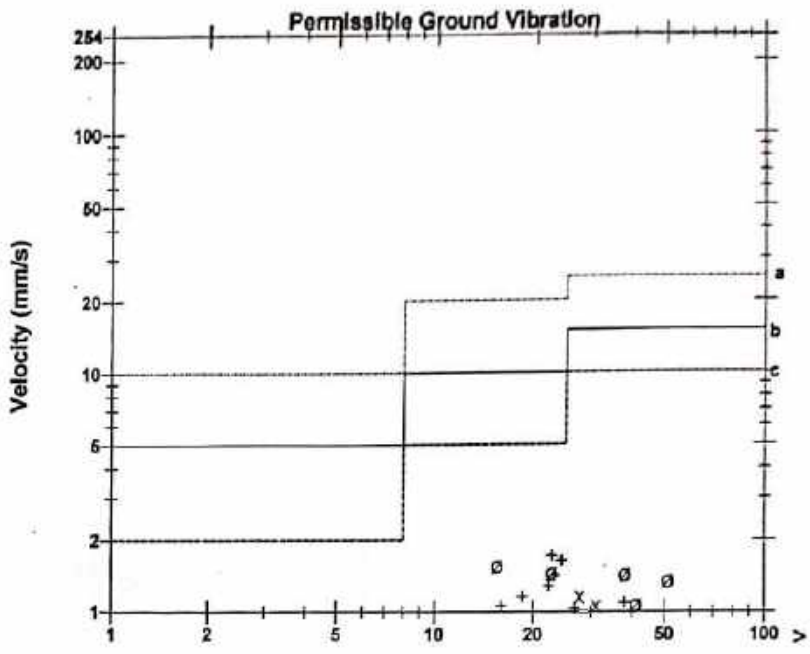
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

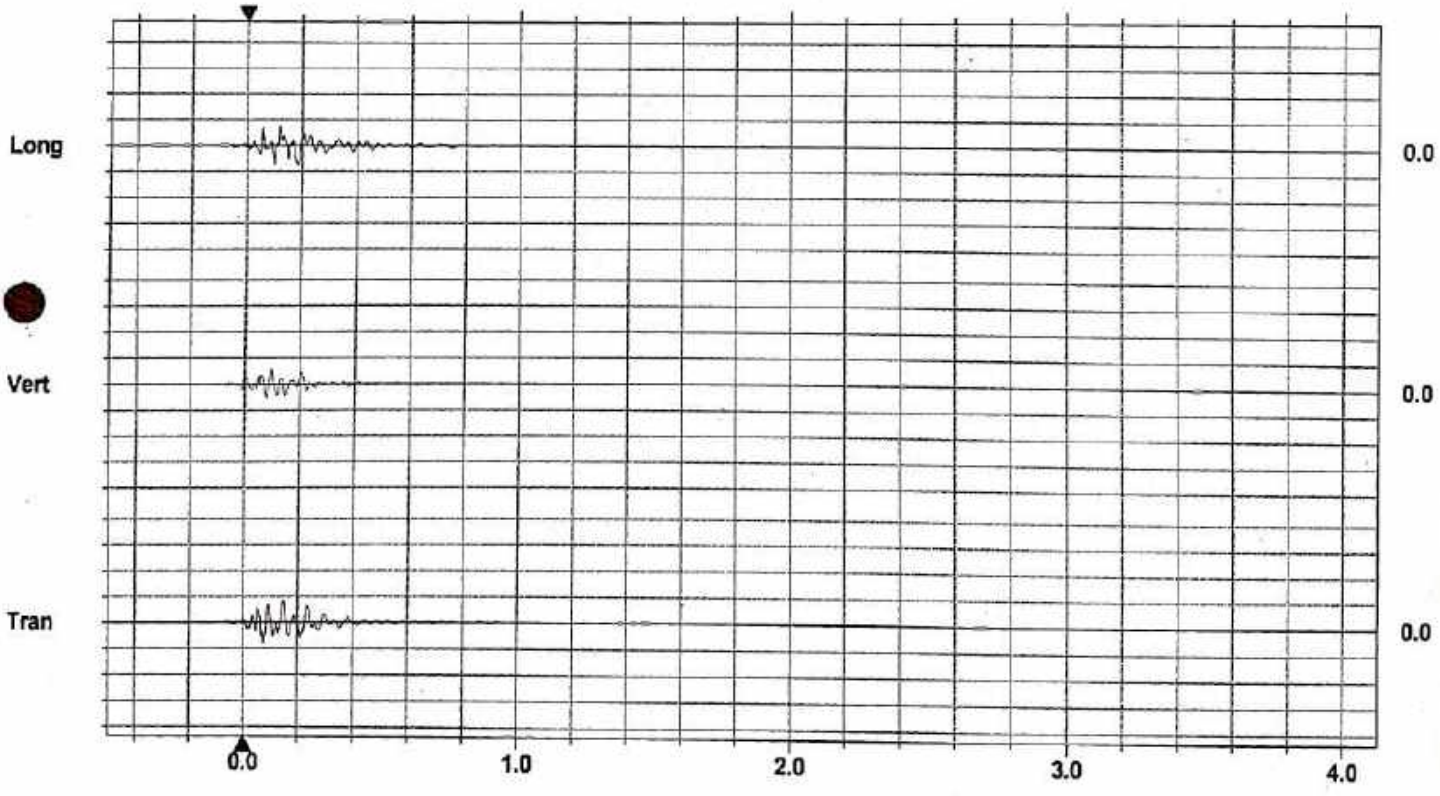
	Tran	**Vert**	**Long**	
PPV	1.710	1.167	1.561	mm/s
ZC Freq	23	28	15.5	Hz
Time (Rel. to Trig)	0.146	0.097	0.118	sec
Peak Acceleration	0.053	0.030	0.044	g
Peak Displacement	0.010	0.006	0.011	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.063 mm/s at 0.148 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: January 19, 2025 (V 10.72 - 10.72)

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Date/Time	Vert at 14:09:45 January 19, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.372 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	465.0 (153.4 m, 0.1 kg)

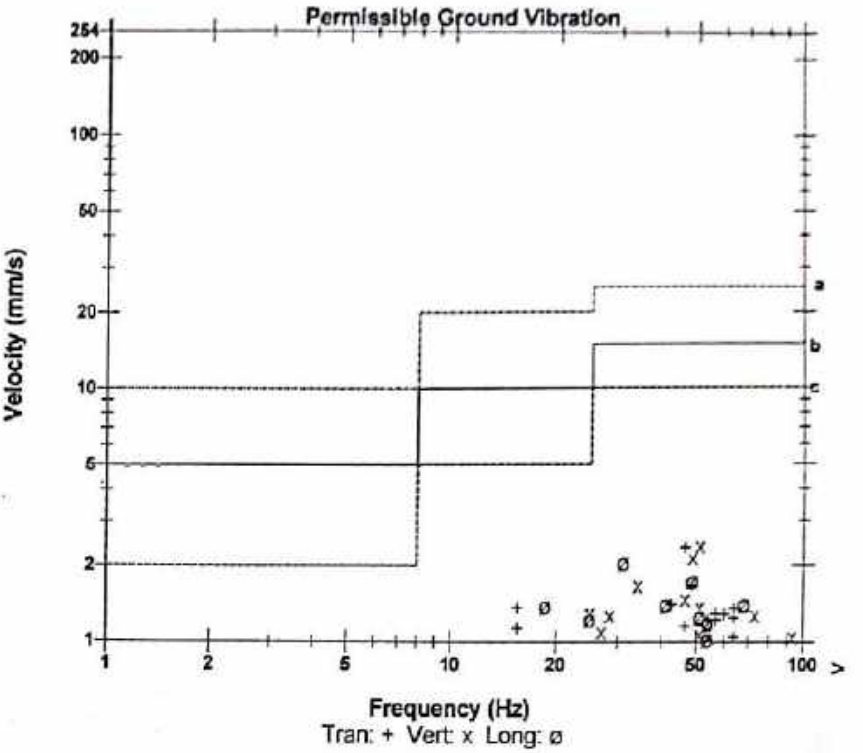
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	2.349	2.396	2.049	mm/s
ZC Freq	47	51	31	Hz
Time (Rel. to Trig)	0.269	0.098	0.135	sec
Peak Acceleration	0.072	0.081	0.082	g
Peak Displacement	0.011	0.007	0.009	mm
Sensor Check	Check	Check	Check	

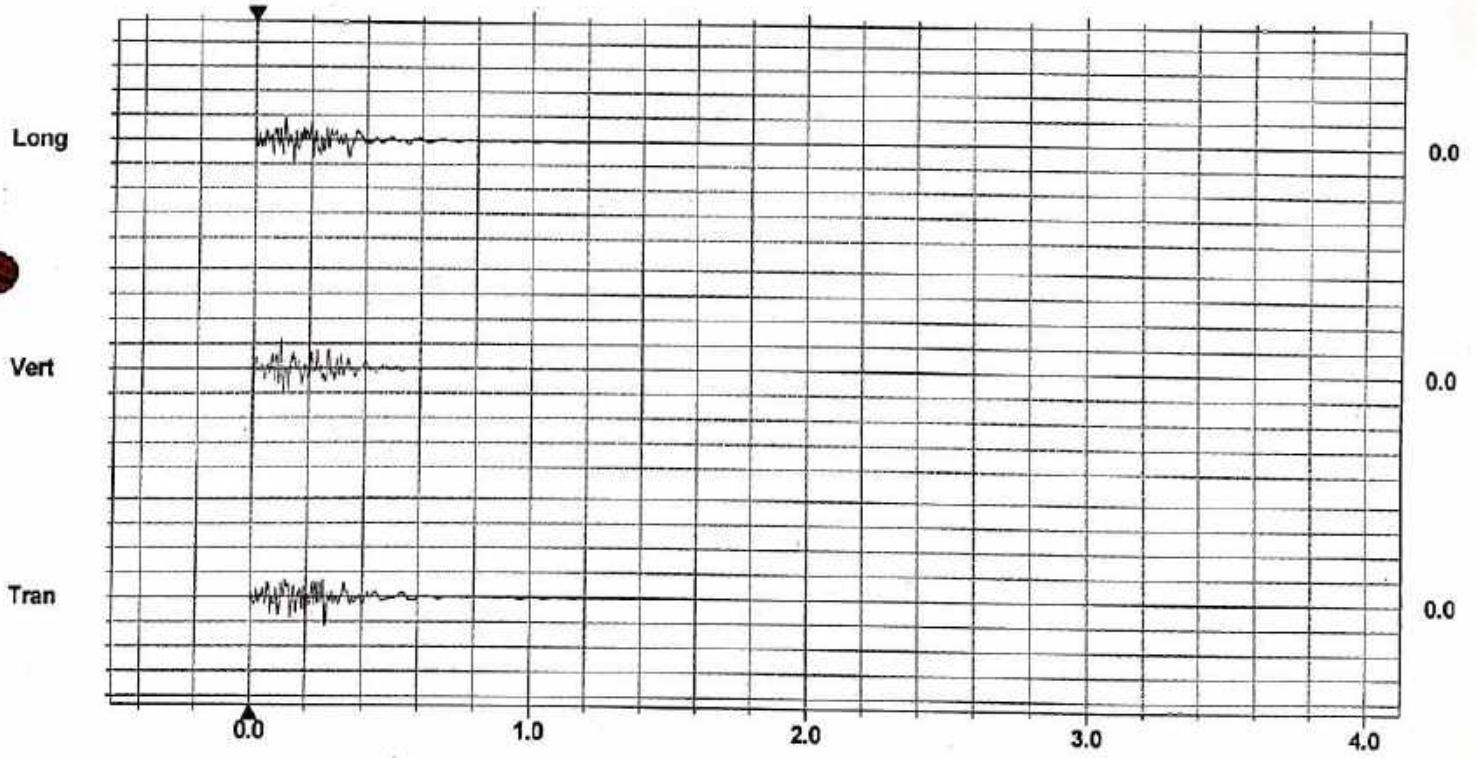
Peak Vector Sum 2.938 mm/s at 0.098 sec

DGMS India (A)



Frequency (Hz)
Tran: + Vert: x Long: ø

a) Industrial Buildings
b) Domestic houses/structures
c) Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

Printed: January 20, 2025 (V 10.72 - 10.72)

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Instantel **Event Report** BLOCK - 30 Instantel

Date/Time	Vert at 14:06:13 January 19, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.01 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

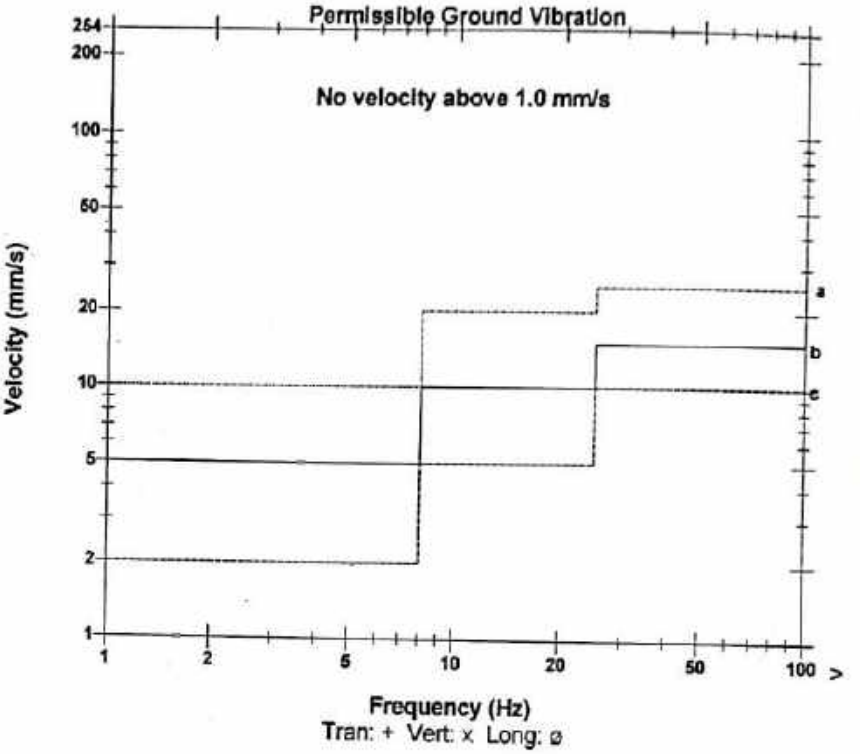
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	0.355	0.969	0.962	mm/s
ZC Freq	85	146	171	Hz
Time (Rel. to Trig)	0.020	0.001	0.004	sec
Peak Acceleration	0.030	0.097	0.094	g
Peak Displacement	0.001	0.001	0.001	mm
Sensor Check	Check	Check	Check	

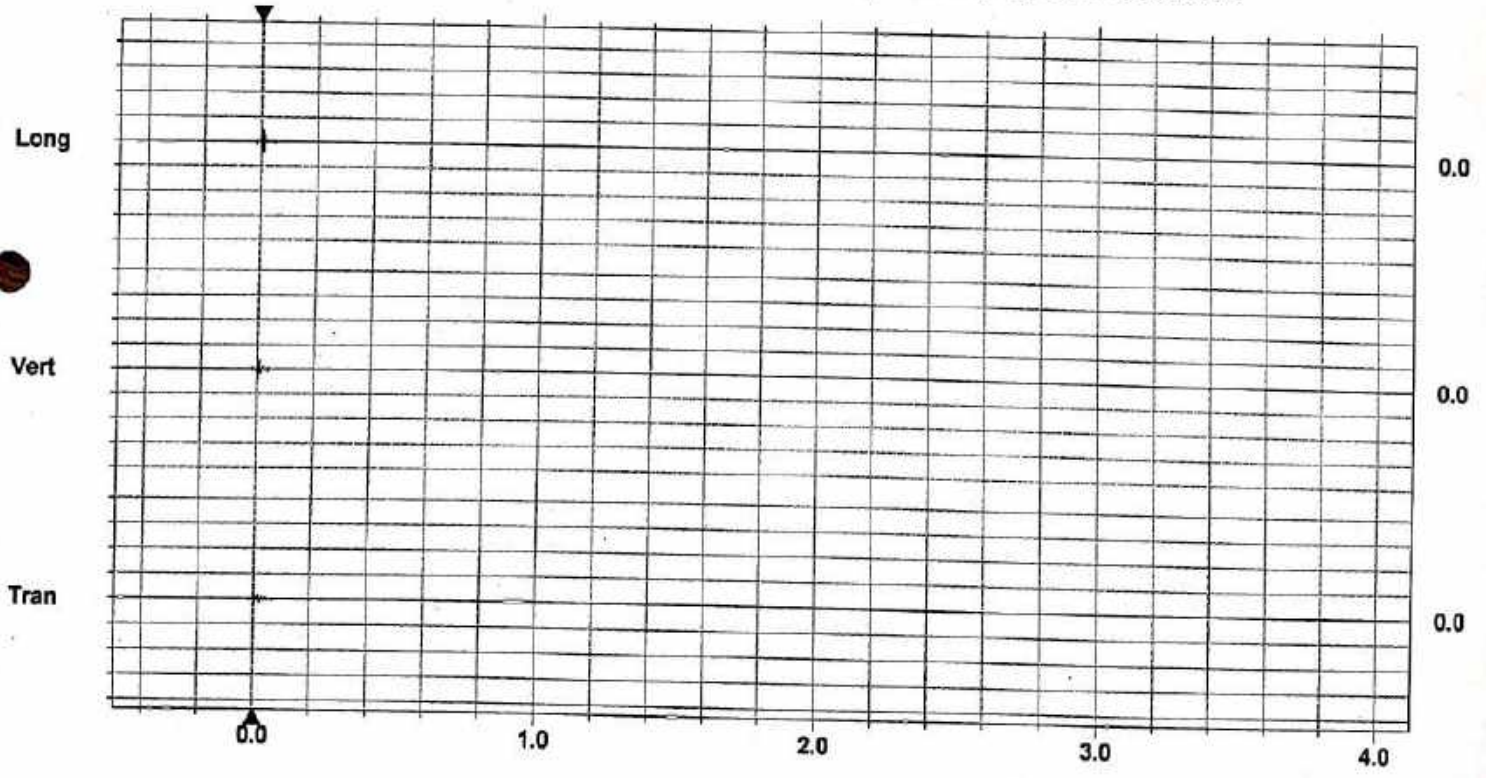
Peak Vector Sum 1.360 mm/s at 0.004 sec

Serial Number	UM14694 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	465.0 (153.4 m, 0.1 kg)

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶——◀

Printed: January 20, 2025 (V 10.72 - 10.72)

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Instantel **Event Report** Back-3(5) Instantel

Date/Time	Tran at 14:04:07 January 19, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.263 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

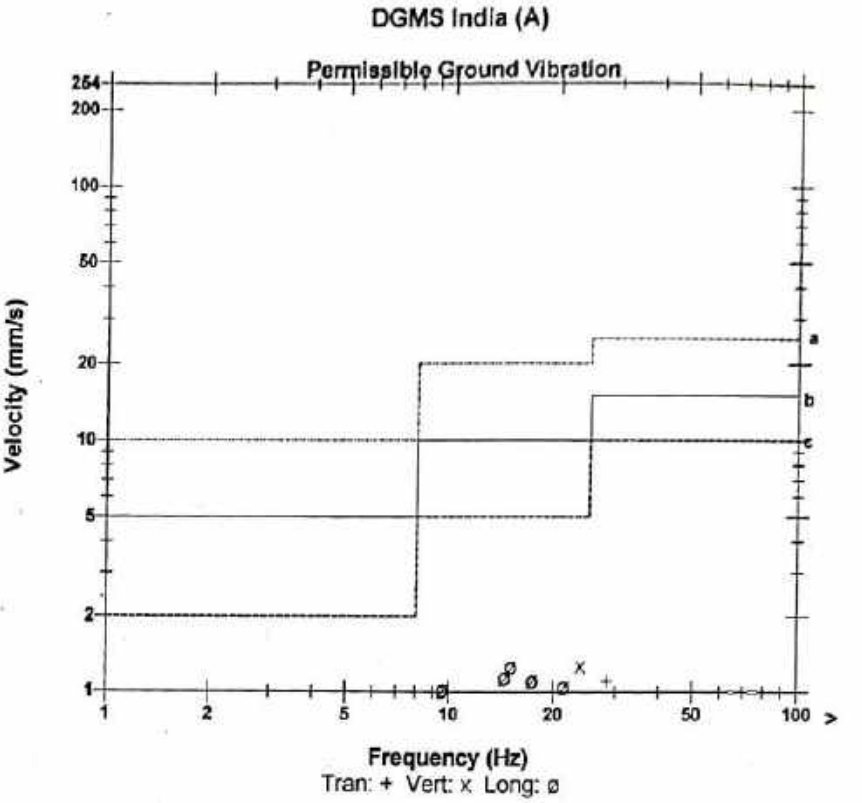
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

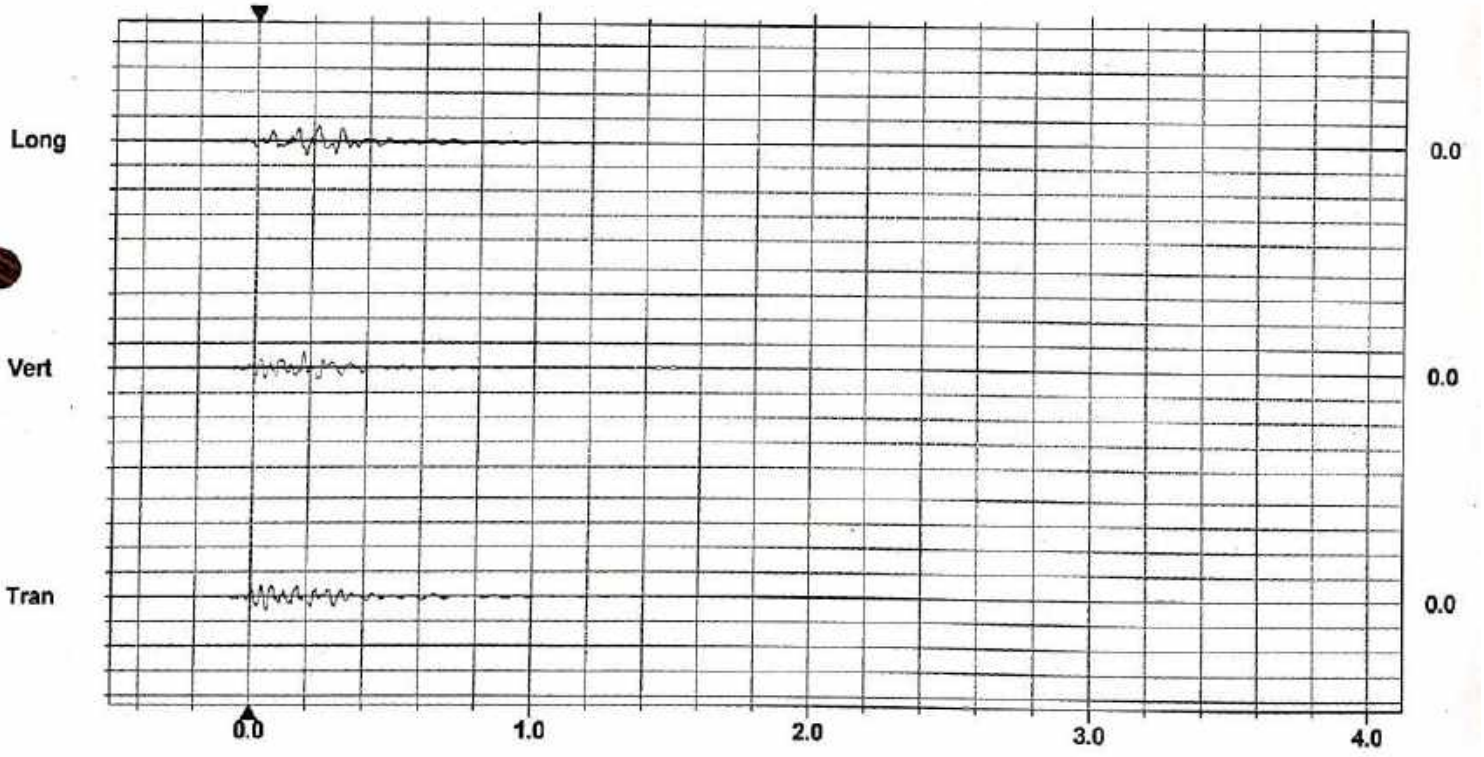
	Tran	**Vert**	**Long**	
PPV	1.103	1.277	1.261	mm/s
ZC Freq	28	24	15.1	Hz
Time (Rel. to Trig)	0.056	0.175	0.217	sec
Peak Acceleration	0.031	0.025	0.030	g
Peak Displacement	0.006	0.009	0.013	mm
Sensor Check	Check	Check	Check	

Peak Vector Sum 1.717 mm/s at 0.175 sec

Serial Number	UM14694 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶——◀

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Instantel

Event Report

490

Block - 30

Instantel

Date/Time	Vert at 13:58:11 January 19, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.353 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.624 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes

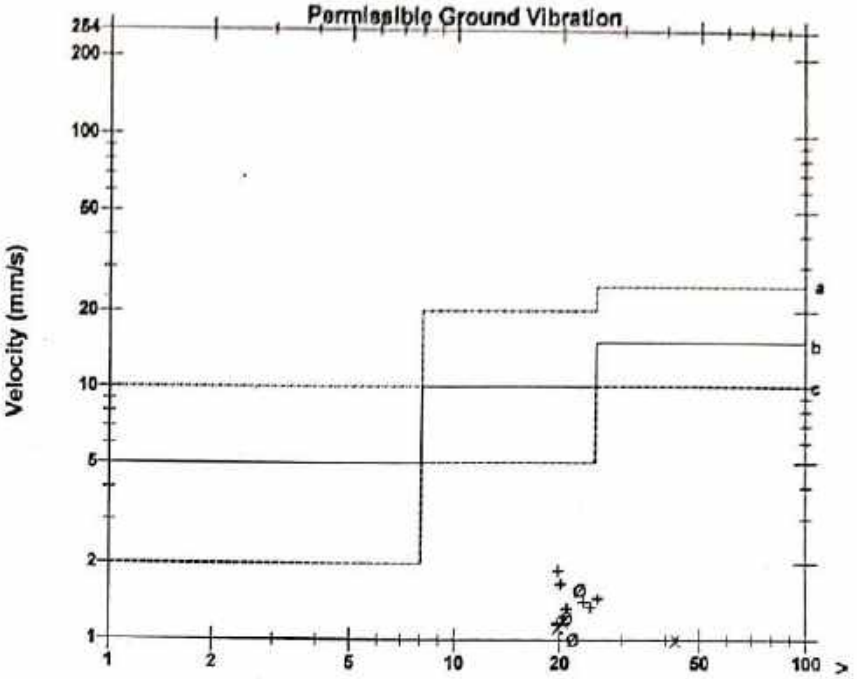
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	1.868	1.198	1.592	mm/s
ZC Freq	19.7	20	23	Hz
Time (Rel. to Trig)	0.240	0.202	0.259	sec
Peak Acceleration	0.046	0.039	0.033	g
Peak Displacement	0.011	0.009	0.009	mm
Sensor Check	Check	Check	Check	

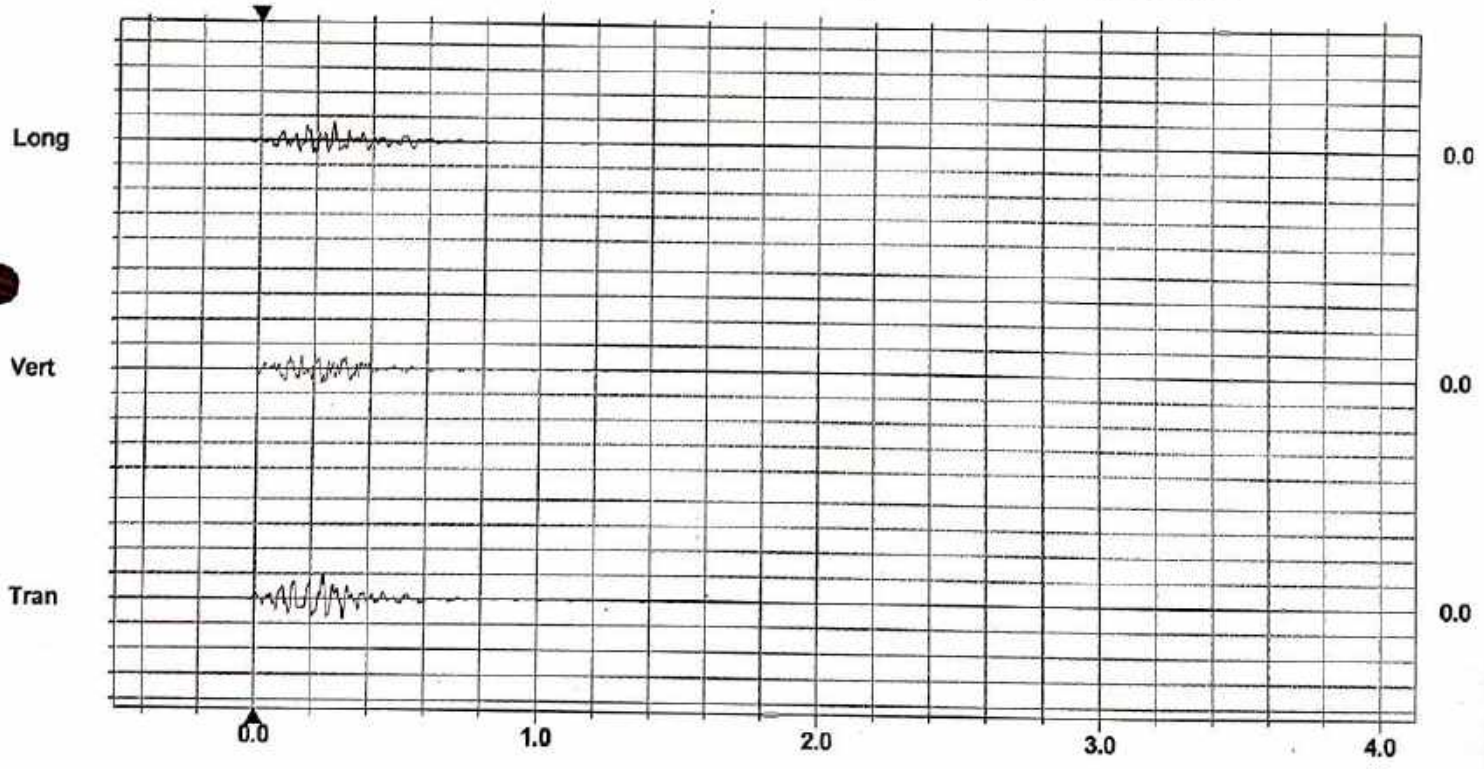
Peak Vector Sum 2.315 mm/s at 0.240 sec

DGMS India (A)

Permissible Ground Vibration



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: January 20, 2025 (V 10.72 - 10.72)

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Date/Time	Tran at 13:34:35 January 20, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.022 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

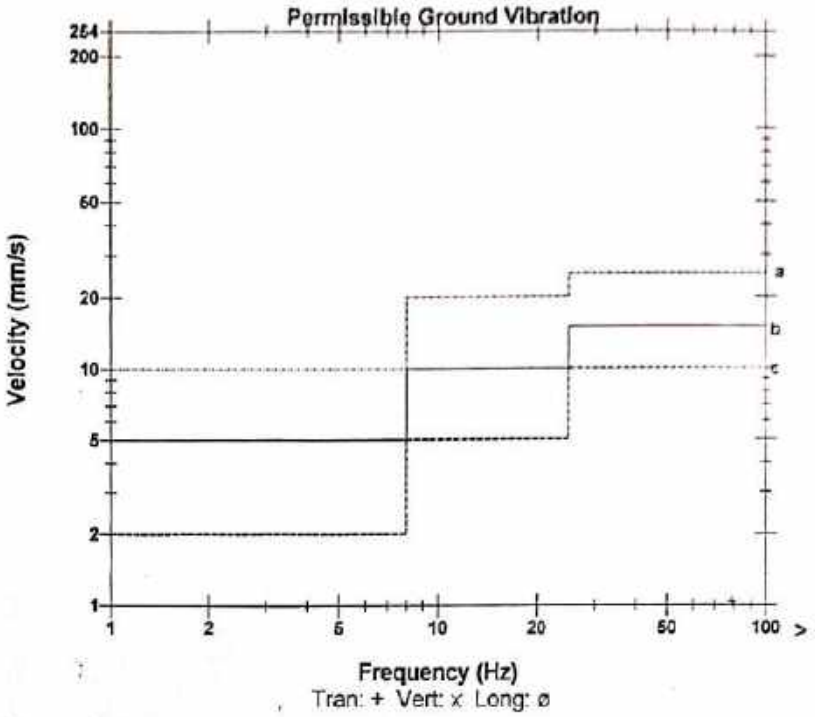
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

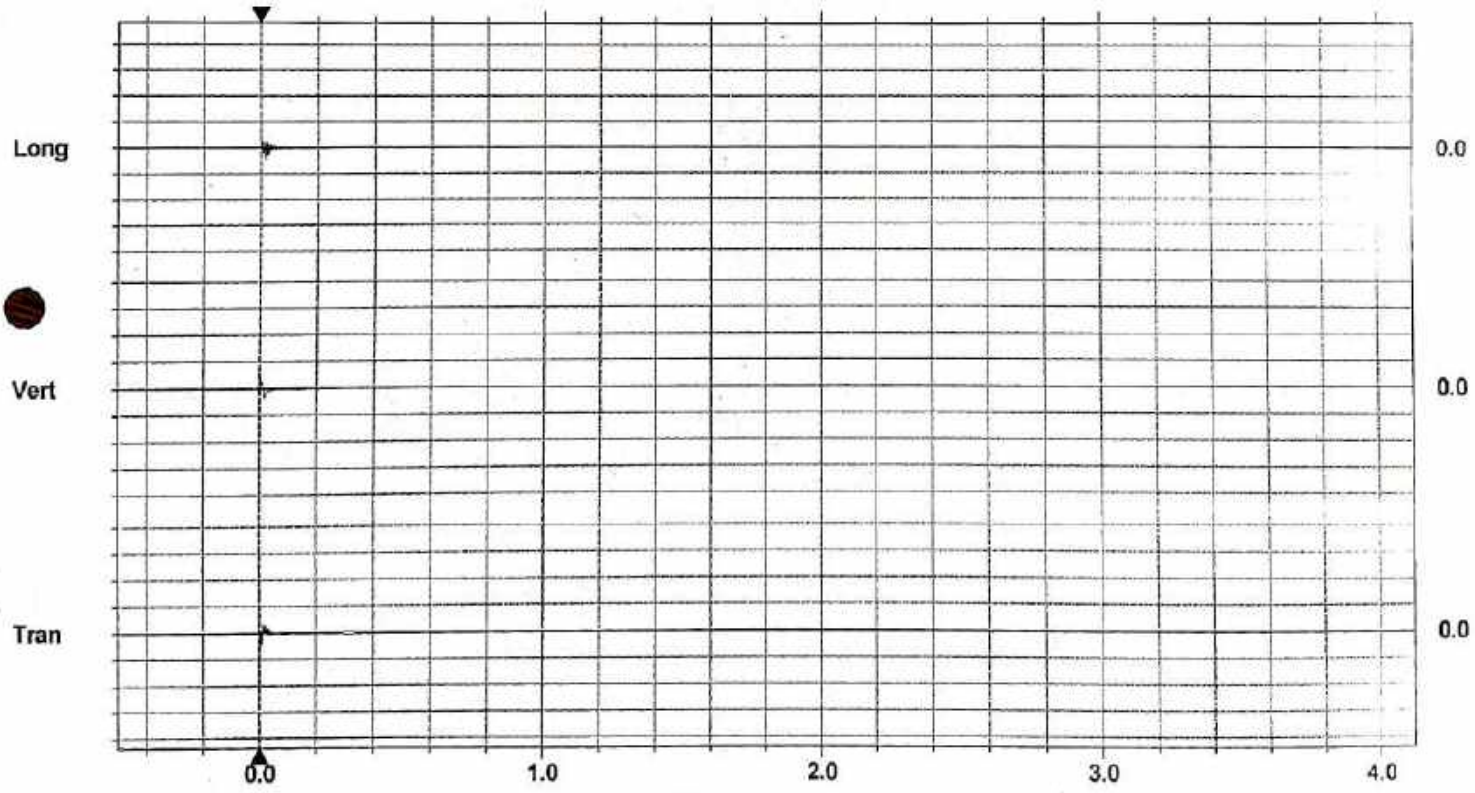
	Tran	Vert	Long	
PPV	1.033	0.851	0.812	mm/s
ZC Freq	79	33	93	Hz
Time (Rel. to Trig)	0.001	0.001	0.017	sec
Peak Acceleration	0.066	0.041	0.048	g
Peak Displacement	0.002	0.004	0.001	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.355 mm/s at 0.001 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Date/Time	Vert at 13:33:12 January 20, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.368 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

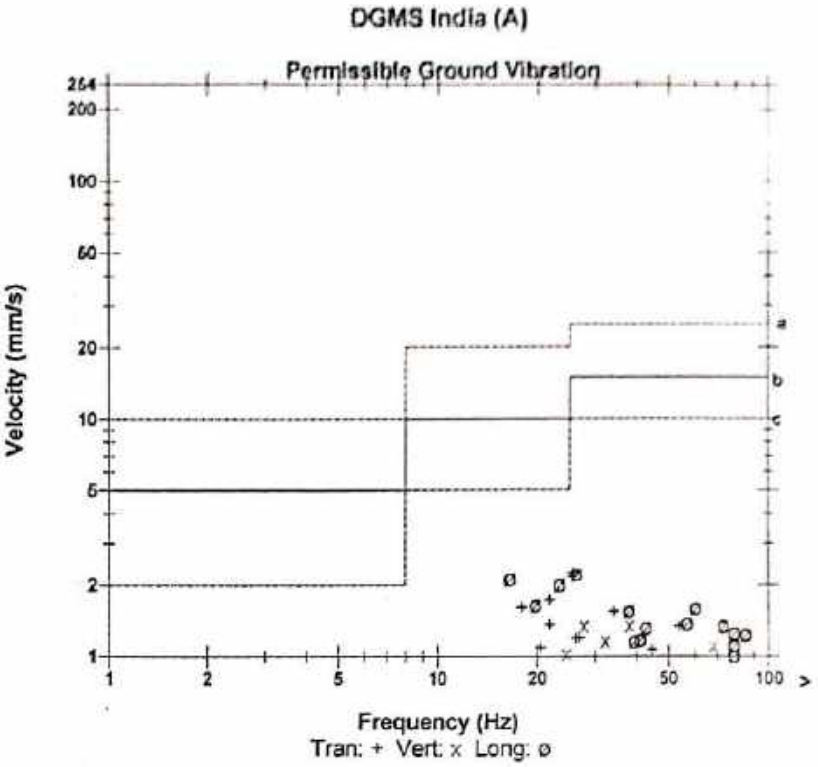
Serial Number	UM14694 V 10-90FB Micromate ISEE
Battery Level	3.7 Volts
Unit Calibration	June 28, 2024 by UES New Delhi
File Name	__TEMP EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

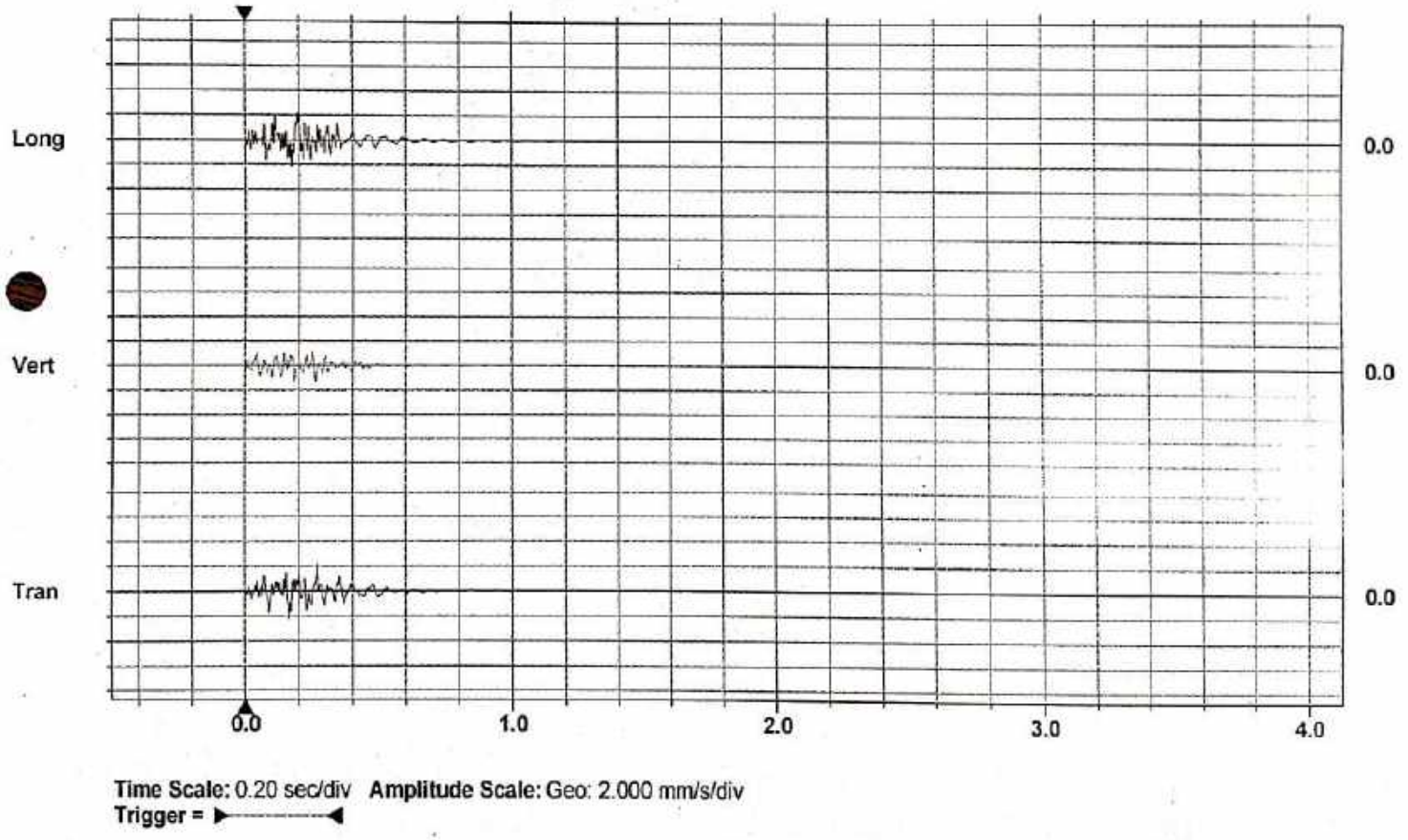
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	2.238	1.356	2.223	mm/s
ZC Freq	26	38	26	Hz
Time (Rel. to Trig)	0.165	0.183	0.198	sec
Peak Acceleration	0.094	0.059	0.122	g
Peak Displacement	0.012	0.006	0.014	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.597 mm/s at 0.173 sec





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Instantel

Event Report

493

Instantel

Date/Time	Vert at 13:27:59 January 20, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.54 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

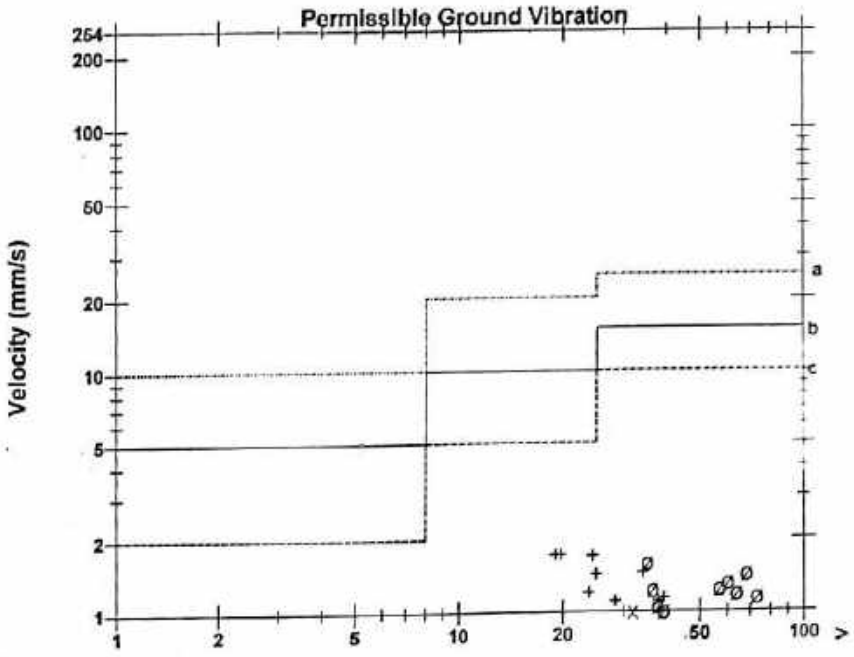
Notes

Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

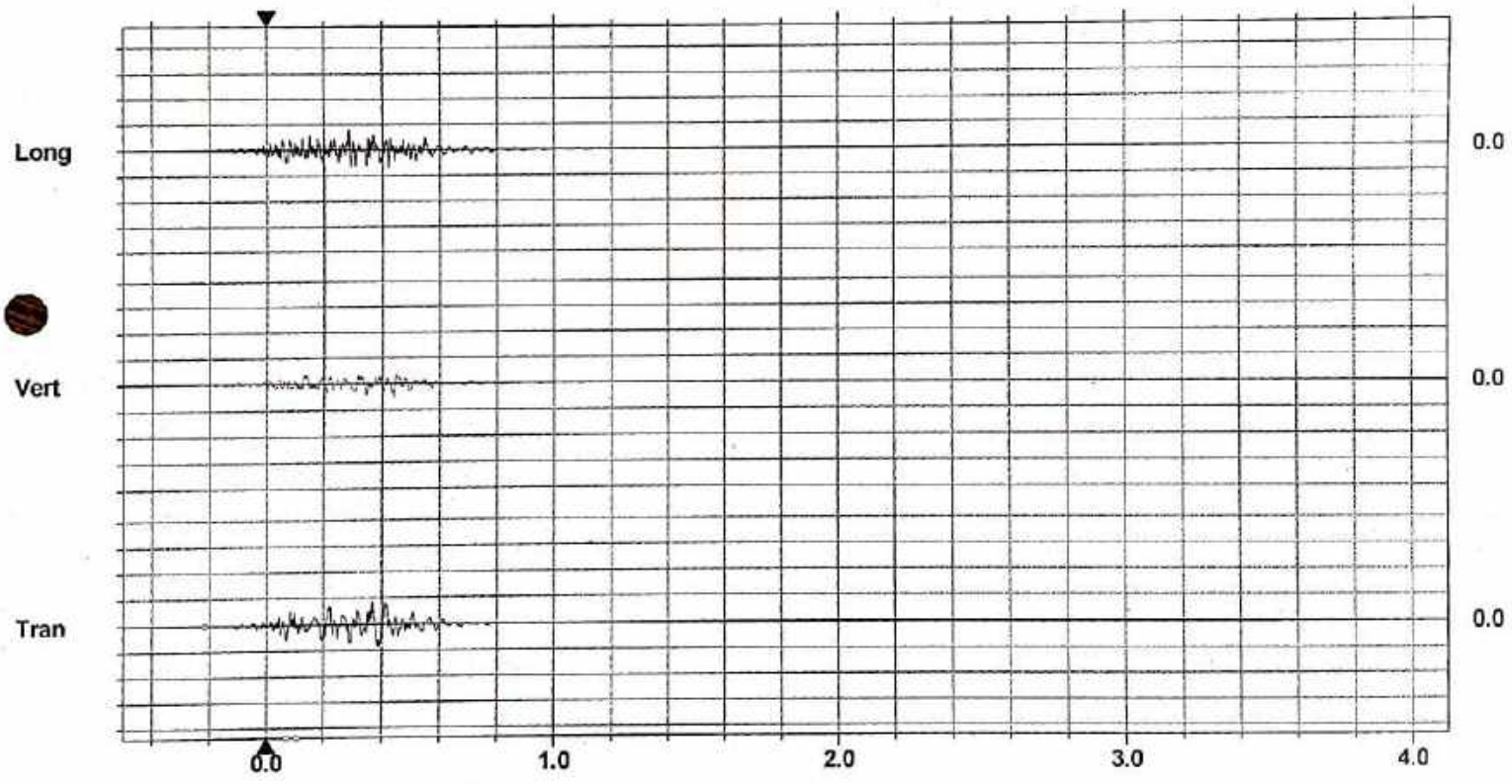
	Tran	**Vert**	**Long**	
PPV	1.718	1.001	1.584	mm/s
ZC Freq	19.7	32	35	Hz
Time (Rel. to Trig)	0.392	0.438	0.285	sec
Peak Acceleration	0.077	0.033	0.072	g
Peak Displacement	0.016	0.005	0.005	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.080 mm/s at 0.367 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶——◀

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Instantel

Event Report

BLOCK - B (2)

494

Instantel

Date/Time	Vert at 13:23:08 January 21, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.289 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes

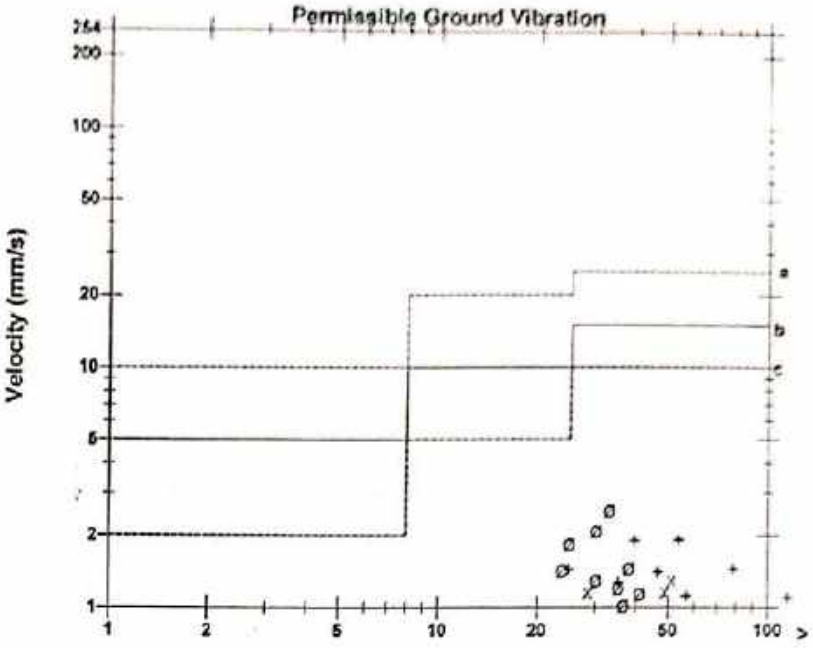
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.6 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	_TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

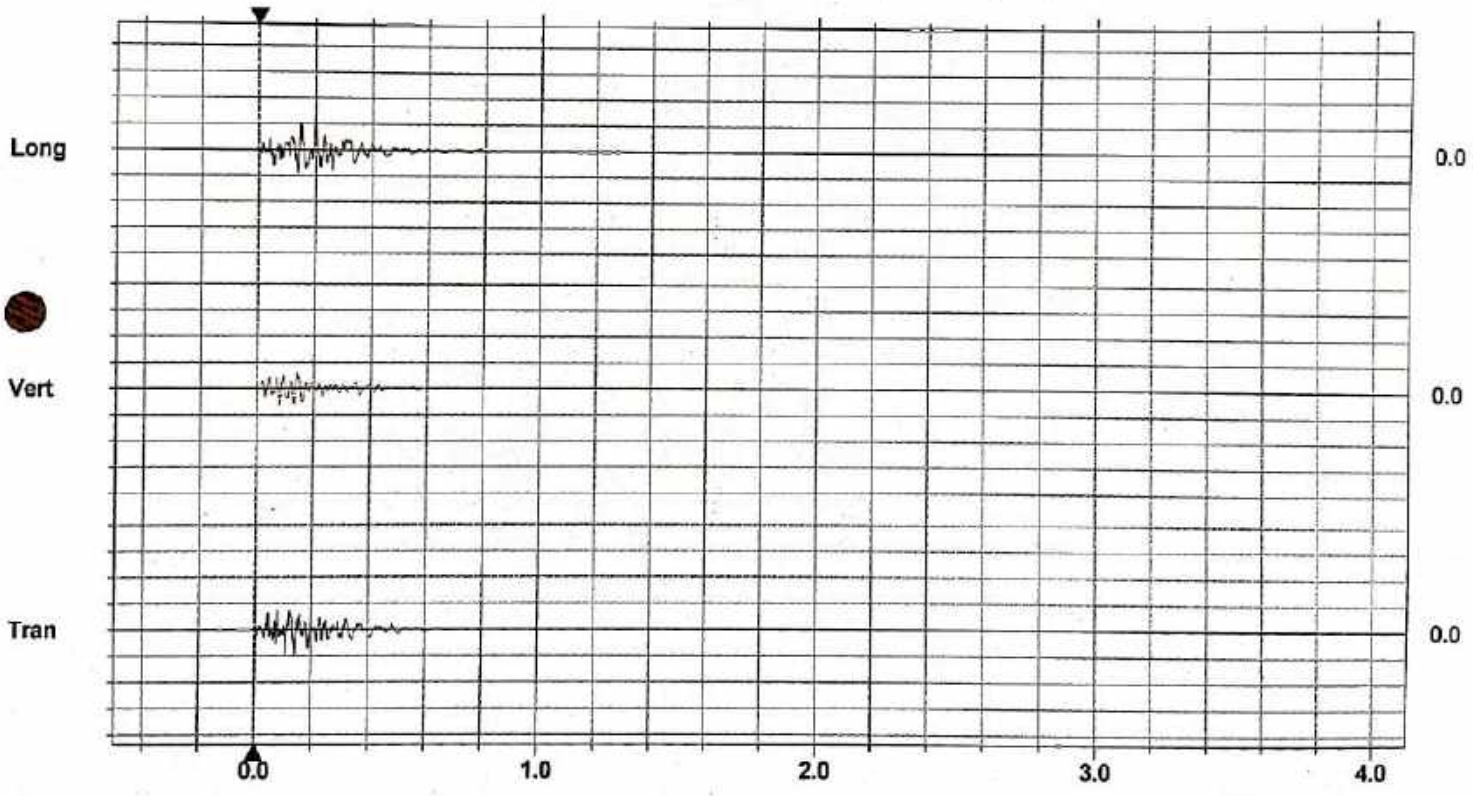
	Tran	**Vert**	**Long**	
PPV	1.900	1.308	2.554	mm/s
ZC Freq	54	51	33	Hz
Time (Rel. to Trig)	0.108	0.081	0.198	sec
Peak Acceleration	0.079	0.044	0.061	g
Peak Displacement	0.008	0.007	0.011	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.648 mm/s at 0.198 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: January 22, 2025 (V 10.72 - 10.72)

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Instantel

Event Report

Block - 80

Instantel

Date/Time	Tran at 13:19:56 January 21, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.375 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.624 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

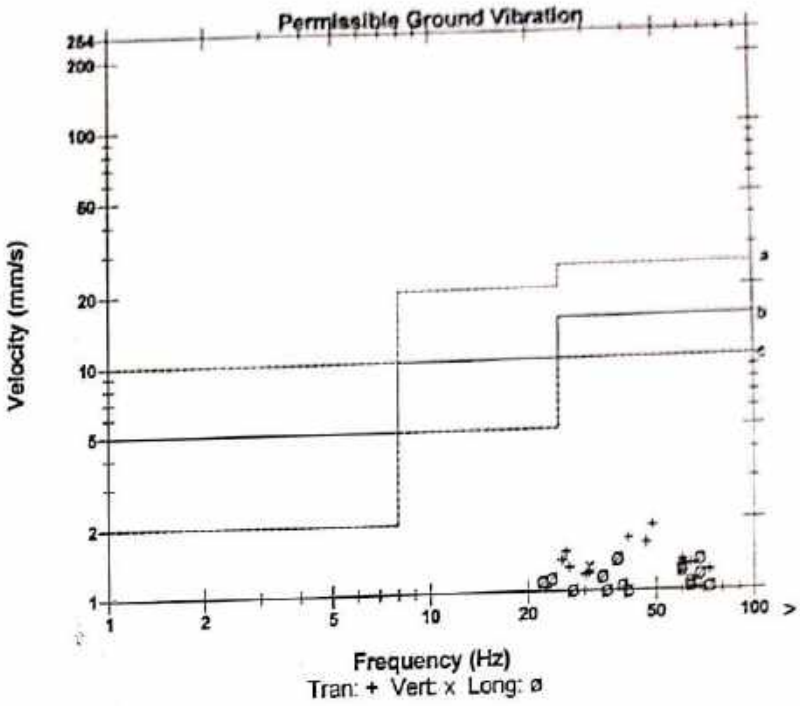
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	1.884	1.277	1.371	mm/s
ZC Freq	49	31	38	Hz
Time (Rel. to Trig)	0.427	0.171	0.177	sec
Peak Acceleration	0.072	0.056	0.095	g
Peak Displacement	0.009	0.006	0.005	mm
Sensor Check	Passed	Passed	Passed	

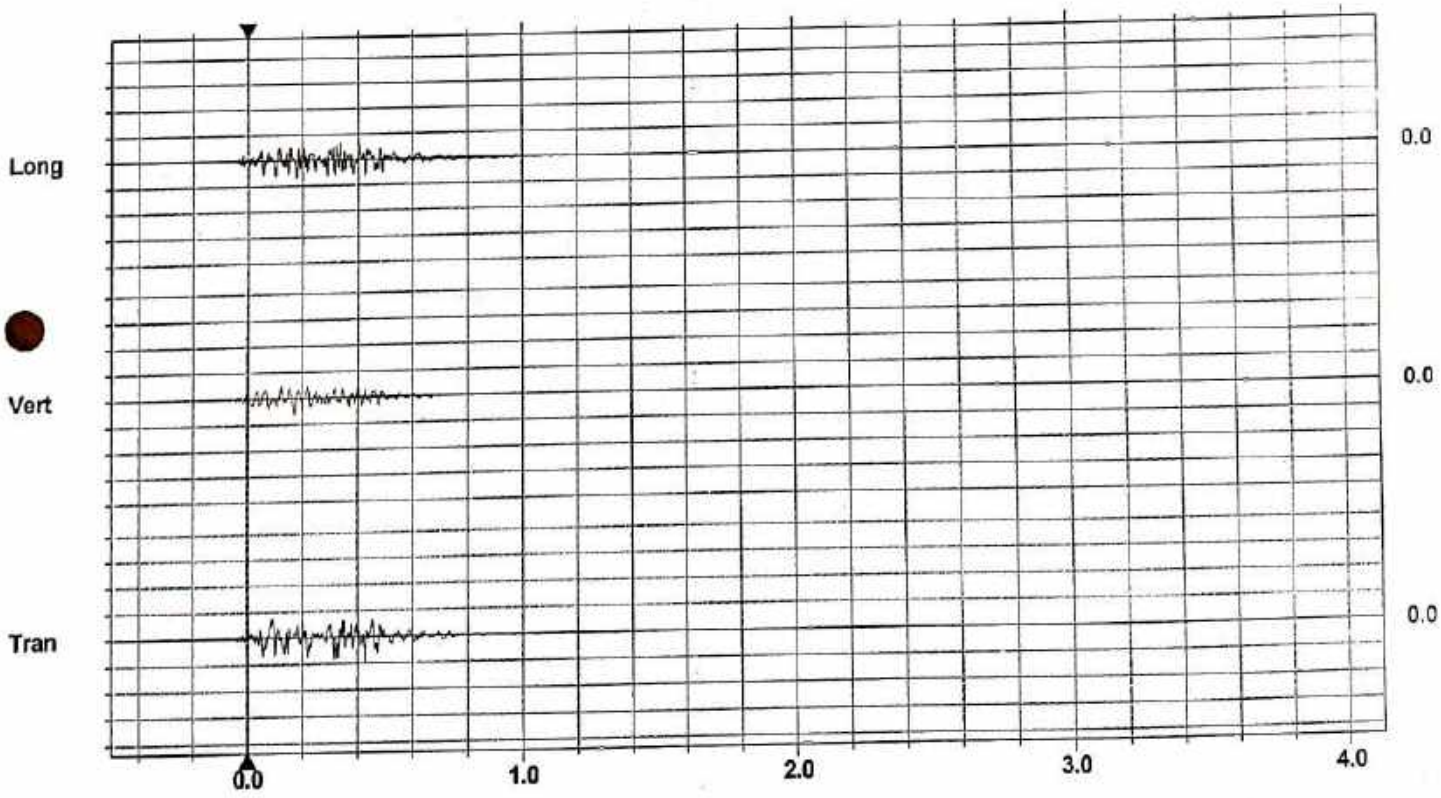
Peak Vector Sum 2.294 mm/s at 0.427 sec

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.6 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	_TEMP EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

Printed: January 22, 2025 (V 10.72 - 10.72)

Format © 1995-2014 Xmark Corporation

Date/Time	Vert at 14:50:45 January 22, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.561 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

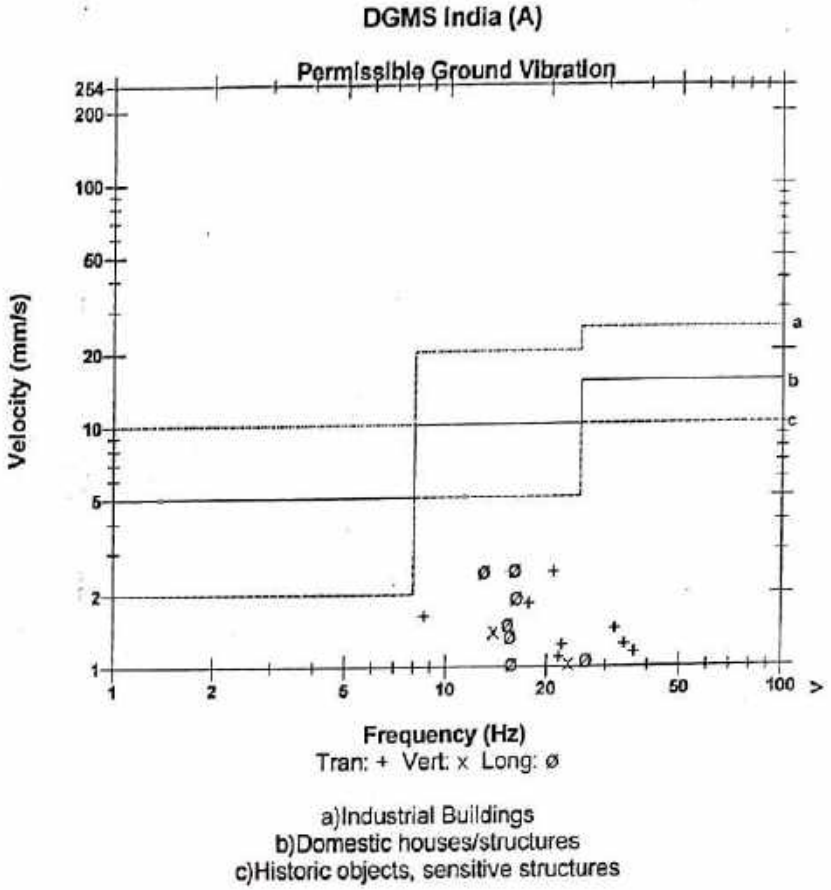
Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (163.4 m, 0.1 kg)

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

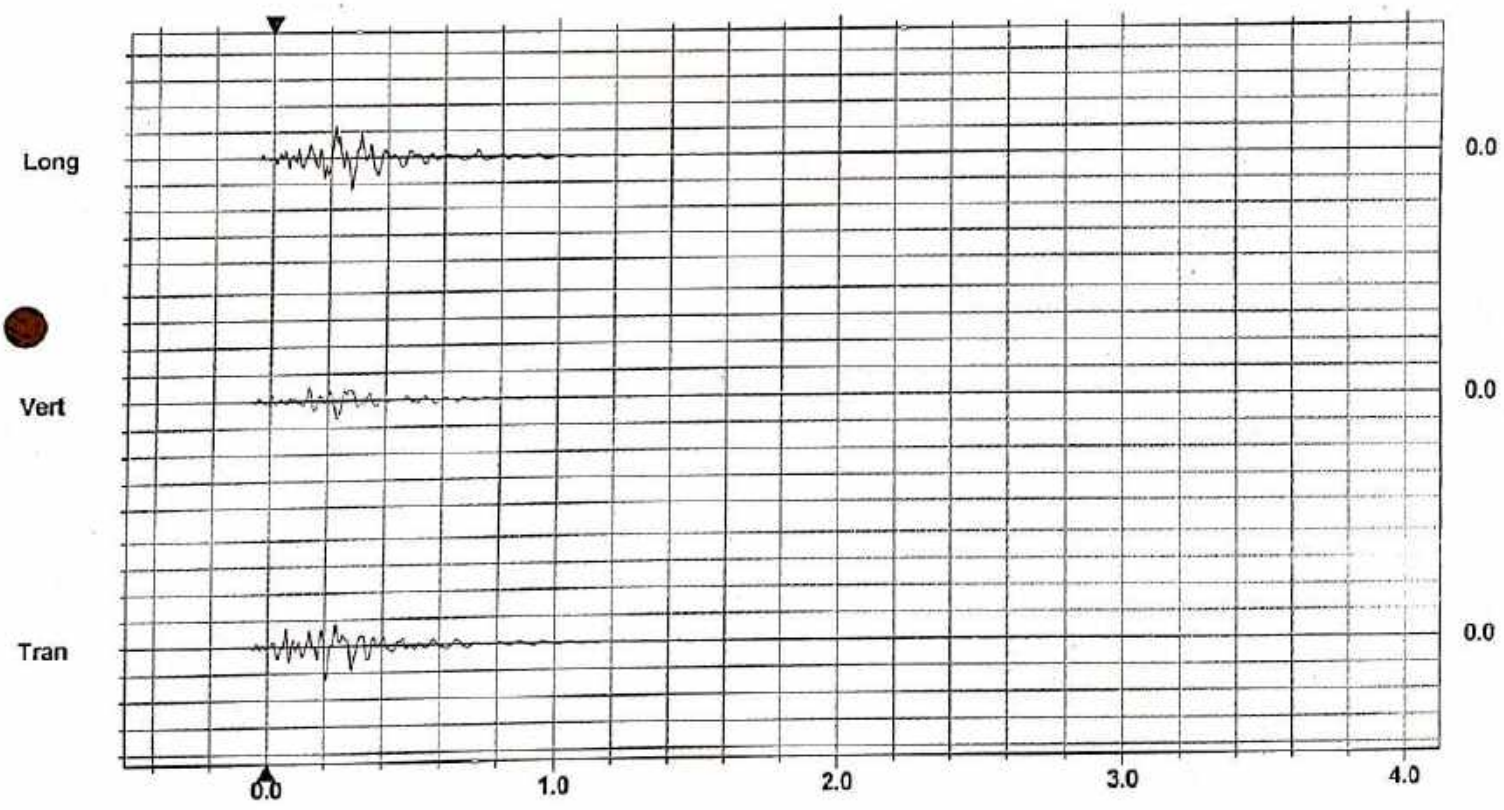
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	2.459	1.403	2.514	mm/s
ZC Freq	21	13.8	16.0	Hz
Time (Rel. to Trig)	0.205	0.229	0.273	sec
Peak Acceleration	0.046	0.036	0.053	g
Peak Displacement	0.020	0.013	0.022	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.700 mm/s at 0.273 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Instantel **Event Report** BLOCK - B(2) Instantel

Date/Time	Long at 14:47:44 January 22, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.289 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

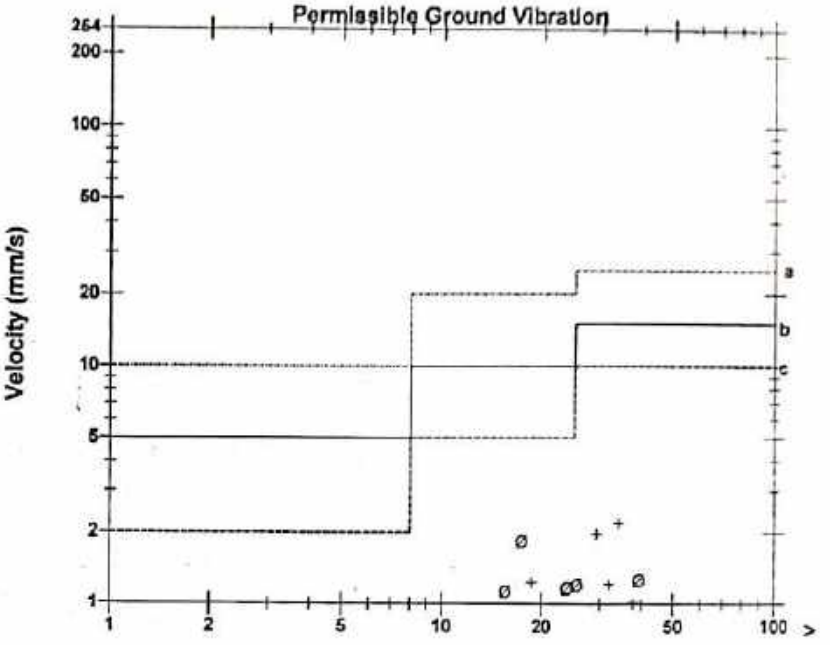
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	2.175	0.812	1.860	mm/s
ZC Freq	34	33	17.4	Hz
Time (Rel. to Trig)	0.079	0.146	0.160	sec
Peak Acceleration	0.071	0.026	0.051	g
Peak Displacement	0.011	0.006	0.013	mm
Sensor Check	Passed	Passed	Passed	

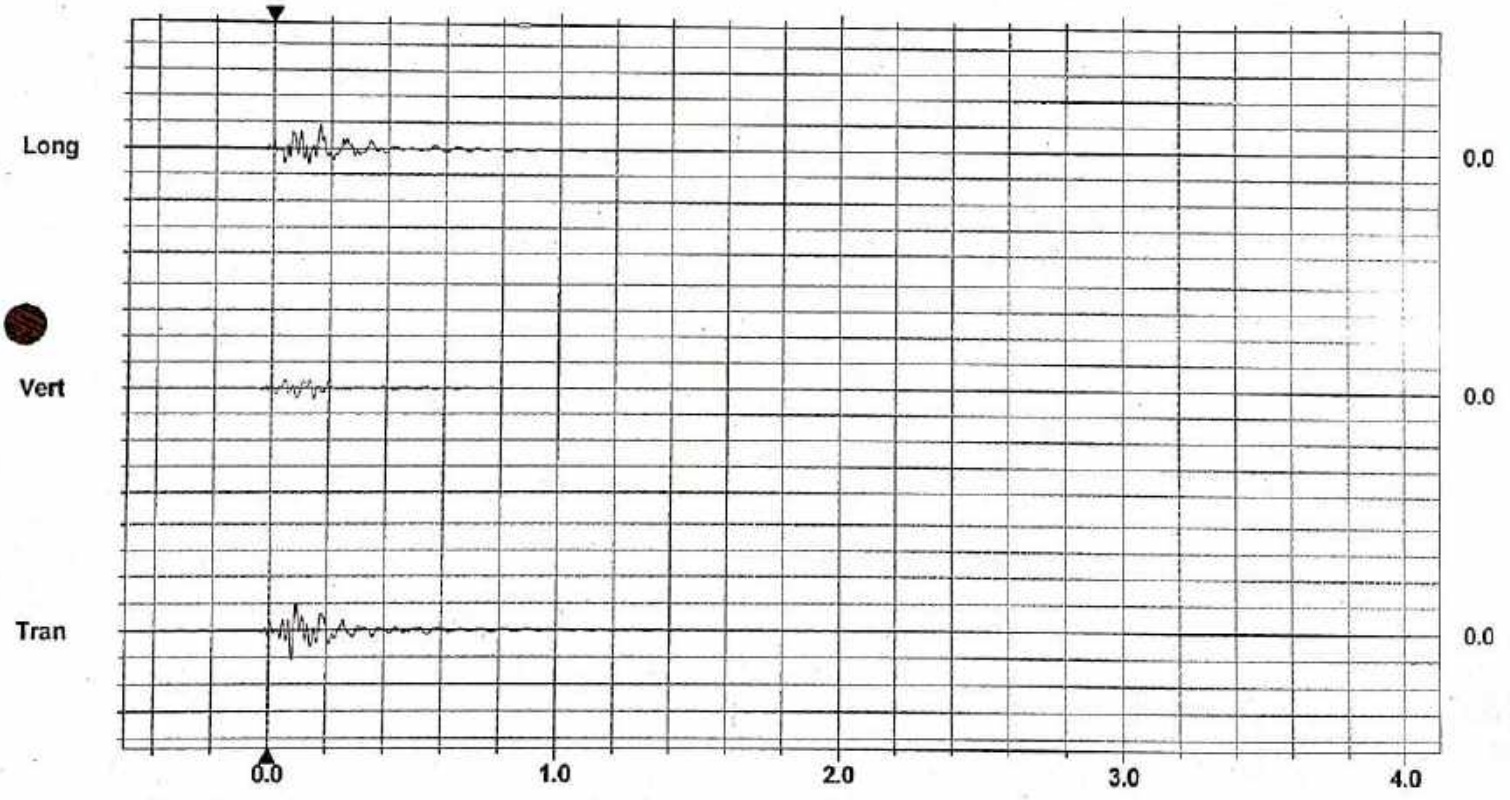
Peak Vector Sum 2.416 mm/s at 0.093 sec

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶——◀

Printed: January 23, 2025 (V 10.72 - 10.72)

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Date/Time	Vert at 14:38:34 January 22, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.002 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

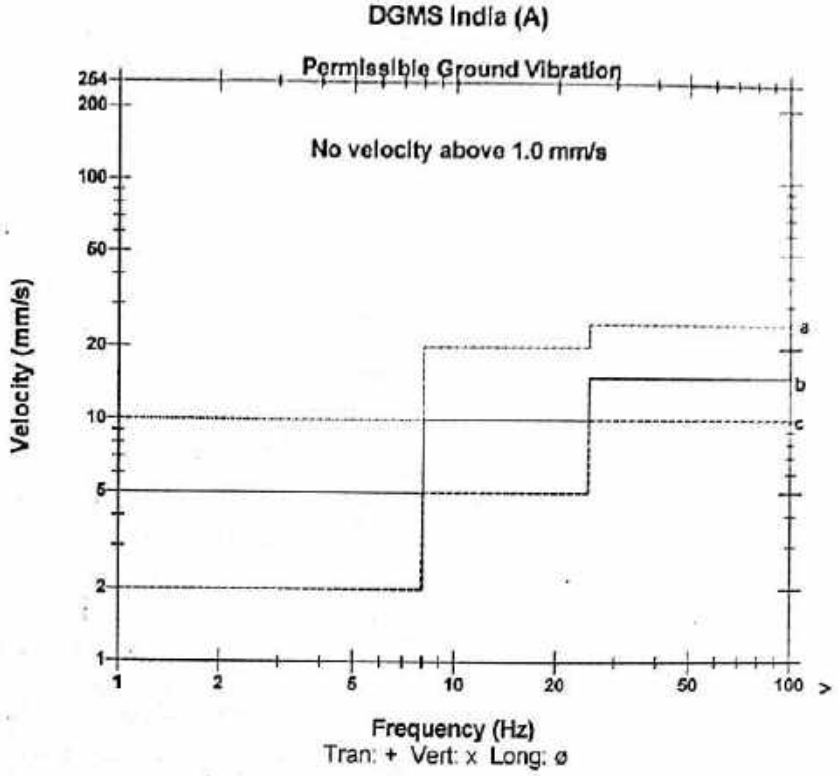
Notes

Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

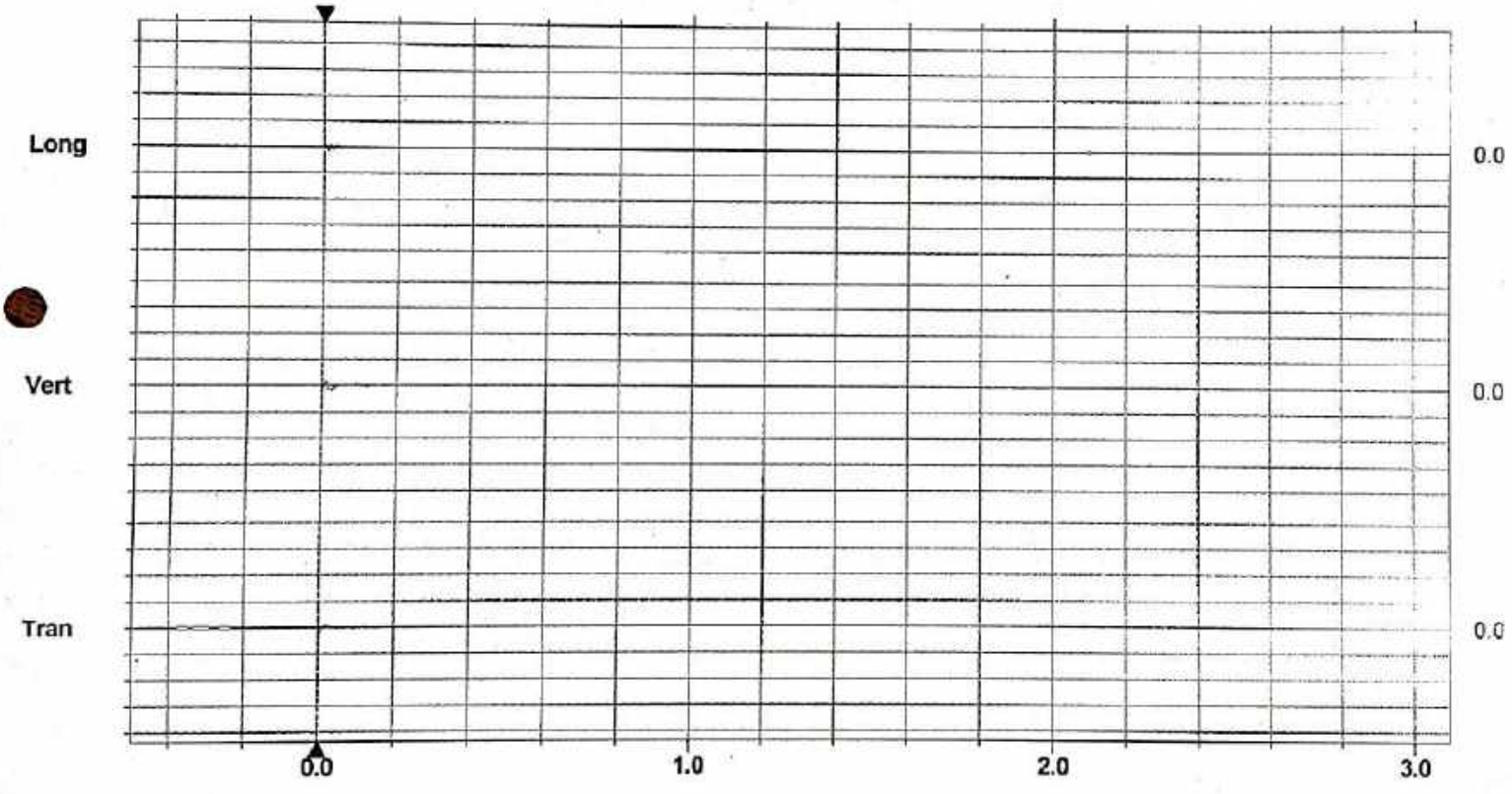
	Serial Number	UM14894 V 10-90FB Micromate ISEE
	Battery Level	3.8 Volts
	Unit Calibration	June 26, 2024 by UES New Delhi
	File Name	__TEMP.EVT
	Scaled Distance	485.0 (153.4 m, 0.1 kg)

	Tran	Vert	Long	
PPV	0.339	0.820	0.284	mm/s
ZC Freq	34	73	68	Hz
Time (Rel. to Trig)	0.003	0.000	0.010	sec
Peak Acceleration	0.016	0.048	0.015	g
Peak Displacement	0.001	0.003	0.001	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 0.861 mm/s at 0.000 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

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Date/Time	Vert at 13:07:09 January 23, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.279 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

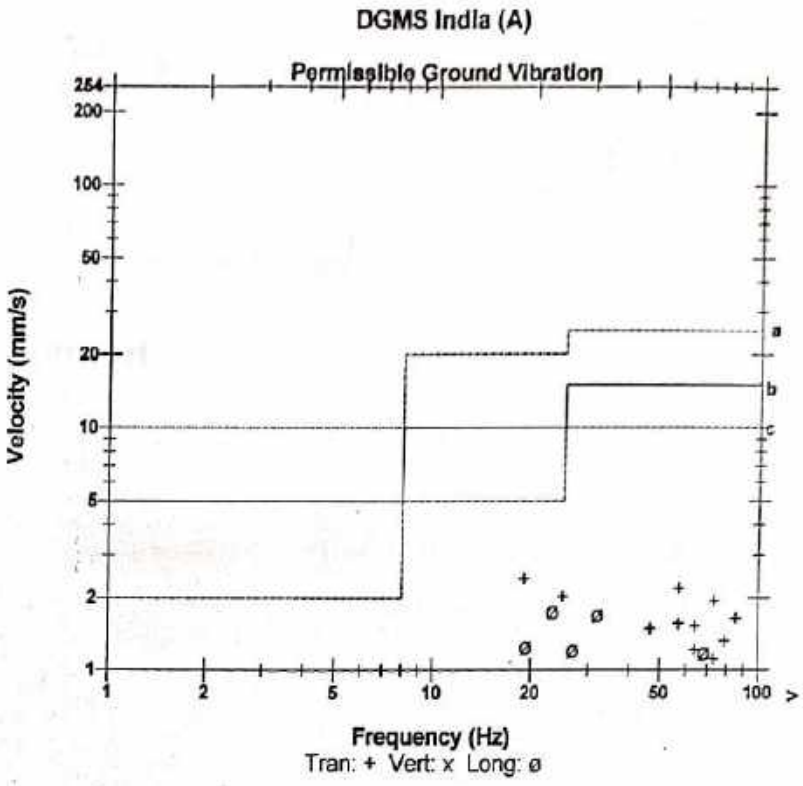
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

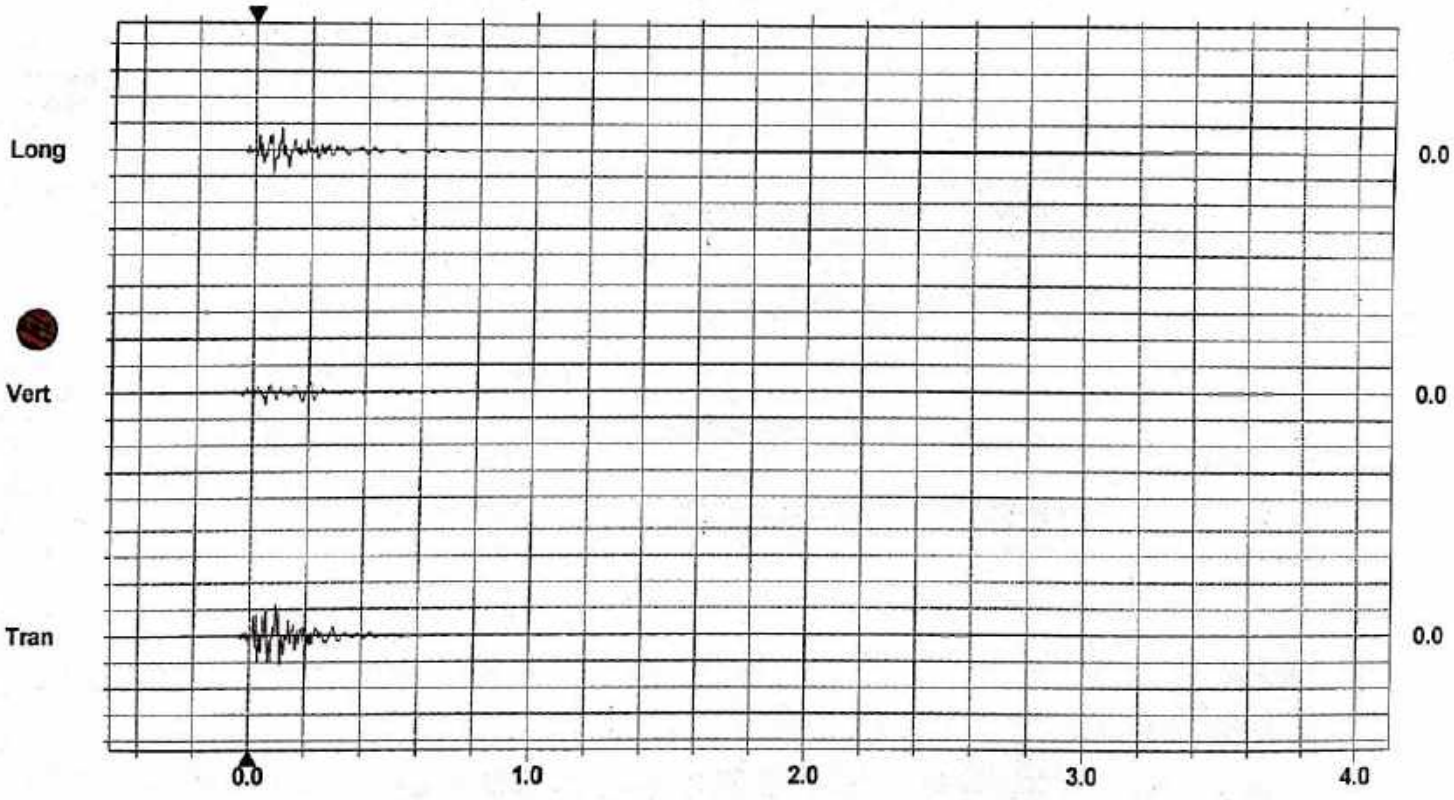
	Tran	Vert	Long	
PPV	2.388	0.899	1.758	mm/s
ZC Freq	19.0	26	23	Hz
Time (Rel. to Trig)	0.093	0.045	0.063	sec
Peak Acceleration	0.100	0.031	0.076	g
Peak Displacement	0.013	0.005	0.009	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.928 mm/s at 0.093 sec

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div
Trigger =

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Instantel

Event Report 500 Block - B

Instantel

Date/Time	Vert at 13:04:23 January 23, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.001 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	_TEMP EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

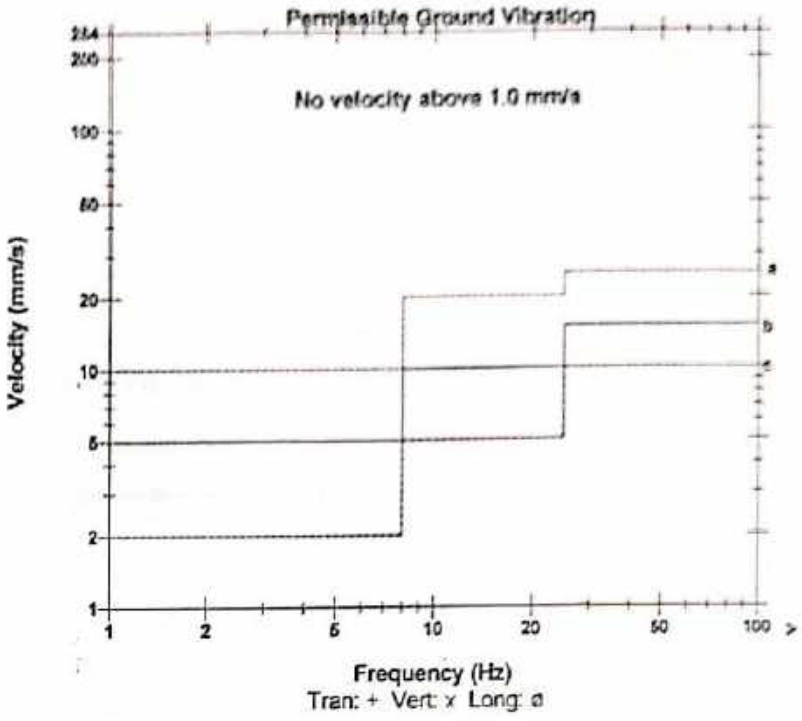
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.624 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

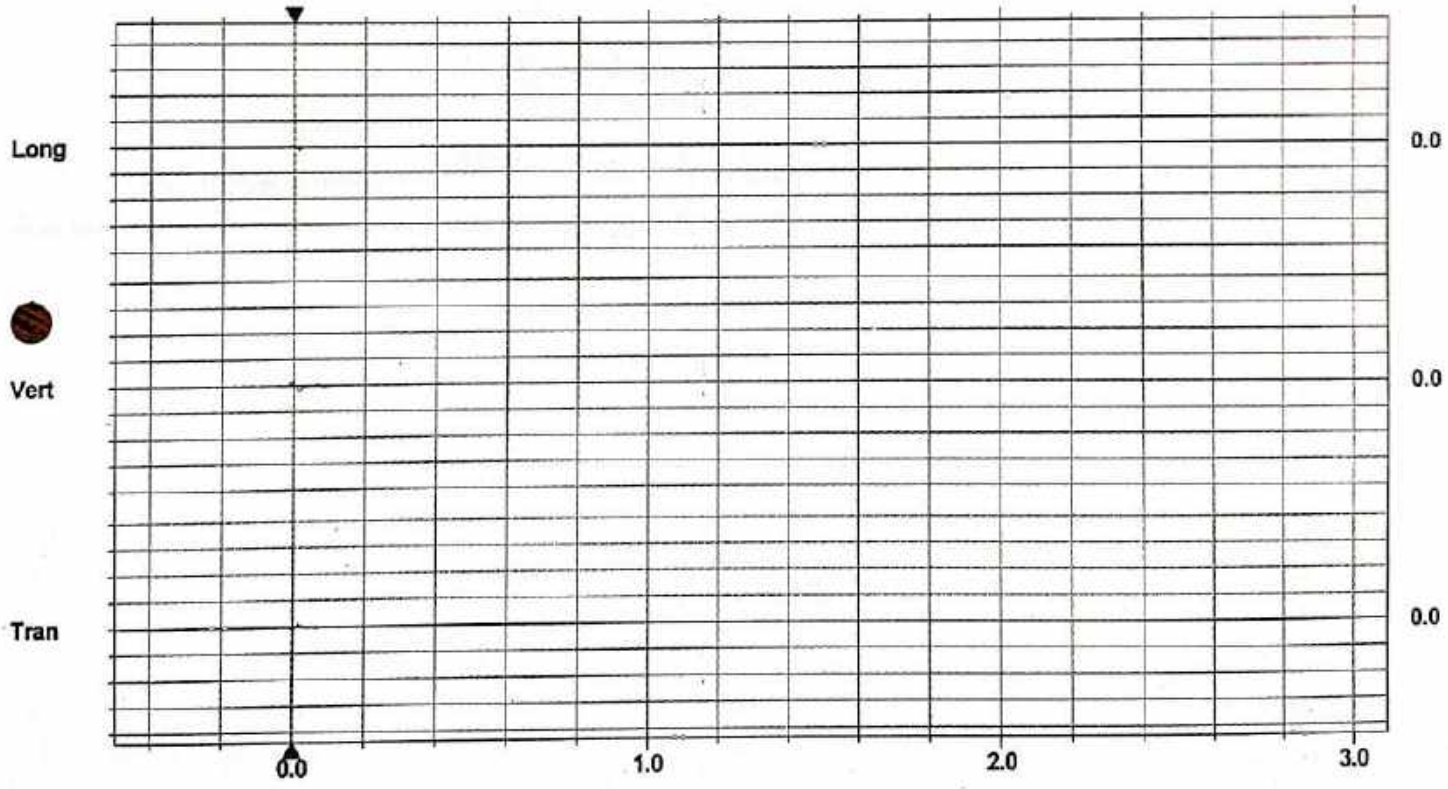
	Tran	Vert	Long	
PPV	0.268	0.575	0.221	mm/s
ZC Freq	60	24	25	Hz
Time (Rel. to Trig)	0.000	0.000	0.013	sec
Peak Acceleration	0.015	0.026	0.010	g
Peak Displacement	0.001	0.003	0.001	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 0.649 mm/s at 0.000 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: January 24, 2025 (V 10.72 - 10.72)

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Instantel

Event Report

501

Block - B ①

Instantel

Date/Time	Long at 13:03:18 January 23, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.168 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

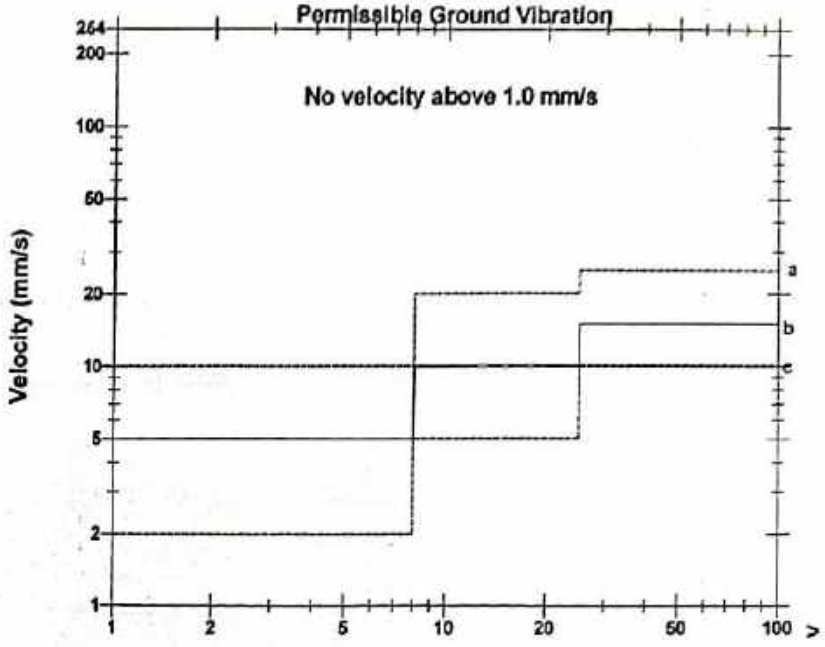
Notes

Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.701	0.284	0.820	mm/s
ZC Freq	31	32	43	Hz
Time (Rel. to Trig)	0.105	0.088	0.156	sec
Peak Acceleration	0.028	0.016	0.028	g
Peak Displacement	0.003	0.001	0.003	mm
Sensor Check	Passed	Passed	Passed	

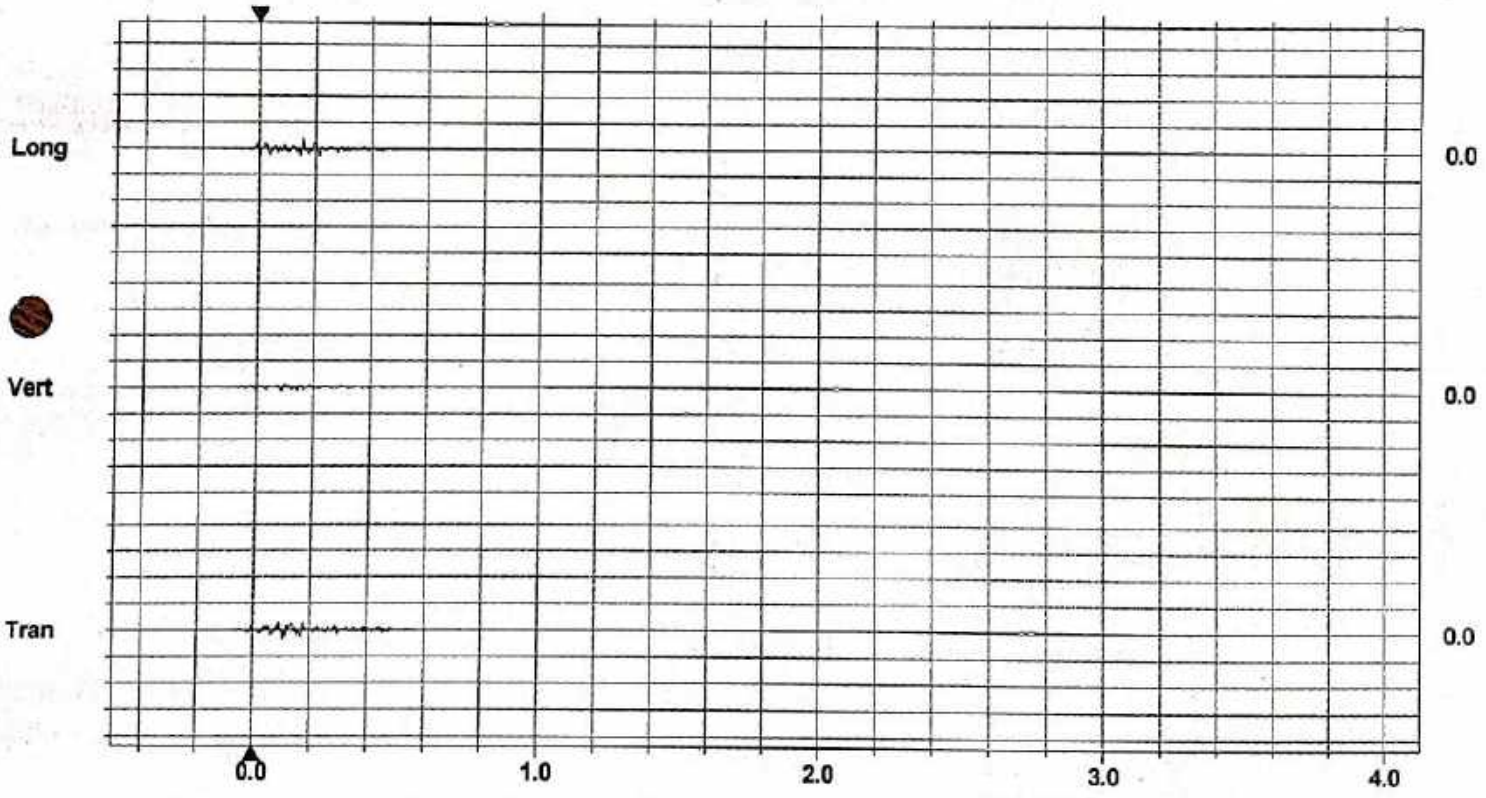
Peak Vector Sum 0.842 mm/s at 0.156 sec

DGMS India (A)



Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: January 24, 2025 (V 10.72 - 10.72)

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Instantel

Event Report

502

Block-B ①

Instantel

Date/Time	Tran at 15:15:09 January 24, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.289 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes

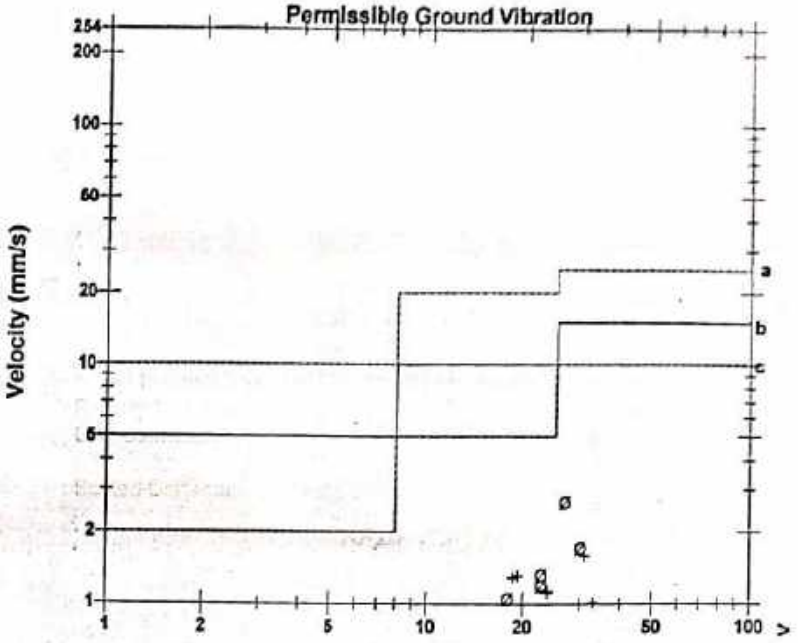
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	1.592	0.835	2.703	mm/s
ZC Freq	31	29	27	Hz
Time (Rel. to Trig)	0.097	0.146	0.070	sec
Peak Acceleration	0.036	0.021	0.059	g
Peak Displacement	0.013	0.004	0.014	mm
Sensor Check	Passed	Passed	Passed	

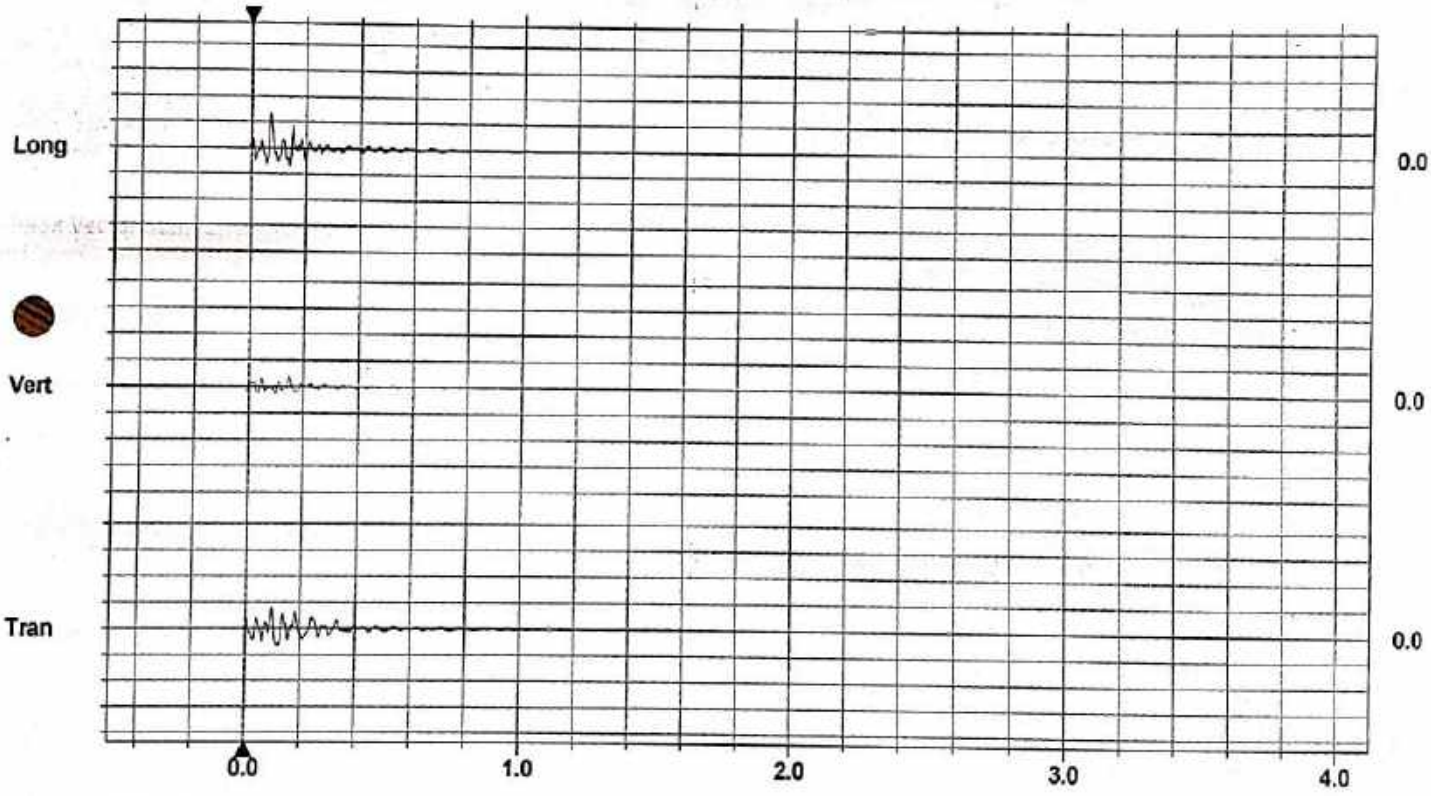
Peak Vector Sum 2.725 mm/s at 0.070 sec

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: January 25, 2025 (V 10.72 - 10.72)

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Instantel Event Report Instantel

Date/Time	Tran at 15:10:03 January 24, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.548 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10.90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 28, 2024 by UES New Delhi
File Name	_TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

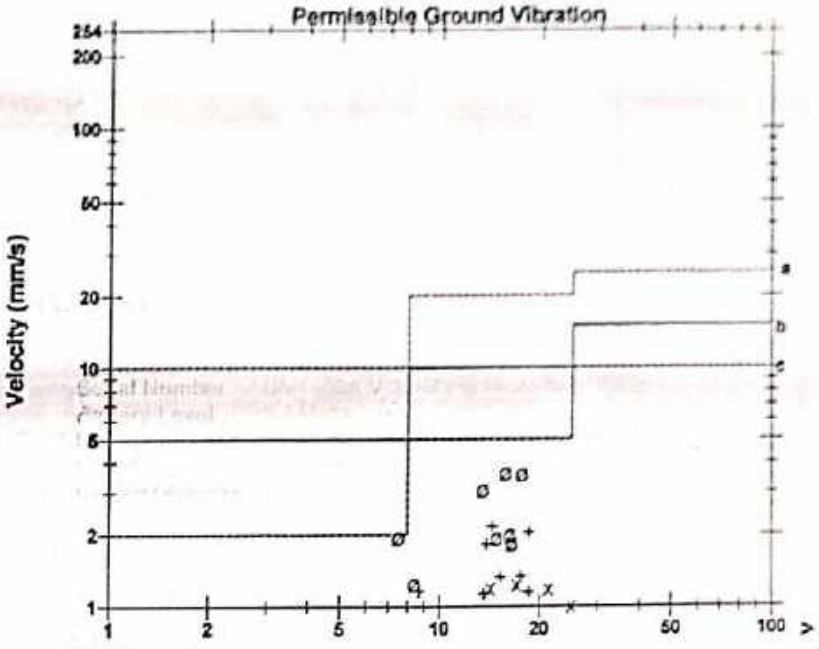
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

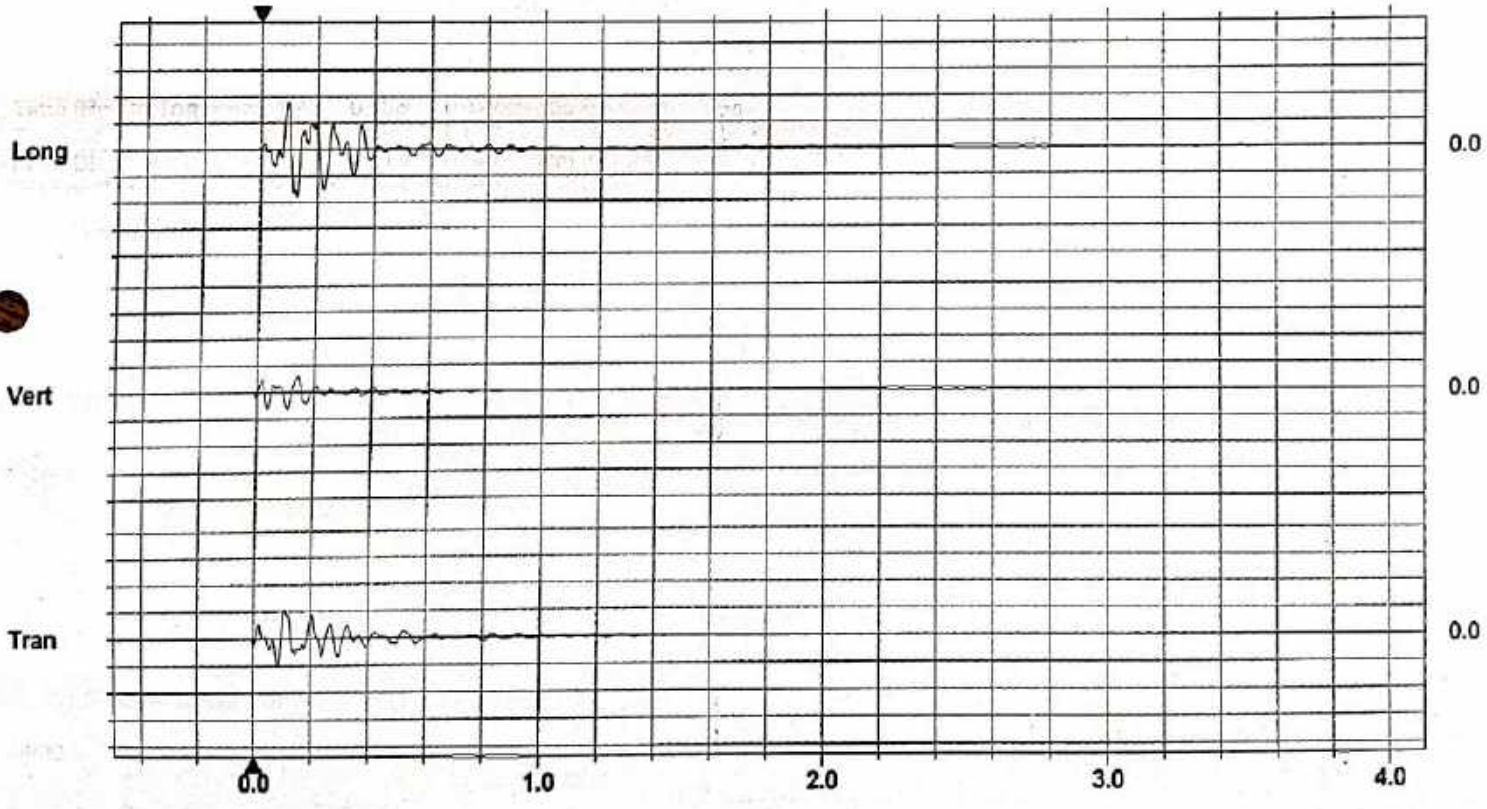
	Tran	Vert	Long	
PPV	2.152	1.245	3.602	mm/s
ZC Freq	14.4	17.1	15.8	Hz
Time (Rel. to Trig)	0.108	0.106	0.127	sec
Peak Acceleration	0.033	0.020	0.058	g
Peak Displacement	0.026	0.013	0.042	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 3.718 mm/s at 0.127 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶——◀

Printed: January 25, 2025 (V 10.72 - 10.72)

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Date/Time	Tran at 15:09:24 January 24, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.019 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 20, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

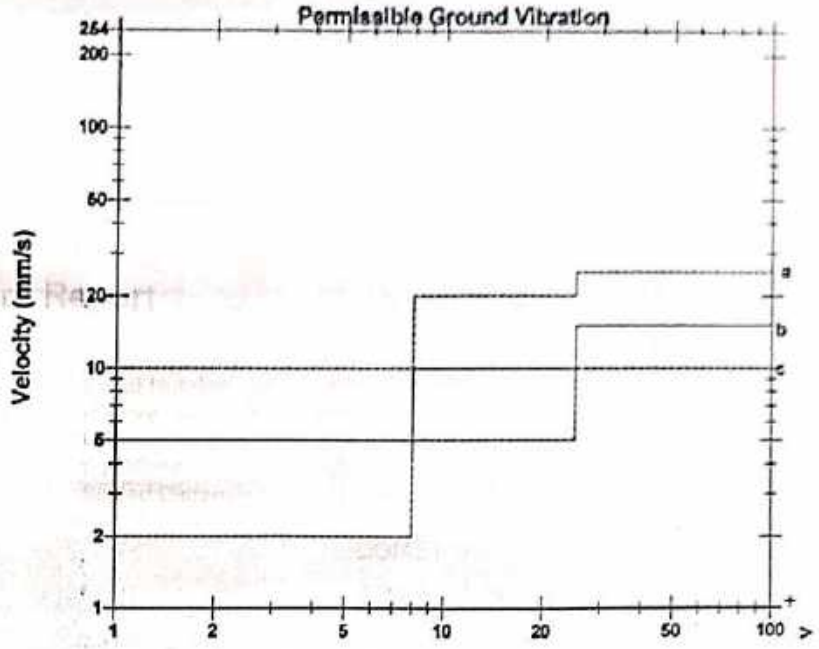
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

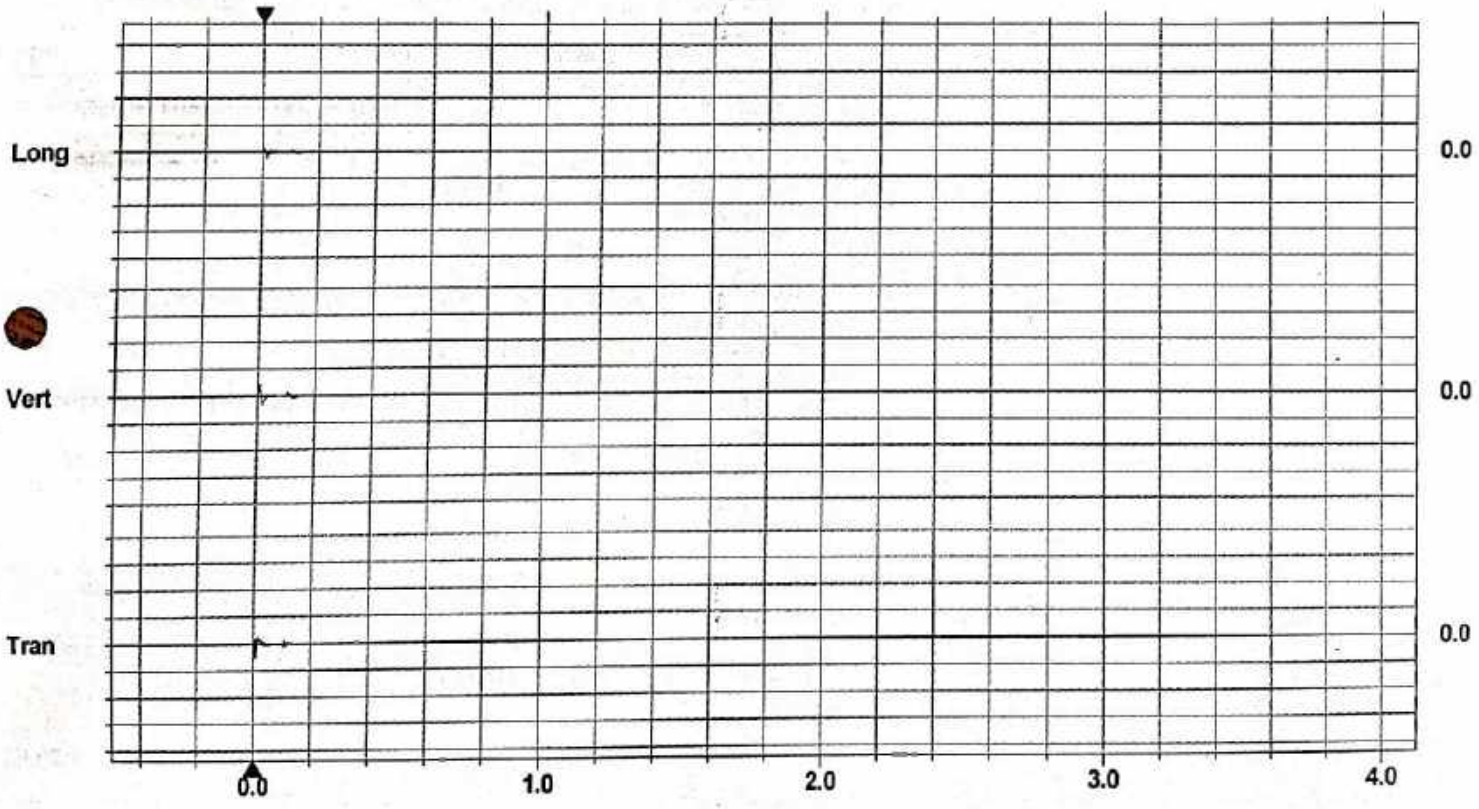
	Tran	Vert	Long	
PPV	1.056	0.820	0.599	mm/s
ZC Freq	102	39	68	Hz
Time (Rel. to Trig)	0.007	0.007	0.001	sec
Peak Acceleration	0.071	0.051	0.033	g
Peak Displacement	0.003	0.004	0.001	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.309 mm/s at 0.007 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶——◀

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Instantel

Event Report

Block - B6

Instantel

Date/Time	Tran at 15:08:55 January 24, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.089 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10.60F B Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	_TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

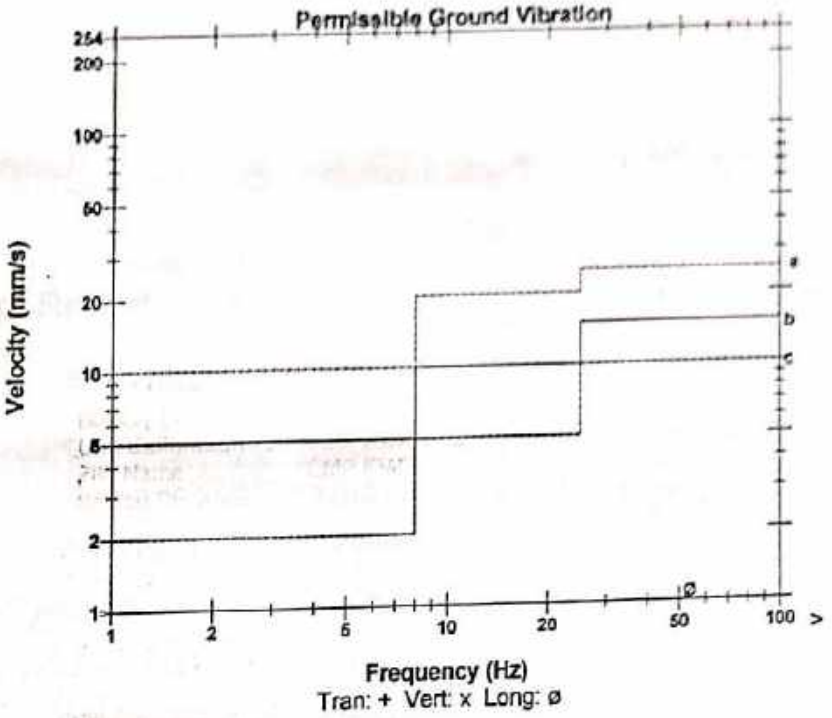
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

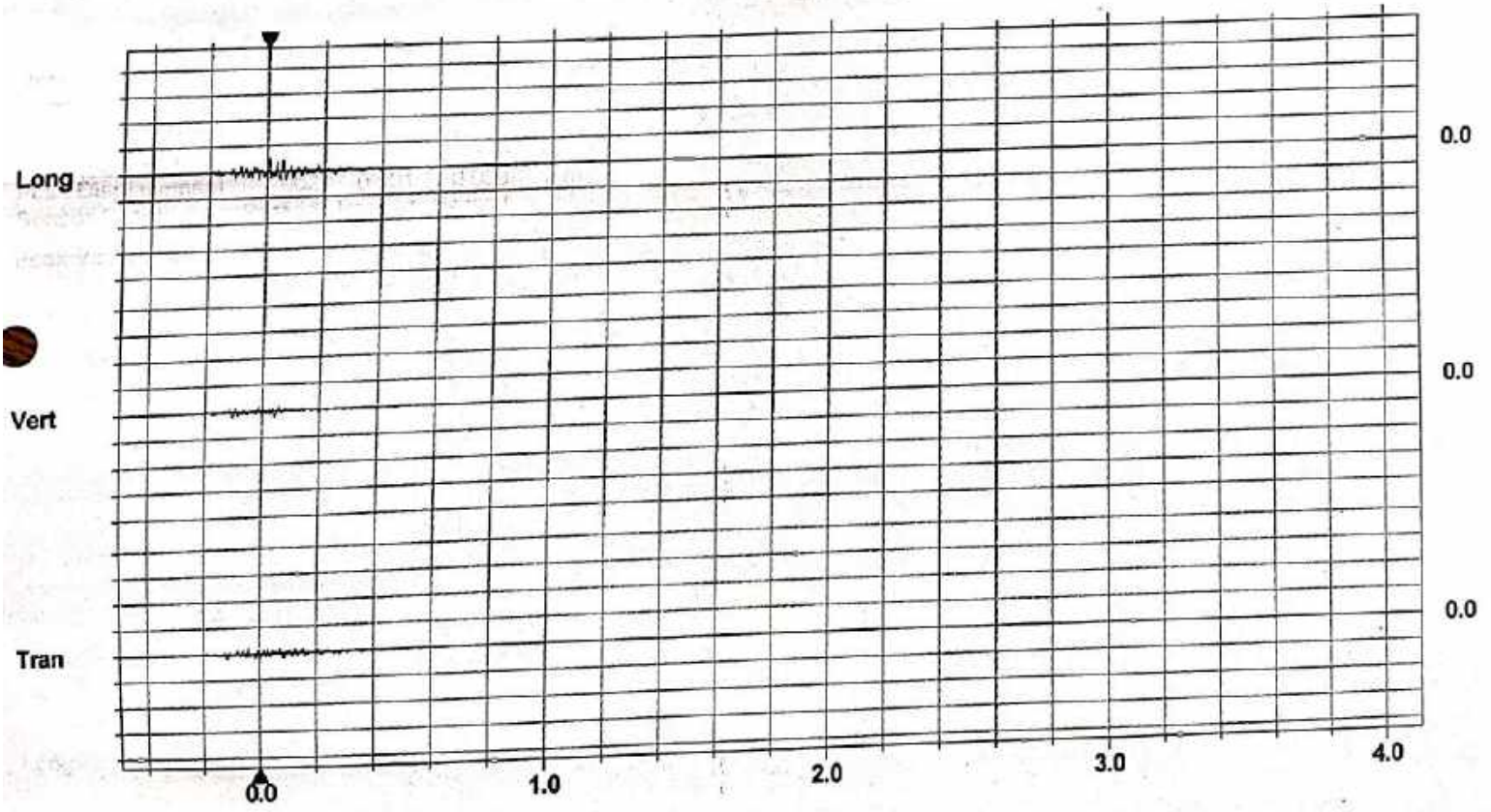
	Tran	Vert	Long	
PPV	0.512	0.426	1.103	mm/s
ZC Freq	47	39	54	Hz
Time (Rel. to Trig)	0.000	0.042	0.003	sec
Peak Acceleration	0.021	0.015	0.036	g
Peak Displacement	0.002	0.001	0.003	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.147 mm/s at 0.003 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div
Trigger =

Printed: January 25, 2025 (V 10.72 - 10.72)

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Instantel **Event Report** Instantel

Date/Time	Tran at 14:07:00 January 25, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	5.0 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10.60FB Micromate ISEE
Battery Level	3.6 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

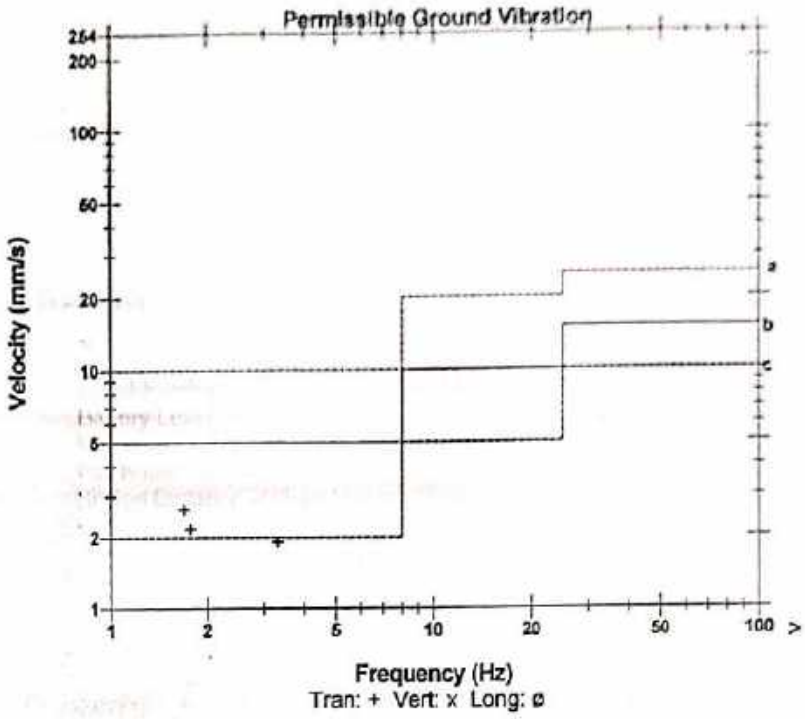
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	2.617	0.977	0.339	mm/s
ZC Freq	1.7	4.1	3.9	Hz
Time (Rel. to Trig)	1.407	1.398	1.399	sec
Peak Acceleration	0.012	0.013	0.008	g
Peak Displacement	0.158	0.036	0.017	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.798 mm/s at 1.407 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures

Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Instantel

Event Report

507

Instantel

Date/Time	Vert at 14:03:04 January 25, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.562 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

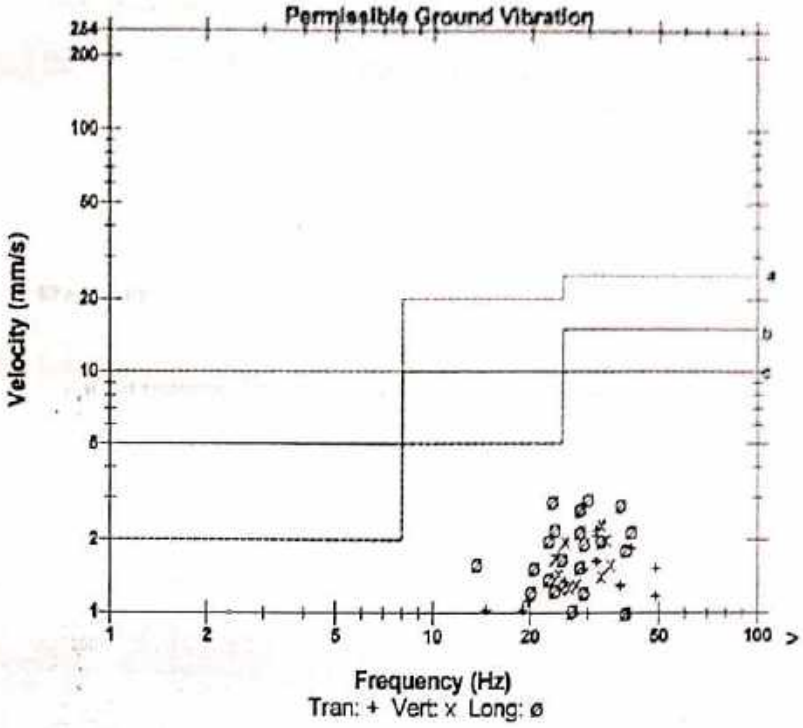
Notes

Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

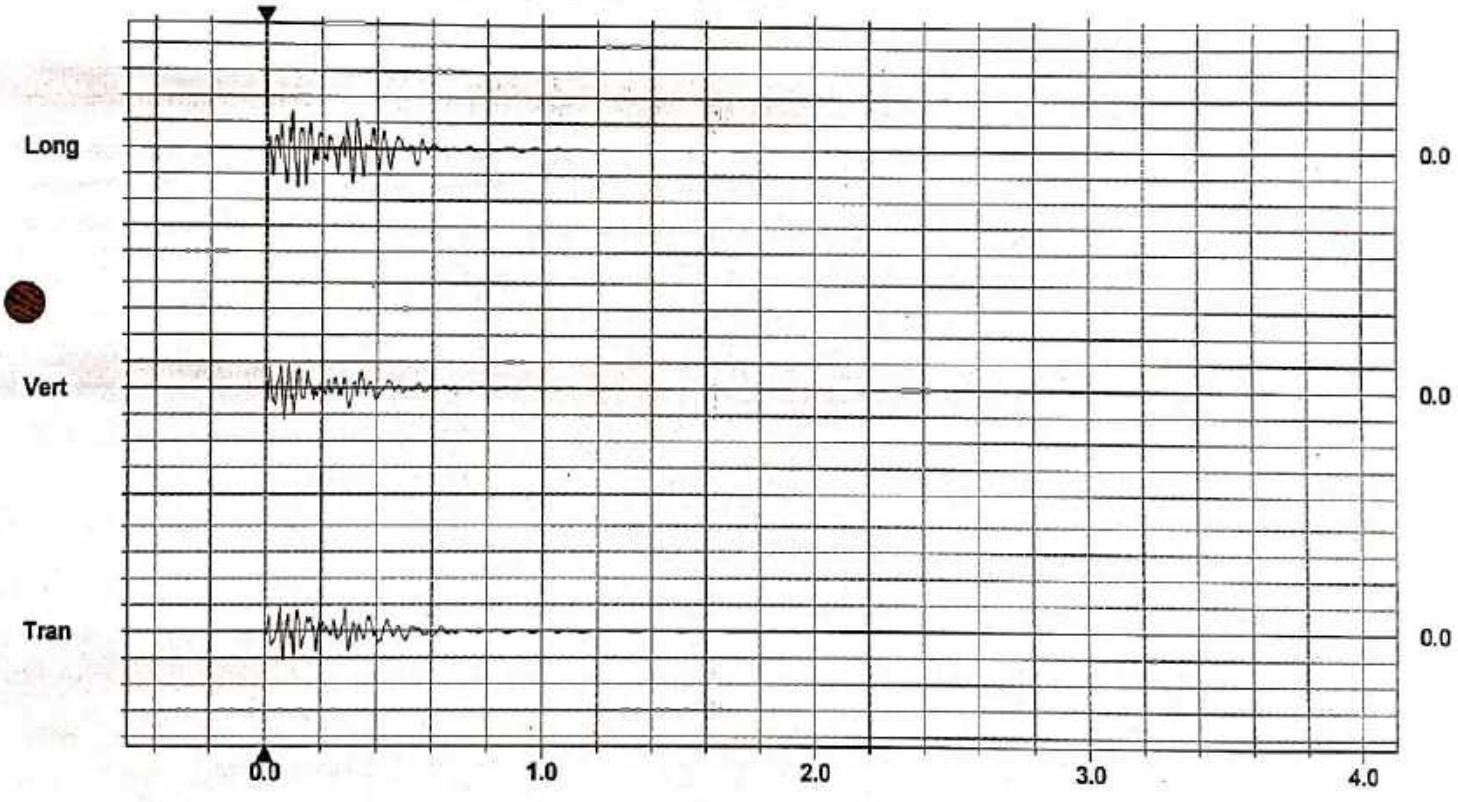
	Tran	Vert	Long	
PPV	2.175	2.325	2.956	mm/s
ZC Freq	32	33	30	Hz
Time (Rel. to Trig)	0.065	0.068	0.111	sec
Peak Acceleration	0.059	0.058	0.079	g
Peak Displacement	0.010	0.010	0.015	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 3.444 mm/s at 0.066 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: January 26, 2025 (V 10.72 - 10.72)

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Instantel

Event Report

508

Instantel

Date/Time	Tran at 13:58:49 January 25, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.042 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 59.752 E
Distance:	153.4 m	

Notes

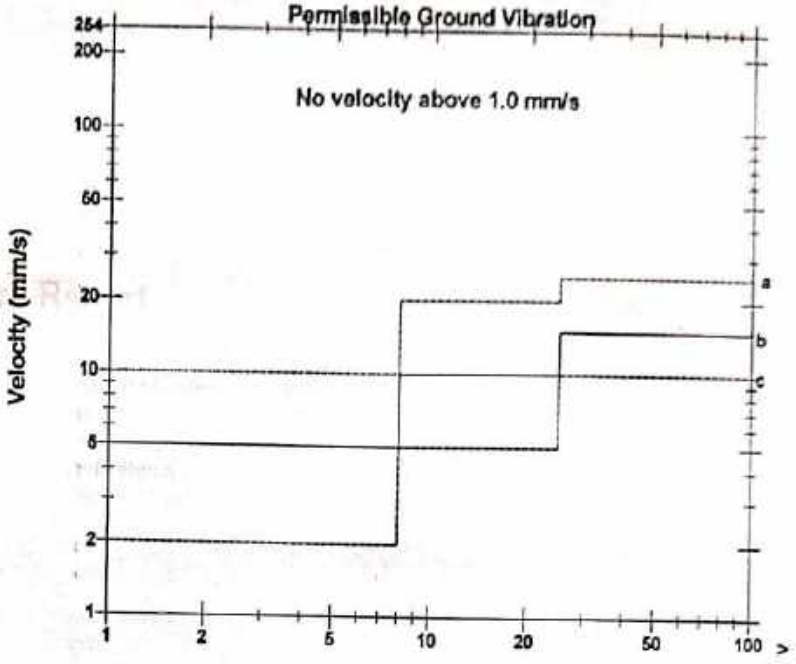
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	0.560	0.386	0.071	mm/s
ZC Freq	3.4	4.1	6.9	Hz
Time (Rel. to Trig)	0.013	-0.120	-0.101	sec
Peak Acceleration	0.010	0.010	0.010	g
Peak Displacement	0.025	0.015	0.001	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 0.657 mm/s at 0.017 sec

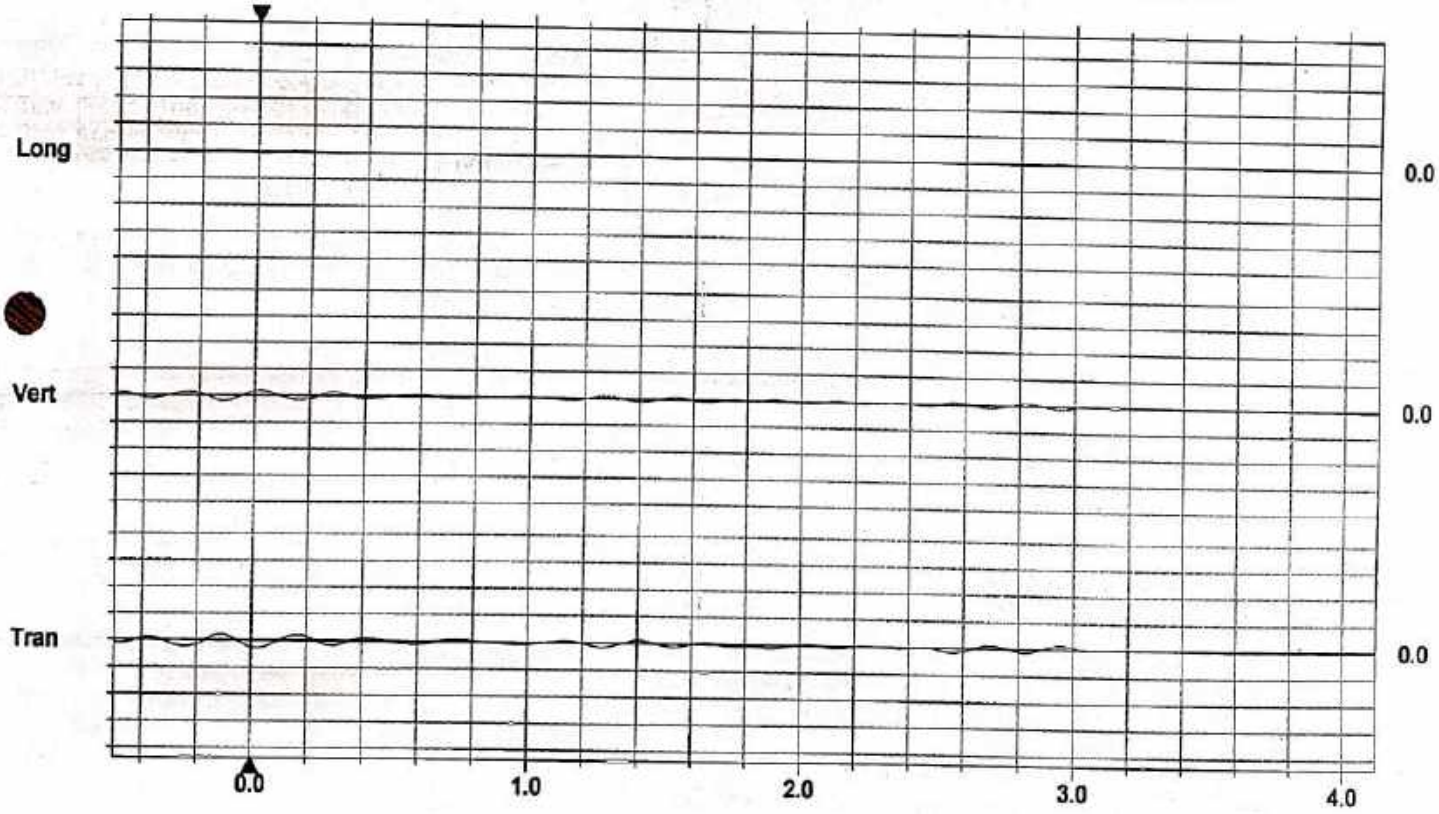
Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

DGMS India (A)



Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Instantel **Event Report** DLR-86 Instantel

509

Date/Time	Long at 13:55:02 January 25, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.284 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

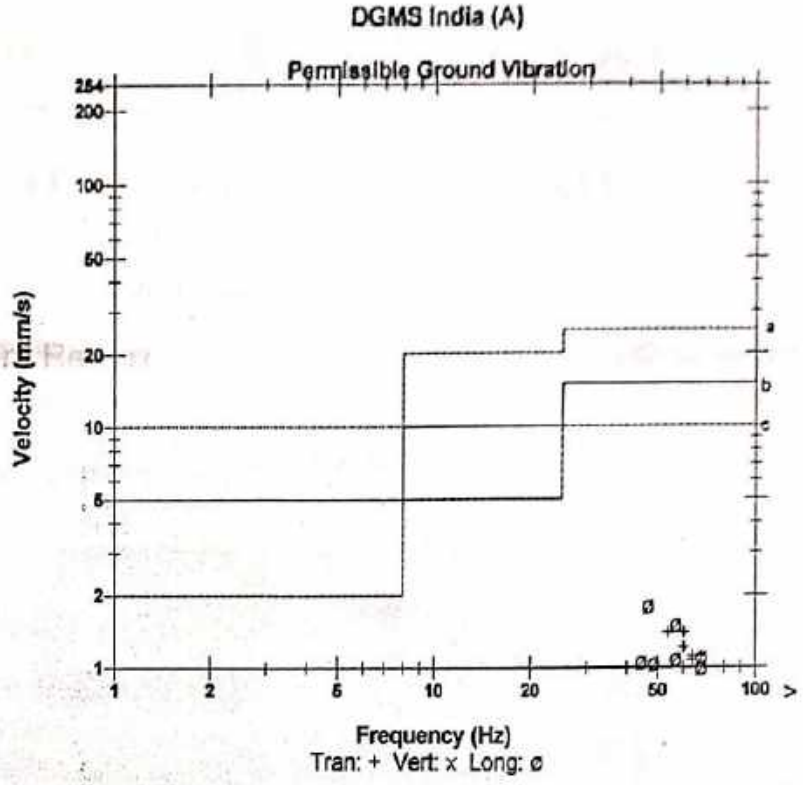
Serial Number	UM14804 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

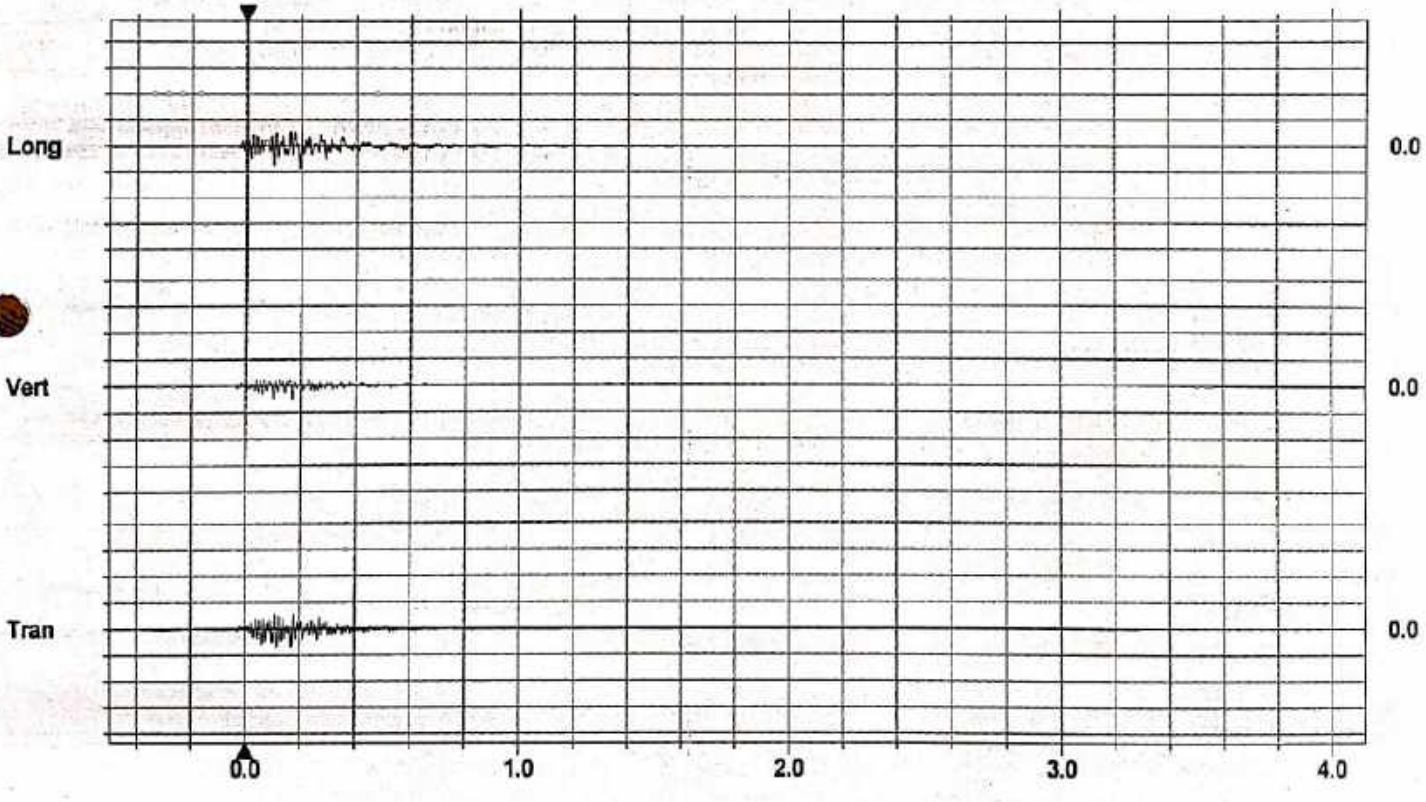
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.762 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	1.395	0.969	1.805	mm/s
ZC Freq	60	60	47	Hz
Time (Rel. to Trig)	0.116	0.169	0.191	sec
Peak Acceleration	0.054	0.035	0.063	g
Peak Displacement	0.004	0.003	0.006	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.884 mm/s at 0.191 sec





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Instantel

Event Report

510

Instantel

Date/Time	Vert at 13:35:31 January 28, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.357 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

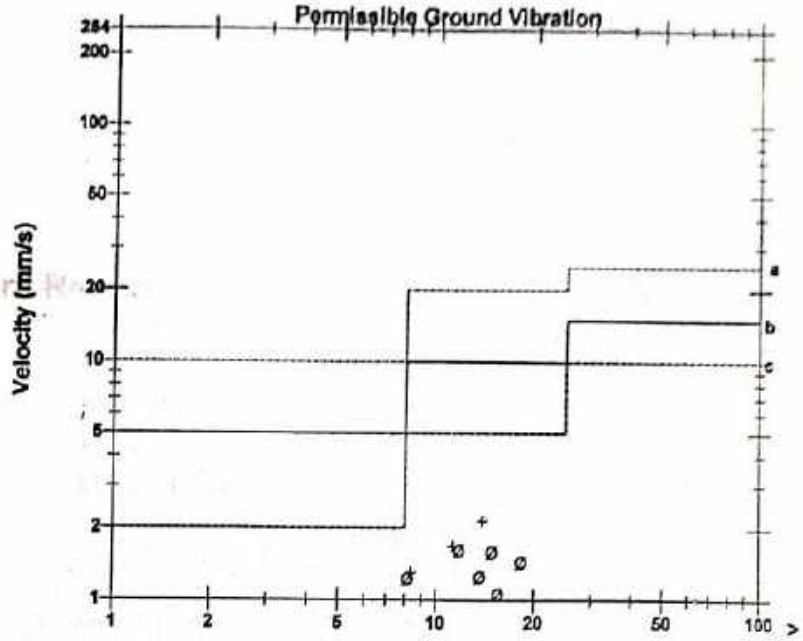
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.160 N	075 58.762 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	2.128	0.749	1.632	mm/s
ZC Freq	13.8	18.6	11.8	Hz
Time (Rel. to Trig)	0.074	0.128	0.183	sec
Peak Acceleration	0.025	0.015	0.023	g
Peak Displacement	0.029	0.006	0.021	mm
Sensor Check	Passed	Passed	Passed	

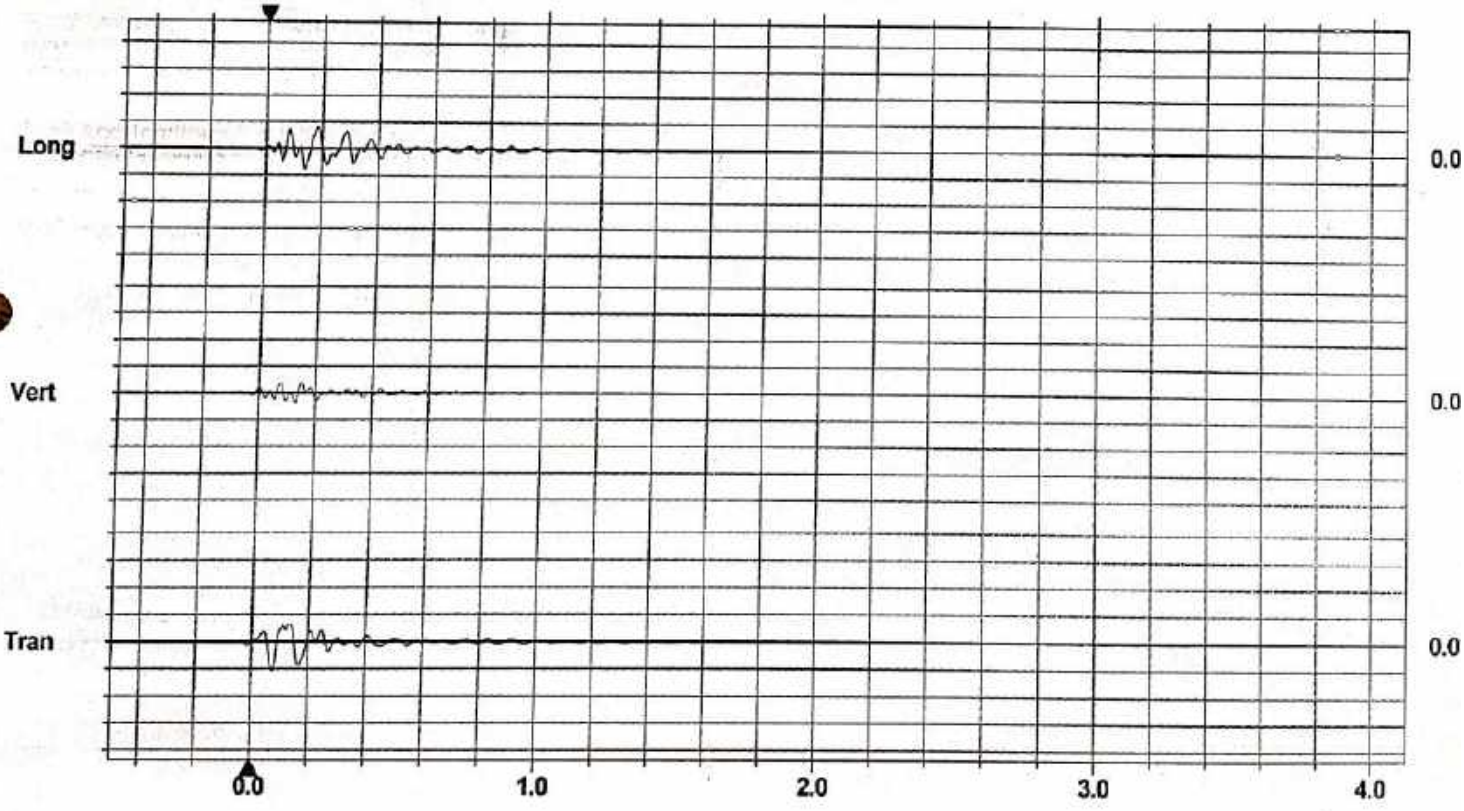
Peak Vector Sum 2.392 mm/s at 0.076 sec

DGMS India (A)



Frequency (Hz)
Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div
Trigger =

Printed: January 27, 2025 (V 10.72 - 10.72)

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Instantel

Event Report

511

Block - B(2)

Instante

Date/Time	Vert at 13:32:21 January 26, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.019 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

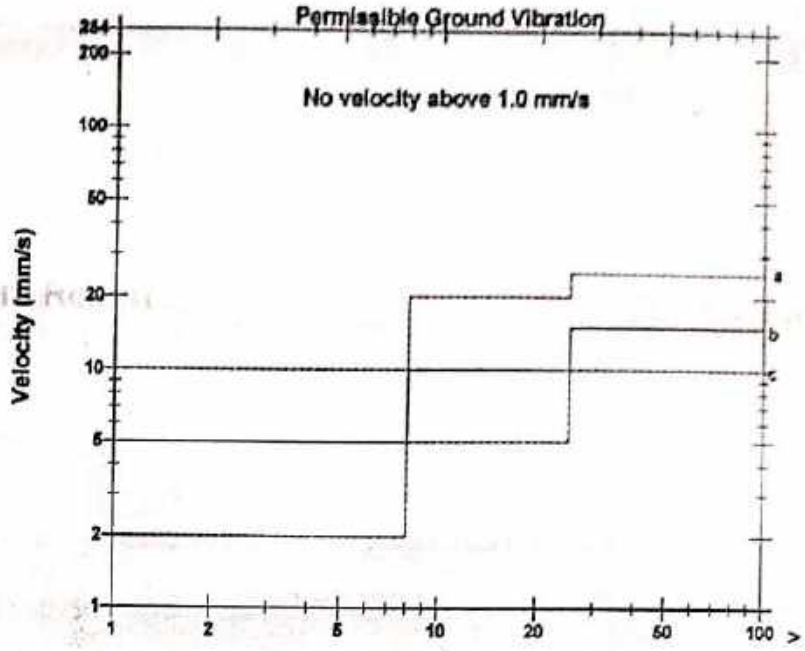
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.323	0.749	0.591	mm/s
ZC Freq	39	37	68	Hz
Time (Rel. to Trig)	0.007	0.007	0.017	sec
Peak Acceleration	0.021	0.046	0.028	g
Peak Displacement	0.001	0.004	0.001	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 0.825 mm/s at 0.007 sec

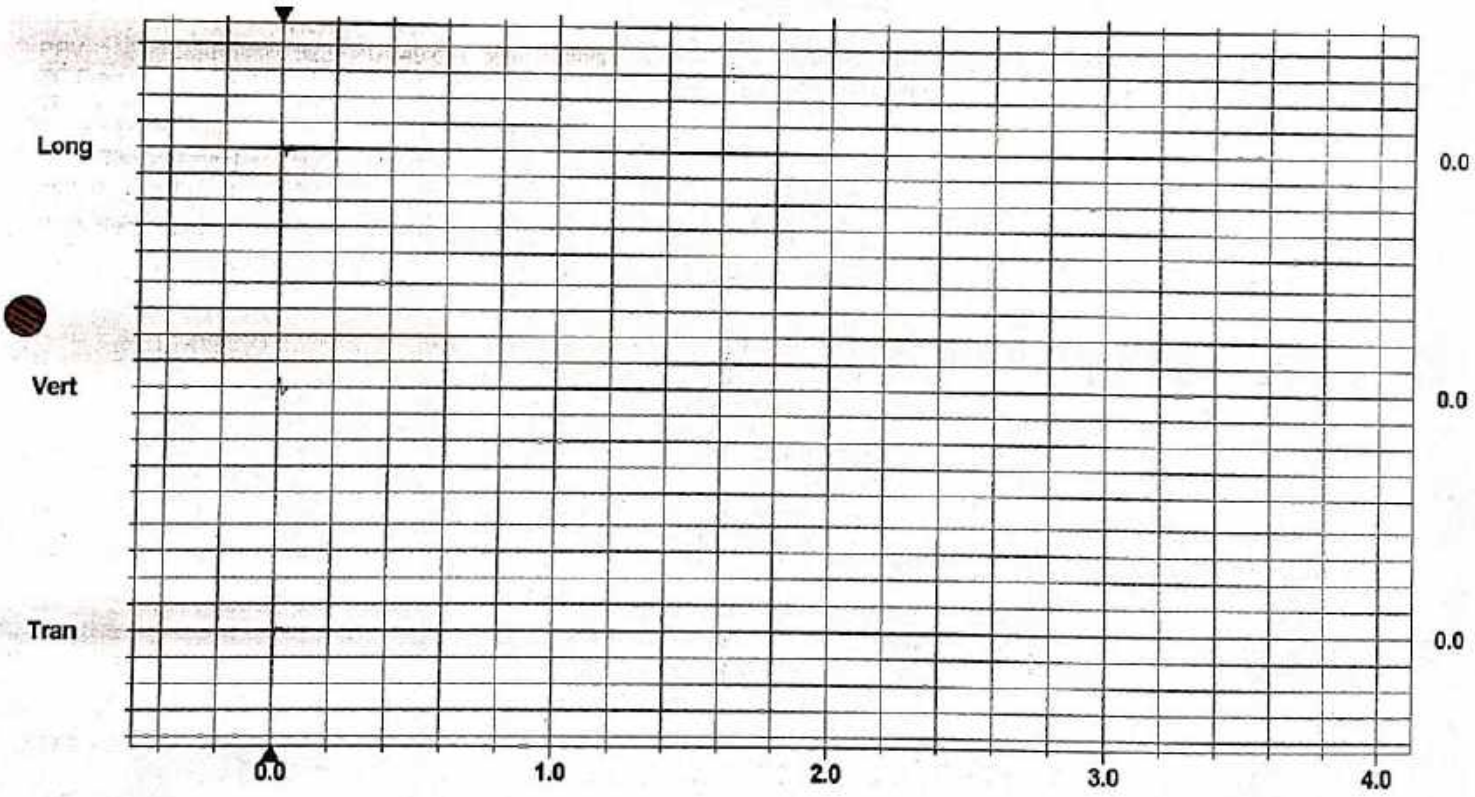
Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

DGMS India (A)



Frequency (Hz)
Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div
Trigger =

Printed: January 27, 2025 (V.10.72 - 10.72)
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Instantel **Event Report** BLOCK - B ① Instantel

Date/Time	Long at 13:30:14 January 28, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.317 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

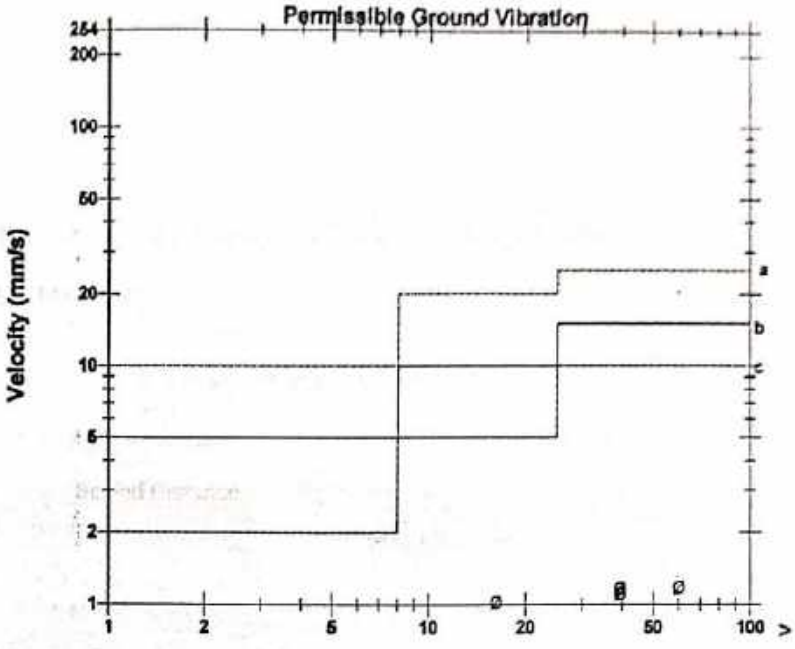
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.160 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

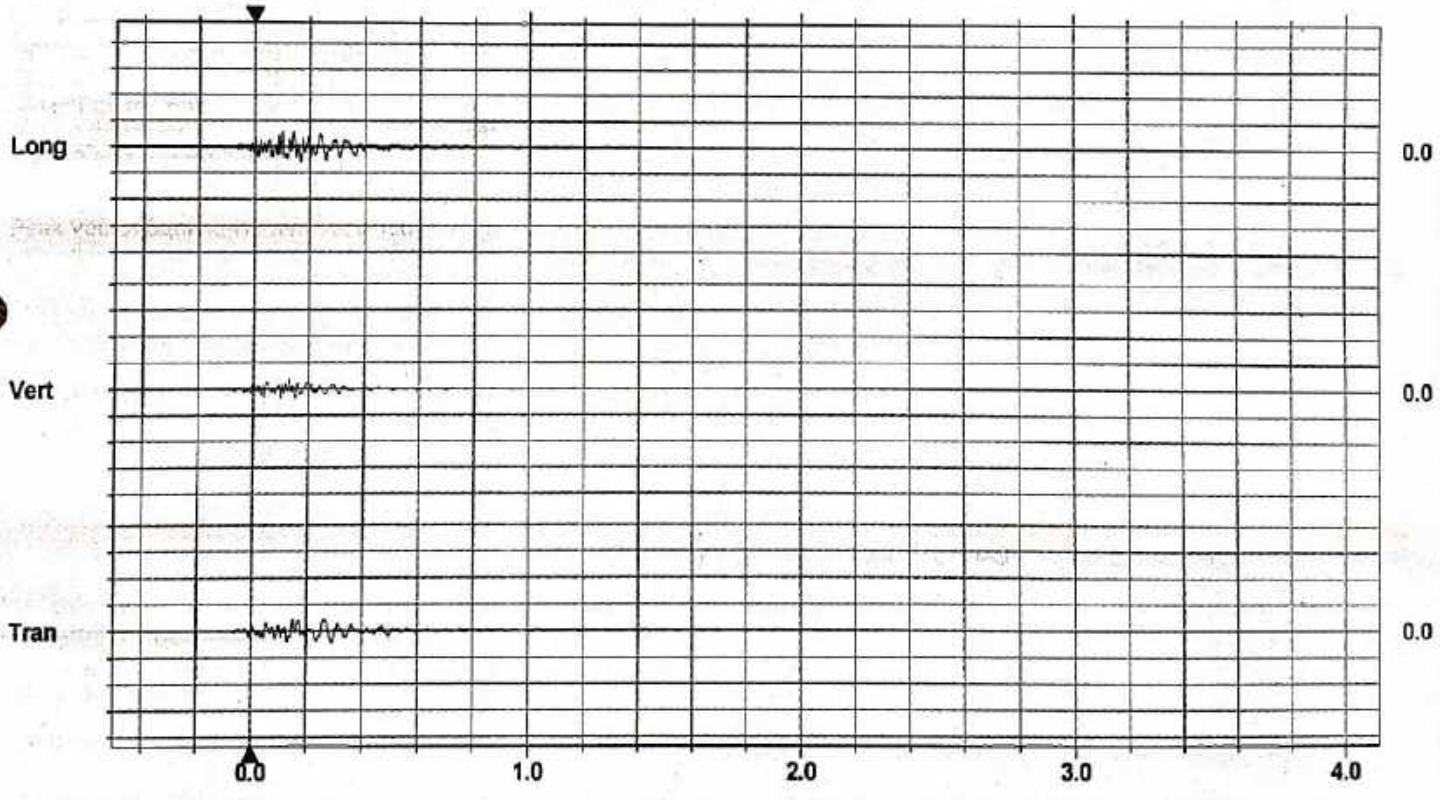
	Tran	Vert	Long	
PPV	0.914	0.820	1.198	mm/s
ZC Freq	18.6	51	60	Hz
Time (Rel. to Trig)	0.262	0.130	0.100	sec
Peak Acceleration	0.028	0.030	0.044	g
Peak Displacement	0.008	0.004	0.006	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.413 mm/s at 0.166 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div
Trigger =

Printed: January 27, 2025 (V 10.72 - 10.72)

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Instantel **Event Report** WVM-8(5) Instant

Date/Time	Vert at 13:58:32 January 27, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.019 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

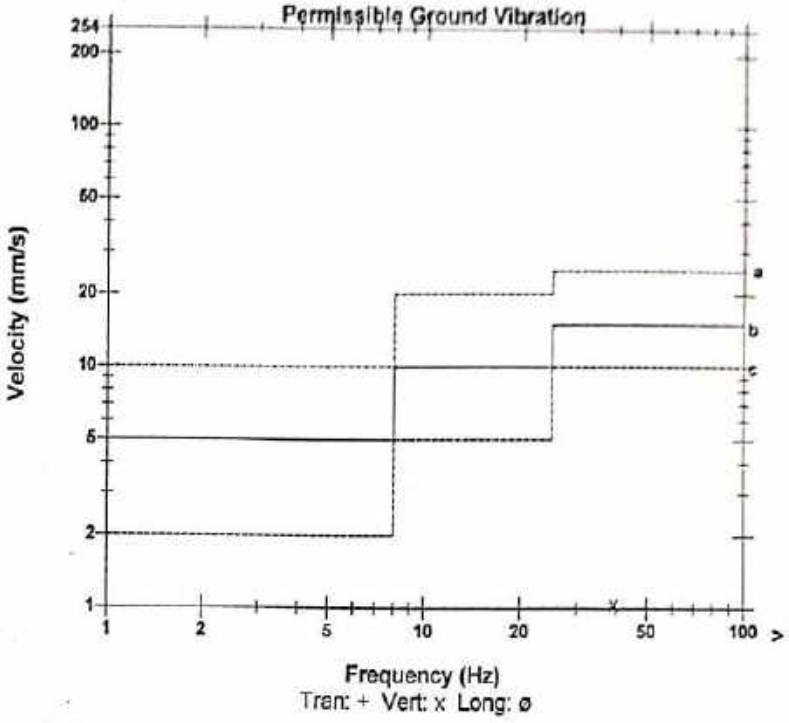
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Serial Number	UM14894 V 10-90FB Micromate ISEE
	Battery Level	3.8 Volts
	Unit Calibration	June 26, 2024 by UES New Delhi
	File Name	_TEMP.EVT
	Scaled Distance	485.0 (153.4 m, 0.1 kg)

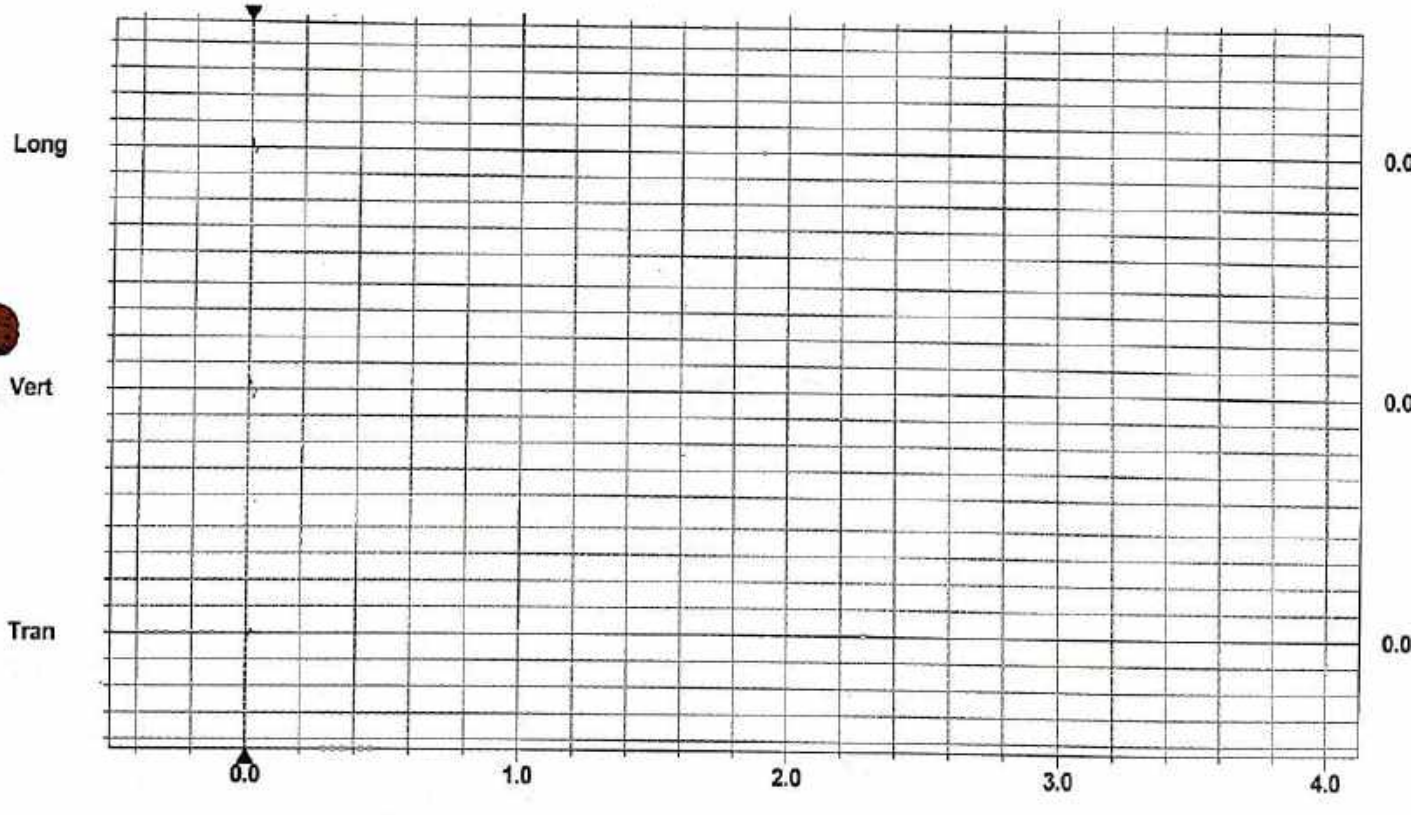
	Tran	**Vert**	**Long**	
PPV	0.370	1.048	0.654	mm/s
ZC Freq	73	39	57	Hz
Time (Rel. to Trig)	0.002	0.001	0.004	sec
Peak Acceleration	0.020	0.064	0.028	g
Peak Displacement	0.001	0.004	0.002	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.166 mm/s at 0.001 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

Printed: January 28, 2025 (V 10.72 - 10.72)

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Event Report

514

BLOCK - B (2)

Instantel

Date/Time	Vert at 13:56:31 January 27, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.018 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

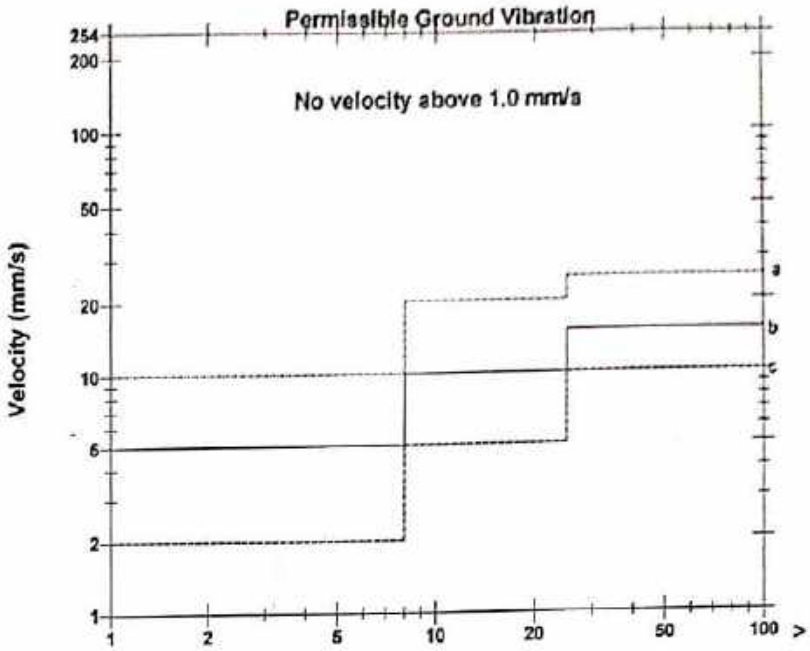
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

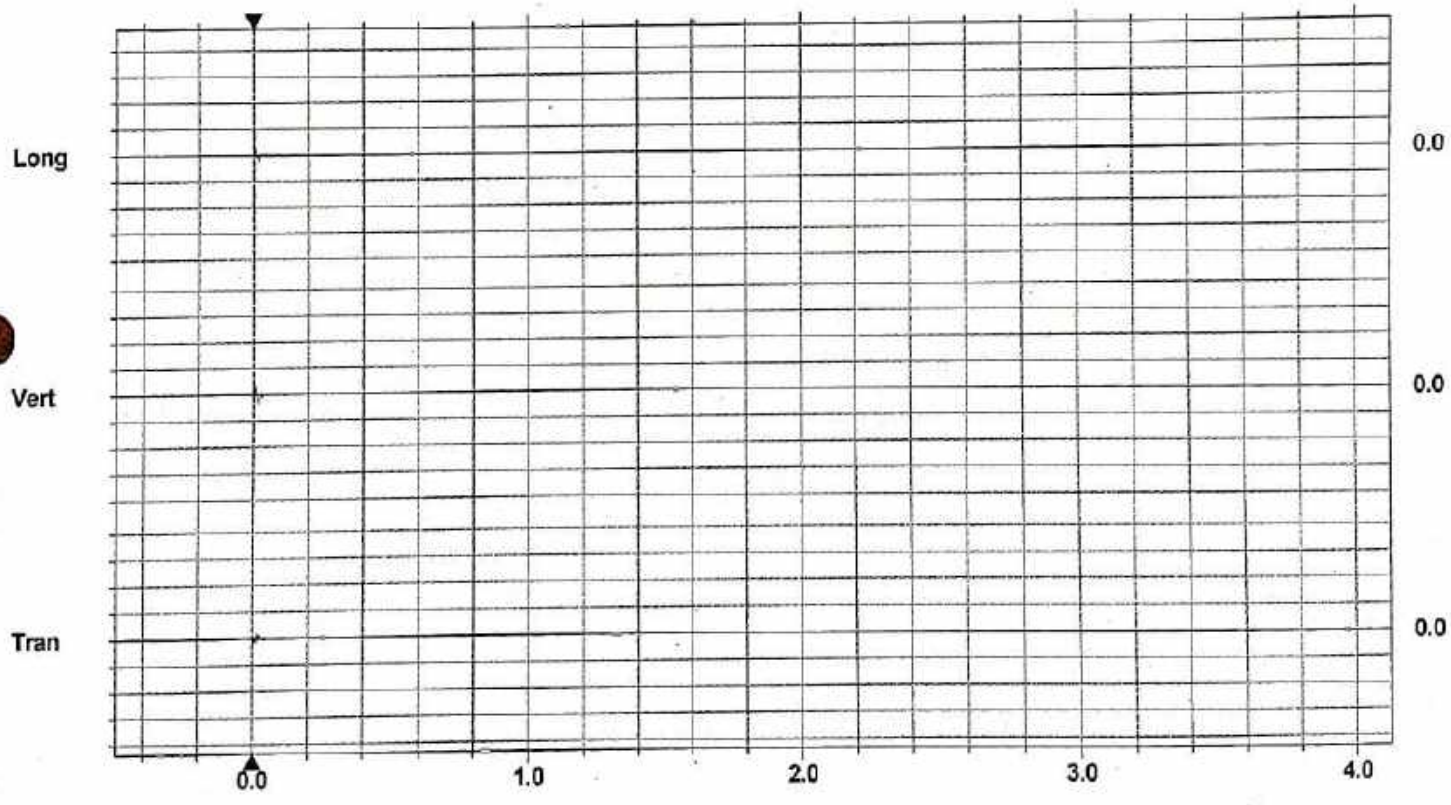
	Tran	Vert	Long	
PPV	0.378	0.883	0.528	mm/s
ZC Freq	73	37	64	Hz
Time (Rel. to Trig)	0.016	0.001	0.002	sec
Peak Acceleration	0.025	0.061	0.028	g
Peak Displacement	0.001	0.003	0.001	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 0.985 mm/s at 0.001 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: January 28, 2025 (V 10.72 - 10.72)

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Instantel

Event Report

3104 - B②

Instantel

Date/Time	Vert at 13:54:11 January 27, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.375 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location

	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

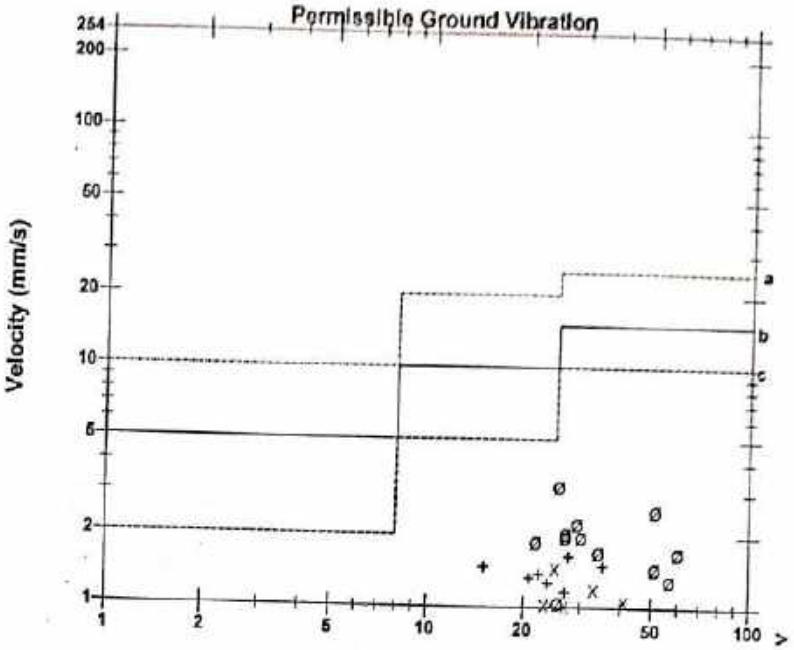
Notes

Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

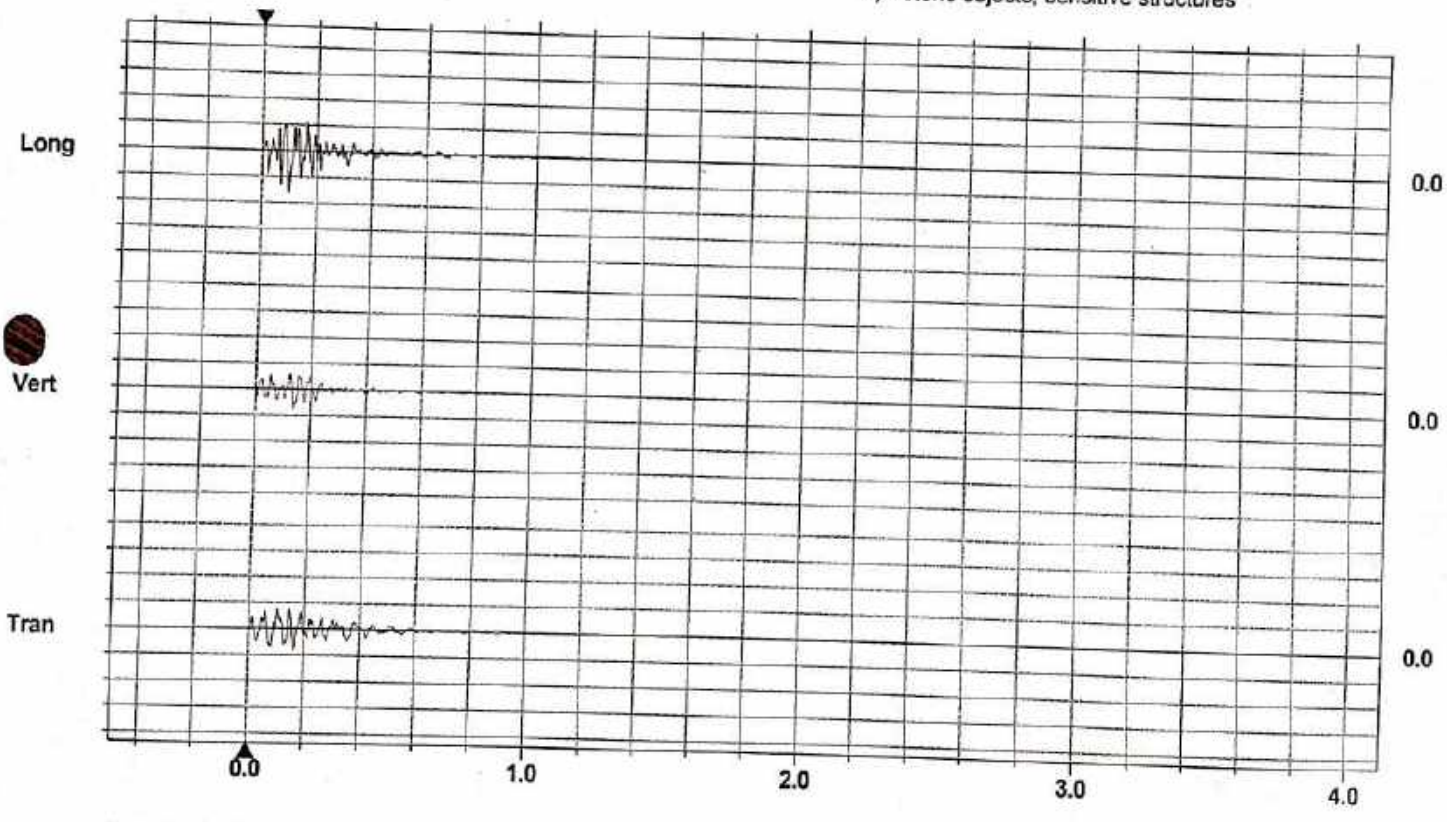
	Tran	Vert	Long	
PPV	1.632	1.474	3.224	mm/s
ZC Freq	28	25	26	Hz
Time (Rel. to Trig)	0.164	0.135	0.098	sec
Peak Acceleration	0.054	0.061	0.086	g
Peak Displacement	0.011	0.009	0.016	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 3.359 mm/s at 0.099 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: January 28, 2025 (V 10.72 - 10.72)

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Instantel **Event Report** Tyuck - 3 ① Instantel

Date/Time	Vert at 13:42:18 January 27, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.017 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

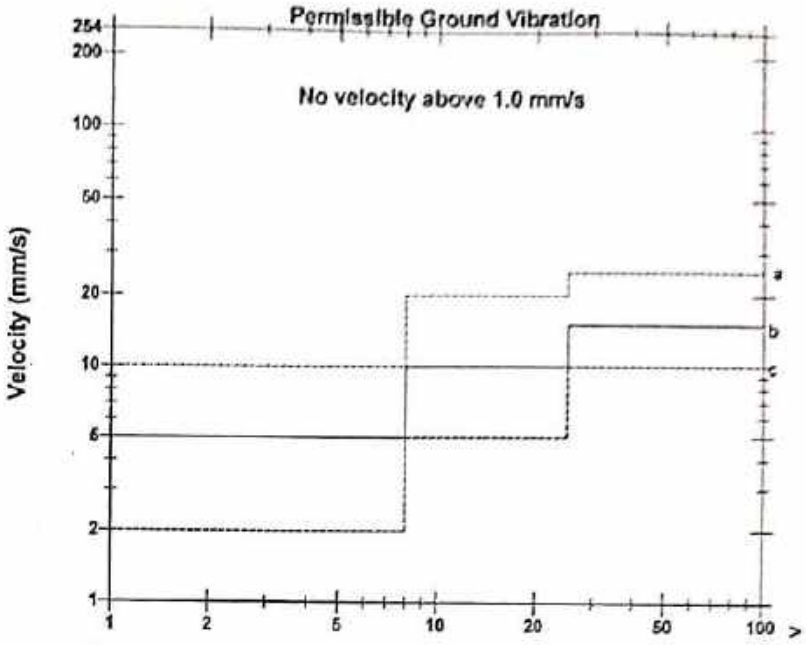
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.402	0.820	0.575	mm/s
ZC Freq	27	23	54	Hz
Time (Rel. to Trig)	0.013	0.016	0.003	sec
Peak Acceleration	0.018	0.041	0.020	g
Peak Displacement	0.001	0.004	0.002	mm
Sensor Check	Passed	Passed	Passed	

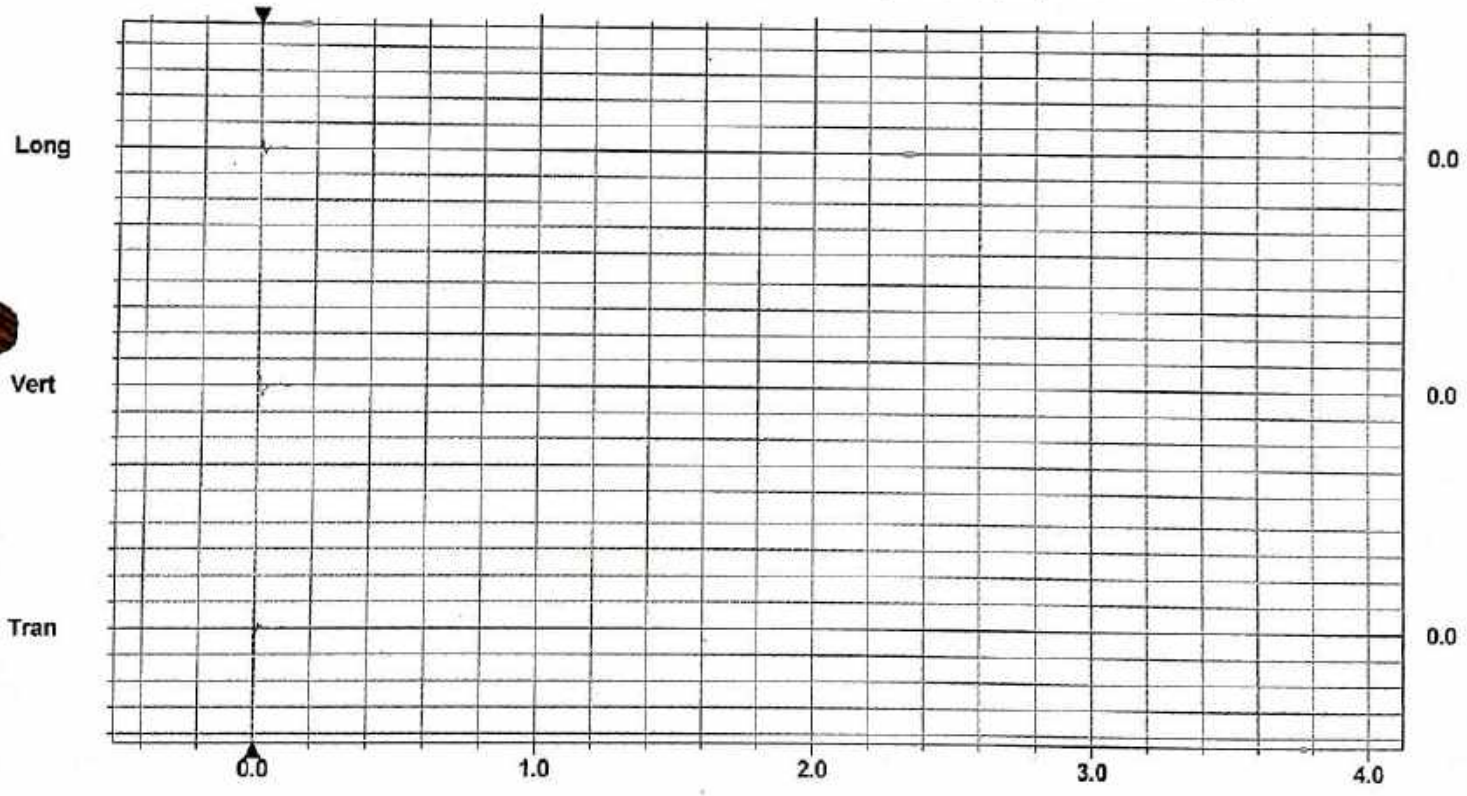
Peak Vector Sum 0.975 mm/s at 0.015 sec

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Instantel

Event Report

517

BLOCK - B (3)

Instantel

Date/Time	Vert at 13:40:50 January 28, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.022 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

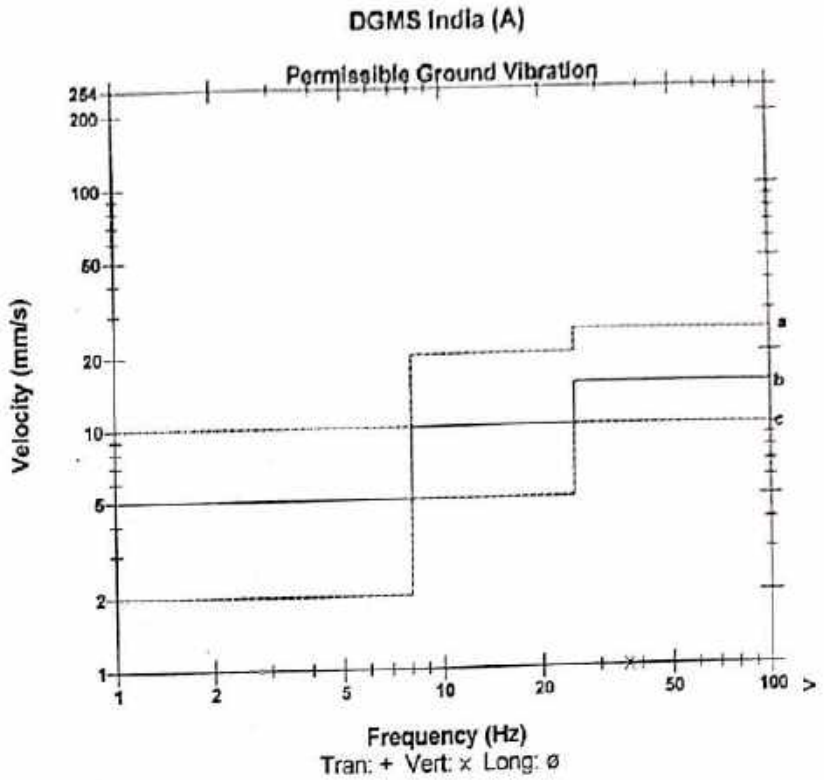
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes

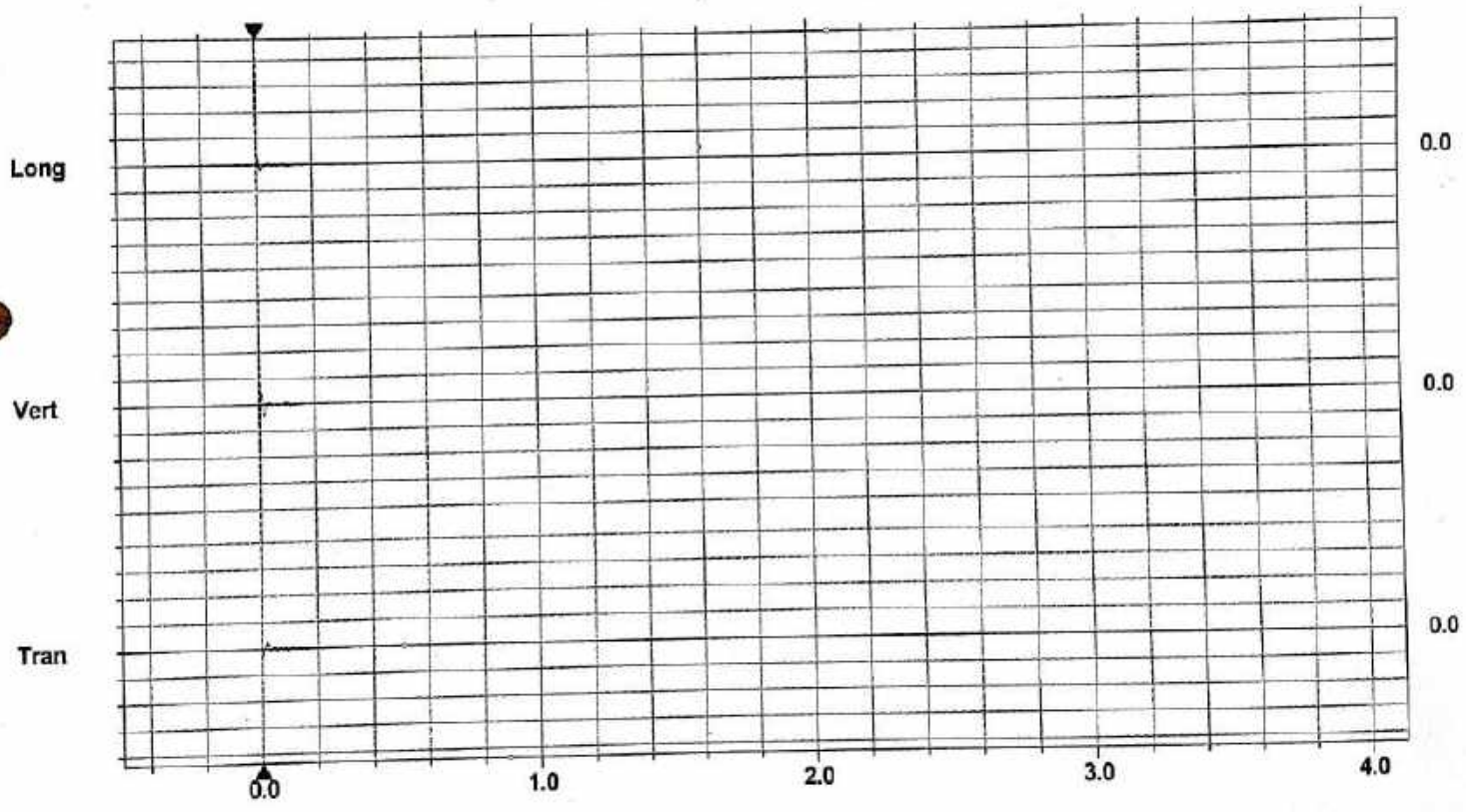
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.623	1.017	0.820	mm/s
ZC Freq	47	37	79	Hz
Time (Rel. to Trig)	0.003	0.001	0.001	sec
Peak Acceleration	0.028	0.067	0.064	g
Peak Displacement	0.002	0.005	0.001	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.283 mm/s at 0.001 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: January 29, 2025 (V 10.72 - 10.72)

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BLOCK - B (2)

518

Date/Time	Vert at 13:36:03 January 28, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.022 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

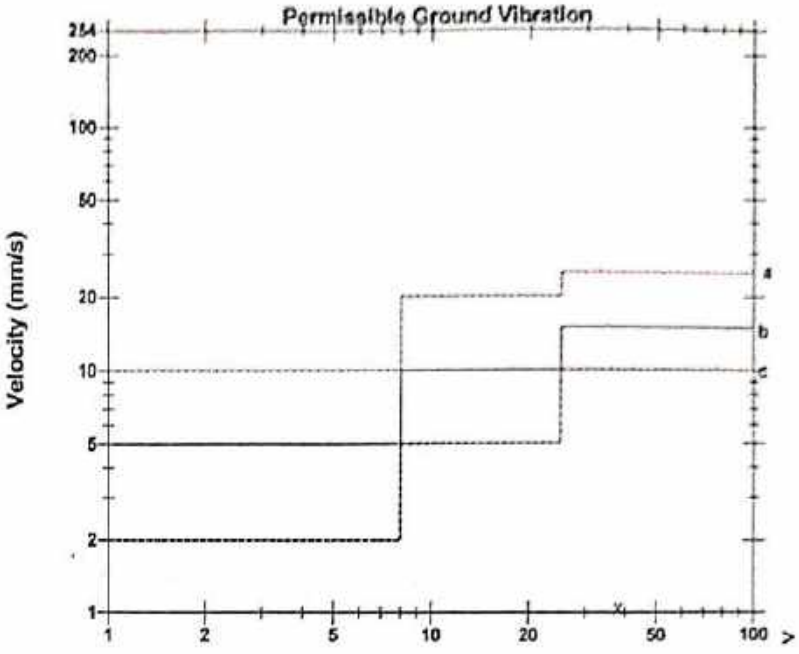
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	0.686	1.048	0.780	mm/s
ZC Freq	43	38	93	Hz
Time (Rel. to Trig)	0.004	0.001	0.002	sec
Peak Acceleration	0.028	0.061	0.058	g
Peak Displacement	0.002	0.004	0.002	mm
Sensor Check	Passed	Passed	Passed	

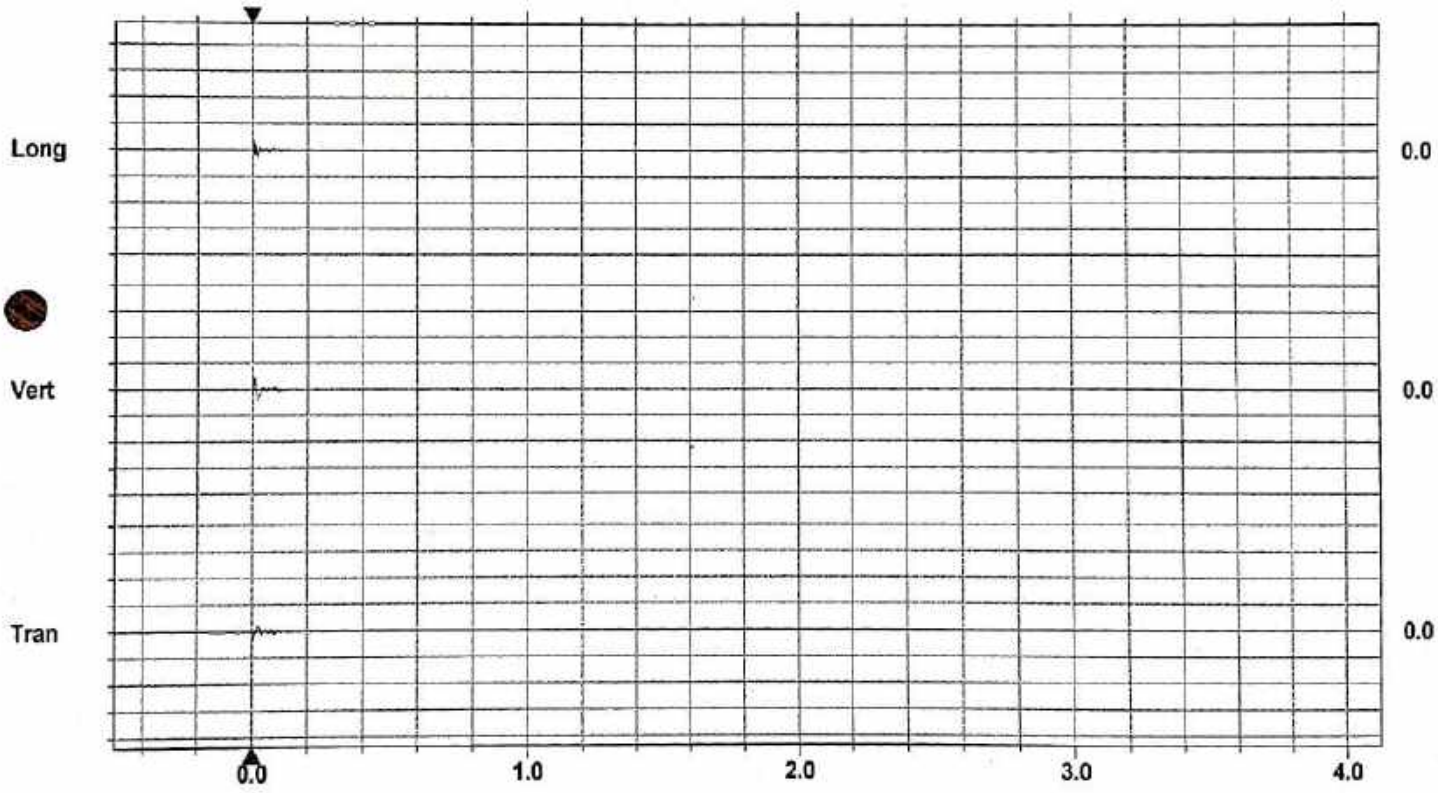
Peak Vector Sum 1.337 mm/s at 0.002 sec

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Instantel

Event Report

519

Instantel

Date/Time	Vert at 13:28:22 January 28, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.024 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10.60FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	TEMP EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

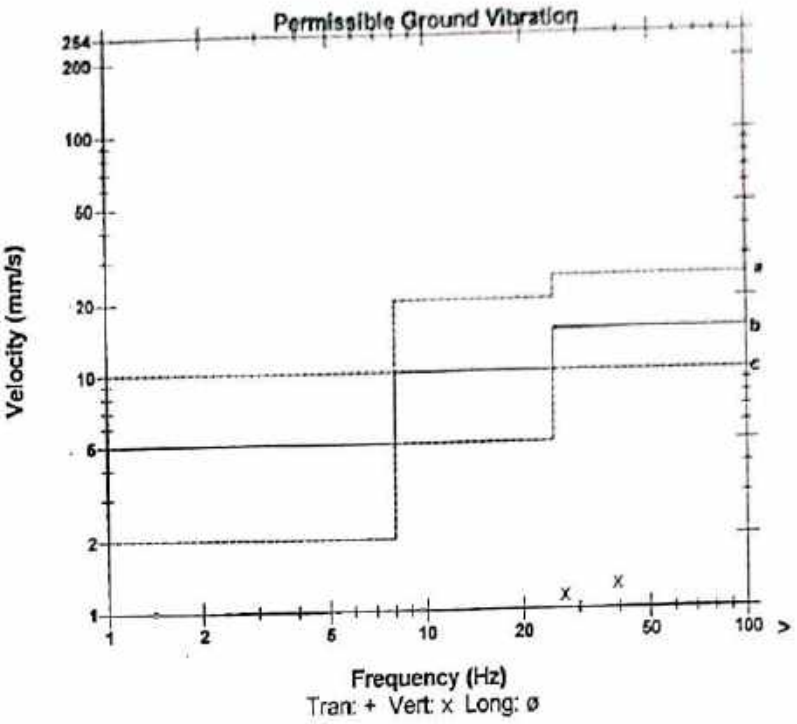
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

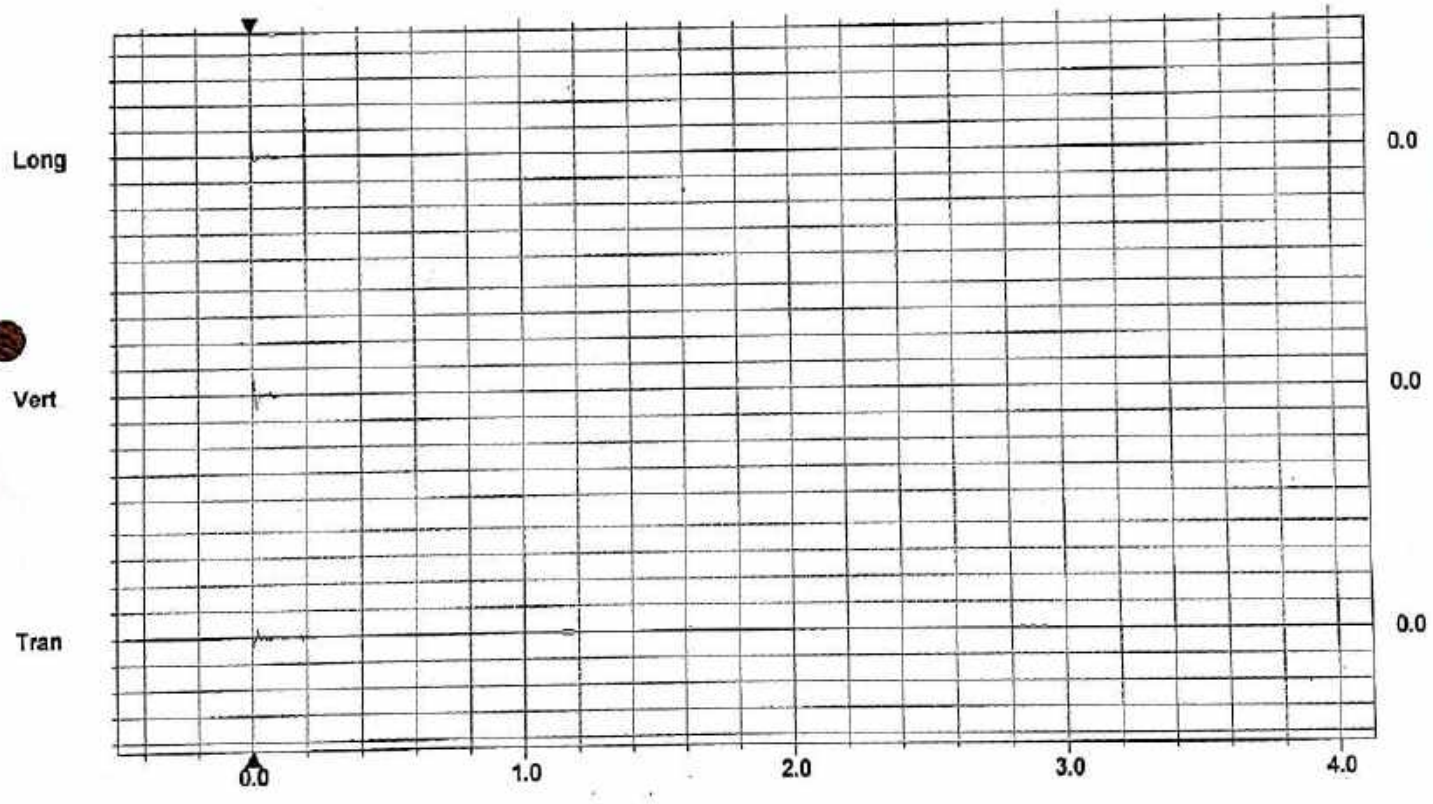
	Tran	Vert	Long	
PPV	0.765	1.277	0.985	mm/s
ZC Freq	41	39	102	Hz
Time (Rel. to Trig)	0.003	0.001	0.001	sec
Peak Acceleration	0.035	0.094	0.064	g
Peak Displacement	0.002	0.006	0.002	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.544 mm/s at 0.001 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Event Report

520

Block - B (4)

Instantel

Date/Time	Long at 14:27:13 January 29, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.375 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

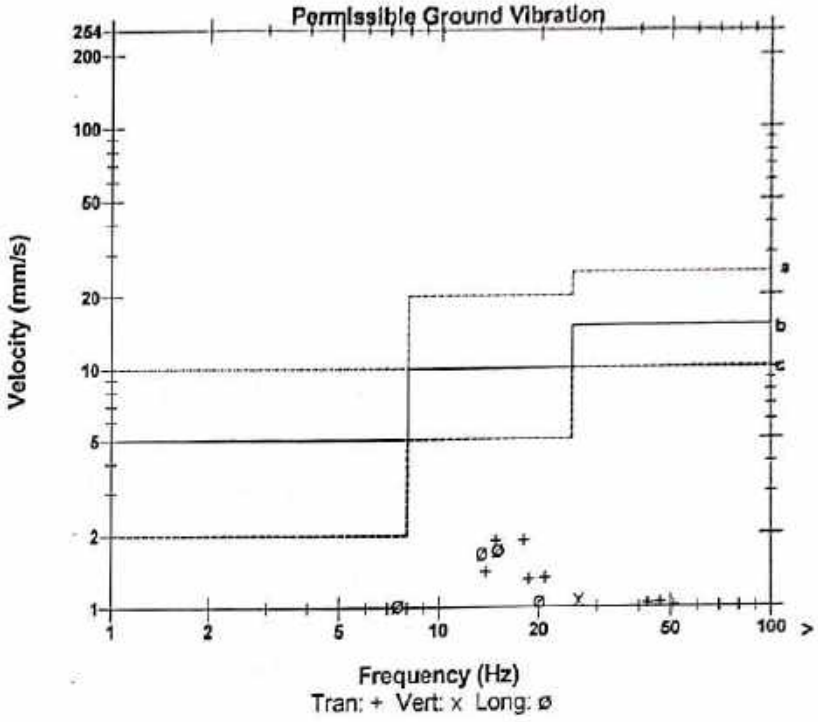
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

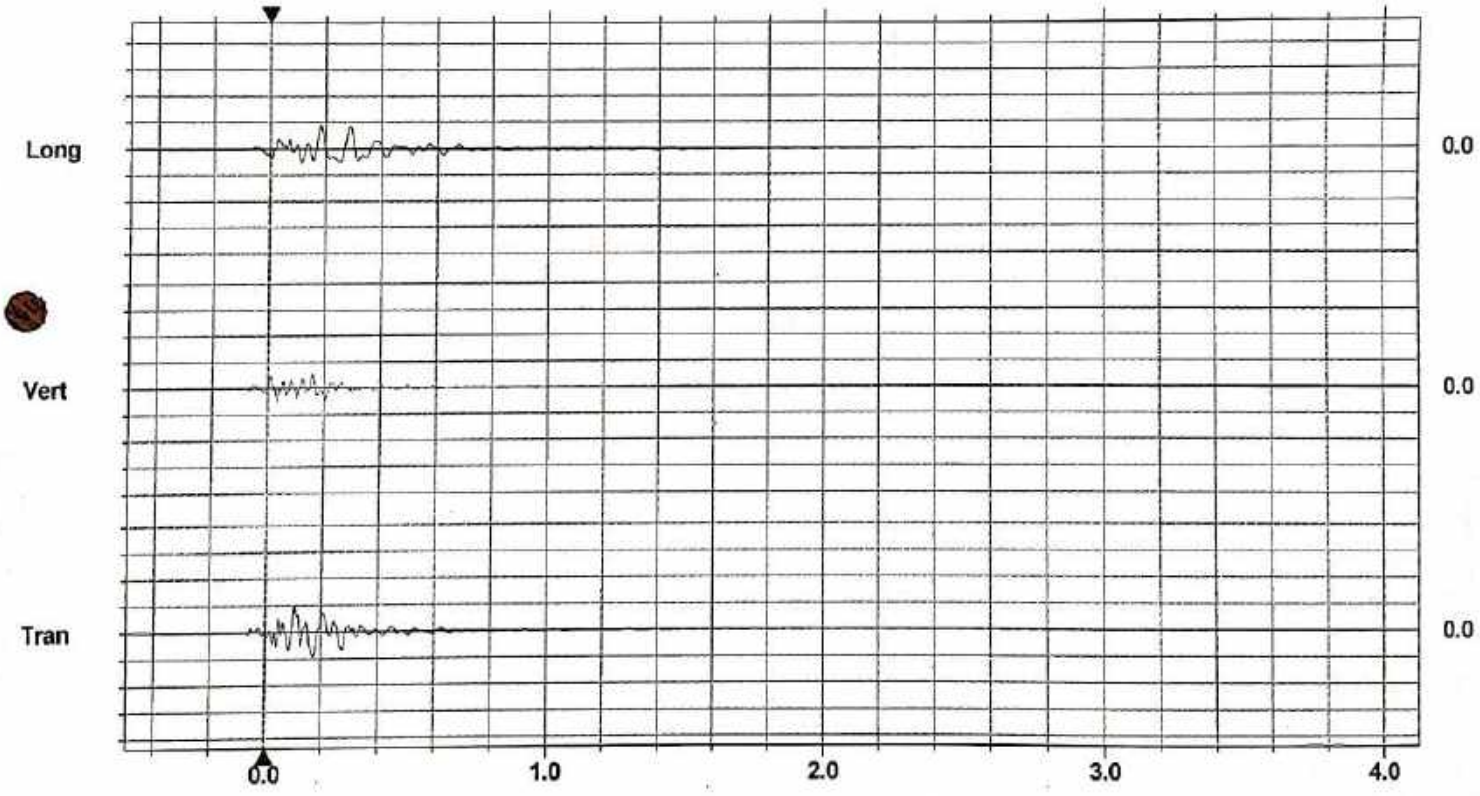
	Tran	**Vert**	**Long**	
PPV	1.892	1.080	1.742	mm/s
ZC Freq	18.0	26	15.1	Hz
Time (Rel. to Trig)	0.102	0.158	0.181	sec
Peak Acceleration	0.043	0.021	0.018	g
Peak Displacement	0.019	0.010	0.023	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.142 mm/s at 0.172 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Event Report

Block - B

Instantel

521

Date/Time	Vert at 14:13:32 January 29, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.326 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14694 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.624 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

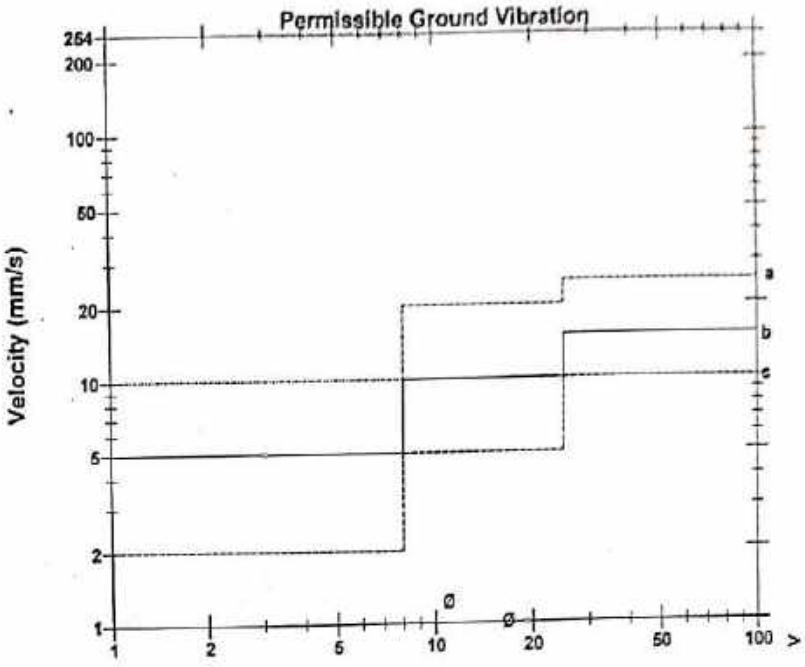
Notes

Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

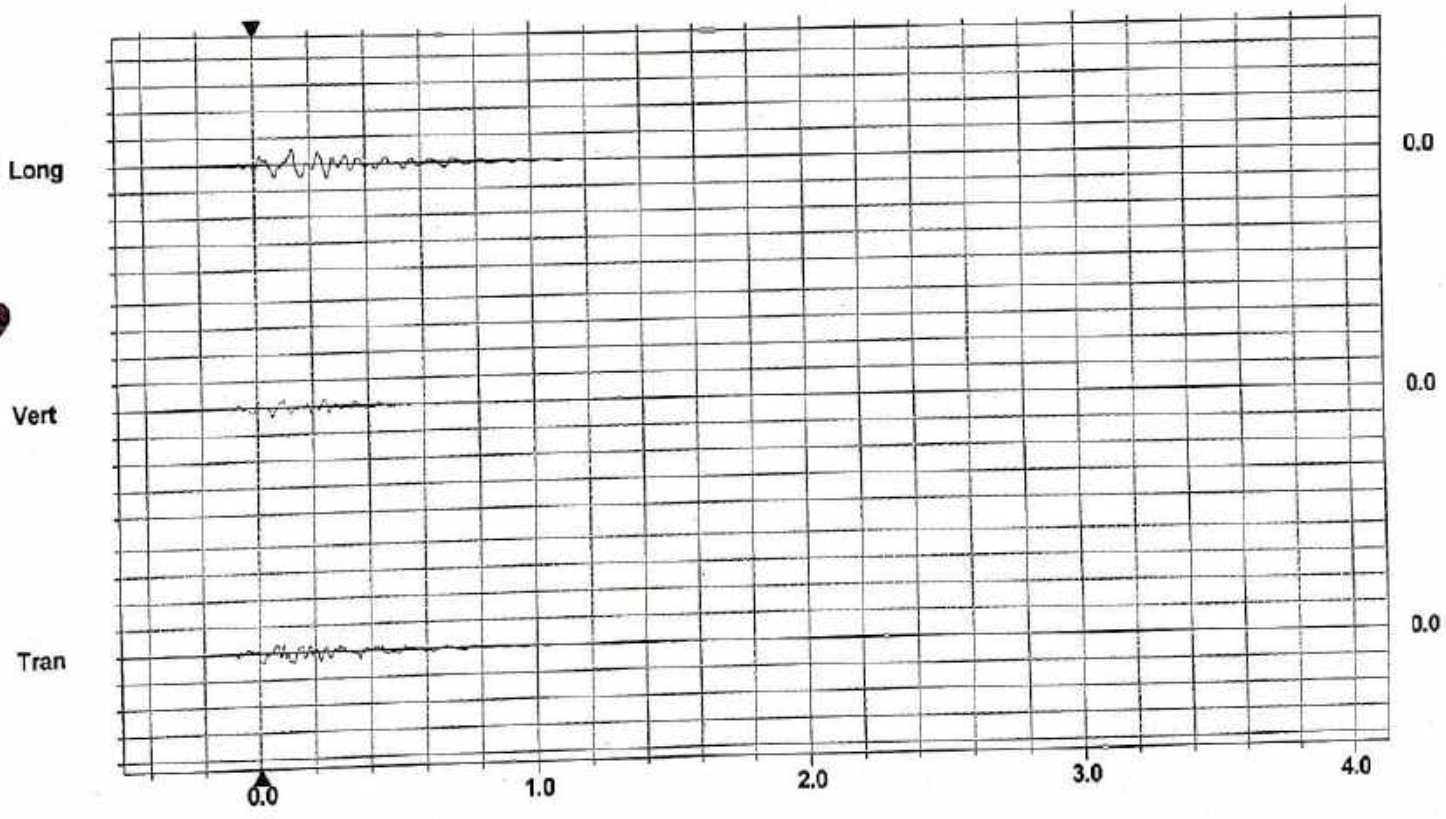
	Tran	Vert	Long	
PPV	0.788	0.654	1.245	mm/s
ZC Freq	12.3	14.2	11.0	Hz
Time (Rel. to Trig)	0.124	0.053	0.134	sec
Peak Acceleration	0.028	0.016	0.020	g
Peak Displacement	0.009	0.006	0.012	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.260 mm/s at 0.134 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: January 30, 2025 (V 10.72 - 10.72)

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Instantel

Event Report

522

BLOCK - B(2)

Instantel

Date/Time	Vert at 14:11:26 January 29, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.001 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

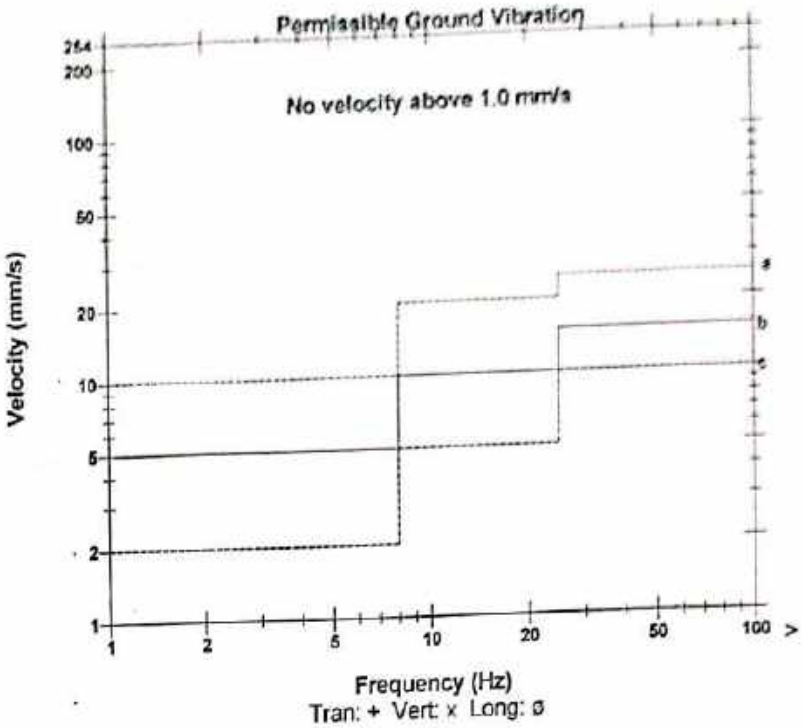
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.197	0.607	0.339	mm/s
ZC Freq	35	79	73	Hz
Time (Rel. to Trig)	0.017	0.000	0.001	sec
Peak Acceleration	0.010	0.036	0.028	g
Peak Displacement	0.001	0.002	0.001	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 0.697 mm/s at 0.000 sec

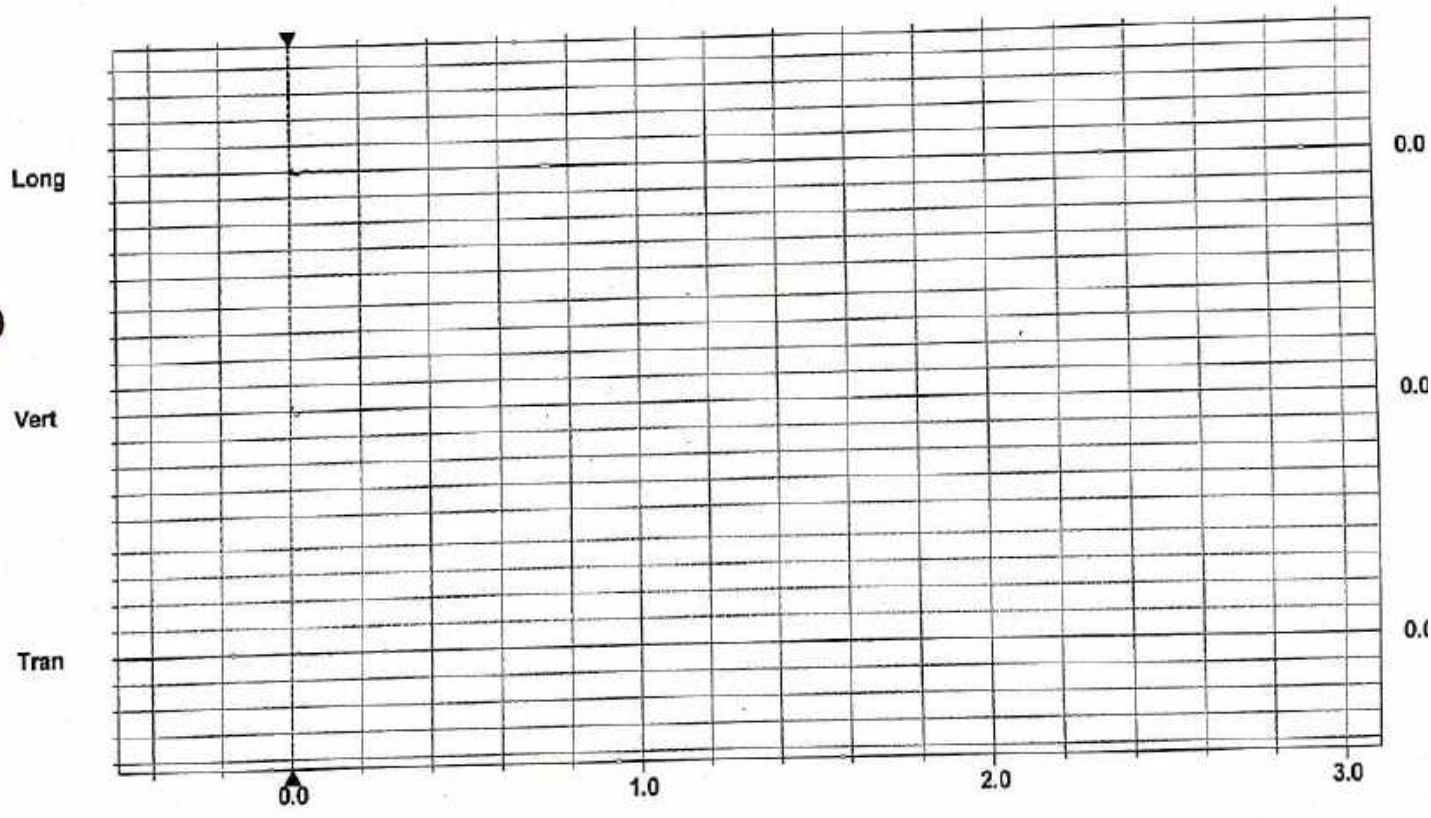
Serial Number	UM14894 V 10.90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

DGMS India (A)



Frequency (Hz)
Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div
Trigger =

Printed: January 30, 2025 (V 10.72 - 10.72)

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Instantel **Event Report** 523 yoch-BV Instantel

Date/Time	Vert at 14:00:56 January 29, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.02 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

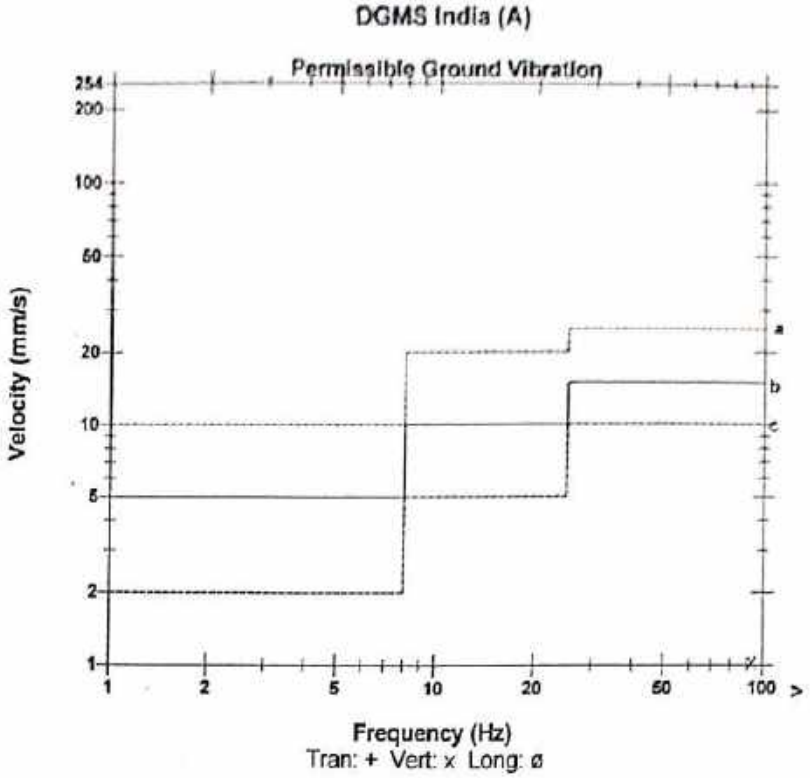
Serial Number	UM14894 V 10-99FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

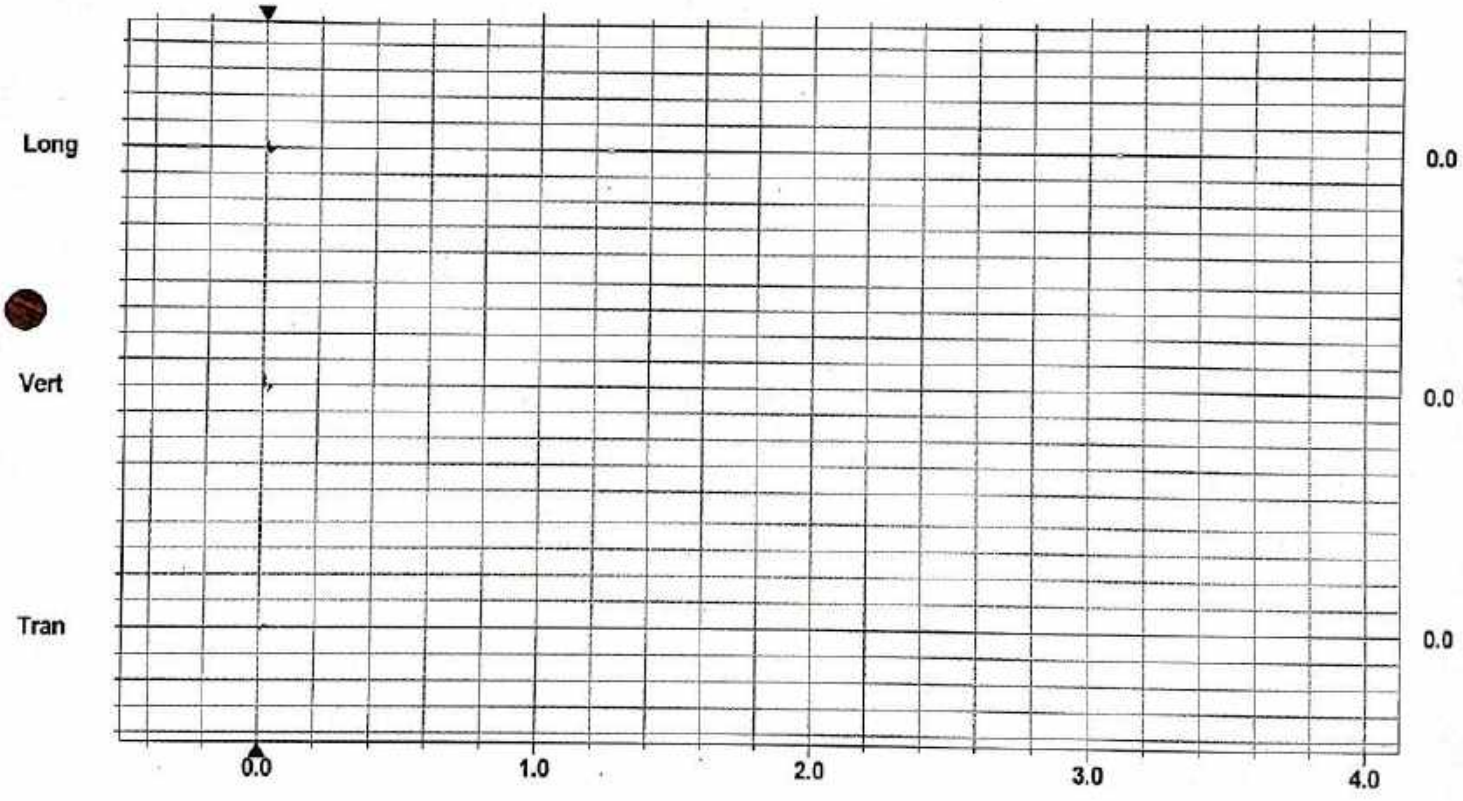
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.236	1.033	0.457	mm/s
ZC Freq	43	93	73	Hz
Time (Rel. to Trig)	0.018	0.001	0.001	sec
Peak Acceleration	0.010	0.069	0.033	g
Peak Displacement	0.001	0.003	0.001	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.135 mm/s at 0.001 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

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Instantel

Event Report

BLOCK - B (3)

Instante

524

Date/Time	Vert at 13:22:11 January 30, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.025 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes

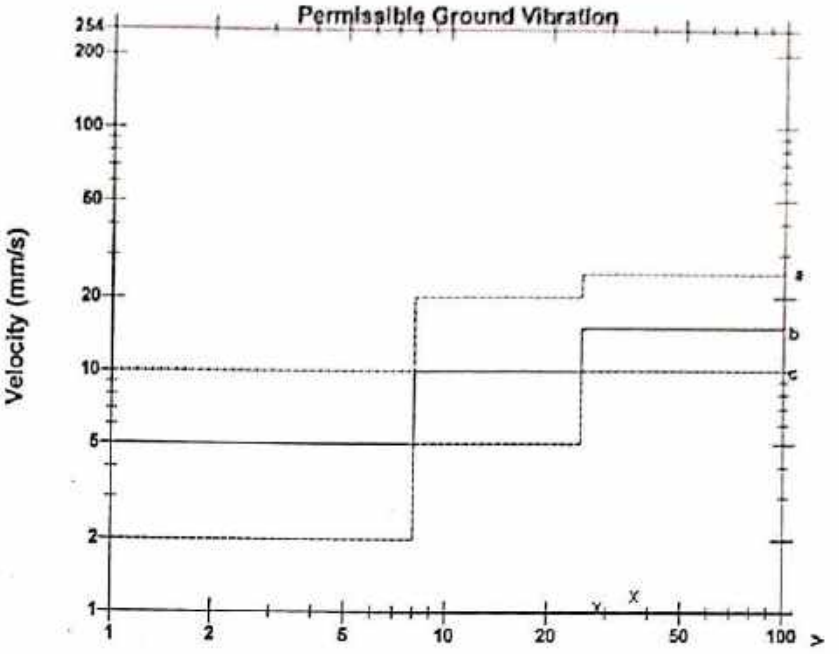
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.607	1.190	0.709	mm/s
ZC Freq	32	37	73	Hz
Time (Rel. to Trig)	0.020	0.001	0.002	sec
Peak Acceleration	0.018	0.072	0.049	g
Peak Displacement	0.003	0.006	0.001	mm
Sensor Check	Passed	Passed	Passed	

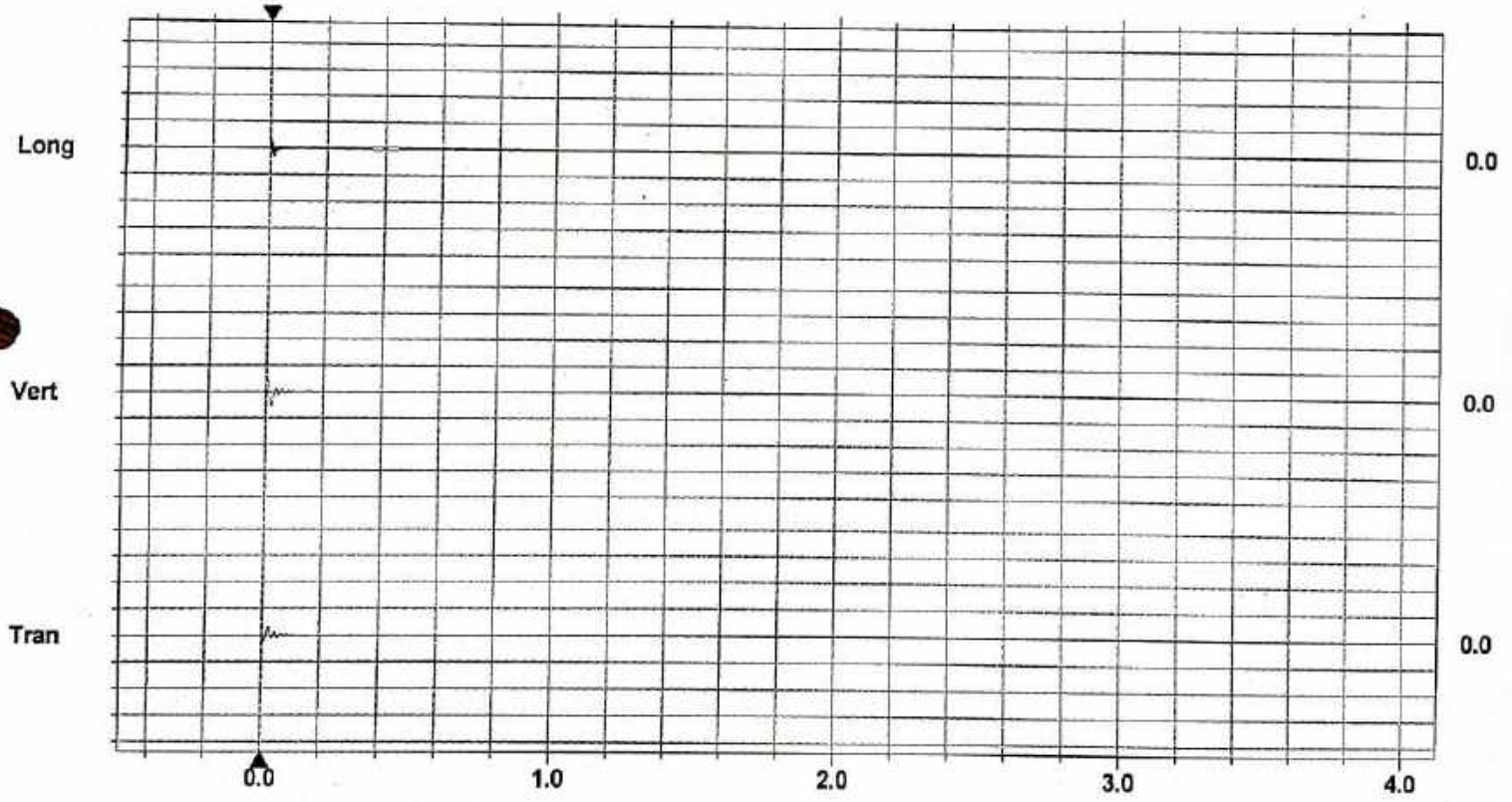
Peak Vector Sum 1.327 mm/s at 0.001 sec

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 28, 2024 by UES New Delhi
File Name	_TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

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Instantel

Event Report

525

Block-B (2)

Instantel

Date/Time	Tran at 13:17:15 January 30, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.227 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14694 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

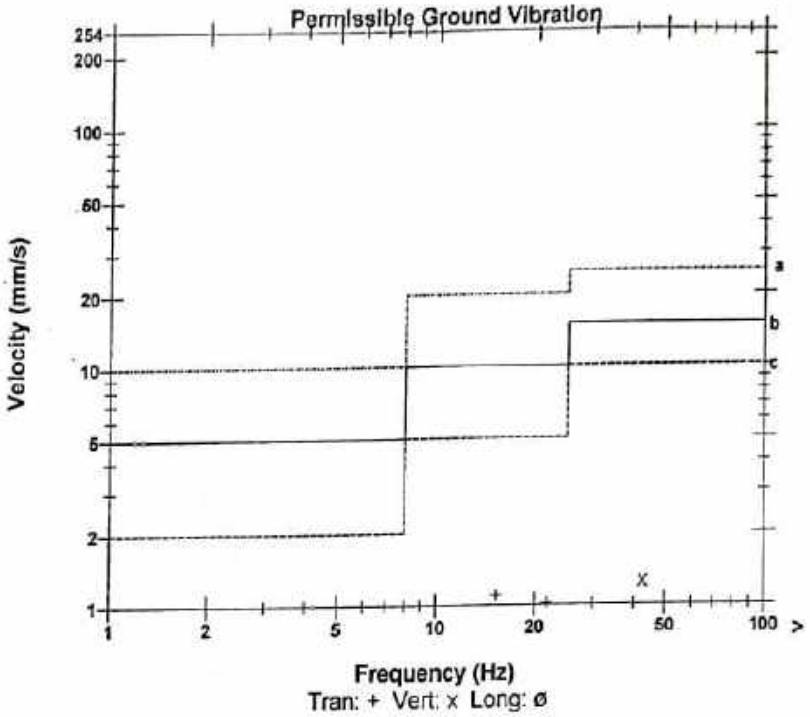
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

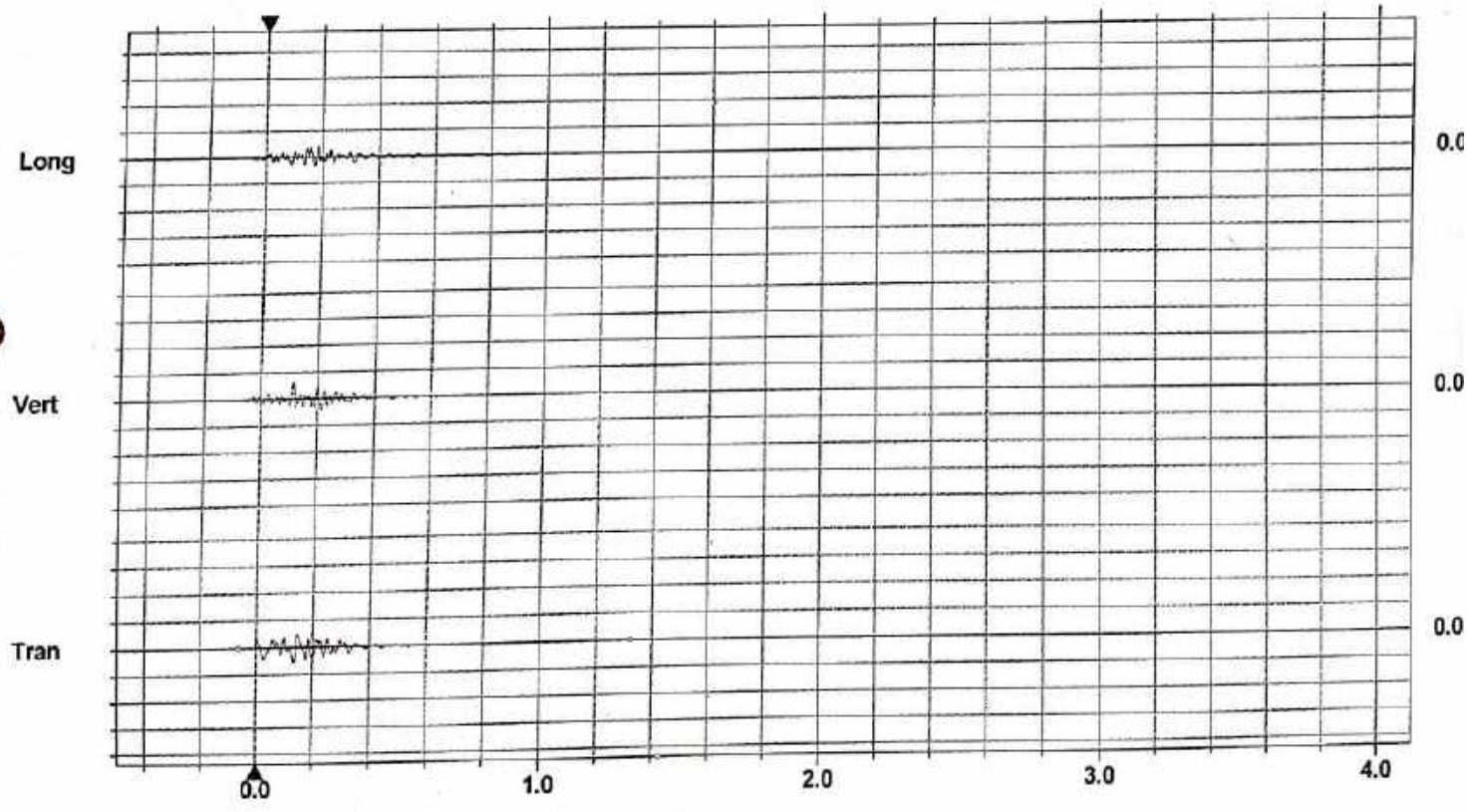
	Tran	Vert	Long	
PPV	1.096	1.261	0.867	mm/s
ZC Freq	15.3	43	64	Hz
Time (Rel. to Trig)	0.133	0.111	0.183	sec
Peak Acceleration	0.033	0.035	0.039	g
Peak Displacement	0.007	0.004	0.004	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.310 mm/s at 0.112 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: January 31, 2025 (V 10.72 - 10.72)

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Instantel **Event Report** 526 Block - B Instantel

Date/Time	Long at 13:12:58 January 30, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.375 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.6 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

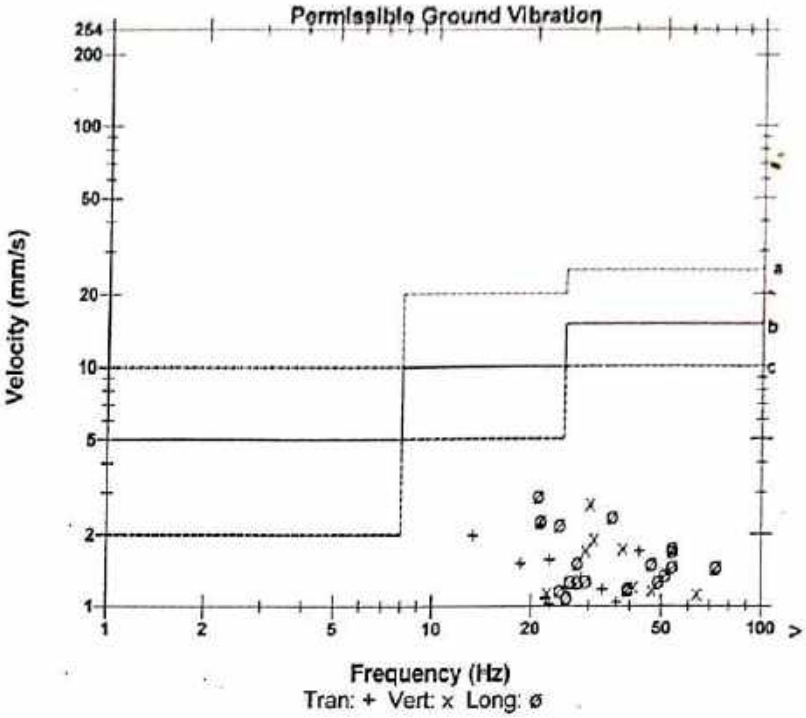
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

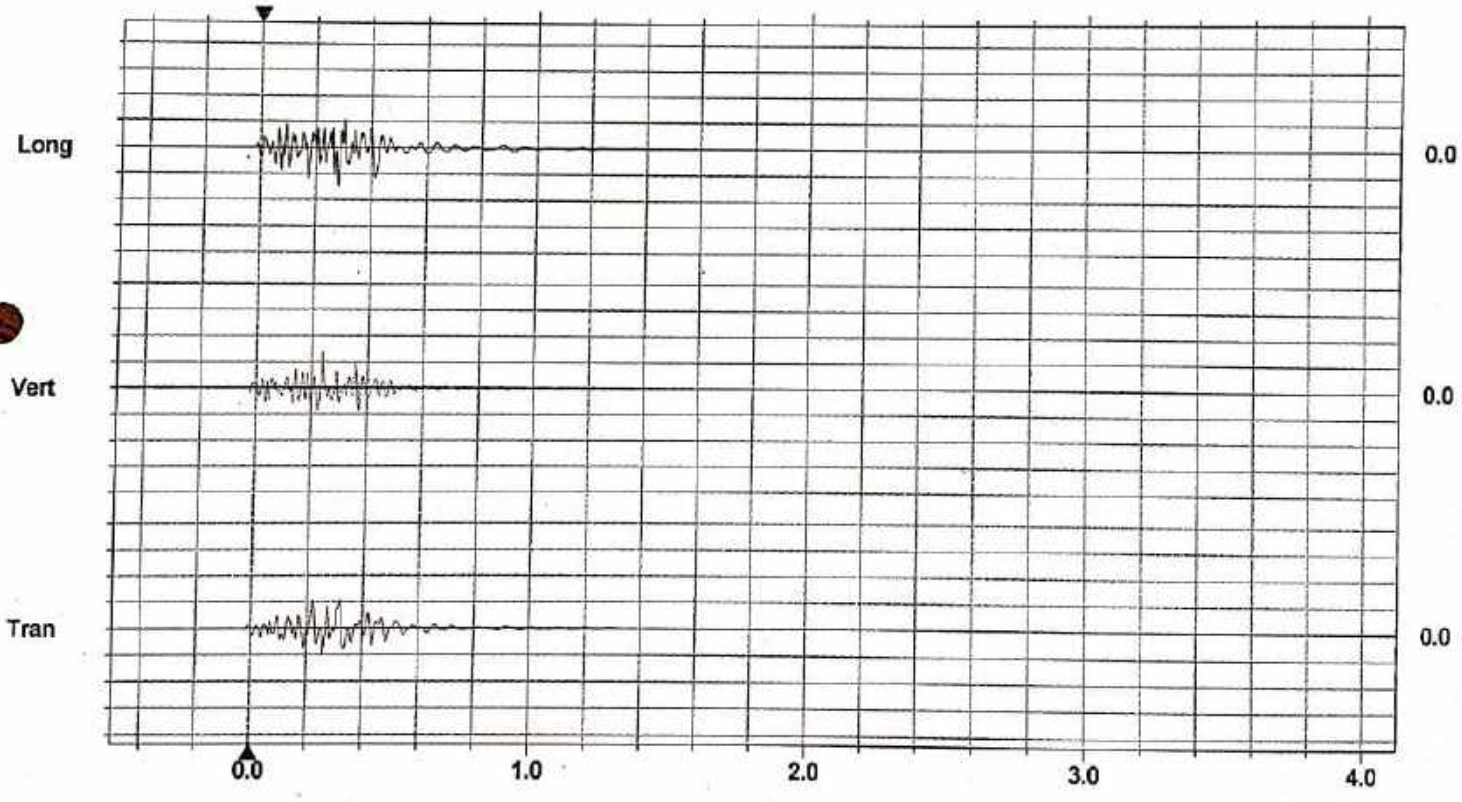
	Tran	Vert	Long	
PPV	2.191	2.688	2.901	mm/s
ZC Freq	21	30	21	Hz
Time (Rel. to Trig)	0.220	0.237	0.280	sec
Peak Acceleration	0.061	0.109	0.102	g
Peak Displacement	0.016	0.011	0.017	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 3.023 mm/s at 0.237 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

Printed: January 31, 2025 (V 10.72 - 10.72)

Format © 1995-2014 Xmark Corporation

Date/Time	Vert at 13:35:54 January 31, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.028 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

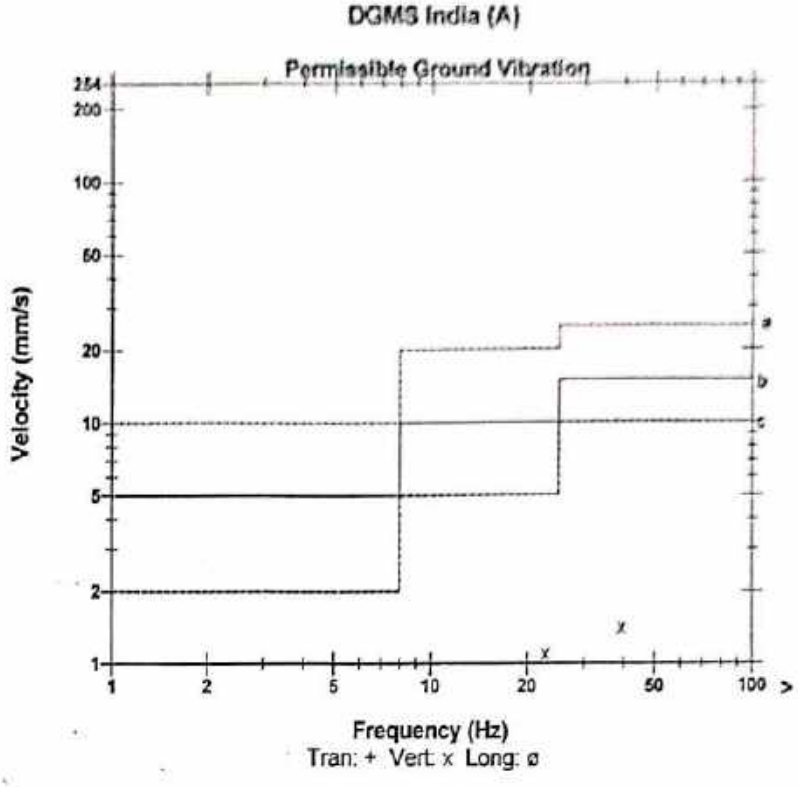
Serial Number	UM14894 V 10.90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	_TEMP EVT
Scaled Distance	486.0 (153.4 m, 0.1 kg)

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

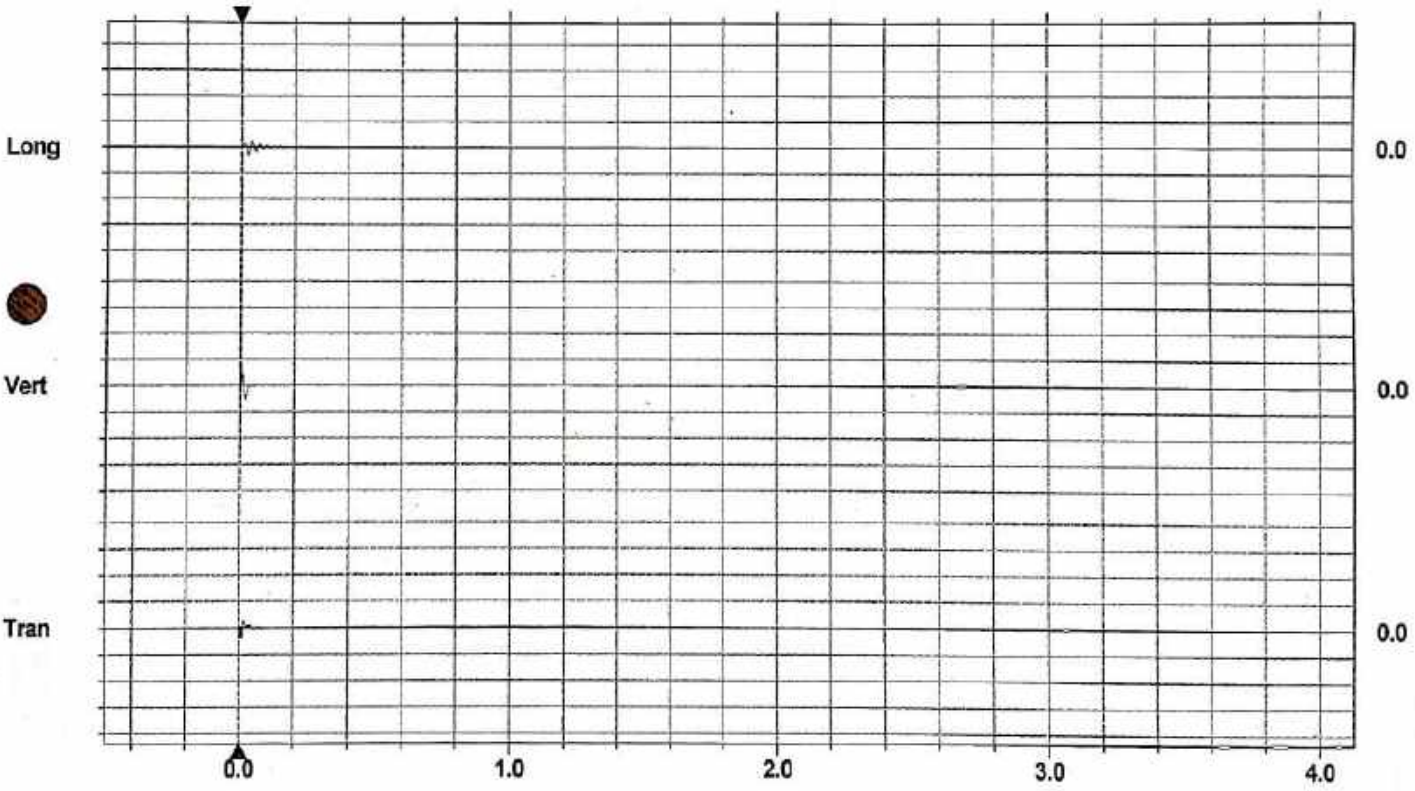
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.788	1.419	0.623	mm/s
ZC Freq	93	39	33	Hz
Time (Rel. to Trig)	0.009	0.002	0.025	sec
Peak Acceleration	0.059	0.076	0.020	g
Peak Displacement	0.002	0.005	0.003	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.594 mm/s at 0.002 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Instantel **Event Report** BOCA - BO Instantel

Date/Time	Long at 13:30:23 January 31, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.171 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

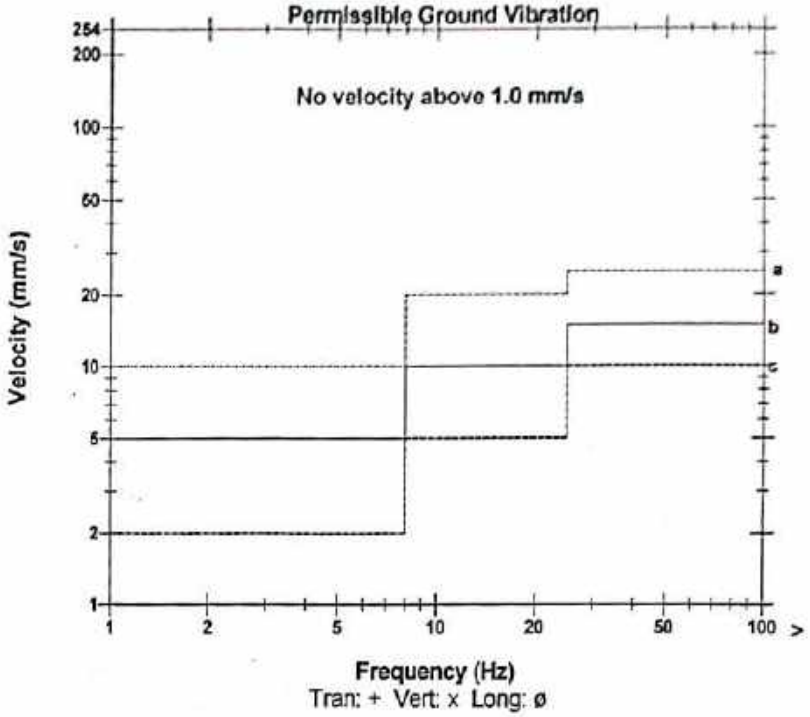
Serial Number	UM14694 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

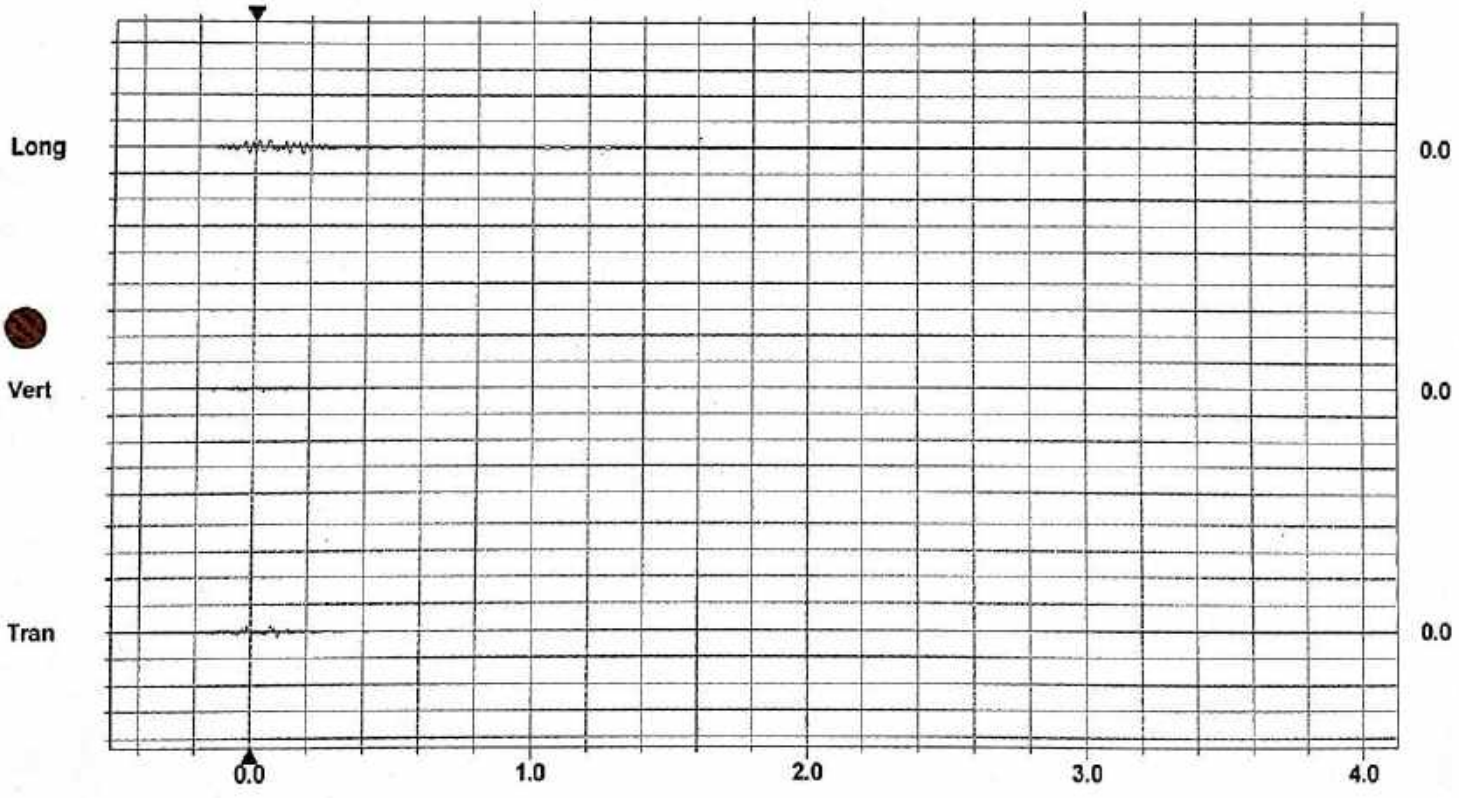
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	0.489	0.355	0.536	mm/s
ZC Freq	31	79	39	Hz
Time (Rel. to Trig)	0.096	0.036	0.001	sec
Peak Acceleration	0.018	0.021	0.018	g
Peak Displacement	0.002	0.001	0.002	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 0.588 mm/s at 0.001 sec





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Date/Time	Tran at 13:37:26 February 1, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.152 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

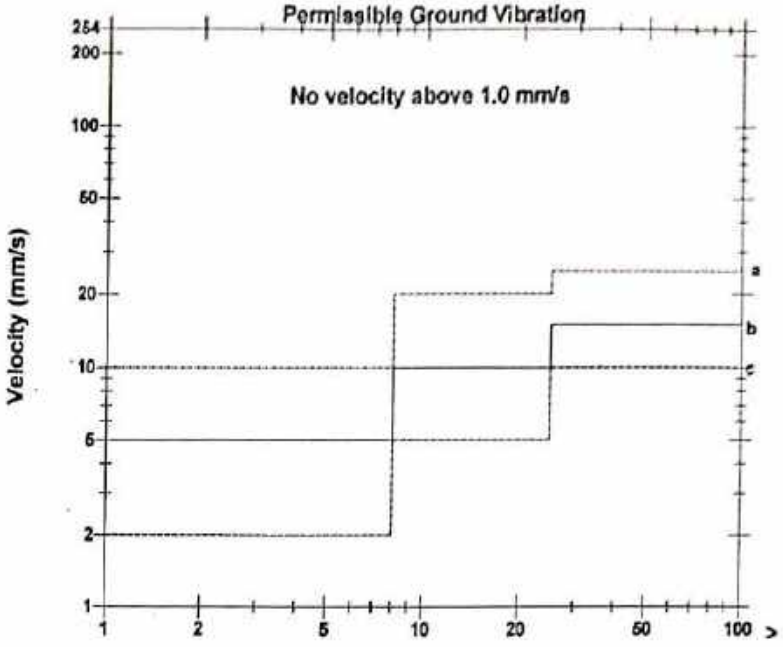
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.938	0.441	0.993	mm/s
ZC Freq	33	38	51	Hz
Time (Rel. to Trig)	0.047	0.114	0.092	sec
Peak Acceleration	0.053	0.026	0.074	g
Peak Displacement	0.005	0.002	0.003	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.249 mm/s at 0.047 sec

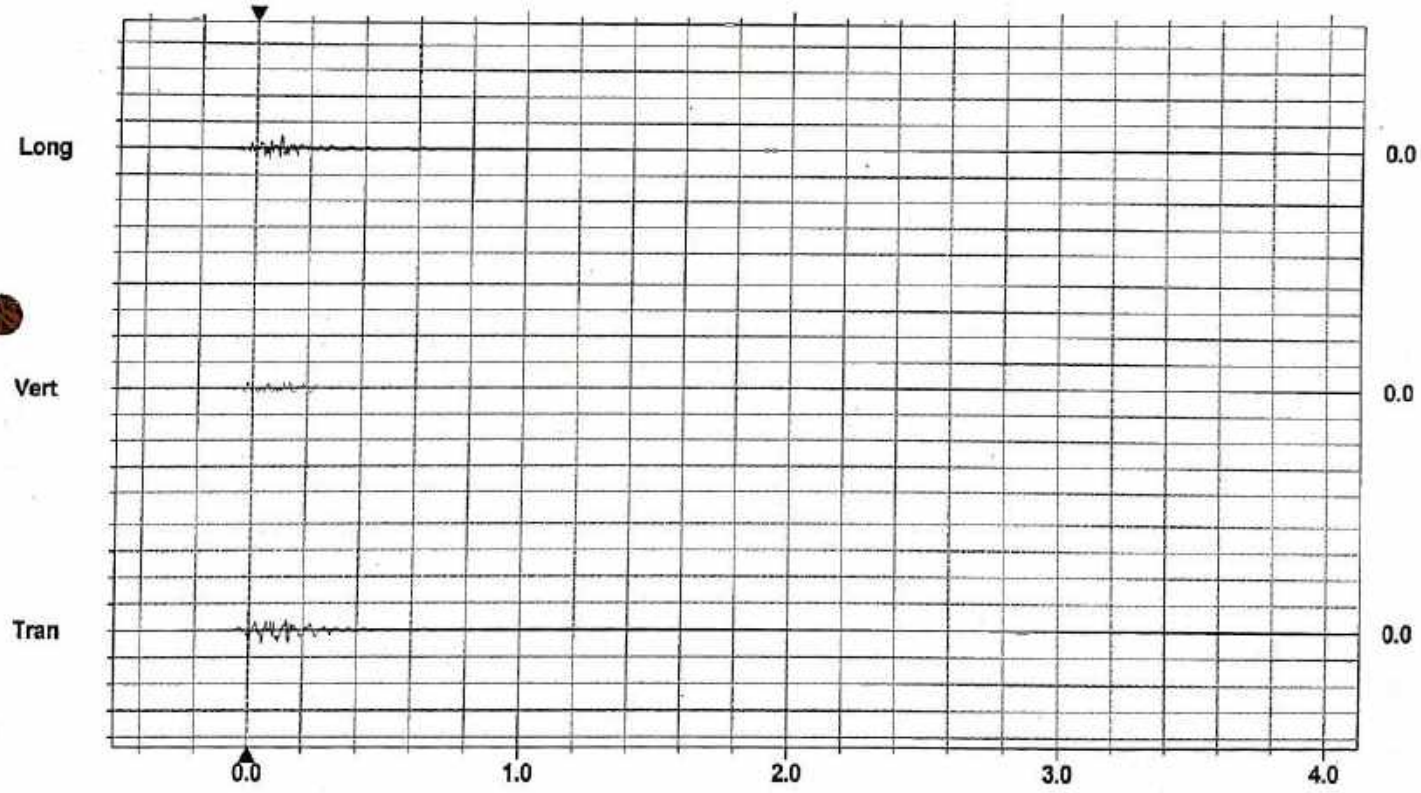
Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

DGMS India (A)



Frequency (Hz)
Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

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Instantel **Event Report** Block - B

530

Instantel

Date/Time	Tran at 13:34:58 February 1, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.157 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

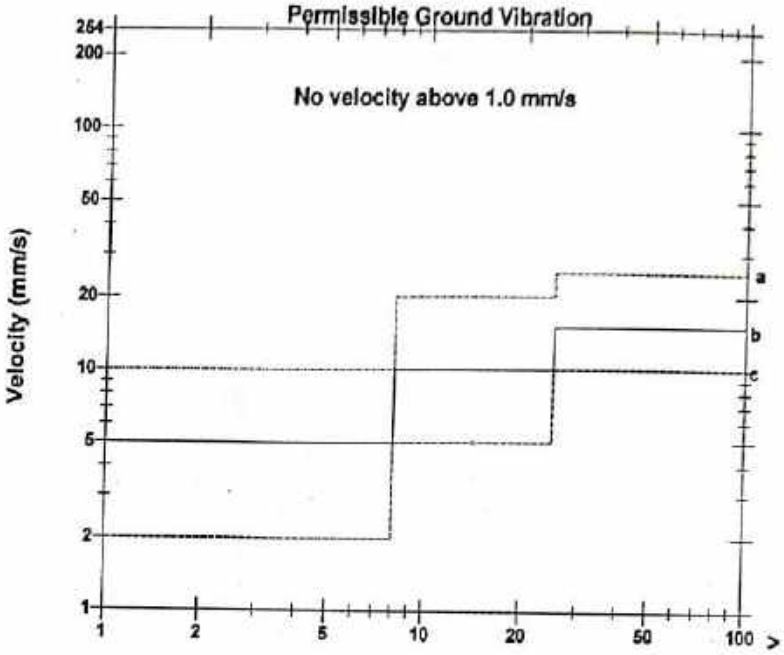
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	0.497	0.236	0.694	mm/s
ZC Freq	79	85	79	Hz
Time (Rel. to Trig)	0.000	-0.059	0.157	sec
Peak Acceleration	0.028	0.015	0.035	g
Peak Displacement	0.001	0.001	0.002	mm
Sensor Check	Passed	Passed	Passed	

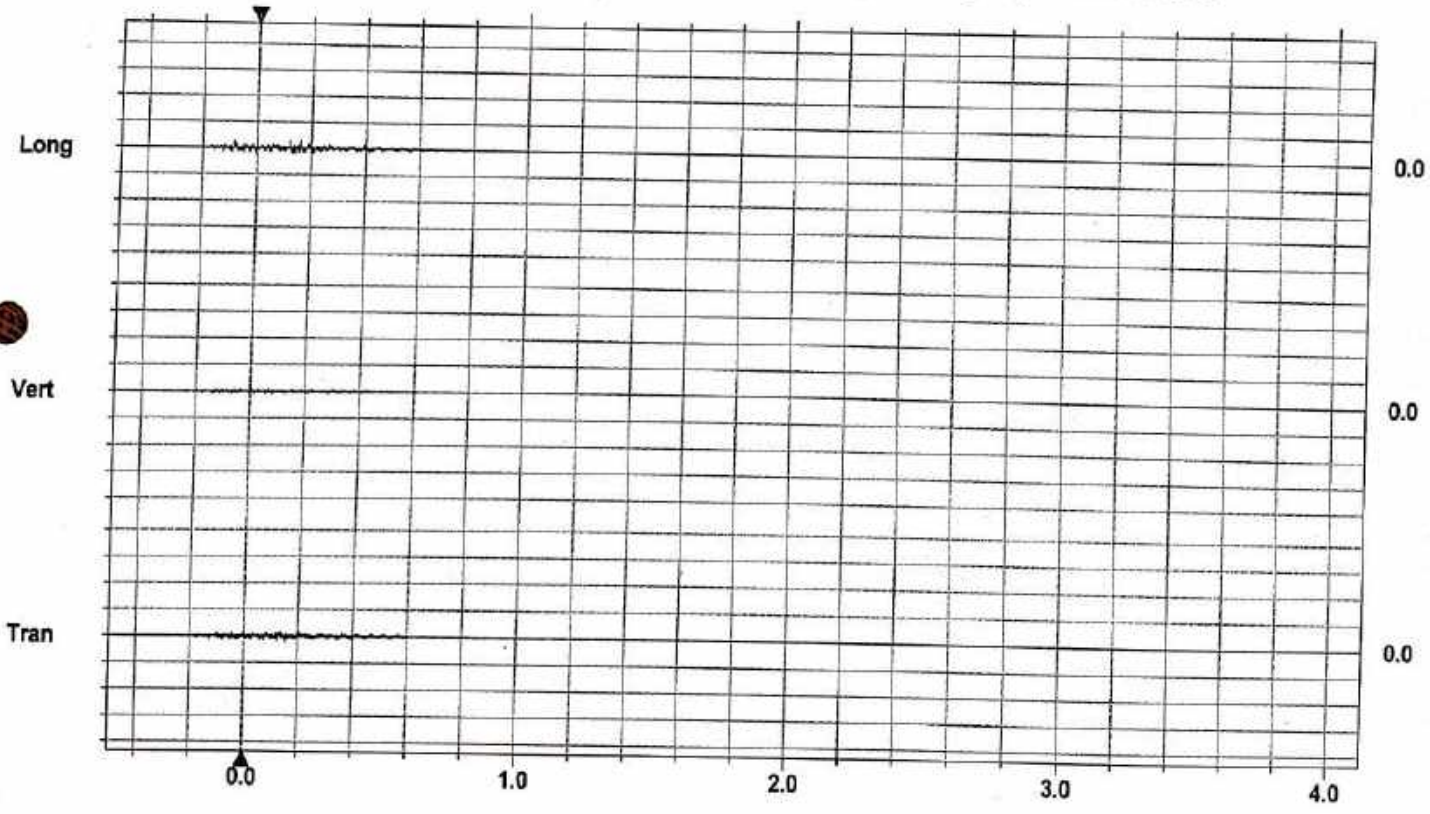
Peak Vector Sum 0.748 mm/s at 0.157 sec

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

Printed: February 2, 2025 (V 10.72 - 10.72)

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Instantel Event Report Instantel

Date/Time	Vert at 13:39:27 February 1, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.0 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10.60FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	_TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

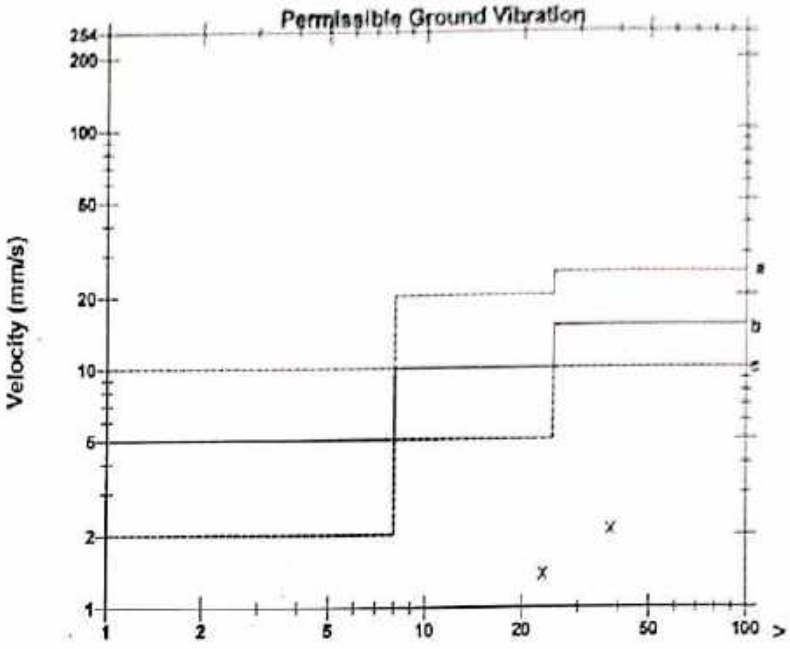
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.835	2.144	0.930	mm/s
ZC Freq	39	38	73	Hz
Time (Rel. to Trig)	0.015	0.015	0.021	sec
Peak Acceleration	0.058	0.156	0.058	g
Peak Displacement	0.002	0.005	0.002	mm
Sensor Check	Passed	Passed	Passed	

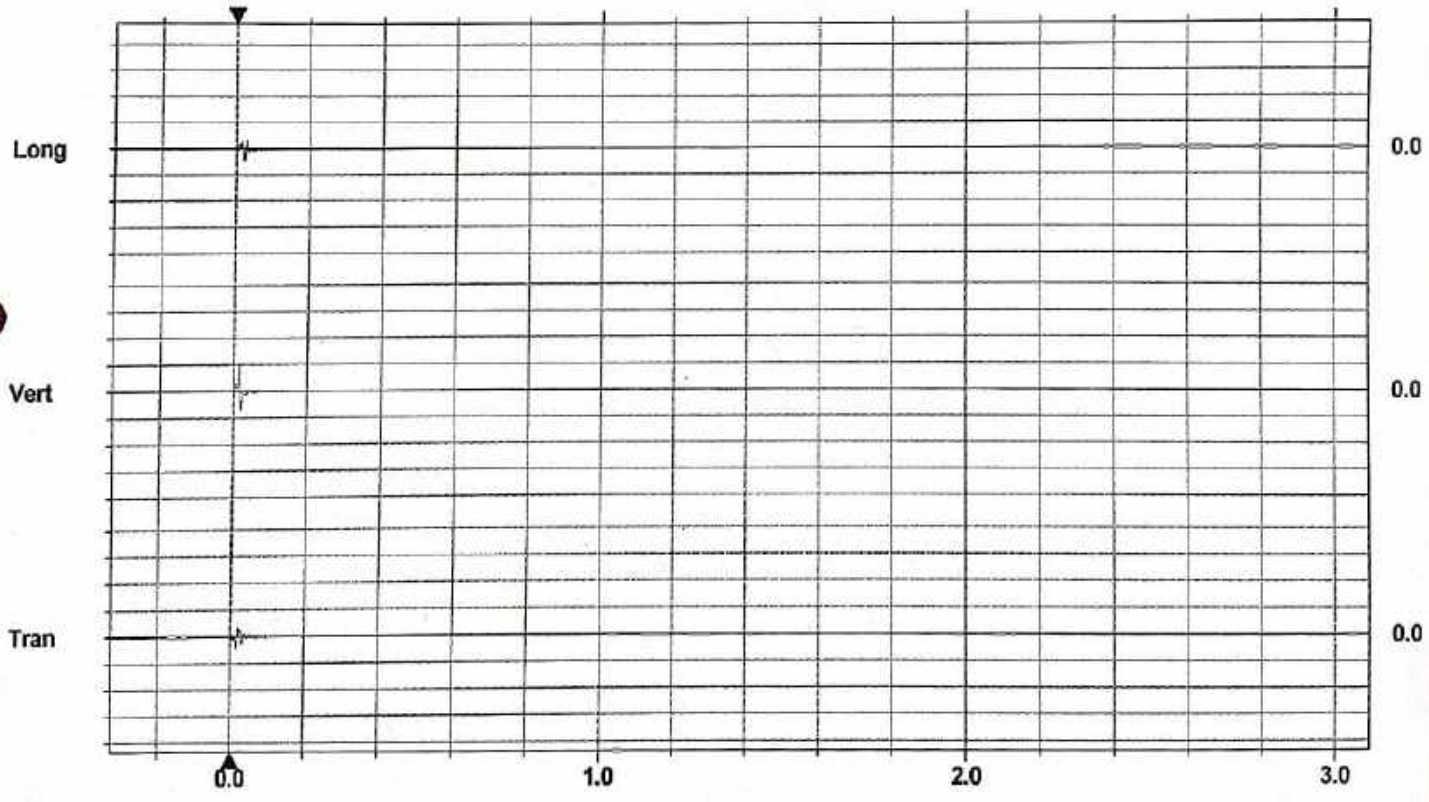
Peak Vector Sum 2.307 mm/s at 0.015 sec

DGMS India (A)



Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶——◀

Printed: February 2, 2025 (V 10.72 - 10.72)

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Date/Time	Vert at 13:27:17 February 2, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.021 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.6 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

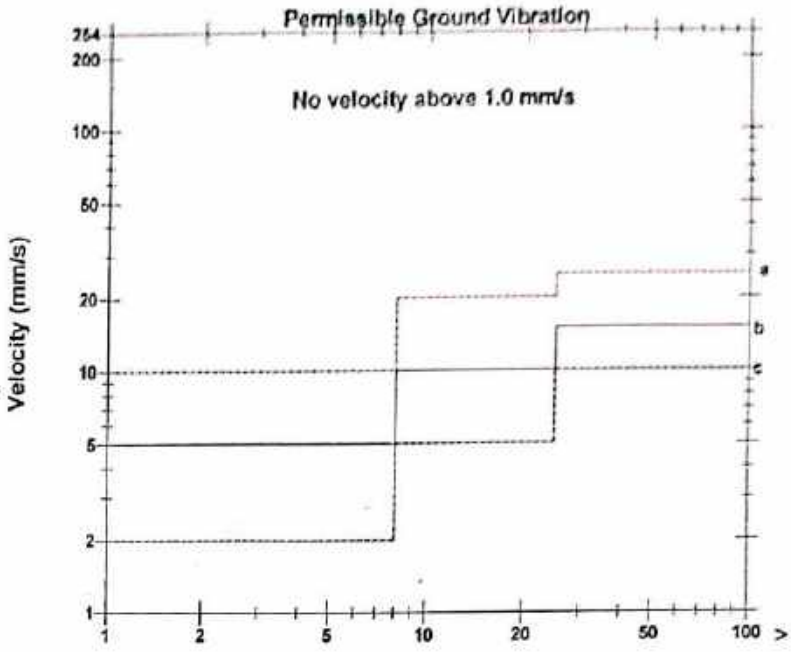
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.307	0.859	0.473	mm/s
ZC Freq	93	35	102	Hz
Time (Rel. to Trig)	0.000	0.008	0.000	sec
Peak Acceleration	0.026	0.036	0.041	g
Peak Displacement	0.001	0.005	0.001	mm
Sensor Check	Passed	Passed	Passed	

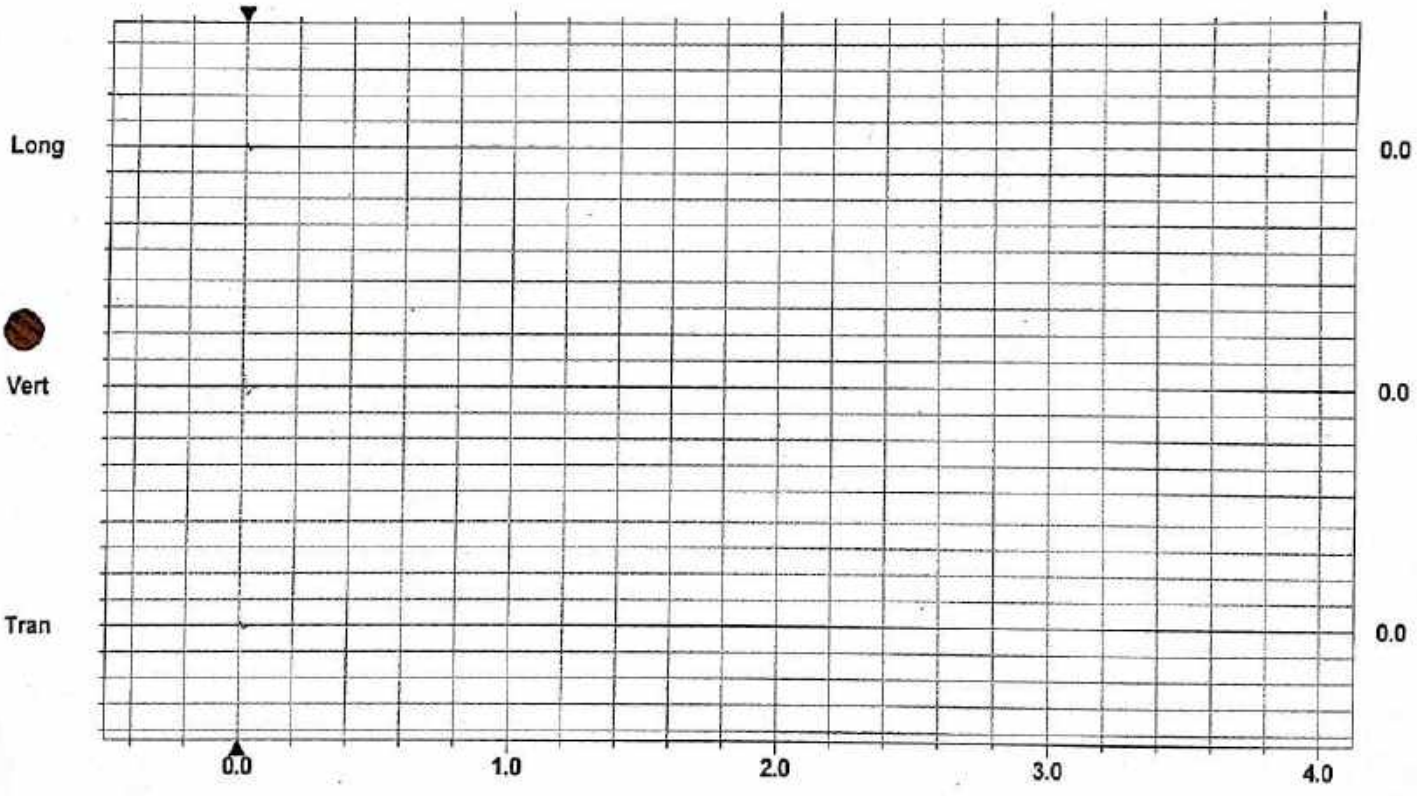
Peak Vector Sum 0.886 mm/s at 0.008 sec

DGMS India (A)



Frequency (Hz)
Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

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Date/Time	Long at 13:27:00 February 2, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.227 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 20, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

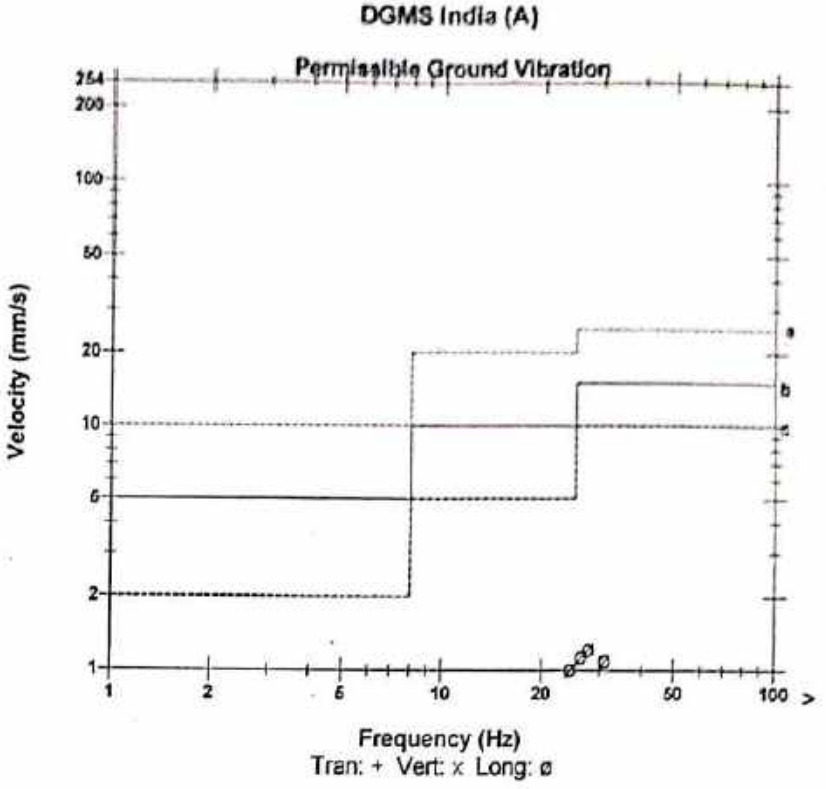
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes

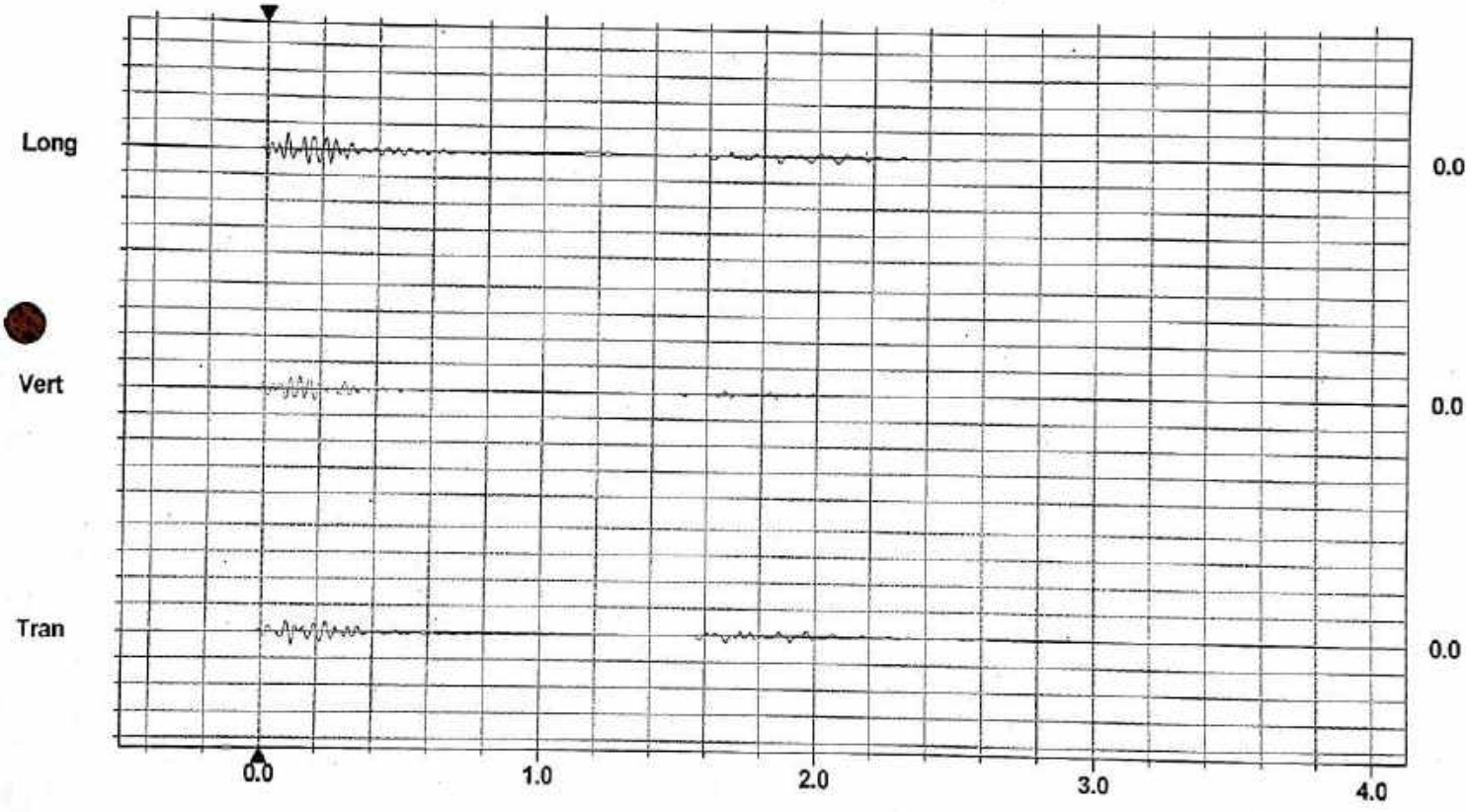
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.993	0.914	1.230	mm/s
ZC Freq	28	31	28	Hz
Time (Rel. to Trig)	0.106	0.125	0.073	sec
Peak Acceleration	0.021	0.021	0.026	g
Peak Displacement	0.005	0.005	0.007	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.495 mm/s at 0.073 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: February 3, 2025 (V 10.72 - 10.72)

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Instantel **Event Report** Doc-3-① Instantel

Date/Time	Vert at 13:20:44 February 2, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.006 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14694 V 10.90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

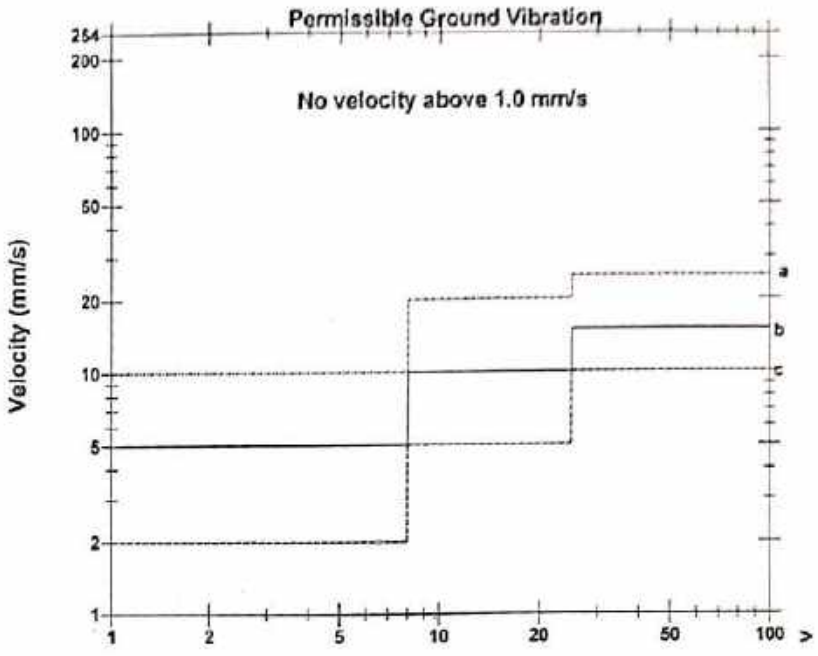
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.292	0.552	0.347	mm/s
ZC Freq	93	33	93	Hz
Time (Rel. to Trig)	-0.000	0.007	-0.001	sec
Peak Acceleration	0.020	0.030	0.021	g
Peak Displacement	0.001	0.003	0.001	mm
Sensor Check	Passed	Passed	Passed	

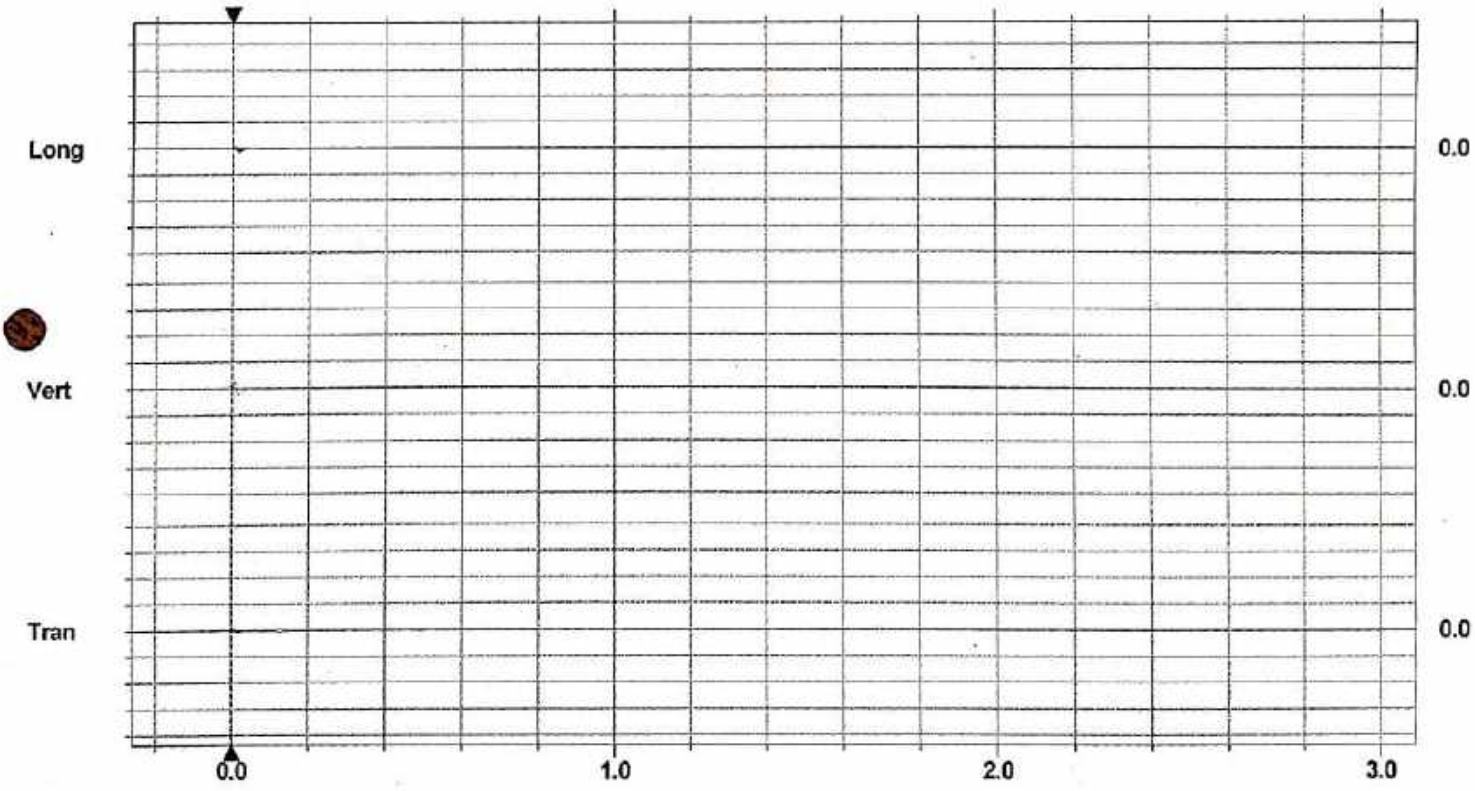
Peak Vector Sum 0.646 mm/s at -0.001 sec

DGMS India (A)



Frequency (Hz)
Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Instantel **Event Report** Block - B Instant

535

Date/Time	Long at 14:40:23 February 3, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.375 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-99FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

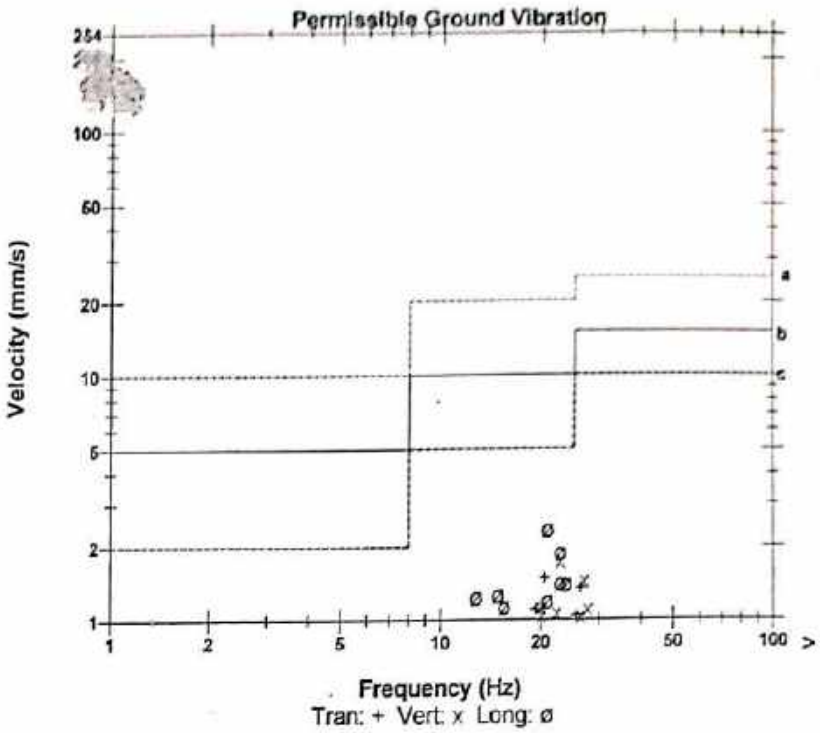
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

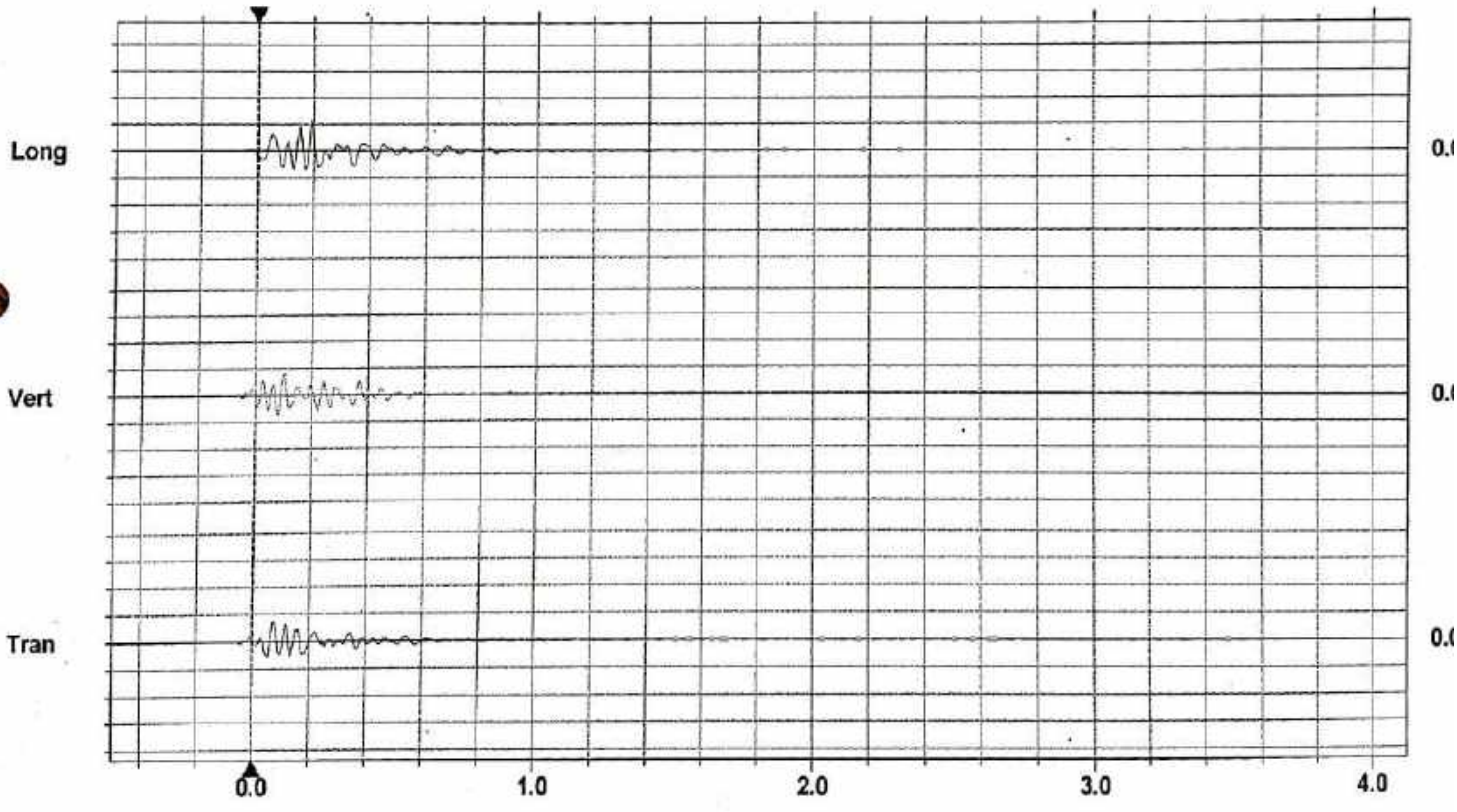
	Tran	**Vert**	**Long**	
PPV	1.474	1.742	2.341	mm/s
ZC Freq	20	23	21	Hz
Time (Rel. to Trig)	0.075	0.100	0.189	sec
Peak Acceleration	0.026	0.033	0.031	g
Peak Displacement	0.011	0.012	0.016	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.461 mm/s at 0.191 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

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Date/Time	Long at 14:34:42 February 3, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.116 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

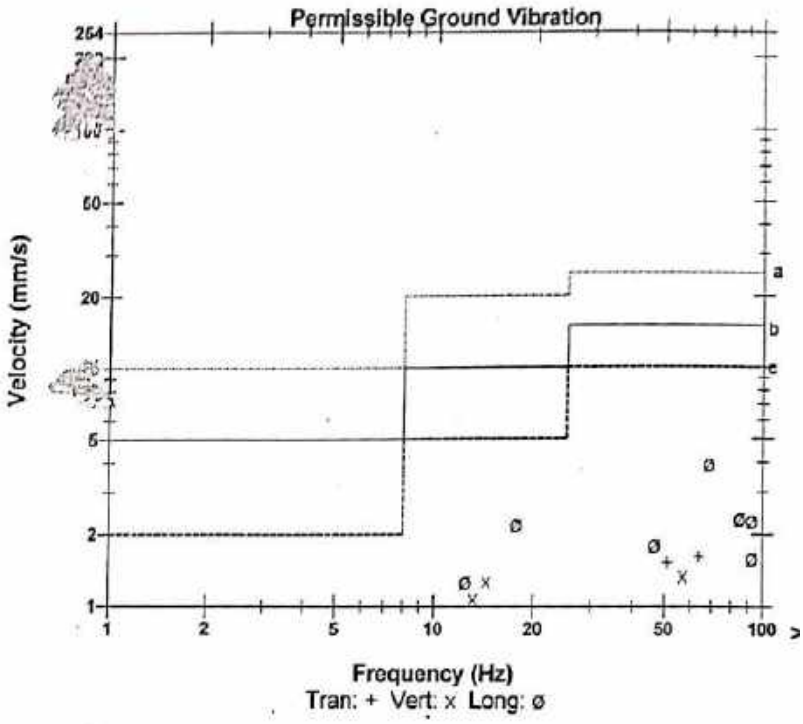
GPS Location	Latitude	Longitude
Source:	027 51.007 N	075 58.024 E
Sensor1:	027 51.160 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

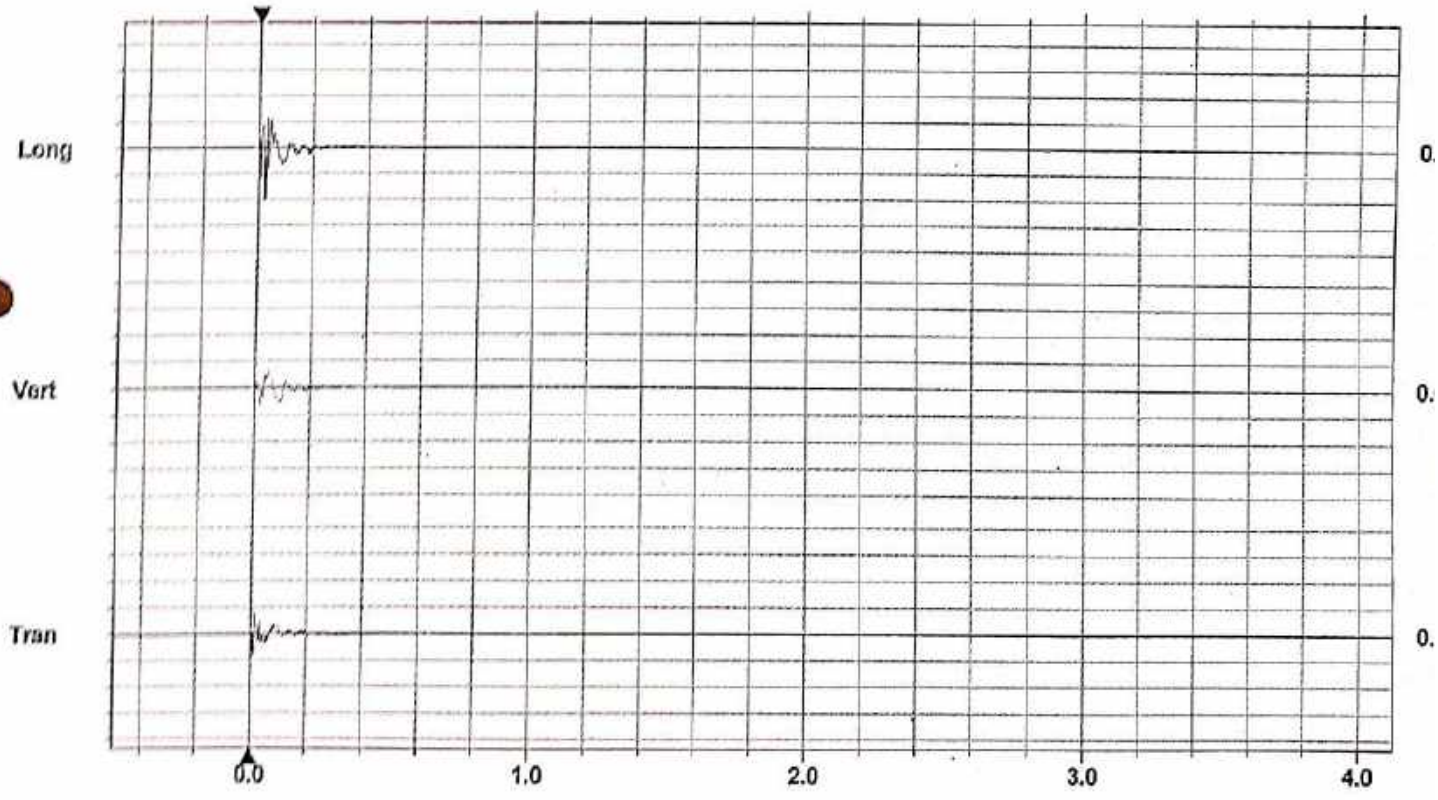
	Tran	Vert	Long	
PPV	1.800	1.340	3.925	mm/s
ZC Freq	64	67	68	Hz
Time (Rel. to Trig)	0.009	0.019	0.023	sec
Peak Acceleration	0.117	0.074	0.176	g
Peak Displacement	0.007	0.014	0.016	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 3.937 mm/s at 0.023 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div
Trigger =

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Instantel **Event Report** Instantel

Date/Time	Vert at 14:33:32 February 3, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.03 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14694 V 10.90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 20, 2024 by UES New Delhi
Name	TEMP EVT
Distance	465.0 (153.4 m, 0.1 kg)

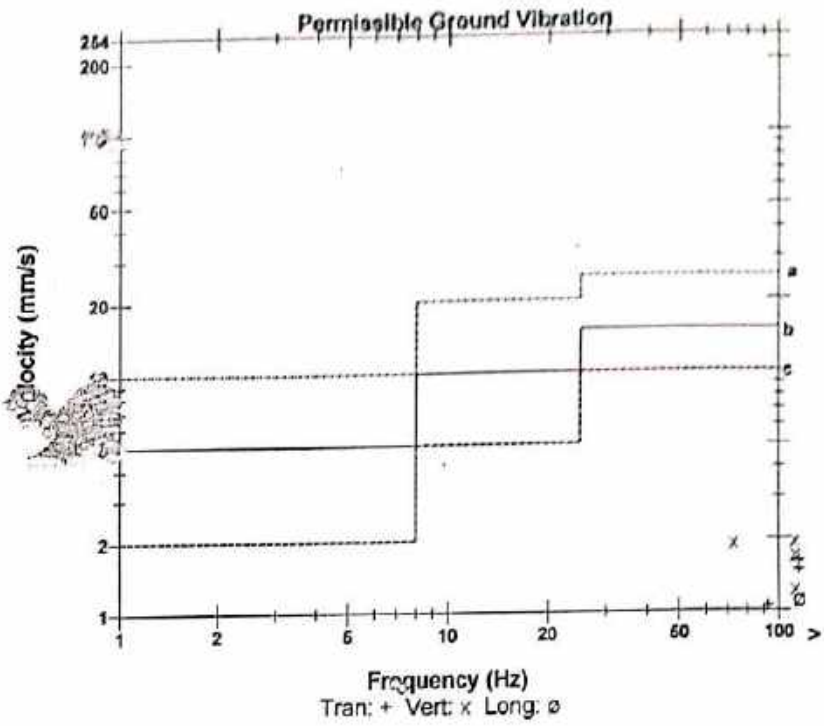
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

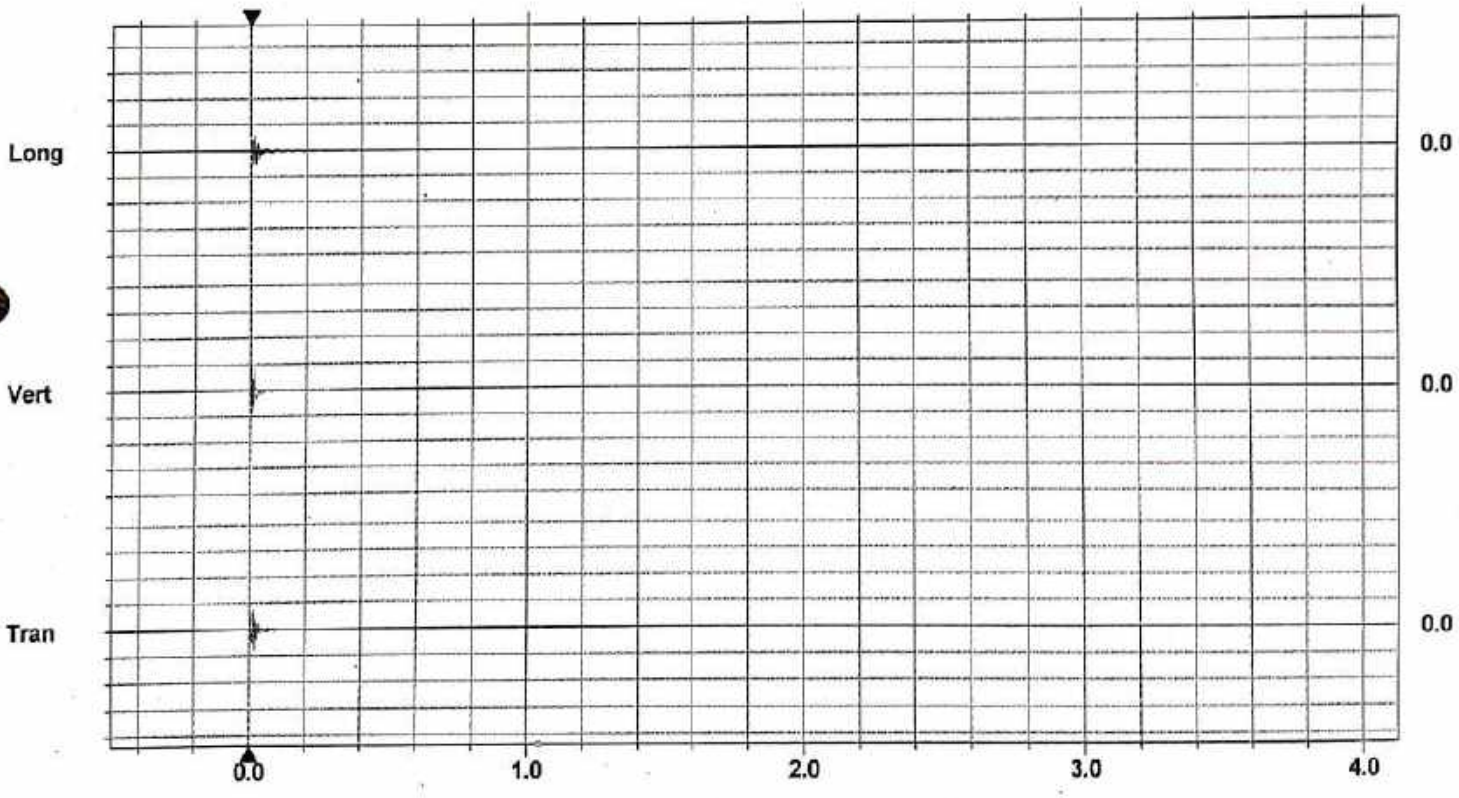
	Tran	**Vert**	**Long**	
PPV	1.608	1.955	1.111	mm/s
ZC Freq	102	>200	102	Hz
Time (Rel. to Trig)	0.017	0.005	0.007	sec
Peak Acceleration	0.117	0.255	0.090	g
Peak Displacement	0.002	0.003	0.002	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.222 mm/s at 0.003 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: February 4, 2025 (V 10.72 - 10.72) Format © 1995-2014 Xmark Corporation

Instantel **Event Report** Block - B1 Instantel

Date/Time	Vert at 14:28:35 February 3, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.344 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

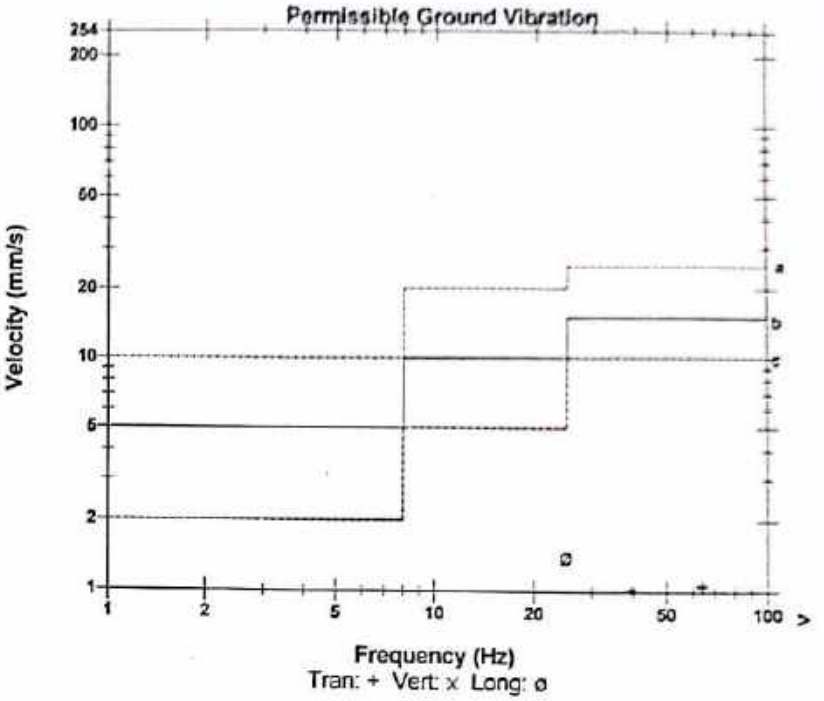
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	1.056	0.985	1.403	mm/s
ZC Freq	64	26	25	Hz
Time (Rel. to Trig)	0.189	0.180	0.204	sec
Peak Acceleration	0.054	0.035	0.046	g
Peak Displacement	0.004	0.004	0.008	mm
Sensor Check	Passed	Passed	Passed	

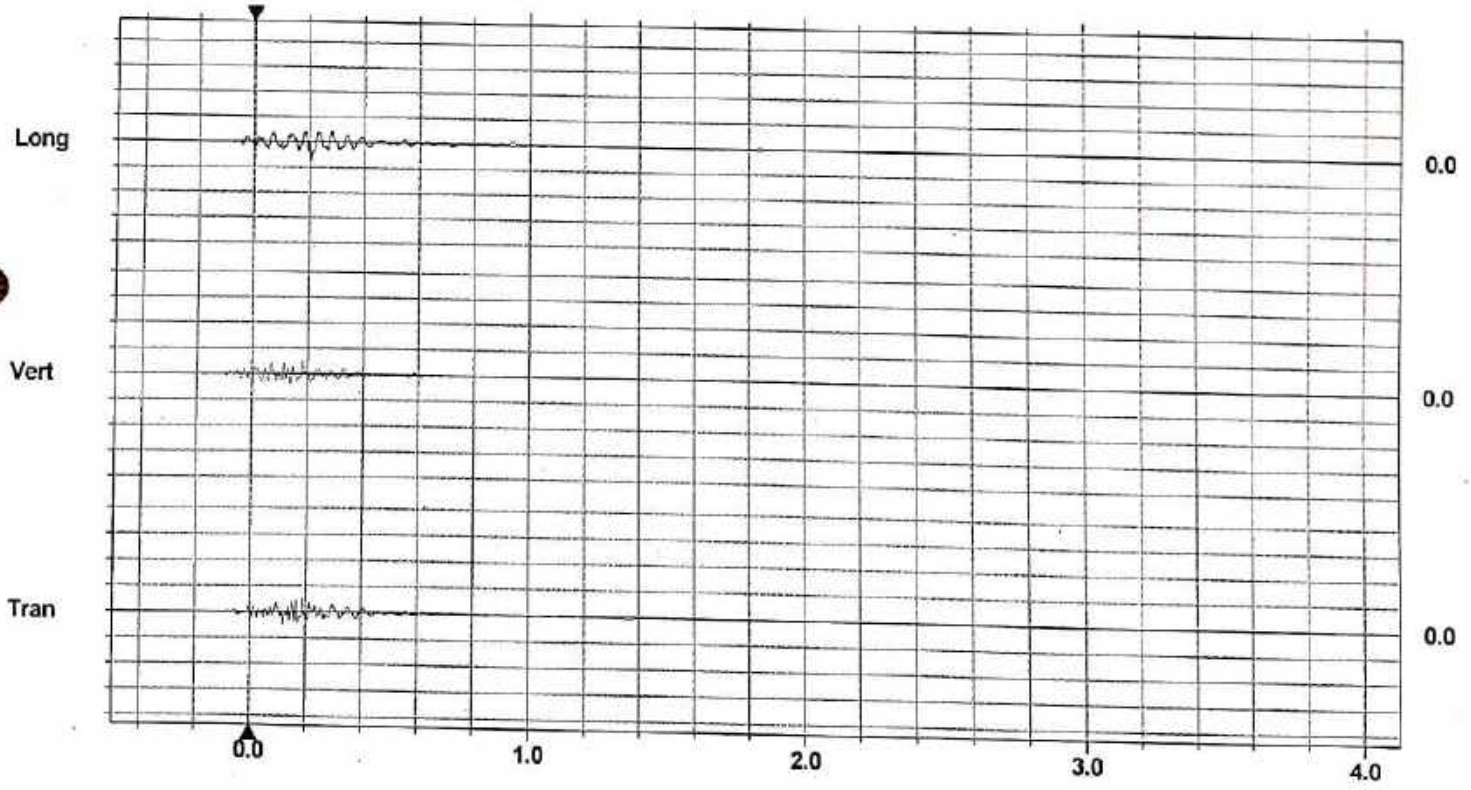
Peak Vector Sum 1.510 mm/s at 0.205 sec

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Instantel

Event Report

539

Block - B (9)

Instantel

Date/Time	Long at 13:53:02 February 4, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.162 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	465.0 (153.4 m, 0.1 kg)

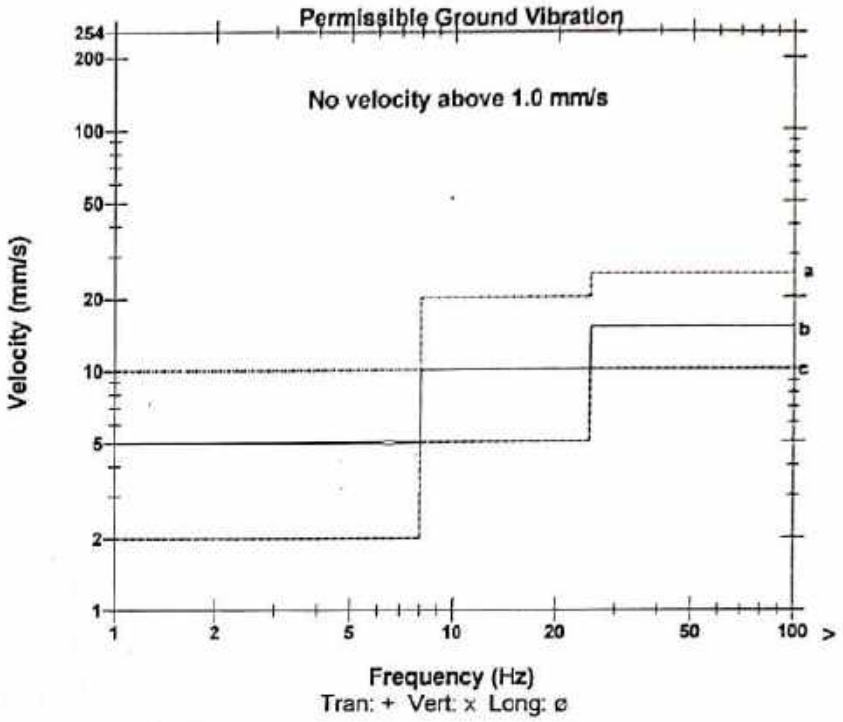
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.624 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	0.512	0.268	0.725	mm/s
ZC Freq	23	33	28	Hz
Time (Rel. to Trig)	0.089	-0.082	0.003	sec
Peak Acceleration	0.013	0.013	0.018	g
Peak Displacement	0.003	0.002	0.004	mm
Sensor Check	Passed	Passed	Passed	

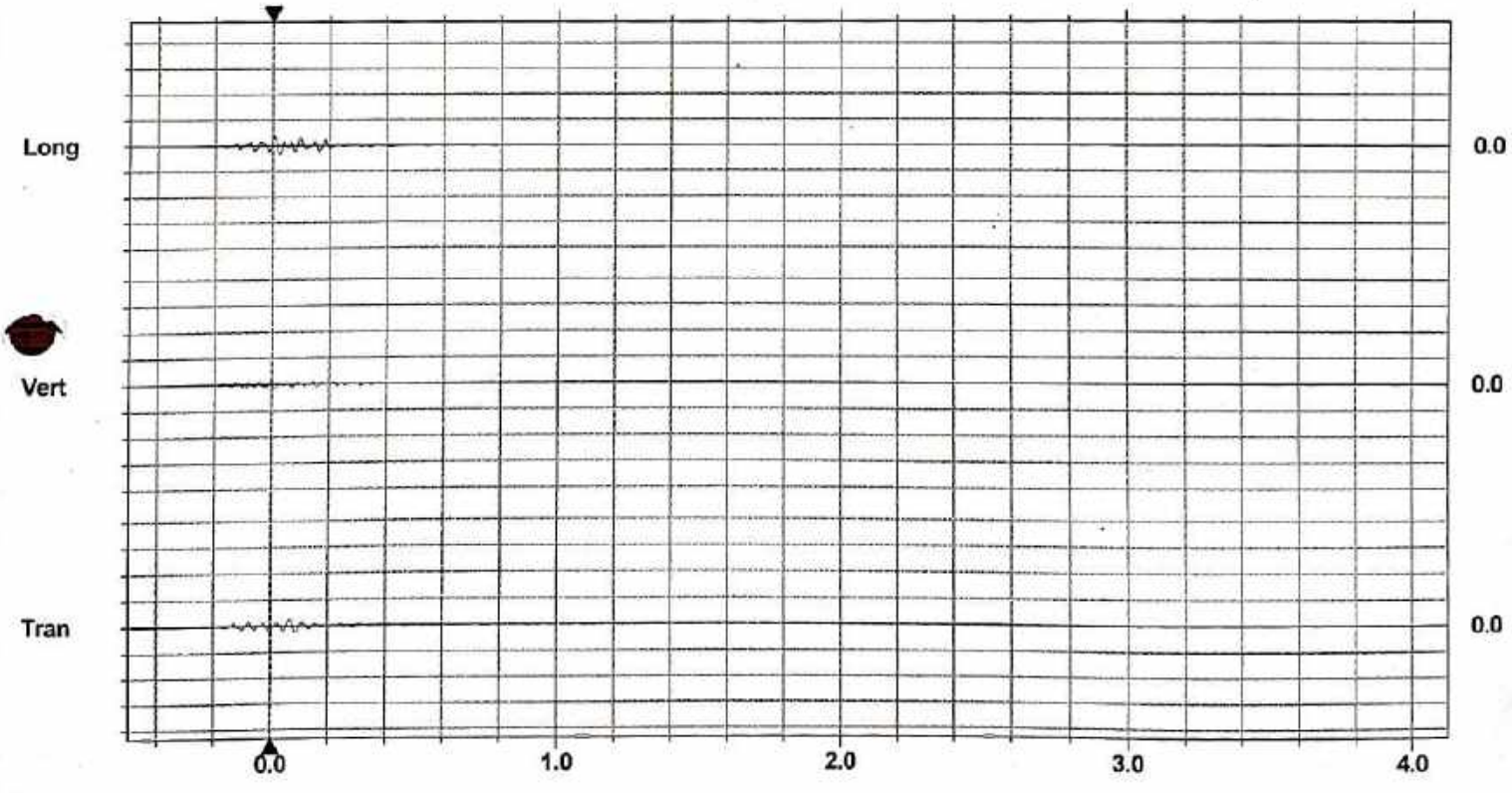
Peak Vector Sum 0.756 mm/s at 0.003 sec

DGMS India (A)



Frequency (Hz)
Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

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Date/Time	Tran at 13:50:25 February 4, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.006 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

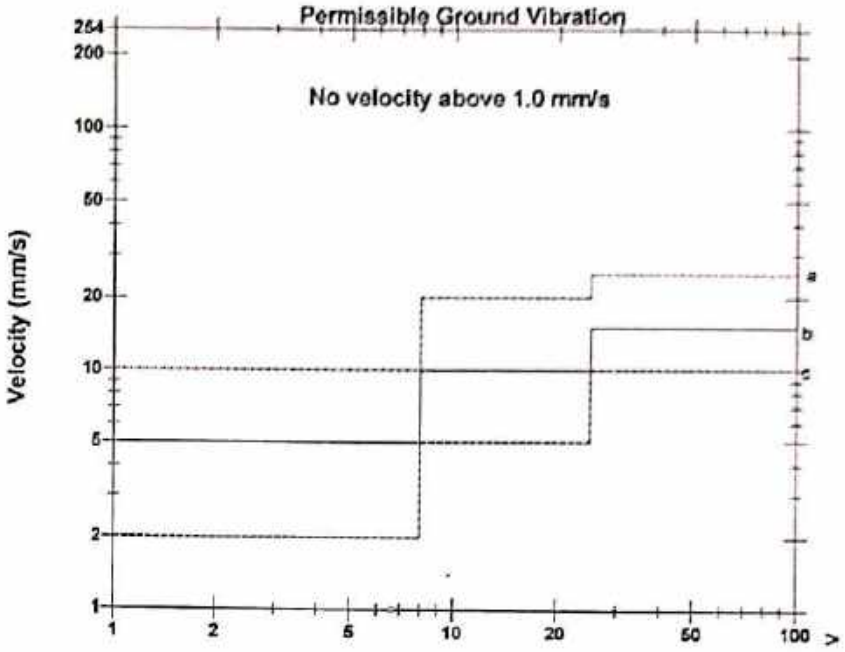
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

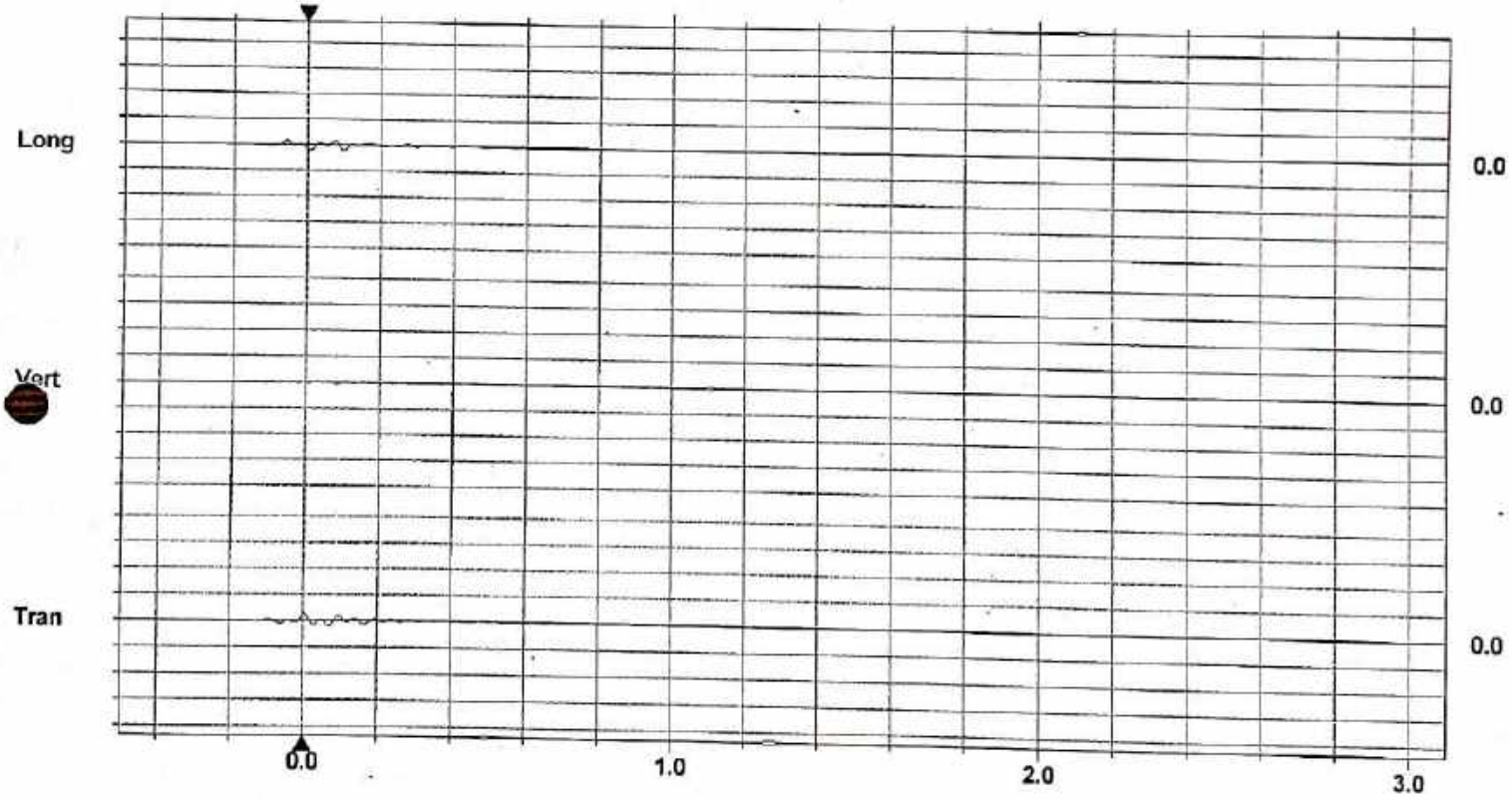
	Tran	Vert	Long	
PPV	0.544	0.173	0.418	mm/s
ZC Freq	16.3	21	14.0	Hz
Time (Rel. to Trig)	0.003	0.084	0.007	sec
Peak Acceleration	0.010	0.008	0.012	g
Peak Displacement	0.005	0.001	0.005	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 0.673 mm/s at 0.004 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: February 5, 2025 (V 10.72 - 10.72)

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Block - B (2)

541

Date/Time	Long at 13:47:53 February 4, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.205 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

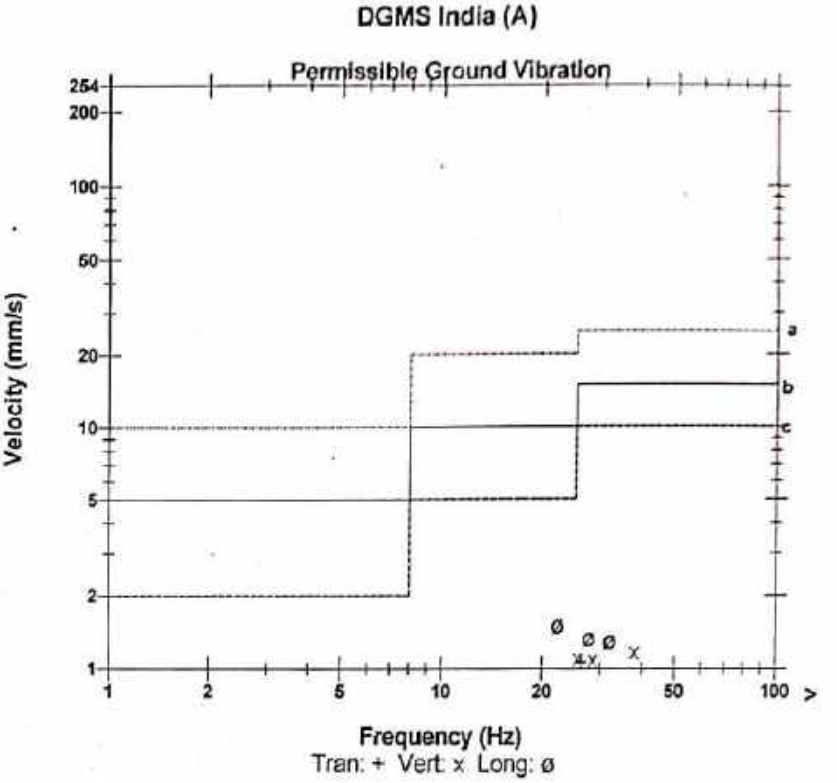
Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

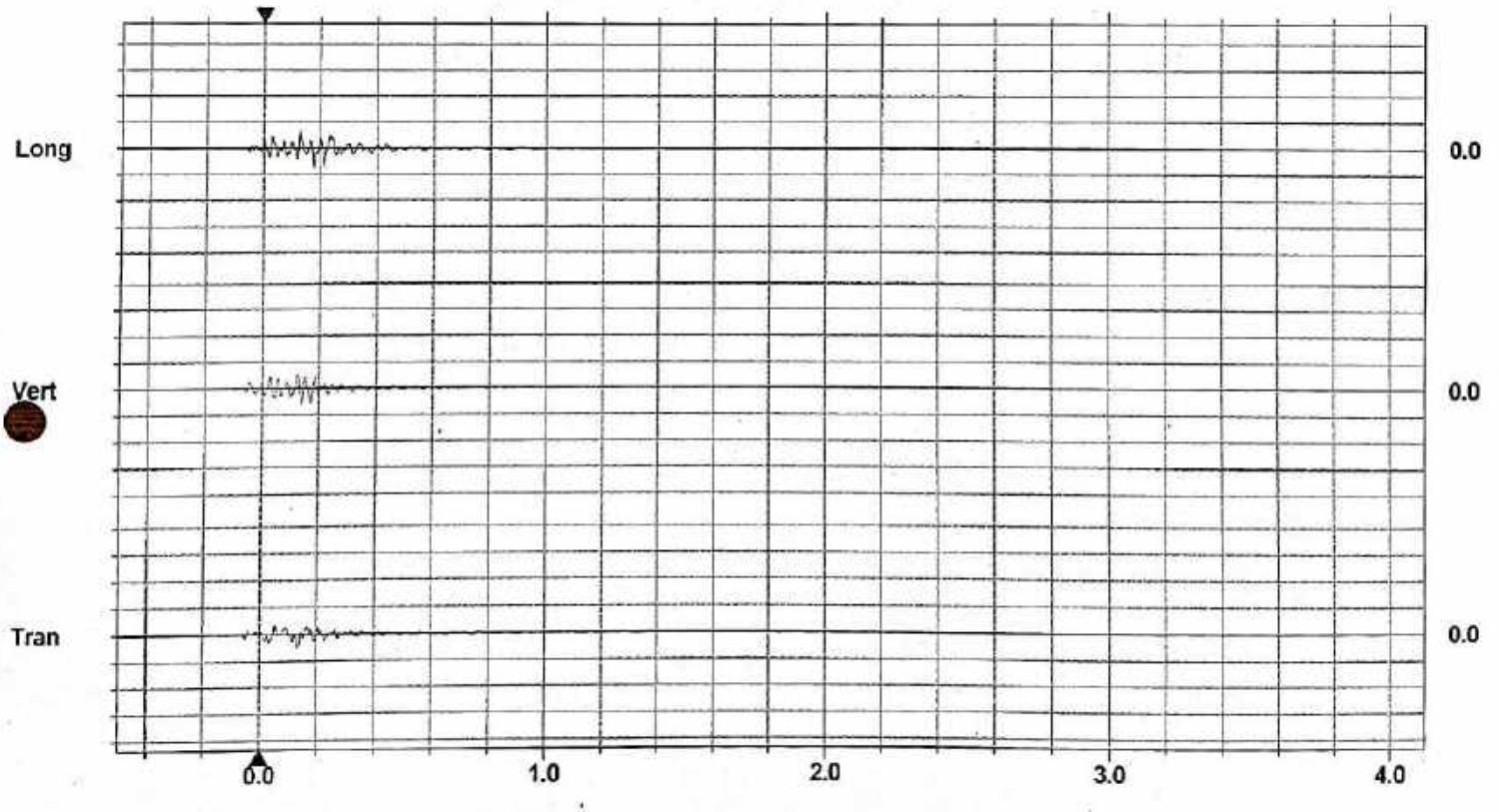
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	1.056	1.174	1.505	mm/s
ZC Freq	26	38	22	Hz
Time (Rel. to Trig)	0.131	0.138	0.176	sec
Peak Acceleration	0.026	0.033	0.038	g
Peak Displacement	0.006	0.006	0.008	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.665 mm/s at 0.126 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

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Instantel Event Report Black - 30 Instantel

Date/Time	Vert at 13:41:56 February 4, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.02 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

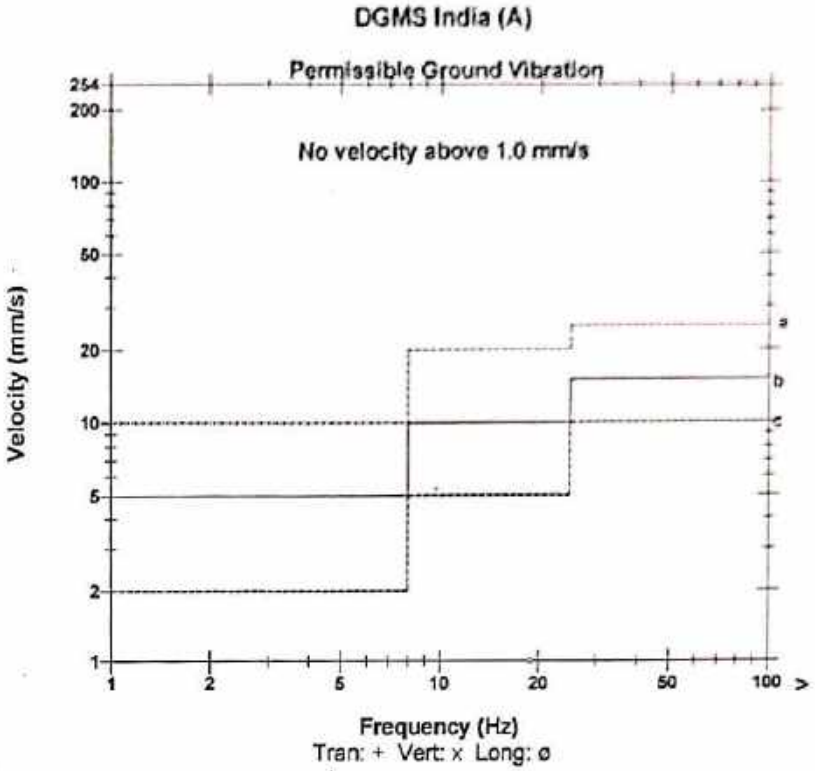
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

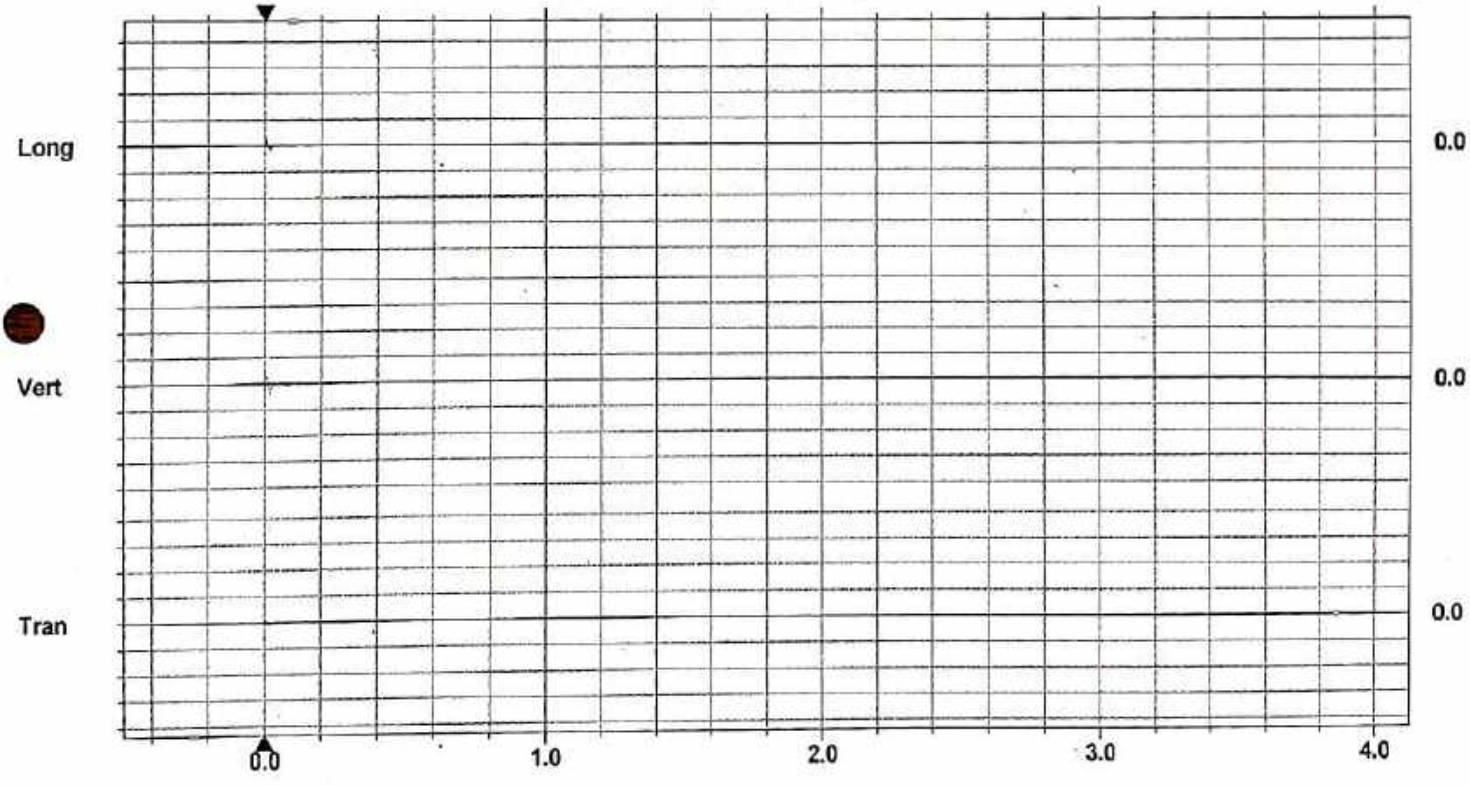
	Tran	**Vert**	**Long**	
PPV	0.236	0.828	0.615	mm/s
ZC Freq	54	38	79	Hz
Time (Rel. to Trig)	0.015	0.001	0.002	sec
Peak Acceleration	0.018	0.059	0.031	g
Peak Displacement	0.000	0.003	.0.001	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 0.978 mm/s at 0.001 sec

Serial Number	UM14894 V 10.90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Event Report Block - B(3)

Instantel

Date/Time	Vert at 13:54:35 February 5, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.016 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-00FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

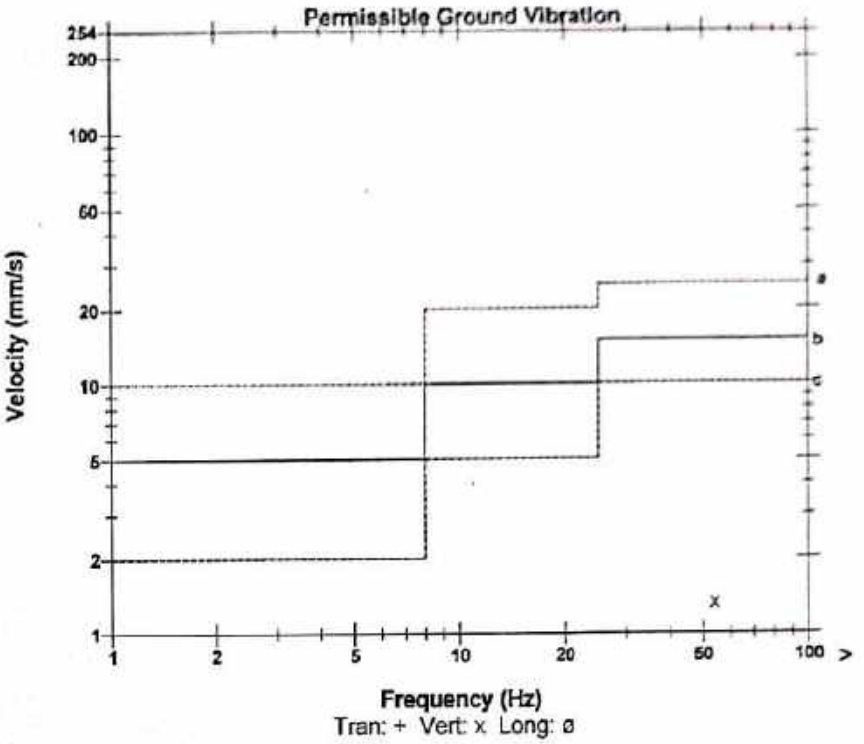
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.624 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

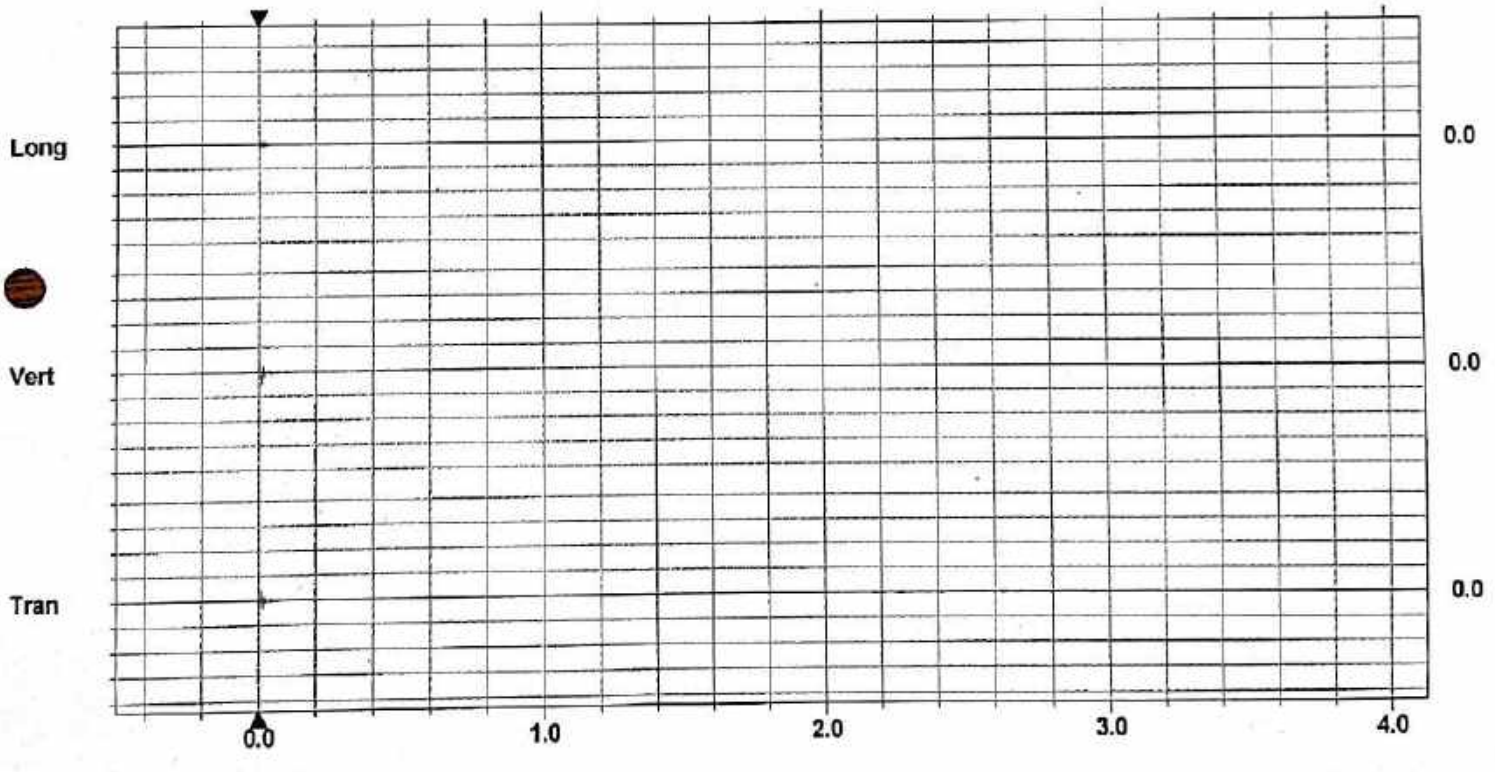
	Tran	**Vert**	**Long**	
PPV	0.883	1.340	0.567	mm/s
ZC Freq	85	54	>200	Hz
Time (Rel. to Trig)	0.011	0.001	0.002	sec
Peak Acceleration	0.059	0.133	0.081	g
Peak Displacement	0.002	0.002	0.000	mm
Sensor Check	Check	Check	Check	

Peak Vector Sum 1.506 mm/s at 0.001 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: February 6, 2025 (V 10.72 - 10.72)

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Instantel **Event Report** Block - D (2) Instantel

Date/Time	Vert at 13:53:49 February 5, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.008 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

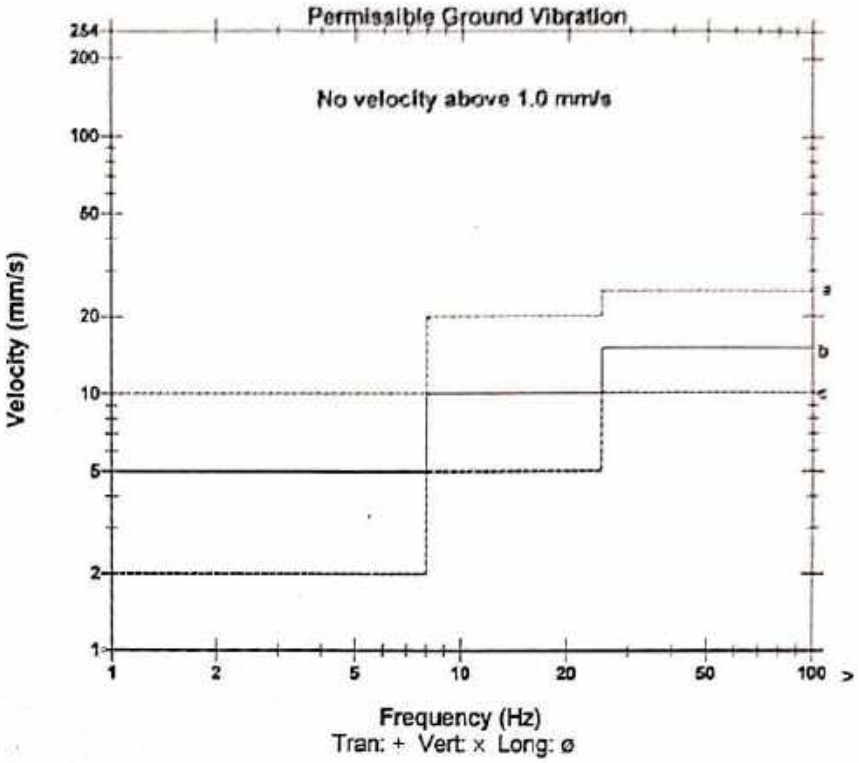
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

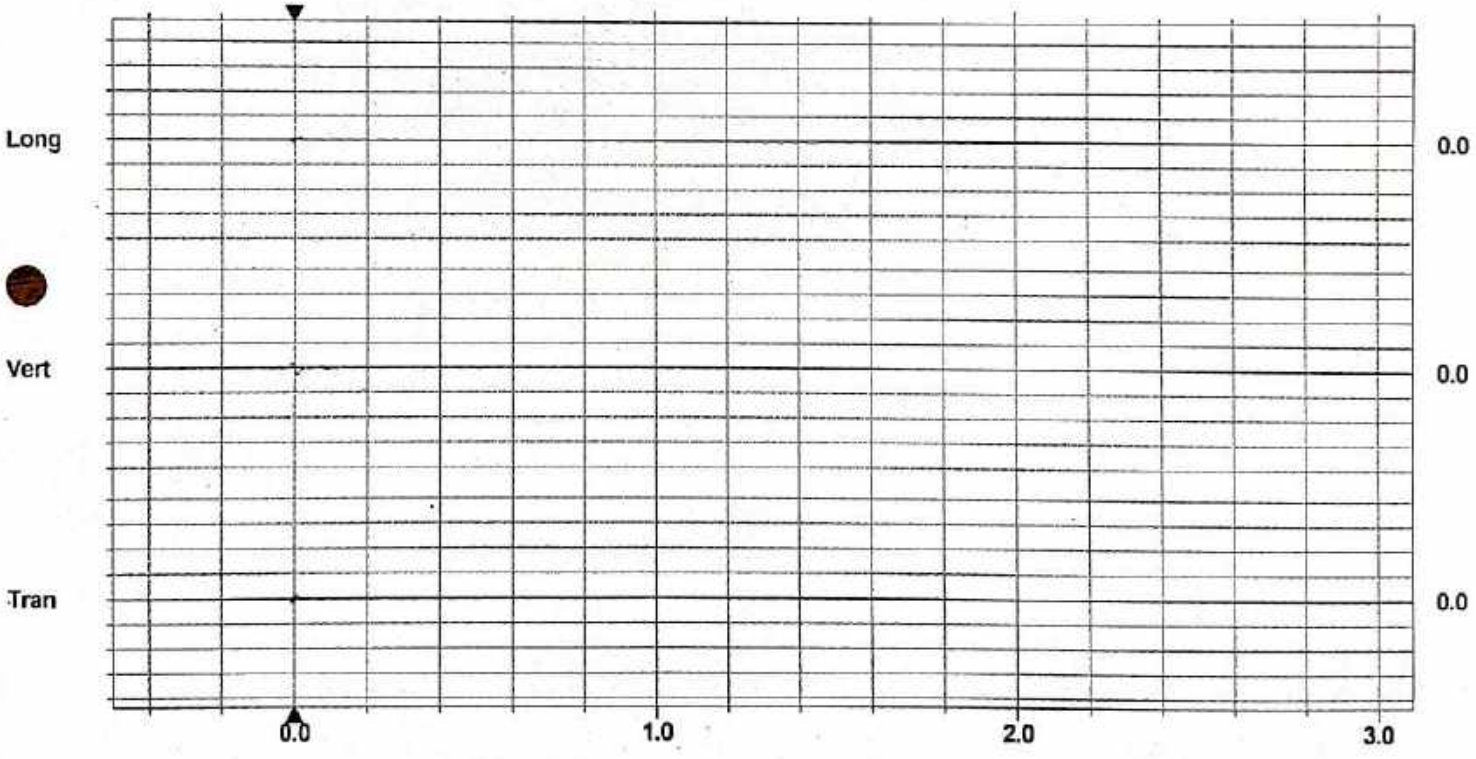
	Tran	Vert	Long	
PPV	0.339	0.528	0.244	mm/s
ZC Freq	68	24	49	Hz
Time (Rel. to Trig)	-0.006	0.007	-0.000	sec
Peak Acceleration	0.023	0.028	0.016	g
Peak Displacement	0.001	0.003	0.001	mm
Sensor Check	Check	Check	Check	

Peak Vector Sum 0.632 mm/s at 0.000 sec

DGMS India (A)



a) Industrial Buildings
b) Domestic houses/structures
c) Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

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Event Report Block-B①

Instantel

545

Date/Time	Vert at 13:50:23 February 5, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.079 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-60FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

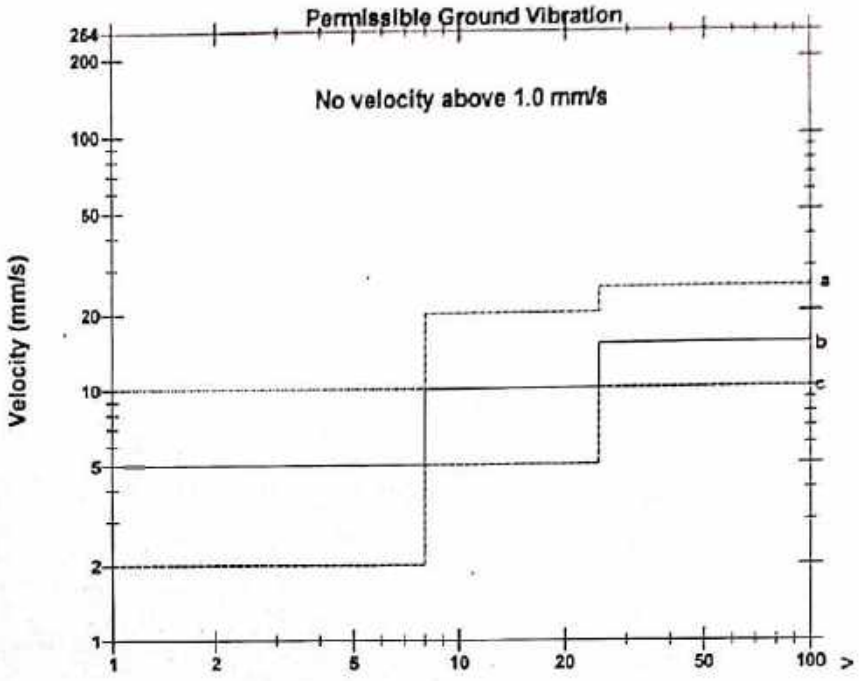
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	0.670	0.670	0.560	mm/s
ZC Freq	26	29	26	Hz
Time (Rel. to Trig)	0.058	0.053	0.065	sec
Peak Acceleration	0.015	0.016	0.016	g
Peak Displacement	0.004	0.004	0.004	mm
Sensor Check	Check	Check	Check	

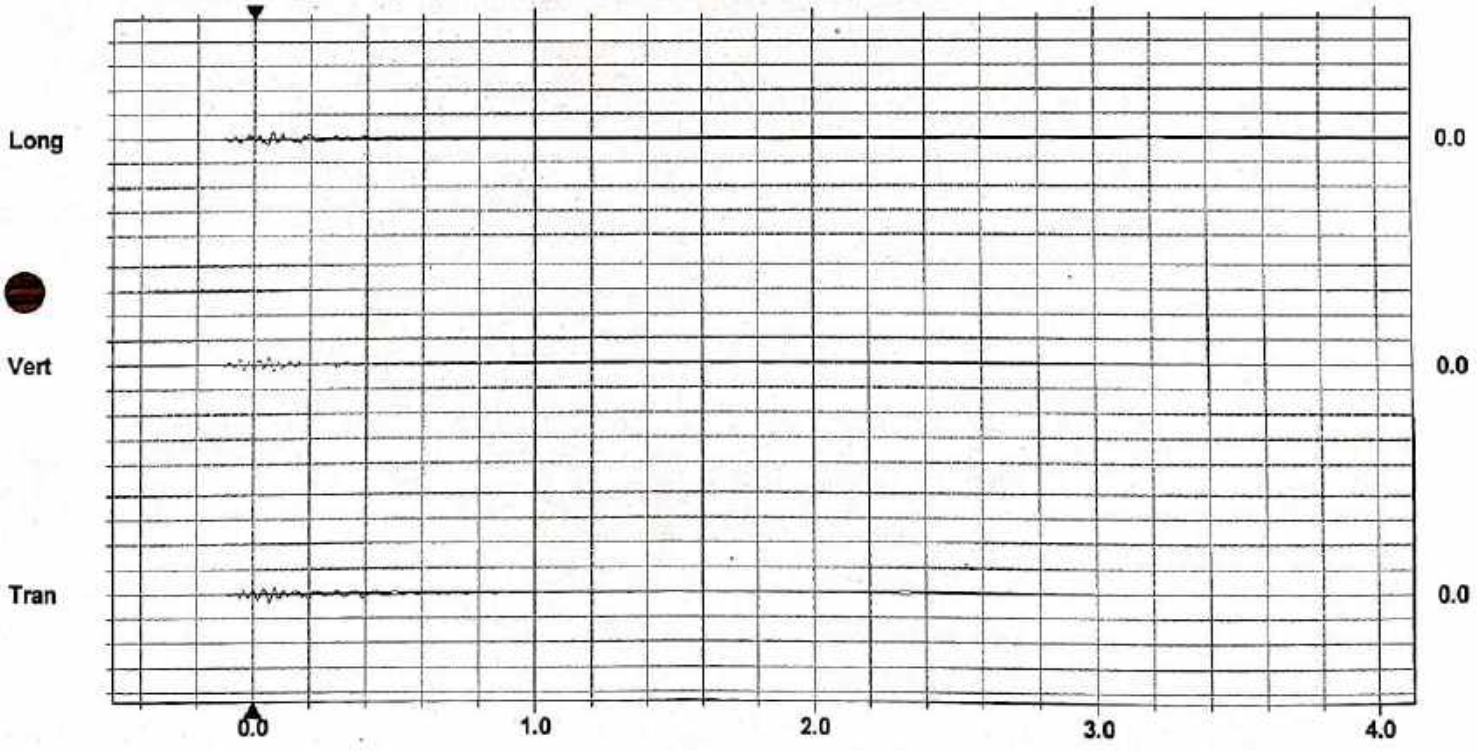
Peak Vector Sum 0.876 mm/s at 0.059 sec

DGMS India (A)



Frequency (Hz)
Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

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Event Report Block-B ③

Instantel

546

Date/Time	Vert at 13:42:57 February 6, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.017 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes

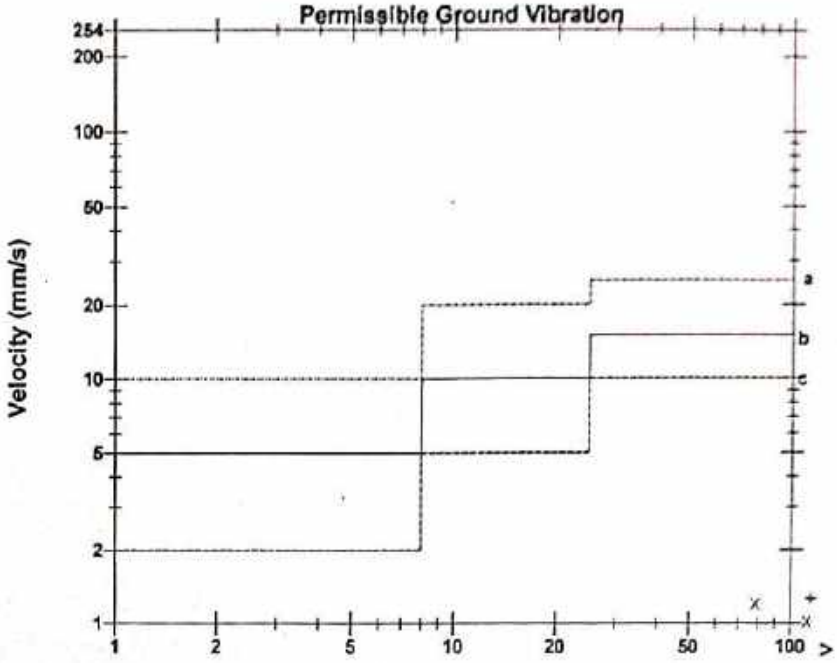
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	1.261	1.222	0.631	mm/s
ZC Freq	114	79	146	Hz
Time (Rel. to Trig)	0.006	0.002	0.006	sec
Peak Acceleration	0.097	0.138	0.059	g
Peak Displacement	0.002	0.003	0.001	mm
Sensor Check	Passed	Passed	Passed	

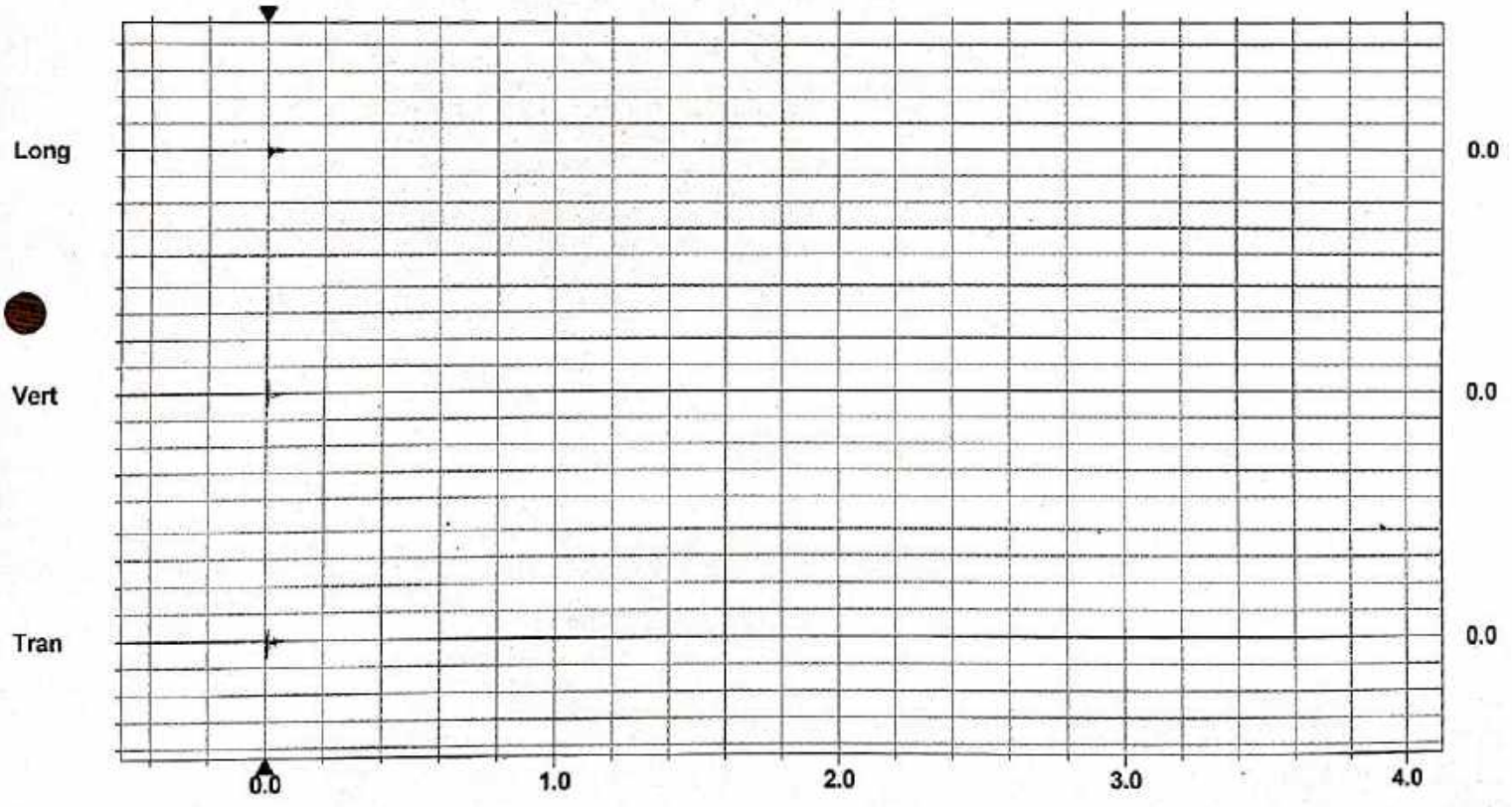
Peak Vector Sum 1.678 mm/s at 0.006 sec

DGMS India (A)

Permissible Ground Vibration



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Instantel

Event Report

Block - B(2)

Instantel

547

Date/Time	Tran at 13:42:45 February 6, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.773 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

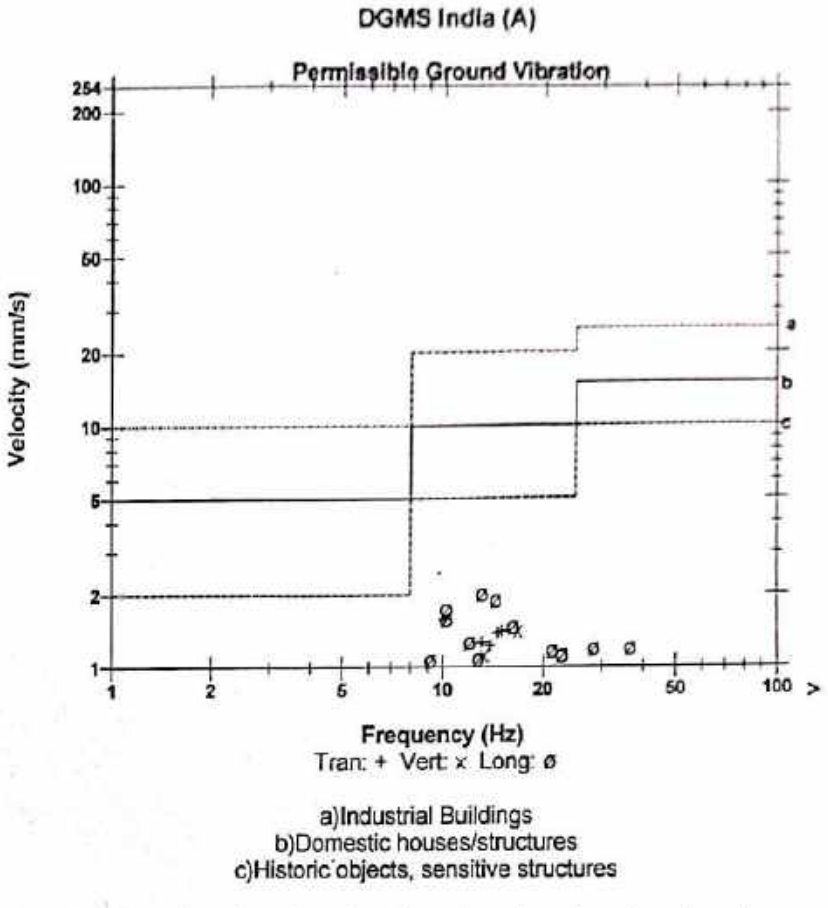
Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

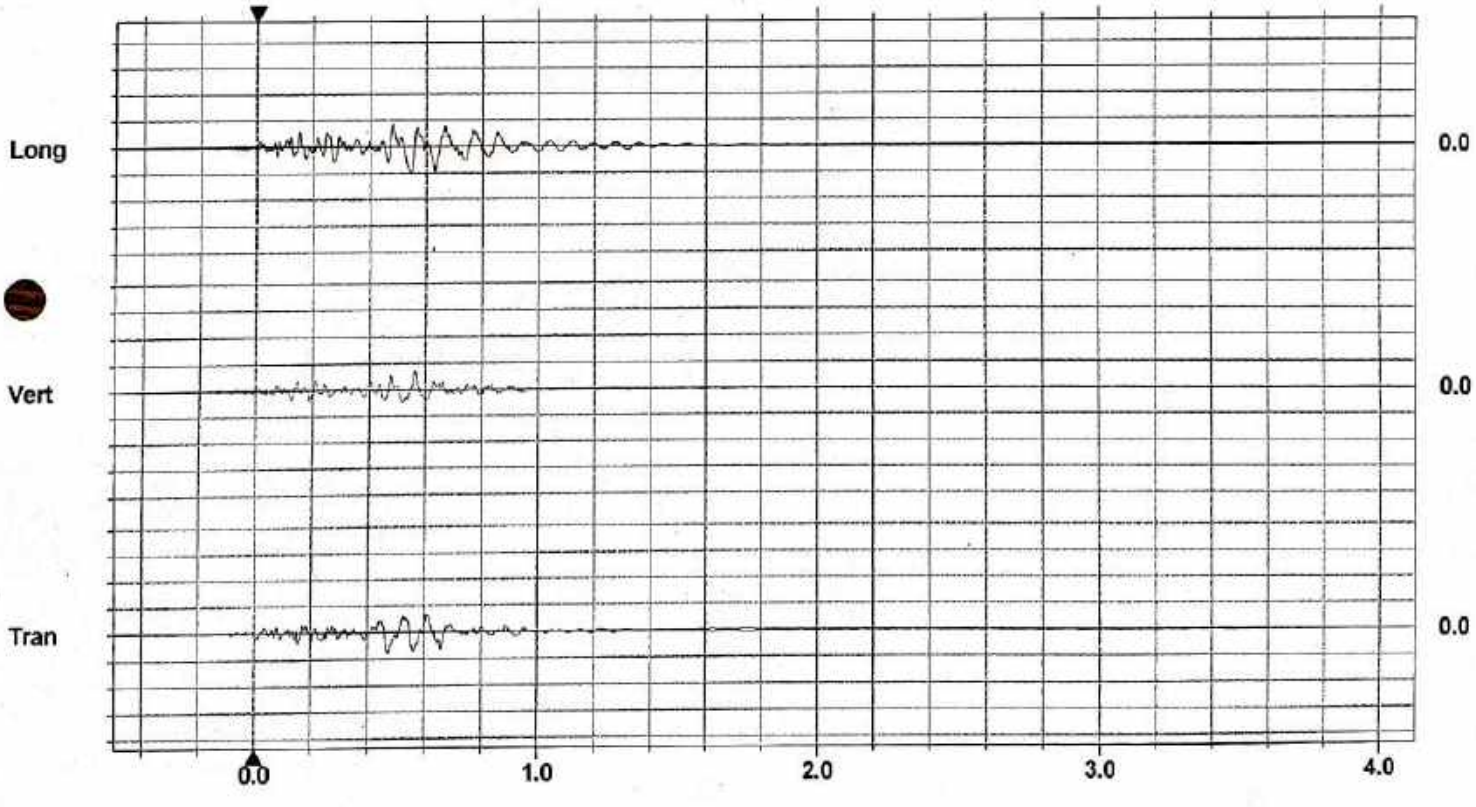
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	1.576	1.419	2.010	mm/s
ZC Freq	10.1	16.8	13.1	Hz
Time (Rel. to Trig)	0.472	0.562	0.543	sec
Peak Acceleration	0.036	0.026	0.036	g
Peak Displacement	0.017	0.011	0.025	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.308 mm/s at 0.564 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: February 7, 2025 (V 10.72 - 10.72)

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Instantel Event Report BIOCA-BD Instantel

Date/Time	Vert at 13:42:22 February 6, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.168 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 28, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

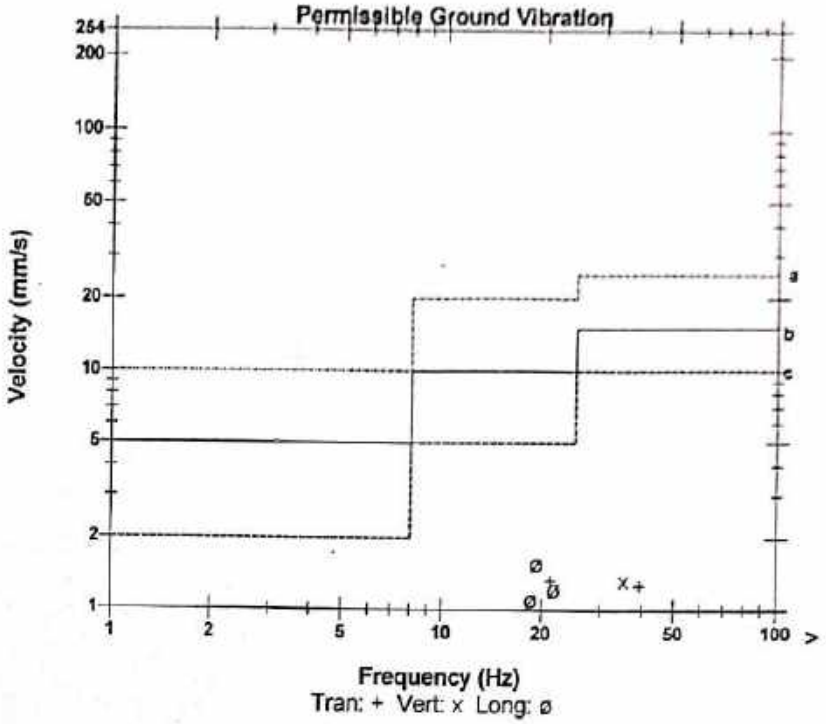
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

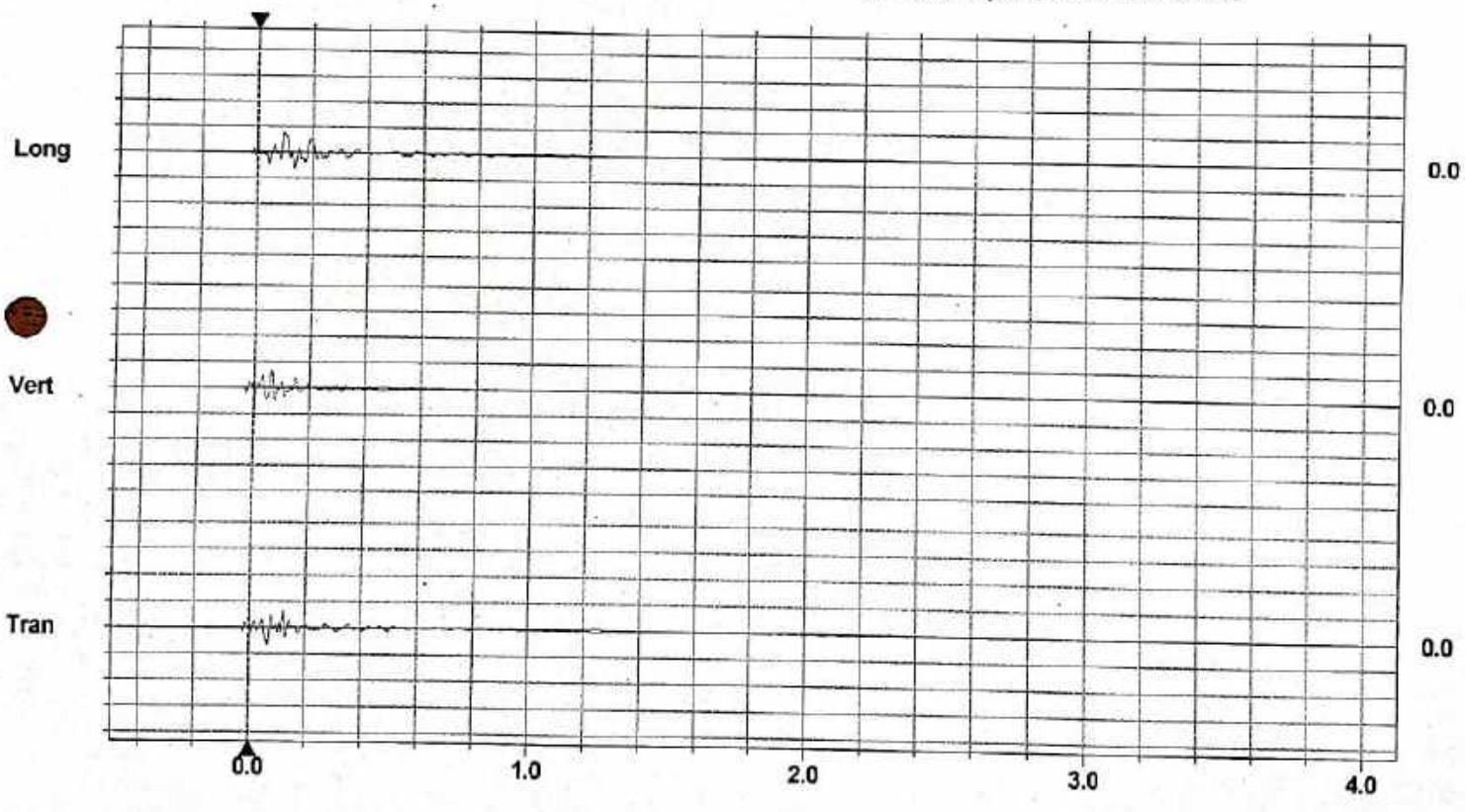
	Tran	Vert	Long	
PPV	1.316	1.332	1.561	mm/s
ZC Freq	21	35	19.3	Hz
Time (Rel. to Trig)	0.066	0.062	0.096	sec
Peak Acceleration	0.038	0.035	0.035	g
Peak Displacement	0.009	0.006	0.014	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.696 mm/s at 0.061 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div
Trigger = ▶——◀

Printed: February 7, 2025 (V 10.72 - 10.72)

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Event Report Blast - B-(9)

Instantel

Date/Time	Vert at 14:04:12 February 7, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.237 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

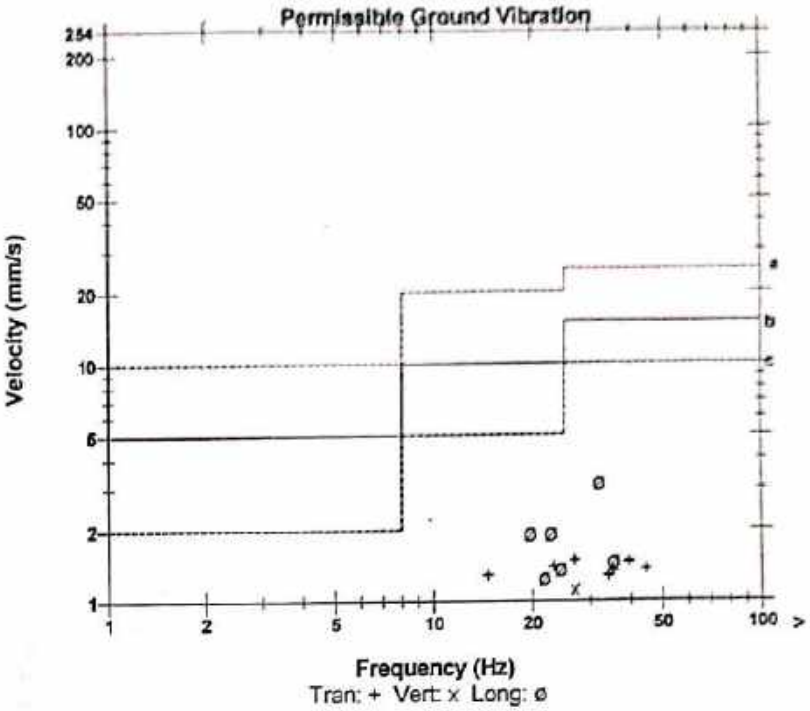
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	1.474	1.119	3.145	mm/s
ZC Freq	27	27	32	Hz
Time (Rel. to Trig)	0.049	0.033	0.073	sec
Peak Acceleration	0.046	0.041	0.072	g
Peak Displacement	0.009	0.006	0.015	mm
Sensor Check	Passed	Passed	Passed	

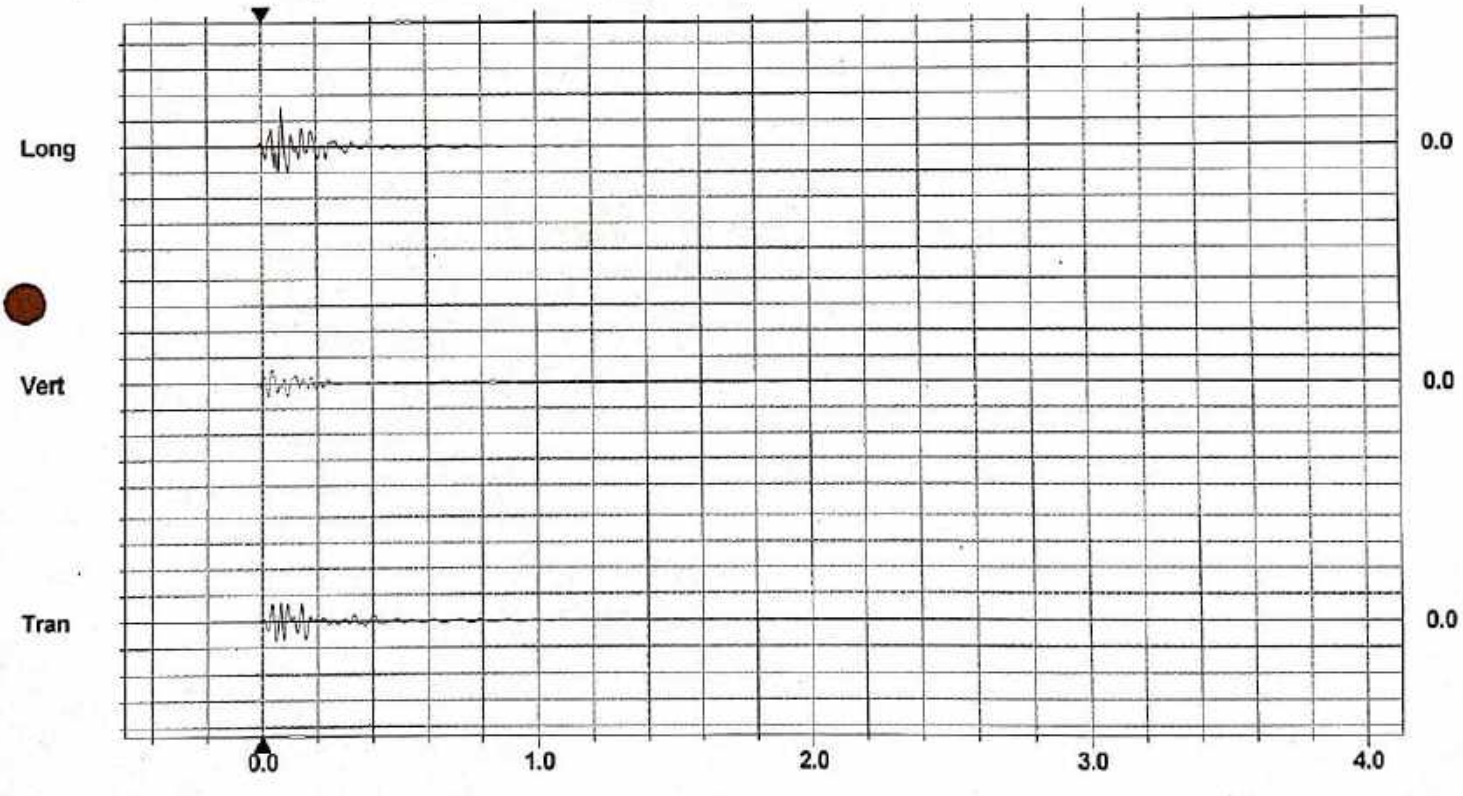
Peak Vector Sum 3.150 mm/s at 0.073 sec

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	_TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: February 8, 2025 (V 10.72 - 10.72)

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Instantel **Event Report** Block - B (3) Instante

550

Date/Time	Long at 14:01:40 February 7, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.132 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

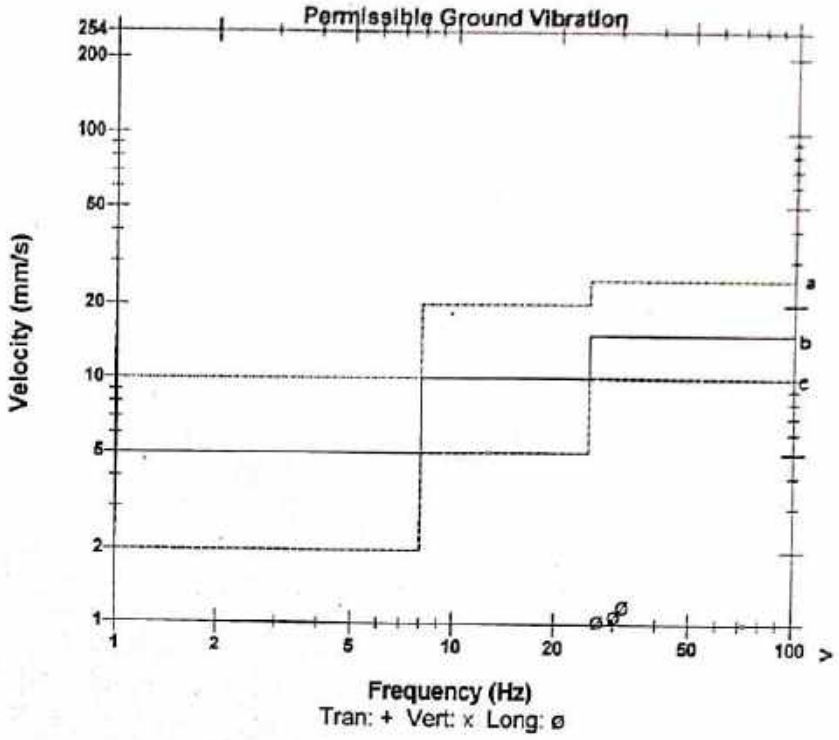
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

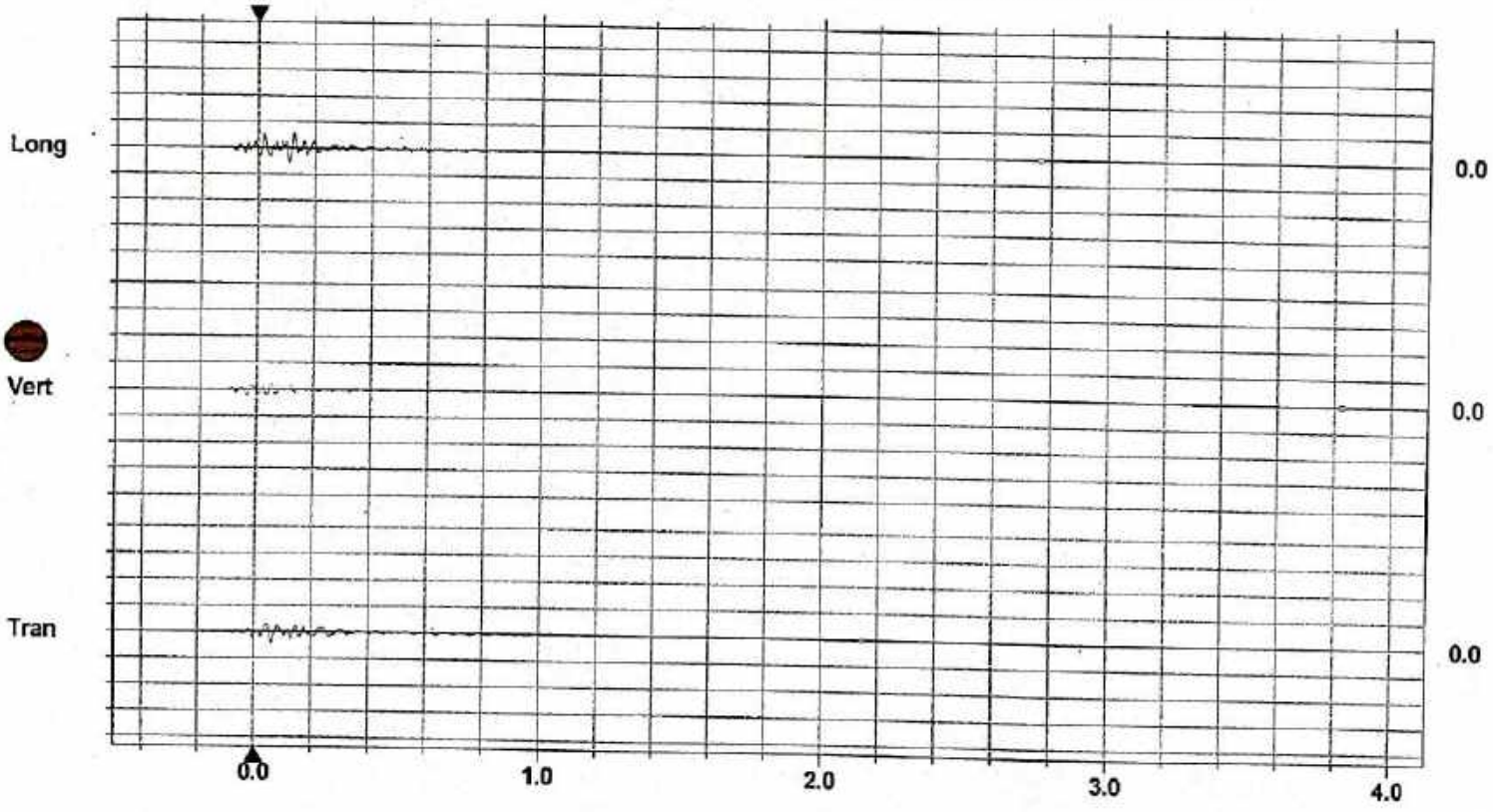
	Tran	Vert	Long	
PPV	0.812	0.418	1.198	mm/s
ZC Freq	22	29	32	Hz
Time (Rel. to Trig)	0.063	-0.035	0.127	sec
Peak Acceleration	0.016	0.013	0.041	g
Peak Displacement	0.005	0.003	0.006	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.263 mm/s at 0.127 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: February 8, 2025 (V 10.72 - 10.72)

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Instantel

Event Report BLOCK - B(2)

551

Instantel

Date/Time	Long at 13:59:42 February 7, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.159 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

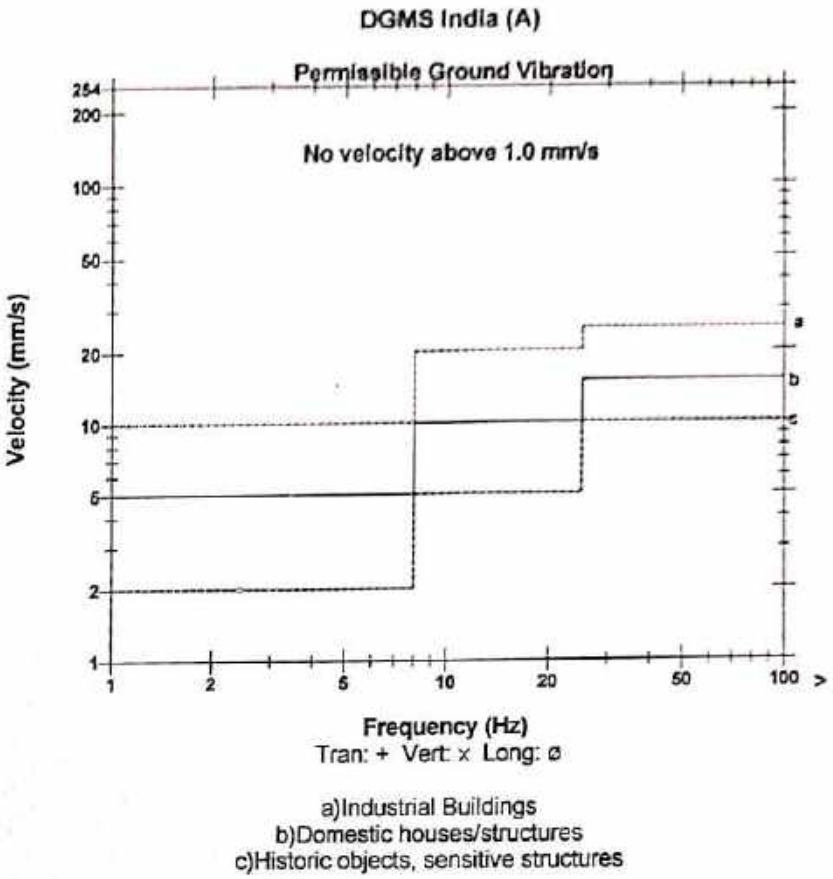
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

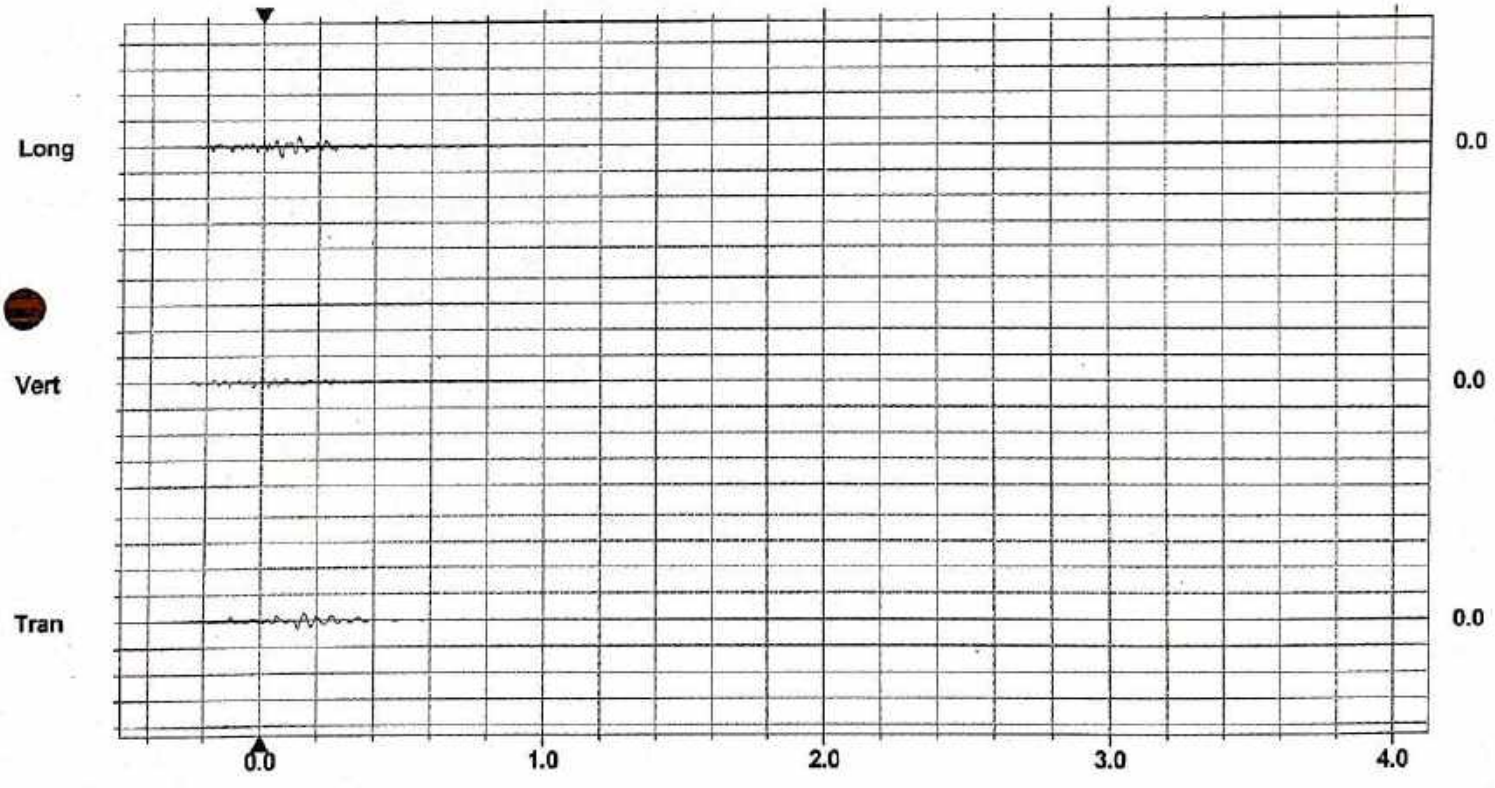
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	0.646	0.378	0.828	mm/s
ZC Freq	17.1	33	24	Hz
Time (Rel. to Trig)	0.132	-0.032	0.065	sec
Peak Acceleration	0.015	0.012	0.020	g
Peak Displacement	0.005	0.002	0.005	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 0.870 mm/s at 0.065 sec

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

Printed: February 8, 2025 (V 10.72 - 10.72)

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Instantel **Event Report** BLOCK-B0 Instantel

Date/Time	Vert at 13:51:43 February 7, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.375 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

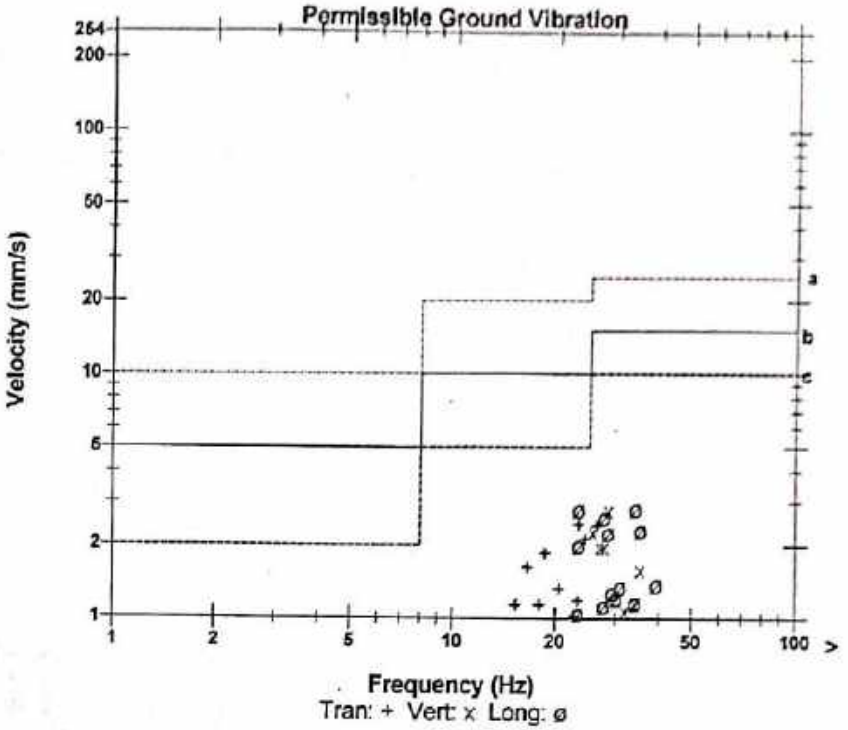
	Tran	**Vert**	**Long**	
PPV	2.428	2.782	2.822	mm/s
ZC Freq	23	28	34	Hz
Time (Rel. to Trig)	0.180	0.084	0.164	sec
Peak Acceleration	0.079	0.056	0.072	g
Peak Displacement	0.020	0.015	0.018	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 3.752 mm/s at 0.149 sec

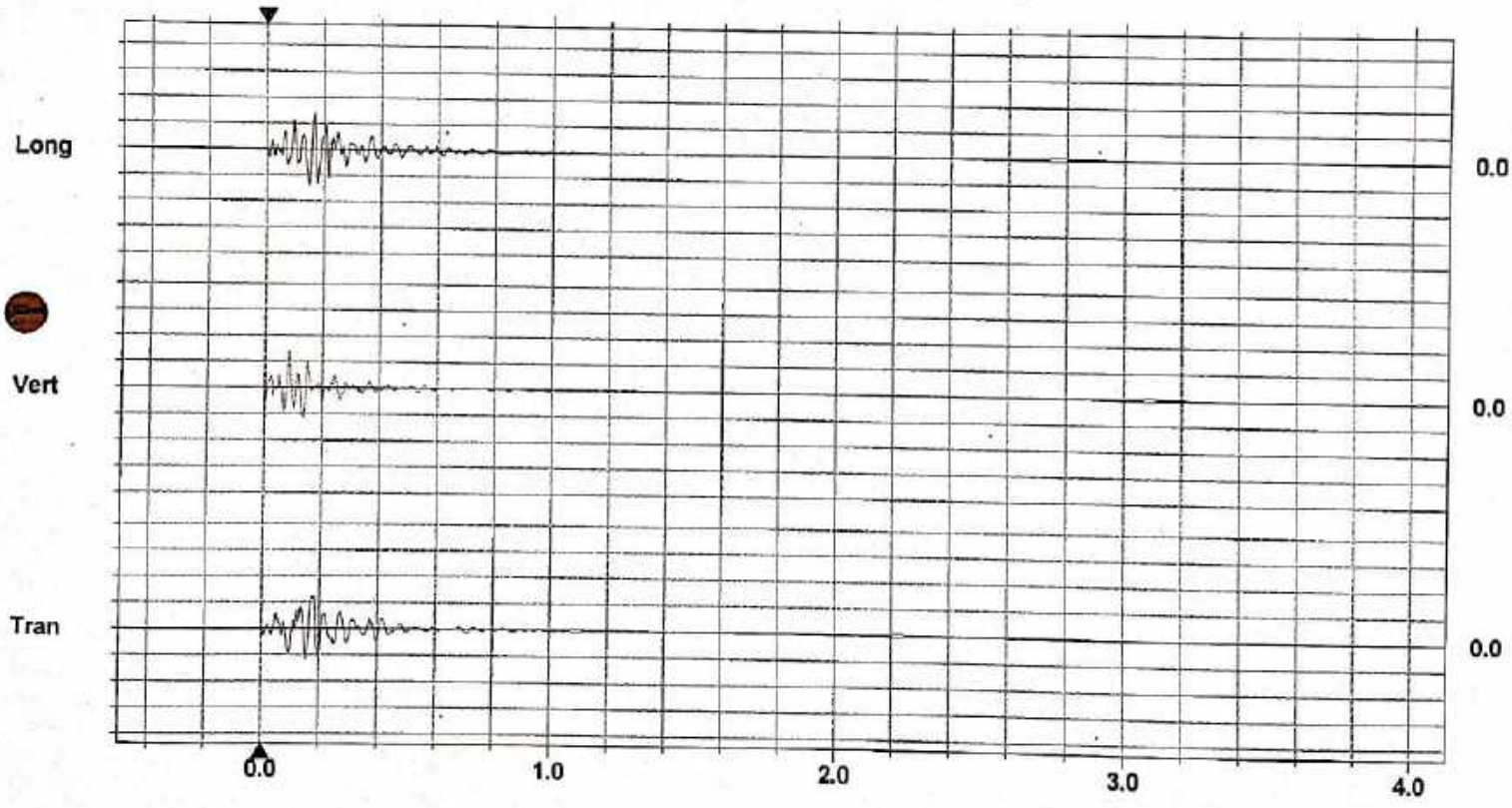
Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

DGMS India (A)

Permissible Ground Vibration



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: February 8, 2026 (V 10.72 - 10.72)

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Instantel

Event Report BLOCK-B(4)

Instantel

553

Date/Time	Vert at 14:00:21 February 8, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.337 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

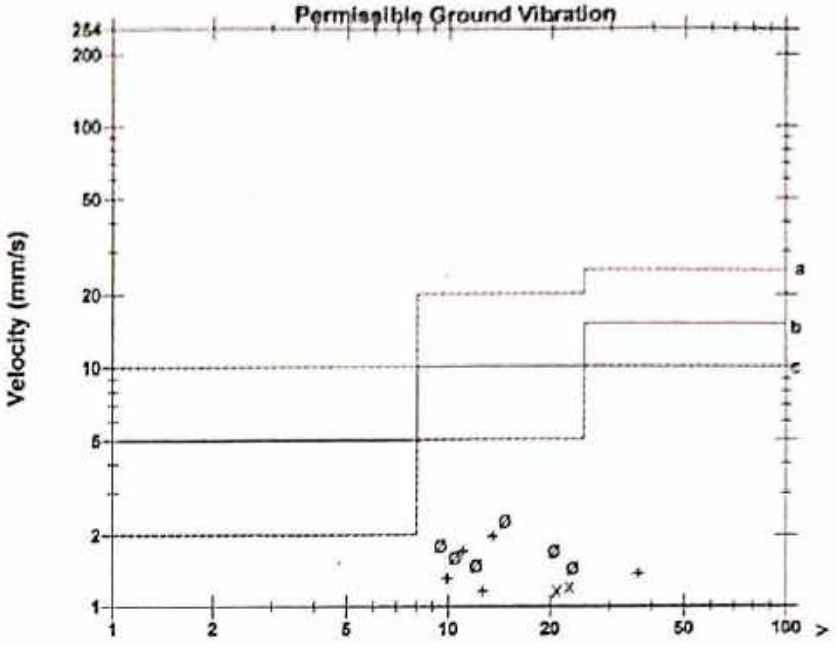
Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

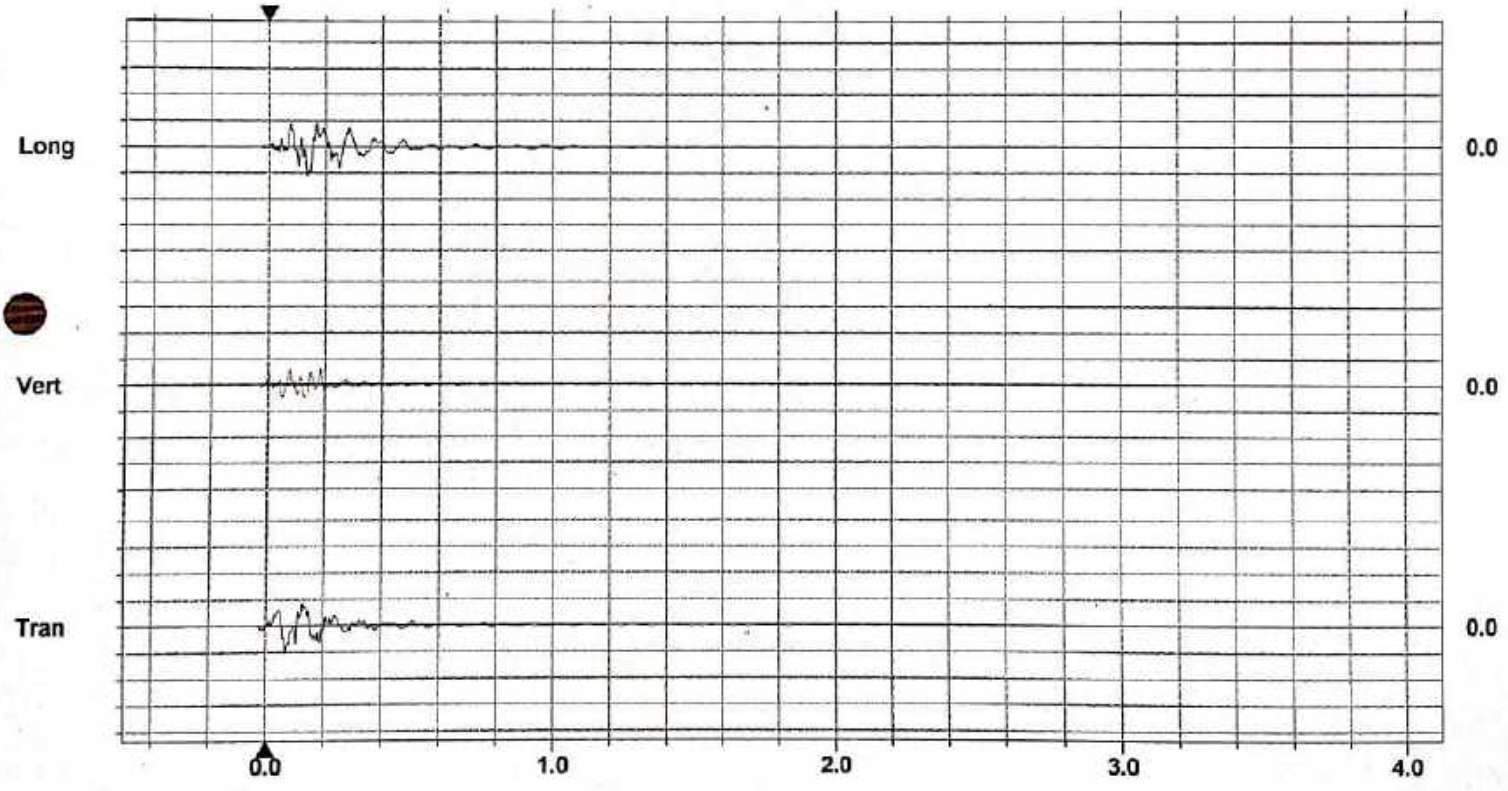
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	1.963	1.214	2.301	mm/s
ZC Freq	13.5	23	14.6	Hz
Time (Rel. to Trig)	0.067	0.184	0.134	sec
Peak Acceleration	0.059	0.033	0.046	g
Peak Displacement	0.023	0.008	0.025	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.843 mm/s at 0.133 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Instantel Event Report BLOCK-B ② Instantel

Date/Time	Long at 13:51:12 February 8, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.375 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

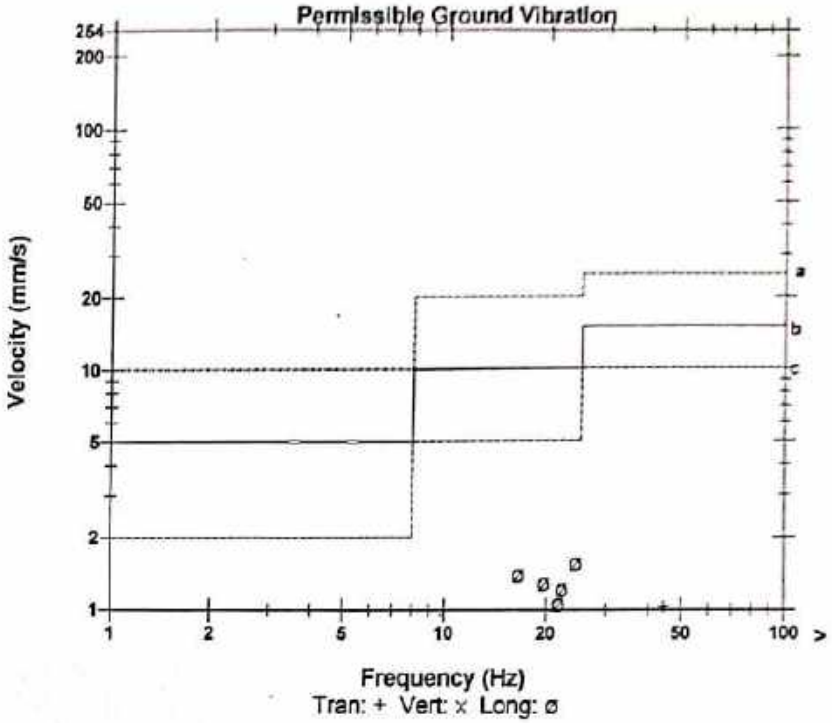
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	1.025	0.938	1.561	mm/s
ZC Freq	45	30	24	Hz
Time (Rel. to Trig)	0.121	0.114	0.061	sec
Peak Acceleration	0.036	0.025	0.041	g
Peak Displacement	0.004	0.005	0.010	mm
Sensor Check	Passed	Passed	Passed	

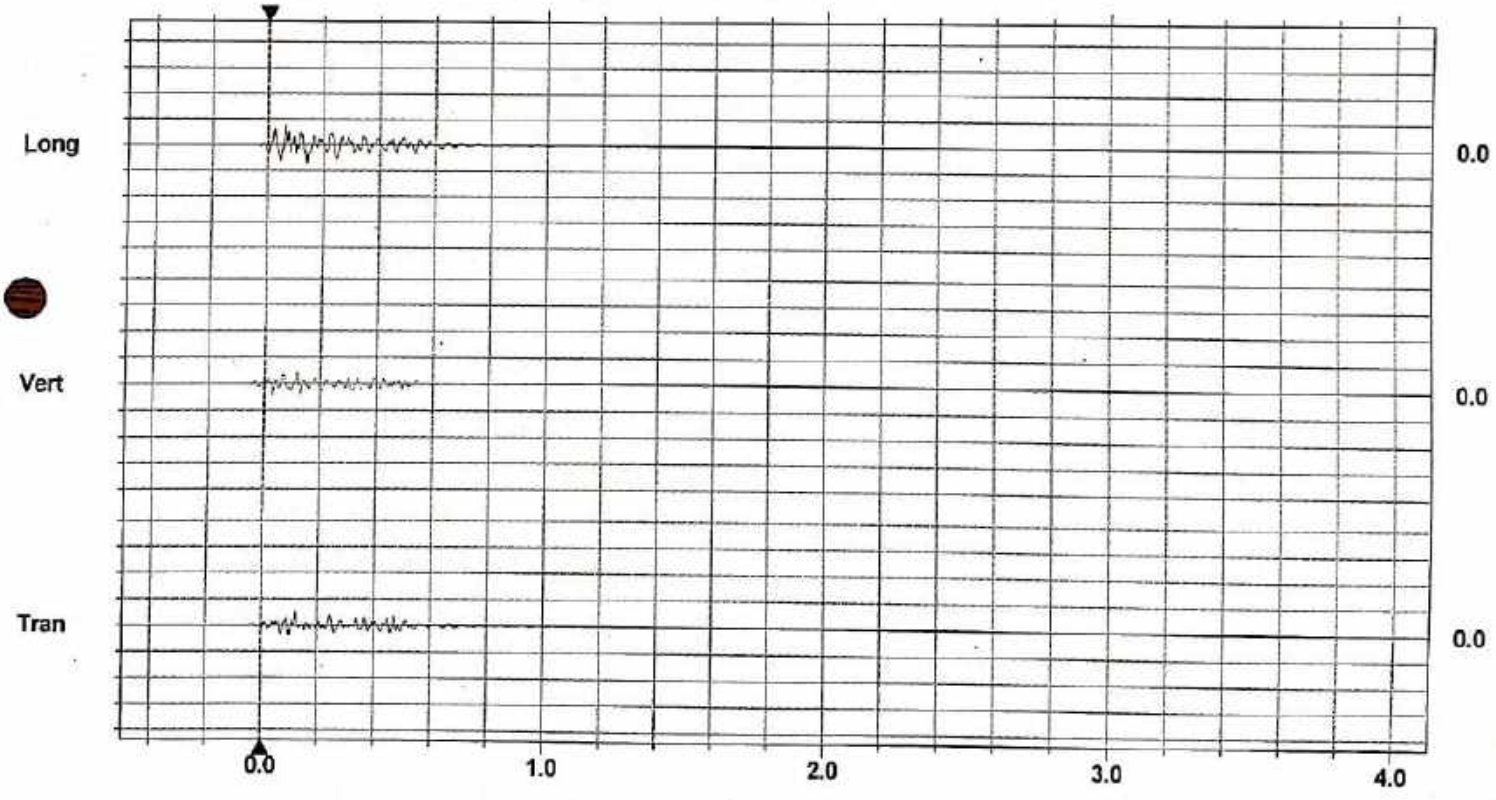
Peak Vector Sum 1.622 mm/s at 0.062 sec

DGMS India (A)



Frequency (Hz)
Tran: + Vert: × Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: February 9, 2025 (V 10.72 - 10.72)

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Date/Time	Tran at 13:48:09 February 8, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.012 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

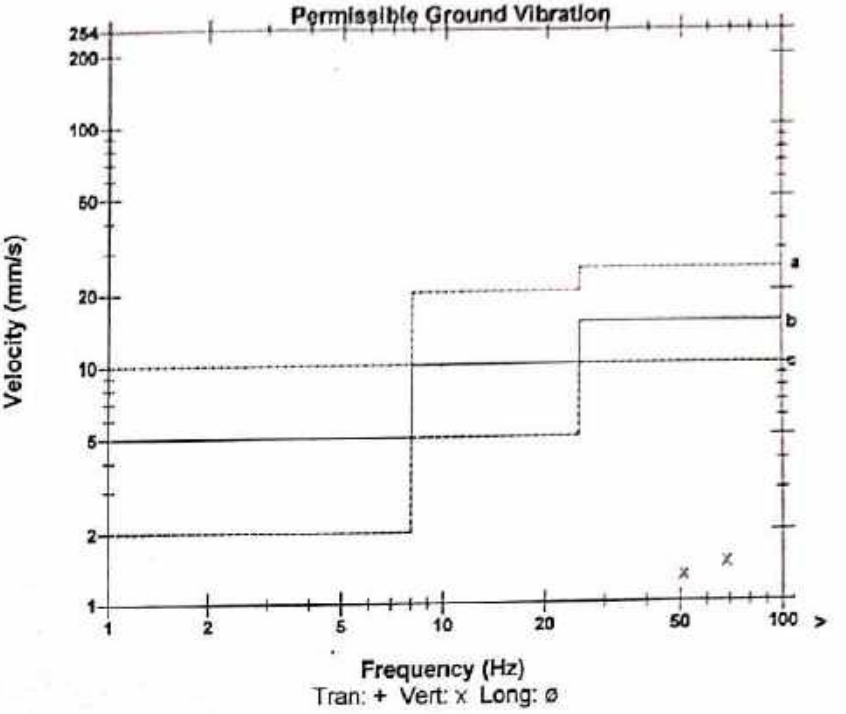
Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

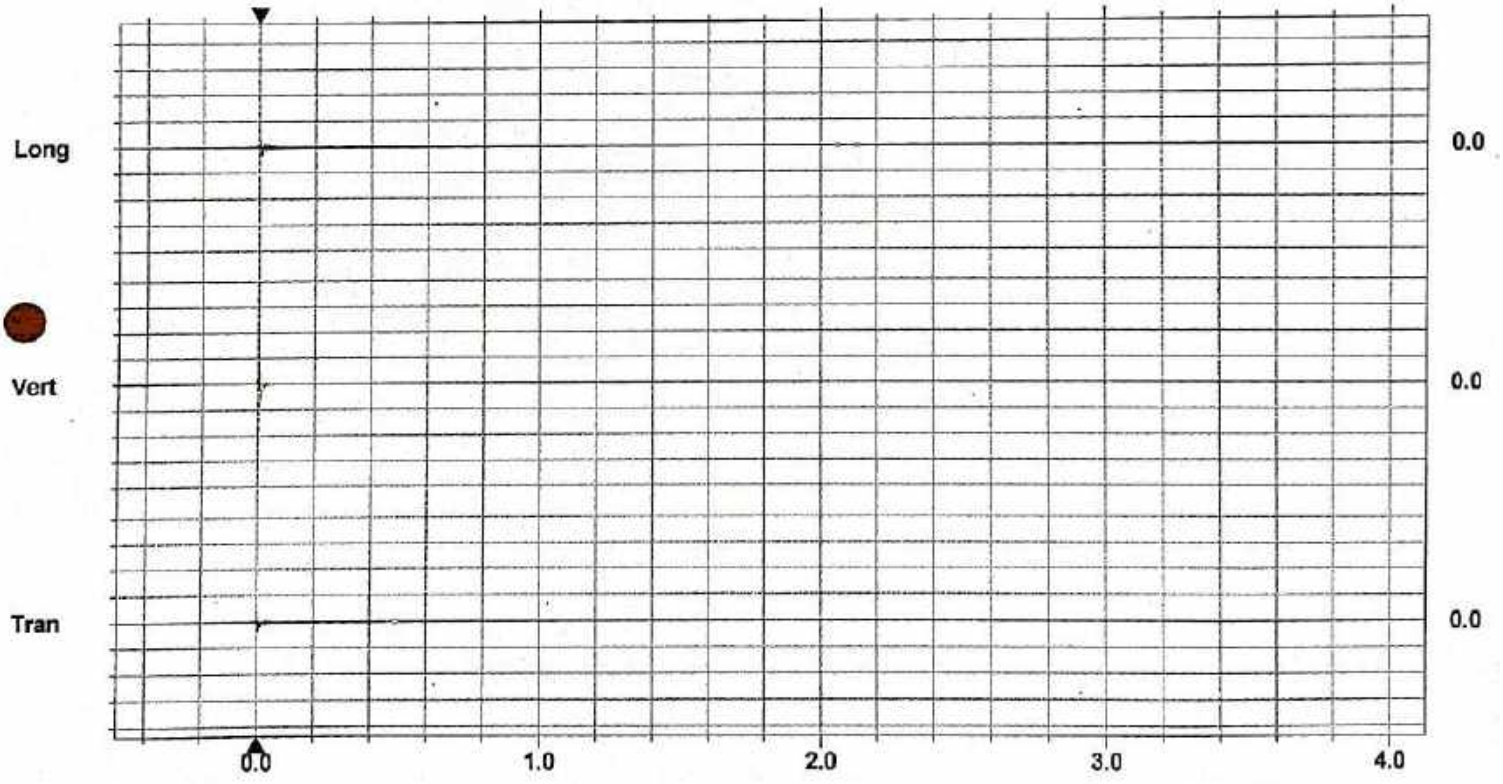
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.946	1.482	0.654	mm/s
ZC Freq	93	68	68	Hz
Time (Rel. to Trig)	0.001	0.001	0.008	sec
Peak Acceleration	0.061	0.097	0.039	g
Peak Displacement	0.001	0.003	0.002	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.829 mm/s at 0.001 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

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Date/Time	Long at 13:43:36 February 8, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.183 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

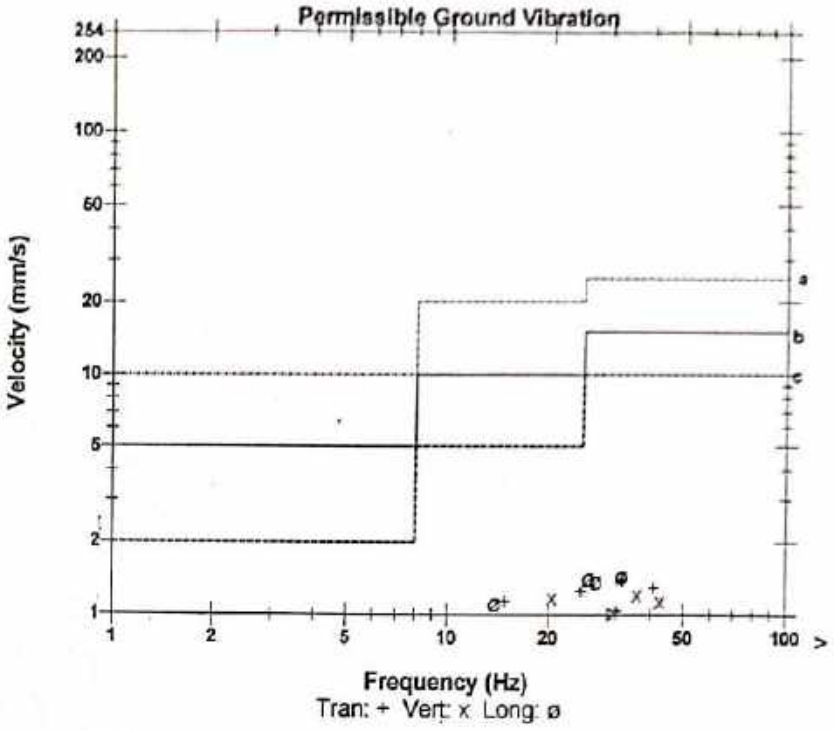
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes

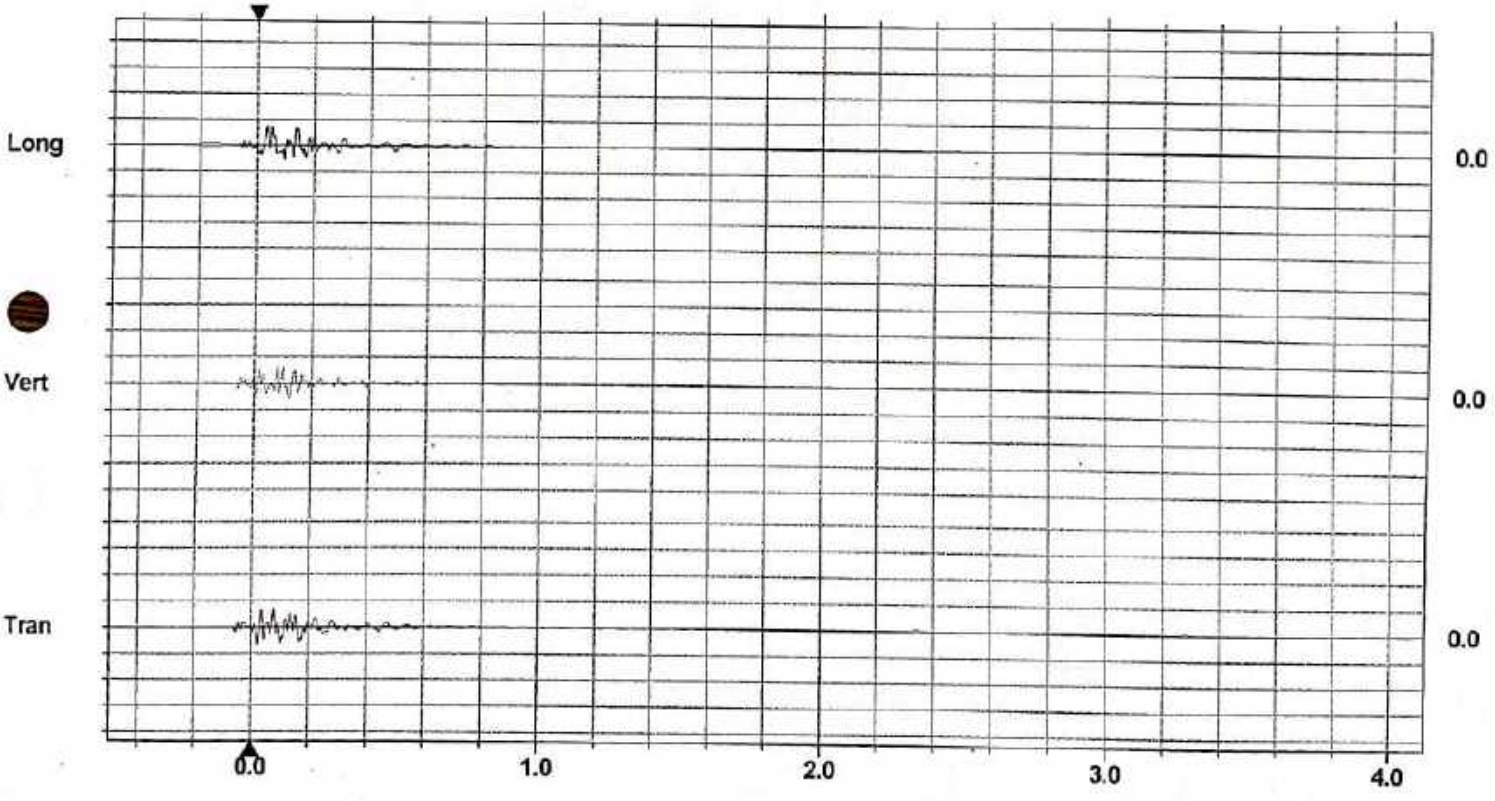
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	1.403	1.222	1.450	mm/s
ZC Freq	33	37	33	Hz
Time (Rel. to Trig)	0.022	0.100	0.034	sec
Peak Acceleration	0.041	0.038	0.043	g
Peak Displacement	0.008	0.008	0.010	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.946 mm/s at 0.034 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Instantel **Event Report** Block - B(5) Instantel

557

Date/Time	Vert at 14:47:17 February 9, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	2.75 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

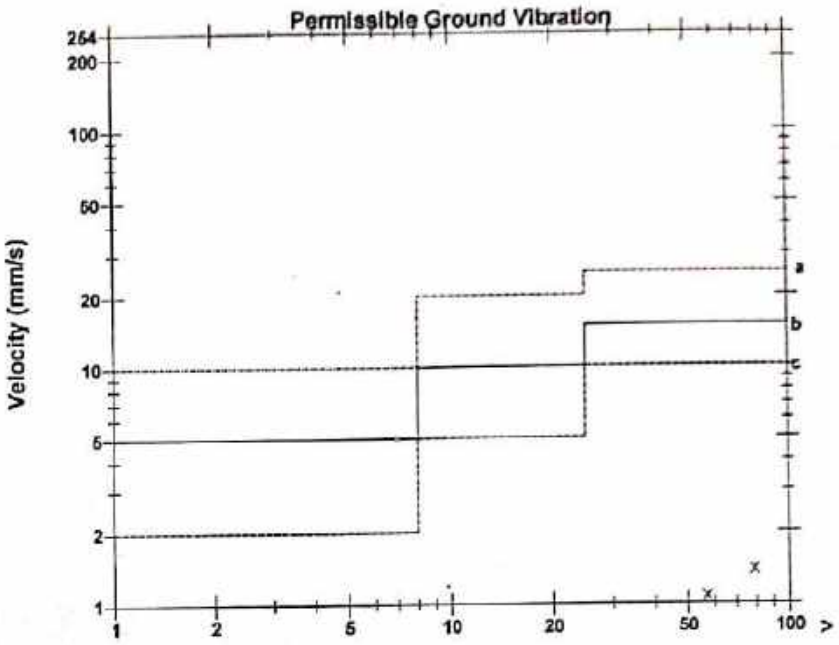
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

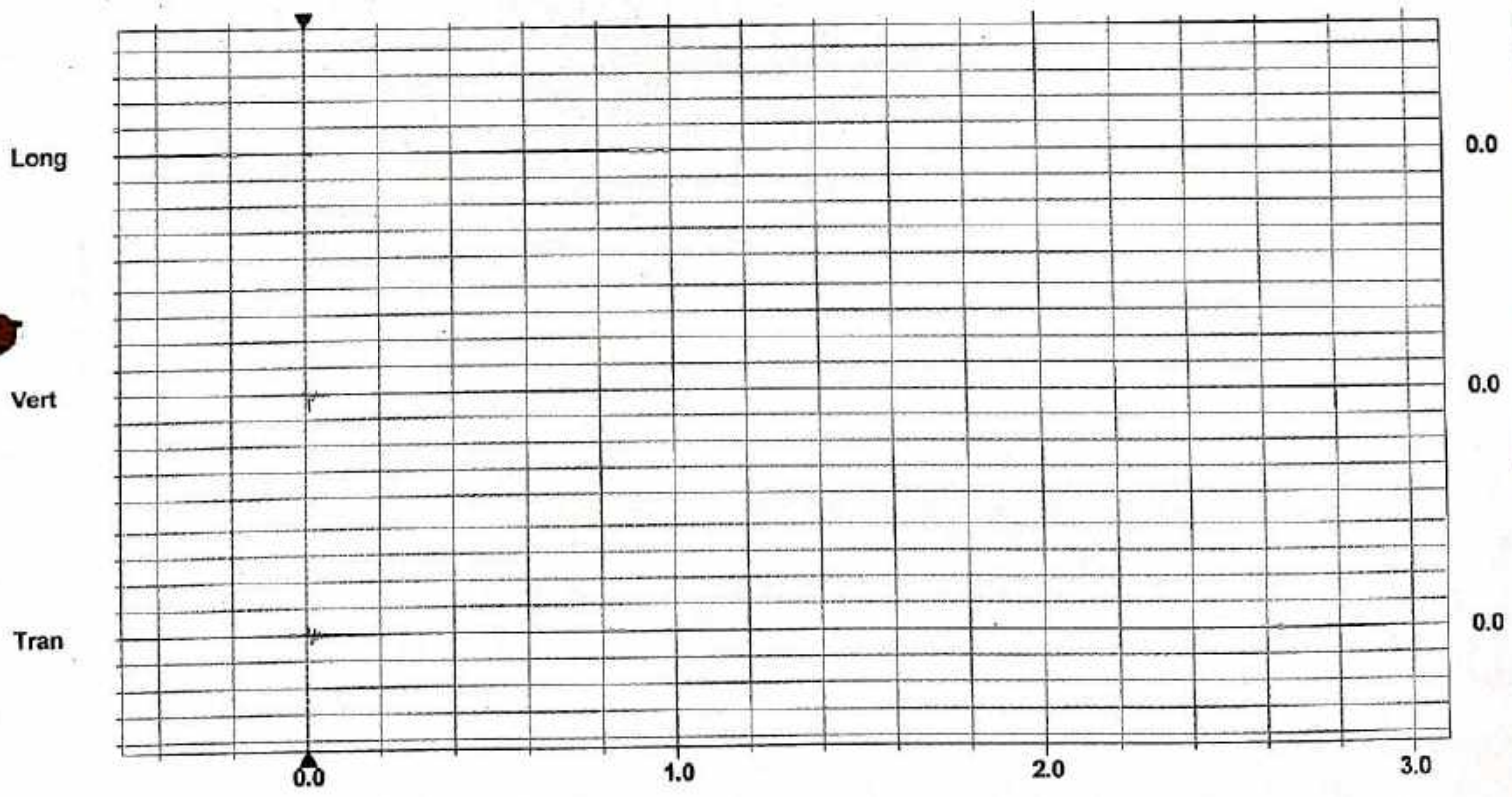
	Tran	**Vert**	**Long**	
PPV	0.694	1.403	0.158	mm/s
ZC Freq	51	79	114	Hz
Time (Rel. to Trig)	0.013	0.009	0.016	sec
Peak Acceleration	0.038	0.092	0.018	g
Peak Displacement	0.002	0.002	0.000	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.549 mm/s at 0.009 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: February 10, 2025 (V 10.72 - 10.72)

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Date/Time	Vert at 14:42:09 February 9, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.022 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Last Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

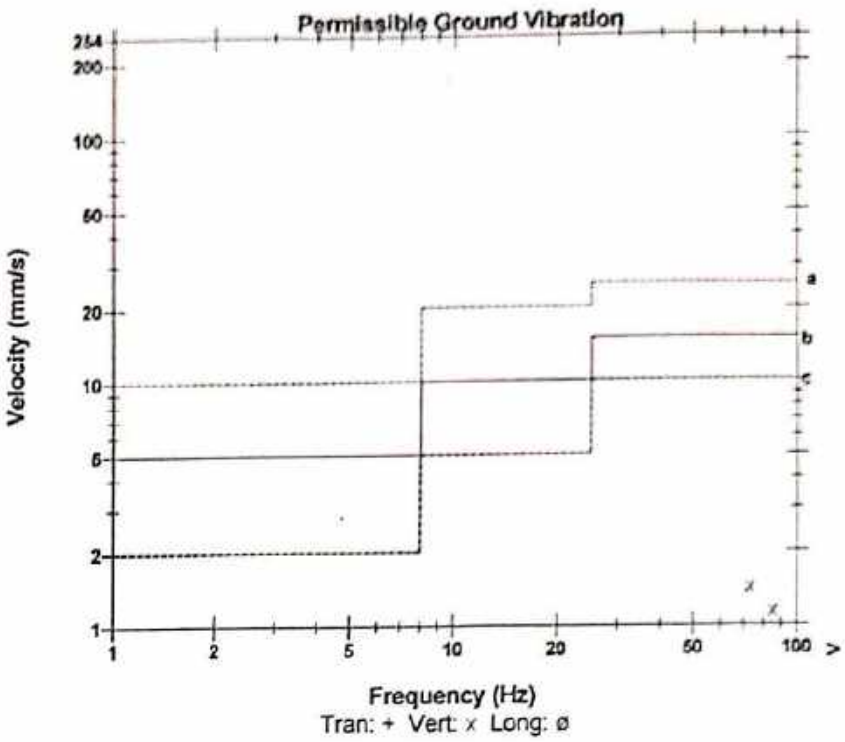
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

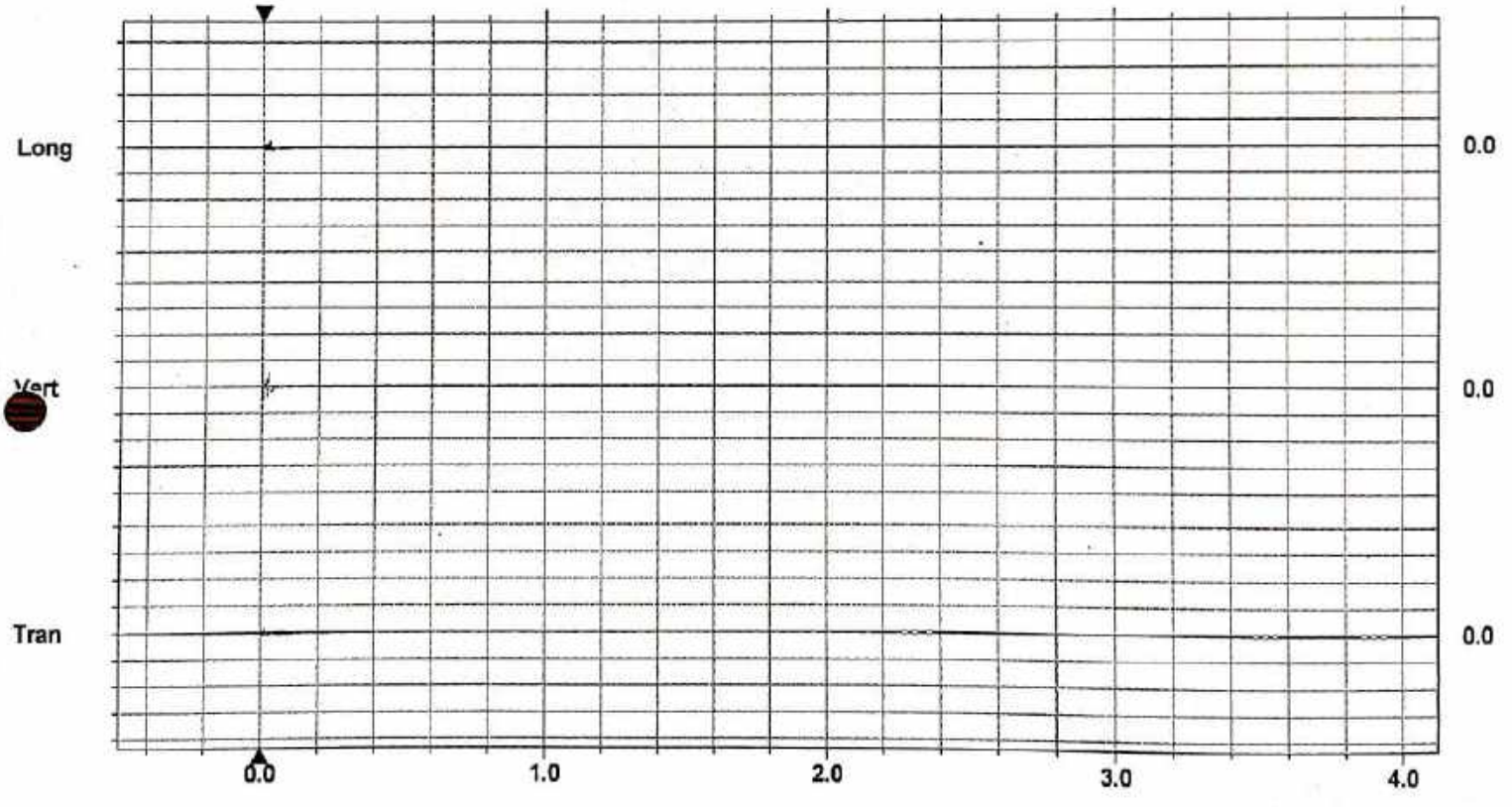
	Tran	Vert	Long	
PPV	0.378	1.427	0.489	mm/s
ZC Freq	93	73	128	Hz
Time (Rel. to Trig)	0.001	0.001	0.021	sec
Peak Acceleration	0.035	0.165	0.036	g
Peak Displacement	0.001	0.002	0.001	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.467 mm/s at 0.001 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: February 10, 2025 (V 10.72 - 10.72)
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Instantel **Event Report** Block - B(3) Instantel

Date/Time	Vert at 14:36:09 February 9, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.029 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

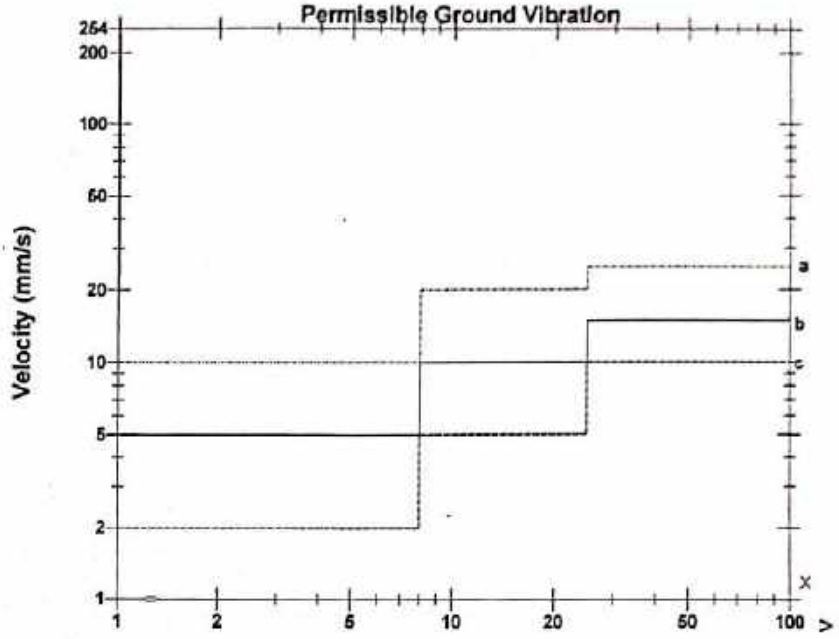
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.536	1.206	0.765	mm/s
ZC Freq	128	114	128	Hz
Time (Rel. to Trig)	0.022	0.018	0.019	sec
Peak Acceleration	0.043	0.109	0.058	g
Peak Displacement	0.001	0.002	0.001	mm
Sensor Check	Passed	Passed	Passed	

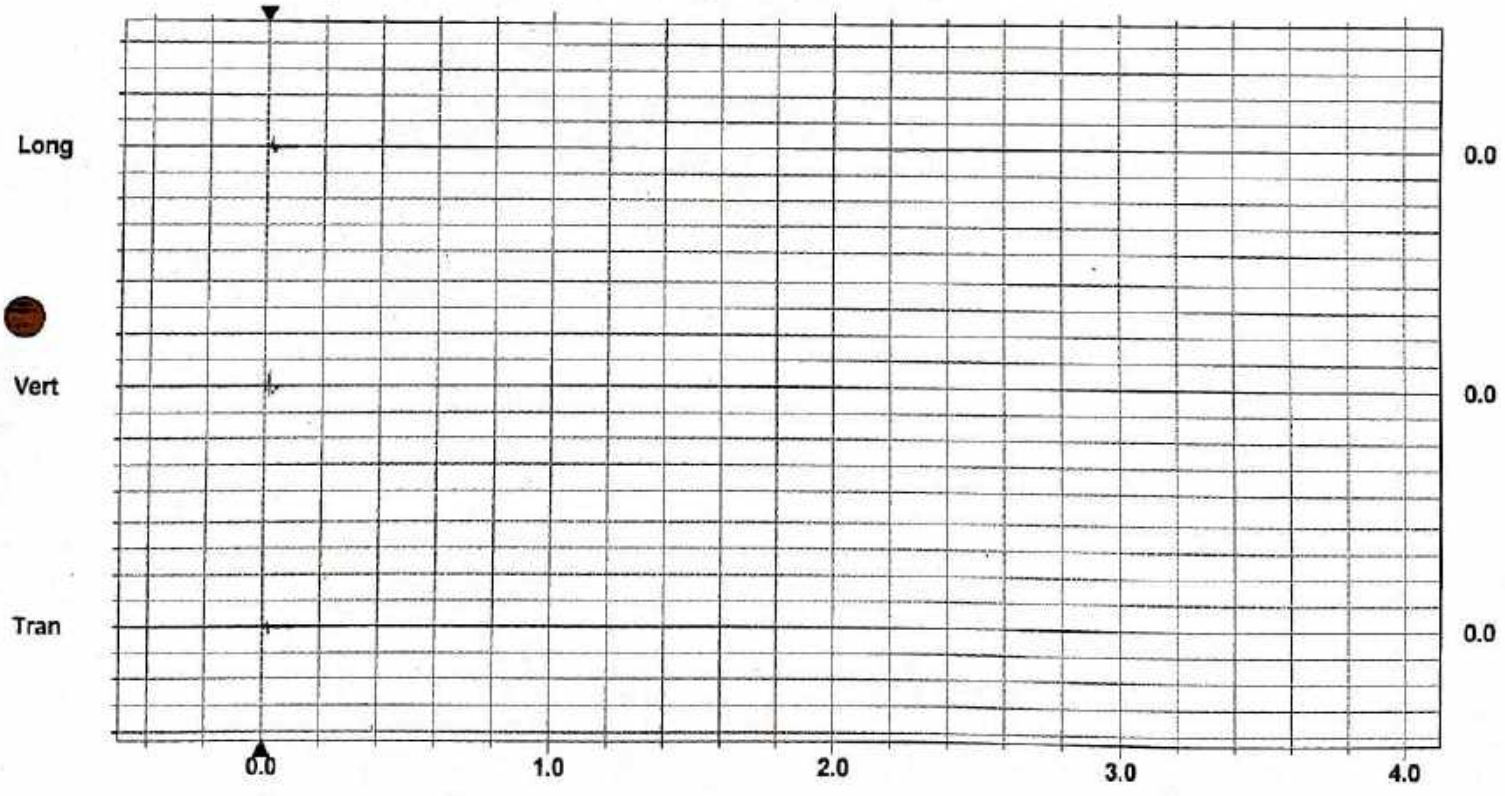
Peak Vector Sum 1.330 mm/s at 0.018 sec

DGMS India (A)

Permissible Ground Vibration



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶——◀

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Instantel

Event Report Block - B (2)

560

Instantel

Date/Time	Vert at 14:34:20 February 9, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.375 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.6 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

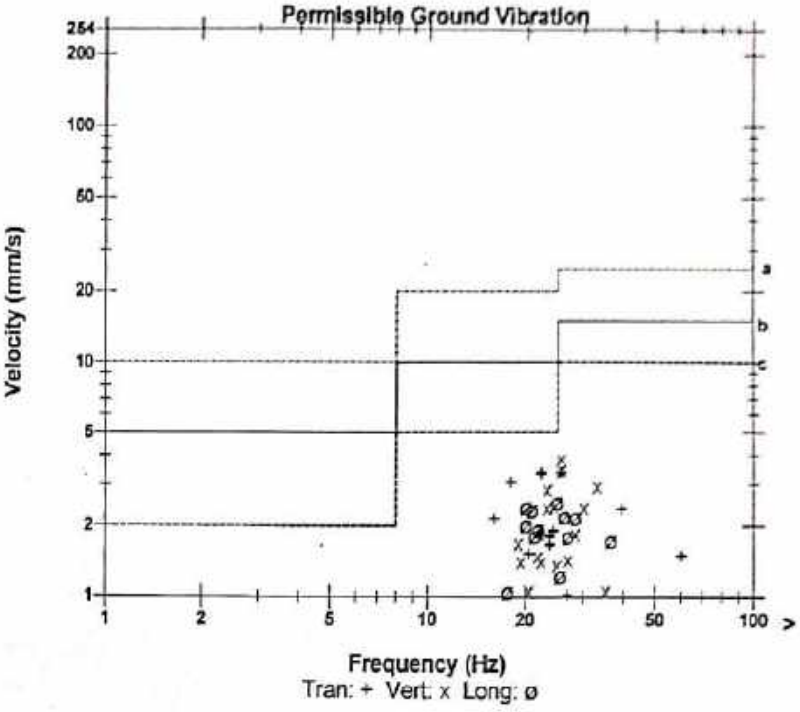
Notes

Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	3.358	3.870	2.514	mm/s
ZC Freq	26	26	25	Hz
Time (Rel. to Trig)	0.069	0.167	0.087	sec
Peak Acceleration	0.104	0.143	0.114	g
Peak Displacement	0.022	0.021	0.017	mm
Sensor Check	Passed	Passed	Passed	

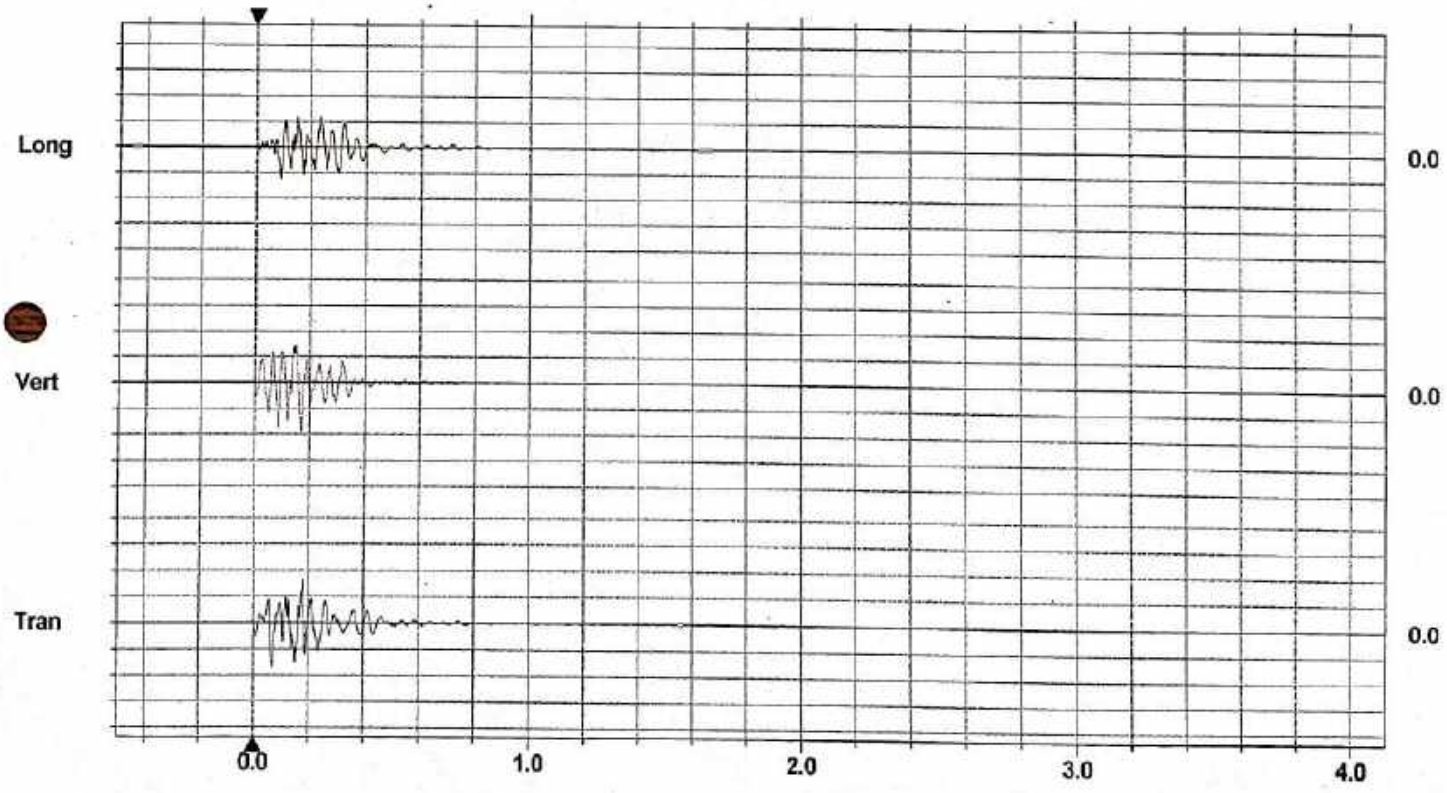
Peak Vector Sum 4.447 mm/s at 0.167 sec

DGMS India (A)



Frequency (Hz)
Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div
Trigger =

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Instantel **Event Report** BLOCK - B ①

Instantel

Date/Time	Vert at 14:24:49 February 9, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.143 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

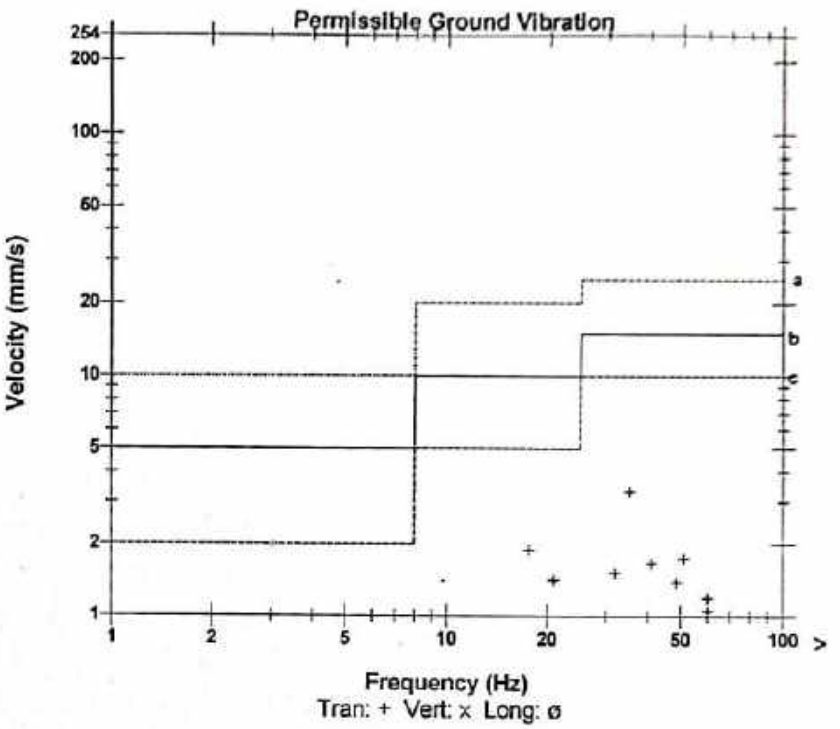
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	3.310	0.954	0.047	mm/s
ZC Freq	35	41	114	Hz
Time (Rel. to Trig)	0.071	0.187	-0.338	sec
Peak Acceleration	0.069	0.033	0.010	g
Peak Displacement	0.014	0.004	0.000	mm
Sensor Check	Passed	Passed	Passed	

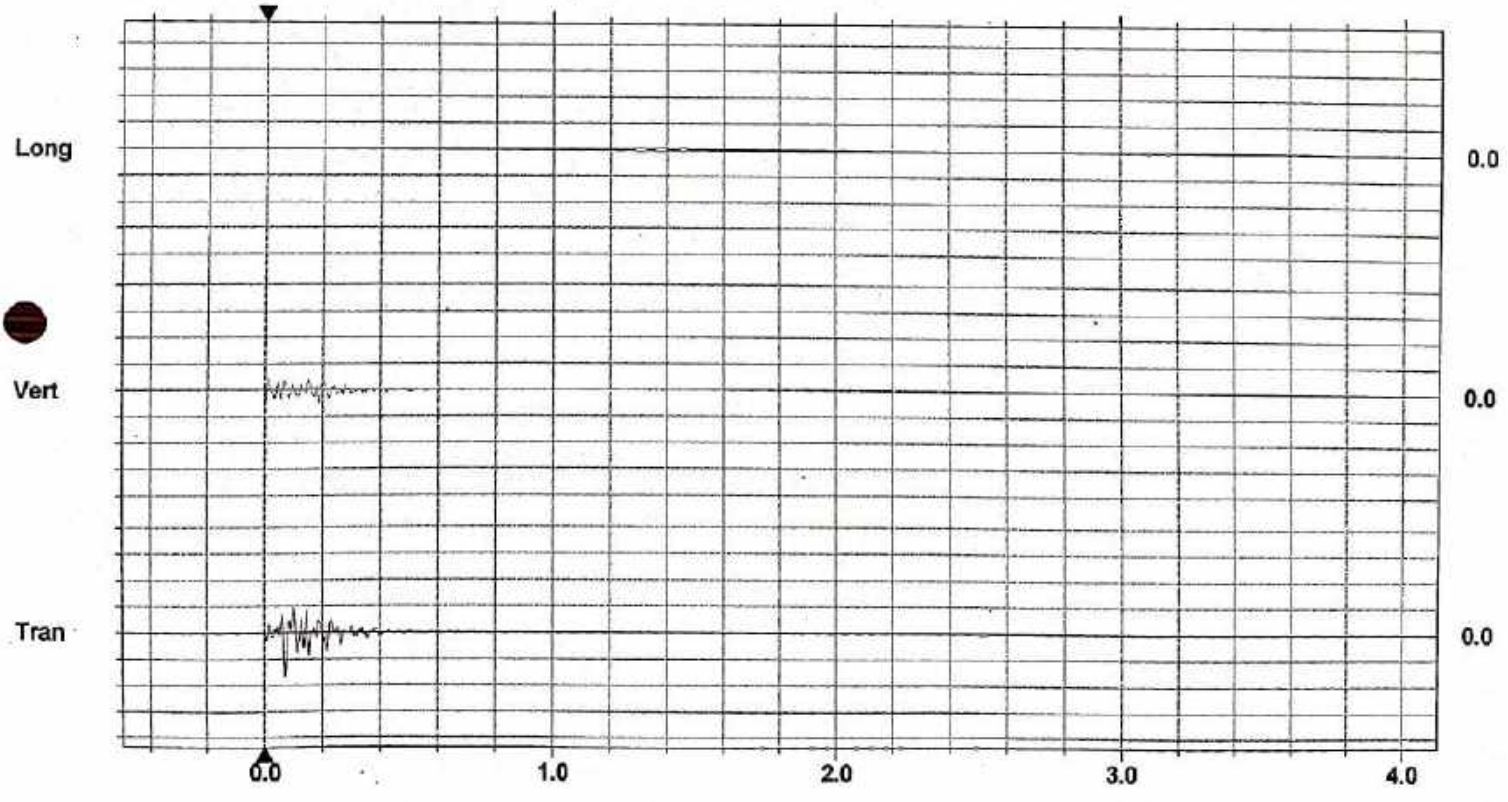
Peak Vector Sum 3.332 mm/s at 0.071 sec

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Instantel **Event Report** Block-B(2) Instant

562

Date/Time	Vert at 13:58:12 February 10, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.032 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14694 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

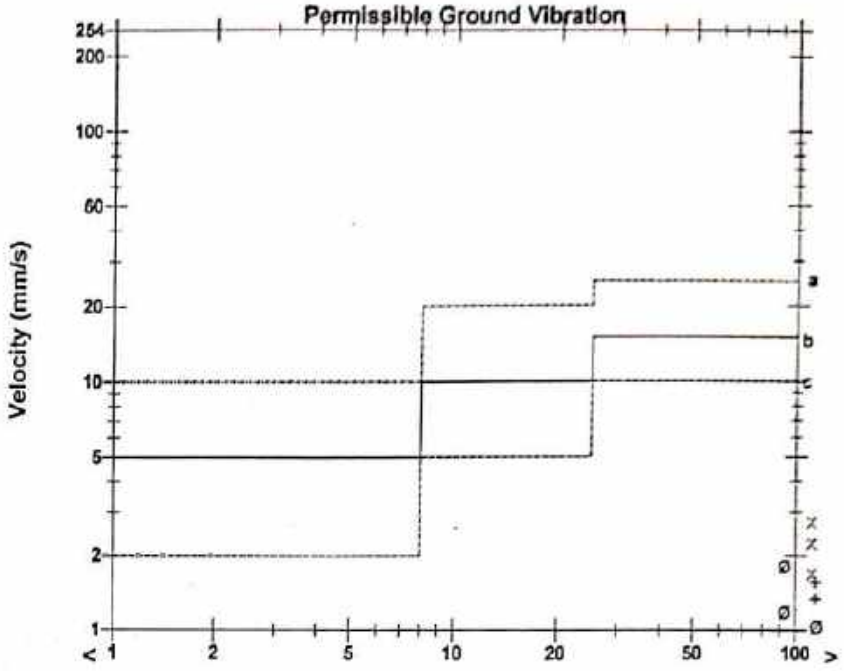
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	1.561	2.767	1.836	mm/s
ZC Freq	102	102	93	Hz
Time (Rel. to Trig)	0.020	0.021	0.021	sec
Peak Acceleration	0.125	0.161	0.117	g
Peak Displacement	0.002	0.004	0.012	mm
Sensor Check	Check	Passed	Passed	

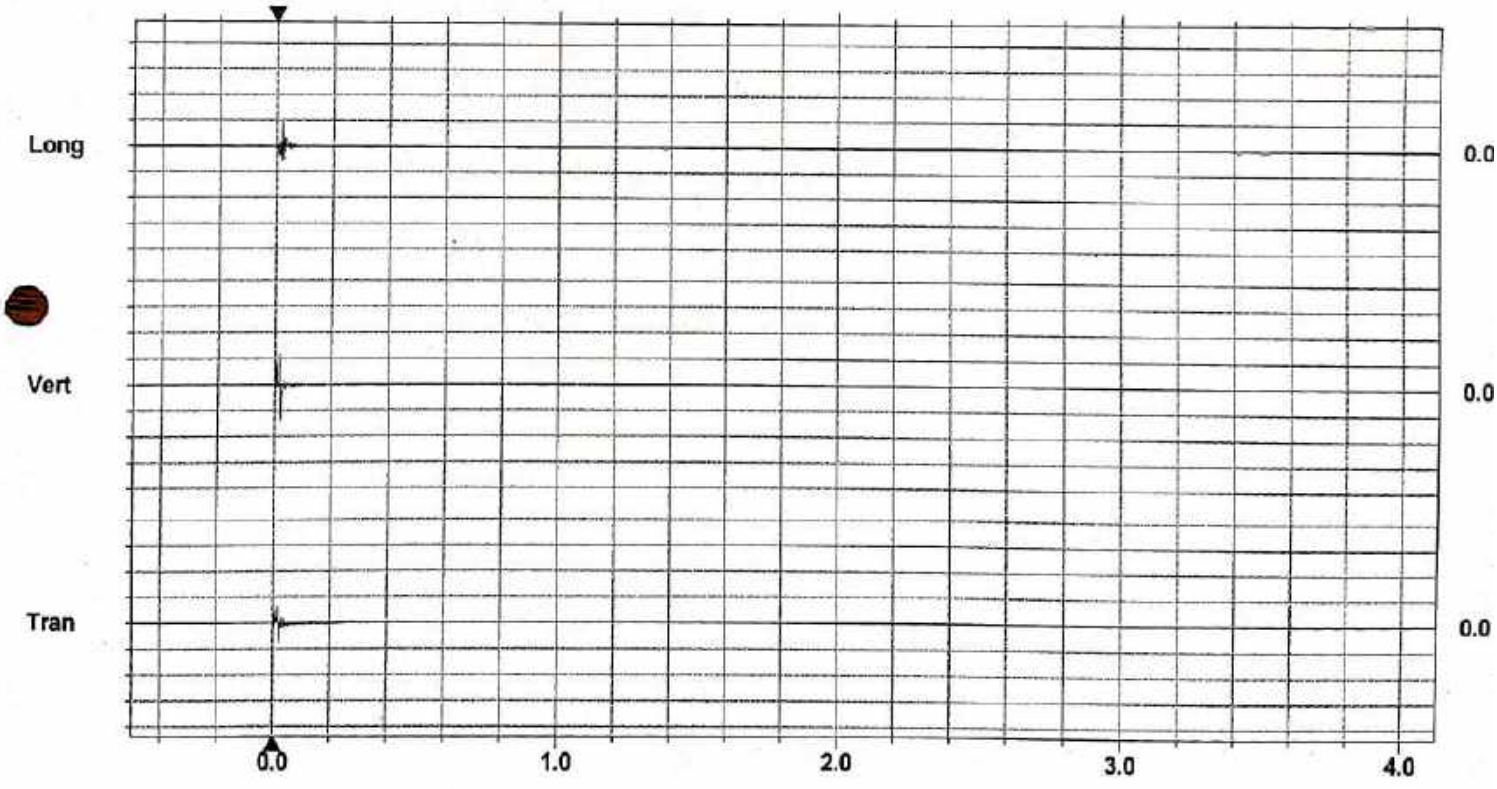
Peak Vector Sum 3.366 mm/s at 0.021 sec

DGMS India (A)

Permissible Ground Vibration



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Instantel **Event Report** Block-B(1) Instan

563

Date/Time	Vert at 13:54:54 February 10, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.02 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

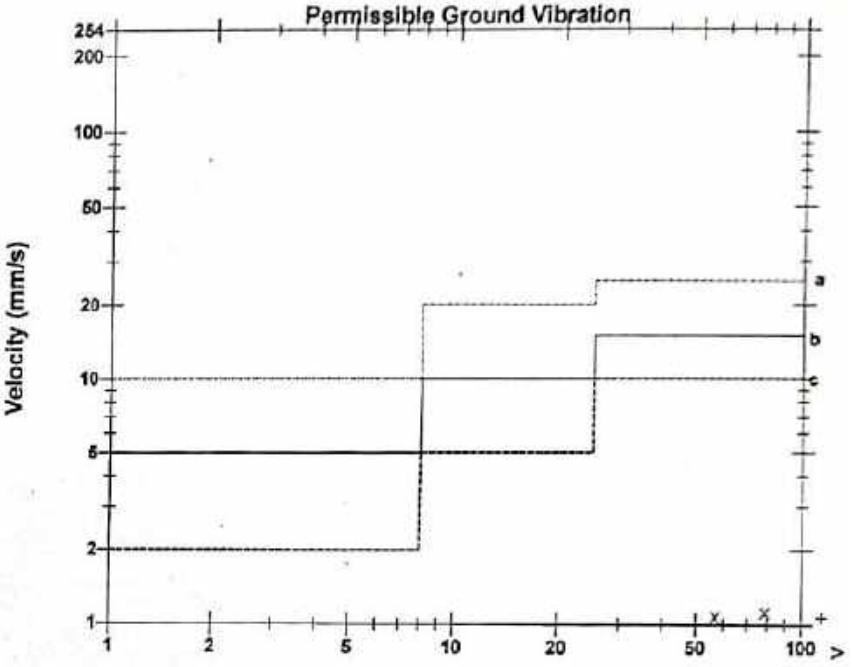
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

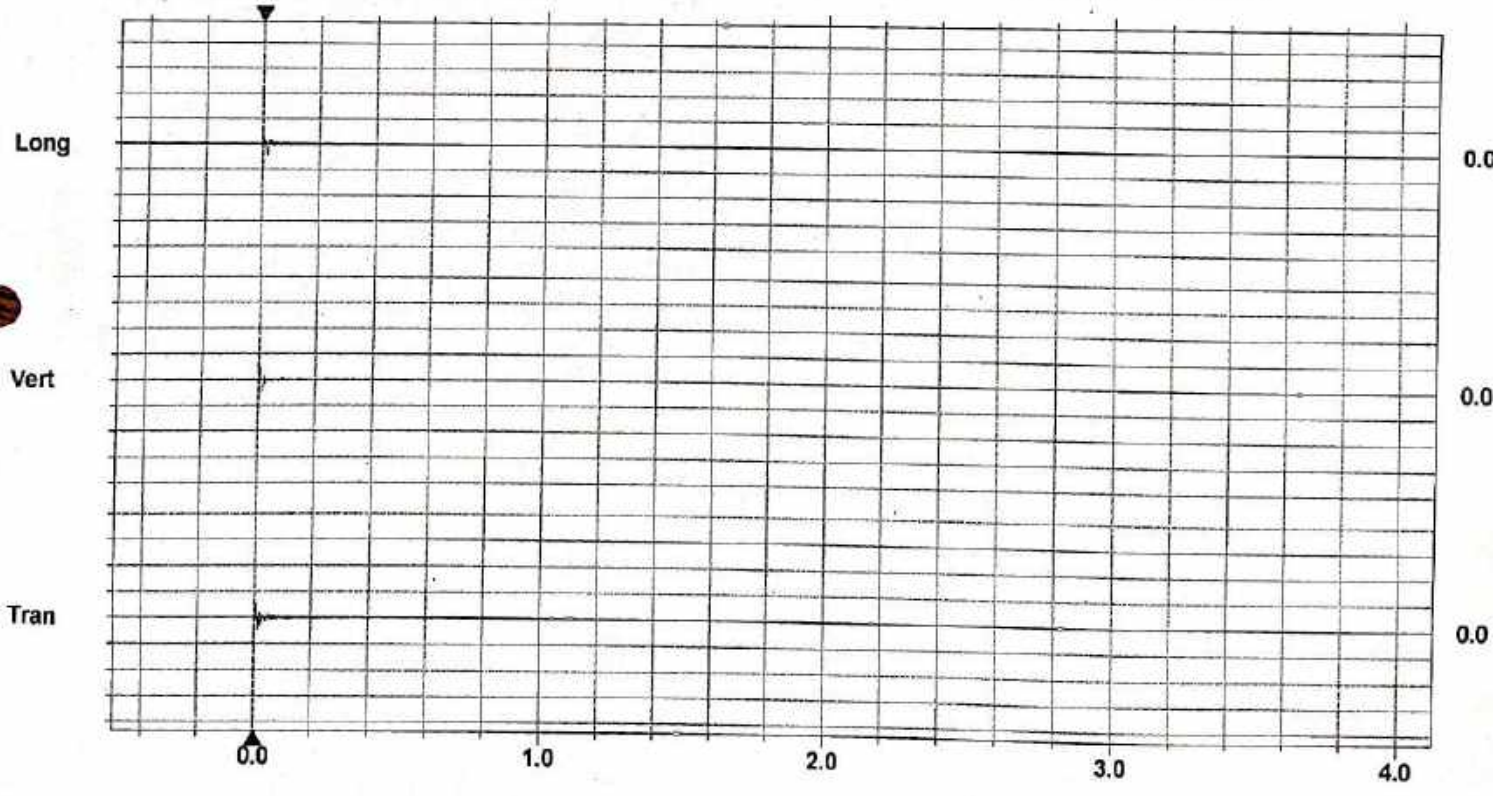
	Tran	**Vert**	**Long**	
PPV	1.064	1.135	0.812	mm/s
ZC Freq	114	79	57	Hz
Time (Rel. to Trig)	0.006	0.007	0.017	sec
Peak Acceleration	0.072	0.084	0.031	g
Peak Displacement	0.001	0.003	0.002	mm
Sensor Check	Check	Passed	Passed	

Peak Vector Sum 1.478 mm/s at 0.006 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Date/Time	Vert at 13:00:34 February 11, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	2.0 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

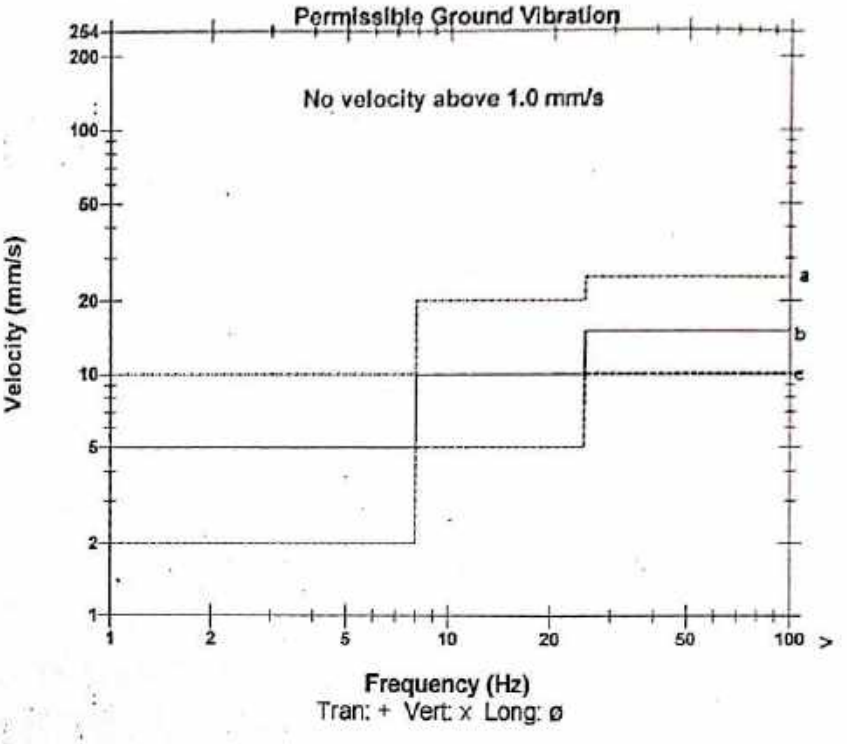
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.623	0.835	0.434	mm/s
ZC Freq	93	45	85	Hz
Time (Rel. to Trig)	0.008	0.003	0.007	sec
Peak Acceleration	0.046	0.053	0.028	g
Peak Displacement	0.001	0.002	0.001	mm
Sensor Check	Passed	Passed	Passed	

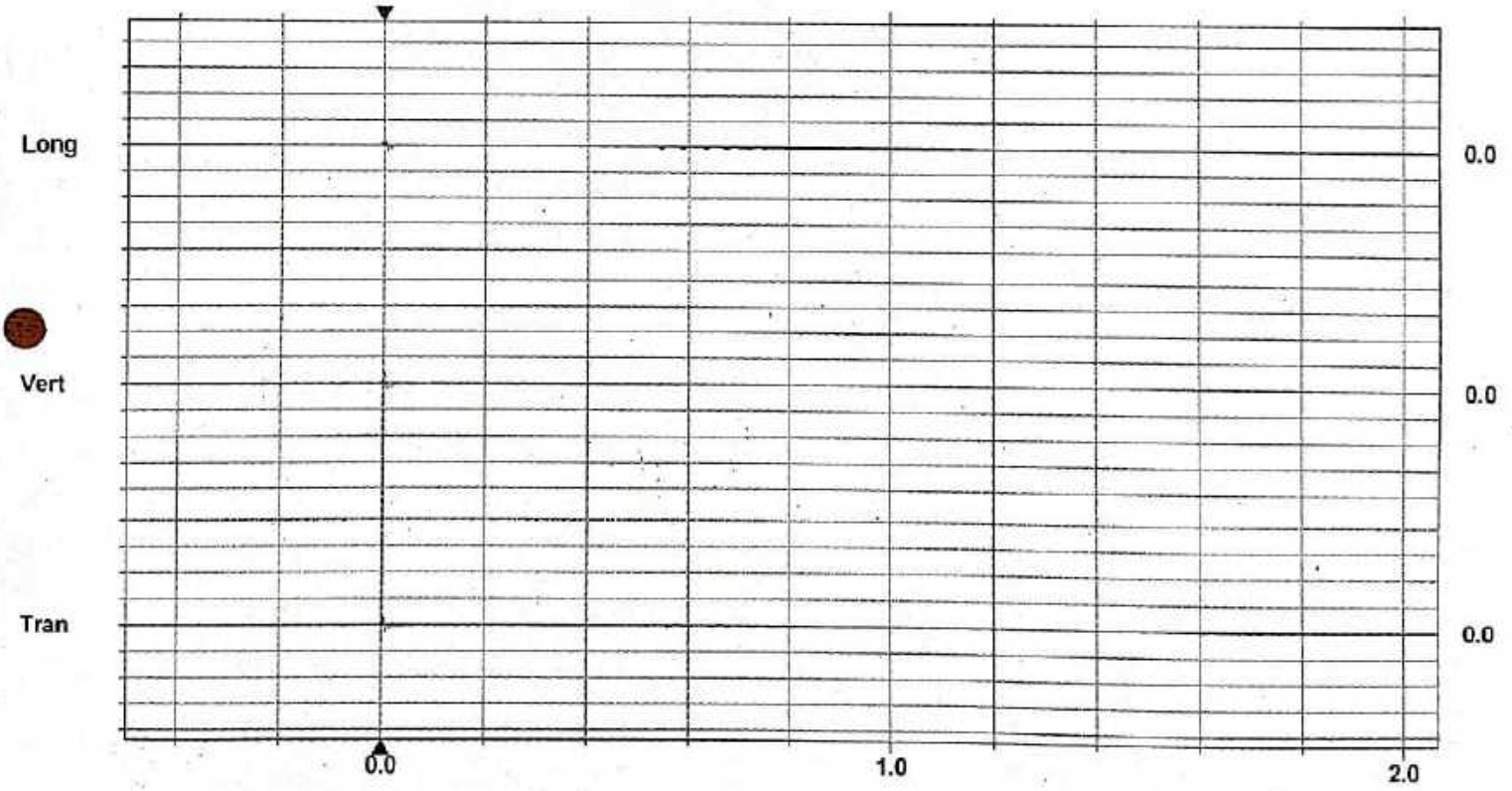
Peak Vector Sum 1.040 mm/s at 0.003 sec

DGMS India (A)



Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div
Trigger =

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Event Report Block - B (3)

565

Date/Time	Vert at 13:52:22 February 12, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	2.292 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

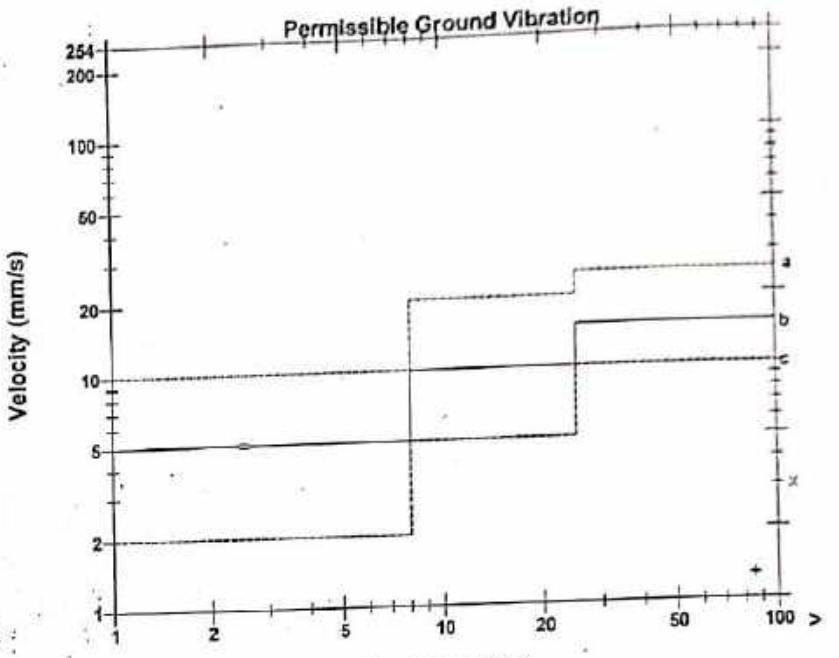
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

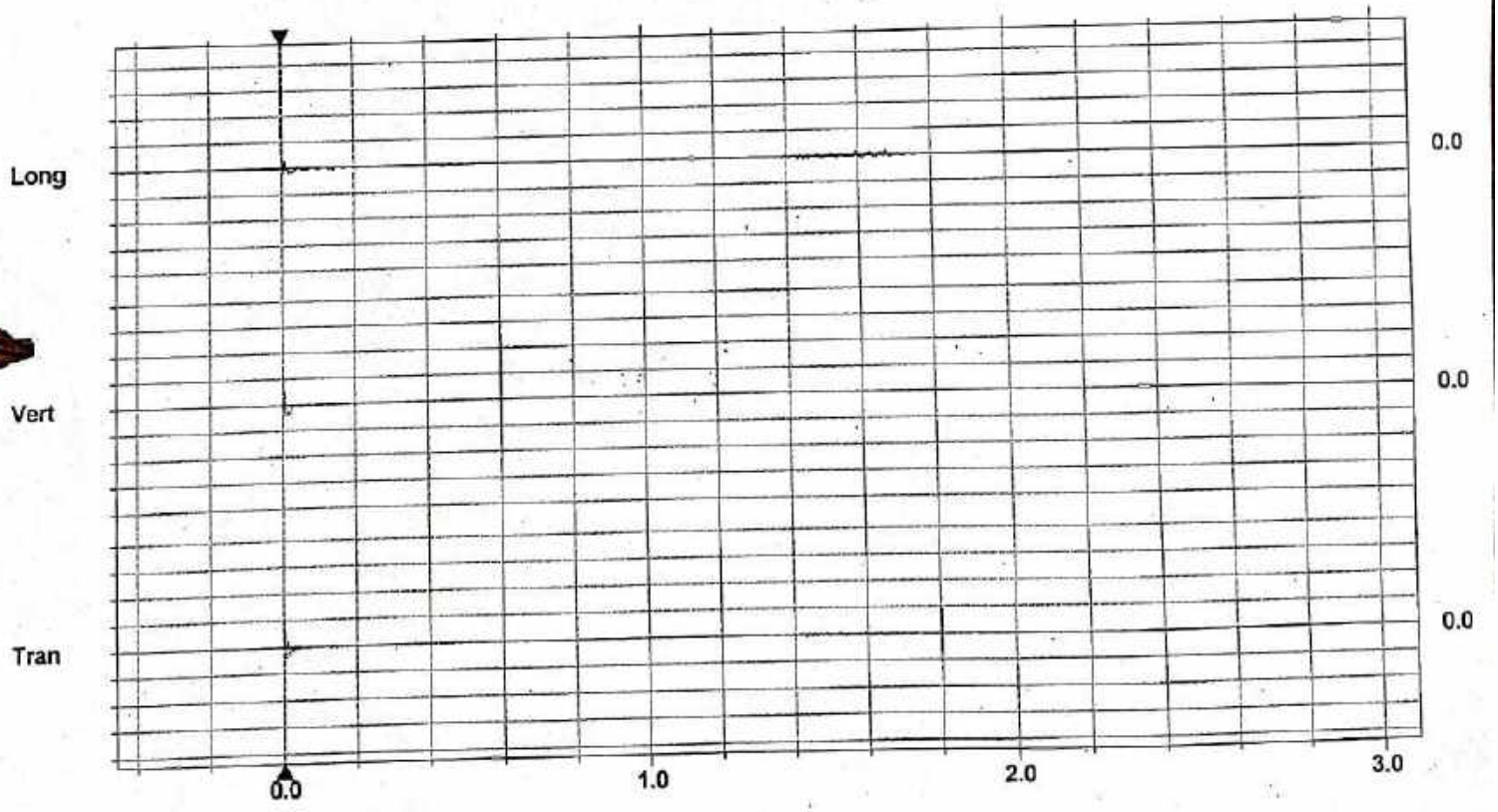
	Tran	Vert	Long	
PPV	1.269	3.019	0.560	mm/s
ZC Freq	85	102	128	Hz
Time (Rel. to Trig)	0.002	0.001	0.008	sec
Peak Acceleration	0.092	0.260	0.056	g
Peak Displacement	0.002	0.005	0.002	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 3.230 mm/s at 0.002 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: February 12, 2025 (V 10.72 - 10.72)

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Instantel **Event Report** BLOCK-B(2) Instantel

Date/Time	Tran at 13:47:47 February 12, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.316 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

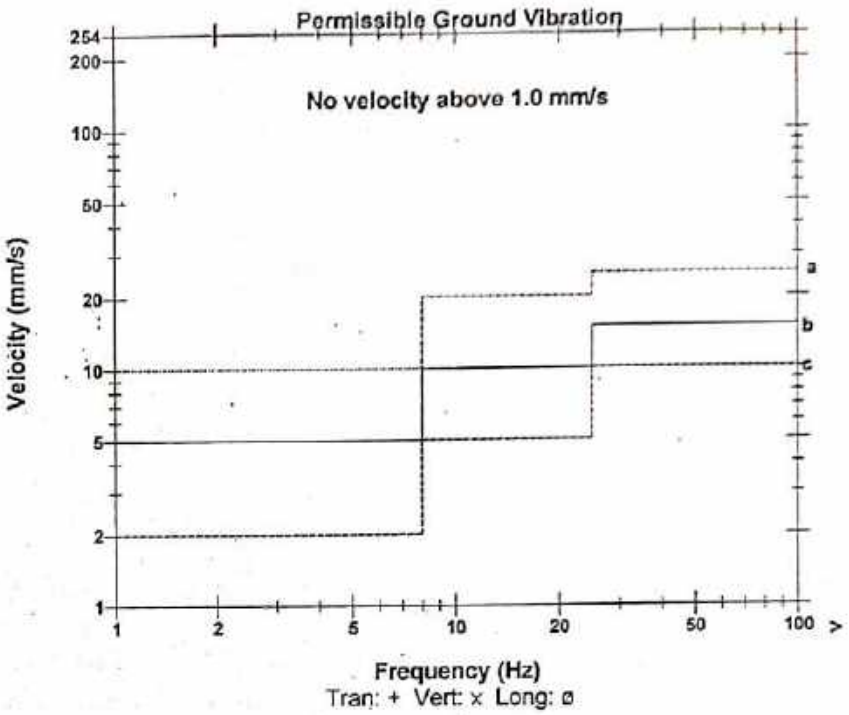
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

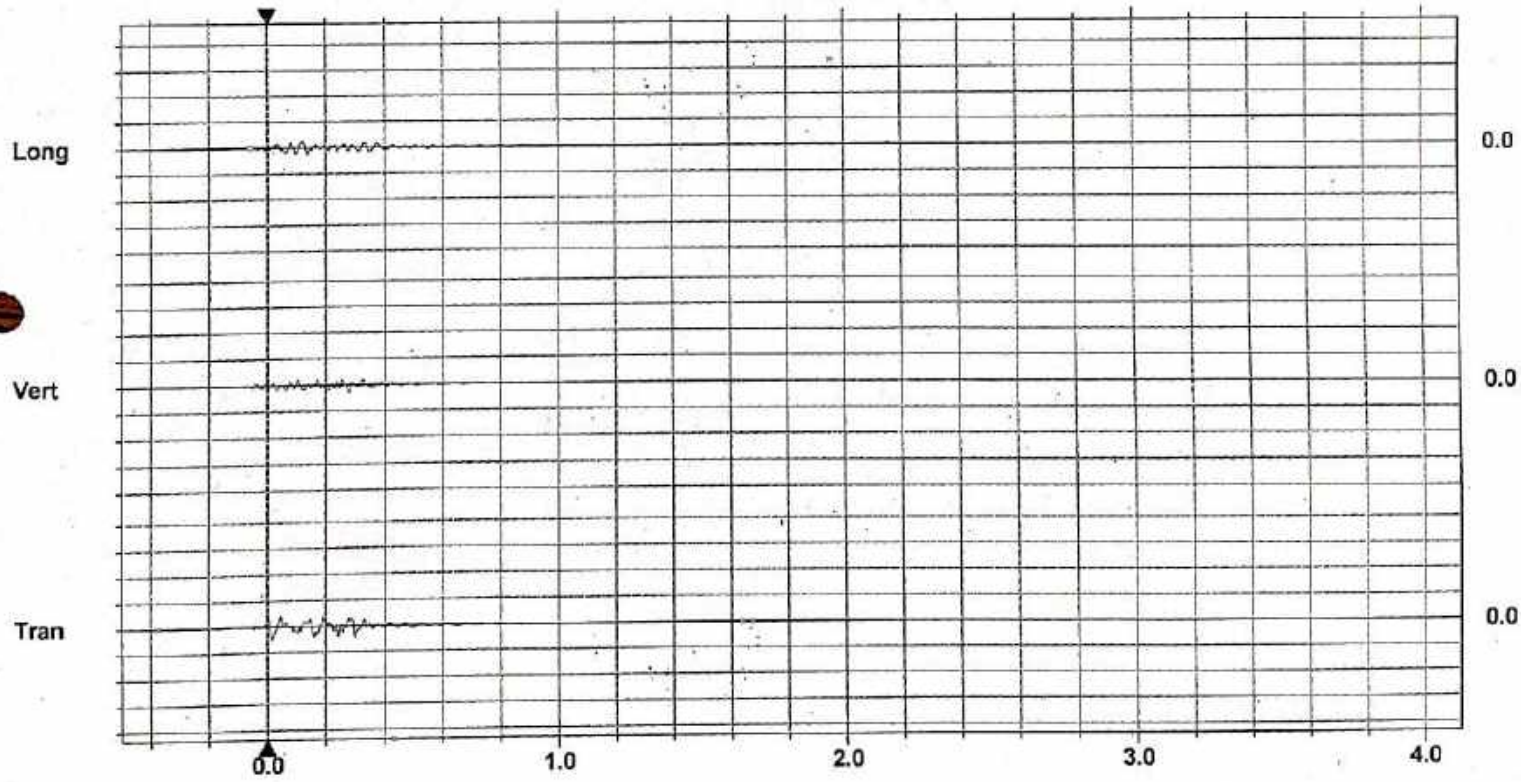
	Tran	Vert	Long	
PPV	0.969	0.583	0.520	mm/s
ZC Freq	21	35	18.6	Hz
Time (Rel. to Trig)	0.017	0.278	0.137	sec
Peak Acceleration	0.031	0.020	0.015	g
Peak Displacement	0.007	0.003	0.004	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 0.983 mm/s at 0.017 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶----------◀

Printed: February 12, 2025 (V 10.72 - 10.72)

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Date/Time	Vert at 13:40:45 February 12, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.374 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

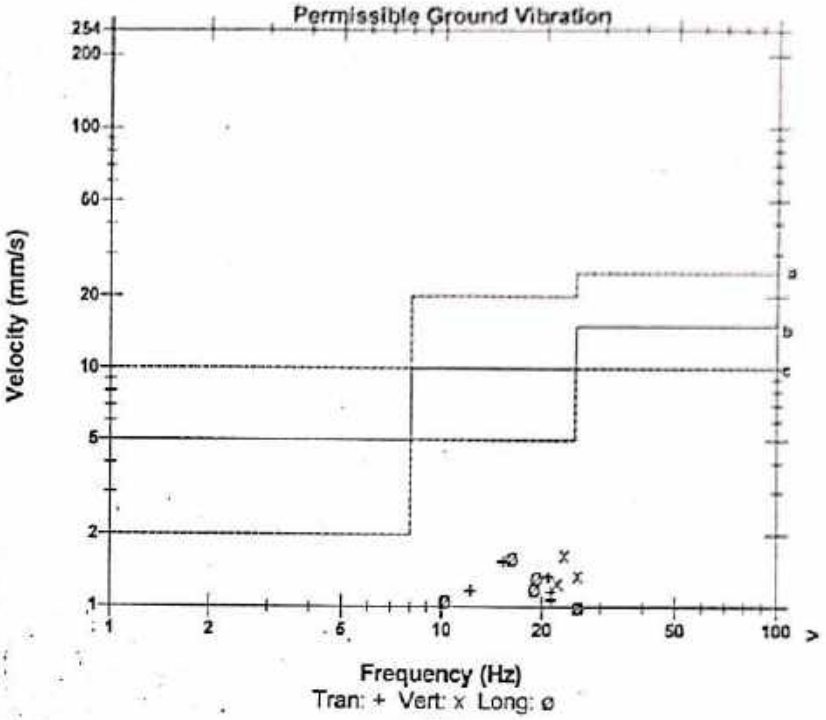
Notes

Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

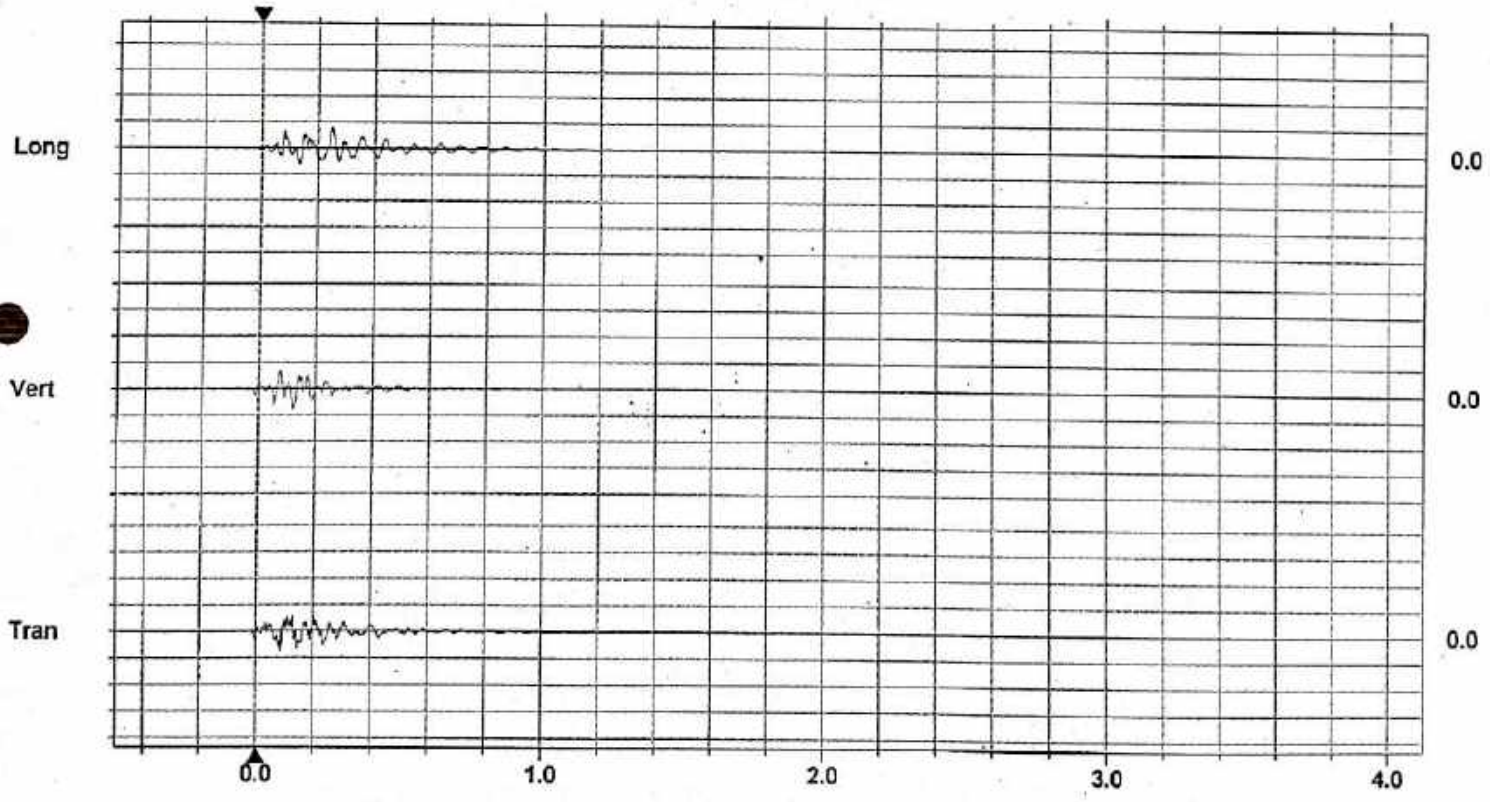
	Tran	**Vert**	**Long**	
PPV	1.545	1.663	1.608	mm/s
ZC Freq	15.3	23	16.3	Hz
Time (Rel. to Trig)	0.085	0.122	0.249	sec
Peak Acceleration	0.053	0.033	0.036	g
Peak Displacement	0.013	0.010	0.013	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.848 mm/s at 0.076 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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568

Date/Time	Vert at 13:19:22 February 14, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	2.25 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

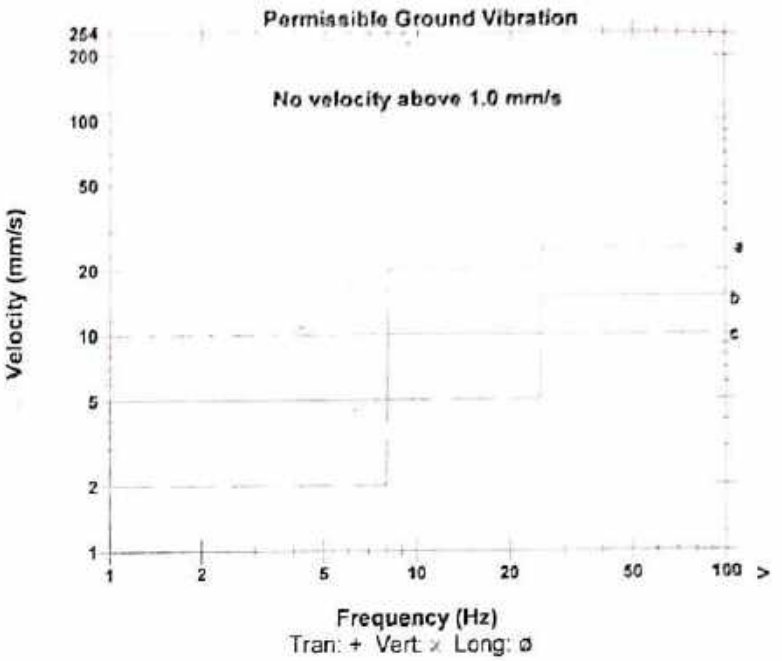
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

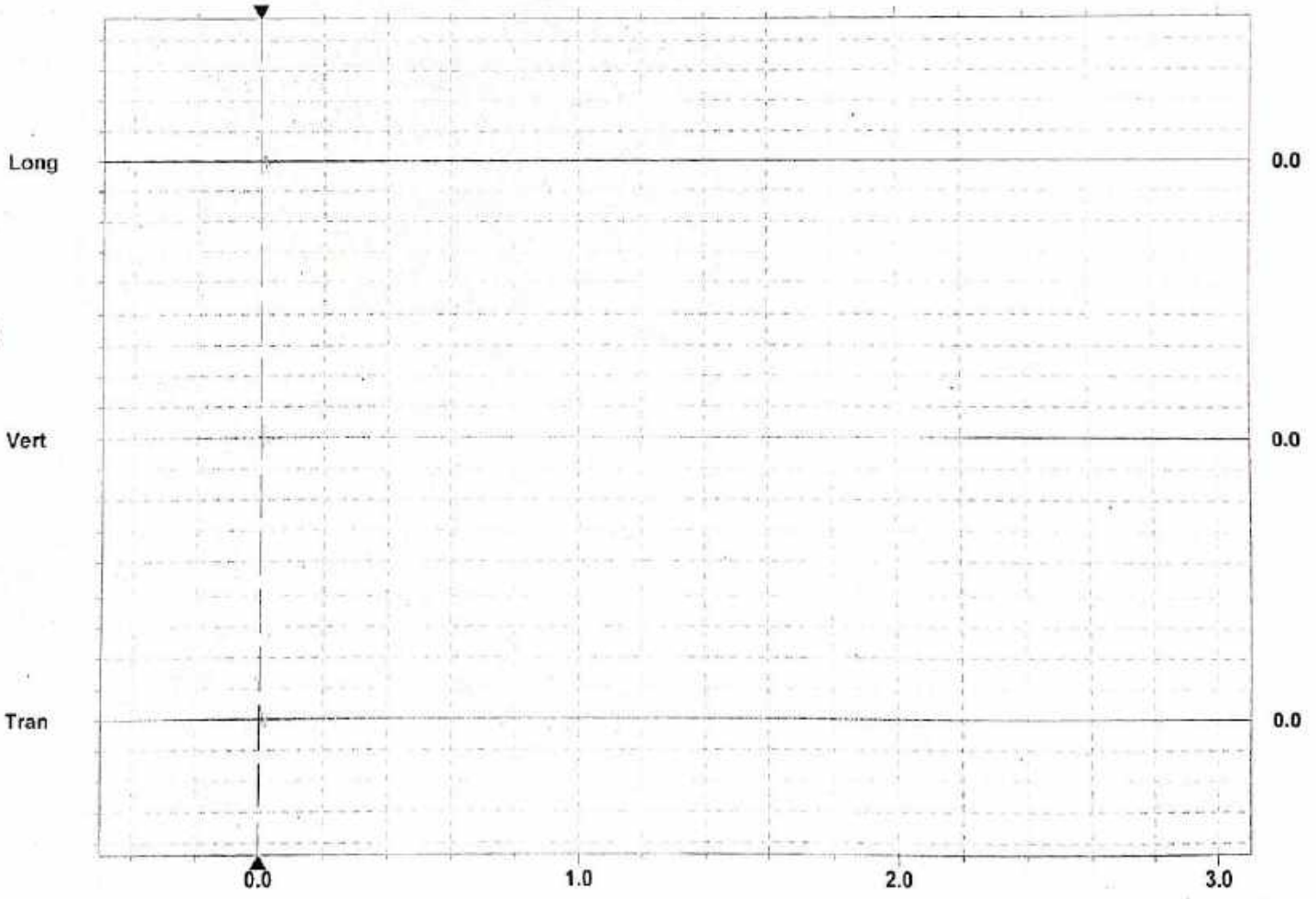
	Tran	**Vert**	**Long**	
PPV	0.567	0.977	0.426	mm/s
ZC Freq	171	93	102	Hz
Time (Rel. to Trig)	0.011	0.010	0.016	sec
Peak Acceleration	0.049	0.125	0.036	g
Peak Displacement	0.001	0.002	0.001	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.126 mm/s at 0.010 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

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Event Report 569 BLV-30

Instantel

Date/Time	Long at 13:19:10 February 14, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	5.62 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	Latitude	Longitude
Source	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

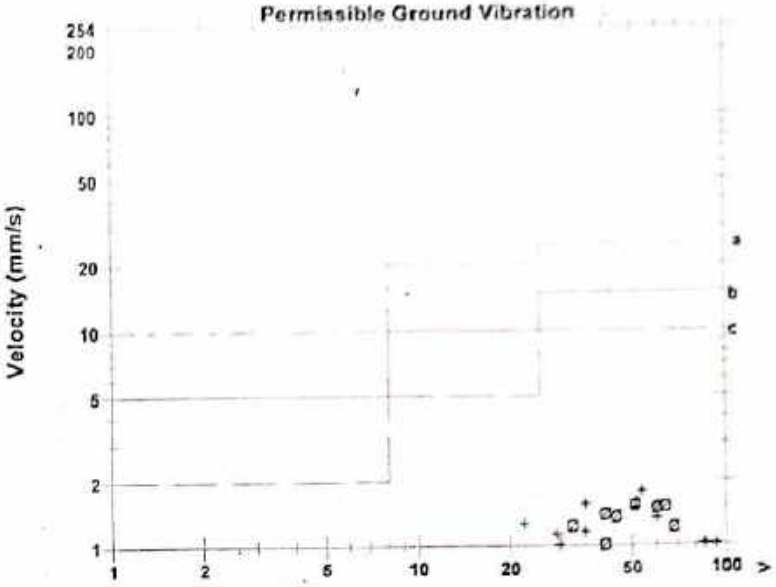
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	1.789	1.103	1.576	mm/s
ZC Freq	54	29	51	Hz
Time (Rel. to Trig)	0.156	0.215	0.188	sec
Peak Acceleration	0.071	0.104	0.069	g
Peak Displacement	0.007	0.004	0.007	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.182 mm/s at 0.180 sec

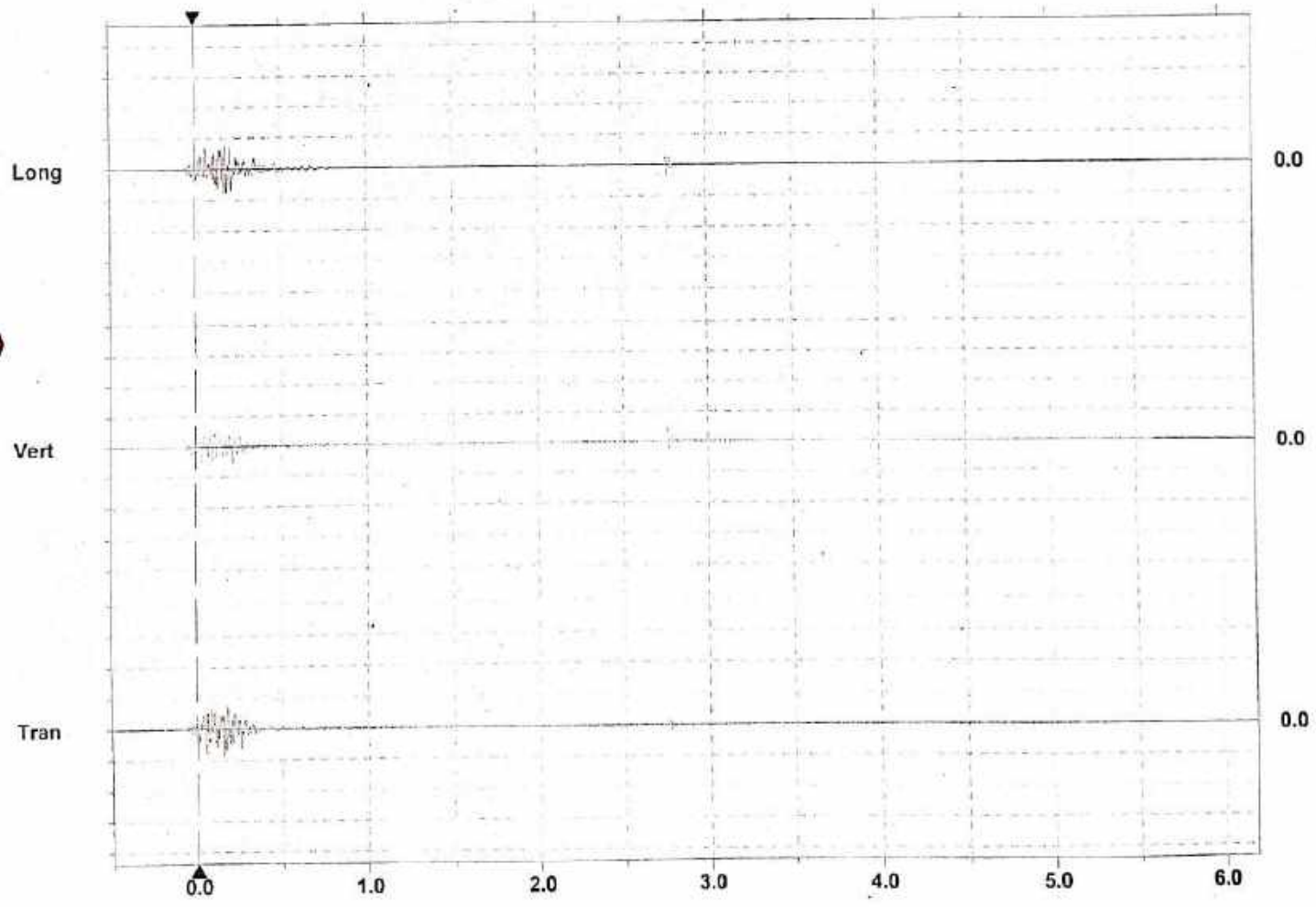
DGMS India (A)

Permissible Ground Vibration



Frequency (Hz)
Tran: + Vert: × Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶——◀

552

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Instantel

Event Report

Blast - B5

570

Instantel

Date/Time	Vert at 14:26:25 February 15, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.009 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.7 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

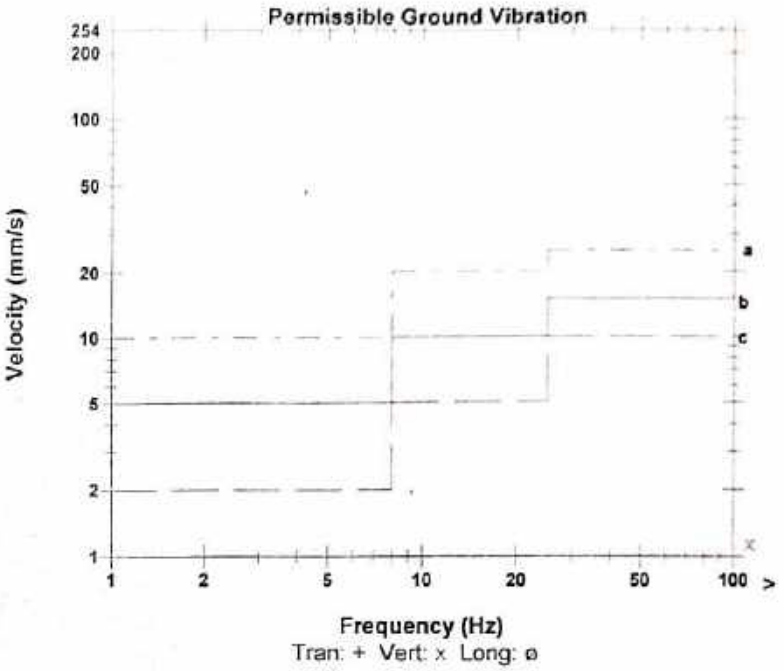
Notes

Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

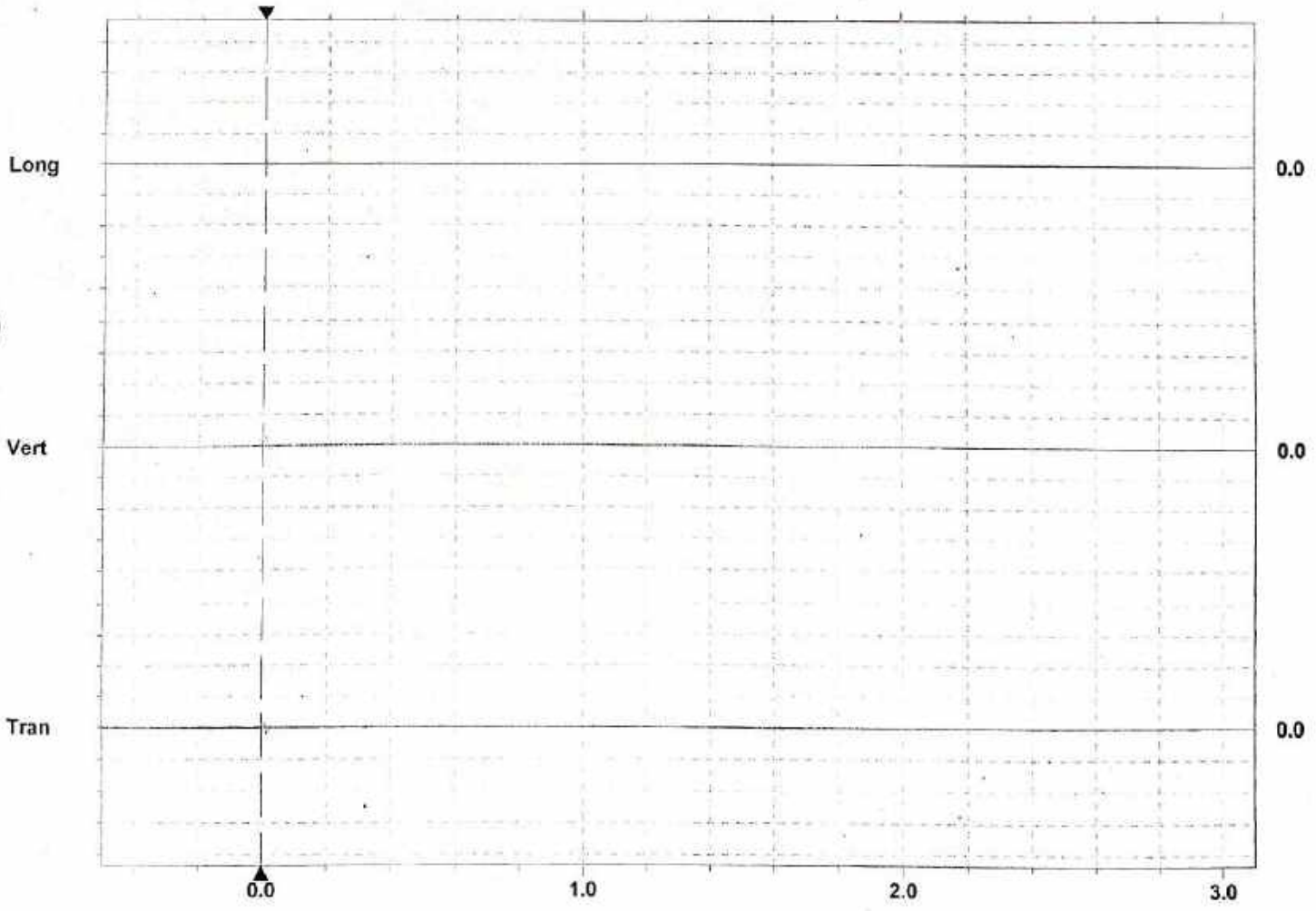
	Tran	Vert	Long	
PPV	0.457	1.151	0.315	mm/s
ZC Freq	114	102	114	Hz
Time (Rel. to Trig)	0.001	0.001	0.001	sec
Peak Acceleration	0.033	0.100	0.030	g
Peak Displacement	0.001	0.002	0.000	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.278 mm/s at 0.001 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶——◀

Instantel

Event Report Block - B

571

Instantel

Date/Time	Tran at 14:25:59 February 15, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.309 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

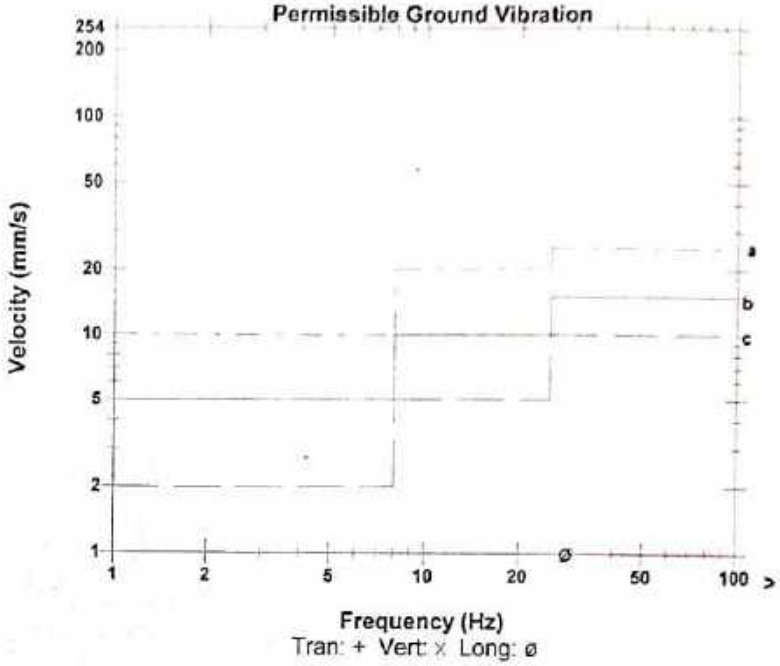
Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.7 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

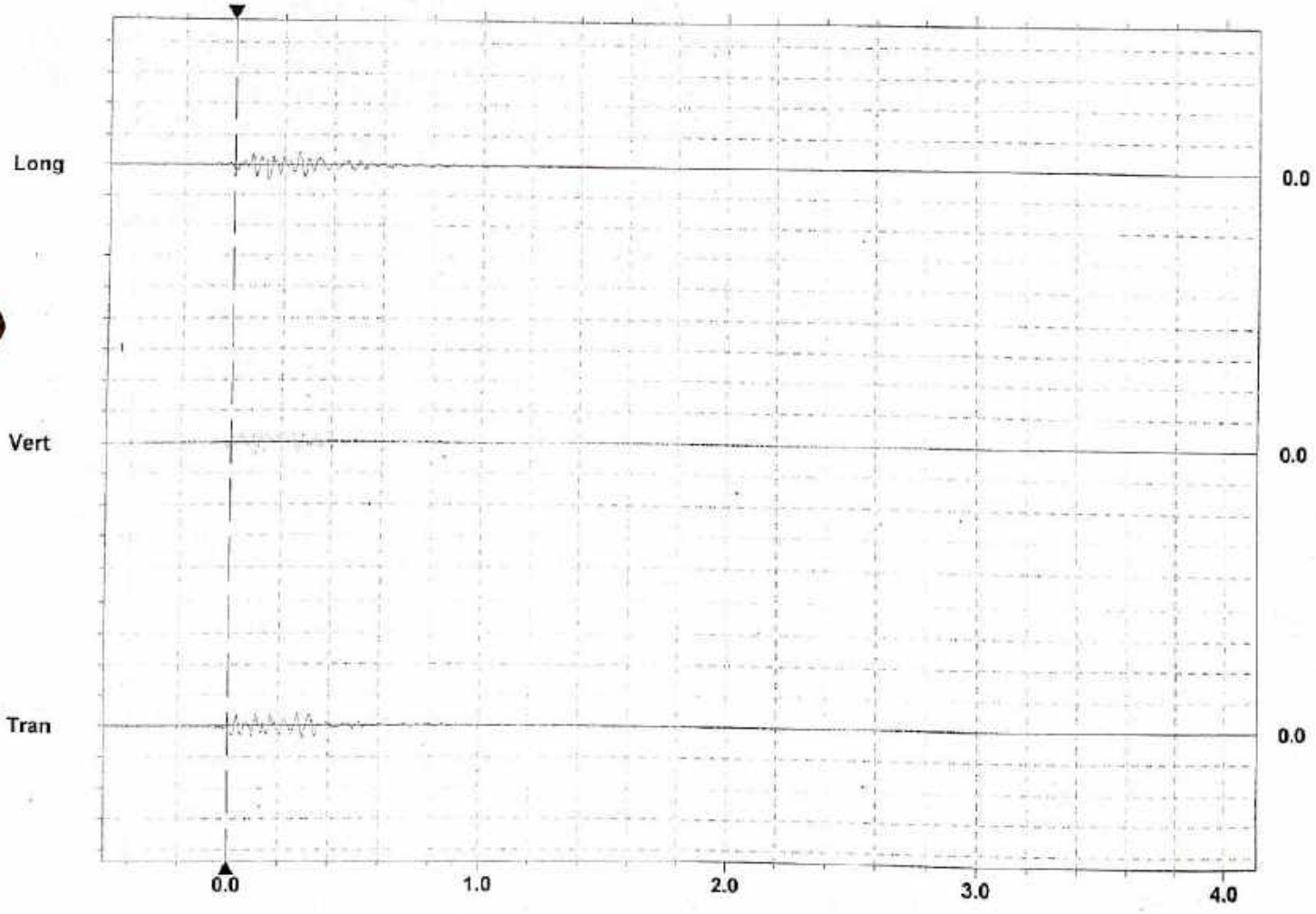
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.772	0.835	1.009	mm/s
ZC Freq	27	24	28	Hz
Time (Rel. to Trig)	0.113	0.266	0.135	sec
Peak Acceleration	0.020	0.033	0.028	g
Peak Displacement	0.006	0.005	0.005	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.184 mm/s at 0.134 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div
Trigger = ▶—— ——◀

554

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Date/Time	Vert at 14:23:20 February 15, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.36 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

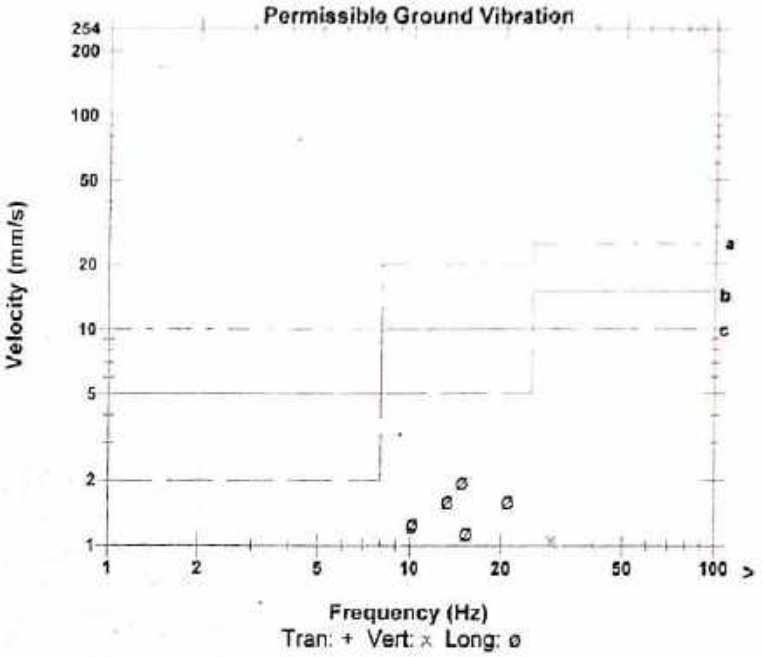
Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.7 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

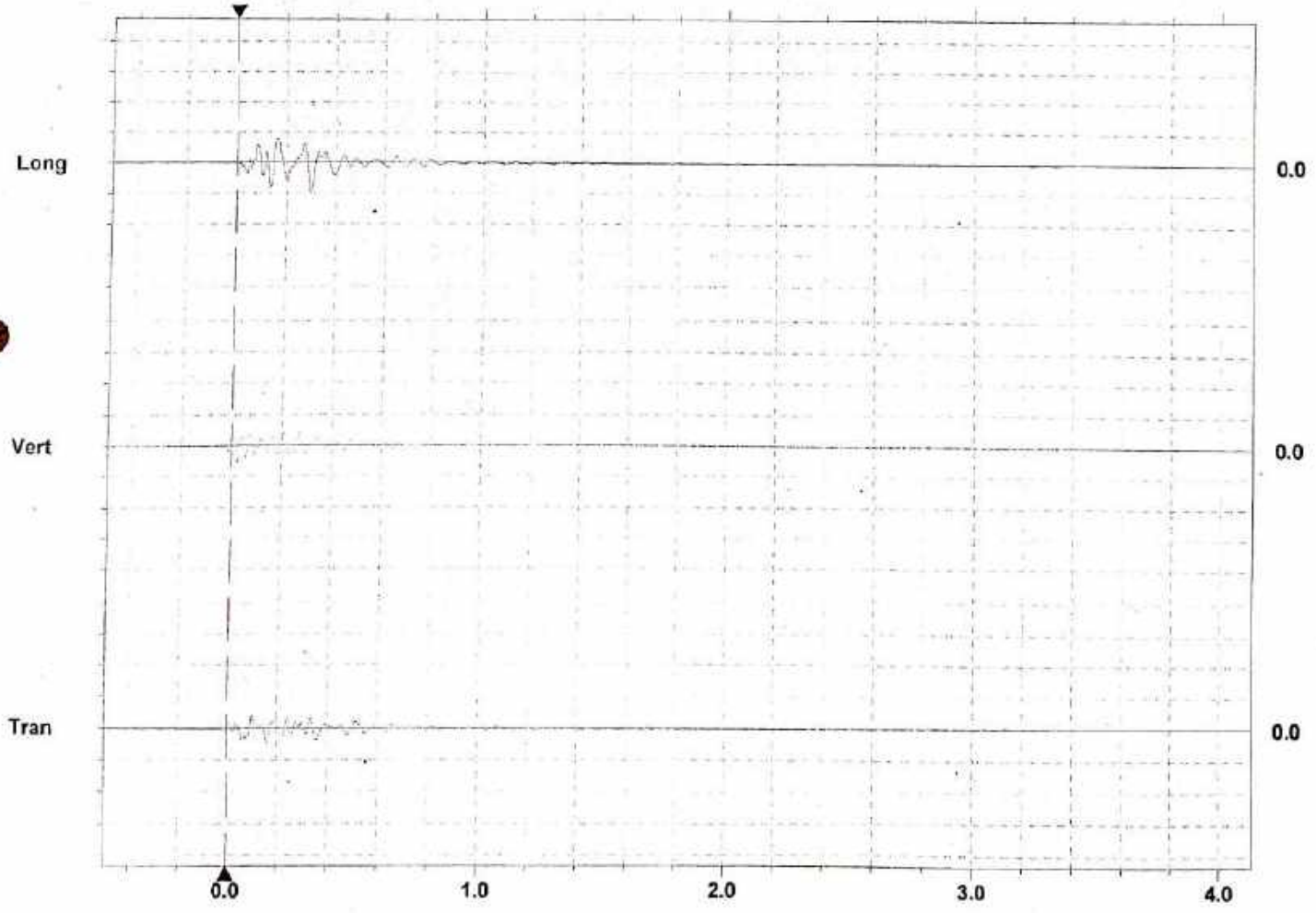
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.938	1.064	1.963	mm/s
ZC Freq	21	29	14.8	Hz
Time (Rel. to Trig)	0.162	0.022	0.299	sec
Peak Acceleration	0.021	0.021	0.028	g
Peak Displacement	0.009	0.007	0.020	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.040 mm/s at 0.299 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div
Trigger =

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Date/Time	Vert at 14:20:33 February 15, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.119 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.7 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

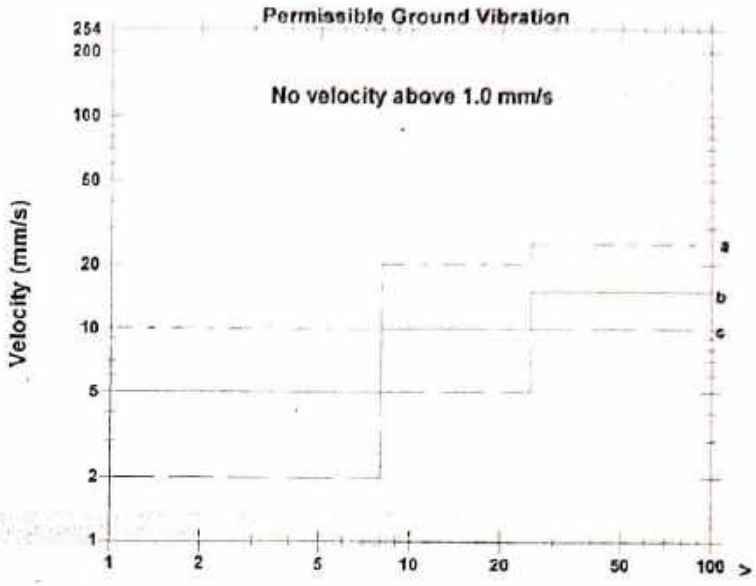
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	0.930	0.638	0.820	mm/s
ZC Freq	21	38	60	Hz
Time (Rel. to Trig)	0.015	0.001	0.016	sec
Peak Acceleration	0.031	0.031	0.041	g
Peak Displacement	0.006	0.003	0.005	mm
Sensor Check	Passed	Passed	Passed	

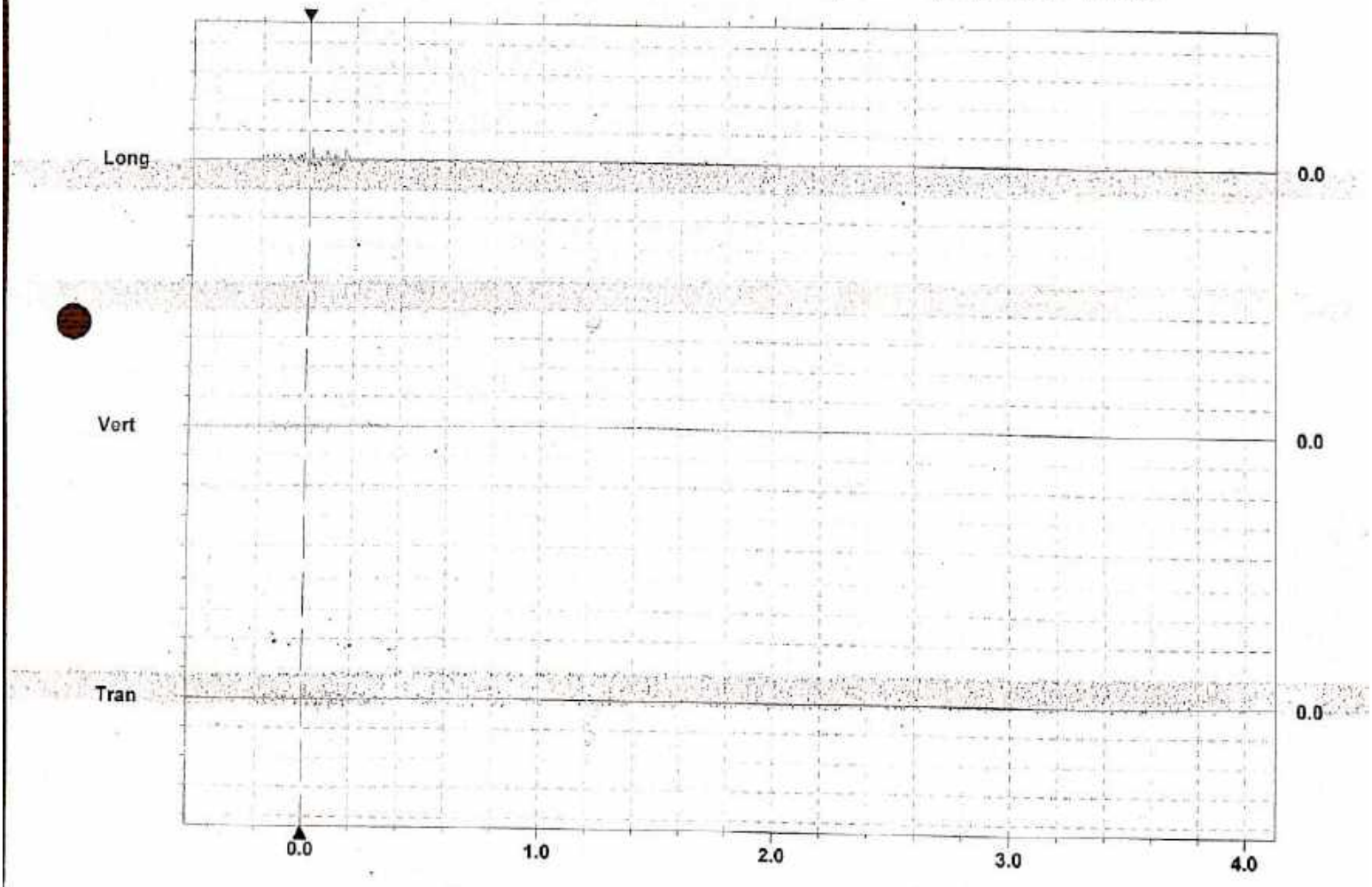
Peak Vector Sum 1.263 mm/s at 0.015 sec

DGMS India (A)



Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div
Trigger =

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Date/Time	Vert at 14:17:16 February 15, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.349 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.7 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

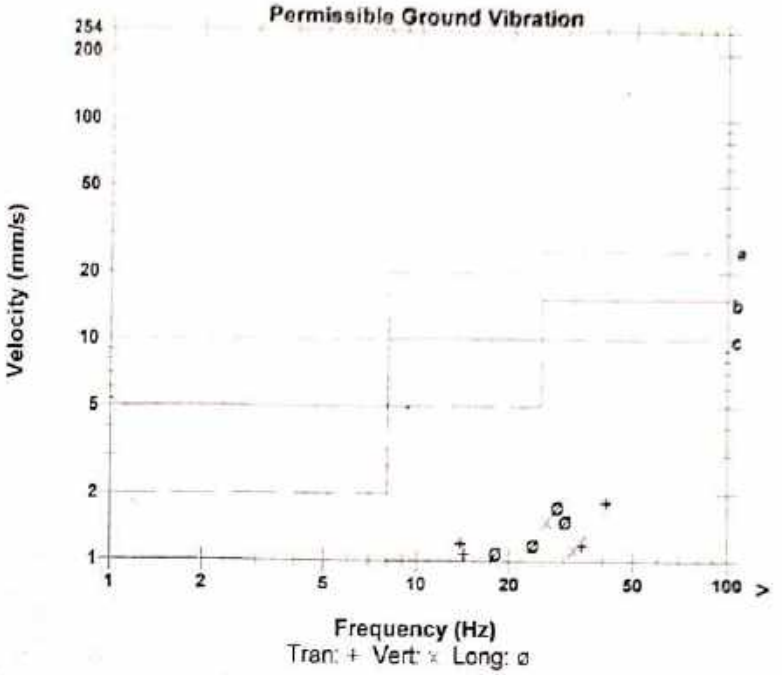
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes

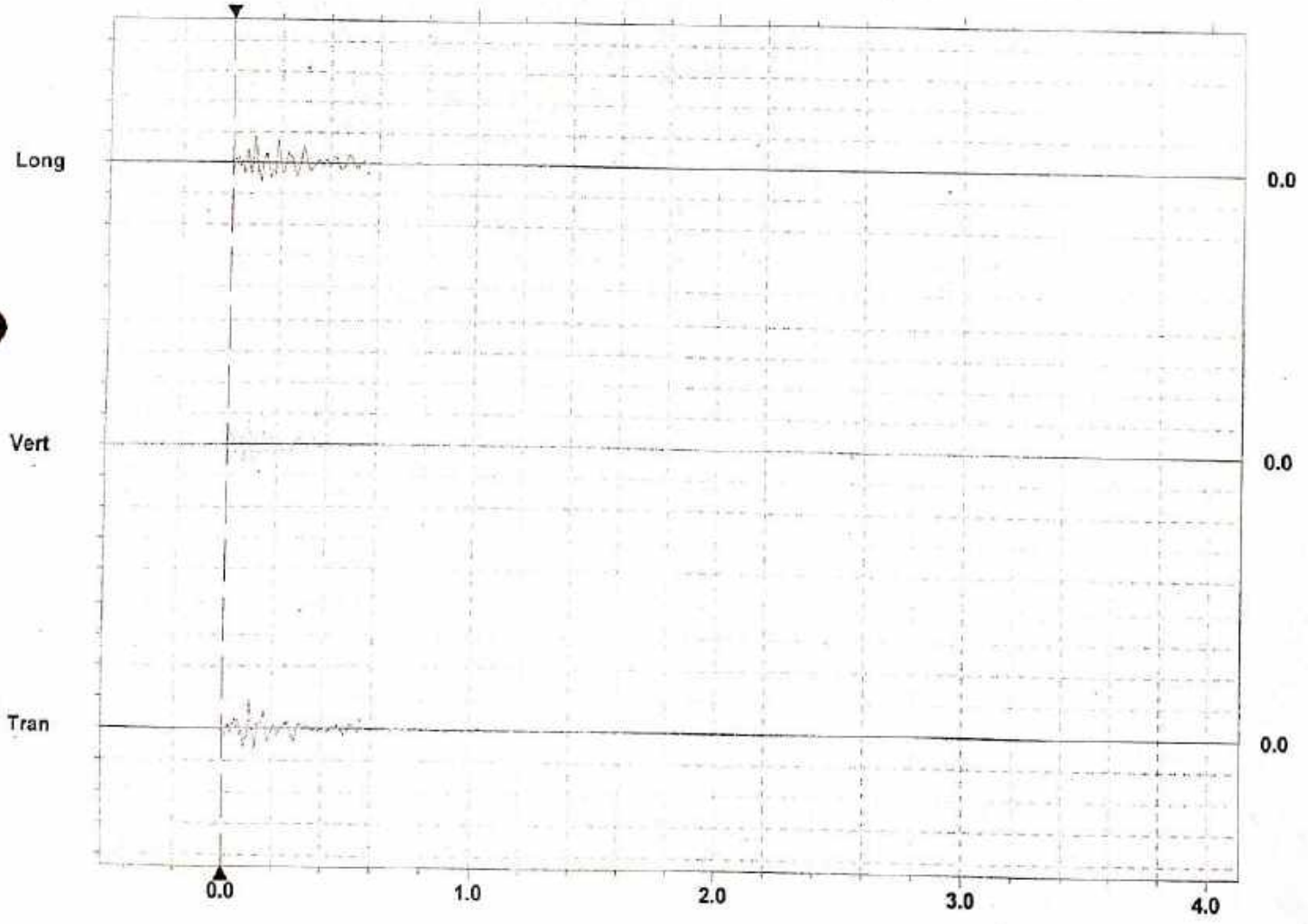
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	1.836	1.521	1.773	mm/s
ZC Freq	41	26	28	Hz
Time (Rel. to Trig)	0.110	0.087	0.092	sec
Peak Acceleration	0.044	0.043	0.044	g
Peak Displacement	0.009	0.008	0.010	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.148 mm/s at 0.087 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶—— ——◀

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Instantel **Event Report** BLOCK - B (1) Instante

575

Date/Time	Vert at 13:56:49 February 16, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.535 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

GPS Location	**Latitude**	**Longitude**
Source	027 51 097 N	075 58 824 E
Sensor1	027 51 150 N	075 58 752 E
Distance	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr
Client: Bayal Mines
User Name: Bayal Mines
General:

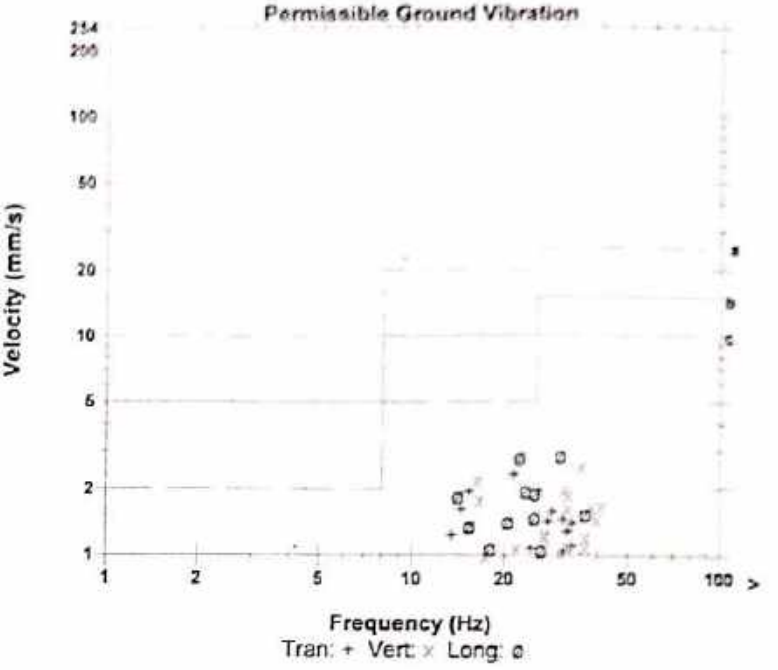
	Tran	**Vert**	**Long**	
PPV	2.341	2.546	2.853	mm/s
ZC Freq	21	35	30	Hz
Time (Rel. to Trig)	0.185	0.151	0.142	sec
Peak Acceleration	0.049	0.115	0.158	g
Peak Displacement	0.017	0.018	0.019	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 3.394 mm/s at 0.154 sec

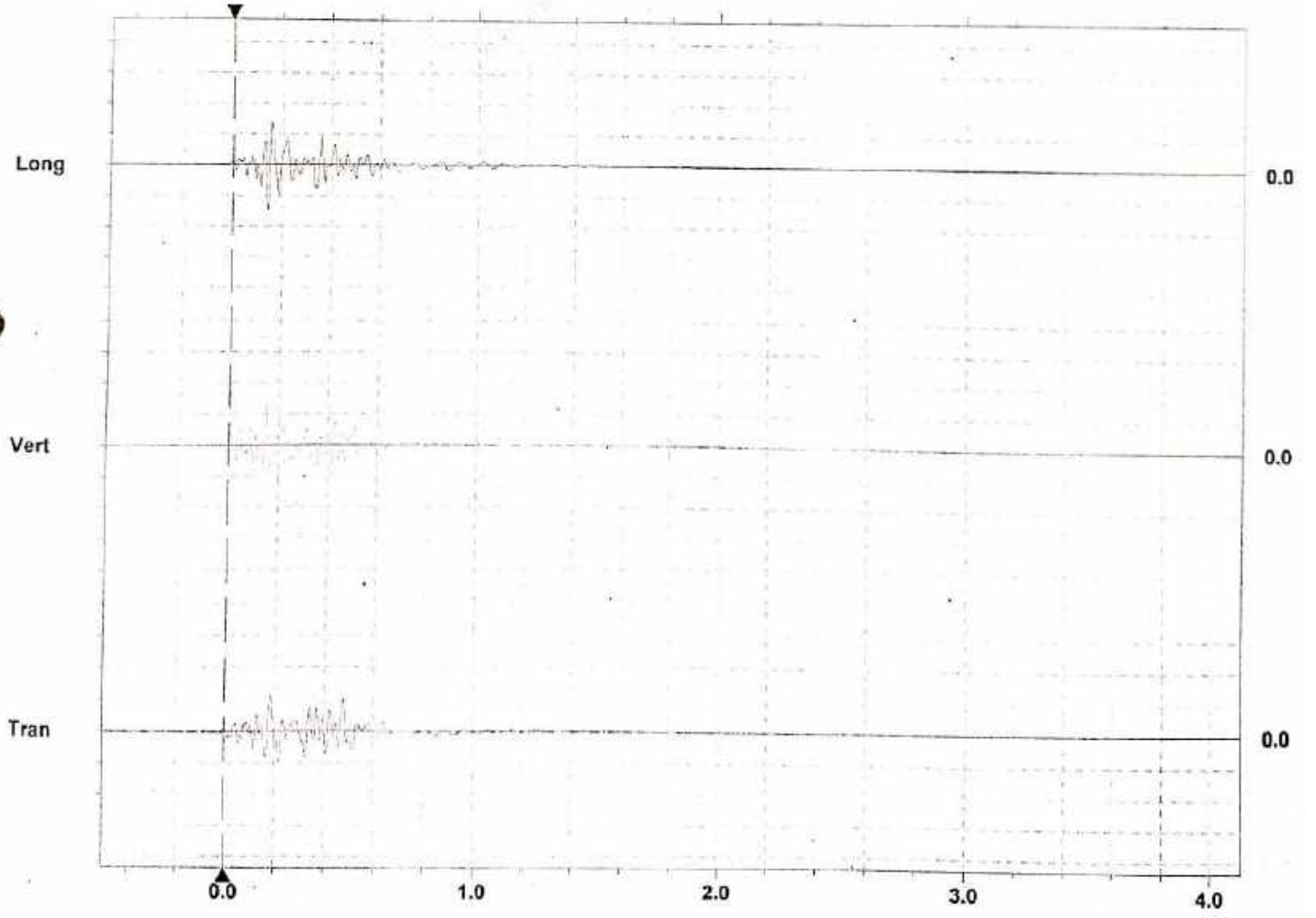
Serial Number	UM14894 V 10.90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	_TEMP EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

DGMS India (A)

Permissible Ground Vibration



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶—— ——◀

558

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Instantel **Event Report** BLOCK - B (3) Instantel

Date/Time	Vert at 13:49:39 February 16, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.167 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

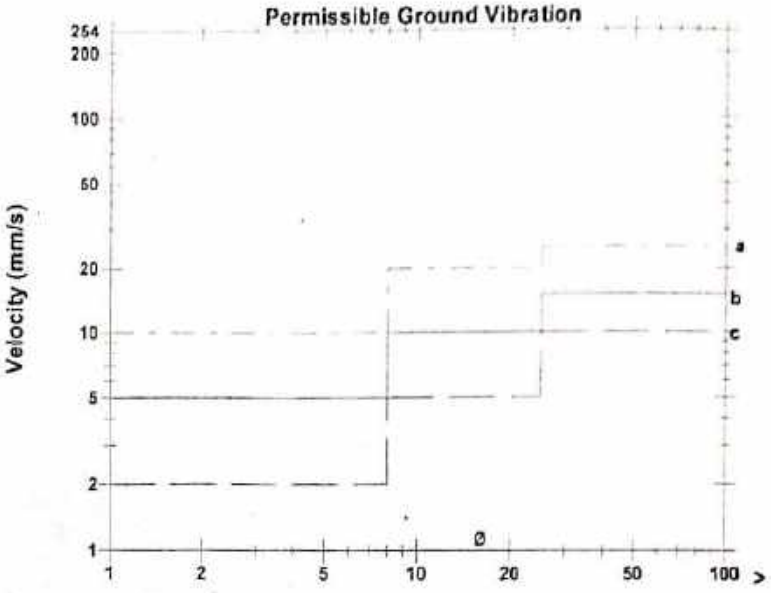
	Tran	**Vert**	**Long**	
PPV	0.812	0.765	1.151	mm/s
ZC Freq	23	20	16.0	Hz
Time (Rel. to Trig)	0.135	0.080	0.114	sec
Peak Acceleration	0.018	0.018	0.018	g
Peak Displacement	0.006	0.006	0.010	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.233 mm/s at 0.057 sec

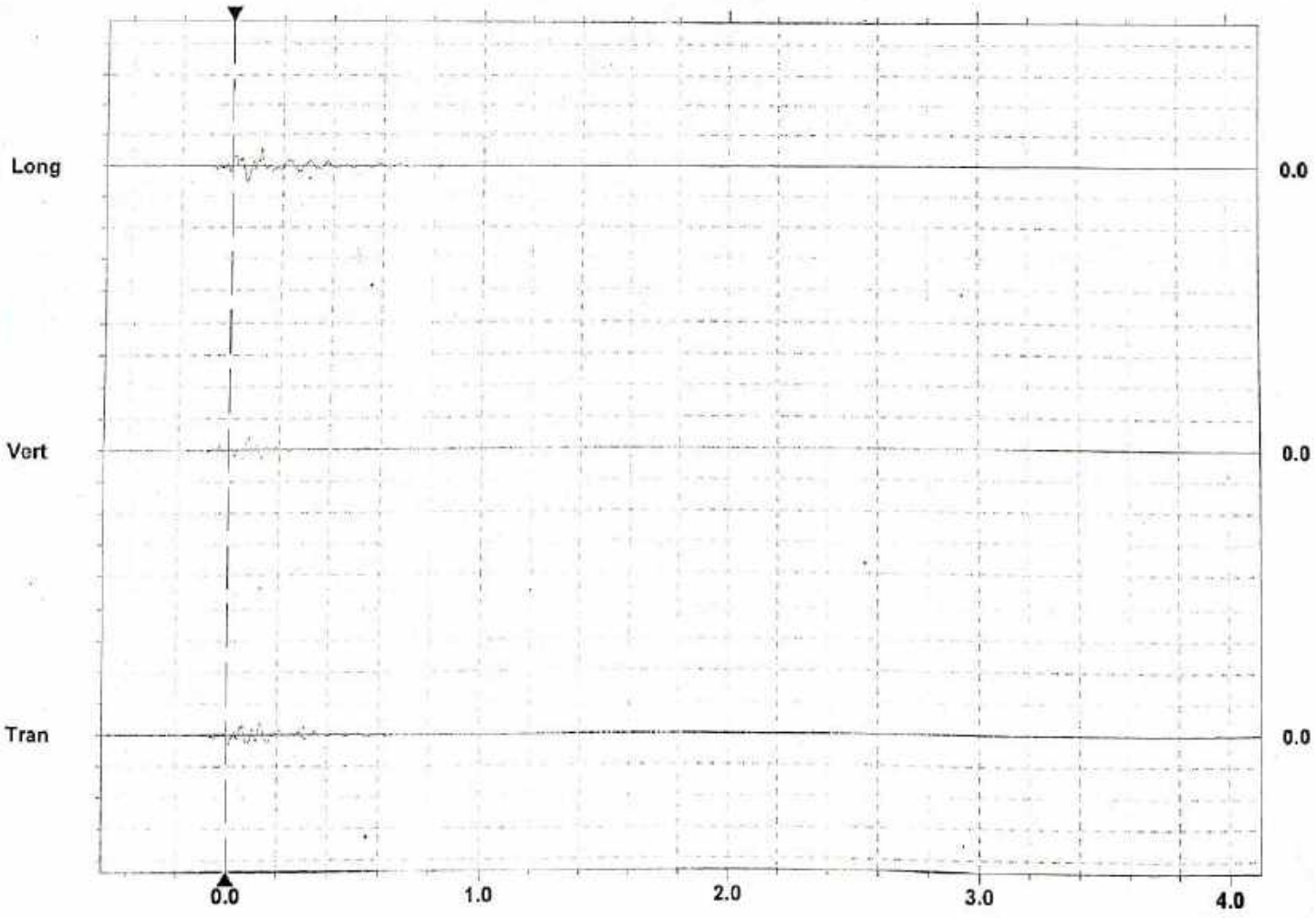
Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

DGMS India (A)

Permissible Ground Vibration



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Instantel

Event Report BIOLV-B

577

Instantel

Date/Time	Tran at 13:46:52 February 16, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.183 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

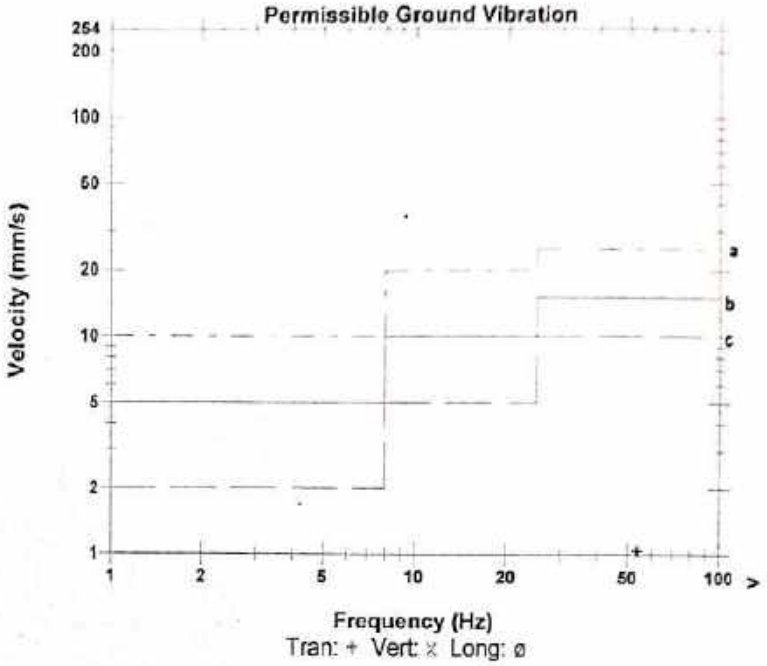
	Tran	**Vert**	**Long**	
PPV	1.040	0.962	0.780	mm/s
ZC Freq	54	37	33	Hz
Time (Rel. to Trig)	0.097	0.103	0.071	sec
Peak Acceleration	0.051	0.033	0.035	g
Peak Displacement	0.006	0.004	0.003	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.043 mm/s at 0.097 sec

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

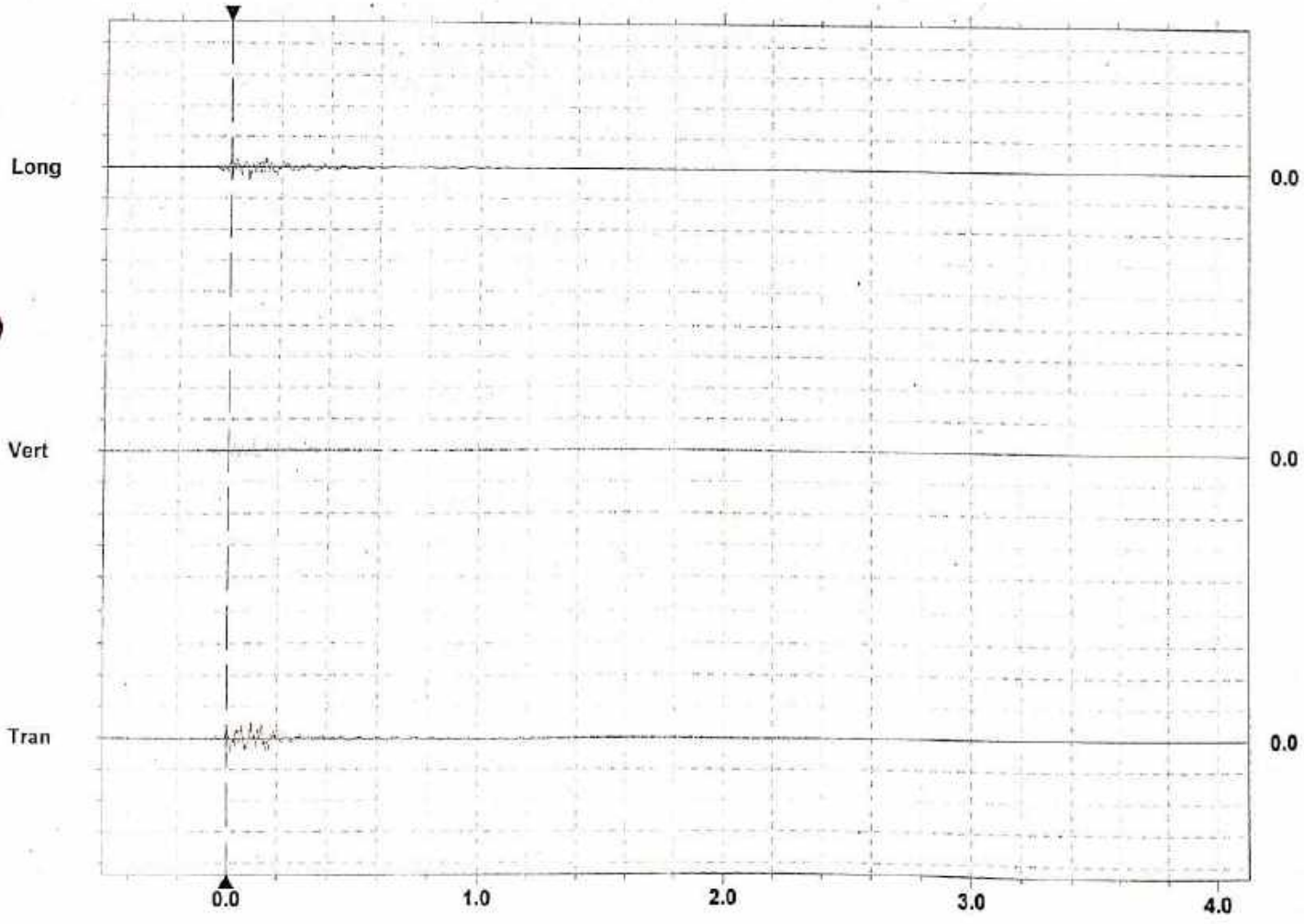
DGMS India (A)

Permissible Ground Vibration



Tran: + Vert: x Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶ ◀

560

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Event Report BICCL-MB-0

Instantel

578

Date/Time	Long at 13:37:13 February 16, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.002 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

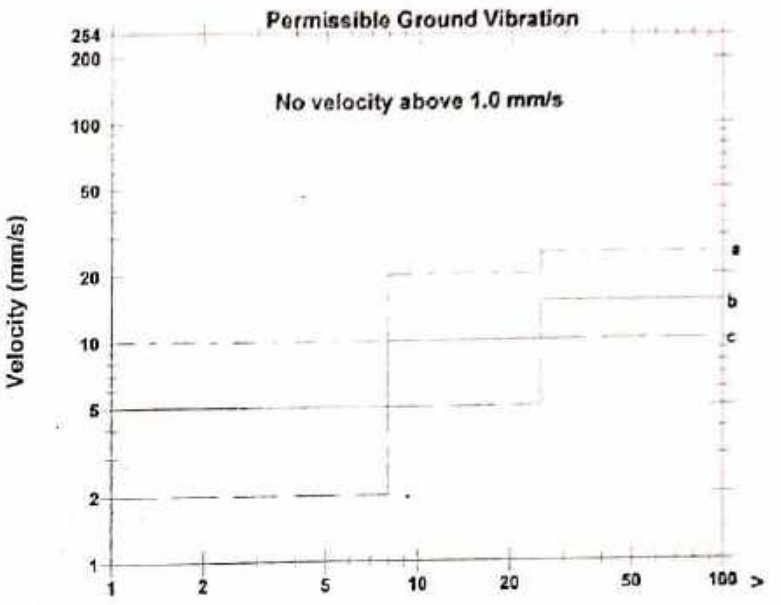
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	0.489	0.378	0.583	mm/s
ZC Freq	26	49	29	Hz
Time (Rel. to Trig)	-0.010	-0.022	0.000	sec
Peak Acceleration	0.021	0.013	0.020	g
Peak Displacement	0.002	0.002	0.003	mm
Sensor Check	Passed	Passed	Passed	

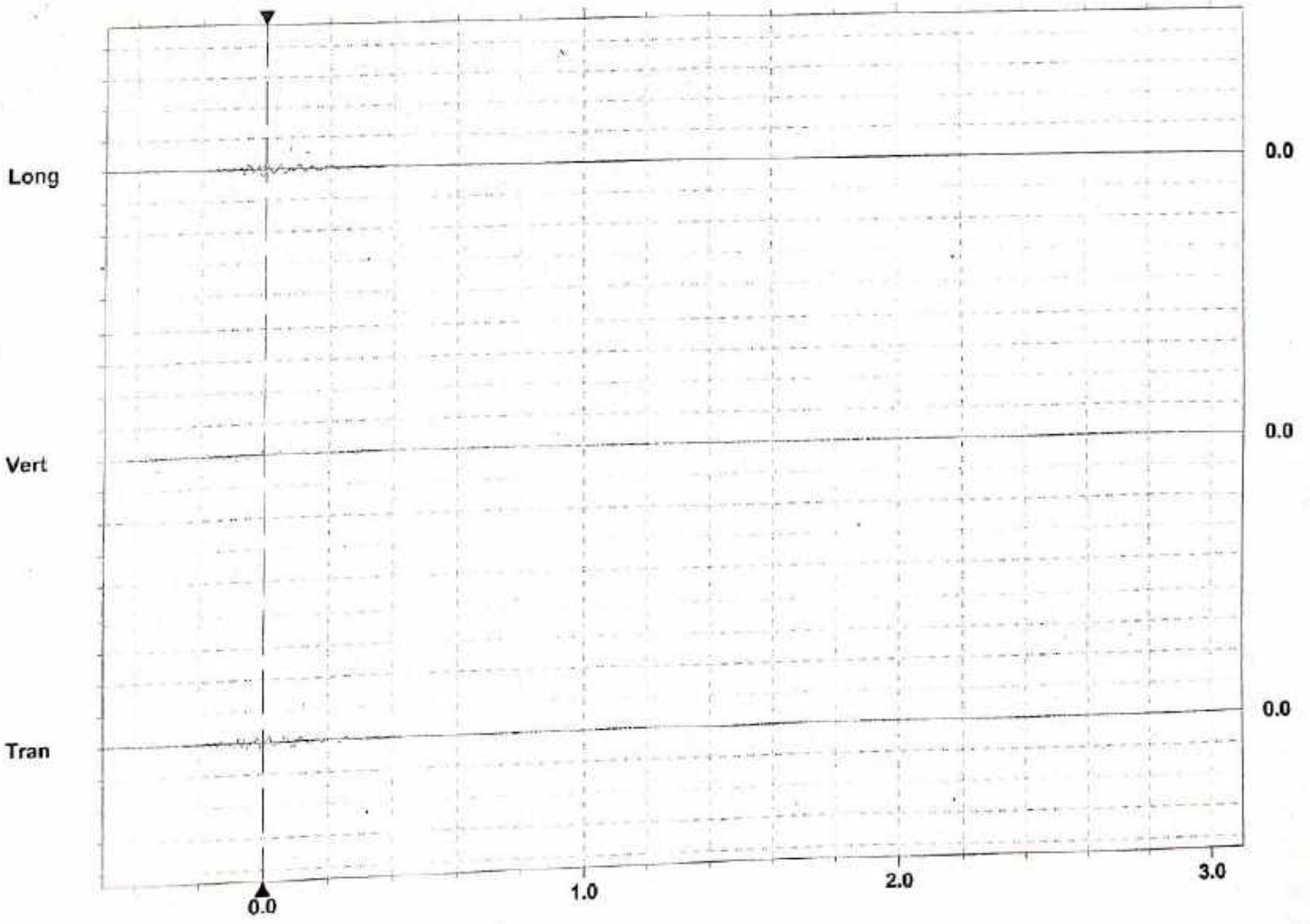
Peak Vector Sum 0.686 mm/s at -0.010 sec

DGMS India (A)



Tran: + Vert: × Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

561

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Instantel **Event Report** Block - B (9) Instantel

579

Date/Time	Vert at 14:30:31 February 17, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.015 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

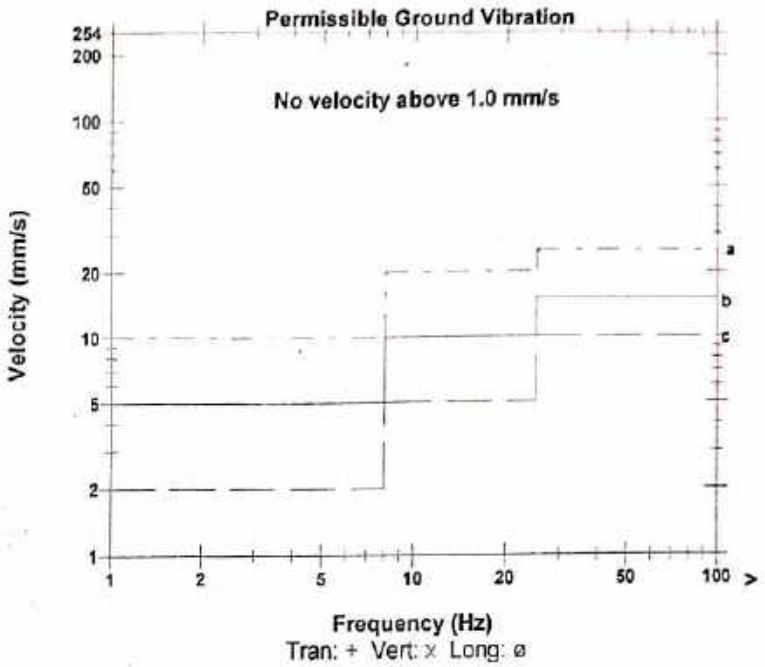
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

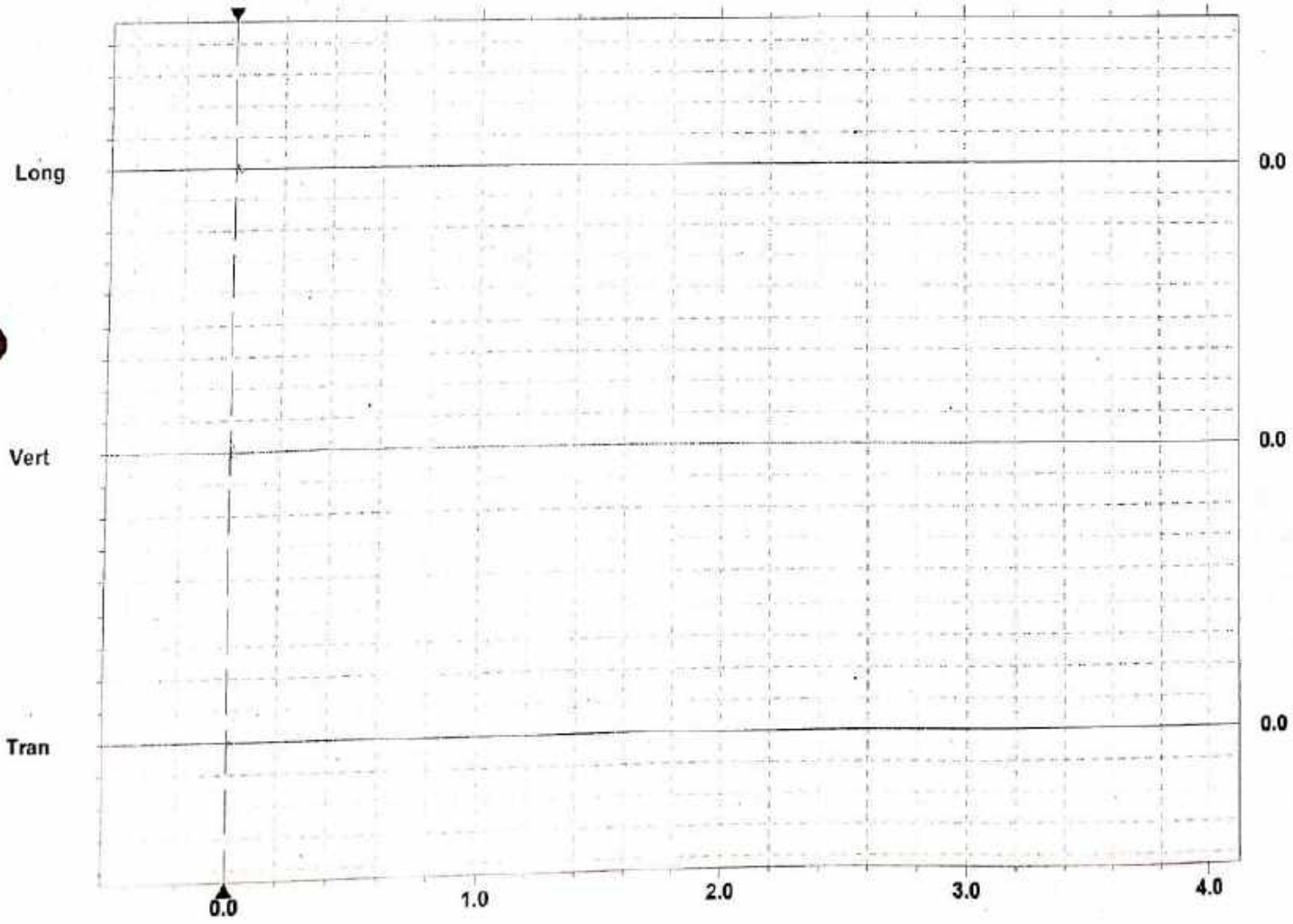
	Tran	**Vert**	**Long**	
PPV	0.307	0.709	0.378	mm/s
ZC Freq	128	93	128	Hz
Time (Rel. to Trig)	0.001	0.001	0.005	sec
Peak Acceleration	0.028	0.063	0.035	g
Peak Displacement	0.001	0.001	0.000	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 0.816 mm/s at 0.001 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶ ◀

562

Instantel

Event Report 580

Instantel

Date/Time	Vert at 14:29:02 February 17, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.006 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.6 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	___TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

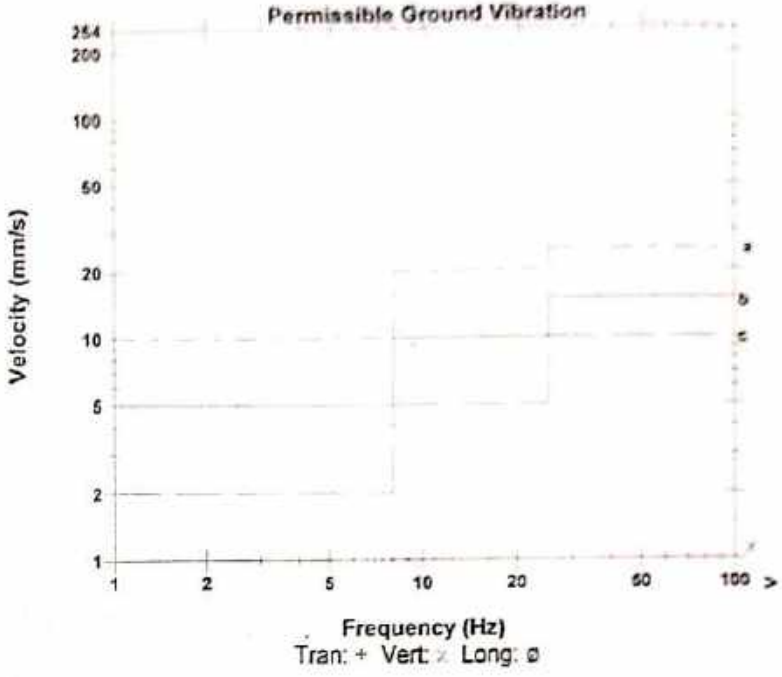
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	**Vert**	**Long**	
PPV	0.512	1.127	0.497	mm/s
ZC Freq	79	146	114	Hz
Time (Rel. to Trig)	0.005	0.004	0.006	sec
Peak Acceleration	0.048	0.104	0.038	g
Peak Displacement	0.001	0.001	0.001	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.218 mm/s at 0.004 sec

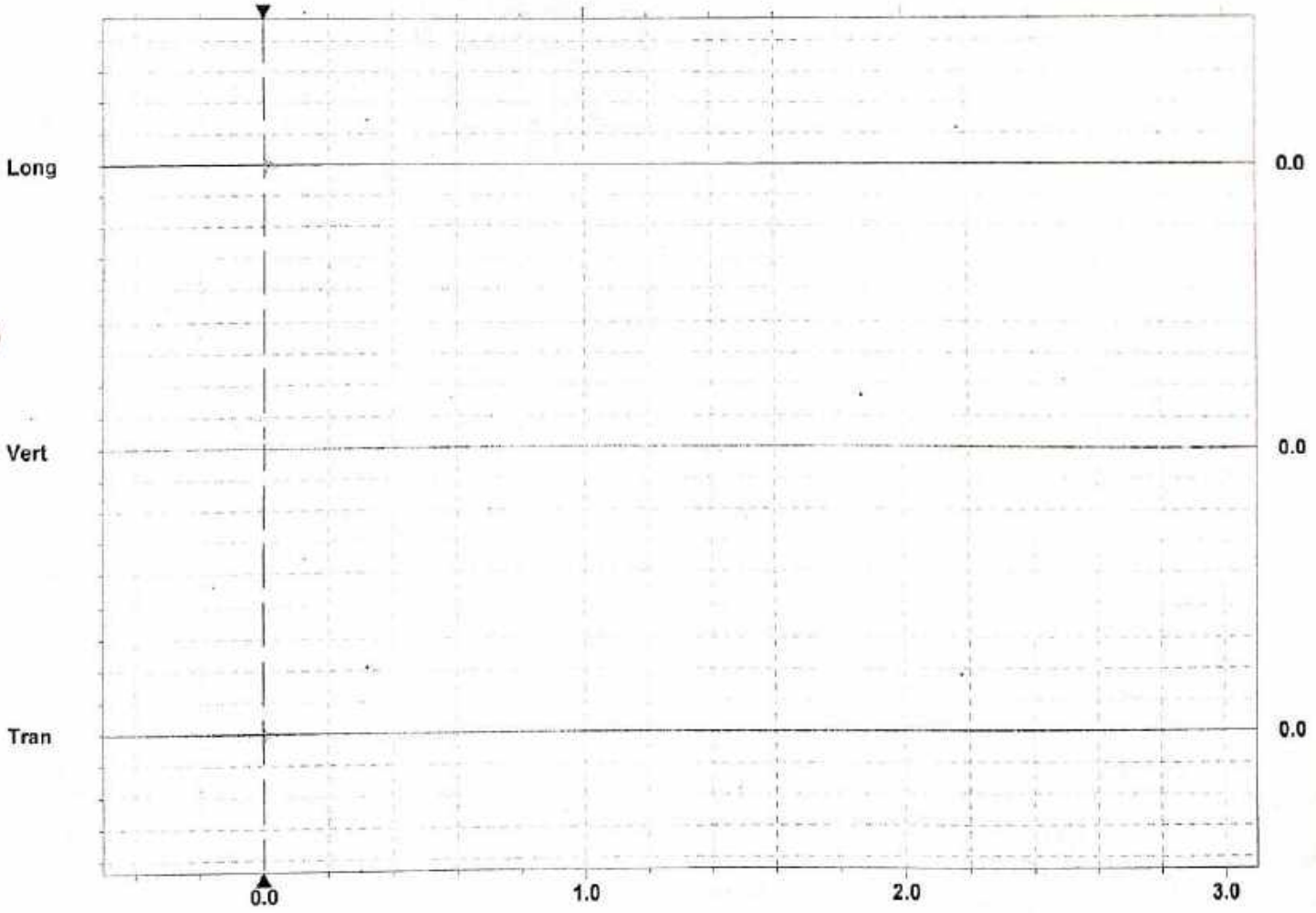
DGMS India (A)

Permissible Ground Vibration



Frequency (Hz)
Tran: + Vert: ◦ Long: ø

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Instantel **Event Report** DIOLK-3(2) Instantel

Date/Time	Vert at 14:23:23 February 17, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.006 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

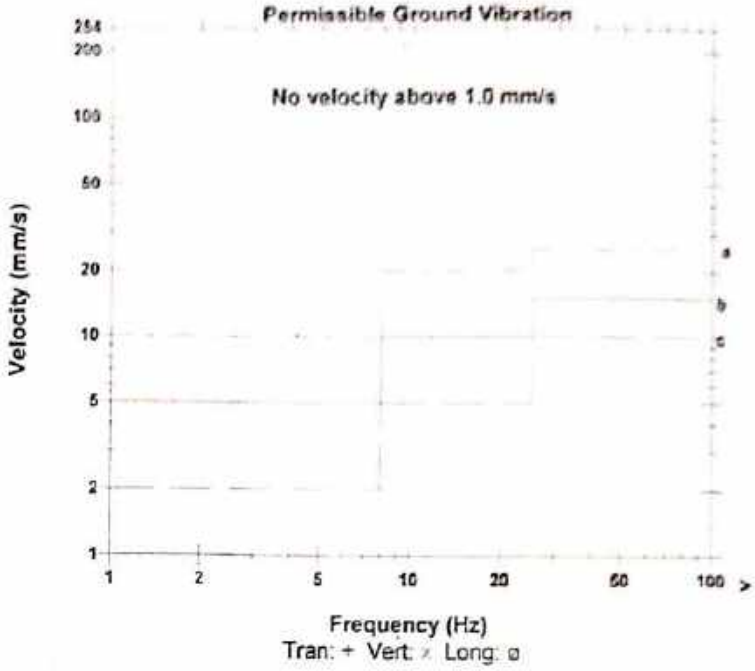
GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

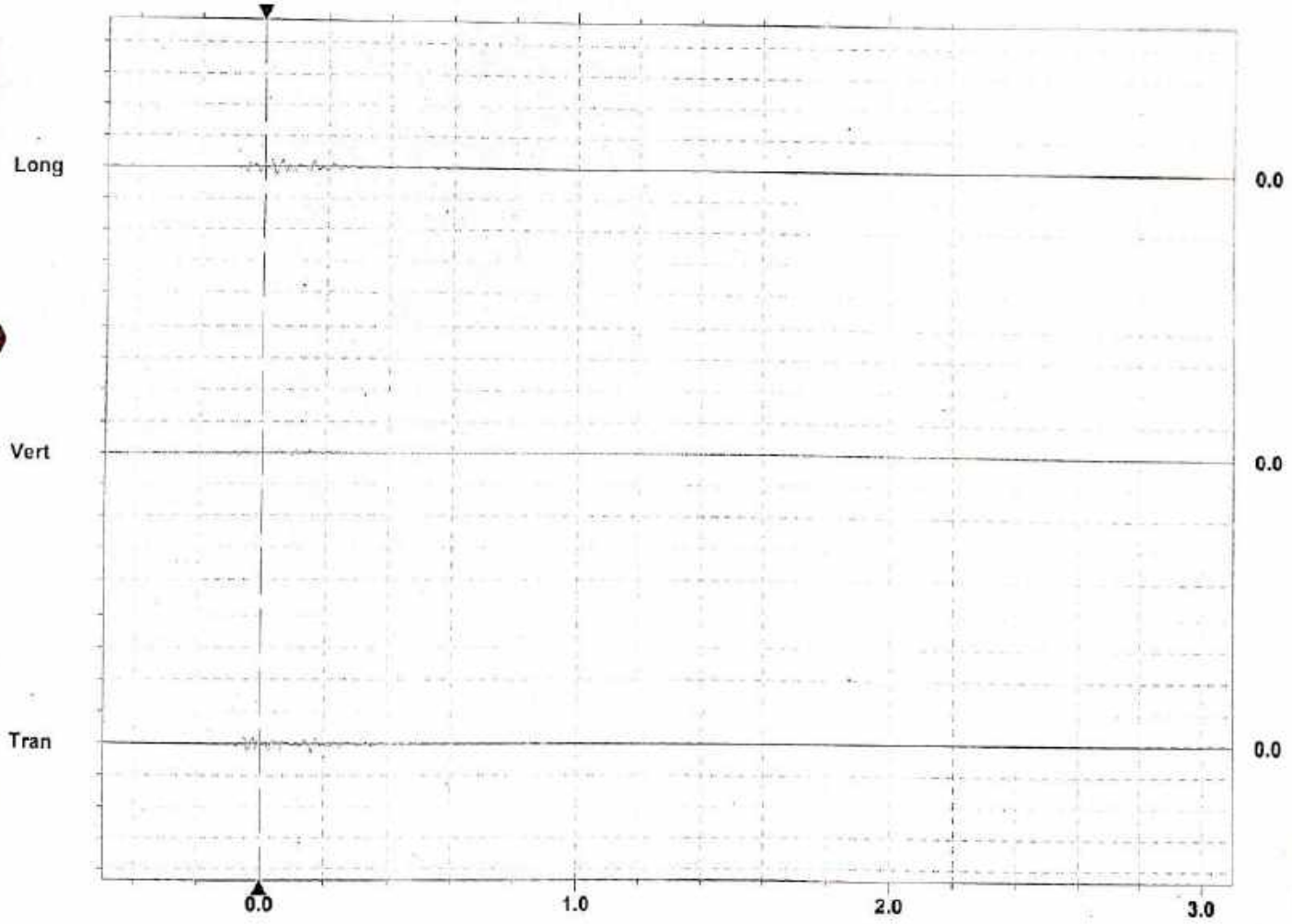
Notes
Location: Near Bayal Mines Blasting to 200 mtr
Client: Bayal Mines
User Name: Bayal Mines
General:

	Serial Number	UM14894 V 10-90FB Micromate ISEE
	Battery Level	3.8 Volts
	Unit Calibration	June 26, 2024 by UES New Delhi
	File Name	TEMP.EVT
	Scaled Distance	485.0 (153.4 m, 0.1 kg)

	Tran	Vert	Long	
PPV	0.497	0.615	0.465	mm/s
ZC Freq	27	37	33	Hz
Time (Rel. to Trig)	0.159	0.002	0.022	sec
Peak Acceleration	0.018	0.023	0.020	g
Peak Displacement	0.003	0.003	0.002	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 0.660 mm/s at 0.002 sec





Instantel Event Report Blast 30 Instantel

Date/Time	Long at 14:22:11 February 17, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.23 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

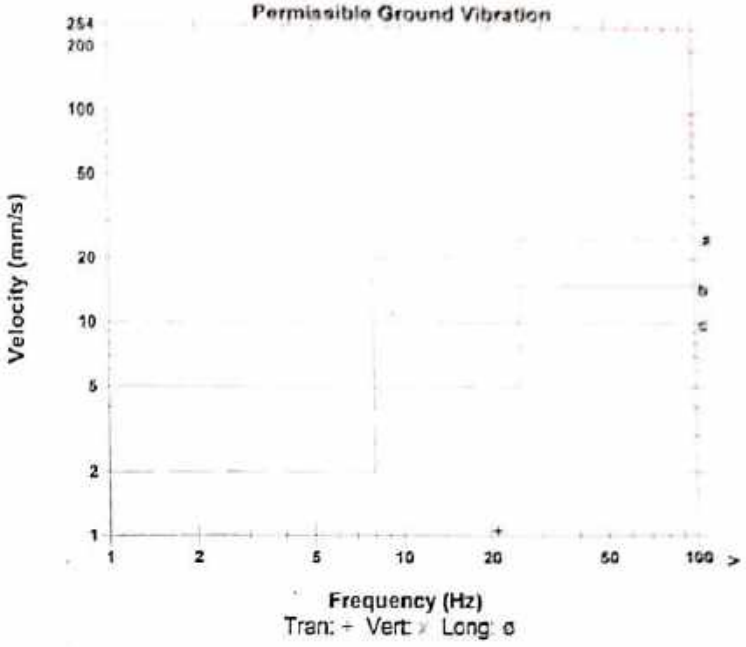
Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

GPS Location	Latitude	Longitude
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

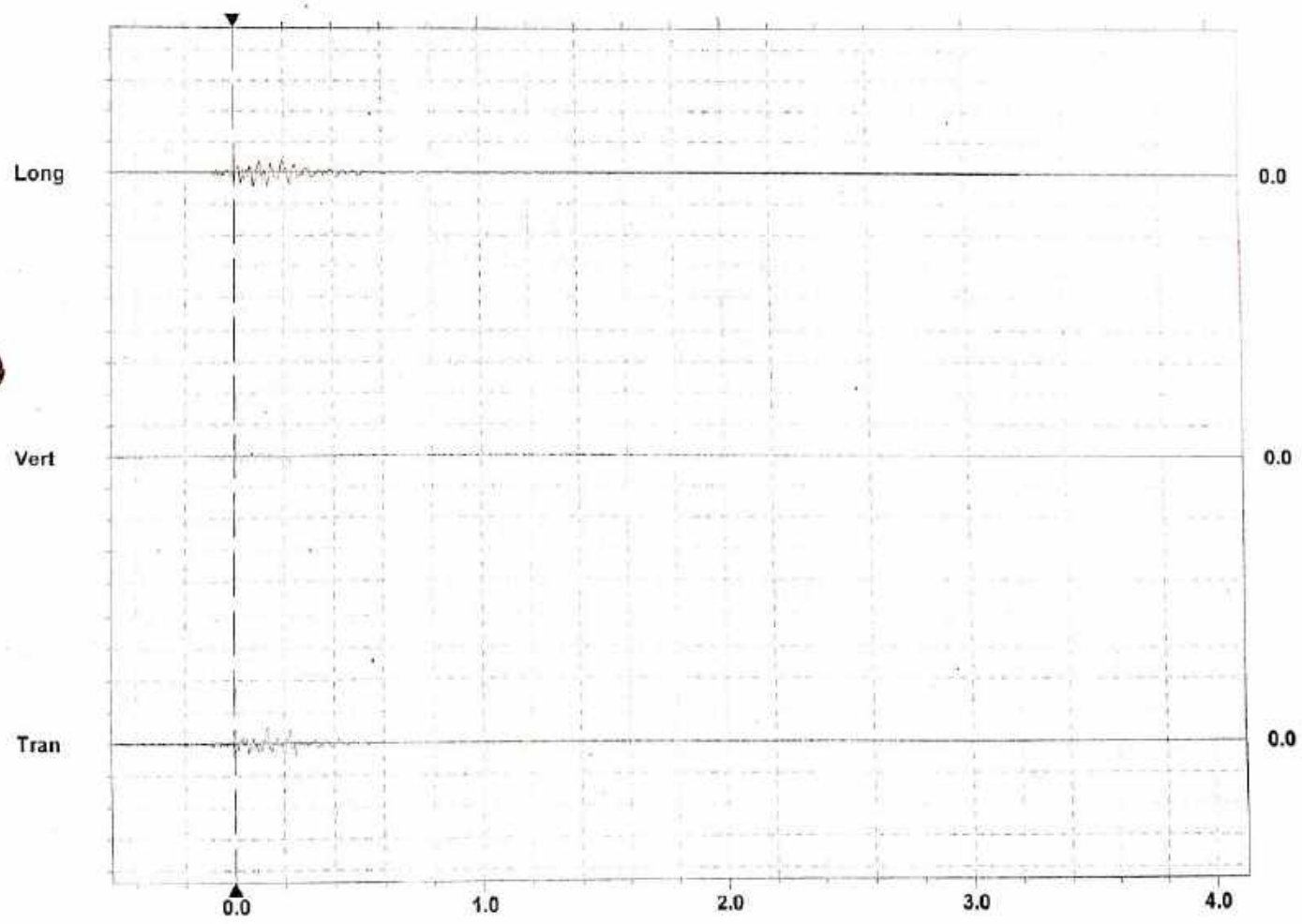
Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

	Tran	Vert	Long	
PPV	1.048	0.434	0.828	mm/s
ZC Freq	21	57	38	Hz
Time (Rel. to Trig)	0.131	0.008	0.079	sec
Peak Acceleration	0.025	0.020	0.026	g
Peak Displacement	0.005	0.002	0.004	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.154 mm/s at 0.133 sec



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div
Trigger =

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Instantel **Event Report** BM-30 Instantel

Date/Time	Long at 13:34:35 February 18, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.169 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines MMB

Serial Number	UM14894 V 10.66FB Micromate ISEE
Battery Level	3.7 Volts
Unit Calibration	June 28, 2024 by UES New Delhi
File Name	TEMP.EVT
Scaled Distance	465.0 (153.4 m, 0.1 kg)

GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr
Client: Bayal Mines
User Name: Bayal Mines
General:

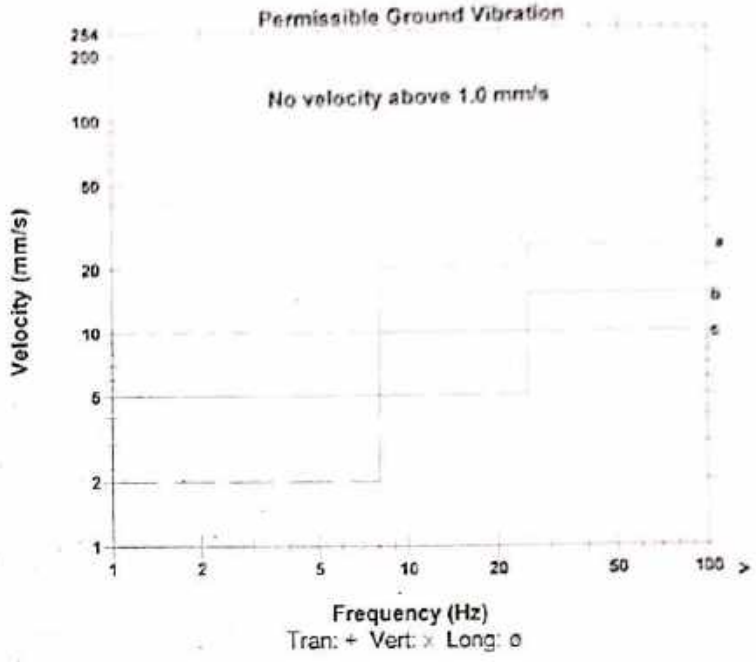
	Tran	Vert	Long	
PPV	0.749	0.646	0.867	mm/s
ZC Freq	32	34	27	Hz
Time (Rel. to Trig)	0.066	0.074	0.051	sec
Peak Acceleration	0.020	0.025	0.031	g
Peak Displacement	0.004	0.003	0.005	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.106 mm/s at 0.051 sec

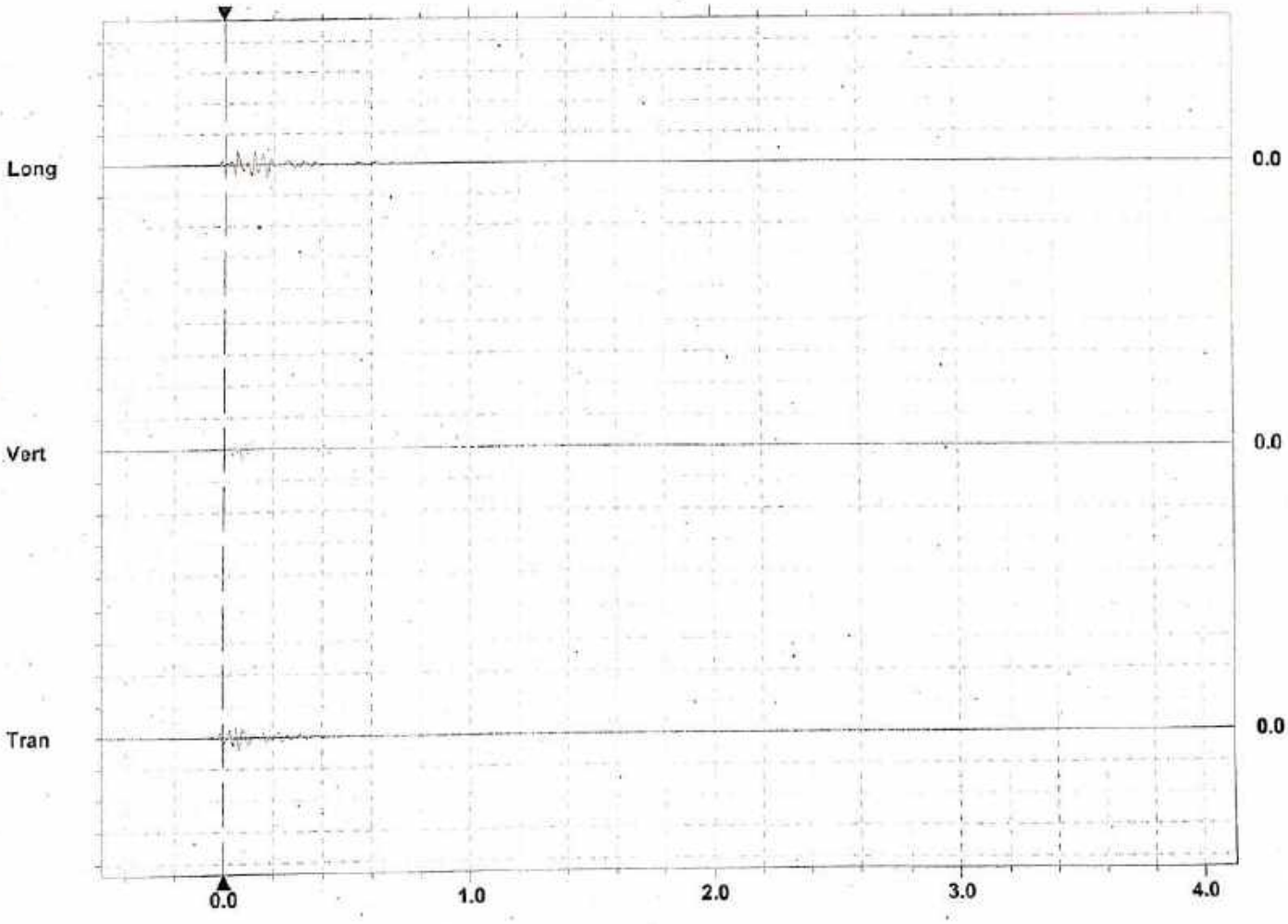
DGMS India (A)

Permissible Ground Vibration

No velocity above 1.0 mm/s



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Printed: February 19, 2025 (V 10.72 - 10.72) Format © 1995-2014 Xmark Corporation

Instantel Event Report BVCL-30 Instantel

584

Date/Time	Long at 13:27:25 February 18, 2025
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.132 sec (Auto=3Sec) at 2048 sps
Operator/Setup:	Operator/Bayal Mines.MMB

Serial Number	UM14894 V 10-90FB Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	June 26, 2024 by UES New Delhi
File Name	__TEMP.EVT
Scaled Distance	485.0 (153.4 m, 0.1 kg)

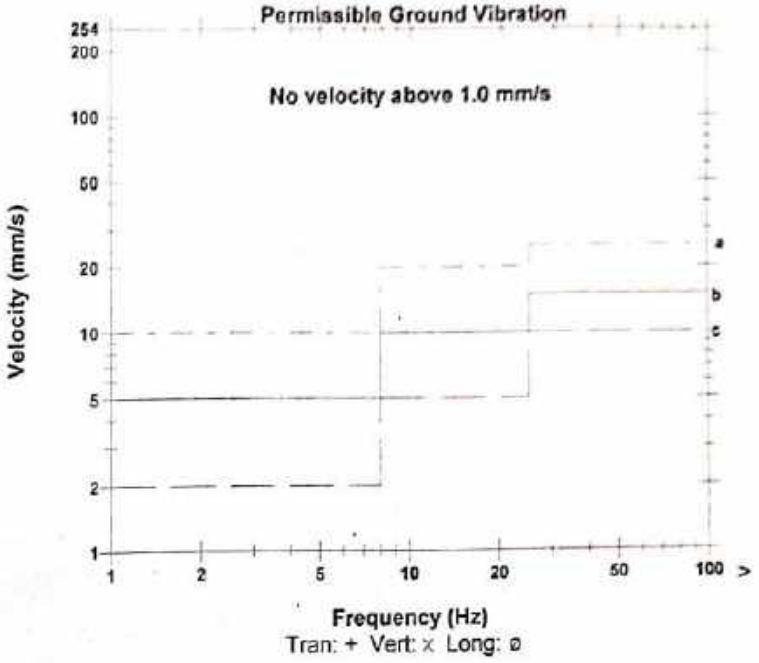
GPS Location	**Latitude**	**Longitude**
Source:	027 51.097 N	075 58.824 E
Sensor1:	027 51.150 N	075 58.752 E
Distance:	153.4 m	

Notes
Location: Near Bayal Mines Blasting to 200 mtr.
Client: Bayal Mines
User Name: Bayal Mines
General:

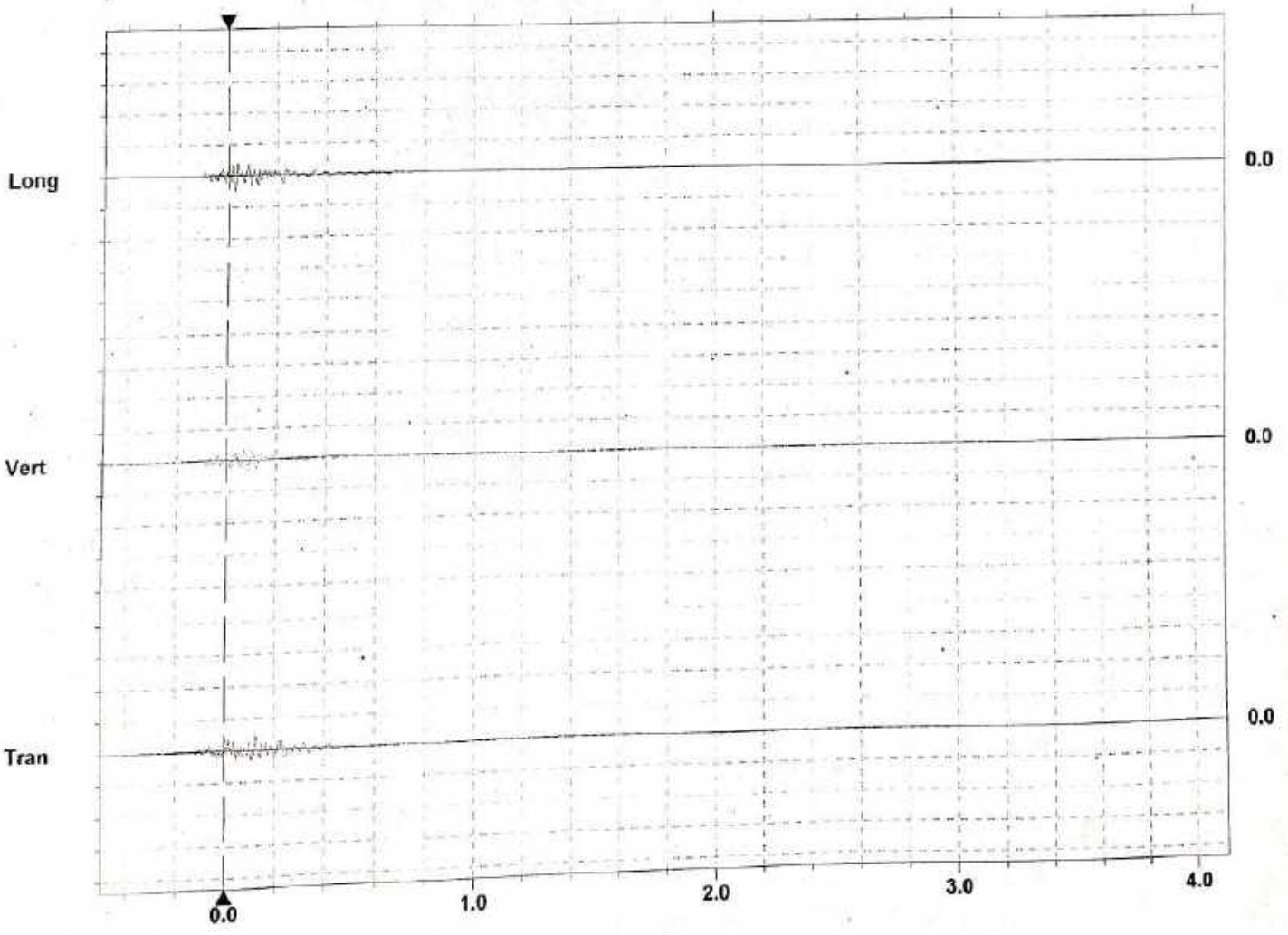
	Tran	**Vert**	**Long**	
PPV	0.835	0.662	0.985	mm/s
ZC Freq	34	32	37	Hz
Time (Rel. to Trig)	0.125	0.103	0.029	sec
Peak Acceleration	0.031	0.021	0.038	g
Peak Displacement	0.004	0.003	0.004	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.041 mm/s at 0.038 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger = ▶—— ——◀

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Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number	:	VEL/AP/01	**Report No.**	:	VEL/AP/240919/001
Name and Address of the Party	:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.**	:	7.8F – 03
			Party Reference No.	:	NIL
			Reporting Date	:	25/09/2024
			Period of Analysis	:	19/09/2024-25/09/2024
			Receipt Date	:	19/09/2024
Name of Sample	:	**AMBIENT AIR**			
Sample Group	:	Atmospheric Pollution			

General Information

Sampling Location	:	Near Mining Site
Sample Collected By	:	VEL Representative
Sampling Equipment Used	:	RDS and FPS with all accessories
Instrument Code	:	VEL/RDS/02 & FPS/06
Instrument Calibration Status	:	Calibrated
Meteorological Condition during Monitoring	:	Clear Sky
Date of Monitoring	:	18/09/2024 - 19/09/2024
Time of Monitoring	:	10:00 AM to 10:00 AM
Ambient Temperature (°C)	:	22.0 Min to 33.0 Max
Surrounding Activity	:	Mining, Vehicular and Human Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS:5182
Sample Duration	:	24.0 Hrs.
Parameter Required	:	As per Work Order

S.No.	Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter (as PM_{10})	IS:5182 (P-23):2006 RA 2017	81.25	$\mu g/m^3$	100
2	Particulate Matter (as $PM_{2.5}$)	IS:5182 (P-24):2019	51.22	$\mu g/m^3$	60
3	Nitrogen Dioxide (NO_2)	IS:5182 (P-6):2006 RA:2022	15.38	$\mu g/m^3$	80
4	Sulphur Dioxide (SO_2)	IS:5182 (P-2): RA:2023	7.8	$\mu g/m^3$	80
5	#Carbon monoxide (CO)	IS 5182 (P-10), NDIR Method	0.91	mg/m^3	4.0

Note: # - indicates CO monitoring for 1 hour

*** End of Report ***

VARDAN ENVIROLAB GURUGRAM

(Reviewed By)

VARDAN ENVIROLAB GURUGRAM

(Authorized Signatory)

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number	:	VEL/AP/02	**Report No.**	:	VEL/AP/240919/002
Name and Address of the Party	:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.**	:	7.8F – 03
			Party Reference No.	:	NIL
			Reporting Date	:	25/09/2024
			Period of Analysis	:	19/09/2024-25/09/2024
			Receipt Date	:	19/09/2024
Name of Sample	:	**AMBIENT AIR**			
Sample Group	:	Atmospheric Pollution			

General Information

Sampling Location	:	Haul Road
Sample Collected By	:	VEL Representative
Sampling Equipment Used	:	RDS and FPS with all accessories
Instrument Code	:	VEL/RDS/03 & FPS/05
Instrument Calibration Status	:	Calibrated
Meteorological Condition during Monitoring	:	Clear Sky
Date of Monitoring	:	18/09/2024 - 19/09/2024
Time of Monitoring	:	11:45 AM to 11:45 AM
Ambient Temperature (°C)	:	22.0 Min to 33.0 Max
Surrounding Activity	:	Human and Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS:5182
Sample Duration	:	24.0 Hrs.
Parameter Required	:	As per Work Order

S.No.	Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter (as PM_{10})	IS:5182 (P-23):2006 RA 2017	90.21	$\mu g/m^3$	100
2	Particulate Matter (as $PM_{2.5}$)	IS:5182 (P-24):2019	56.38	$\mu g/m^3$	60
3	Nitrogen Dioxide (NO_2)	IS:5182 (P-6):2006 RA:2022	24.57	$\mu g/m^3$	80
4	Sulphur Dioxide (SO_2)	IS:5182 (P-2): RA:2023	10.45	$\mu g/m^3$	80
5	Carbon monoxide (CO)	IS 5182 (P-10), NDIR Method	0.95	mg/m^3	4.0

Note: # - indicates CO monitoring for 1 hour

*** End of Report ***

VARDAN ENVIROLAB GURUGRAM

(Reviewed By)

(Authorized Signatory)

VARDAN ENVIROLAB GURUGRAM

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number	:	VEL/AP/03	**Report No.**	:	VEL/AP/240919/003
Name and Address of the Party	:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.**	:	7.8F – 03
			Party Reference No.	:	NIL
			Reporting Date	:	25/09/2024
			Period of Analysis	:	19/09/2024-25/09/2024
			Receipt Date	:	19/09/2024
Name of Sample	:	**AMBIENT AIR**			
Sample Group	:	Atmospheric Pollution			

General Information

Sampling Location	:	Loading Point
Sample Collected By	:	VEL Representative
Sampling Equipment Used	:	RDS and FPS with all accessories
Instrument Code	:	VEL/RDS/04 & FPS/03
Instrument Calibration Status	:	Calibrated
Meteorological Condition during Monitoring	:	Clear Sky
Date of Monitoring	:	18/09/2024 - 19/09/2024
Time of Monitoring	:	10:20 AM to 10:20 AM
Ambient Temperature (°C)	:	22.0 Min to 33.0 Max
Surrounding Activity	:	Human and Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS:5182
Sample Duration	:	24.0 Hrs.
Parameter Required	:	As per Work Order

S.No.	Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter (as PM_{10})	IS:5182 (P-23):2006 RA 2017	90.22	$\mu g/m^3$	100
2	Particulate Matter (as $PM_{2.5}$)	IS:5182 (P-24):2019	58.36	$\mu g/m^3$	60
3	Nitrogen Dioxide (NO_2)	IS:5182 (P-6):2006 RA:2022	20.17	$\mu g/m^3$	80
4	Sulphur Dioxide (SO_2)	IS:5182 (P-2): RA:2023	11.25	$\mu g/m^3$	80
5	Carbon monoxide (CO)	IS 5182 (P-10), NDIR Method	0.95	mg/m^3	4.0

Note: # - indicates CO monitoring for 1 hour

*** End of Report ***

VARDAN ENVIROLAB GURUGRAM

(Reviewed By)

(Authorized Signatory)

VARDAN ENVIROLAB GURUGRAM

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number	:	VEL/AP/04	**Report No.**	:	VEL/AP/240919/004
Name and Address of the Party	:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.**	:	7.8F – 03
			Party Reference No.	:	NIL
			Reporting Date	:	25/09/2024
			Period of Analysis	:	19/09/2024-25/09/2024
			Receipt Date	:	19/09/2024
Name of Sample	:	**AMBIENT AIR**			
Sample Group	:	Atmospheric Pollution			

General Information

Sampling Location	:	Village- Bayal
Sample Collected By	:	VEL Representative
Sampling Equipment Used	:	RDS and FPS with all accessories
Instrument Code	:	VEL/RDS/07 & FPS/02
Instrument Calibration Status	:	Calibrated
Meteorological Condition during Monitoring	:	Clear Sky
Date of Monitoring	:	18/09/2024 - 19/09/2024
Time of Monitoring	:	10:45 AM to 10:45 AM
Ambient Temperature (°C)	:	22.0 Min to 33.0 Max
Surrounding Activity	:	Human and Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS:5182
Sample Duration	:	24.0 Hrs.
Parameter Required	:	As per Work Order

S.No.	Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter (as PM_{10})	IS:5182 (P-23):2006 RA 2017	79.24	$\mu g/m^3$	100
2	Particulate Matter (as $PM_{2.5}$)	IS:5182 (P-24):2019	56.36	$\mu g/m^3$	60
3	Nitrogen Dioxide (NO_2)	IS:5182 (P-6):2006 RA:2022	16.28	$\mu g/m^3$	80
4	Sulphur Dioxide (SO_2)	IS:5182 (P-2): RA:2023	7.1	$\mu g/m^3$	80
5	Carbon monoxide (CO)	IS 5182 (P-10), NDIR Method	0.79	mg/m^3	4.0

Note: # - indicates CO monitoring for 1 hour

*** End of Report ***

VARDAN ENVIROLAB GURUGRAM

(Reviewed By)

(Authorized Signatory)

VARDAN ENVIROLAB GURUGRAM

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number	:	VEL/AP/05	**Report No.**	:	VEL/AP/240919/005
Name and Address of the Party	:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.**	:	7.8F – 03
			Party Reference No.	:	NIL
			Reporting Date	:	25/09/2024
			Period of Analysis	:	19/09/2024-25/09/2024
			Receipt Date	:	19/09/2024
Name of Sample	:	**AMBIENT AIR**			
Sample Group	:	Atmospheric Pollution			

General Information

Sampling Location	:	100 mtr from Mine Site
Sample Collected By	:	VEL Representative
Sampling Equipment Used	:	RDS and FPS with all accessories
Instrument Code	:	VEL/RDS/05 & FPS/07
Instrument Calibration Status	:	Calibrated
Meteorological Condition during Monitoring	:	Clear Sky
Date of Monitoring	:	18/09/2024 - 19/09/2024
Time of Monitoring	:	11:20 PM to 11:20 PM
Ambient Temperature (°C)	:	22.0 Min to 33.0 Max
Surrounding Activity	:	Human and Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS:5182
Sample Duration	:	24.0 Hrs.
Parameter Required	:	As per Work Order

S.No.	Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter (as PM_{10})	IS:5182 (P-23):2006 RA 2017	85.19	$\mu g/m^3$	100
2	Particulate Matter (as $PM_{2.5}$)	IS:5182 (P-24):2019	54.22	$\mu g/m^3$	60
3	Nitrogen Dioxide (NO_2)	IS:5182 (P-6):2006 RA:2022	18.27	$\mu g/m^3$	80
4	Sulphur Dioxide (SO_2)	IS:5182 (P-2): RA:2023	9.8	$\mu g/m^3$	80
5	Carbon monoxide (CO)	IS 5182 (P-10), NDIR Method	0.94	mg/m^3	4.0

Note: # - indicates CO monitoring for 1 hour

*** End of Report ***

VARDAN ENVIROLAB GURUGRAM

(Reviewed By)

(Authorized Signatory)

VARDAN ENVIROLAB GURUGRAM

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number	:	VEL/AP/06	**Report No.**	:	VEL/AP/240919/006
Name and Address of the Party	:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.**	:	7.8F – 03
			Party Reference No.	:	NIL
			Reporting Date	:	25/09/2024
			Period of Analysis	:	19/09/2024-25/09/2024
			Receipt Date	:	19/09/2024
Name of Sample	:	**AMBIENT AIR**			
Sample Group	:	Atmospheric Pollution			

General Information

Sampling Location	:	Village - Doyala
Sample Collected By	:	VEL Representative
Sampling Equipment Used	:	RDS and FPS with all accessories
Instrument Code	:	VEL/RDS/07 & FPS/04
Instrument Calibration Status	:	Calibrated
Meteorological Condition during Monitoring	:	Clear Sky
Date of Monitoring	:	18/09/2024 - 19/09/2024
Time of Monitoring	:	12:15 PM to 12:15 PM
Ambient Temperature (°C)	:	22.0 Min to 33.0 Max
Surrounding Activity	:	Human and Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS:5182
Sample Duration	:	24.0 Hrs.
Parameter Required	:	As per Work Order

S.No.	Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter (as PM_{10})	IS:5182 (P-23):2006 RA 2017	71.54	$\mu g/m^3$	100
2	Particulate Matter (as $PM_{2.5}$)	IS:5182 (P-24):2019	52.27	$\mu g/m^3$	60
3	Nitrogen Dioxide (NO_2)	IS:5182 (P-6):2006 RA:2022	14.3	$\mu g/m^3$	80
4	Sulphur Dioxide (SO_2)	IS:5182 (P-2): RA:2023	7.1	$\mu g/m^3$	80
5	Carbon monoxide (CO)	IS 5182 (P-10), NDIR Method	0.71	mg/m^3	4.0

Note: # - indicates CO monitoring for 1 hour

*** End of Report ***

VARDAN ENVIROLAB GURUGRAM

(Reviewed By)

(Authorized Signatory)

VARDAN ENVIROLAB GURUGRAM

591

Laboratory of the
Haryana State Pollution Control Board
Vikas Sadan, Ist Floor, Gurgaon

Tel-2332596

~~Paid~~ /**Monitoring** ✓

Description to:-
Bayal Quartz & Feldspar Mines, Village-Bayal, Block-B, Site-1 Report No: 872
Lat-27.851042^0 Long-75.979808^0

Dated. 21/02/2025

Description of the Sample:-Received 18/02/2025 a sample of Ambient Air from Dr. Narender Sharma, RD, CPCB, Sh. Krishna Kumar, RO, Sh. Manoj Kumar, SDM, Sh. Rajnish, RFO & Sh. Anuj Narwal, AEE collected on 17/02/2025 to 18/02/2025 from Bayal Quartz & Feldspar Mines, Village-Bayal, Block-B, Site-1 Lat-27.851042^0 Long-75.979808^0.

ANALYSIS REPORT

Sr.No	Descriptions	Report No: 872			
1.	Location of Sampling Point		Site-1		
2.	Date of sampling	17/02/2025 to 18/02/2025	17/02/2025 to 18/02/2025	17/02/2025 to 18/02/2025	
3.	Sampling started at	17/02/2025 6.00 PM	18/02/2025 02.00 AM	18/02/2025 10.00 AM	
4.	Sampling completed at	18/02/2025 02.00 AM	18/02/2025 10.00 AM	18/02/2025 06.00 PM	
5.	Actual time of sampling	8 Hrs.	8 Hrs.	8 Hrs.	
6.	Flow rate of PM_{10} (m^3/min)	1.0	1.0	1.0	
7.	Volume of air sampled for PM_{10} (m^3)	480	480	480	
8.	Flow rate of $PM_{2.5}$ LPM	16.7	16.7	16.7	
9.	Volume of air sampled for $PM_{2.5}$ (m^3)	24.04	24.04	24.04	
10.	Average Ambient Temperature	-	-	-	
11.	Weather condition	Normal	Normal	Normal	
	RESULTS				Prescribed Limits
10.	PM_{10} µg/Nm^3 (8 Hourly)	71.0	76.0	89.0	100.0
11.	$PM_{2.5}$ µg/Nm^3 (24 Hourly)		51.0		60.0
12.	Sulpher Dioxide µg/Nm^3	10.2	11.2	15.6	80.0
13.	Oxides of Nitrogen µg/Nm^3	8.2	9.4	10.2	80.0

Sample Collected/Not Collected by us

Sample Consumed in testing

LAB INCHARGE

Dated 21/02/2025

HSPCB/Lab/GR/2024/ 1507

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Laboratory of the
Haryana State Pollution Control Board
Vikas Sadan, Ist Floor, Gurgaon

Tel-2332596

Paid /**Monitoring**

Description to:-
Bayal Quartz & Feldspar Mines, Village-Bayal, Block-B, Site-2 Report No: 874
Lat-27.852536^0 Long-75.979179^0

Dated. 21/02/2025

Description of the Sample:-Received 18/02/2025 a sample of Ambient Air from Dr. Narender Sharma, RD, CPCB, Sh. Krishna Kumar, RO, Sh. Manoj Kumar, SDM, Sh. Rajnish, RFO & Sh. Anuj Narwal, AEE collected on **17/02/2025 to 18/02/2025 from Bayal Quartz & Feldspar Mines, Village-Bayal, Block-B, Site-2 Lat-27.852536^0 Long-75.979179^0.**

ANALYSIS REPORT

Sr.No	Descriptions	Report No: 874			
1.	Location of Sampling Point		Site-2		
2.	Date of sampling	17/02/2025 to 18/02/2025	17/02/2025 to 18/02/2025	17/02/2025 to 18/02/2025	
3.	Sampling started at	17/02/2025 6.00 PM	18/02/2025 02.00 AM	18/02/2025 10.00 AM	
4.	Sampling completed at	18/02/2025 02.00 AM	18/02/2025 10.00 AM	18/02/2025 06.00 PM	
5.	Actual time of sampling	8 Hrs.	8 Hrs.	8 Hrs.	
6.	Flow rate of PM_{10} (m^3/min)	1.0	1.0	1.0	
7.	Volume of air sampled for PM_{10} (m^3)	480	480	480	
8.	Flow rate of $PM_{2.5}$ LPM	16.7	16.7	16.7	
9.	Volume of air sampled for $PM_{2.5}$ (m^3)	24.04	24.04	24.04	
10.	Average Ambient Temperature	-	-	-	
11.	Weather condition	Normal	Normal	Normal	
	RESULTS				Prescribed Limits
10.	PM_{10} µg/Nm^3 (24 Hourly)	77.0	72.0	85.0	100.0
11.	$PM_{2.5}$ µg/Nm^3 (24 Hourly)		49.0		60.0
12.	Sulpher Dioxide µg/Nm^3	12.4	13.2	14.8	80.0
13.	Oxides of Nitrogen µg/Nm^3	9.6	10.4	10.6	80.0

Sample Collected/Not Collected by us

Sample Consumed in testing

LAB INCHARGE
Dated 21/02/2025

HSPCB/Lab/GR/2024/ 1511

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Laboratory of the 593
Haryana State Pollution Control Board
Vikas Sadan, Ist Floor, Gurgaon

Tel-2332596

~~Paid~~ /**Monitoring** ✓

Description to:-
Bayal Quartz & Feldspar Mines, Village-Bayal, Block-B, Site-1 Report No: 875
Lat-27.851042^0 Long-75.979808^0

Dated. 21/02/2025

Description of the Sample:-Received 19/02/2025 a sample of Ambient Air from Dr. Narender Sharma, RD, CPCB, Sh. Krishna Kumar, RO, Sh. Manoj Kumar, SDM, Sh. Rajnish, RFO & Sh. Anuj Narwal, AEE collected on 18/02/2025 to 19/02/2025 from Bayal Quartz & Feldspar Mines, Village-Bayal, Block-B, Site-1 Lat-27.851042^0 Long-75.979808^0.

ANALYSIS REPORT

Sr.No	Descriptions	Report No: 875			
1.	Location of Sampling Point		Site-1		
2.	Date of sampling	18/02/2025 to 19/02/2025	18/02/2025 to 19/02/2025	18/02/2025 to 19/02/2025	
3.	Sampling started at	18/02/2025 6.00 PM	19/02/2025 02.00 AM	19/02/2025 10.00 AM	
4.	Sampling completed at	19/02/2025 02.00 AM	19/02/2025 10.00 AM	19/02/2025 06.00 PM	
5.	Actual time of sampling	8 Hrs.	8 Hrs.	8 Hrs.	
6.	Flow rate of PM_{10} (m^3/min)	1.0	1.0	1.0	
7.	Volume of air sampled for PM_{10} (m^3)	480	480	480	
8.	Flow rate of $PM_{2.5}$ LPM	16.7	16.7	16.7	
9.	Volume of air sampled for $PM_{2.5}$ (m^3)	24.04	24.04	24.04	
10.	Average Ambient Temperature	-	-	-	
11.	Weather condition	Normal	Normal	Normal	
	RESULTS				Prescribed Limits
10.	PM_{10} µg/Nm^3 (24 Hourly)	82.0	76.0	91.0	100.0
11.	$PM_{2.5}$ µg/Nm^3 (24 Hourly)		54.0		60.0
12.	Sulpher Dioxide µg/Nm^3	11.8	13.0	15.2	80.0
13.	Oxides of Nitrogen µg/Nm^3	9.4	10.2	11.6	80.0
	Sample Collected/Not Collected by us				
	Sample Consumed in testing				

LAB INCHARGE
Dated 21/02/2025

HSPCB/Lab/GR/2024/ 1513

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Laboratory of the
Haryana State Pollution Control Board
Vikas Sadan, Ist Floor, Gurgaon

Tel-2332596

~~Paid~~ /**Monitoring** ✓

Description to:-
Bayal Quartz & Feldspar Mines, Village-Bayal, Block-B, Site-2 Report No: 876
Lat-27.852536^0 Long-75.979179^0

Dated. 21/02/2025

Description of the Sample:-Received 19/02/2025 a sample of Ambient Air from Dr. Narender Sharma, RD, CPCB, Sh. Krishna Kumar, RO, Sh. Manoj Kumar, SDM, Sh. Rajnish, RFO & Sh. Anuj Narwal, AEE collected on 18/02/2025 to 19/02/2025 from Bayal Quartz & Feldspar Mines, Village-Bayal, Block-B, Site-2 Lat-27.852536^0 Long-75.979179^0.

ANALYSIS REPORT

Sr.No	Descriptions	Report No: 876			
1.	Location of Sampling Point		Site-2		
2.	Date of sampling	18/02/2025 to 19/02/2025	18/02/2025 to 19/02/2025	18/02/2025 to [illegible]/02/2025	
3.	Sampling started at	18/02/2025 6.00 PM	19/02/2025 02.00 AM	[illegible]/02/2025 .00 AM	
4.	Sampling completed at	19/02/2025 02.00 AM	19/02/2025 10.00 AM	[illegible]/02/2025 06.00 PM	
5.	Actual time of sampling	8 Hrs.	8 Hrs.	8 Hrs.	
6.	Flow rate of PM_{10} (m^3/min)	1.0	1.0	1.0	
7.	Volume of air sampled for PM_{10} (m^3)	480	480	480	
8.	Flow rate of $PM_{2.5}$ LPM	16.7	16.7	16.7	
9.	Volume of air sampled for $PM_{2.5}$ (m^3)	24.04	24.04	24.04	
10.	Average Ambient Temperature	-	-	-	
11.	Weather condition	Normal	Normal	Normal	
	RESULTS				Prescribed Limits
10.	PM_{10} µg/Nm^3 (24 Hourly)	87.0	80.0	94.0	100.0
11.	$PM_{2.5}$ µg/Nm^3 (24 Hourly)		55.0		60.0
12.	Sulpher Dioxide µg/Nm^3	10.0	12.8	14.6	80.0
13.	Oxides of Nitrogen µg/Nm^3	8.8	9.4	11.0	80.0
	Sample Collected/Not Collected by us				
	Sample Consumed in testing				

LAB INCHARGE
Dated 21/02/2025

HSPCB/Lab/GR/2024/ 1515

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Laboratory of the
Haryana State Pollution Control Board
Vikas Sadan, Ist Floor, Gurgaon

Tel-2332596

~~Paid~~ /**Monitoring**

Description to:-
Bayal Quartz & Feldspar Mines, Village-Bayal, Block-A, Site-3 Report No: 877
Lat-27.861815^0 Long-75.97609^0

Dated. 21/02/2025

Description of the Sample:-Received 19/02/2025 a sample of Ambient Air from Dr. Narender Sharma, RD, CPCB, Sh. Krishna Kumar, RO, Sh. Manoj Kumar, SDM, Sh. Rajnish, RFO & Sh. Anuj Narwal, AEE collected on 18/02/2025 to 19/02/2025 from Bayal Quartz & Feldspar Mines, Village-Bayal, Block-A, Site-3 Lat-27.861815^0 Long-75.97609^0.

ANALYSIS REPORT

Sr.No	Descriptions	Report No: 877 Site-3			
1.	Location of Sampling Point				
2.	Date of sampling	18/02/2025 to 19/02/2025	18/02/2025 to 19/02/2025	18/02/2025 to 19/02/2025	
3.	Sampling started at	18/02/2025 6.00 PM	19/02/2025 02.00 AM	19/02/2025 10.00 AM	
4.	Sampling completed at	19/02/2025 02.00 AM	19/02/2025 10.00 AM	19/02/2025 06.00 PM	
5.	Actual time of sampling	24 Hrs.	24 Hrs.	24 Hrs.	
6.	Flow rate of PM_{10} (m^3/min)	8 Hrs.	8 Hrs.	8 Hrs.	
7.	Volume of air sampled for PM_{10} (m^3)	480	480	480	
8.	Flow rate of $PM_{2.5}$ LPM	16.7	16.7	16.7	
9.	Volume of air sampled for $PM_{2.5}$ (m^3)	24.04	24.04	24.04	
10.	Average Ambient Temperature	-	-	-	
11.	Weather condition	Normal	Normal	Normal	
	RESULTS				Prescribed Limits
10.	PM_{10} µg/Nm^3 (24 Hourly)	74.0	79.0	87.0	100.0
11.	$PM_{2.5}$ µg/Nm^3 (24 Hourly)		47.0		60.0
12.	Sulpher Dioxide µg/Nm^3	9.4	9.2	10.6	80.0
13.	Oxides of Nitrogen µg/Nm^3	7.0	7.6	8.8	80.0
	Sample Collected/Not Collected by us				
	Sample Consumed in testing				

LAB INCHARGE
Dated 21/02/2025

HSPCB/Lab/GR/2024/ 517

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प्रेषक

सिविल सर्जन
नारनौल ।

प्रेषित

Regional Officer
Mahendragarh Region
Haryana state pollution control board
Ram nagar colony, Narnaul

क्रमांक संख्या: पी०एच०/2025/207 दिनांक: 30/01/25

विषय: Regarding Original Application No. 1140/2024 titled as Sumit Kumar Versus State of Haryana in Hon'ble NGT, New Delhi.

उपरोक्त विषय के सन्दर्भ में

हरियाणा स्टेट पोलुशन कंट्रोल बोर्ड के पत्र क्रमांक HSPCB/MG/2025/1190 दिनांक 10.01.2025 पत्र के आदेशानुसार PHC से कम्पाइल रिपोर्ट सुचना एव कार्यवाही हेतु प्रेषित है।

सलंगन - रिपोर्ट

उप सिविल सर्जन (स्वास्थ्य)
कृते: सिविल सर्जन नारनौल

Respiratory Disease Harijan Basti Bayal PHC Bayal

Sr No.	Patient Name	Age/Sex	Residence	Disease	Treatment Details	Comorbidities	Present Status
1	मिश्री देवी w/o रामेश्वर	60/F	बायल	COPD	TAB. Etophyline & theophyline Inh. Foracort Tab. Lcz Cough syp Salbutamol	Hypertension	On Medicine
2	सोहन s/o मूला राम	71/M	बायल	COPD	TAB. Etophyline & theophyline Inh. Foracort Tab. Lcz Cough syp Salbutamol	NO	On Medicine
3	कोसिल्या w/o सोहन लाल	70/F	बायल	COPD	TAB. Etophyline & theophyline Inh. Foracort Tab. Lcz Cough syp Salbutamol	Hypertention	On Medicine
4	रामेश्वर s/o गरीबा राम	65/M	बायल	COPD	TAB. Etophyline & theophyline Inh. Foracort Tab. Lcz Cough syp Salbutamol	NO	On Medicine
5	मुली w/o बनवारी	67/F	बायल	COPD	TAB. Etophyline & theophyline Inh. Foracort Tab. Lcz Cough syp Salbutamol	NO	On Medicine
6	नन्दों w/o ताराचंद	54/F	बायल	COPD	TAB. Etophyline & theophyline Inh. Foracort Tab. Lcz Cough syp Salbutamol	NO	On Medicine

Scanned with OKEN Scanner

प्रेषक,

चिकित्सा अधिकारी प्रभारी

प्राथमिक स्वास्थ्य केंद्र बायल।

सेवा मे,

सिविल सर्जन

नारनौल।

पत्र कमाँक - 11/2025/PHC BAYAL दिनांक 20/01/2025

विषय – Original application No.1140/2024 titled as Sumit Kumar versus satate of Haryana in Honble NGT New Delhi.

उपरोक्त विषय के सन्दर्भ मे आपके कार्यालय के पत्र कमाँक पीo एचo /2025/203 दिनांक 20/01/2025 के तहत हरिजन बस्ती गाव बायल के अंतर्गत Respiratory Disease के 1 Jan. 2020 To 31 Dec. 2024 तक कुल 6 cases है। यह आपको सूचनार्थ व आवश्यक कार्यवाही हेतु प्रेषित है।

20/01/2025
Medical Officer
PHC Bayal (M/Garh)

Annexure-22

HARYANA STATE POLLUTION CONTROL BOARD
Lala Nemi Chand Singhal Enc. Sohna Road, Near Hanuman Mandir, Dharuhera Ph. 01274-244440-41(O)
Website: www.hspcb.gov.in E-Mail - hspcb.pkl@sifymail.com
Telephone No.: 0172-2577870-73

No. HSPCB/Consent/ : 313129218MAHCTE6117016 **Dated:26/12/2018**

To.

M/s : SHRI RAM STONE CRUSHER
Khewat No. 11, Khatoni NO. 11, M.No. 49, Kila No. 3 (7-11) & 4 (7-11) total 15 Kanal 02 Marla at VIll-Panchnota, Nangal Chaudhary Distt-Mohindergarh
MAHENDRAGARH
123023

Sub. : Grant of consent to Establish to M/s SHRI RAM STONE CRUSHER

Please refer to your application no. 6117016 received on dated 2018-12-17 in regional office Dharuhera.

With reference to your above application for consent to establish,M/s SHRI RAM STONE CRUSHER is here by granted consent as per following specification/Terms and conditions.

Consent Under	AIR/WATER
Period of consent	26/12/2018 - 25/12/2023
Industry Type	Stone crushers
Category	ORANGE
Investment(In Lakh)	350.0
Total Land Area (Sq. meter)	7610.0
Total Builtup Area (Sq. meter)	4000.0
Quantity of effluent	
1. Trade	0.0 KL/Day
2. Domestic	0.5 KL/Day
Number of outlets	1.0
Mode of discharge	
1. Domestic	Septic Tank
2. Trade	NA
Permissible Domestic Effluent Parameters	
1. NA	
Permissible Trade Effluent Parameters	
1. NA	mg/l
Number of stacks	1
Height of stack	

1. Stack attached to DG set	3 meters
Permissible Emission parameters	
1. SPM	600 mg/m3
Capacity of boiler	
1. N.A.	Ton/hr
Type of Furnace	
1. N.A.	
Type of Fuel	
1. Diesel	0.250 KL/day

Regional Officer, Dharuhera

Haryana State Pollution Control Board.

Terms and conditions

1. The industry has declared that the quantity of effluent shall be 0.5 KL/Day i.e 0KL/Day for Trade Effluent, 0 KL/Day for Cooling, 0.5 KL/Day for Domestic and the same should not exceed .

2. The above 'Consent to Establish' is valid for 60 months from the date of its issue to be extended for another one year at the discretion of the Board or till the time the unit starts its trial production whichever is earlier. The unit will have to set up the plant and obtain consent during this period.

3. The officer/official of the Board shall have the right to access and inspection of the industry in connection with the various processes and the treatment facilities being provided simultaneously with the construction of building/machinery. The effluent should conform the effluent standards as applicable

4. That necessary arrangement shall be made by the industry for the control of Air Pollution before commissioning the plant. The emitted pollutants will meet the emission and other standards as laid/will be prescribed by the Board from time to time.

5. The applicant will obtain consent under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21/22 of the Air (Prevention & Control of Pollution) Act,1981 as amended to-date-even before starting trial production

6. The above Consent to Establish is further subject to the conditions that the unit complies with all the laws/rules/decisions and competent directions of the Board/Government and its functionaries in all respects before commissioning of the operation and during its actual working strictly.

7. No in-process or post-process objectionable emission or the effluent will be allowed, if the scheme furnished by the unit turns out to be defective in any actual experience

8. The Electricity Department will give only temporary connection and permanent connection to the unit will be given after verifying the consent granted by the Board, both under Water Act and Air Act.

9. Unit will raise the stack height of DG Set/Boiler as per Board's norms.

10. Unit will maintain proper logbook of Water meter/sub meter before/after commissioning.

11. That in the case of an industry or any other process the activity is located in an area approved and that in case the activity is sited in an residential or institutional or commercial or agricultural area, the necessary permission for siting such industry and process in an residential or institutional or commercial or agricultural area or controlled area under Town and Country Planning laws CLU or Municipal laws has to be obtained from the competent Authority in law permitting this deviation and be submitted in original with the request for consent to operate.

12. That there is no discharge directly or indirectly from the unit or the process into any interstate river or Yamuna River or River Ghaggar.

13. That the industry or the unit concerned is not sited within any prohibited distances according to the Environmental Laws and Rules, Notification, Orders and Policies of Central Pollution control Board and Haryana State Pollution Control Board.

14. That of the unit is discharging its sewage or trade effluent into the public sewer meant to receive trade effluent from industries etc. then the permission of the Competent Authority owing and operating such public sewer giving permission letter to his unit shall be submitted at time of consent to operate.

15. That if at any time, there is adverse report from any adjoining neighbor or any other aggrieved party or Municipal Committee or Zila Parishad or any other public body against the unit's pollution; the Consent to Establish so granted shall be revoked.

16. That all the financial dues required under the rules and policies of the Board have been deposited in full by the unit for this Consent to Establish.

17. In case of change of name from previous Consent to Establish granted, fresh Consent to Establish fee shall be levied.

18. Industry should adopt water conservation measures to ensure minimum consumption of water in their Process. Ground water based proposals of new industries should get clearance from Central Ground Water Authority for scientific development of previous resource.

19. That the unit will take all other clearances from concerned agencies, whenever required.

20. That the unit will not change its process without the prior permission of the Board.

21. That the Consent to Establish so granted will be invalid, if the unit falls in Aravali Area or non conforming area.

22. That the unit will comply with the Hazardous Waste Management Rules and will also make the non-leachate pit for storage of Hazardous waste and will undertake not to dispose off the same except for pit in their own premises or with the authorized disposal authority.

23. That the unit will submit an undertaking that it will comply with all the specific and general conditions as imposed in the above Consent to Establish within 30 days failing which Consent to Establish will be revoked.

24. That unit will obtain EIA from MoEF, if required at any stage.

25. In case of unit does not comply with the above conditions within the stipulated period, Consent to Establish will be revoked.

26. That unit will obtain consent to operate from the board before the start of product activity.

Specific Conditions

Other Conditions :

That the unit will install and abide by the directions of notification dated 11.05.2016. 2. The unit will installed air pollution control measure (APCM) as per notification dated 11.05.2016. 3. Unit will apply for first CTO after the installation of plant and machinery and completion of latest APCM as per notification 11.05.2016 before commissioning and before 90 days of expiry of CTE. 4. Unit will take all necessary clearances from all the concerned departments / agencies. 5. This CTE is for establishment of unit at Khewat No. 11, Khatoni NO. 11, M.No. 49, Kila No. 3 (7-11) & 4 (7-11) total 15 Kanal 02 Marla at VIll-Panchnota, Nangal Chaudhary Distt-Mohindergarh. 6. In case at any stage, if aravali plantation/Gair Mumkin Pahar will be declared as forest by the concerned department / by any court of law / Govt./Forest Deptt etc, and if unit fails to meet prescribed siting norms, this CTE deemed revoked. 7. This CTE is valid for 05 years or up to the commissioning of the unit whichever is earlier. 8. The unit will use / purchase raw materials from the legal mines. 9. The unit will abide with the directions/guidelines HSPCB/CPCB/ any court decision/ direction of any competent authority. 10. The unit will abide for the production capacity upto average 3000 MT/day with install one set of plant & machinery as per submitted proposed site plan. 11. Unit will maintain record of water consumed for spraying/dust suppression & used for domestic purpose. 12. This CTE is without prejudice to any action under the provisions of applicable laws / acts / notification / courts order to be taken in respect of any violation at any stage without any claim of the unit. If the unit fails to comply the provisions of said notification dated 11.05.2016, conditions of CTE, various applicable provisions of concerned departments / agencies / authorities / any relevant decision of court, the consent to establish so granted shall be revoked automatically without giving any notice.

Regional Officer, Dharuhera

Haryana State Pollution Control Board.

HARYANA STATE

HARYANA STATE POLLUTION CONTROL BOARD
Lala Nemi Chand Singhal Enc.Sohna Road,
Near Hanuman Mandir,Dharuhera
Ph. 01274-244440-41(O)
E-mail: hspcb.pkl@sify.com

No. HSPCB/Consent/ : 313129219MAHCTOA6636376 Dated:30/07/2019

To.

M/s :SHRI RAM STONE CRUSHER
Khewat No. 11, Khatoni NO. 11, M.No. 49, Kila No. 3 (7-11) & 4 (7-11) total 15 Kanal 02 Marla at Vill-Panchnota, Nangal Chaudhary Distt-Mohindergarh

Subject: Grant of consent to operate to M/s SHRI RAM STONE CRUSHER.

Please refer to your application no. 6636376 received on dated 2019-06-11 in regional office Dharuhera.With reference to your above application for consent to operate,M/s SHRI RAM STONE CRUSHER is here by granted consent as per following specification/Terms and conditions.

Consent Under	AIR
Period of consent	30/07/2019 - 31/03/2024
Industry Type	Stone crushers
Category	ORANGE
Investment(In Lakh)	350.0
Total Land Area(Sq. meter)	7610.0
Total Builtup Area(Sq. meter)	4000.0
Quantity of effluent	
1. Trade	0.0 KL/Day
2. Domestic	0.5 KL/Day
Number of outlets	1.0
Mode of discharge	
1. Domestic	septic tank
2. Trade	
Domestic Effluent Parameters	
1. NA	
Trade Effluent Parameters	
1. NA	
Number of stacks	1
Height of stack	
1. NA	
Emission parameters	
1. SPM	600 mg/m3
Product Details	

1. STONE DUST AND DIFFERENT SIZES OF STONE GRIT	3000 Metric Tonnes/day
Capacity of boiler	
1. NA	Ton/hr
Type of Furnace	
1. NA	
Type of Fuel	
1. Electricity	Kilowatt/day
Raw Material Details	
STONE BOULDERS	3000 Metric Tonnes/Day

Regional Officer, Dharuhera
Haryana State Pollution Control Board.

Terms and conditions

1. The applicants shall maintain good house keeping both within factory and in the premises. All hose pipelines values, storage tanks etc. shall be leak proof. In plant allowable pollutants levels, if specified by State Board should be met strictly.
2. The applicant/company shall comply with and carry out directive/orders issued by the Board in this consent order at all subsequent times without negligence of his /its part. The applicant/company shall be liable for such legal action against him as per provision of the law/act in case of violation of any order/directives. Issued at any time and or non compliance of the terms and conditions of his consent order.
3. The applicant shall make an application for grant of consent at least 90 days before the date of expiry of this consent.
4. Necessary fee as prescribed for obtaining renewal consent shall be paid by the applicant alongwith the consent application.
5. If due to any technological improvement or otherwise this Board is of opinion that all or any of the conditions referred to above required variation (including the change of any control equipment either in whole or in part) this Board shall after giving the applicant an opportunity of being heard vary all or such condition and there upon the applicant shall be bound to comply with the conditions so varied.
6. The industry shall provide adequate arrangement for fighting the accidental leakages, discharge of any pollutants gas/liquids from the vessels, mechanical equipment etc. which are likely to cause environment pollution.
7. The industry shall comply noise pollution (Regulation and control) Rules, 2000.
8. The industry shall comply all the direction/Rules/Instructions as may be issued by the MOEF/CPCB/HSPCB from time to time.
9. The industry shall ensure that various characteristics of the effluents remain within the tolerance limits as specified in EPA Standard and as amended from time to time and at no time the concentration of any characteristics should exceed these limits for discharge.
10. The industry would immediately submit the revised application to the Board in the event of any change in the raw material in process, mode of treatment/discharge of effluent. In case of change of process at any stage during the consent period, the industry shall submit fresh consent application alongwith the consent to operate fee, if found due, which may be on any

account and that shall be paid by the industry and the industry would immediately submit the consent application to the Board in the event of any change during the year in the raw material, quantity, quality of the effluent, mode of discharge, treatment facilities etc.

11. The officer/official of the Board shall reserve the right to access for the inspection of the industry in connection with the various process and the treatment facilities. The consent to operate is subject to review by the Board at any time.

12. Permissible limits for any pollutants mentioned in the consent to operate order should not exceed the concentration permitted in the effluent by the Board.

13. The industry shall pay the balance fee, in case it is found due from the industry at any time later on.

14. If the industry fails to adhere to any of the conditions of this consent to operate order, the consent to operate so granted shall automatically lapse.

15. If the industry **is closed temporarily at its own, they shall inform the Board and obtain** permission before **restart of the unit**.

16. The industry shall comply all the Directions/ Rules/Instructions issued from time to time by the Board.

Specific Conditions :

1.The unit will abide by the directions of notification dated 11.05.2016. 2. The unit will maintain air pollution control measure (APCM) as per notification dated 11.05.2016 & will operate regularly. 3. Unit will take all necessary clearances from all the concerned departments /agencies.4.The unit will use/purchase raw materials from the legal mines.5. The unit will get **first sample done** from the board within 03 months of CTO granted. 6. Unit will maintain log **book of raw material** purchase and water procured from legal source as per quantity mentioned in Notification dated 11.05.2016 and unit will submit detail thereof fortnightly. 7. In case of non compliance of any conditions this CTO stands revoked automatically without any notice and time.

Kuldeep Singh Digitally signed by Kuldeep Singh Date: 2019.07.30 15:02:11 +05'30'

Regional Officer, Dharuhera

Haryana State Pollution Control Board.

HARYANA STATE POLLUTION CONTROL BOARD
Lala Nemi Chand Singhal Enc. Sohna Road, Near Hanuman Mandir, Dharuhera Ph. 01274-244440-41(O)
Website: www.hspcb.gov.in E-Mail - hspcb.pkl@sifymail.com
Telephone No.: 0172-2577870-73

No. HSPCB/Consent/ : 313129223MAHCTE70193938 **Dated:19/11/2023**

To.

M/s : SHRI RAM STONE CRUSHER
Khewat No. 11, Khatoni NO. 11, M.No. 49, Kila No. 3 (7-11) & 4 (7-11) total 15 Kanal 02 Marla at Vill-Panchnota, Nangal Chaudhary Distt-Mohindergarh
MAHENDRAGARH
123023

Sub. : Grant of consent to Establish to M/s SHRI RAM STONE CRUSHER

Please refer to your application no. 70193938 received on dated 2023-11-04 in regional office Dharuhera.

With reference to your above application for consent to establish,M/s SHRI RAM STONE CRUSHER is here by granted consent as per following specification/Terms and conditions.

Consent Under	AIR/WATER
Period of consent	19/11/2023 - 18/11/2028
Industry Type	Stone crushers
Category	ORANGE
Investment(In Lakh)	350.0
Total Land Area (Sq. meter)	7610.0
Total Builtup Area (Sq. meter)	4000.0
Quantity of effluent	
1. Trade	0.0 KL/Day
2. Domestic	0.5 KL/Day
Number of outlets	1.0
Mode of discharge	
1. Domestic	Septic Tank
2. Trade	NA
Permissible Domestic Effluent Parameters	
1. NA	
Permissible Trade Effluent Parameters	
1. NA	mg/l
Number of stacks	1
Height of stack	

Height of stack	
1. NA	
Permissible Emission parameters	
1. SPM	600 mg/m3
Capacity of boiler	
1. NA	Ton/hr
Type of Furnace	
1. NA	
Type of Fuel	
1. Electricity	Kilowatt/day

Regional Officer, Mahendragarh

Haryana State Pollution Control Board.

Terms and conditions

1. The industry has declared that the quantity of effluent shall be 0.5 KL/Day i.e 0KL/Day for Trade Effluent, 0 KL/Day for Cooling, 0.5 KL/Day for Domestic and the same should not exceed .

2. The above 'Consent to Establish' is valid for 60 months from the date of its issue to be extended for another one year at the discretion of the Board or till the time the unit starts its trial production whichever is earlier. The unit will have to set up the plant and obtain consent during this period.

3. The officer/official of the Board shall have the right to access and inspection of the industry in connection with the various processes and the treatment facilities being provided simultaneously with the construction of building/machinery. The effluent should conform the effluent standards as applicable

4. That necessary arrangement shall be made by the industry for the control of Air Pollution before commissioning the plant. The emitted pollutants will meet the emission and other standards as laid/will be prescribed by the Board from time to time.

5. The applicant will obtain consent under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21/22 of the Air (Prevention & Control of Pollution) Act,1981 as amended to-date-even before starting trial production

6. The above Consent to Establish is further subject to the conditions that the unit complies with all the laws/rules/decisions and competent directions of the Board/Government and its functionaries in all respects before commissioning of the operation and during its actual working strictly.

7. No in-process or post-process objectionable emission or the effluent will be allowed, if the scheme furnished by the unit turns out to be defective in any actual experience

8. The Electricity Department will give only temporary connection and permanent connection to the unit will be given after verifying the consent granted by the Board, both under Water Act and Air Act.

9. Unit will raise the stack height of DG Set/Boiler as per Board's norms.

10. Unit will maintain proper logbook of Water meter/sub meter before/after commissioning.

11. That in the case of an industry or any other process the activity is located in an area approved and that in case the activity is sited in an residential or institutional or commercial or agricultural area, the necessary permission for siting such industry and process in an residential or institutional or commercial or agricultural area or controlled area under Town and Country Planning laws CLU or Municipal laws has to be obtained from the competent Authority in law permitting this deviation and be submitted in original with the request for consent to operate.

12. That there is no discharge directly or indirectly from the unit or the process into any interstate river or Yamuna River or River Ghaggar.

13. That the industry or the unit concerned is not sited within any prohibited distances according to the Environmental Laws and Rules, Notification, Orders and Policies of Central Pollution control Board and Haryana State Pollution Control Board.

14. That of the unit is discharging its sewage or trade effluent into the public sewer meant to receive trade effluent from industries etc. then the permission of the Competent Authority owing and operating such public sewer giving permission letter to his unit shall be submitted at time of consent to operate.

15. That if at any time, there is adverse report from any adjoining neighbor or any other aggrieved party or Municipal Committee or Zila Parishad or any other public body against the unit's pollution; the Consent to Establish so granted shall be revoked.

16. That all the financial dues required under the rules and policies of the Board have been deposited in full by the unit for this Consent to Establish.

17. In case of change of name from previous Consent to Establish granted, fresh Consent to Establish fee shall be levied.

18. Industry should adopt water conservation measures to ensure minimum consumption of water in their process. Ground water based proposals of new industries should get clearance from Central Ground Water Authority (CGWA)/ Haryana Water Resources (Conservation, Regulation and Management) Authority (HWRA) for scientific development of precious resource

19. That the unit will take all other clearances from concerned agencies, whenever required.

20. That the unit will not change its process without the prior permission of the Board.

21. That the Consent to Establish so granted will be invalid, if the unit falls in Aravali Area or non conforming area.

22. That the unit will comply with the Hazardous Waste Management Rules and will also make the non-leachate pit for storage of Hazardous waste and will undertake not to dispose off the same except for pit in their own premises or with the authorized disposal authority.

23. That the unit will submit an undertaking that it will comply with all the specific and general conditions as imposed in the above Consent to Establish within 30 days failing which Consent to Establish will be revoked.

24. That unit will obtain EIA from MoEF, if required at any stage.

25. In case of unit does not comply with the above conditions within the stipulated period, Consent to Establish will be revoked.

26. That unit will obtain consent to operate from the board before the start of product activity.

27. The industrial/non industrial sector projects shall develop green belt (as applicable) in its premises including periphery, entry and exit, as per notifications/conditions of EC/directions of MOEF/CPCB/SPCB/NGT/ any court of law. In case of stone crushers, hot mix plants, mineral grinding units, screening plants and brick kilns etc., the unit shall develop adequate green belt and erect barrier/barricade/boundary wall as applicable, as per notifications/directions of MOEF/CPCB/SPCB/NGT/ any court of law.

28. The unit shall develop paved or hard surfaced approach road to the site of unit (including the storage site, if it is at different place) from the nearest public road for transportation of raw material/final product.

Specific Conditions

Other Conditions :

1.The applicant/unit shall comply with and carry out directive/orders issued by the Board in this consent order at all subsequent times without negligence of his /its part. The applicant/company shall be liable for such legal action against him as per provision of the law/act in case of violation of any order/directives. Issued at any time and or non-compliance of the terms and conditions of his consent order.
2. The unit will operate Air Pollution Control Measures properly and maintain the logbook.
3. Unit will comply with all the directions / orders / any outcome of the Hon'ble NGT regarding O.A. No. 667/2018 in the matter titled as Mahendra Singh Vs. State of Haryana and Ors and O.A. No. 679/2018 titled as Tejpal Vs. State of Haryana & Ors.
4.The unit will comply the provisions of notification 11.05.2016 regarding stone crushing unit and other directions regarding the abatement of air pollution on stone crusher.
5.The unit will deposit final environment compensation within 15 days as per applicability if levied in compliance of the directions /order in the matter of OA No. 667/2018 Titled as Mahendra Singh Vs State of Haryana And Ors. OA No. 679/2018 titled as Tejpal vs State of Haryana and Ors. & OA No. 599/2019 titled as Bishamber Singh Vs state of Haryana and Ors.
6.The consent to establish Expan is granted herewith prejudice to be action taken if any, in compliance of the outcome of the final order in the matter of OA No. 667/2018 Titled as Mahendra Singh Vs State of Haryana And Ors. OA No. 679/2018 titled as Tejpal vs State of Haryana and Ors. & OA No. 599/2019 titled as Bishamber Singh Vs state of Haryana and Ors.
7. The unit will comply with all the conditions of Consent to establish expansion, so granted.
8.The unit will plant sufficient Nos. of trees within & outside the premises during the coming monsoon season.
9.Unit will comply with all the conditions of CTE, CTO so granted and will obtain necessary permissions from concerned Deptt. /Local prescribed Authority, as per applicable Laws.
10.This CTE expansion is without prejudice to any action under the provisions of applicable laws / acts / notification / courts order to be taken in respect of any past violation at any stage without any claim of the unit. If the unit fails to comply with the provisions/conditions of CTE expansion, various applicable provisions of concerned departments / agencies / authorities / any relevant decision of court, the CTE so granted shall be revoked automatically without giving any notice.
11.Unit will comply with all the prescribed air emission standards under the provisions of Air (Prevention and Control of Pollution) Act, 1981 and Environment (Protection) Act, 1986 amended from time to time. 12. Unit will obtain all necessary permission/Permissions/registrations done well in time from all the concerned departments.
13.Unit will deposit the balance CTE expansion fee if found pending at a later stage as per prescribed schedule as available on the website of the Board.
14.Grant CTE expansion does not prevent the Board from revoking of those CTE expansion including taking appropriate action against those defaulting units, where CTE or CTO has been obtained or got extended on the basis of wrong declaration or false documents and also who fail to comply with any of the conditions of CTE/CTO granted to such units or any relevant provisions of Water Act, 1974 and Air Act, 1981 beside forfeiture of performance security deposited by the unit for obtaining CTE & on refusal of CTO.

KRISHAN KUMAR

Digitally signed by KRISHAN KUMAR
Date: 2023.11.19 10:30:52 +05'30'

Regional Officer, Mahendragarh
Haryana State Pollution Control Board.

Annexure-25

HARYANA STATE POLLUTION CONTROL BOARD

Regional office,Mahendragarh at Lala Nemi Chand Singhal Enc.Sohna Road, Near Hanuman Mandir,Dharuhera. Email:- hspcbromg@gmail.com

E-mail: hspcb@hry.nic.in

No. HSPCB/Consent/ : 313129224MAHCTOA6822739 **Dated:02/02/2024**

To.

M/s :SHRI RAM STONE CRUSHER

Khewat No. 11, Khatoni NO. 11, M.No. 49, Kila No. 3 (7-11) & 4 (7-11) total 15 Kanal 02 Marla at VIll-Panchnota, Nangal Chaudhary Distt-Mohindergarh

Subject: Grant of consent to operate to M/s SHRI RAM STONE CRUSHER.

Please refer to your application no. 6822739 received on dated 2023-12-28 in regional office Mahendragarh.With reference to your above application for consent to operate,M/s SHRI RAM STONE CRUSHER is here by granted consent as per following specification/Terms and conditions.

Consent Under	AIR
Period of consent	01/04/2024 - 31/03/2029
Industry Type	Stone crushers
Category	ORANGE
Investment(In Lakh)	394.5
Total Land Area(Sq. meter)	7610.0
Total Builtup Area(Sq. meter)	4000.0
Quantity of effluent	
1. Trade	0.0 KL/Day
2. Domestic	0.5 KL/Day
Number of outlets	1.0
Mode of discharge	
1. Domestic	Septic Tank
2. Trade	
Domestic Effluent Parameters	
1. NA	
Trade Effluent Parameters	
1. NA	
Number of stacks	1
Height of stack	
1. NA	
Emission parameters	
1. SPM	600 mg/m3
Product Details	

1. STONE DUST AND DIFFERENT SIZES OF STONE GRIT	11000 Metric Tonnes/day
Capacity of boiler	
1. NA	Ton/hr
Type of Furnace	
1. NA	
Type of Fuel	
1. Electricity	Kilowatt/day
Raw Material Details	
STONE BOULDERS	11000 Metric Tonnes/Day

Regional Officer, Mahendragarh
Haryana State Pollution Control Board.

Terms and conditions

1. The applicants shall maintain good house keeping both within factory and in the premises. All hose pipelines values, storage tanks etc. shall be leak proof. In plant allowable pollutants levels, if specified by State Board should be met strictly.
2. The applicant/company shall comply with and carry out directive/orders issued by the Board in this consent order at all subsequent times without negligence of his /its part. The applicant/company shall be liable for such legal action against him as per provision of the law/act in case of violation of any order/directives. Issued at any time and or non compliance of the terms and conditions of his consent order.
3. The applicant shall make an application for grant of consent at least 90 days before the date of expiry of this consent.
4. Necessary fee as prescribed for obtaining renewal consent shall be paid by the applicant alongwith the consent application.
5. If due to any technological improvement or otherwise this Board is of opinion that all or any of the conditions referred to above required variation (including the change of any control equipment either in whole or in part) this Board shall after giving the applicant an opportunity of being heard vary all or such condition and there upon the applicant shall be bound to comply with the conditions so varied.
6. The industry shall provide adequate arrangement for fighting the accidental leakages, discharge of any pollutants gas/liquids from the vessels, mechanical equipment etc. which are likely to cause environment pollution.
7. The industry shall comply noise pollution (Regulation and control) Rules, 2000.
8. The industry shall comply all the direction/Rules/Instructions as may be issued by the MOEF/CPCB/HSPCB from time to time.
9. The industry shall ensure that various characteristics of the effluents remain within the tolerance limits as specified in EPA Standard and as amended from time to time and at no time the concentration of any characteristics should exceed these limits for discharge.
10. The industry would immediately submit the revised application to the Board in the event of any change in the raw material in process, mode of treatment/discharge of effluent. In case of change of process at any stage during the consent period, the industry shall submit fresh consent application alongwith the consent to operate fee, if found due, which may be on any

account and that shall be paid by the industry and the industry would immediately submit the consent application to the Board in the event of any change during the year in the raw material, quantity, quality of the effluent, mode of discharge, treatment facilities etc.

11. The officer/official of the Board shall reserve the right to access for the inspection of the industry in connection with the various process and the treatment facilities. The consent to operate is subject to review by the Board at any time.

12. Permissible limits for any pollutants mentioned in the consent to operate order should not exceed the concentration permitted in the effluent by the Board.

13. The industry shall pay the balance fee, in case it is found due from the industry at any time later on.

14. If the industry fails to adhere to any of the conditions of this consent to operate order, the consent to operate so granted shall automatically lapse.

15. If the industry is closed temporarily at its own, they shall inform the Board and obtain permission before restart of the unit.

16. The industry shall comply all the Directions/ Rules/Instructions issued from time to time by the Board.

Specific Conditions :

1. Unit will comply all the directions / orders / any outcome of the of Hon'ble NGT regarding O.A. No. 667/2018 in the matter titled as Mahendra Singh Vs. State of Haryana and Ors and O.A. No. 679/2018 titled as Tejpal Vs. State of Haryana & Ors.

2. The unit will maintain its APCM/dust suppression system in well working condition.

3. This CTO is without prejudice to any action under the provisions of applicable laws / acts / notification / courts order to be taken in respect of any past violation at any stage without any claim of the unit. If the unit fails to comply with the provisions/conditions of CTO, various applicable provisions of concerned departments / agencies / authorities / any relevant decision of court, the consent to operate so granted shall be revoked automatically without giving any notice.

4. The unit will comply the provisions of notification 11.05.2016 regarding stone crushing unit and other directions regarding the abatement of air pollution on stone crusher.

5. The unit will operate Air Pollution Control Measures properly and maintain the logbook as per notification 11.05.2016.

6. The standards prescribed under environmental laws by MoEF&CC/ CPCB are followed by the Board. Further, it is clarified that the standards to be prescribed from time to time under environmental laws by MoEF&CC/CPCB shall also be deemed to be the standards of Board. Provided that in case any stringent parameters will be prescribed by the Board on any subject where upon parameters are also provided by MoEF&CC/CPCB, the standards prescribed by the Board will be followed. The general standards prescribed under EP Rules, 1986 (as amended) shall be applicable on the industries for which specific standards are not prescribed.

7. Grant CTO does not prevent the Board from revoking of those CTO including taking appropriate action against those defaulting units, where CTE or CTO has been obtained or got extended on the basis of wrong declaration or false documents and also who fail to comply with any of the conditions of CTE/CTO granted to such units or any relevant provisions of Water Act, 1974 and Air Act, 1981 beside forfeiture of performance security deposited by the unit for obtaining CTE & on refusal of CTO.

8. The applicant/unit shall comply with and carry out directive/orders issued by the Board in

this consent order at all subsequent times without negligence of his /its part. The applicant/company shall be liable for such legal action against him as per provision of the law/act in case of violation of any order/directives. Issued at any time and or non-compliance of the terms and conditions of his consent order

9. The unit will deposit any amount of environment compensation within 15 days as per applicability if levied in compliance of the directions order in the matter of OA No. 667/2018 in the matter titled as Mahendra Singh Vs. State of Haryana and Ors and O.A. No. 679/2018 titled as Tejpal Vs. State of Haryana & Ors.

10 This consent to operate is granted herewith prejudice to be action taken if any, in compliance of the outcome of the any order/ any relevant decision of court in the matter of OA No. 667/2018 in the matter titled as Mahendra Singh Vs. State of Haryana and Ors and O.A. No. 679/2018 titled as Tejpal Vs. State of Haryana & Ors, the consent to operate so granted shall be revoked automatically without giving any notice.

Regional Officer, Mahendragarh
Haryana State Pollution Control Board.

HARYANA STATE

Annexure-26

HARYANA STATE POLLUTION CONTROL BOARD

HSPCB

Lala Nemi Chand Singhal Enc.Sohna Road, Near Hanuman Mandir,Dharuhera Ph. 01274-244440-41(O)
Email:- hspcbrodr@gmail.com
Website: www.hrocmms.nic.in E-Mail - hspcbho@gmail.com
Telephone No.: 0172-2577870-73

No. HSPCB/Consent/ : 313129220MAHCTE8036401 **Dated:26/08/2020**

To.

M/s : SHRI RAM STONE CRUSHER PLANT 2
Khewat No. 23, Khatoni NO. 25, M./Kila No. 46//21 (8-0), 22(8-16), 48//1(7-7) & 2(2-11) total 26 Kanal 14 Marla at Village Panchnota, Nangal Chaudhary, Distt-Mohindergarh
MAHENDRAGARH
123023

Sub. : Grant of consent to Establish to M/s SHRI RAM STONE CRUSHER PLANT 2

Please refer to your application no. 8036401 received on dated 2020-08-22 in regional office Dharuhera.

With reference to your above application for consent to establish,M/s SHRI RAM STONE CRUSHER PLANT 2 is here by granted consent as per following specification/Terms and conditions.

Consent Under	AIR/WATER
Period of consent	26/08/2020 - 25/08/2025
Industry Type	Stone crushers
Category	ORANGE
Investment(In Lakh)	430.0
Total Land Area (Sq. meter)	13506.0
Total Builtup Area (Sq. meter)	6000.0
Quantity of effluent	
1. Trade	0.0 KL/Day
2. Domestic	0.5 KL/Day
Number of outlets	1.0
Mode of discharge	
1. Domestic	septic tank
2. Trade	
Permissible Domestic Effluent Parameters	
1. NA	
Permissible Trade Effluent Parameters	
1. NA	mg/l

Number of stacks	1
Height of stack	
1. Dg Set	3 Meter
Permissible Emission parameters	
1. SPM	600 micro gm/m3
Capacity of boiler	
1. N.A	Ton/hr
Type of Furnace	
1. N.A	
Type of Fuel	
1. Diesel	.200 KL/day

Regional Officer, Dharuhera

Haryana State Pollution Control Board.

Terms and conditions

1. The industry has declared that the quantity of effluent shall be 0.5 KL/Day i.e 0KL/Day for Trade Effluent, 0 KL/Day for Cooling, .5 KL/Day for Domestic and the same should not exceed .

2. The above 'Consent to Establish' is valid for 60 months from the date of its issue to be extended for another one year at the discretion of the Board or till the time the unit starts its trial production whichever is earlier. The unit will have to set up the plant and obtain consent during this period.

3. The officer/official of the Board shall have the right to access and inspection of the industry in connection with the various processes and the treatment facilities being provided simultaneously with the construction of building/machinery. The effluent should conform the effluent standards as applicable

4. That necessary arrangement shall be made by the industry for the control of Air Pollution before commissioning the plant. The emitted pollutants will meet the emission and other standards as laid/will be prescribed by the Board from time to time.

5. The applicant will obtain consent under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21/22 of the Air (Prevention & Control of Pollution) Act,1981 as amended to-date-even before starting trial production

6. The above Consent to Establish is further subject to the conditions that the unit complies with all the laws/rules/decisions and competent directions of the Board/Government and its functionaries in all respects before commissioning of the operation and during its actual working strictly.

7. No in-process or post-process objectionable emission or the effluent will be allowed, if the scheme furnished by the unit turns out to be defective in any actual experience

8. The Electricity Department will give only temporary connection and permanent connection to the unit will be given after verifying the consent granted by the Board, both under Water Act and Air Act.

9. Unit will raise the stack height of DG Set/Boiler as per Board's norms.

10. Unit will maintain proper logbook of Water meter/sub meter before/after commissioning.

11. That in the case of an industry or any other process the activity is located in an area approved and that in case the activity is sited in an residential or institutional or commercial or agricultural area, the necessary permission for siting such industry and process in an residential or institutional or commercial or agricultural area or controlled area under Town and Country Planning laws CLU or Municipal laws has to be obtained from the competent Authority in law permitting this deviation and be submitted in original with the request for consent to operate.

12. That there is no discharge directly or indirectly from the unit or the process into any interstate river or Yamuna River or River Ghaggar.

13. That the industry or the unit concerned is not sited within any prohibited distances according to the Environmental Laws and Rules, Notification, Orders and Policies of Central Pollution control Board and Haryana State Pollution Control Board.

14. That of the unit is discharging its sewage or trade effluent into the public sewer meant to receive trade effluent from industries etc. then the permission of the Competent Authority owing and operating such public sewer giving permission letter to his unit shall be submitted at time of consent to operate.

15. That if at any time, there is adverse report from any adjoining neighbor or any other aggrieved party or Municipal Committee or Zila Parishad or any other public body against the unit's pollution; the Consent to Establish so granted shall be revoked.

16. That all the financial dues required under the rules and policies of the Board have been deposited in full by the unit for this Consent to Establish.

17. In case of change of name from previous Consent to Establish granted, fresh Consent to Establish fee shall be levied.

18. Industry should adopt water conservation measures to ensure minimum consumption of water in their Process. Ground water based proposals of new industries should get clearance from Central Ground Water Authority for scientific development of previous resource.

19. That the unit will take all other clearances from concerned agencies, whenever required.

20. That the unit will not change its process without the prior permission of the Board.

21. That the Consent to Establish so granted will be invalid, if the unit falls in Aravali Area or non conforming area.

22. That the unit will comply with the Hazardous Waste Management Rules and will also make the non-leachate pit for storage of Hazardous waste and will undertake not to dispose off the same except for pit in their own premises or with the authorized disposal authority.

23. That the unit will submit an undertaking that it will comply with all the specific and general conditions as imposed in the above Consent to Establish within 30 days failing which Consent to Establish will be revoked.

24. That unit will obtain EIA from MoEF, if required at any stage.

25. In case of unit does not comply with the above conditions within the stipulated period, Consent to Establish will be revoked.

26. That unit will obtain consent to operate from the board before the start of product activity.

Specific Conditions

Other Conditions :

1. That the unit will abide with all the directions of notification dated 11.05.2016 and unit will ensure all compliance as per commitment made in the shape of undertaking/affidavit and any variation if found at any stage at any time in respect of documents submission and commitment/undertaken made therein, CTE deemed revoked and unit/project proponent will be liable for appropriate action as per law. 2. That the unit will be established as per latest notification dated 11.05.2016. 3. The unit will installed air pollution control measure (APCM) as per notification dated 11.05.2016. 4. Unit will apply for first CTO after the installation of plant and machinery and completion of latest APCM as per notification 11.05.2016 before commissioning. 5. Unit will take all necessary clearances from all the concerned departments / agencies. 6. This CTE is for establishment of unit Khewat No. 23, Khatoni NO. 25, M./Kila No. 46//21 (8-0), 22(8-16), 48//1(7-7) & 2(2-11) total 26 Kanal 14 Marla at Village Panchnota, Nangal Chaudhary, Distt-Mohindergarh 7. In case at any stage, if aravali plantation/GairMumkinPahar will be declared as forest by the concerned department / by any court of law / Govt./Forest Deptt etc, and if unit fails to meet prescribed siting norms, this CTE deemed revoked. 8. This CTE is valid for 05 years or up to the commissioning of the unit whichever is earlier. 9. The unit will use / purchase raw materials from the legal mines. 10. The unit will abide with the directions/guidelines HSPCB/CPCB/ any court decision/ direction of any competent authority. 11. The unit will abide for the production capacity up-to avg 3000 MT/day with one machinery set. 12. This CTE so granted subject to compliance of Hon'ble NGT orders dated 24.07.2019 & Hon'ble Supreme Court stay order dated 13.08.2019 in Civil Appeal Diary No. (s) 27469/2019 & legal opinion issued by HQ in this regard at Khewat No. 23, Khatoni NO. 25, M./Kila No. 46//21 (8-0), 22(8-16), 48//1(7-7) & 2(2-11) total 26 Kanal 14 Marla at Village Panchnota, Nangal Chaudhary, Distt-Mohindergarh and is without any prejudice to the actions initiated by the board in earlier cases for violations of relevant Acts, Rules/ any direction issued by either Hon'able Court or competent Authority issued relevant to this project. and subject to the outcome of any directions of Hon'ble Supreme Court/National Green Tribunal and other legal form, as the case may be, as per direction of competent authority. If the unit fails to comply the provisions of said notification dated 11.05.2016, conditions of CTE, various applicable provisions of concerned departments / agencies / authorities / any relevant decision of court, the consent to establish so granted shall be revoked automatically without giving any notice. 13. Unit will submit Production certificate form the concerned Prescribed authority.

Regional Officer, Dharuhera

Haryana State Pollution Control Board.

HARYANA STATE POLLUTION CONTROL BOARD
Lala Nemi Chand Singhal Enc.Sohna Road, Near Hanuman Mandir,Dharuhera Ph. 01274-244440-41(O) Email:- hspcbrodr@gmail.com
E-mail: hspcb@hry.nic.in

No. HSPCB/Consent/ : 313129220MAHCTOA8136111 Dated:14/10/2020

To.

M/s :SHRI RAM STONE CRUSHER PLANT 2
Khewat No. 23, Khatoni NO. 25, M./Kila No. 46//21 (8-0), 22(8-16), 48//1(7-7) & 2(2-11) total 26 Kanal 14 Marla at Village Panchnota, Nangal Chaudhary, Distt-Mohindergarh

Subject: Grant of consent to operate to M/s SHRI RAM STONE CRUSHER PLANT 2.

Please refer to your application no. 8136111 received on dated 2020-09-17 in regional office Dharuhera.With reference to your above application for consent to operate,M/s SHRI RAM STONE CRUSHER PLANT 2 is here by granted consent as per following specification/Terms and conditions.

Consent Under	AIR
Period of consent	14/10/2020 - 31/03/2024
Industry Type	Stone crushers
Category	ORANGE
Investment(In Lakh)	430.0
Total Land Area(Sq. meter)	13560.0
Total Builtup Area(Sq. meter)	6000.0
Quantity of effluent	
1. Trade	0.0 KL/Day
2. Domestic	0.5 KL/Day
Number of outlets	1.0
Mode of discharge	
1. Domestic	SEPTIC TANK
2. Trade	
Domestic Effluent Parameters	
1. NA	0
Trade Effluent Parameters	
1. NA	
Number of stacks	1
Height of stack	
1. ATTACHED TO DG SET	3 METER
Emission parameters	
1. SPM	600 mg/m3

Product Details	
1. STONE DUST AND DIFFERENT SIZES OF STONE GRIT	4000 Metric Tonnes/day
Capacity of boiler	
1. NA	0 Ton/hr
Type of Furnace	
1. NA	0
Type of Fuel	
1. Diesel	0.2 KL/day
Raw Material Details	
STONE BOULDER	4000 Metric Tonnes/Day

Regional Officer, Dharuhera
Haryana State Pollution Control Board.

Terms and conditions

1. The applicants shall maintain good house keeping both within factory and in the premises. All hose pipelines values, storage tanks etc. shall be leak proof. In plant allowable pollutants levels, if specified by State Board should be met strictly.
2. The applicant/company shall comply with and carry out directive/orders issued by the Board in this consent order at all subsequent times without negligence of his /its part. The applicant/company shall be liable for such legal action against him as per provision of the law/act in case of violation of any order/directives. Issued at any time and or non compliance of the terms and conditions of his consent order.
3. The applicant shall make an application for grant of consent at least 90 days before the date of expiry of this consent.
4. Necessary fee as prescribed for obtaining renewal consent shall be paid by the applicant alongwith the consent application.
5. If due to any technological improvement or otherwise this Board is of opinion that all or any of the conditions referred to above required variation (including the change of any control equipment either in whole or in part) this Board shall after giving the applicant an opportunity of being heard vary all or such condition and there upon the applicant shall be bound to comply with the conditions so varied.
6. The industry shall provide adequate arrangement for fighting the accidental leakages, discharge of any pollutants gas/liquids from the vessels, mechanical equipment etc. which are likely to cause environment pollution.
7. The industry shall comply noise pollution (Regulation and control) Rules, 2000.
8. The industry shall comply all the direction/Rules/Instructions as may be issued by the MOEF/CPCB/HSPCB from time to time.
9. The industry shall ensure that various characteristics of the effluents remain within the tolerance limits as specified in EPA Standard and as amended from time to time and at no time the concentration of any characteristics should exceed these limits for discharge.
10. The industry would immediately submit the revised application to the Board in the event of any change in the raw material in process, mode of treatment/discharge of effluent. In case of

change of process at any stage during the consent period, the industry shall submit fresh consent application alongwith the consent to operate fee, if found due, which may be on any account and that shall be paid by the industry and the industry would immediately submit the consent application to the Board in the event of any change during the year in the raw material, quantity, quality of the effluent, mode of discharge, treatment facilities etc.

11. The officer/official of the Board shall reserve the right to access for the inspection of the industry in connection with the various process and the treatment facilities. The consent to operate is subject to review by the Board at any time.

12. Permissible limits for any pollutants mentioned in the consent to operate order should not exceed the concentration permitted in the effluent by the Board.

13. The industry shall pay the balance fee, in case it is found due from the industry at any time later on.

14. If the industry fails to adhere to any of the conditions of this consent to operate order, the consent to operate so granted shall automatically lapse.

15. If the industry is closed temporarily at its own, they shall inform the Board and obtain permission before restart of the unit.

16. The industry shall comply all the Directions/ Rules/Instructions issued from time to time by the Board.

Specific Conditions :

1. The unit will abide by the directions of notification dated 11.05.2016. 2. The unit will maintain air pollution control measure (APCM) as per notification dated 11.05.2016 & will operate regularly. 3. Unit will take all necessary clearances from all the concerned departments /agencies. 4. The unit will use/purchase raw materials from the legal mines. 5. The inspection of the unit will be carried out by the authorized officer within a period of 3 months of grant of CTO for collection of samples and in case of failing of the same this CTO stands revoked automatically besides further necessary action will be applicable. 6. Unit will maintain log book of raw material purchase and water procured from legal source as per quantity mentioned in Notification dated **11.05.2016. 7. Unit will deposit balance CTO fee if found pending at on** later stage. Copy **of Spot Inspection is enclosed herewith. 8. This CTO so granted subject to** compliance of Hon'ble NGT orders dated 24.07.2019 & Hon'ble Supreme Court stay order dated 13.08.2019 in Civil Appeal Diary No. (s) 27469/2019 & legal opinion issued vide letter no. HSPCB/DHR/744/2020/422 dated 26.8.2020 by HQ in this regard and is without any prejudice to the actions taken /to be taken by the board in earlier cases/this case for violations of relevant Acts, Rules/ any direction issued by either Hon'ble Court or competent Authority issued relevant to this project and subject to the outcome of any directions of Hon'ble Supreme Court/National Green Tribunal and other legal form, as the case may be, as per direction of competent authority. If the unit fails to comply the provisions of said notification dated 11.05.2016, conditions of CTE, various applicable provisions of concerned departments / agencies / authorities / any relevant decision of court, the consent to operate so granted shall be revoked automatically without giving any notice. 9. Unit will submit Production certificate from the concerned prescribed authority.

KULDEEP SINGH

Regional Officer, Dharuhera

Haryana State Pollution Control Board.

HARYANA STATE POLLUTION CONTROL BOARD

HSPCB

Lala Nemi Chand Singhal Enc.Sohna Road, Near Hanuman Mandir,Dharuhera Ph. 01274-244440-41(O)
Email:- hspcbrodr@gmail.com
Website: www.hrocmms.nic.in E-Mail - hspcbho@gmail.com
Telephone No.: 0172-2577870-73

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No. HSPCB/Consent/ : 313129223MAHCTE79016688 **Dated:19/11/2023**

To.

M/s : SHRI RAM STONE CRUSHER PLANT 2
Khewat No. 23, Khatoni NO. 25, M./Kila No. 46//21 (8-0), 22(8-16), 48//1(7-7) & 2(2-11) total 26 Kanal 14 Marla at Village Panchnota, Nangal Chaudhary, Distt-Mohindergarh
MAHENDRAGARH
123023

Sub. : Grant of consent to Establish to M/s SHRI RAM STONE CRUSHER PLANT 2

Please refer to your application no. 79016688 received on dated 2023-11-05 in regional office Dharuhera.

With reference to your above application for consent to establish,M/s SHRI RAM STONE CRUSHER PLANT 2 is here by granted consent as per following specification/Terms and conditions.

Consent Under	AIR/WATER
Period of consent	19/11/2023 - 18/11/2028
Industry Type	Stone crushers
Category	ORANGE
Investment(In Lakh)	430.0
Total Land Area (Sq. meter)	13506.0
Total Builtup Area (Sq. meter)	6000.0
Quantity of effluent	
1. Trade	0.0 KL/Day
2. Domestic	0.5 KL/Day
Number of outlets	1.0
Mode of discharge	
1. Domestic	septic tank
2. Trade	
Permissible Domestic Effluent Parameters	
1. NA	
Permissible Trade Effluent Parameters	
1. NA	mg/l

Height of stack	
1. NA	
Permissible Emission parameters	
1. SPM	600 mg/m3
Capacity of boiler	
1. NA	Ton/hr
Type of Furnace	
1. NA	
Type of Fuel	
1. Electricity	Kilowatt/day

Regional Officer, Mahendragarh

Haryana State Pollution Control Board.

Terms and conditions

1. The industry has declared that the quantity of effluent shall be 0.5 KL/Day i.e 0KL/Day for Trade Effluent, 0 KL/Day for Cooling, 0.5 KL/Day for Domestic and the same should not exceed .

2. The above 'Consent to Establish' is valid for 60 months from the date of its issue to be extended for another one year at the discretion of the Board or till the time the unit starts its trial production whichever is earlier. The unit will have to set up the plant and obtain consent during this period.

3. The officer/official of the Board shall have the right to access and inspection of the industry in connection with the various processes and the treatment facilities being provided simultaneously with the construction of building/machinery. The effluent should conform the effluent standards as applicable

4. That necessary arrangement shall be made by the industry for the control of Air Pollution before commissioning the plant. The emitted pollutants will meet the emission and other standards as laid/will be prescribed by the Board from time to time.

5. The applicant will obtain consent under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21/22 of the Air (Prevention & Control of Pollution) Act,1981 as amended to-date-even before starting trial production

6. The above Consent to Establish is further subject to the conditions that the unit complies with all the laws/rules/decisions and competent directions of the Board/Government and its functionaries in all respects before commissioning of the operation and during its actual working strictly.

7. No in-process or post-process objectionable emission or the effluent will be allowed, if the scheme furnished by the unit turns out to be defective in any actual experience

8. The Electricity Department will give only temporary connection and permanent connection to the unit will be given after verifying the consent granted by the Board, both under Water Act and Air Act.

9. Unit will raise the stack height of DG Set/Boiler as per Board's norms.

10. Unit will maintain proper logbook of Water meter/sub meter before/after commissioning.

11. That in the case of an industry or any other process the activity is located in an area approved and that in case the activity is sited in an residential or institutional or commercial or agricultural area, the necessary permission for siting such industry and process in an residential or institutional or commercial or agricultural area or controlled area under Town and Country Planning laws CLU or Municipal laws has to be obtained from the competent Authority in law permitting this deviation and be submitted in original with the request for consent to operate.

12. That there is no discharge directly or indirectly from the unit or the process into any interstate river or Yamuna River or River Ghaggar.

13. That the industry or the unit concerned is not sited within any prohibited distances according to the Environmental Laws and Rules, Notification, Orders and Policies of Central Pollution control Board and Haryana State Pollution Control Board.

14. That of the unit is discharging its sewage or trade effluent into the public sewer meant to receive trade effluent from industries etc. then the permission of the Competent Authority owing and operating such public sewer giving permission letter to his unit shall be submitted at time of consent to operate.

15. That if at any time, there is adverse report from any adjoining neighbor or any other aggrieved party or Municipal Committee or Zila Parishad or any other public body against the unit's pollution; the Consent to Establish so granted shall be revoked.

16. That all the financial dues required under the rules and policies of the Board have been deposited in full by the unit for this Consent to Establish.

17. In case of change of name from previous Consent to Establish granted, fresh Consent to Establish fee shall be levied.

18. Industry should adopt water conservation measures to ensure minimum consumption of water in their process. Ground water based proposals of new industries should get clearance from Central Ground Water Authority (CGWA)/ Haryana Water Resources (Conservation, Regulation and Management) Authority (HWRA) for scientific development of precious resource

19. That the unit will take all other clearances from concerned agencies, whenever required.

20. That the unit will not change its process without the prior permission of the Board.

21. That the Consent to Establish so granted will be invalid, if the unit falls in Aravali Area or non conforming area.

22. That the unit will comply with the Hazardous Waste Management Rules and will also make the non-leachate pit for storage of Hazardous waste and will undertake not to dispose off the same except for pit in their own premises or with the authorized disposal authority.

23. That the unit will submit an undertaking that it will comply with all the specific and general conditions as imposed in the above Consent to Establish within 30 days failing which Consent to Establish will be revoked.

24. That unit will obtain EIA from MoEF, if required at any stage.

25. In case of unit does not comply with the above conditions within the stipulated period, Consent to Establish will be revoked.

26. That unit will obtain consent to operate from the board before the start of product activity.

27. The industrial/non industrial sector projects shall develop green belt (as applicable) in its premises including periphery, entry and exit, as per notifications/conditions of EC/directions of MOEF/CPCB/SPCB/NGT/ any court of law. In case of stone crushers, hot mix plants, mineral grinding units, screening plants and brick kilns etc., the unit shall develop adequate green belt and erect barrier/barricade/boundary wall as applicable, as per notifications/directions of MOEF/CPCB/SPCB/NGT/ any court of law.

28. The unit shall develop paved or hard surfaced approach road to the site of unit (including the storage site, if it is at different place) from the nearest public road for transportation of raw material/final product.

Specific Conditions

Other Conditions :

1.The applicant/unit shall comply with and carry out directive/orders issued by the Board in this consent order at all subsequent times without negligence of his /its part. The applicant/company shall be liable for such legal action against him as per provision of the law/act in case of violation of any order/directives. Issued at any time and or non-compliance of the terms and conditions of his consent order.
2. The unit will operate Air Pollution Control Measures properly and maintain the logbook.
3. Unit will comply with all the directions / orders / any outcome of the Hon'ble NGT regarding O.A. No. 667/2018 in the matter titled as Mahendra Singh Vs. State of Haryana and Ors and O.A. No. 679/2018 titled as Tejpal Vs. State of Haryana & Ors.
4.The unit will comply the provisions of notification 11.05.2016 regarding stone crushing unit and other directions regarding the abatement of air pollution on stone crusher.
5.The unit will deposit final environment compensation within 15 days as per applicability if levied in compliance of the directions /order in the matter of OA No. 667/2018 Titled as Mahendra Singh Vs State of Haryana And Ors. OA No. 679/2018 titled as Tejpal vs State of Haryana and Ors. & OA No. 599/2019 titled as Bishamber Singh Vs state of Haryana and Ors.
6.The consent to establish Expan is granted herewith prejudice to be action taken if any, in compliance of the outcome of the final order in the matter of OA No. 667/2018 Titled as Mahendra Singh Vs State of Haryana And Ors. OA No. 679/2018 titled as Tejpal vs State of Haryana and Ors. & OA No. 599/2019 titled as Bishamber Singh Vs state of Haryana and Ors.
7. The unit will comply with all the conditions of Consent to establish expansion, so granted.
8.The unit will plant sufficient Nos. of trees within & outside the premises during the coming monsoon season.
9.Unit will comply with all the conditions of CTE, CTO so granted and will obtain necessary permissions from concerned Deptt. /Local prescribed Authority, as per applicable Laws.
10.This CTE expansion is without prejudice to any action under the provisions of applicable laws / acts / notification / courts order to be taken in respect of any past violation at any stage without any claim of the unit. If the unit fails to comply with the provisions/conditions of CTE expansion, various applicable provisions of concerned departments / agencies / authorities / any relevant decision of court, the CTE so granted shall be revoked automatically without giving any notice.
11.Unit will comply with all the prescribed air emission standards under the provisions of Air (Prevention and Control of Pollution) Act, 1981 and Environment (Protection) Act, 1986 amended from time to time. 12. Unit will obtain all necessary permission/Permissions/registrations done well in time from all the concerned departments.
13.Unit will deposit the balance CTE expansion fee if found pending at a later stage as per prescribed schedule as available on the website of the Board.
14.Grant CTE expansion does not prevent the Board from revoking of those CTE expansion including taking appropriate action against those defaulting units, where CTE or CTO has been obtained or got extended on the basis of wrong declaration or false documents and also who fail to comply with any of the conditions of CTE/CTO granted to such units or any relevant provisions of Water Act, 1974 and Air Act, 1981 beside forfeiture of performance security deposited by the unit for obtaining CTE & on refusal of CTO.

KRISHAN KUMAR

Digitally signed by KRISHAN KUMAR
Date: 2023.11.19 14:20:52 +05'30'

Regional Officer, Mahendragarh

Haryana State Pollution Control Board.

Annexure-29

HARYANA STATE POLLUTION CONTROL BOARD

Regional office,Mahendragarh at Lala Nemi Chand Singhal Enc.Sohna Road, Near Hanuman Mandir,Dharuhera. Email:- hspcbromg@gmail.com

E-mail: hspcb@hry.nic.in

No. HSPCB/Consent/ : 313129224MAHCTOA55104406 **Dated:02/02/2024**

To.

M/s :SHRI RAM STONE CRUSHER PLANT 2

Khewat No. 23, Khatoni NO. 25, M./Kila No. 46//21 (8-0), 22(8-16), 48//1(7-7) & 2(2-11) total 26 Kanal 14 Marla at Village Panchnota, Nangal Chaudhary, Distt-Mohindergarh

Subject: Grant of consent to operate to M/s SHRI RAM STONE CRUSHER PLANT 2.

Please refer to your application no. 55104406 received on dated 2023-12-28 in regional office Mahendragarh.With reference to your above application for consent to operate,M/s SHRI RAM STONE CRUSHER PLANT 2 is here by granted consent as per following specification/Terms and conditions.

Consent Under	AIR
Period of consent	01/04/2024 - 31/03/2029
Industry Type	Stone crushers
Category	ORANGE
Investment(In Lakh)	476.92999
Total Land Area(Sq. meter)	13506.0
Total Builtup Area(Sq. meter)	6000.0
Quantity of effluent	
1. Trade	0.0 KL/Day
2. Domestic	0.5 KL/Day
Number of outlets	1.0
Mode of discharge	
1. Domestic	Septic Tank
2. Trade	
Domestic Effluent Parameters	
1. NA	
Trade Effluent Parameters	
1. NA	
Number of stacks	1
Height of stack	
1. NA	
Emission parameters	
1. SPM	600 mg/m3

2. All Standards as per EP Acts/Rules/Norms	
Product Details	
1. STONE DUST AND DIFFERENT SIZES OF STONE GRIT	11000 Metric Tonnes/day
Capacity of boiler	
1. NA	Ton/hr
Type of Furnace	
1. NA	
Type of Fuel	
1. Electricity	Kilowatt/day
Raw Material Details	
STONE BOULDER	11000 Metric Tonnes/Day

Regional Officer, Mahendragarh
Haryana State Pollution Control Board.

Terms and conditions

1. The applicants shall maintain good house keeping both within factory and in the premises. All hose pipelines values, storage tanks etc. shall be leak proof. In plant allowable pollutants levels, if specified by State Board should be met strictly.
2. The applicant/company shall comply with and carry out directive/orders issued by the Board in this consent order at all subsequent times without negligence of his /its part. The applicant/company shall be liable for such legal action against him as per provision of the law/act in case of violation of any order/directives. Issued at any time and or non compliance of the terms and conditions of his consent order.
3. The applicant shall make an application for grant of consent at least 90 days before the date of expiry of this consent.
4. Necessary fee as prescribed for obtaining renewal consent shall be paid by the applicant alongwith the consent application.
5. If due to any technological improvement or otherwise this Board is of opinion that all or any of the conditions referred to above required variation (including the change of any control equipment either in whole or in part) this Board shall after giving the applicant an opportunity of being heard vary all or such condition and there upon the applicant shall be bound to comply with the conditions so varied.
6. The industry shall provide adequate arrangement for fighting the accidental leakages, discharge of any pollutants gas/liquids from the vessels, mechanical equipment etc. which are likely to cause environment pollution.
7. The industry shall comply noise pollution (Regulation and control) Rules, 2000.
8. The industry shall comply all the direction/Rules/Instructions as may be issued by the MOEF/CPCB/HSPCB from time to time.
9. The industry shall ensure that various characteristics of the effluents remain within the tolerance limits as specified in EPA Standard and as amended from time to time and at no time the concentration of any characteristics should exceed these limits for discharge.

10. The industry would immediately submit the revised application to the Board in the event of any change in the raw material in process, mode of treatment/discharge of effluent. In case of change of process at any stage during the consent period, the industry shall submit fresh consent application alongwith the consent to operate fee, if found due, which may be on any account and that shall be paid by the industry and the industry would immediately submit the consent application to the Board in the event of any change during the year in the raw material, quantity, quality of the effluent, mode of discharge, treatment facilities etc.
11. The officer/official of the Board shall reserve the right to access for the inspection of the industry in connection with the various process and the treatment facilities. The consent to operate is subject to review by the Board at any time.
12. Permissible limits for any pollutants mentioned in the consent to operate order should not exceed the concentration permitted in the effluent by the Board.
13. The industry shall pay the balance fee, in case it is found due from the industry at any time later on.
14. If the industry fails to adhere to any of the conditions of this consent to operate order, the consent to operate so granted shall automatically lapse.
15. If the industry is closed temporarily at its own, they shall inform the Board and obtain permission before restart of the unit.
16. The industry shall comply all the Directions/ Rules/Instructions issued from time to time by the Board.

HARYANA STATE

Specific Conditions :

1. Unit will comply all the directions / orders / any outcome of the of Hon'ble NGT regarding O.A. No. 667/2018 in the matter titled as Mahendra Singh Vs. State of Haryana and Ors and O.A. No. 679/2018 titled as Tejpal Vs. State of Haryana & Ors.
2. The unit will maintain its APCM/dust suppression system in well working condition.
3. This CTO is without prejudice to any action under the provisions of applicable laws / acts / notification / courts order to be taken in respect of any past violation at any stage without any claim of the unit. If the unit fails to comply with the provisions/conditions of CTO, various applicable provisions of concerned departments / agencies / authorities / any relevant decision of court, the consent to operate so granted shall be revoked automatically without giving any notice.
4. The unit will comply the provisions of notification 11.05.2016 regarding stone crushing unit and other directions regarding the abatement of air pollution on stone crusher.
5. The unit will operate Air Pollution Control Measures properly and maintain the logbook as per notification 11.05.2016.
6. The standards prescribed under environmental laws by MoEF&CC/ CPCB are followed by the Board. Further, it is clarified that the standards to be prescribed from time to time under environmental laws by MoEF&CC/CPCB shall also be deemed to be the standards of Board. Provided that in case any stringent parameters will be prescribed by the Board on any subject where upon parameters are also provided by MoEF&CC/CPCB, the standards prescribed by the Board will be followed. The general standards prescribed under EP Rules, 1986 (as amended) shall be applicable on the industries for which specific standards are not prescribed.
7. Grant CTO does not prevent the Board from revoking of those CTO including taking appropriate action against those defaulting units, where CTE or CTO has been obtained or got extended on the basis of wrong declaration or false documents and also who fail to comply

with any of the conditions of CTE/CTO granted to such units or any relevant provisions of Water Act, 1974 and Air Act, 1981 beside forfeiture of performance security deposited by the unit for obtaining CTE & on refusal of CTO.

8. The applicant/unit shall comply with and carry out directive/orders issued by the Board in this consent order at all subsequent times without negligence of his /its part. The applicant/company shall be liable for such legal action against him as per provision of the law/act in case of violation of any order/directives. Issued at any time and or non-compliance of the terms and conditions of his consent order

9. The unit will deposit any amount of environment compensation within 15 days as per applicability if levied in compliance of the directions order in the matter of OA No. 667/2018 in the matter titled as Mahendra Singh Vs. State of Haryana and Ors and O.A. No. 679/2018 titled as Tejpal Vs. State of Haryana & Ors.

10 This consent to operate is granted herewith prejudice to be action taken if any, in compliance of the outcome of the any order/ any relevant decision of court in the matter of OA No. 667/2018 in the matter titled as Mahendra Singh Vs. State of Haryana and Ors and O.A. No. 679/2018 titled as Tejpal Vs. State of Haryana & Ors, the consent to operate so granted shall be revoked automatically without giving any notice.

Regional Officer, Mahendragarh
Haryana State Pollution Control Board.

HARYANA STATE

GSTIN No. 06AEKPB4128A2Z6

Bayal Quartz & Feldspar Mines

Regd. Office : Sector-1, Home No. 196-P, Narnaul-123001 (Haryana)
Email : psangwan5757@gmail.com Mob. 9215105757

Ref. No..... *Dated.....*

To

Date: 20.12.2024

The Director,
Ministry of Environment, Forests & Climate Change (IA Division),
Indira Paryavaran Bhavan, Jor Bagh Road,
New Delhi

Sub: Environmental Clearance to M/s Bayal Quartz & Feldspar Mine of Mr. Manmohan Bhadana, S/o Kartar Singh Bhadana over an area of 76.75 Ha. & rate of production is 55, 00,000 TPA (ROM) situated at Khasra no. 201, 223 & 224 Village- Bayal, Tehsil- Narnaul, District – Mahendargarh (Haryana) for the Submission period of December 2024.

Ref. No. J-11015/10/2017-IA.II (M) Dated 4th May, 2018

Sir,

In accordance to the EC letter as above stated received from Ministry of Environment, Forests & Climate Change vide letter **J-11015/10/2017-IA.II(M) Dated 4th May, 2018.** We are submitting herewith six monthly compliance report of stipulated conditions of Environment Clearance (Soft only) along with laboratory analysis results the specific and general conditions and relevant annexure.

We fully assure you that we will comply with all conditions as specified in the Environment clearance granted us.

For M/s Bayal Quartz & Feldspar Mine

Bayal Quartz And Feldspar Mines Prop.

Authorised Signatory

Name - Pramesh Singh
Designation Authorized Representative
Email - psangwan5757@gmail.com
Contact No.- 9215105757

Copy to:

1. The Director, Ministry of Environment & Forests, Northern Regional Office, Sector-31, Dakshin Marg, Chandigarh-160030
2. The Chairmen, Haryana State Pollution Control Board, Sector-6, Panchkula

SIX MONTHLY ENVIRONMENTAL COMPLIANCE MONITORING REPORT OF

STIPULATED CONDITIONS OF ENVIRONMENTAL CLEARANCE

(Period- April 2024 to September 2024)

FOR

M/s Bayal Quartz & Feldspar Mine

Shri Manmohan Bhadana,

Khasra No- 201,223 &224

Vill- Bayal, Taluka- Narnaul

District- Mahendregarh, Haryana

SUBMITTED BY:

M/s Bayal Quartz & Feldspar Mine

Dist-Faridabad (HR)

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1 INTRODUCTION

1.1 Introduction

M/s Bayal Quartz & Feldspar Mine has obtained the Environmental Clearance Letter from Ministry of Environment, Forest and Climate Change (Impact Assessment Division), New Delhi for the Mining of Bayal Quartz & Feldspar Mine of Mr. Manmohan Bhadana, S/o Kartar Singh Bhadana at Khasra No.-201,223 & 224, Village-Bayal, Taluka-Narnaul, District-Mahendergarh, Haryana Vide Ref. No. **J-11015/10/2017-IA.II (M) dated 4th May, 2018.**

Total area of the mining site is 76.75 hectares. An approval for the mining scheme and progressive mine closure plan was obtained from the Department of Mines & Geology, Haryana vide Letter no. **DMG/HY /MP /Bayal/2022/4651** on dated **17.08.2023**.

1.2 Purpose of the Report

As per the "Sub Para (i)" of "Para 10" of EIA Notification 2006, it is stated that "It shall be mandatory for the project management to submit six monthly compliance reports in respect of the stipulated prior environmental clearance terms and conditions in hard and soft copies to the regulatory authority concerned, on 1st June and 1st December of each calendar year" and as per compliance of condition mentioned in Environment Clearance Letter (i.e. Part B General Condition, point number- 38), Six monthly compliance reports should be submitted to the Regulatory Authority of Central and State Government.

It is mandatory to submit a Six Monthly Compliance Report to show the status & compliance of all the Conditions mentioned in Environment clearance Letter, along with monitoring of various Environmental Parameters (as per CPCB Norms).

The regulatory authorities in this case are MoEF & CC, MOM (Ministry Of Mines) New Delhi, DOF (Department Of Forest) Chandigarh, CWW (Chief Wildlife Warden) Panchkula, PCCF (Principal Chief Conservator of Forests) Chandigarh, DC (District Collector) Haryana, Delhi, MoEF& CC, Chandigarh and HSPCB, Panchkula, CPCB, New Delhi, DoE, Chandigarh, DMG, chandigarh, CGWA New Delhi, Department of Irrigation Panchkula & State Environment Impact Assessment Authority, Haryana. Various scheduled Site Visits were conducted by a team of Experts to Monitor Pollution related parameters as defined by CPCB / HSPCB. Samples for water and soil were also collected for further analysis.

Based on the Specific and General Conditions mentioned in the EC Letter, a Compliance Report was prepared on behalf of Project Proponent; details of which are present in Chapter-2 entitled **"ADHERENCE OF SPECIFIC AND GENERAL CONDITIONS"**

This report is supposed to submit after every six month as per the conditions stipulated in Environment Clearance Letter. The Environmental assessment has been carried out to verify:

1) That the proposed project has not any adverse effect on the project site as well as its surrounding.
2) That there is compliance with the conditions stipulated in the Environmental Clearance Letter.

3) That the Project proponent is implementing the environmental safeguards and environmental pollution mitigative measures as suggested in approved Mining Plan and Form-1, Environmental Management Plan with true spirit.
4) The non-conformity in the project with respect to the environmental implication.

1.3 Methodology for Preparation of Report is as follows:

1) Study of EC Letter & Related Documents,
2) Site Visits by a Team of Experts,
3) Monitoring of Environment Parameters, viz. Ambient Air, Water, Noise, Soil & DG stack emissions,
4) Analysis of Samples collected during Monitoring,
5) Interpretation of Monitoring Results,
6) Preparation of six monthly Environmental Compliance Report.

1.4 Generic Structure of Report:

1. Purpose of the Report, explaining the need of a Compliance Report and Methodology Adopted for preparation of Report.
2. Compliance Report, explaining the entire specific & general conditions given in the EC Letter and providing details w.r.t. each condition/ guideline.
3. Monitoring Reports & Analysis, showing the level of pollution/emission within the project site for various Environment Parameters.
4. Photographs showing status of the project and sampling/monitoring of environmental parameters.
5. Supporting Documents related mandatory for the project.

2 ADHERENCE OF SPECIFIC AND GENERAL CONDITIONS

Part A: Specific Conditions

S. No.	Specific Conditions	*Reply*
1.	Environmental clearance is granted subject to final outcome of Hon'ble Supreme Court of India, Hon'ble High Court of Haryana and any other Court of Law, if any, as may be applicable to this project.	Agreed. Environmental Clearance was granted in favour of M/s Bayal Quartz & Feldspar Mine for proposed Stone along with Associated Minor Minerals at Khasra No.-201,223 & 224, Village- Bayal, Taluka- Narnaul, District-Mahendergarh Haryana by vide letter no. **J-11015/10/2017-IA.II (M) dated 4th May, 2018.** Copy of EC is enclosed as **Annexure-1.**
2.	No mining activities will be allowed in forest area, if any, for which the Forest Clearance is not available.	Agreed. NOC Forest has been obtained from DFO Mahendergarh vide **letter no 68 dated 12.04.2017.** Copy of NOC Forest has been attached as **Annexure-4.**
3.	The Project Proponent shall obtain Consent to Operate from the State Pollution Control Board, Haryana and effectively implement all the conditions stipulated therein.	The project proponent has obtained CTO from State Pollution Control Board, Haryana vide letter number **313100422MAHCTO25082187** on dated **25.07.2022. The CTO is valid up to 30.09.2025.** CTO is attached as **Annexure-2.**
4.	No mining should be carried out within 50 meters of the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District roads (ODRs), temple and no mining should be carried out with 100 meters by using explosive from the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs), temple even if, PP obtained permission from DGMS. For mining in the remaining area the proponent should conduct the blast vibration study by engaging CSIR-Central Institute of Mining and Fuel Research (CIMFR), Dhanbad or National Institute of Rock Mechanics (NIRM), Karnataka. The report so obtained should be submitted to DGMS for obtaining the permission for carrying out mining by using explosive.	Agreed & Complied. No mining is being carried out within 50 meters of the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District roads (ODRs), temple and no mining is being carried out with 100 meters by using explosive from the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) etc. Blasting and vibration study has already been conducted by CSIR-Central Institute of Mining and Fuel Research (Council of Scientific & Industrial Research) on dated 01.12.2021. **Micro mate Calibration Certificate** is being attached as **Annexure-6.**
5.	Shelter belt i.e. wind barrier of 30 meter width and consisting of at least 5 tiers around lease facing the habitation/ school/public road (if any in the vicinity) shall be raised.	Agreed.

<table>
<tr><td>6.</td><td>Adequate protection against the dust and other environmental pollution arising due to mining activity shall be made so that human habitation located near the lease in not adversely affected. The status of implementation shall be report to Regional Office, MOEF&CC and SPCB, Haryana.</td><td>Agreed & Complied.

We are using following precautions and dust mitigation for protection against dust:-

• Regularly water sprinkling
• Tarpaulin covered trucks
• Dust mask for workers
• Dry fog machine
• Wet drilling, and
• Fixed water sprinklers along the permanent haul road.
Photographs showing water sprinklers & smog gun are attached as Annexure-9.</td></tr>
<tr><td>7.</td><td>The proponent should ensure that mine working shall not intersect the ground water table of the area. The mining should be restricted till 356 masl till the PP submits the detailed hydro-geological study and obtained permission from CGWA for intersection of ground water table, if any, for mining beyond 356 masl.</td><td>Agreed.

The Mining activity will be done as per the approved mining plan and it will be ensured that the mine workings are terminated before 10 meters above the ground water table.</td></tr>
<tr><td>8.</td><td>Regular monitoring of ground water level and quality shall be carried out in and around the mine lease by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring shall be carried out four times in a year pre- monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to Ministry of Environment, Forest & Climate Change and its Regional office, Chandigarh, Central Ground Water Authority and Regional Director, Central Ground Water Board.</td><td>Monitoring for Ground water level & water quality is being done as per prescribed schedule in existing wells in and around the mine lease area. In this reporting period, Monitoring was conducted in month of Pre monsoon (May) and Monsoon (August).

Monitoring report of ground water quality is attached as Annexure-10.

Ground water levels data are given in Table3.11 of the chapter-3.</td></tr>
<tr><td>9.</td><td>The Budget earmarked for Environmental Management Plan Rs 172.35 Lakh (Capital Cost) and Rs 458.0 Lakh (Recurring) should be kept in separate account (except amount to be submitted to Forest Department for implementation of the conservation plan) and same needs to be audited annually. The activates proposed under EMP are a) Environmental Monitoring for Air, Noise, Water and Soil Quality, b) Purchase of minimum two water tanker having mist cannon fogger, c) construction of garland drains, d) Green belt Development along the mine boundary, e) Afforestation & Reclamation activities, f) Rain water harvesting pits, g) mine waste/ overburden management and h) Implementation of Conservation plan for Schedule -1 species. The Proponent should submit the detailed report to Regional office, MoEF& CC on implementation of EMP along with audited report of expenditure incurred; purchase documents, photographs in support of implementation of activities, Geo-location of the monitoring stations etc.</td><td>Agreed.

A total of Rs. 203.25 Lakh have been spent so far in capital expenses towards EMP towards space and inventory for green belt development, purchase of mist fogging cannon, construction of garland drains, desilting chamber, RWH pits, fixed sprinklers and OB dump management. Also, Rs. 2.04 Crores have been spent so far in the recurring cost towards EMP.

A.CAPITAL EXPENDITURE

<table>
<tr><th>S.No.</th><th>Expenditure Head (From January 1st 2018 –September 30, 2024 till)</th><th>Total Certified expenses</th></tr>
<tr><td>1.</td><td>Land for green belt development and construction of GI sheet parapet wall including procurement, levelling and other necessary development</td><td>Rs. 50,00,000.00/-</td></tr>
<tr><td>2.</td><td>Purchase and erection of wind barrier walls</td><td>Rs.58,60,000.00/</td></tr>
</table>
</td></tr>
</table>

3.	Development of Garland Drains around the dump	**Rs. 200,000.00/**
4.	Development of Desilting Chamber	**Rs. 100,000.00/**
5.	Development of Rain Water Harvesting Pits along with retaining wall and incoming drains retaining wall and incoming drains	**Rs. 800,000.00/-**
6.	Installation of Fixed Water Sprinklers around 1000 Ft.	**Rs. 100,000.00**
7.	Procurement of plant saplings –total around 13000,including plantation and guards	**Rs. 2,050,000.00**
8.	Procedure of ambient air quality monitoring station.	**Rs. 725,000,00**
9.	Purchase of Water Tanker with Mist Fogger arrangement.	**Rs. 650,000.00**
10	Dressing and stabilizing slope of the OB Dump yard.	**Rs. 4,600,000.00**
11	Contribution to Mines Safety, Environment and Cleanliness Celebration/Drive	**Rs. 240,000**
12	**Total Capital Expenditures so far for EMP**	**Rs. 203.25 Lakh Only**

B. Recurring Expenditure

S.No.	**Expenditure Head (From January 1st 2018 – September 30, 2024 till)**	**Certified Amount**
1.	Payment towards hiring operation and maintenance of the mobile water tankers - 6 Nos.	Rs. 1,94,40,000/-
2.	Periodic Monitoring for Environmental Parameters i.e. AAQ Water etc. through NABL accredited agency.	Rs. 600,000/-
3.	**Total Recurring Expenses so far for EMP**	**Rs. 200.40/- Lakh only**
4.	**Gross Total Expenses for for EMP(Capital + Recurring)**	**Rs. 403.65 Lakh**

CA Certificate for M/s Bayal Quartz and Feldspar

<table>
<tr><td></td><td></td><td>Mines for EMP Expenditure are attached as Annexure-11.</td></tr>
<tr><td>10.</td><td>The Budget earmarked for Management of Labour Camps will be Rs 28.25 Lakh (Capital) and Rs 46.6 Lakh (Recurring) and same needs to be kept in a separate account. The account needs to be audited annually and report of the same shall be submitted to Regional office, MoEF&CC along with supporting documents, photographs and geo-location.</td><td>Agreed.

For the working labours following Facilities have been provided by project proponent.
➢ Full-fledged well-constructed labor camps with mess facility.
➢ Hygienic Toilet Facilities provided at the Mine Site.
➢ Portable drinking water provided to the laborers.
➢ Regular Medical checkup facilities are being provided.</td></tr>
<tr><td>11.</td><td>Occupational health and safety measures of the workers including identification of work related health hazards, training on health effect of mineral dust shall be carried out. Initial and periodical medical examination of each worker and record of the same shall be maintained. The budget earmarked for the occupational health surveillance will be Rs 2.62 Lakh (Capital) and Rs 81.31 Lakh (recurring). The proponent shall engage a doctor who is well trained in occupational health and has NIOSH B reader Certification (using the ILO 2000 Classification of Radiographs of Pneumoconiosis). The project Proponent shall maintain a separate account for budget earmarked for occupational health surveillance plan and the same needs to be audited annually. The annual report of implementation of the occupational health surveillance plan shall be submitted to Regional Office, MoEF&CC. The Project proponent shall increase the budget earmarked for occupational health surveillance plan as per requirement.</td><td>Agreed & Complied.

Occupational health and safety of all the workers are kept on priority.

Dust Mask has been provided to the workers working in the dust prone areas as additional personal protective equipment. Workers is being informed and kept aware about occupational health hazards due to such activities and preventive measures.

Worker’s health related problems are properly addressed. All workmen have undergone detailed medical checkup / screening including Chest X-Ray as per ILO convention. Sample Occupational Health Reports of 10 workers is attached as Annexure-5.

Photographs of workers wearing “PPE KITS” are attached as Annexure-13.

Photographs of Safety Signboards are attached as Annexure-14.</td></tr>
<tr><td>12.</td><td>The budget earmarked for the Enterprise Social Commitment (ESC) will be Rs 26.55 Lakh which includes supply of medical equipment to the Govt. Hospitals, installation of RO Plant in village Panchayat, Supply of books to Govt. School & libraries, organizing health camp for villagers, rainwater harvesting structures and installation of roof top solar panel in village Panchayat Bhawan. The amount earmarked for ESC should be kept in separate account and same shall to be audited annually. The PP shall submit an annual report of compliance of activities proposed under ESC, to Regional Office, MoEF & CC with audited statement, photograph etc.</td><td>Agreed.

A total of Rs. 76.93 Lakh have been spent in ESC heads like development of school library, installation and repairs of the water pump at village, development of stadium, Bharthari Temple, and other village development activities through Gram Panchayat Bayal.

Budgetary Allocation for Enterprise Social Commitment is as follows-
<table>
<tr><th>S.No.</th><th>Expenditure Head</th><th>Certified Amount</th></tr>
<tr><td colspan="3">For Financial Year (October1, 2023 to September 30, 2024)</td></tr>
<tr><td>1.</td><td>Contribution for providing uniforms, furniture and infrastructure support to school children at Bayal</td><td>Rs. 183,500.00/-</td></tr>
<tr><td>2.</td><td>Re-flooring of the Bharthari Baba Temple, Bayal and contribution for annual fair at the temple.</td><td>Rs. 398,000.00/-</td></tr>
</table></td></tr>
</table>

		3. Contribution to the Bhairu Baba Temple and Hiramal Baba Temple, and donation to the Gaushala. — Rs 511,000.00/- 4. Donation to the Jeen Mata Temple for refurbishment — Rs. 181,000.00/- 5. Contribution for community works — Rs. 458,000.00/- 6. Contribution for village development — Rs. 8,66,500.00/- 7. Donation to Baba Ratiram Ashram — Rs. 252,000.00/- **Total CSR Expenditure so far (2018-Sept 30, 2024) — Rs. 76,93,311.00/-** **CA Certificate for M/s Bayal Quartz and Feldspar Mines for ECS Expenditure is attached as Annexure-11.**
13.	The Project Proponent shall get the blasting studies done by engaging CSIR-Central Institute of Mining and Fuel Research (CIMFR), Dhanbad or National Institute of Rock Mechanics (NIRM), Karnataka or any other institute of national repute before commencement of any blasting operation within 500 meters of the habitation. The budget earmarked for conducting blasting studies will be Rs 34.0 Lakh.The blasting study report shall be submitted to Ministry of Environment, Forest and Climate Change and its Regional Office within three month of its finalization. The proponent shall monitor ground vibration and air overpressure of each blast and shall keep a record of the same which include logs generated from Blastmate, geo-location of the blast. Dated and time of blast, number of holes blasted, charge per holes, explosive used, bench parameters, drill hole parameters etc.	**Agreed.** Blasting and vibration study has already been conducted by CSIR-Central Institute of Mining and Fuel Research (Council of Scientific & Industrial Research), in 2018, 2021, and 2024. A total sum of Rs. 34.90 lakh have been spent in conducting the studies and upkeep of the documents. MiniMate Plus, MiniMate Blaster and MiniMate DS- 077 (Made in Canada by M/s Instantel Inc.) Instrument to monitor ground vibrations and air overpressure of each blast and record are being maintained in log book. **The permission received from DGMS under Regulation 164(1)(b) of MMR1961, as per the recommendations of the study conducted by CIMFR is attached herewith as Annexure-15.** **(Micro mate Calibration Certificate is attached as Annexure-6)** **Seismograph Event Report is attached as Annexure-15.**
14.	The project proponent shall compensate all 43 identified families as per proposed R&R plan. The Rs 6.16 Cr earmarked for R&R plan shall be kept in separate account and same needs to be audited. The details of the compensation paid to the project affected families shall be sent to Regional Office, MoEF&CC within one year of the commencement of the mining operation.	Agreed. We have compensated all 43 identified families as per proposed R & R Plan. A total investment of Rs. 21.34 crores has been made so far in the R&R Plan. Copy of the same is attached as **Annexure-16.**

Part B- Standard Conditions

1.	A final Mine Closure Plan along with details of Corpus fund shall be submitted to the Ministry of Environment, Forest & Climate Change 5 years in advance of final mine closure for approval.	A final mine closure plan along with details of corpus fund has already been submitted to the SEIAA well within the stipulated period as prescribed in the minor mineral concession rules 2012.
2.	The Environment Clearance is subject to obtaining requisite NBWL Clearance from the Standing	Not Applicable. No NBWL clearance required as there is no eco-sensitive

	Committee of National Board for Wildlife as applicable for the Mining project.	area in the study area.
3.	No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment, Forest & Climate Change.	Agreed. Mining activity is being carried out as per Approved Mining Plan. Mining plan is being attached as **Annexure-3.**
4.	No change in the calendar plan including excavation, quantum of stone and waste should be made	Agreed & Complied. Mining activity is being carried out as per Approved Mining Plan.
5.	The Project Proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of surface water and ground water for the project	Agreed & Complied.
6.	Mining shall be carried out as per the provision outlined in mining plan approved by Indian Bureau of Mines (IBM)/ State Mines and Geology department as well as by abiding to the guidelines of Directorate General Mines Safety (DGMS)	Agreed & Complied. Mining activity is being carried out as per Approved Mining Plan.
7.	Project Proponent shall obtain the necessary prior permission from the Central Ground Water Authority (CGWA) in case of intersecting the Ground Water table. The intersecting ground water table can only be commence after conducting detailed hydrogeological study and necessary permission from the CGWA. The report on six monthly basis on changes in Ground water level and quality shall be submitted to the Regional Office of the Ministry, CGWA and state Pollution Control Board.	Agreed & Complied. As per approved mine plan, mining has not intersected the ground water so permission from the Central Ground Water Authority (CGWA) is not required, as of now.
8.	The lands which are not owned by Proponent, mining will be carried out only after obtaining the consents from all the concerned land owners as per the provisions of the Mineral Concession Rules, 1960 and MMDR Act, 1957.	Agreed.
9.	Digital Processing of the entire area using remote sensing technique shall be carried out regularly once in three years for monitoring land use pattern and report submitted to Ministry of Environment , Forest and Climate Change its Regional Office.	Agreed. Digital Processing Report is attached as **Annexure-17.**
10.	The critical parameters as per the Notification 2009 such as PM_{10}, $PM_{2.5}$, NO_x and SO_x etc. In the ambient air within the impact zone, peak particle velocity at 300m distance or within the nearest habitation, whichever is closer shall be monitored periodically. Further quality of discharged water shall also be monitored [(TDS, DO, pH and Total Suspended Solids (TSS)]. The monitored data shall be uploaded on the website of the company as well as displayed on a display board at the project site at a suitable location near the main gate of the Company in public domain. The circular No. J-20012/1/2006-IA.II(M) dated 27.05.2009 issued by Ministry of Environment ,Forest and Climate Change shall also be referred in this regard for its compliance.	Agreed & Complied. The critical parameters as per the Notification 2009 such as PM_{10}, $PM_{2.5}$, NO_x and SO_2 etc are being regularly monitored periodically. Monitoring results of ambient air quality is enclosed as **Annexure-10.**
11.	The Proponent shall install online Ambient Air Quality Monitoring System and there should be system for	Agreed.

	display of digital AAQ data within 03 months at least three location as per wind direction. Online provision of pH and turbidity meters at discharge points of STP and ETP and also at water storage ponds in the mining area may be made. Project Proponent should display the result digitally in front of the main gate of the mine site.	We have installed Ambient Air Quality Monitoring System. Ambient Air Quality is being monitored regularly. Report of a random day (17.12.2024) is being attached with the report as **Annexure – 10A** Lab Report of Ambient Air Quality are attached as **Annexure-10.**
12.	Effective safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of PM_{10}, and $PM_{2.5}$ such as haul road, loading and unloading point and transfer points. Fugitive dust emissions from all the sources shall be controlled regularly. It shall be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regards. Monitoring of Ambient Air Quality to be carried out based on the Notification 2009, as amended from time to time by the Central Pollution Control Board.	Agreed. Project proponent adopted effective safeguard measures for workers. Regular water sprinkling is being carried out in critical areas prone to control air pollution having high levels of SPM and RSPM such as haul roads, loading & unloading points. Ambient air quality monitoring is conducted in mining and village area. The results show that Ambient Air Quality parameters conform to the norms prescribed by the CPCB and no adverse effect on the nearby area. Monitoring Lab reports are enclosed as **Annexure-10.**
13.	Regular monitoring of ground water level and quality shall be carried out in and around the mine lease by establishing a network of existing wells and constructing new piezometers during the mining operation. The project proponent shall ensure that no natural water course and/pr water resources shall be obstructed due to any mining operations. The monitoring shall be carried out four times in a year-pre monsoon (April-May), Monsoon (August), Post Monsoon (November); winter (January) and the data thus collected may be sent regularly to MoEF&CC and its Regional Office, CGWA and Regional Director CGWB.	Regular monitoring of ground water level and quality is being carried out in existing well in and around the mine lease area. Reports of ground water quality monitoring are attached as **Annexure-10.** Ground water Level data around the mine area for **Pre monsoon (May)** and **Monsoon (August)** are given **in Table 3.11 of the chapter-3.**
14.	Regular monitoring of the flow rate of the springs and perennial nallahs flowing in and around the mine lease shall be carried out and records maintain. The natural water bodies and or streams which are flowing in an around the village, should not be disturbed. The Water table should be nurtured so as not to go down below the pre-mining period. In case of any water scarcity in the area, the Project Proponent has to provide water to the villagers for their use. A provision for regular monitoring of water table in open dug well located in village should be incorporated to ascertain the impact of mining over ground water table.	There is no spring, perennial river or any other water body in and nearby the lease area. We ensure that natural water bodies or streams which are flowing in an around the village, will not be disturbed by the Mining Activity.

15.	Regular monitoring of water quality upstream and downstream of water bodies shall be carried out and record of monitoring data should be maintained and submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office, central Ground Water Authority, Regional Director, Central Ground Water Board, State Pollution Control Board and Central Pollution Control Board.	Noted & Complied. We are regularly submitting the monitoring reports to the Ministry of Environment, Forest and Climate Change and its Regional Office, central Ground Water Authority, Regional Director, Central Ground Water Board, State Pollution Control Board and Central Pollution Control Board.
16.	Transportation of the minerals by road passing through the village shall not be allowed. A 'bypass' road should be constructed (say, leaving a gap of at least 200 meters) for the purpose of transportation of the minerals so that the impact of sound, dust and accidents could be mitigated. The Project Proponent shall bear the cost towards the widening and strengthening of existing public road network in case the same is proposed to be used for the Project. No road movement should be allowed on existing village road network without appropriately increasing the carrying capacity of such roads.	Noted & Complied. Transportation of the minerals is being done by the bypass road and no road movement is being done on existing village road network. by using existing public road network with appropriate carrying capacity of the road. However we will bear the cost towards widening and strengthening of the roads.
17.	The illumination and sound at night at project site disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right for darkness and minimal noise levels at night. Project Proponent must ensure that the biological clock of the villages is not disturbed; by orienting the floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day light/night hours	Agreed. We ensure that the noise level in the mine site is under the permissible limit at day and night time and also, we ensure that the biological clock of the villagers is not being disturbed. Monitoring Lab reports is enclosed **as Annexure-10.**
18.	Main haulage road in the mine should be provided with permanent water sprinklers and other roads should be regularly wetted with water tankers fitted with sprinklers. Crusher and material transfer points should invariably be provided with Bag filters and or dry fogging system. Belt conveyers should be fully covered to avoid air borne dust.	Agreed. Regularly water sprinkling is being done on main haulage roads with water tankers fitted sprinklers. Photograph of the same is attached as **Annexure-9.**
19.	Main haulage road in the mine should be provided with permanent water sprinklers and other roads should be regularly wetted with water tankers fitted with sprinklers. Crusher and material transfer points should invariably be provided with Bag filters and or dry fogging system. In case of Belt-conveyers facilities the system should be fully covered to avoid air borne dust; use of effective sprinkler system to suppress fugitive dust on haul roads and other transport roads shall be ensured.	Agreed. Regularly water sprinkling is being done on main haulage roads with water tankers fitted with sprinklers. Photograph of the same is attached as **Annexure-9.**
20.	Sufficient number of Gullies to be provided for better management of water. Regular Monitoring of pH shall be included in the monitoring plan and report shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office on six monthly basis.	Agreed. We are regularly doing the monitoring and report of the same sis being submitted to Ministry of Environment, Forest and Climate Change and its Regional Office on six monthly bases. Monitoring report is attached as **Annexure-10.**
21.	The pollution due to transportation load on the environment will be effectively controlled and water	Agreed & Complied.

	sprinkling will also be done regularly. Vehicular emissions shall be kept under control and regularly monitored. Project should be kept under control and regularly monitored. Project should obtain 'PUC' certificate for all the vehicles from authorized pollution testing centres.	We are using following precaution and dust mitigation for protection against Transportation load on environment :- 1. Regularly water sprinkling 2. Tarpaulin covered trucks 3. All vehicle monitored regularly 4. All vehicles have PUC certificate from PTC. PUC Certificate is attached as **Annexure-7.**
22.	There shall be planning, developing and implementing facility of rainwater harvesting measures to augment ground water resources in the area in consultation with Central Ground Water Board.	Agreed. We have constructed Rain water harvesting pit as per EIA report. Photographs of Rain water harvesting pit are attached as **Annexure-17.**
23.	The Project Proponent has to take care of gullies formed on slopes. Dump mass should be consolidated with proper filling/levelling with the help of dozer/compactors.	Agreed. Mining activity is being carried out as per Approved Mining Plan.
24.	The reclamation at waste dump sites shall be ecologically sustainable. Scientific reclamation shall be followed. The local species may be encouraged and species are so chosen that the slope, bottom of the dumps and top of the dumps are able to sustain these species. The aspect of the dump is also a factor which regulates some climatic parameters and allows only species adopted to that micro climate.	Agreed. The reclamation at the waste dump site is being done as per approved mining plan. Local species is being planted in consultation with the forest department.
25.	The top soil, if any, shall temporarily be stored at earmarked site(s) only and it should not be kept unutilized for long. The topsoil shall be used for land reclamation and plantation. The over burden (OB) generated during the mining operations shall be stacked at long period of time. The maximum height of the dumps shall not exceed 8m and width 20 m and overall slope of the dumps shall be maintained to 45°. The OB dumps should be scientifically vegetated with suitable native species to prevent erosion and surface run off. In critical areas, use of geo-textiles shall be undertaken for stabilization of the dump. The entire excavated areas should continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office on six monthly basis.	Agreed. Top soil is being used for green belt development and OB generated at the mine site is being managed as per Approved Mining Plan. Compliance status is being submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office on six monthly bases. Photographs of Green Belt area on site is attached as **Annexure-8.**
26.	Catch drains and siltation ponds of appropriate size shall be constructed around the mine working, mineral and OB dumps to prevent run off of water and flow of sediments directly into the river and other water bodies. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drains shall be regularly desilted particularly after monsoon and maintained properly. The drains, setting tanks and check dams of appropriate size, gradient and length shall be constructed both around the mine pit and over	Agreed. Catch drains and siltation pond of appropriate size in and around mine site is being constructed as per the requirement of Approved Mining plan. Photographs of Garland Drain and Siltation Pond are attached as **Annexure-18.**

	burden dumps to prevent run off of water and flow of sediments directly into the river and other water bodies and sump capacity should be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper setting of silt material. Sedimentation pits shall be constructed at the corners of the garland drains and desilted at regular intervals.	
27.	Plantation shall be raised in a 7.5m wide green belt in the Safety zone around the mining lease, backfilled and reclaimed area, around water body, along the roads etc. by planting the native species in consultation with the local DFO/Agriculture Department. The density of the trees should be around 2500 plants per ha. Greenbelt shall be developed all along the mine lease area in a phased manner and shall be completed within first five years.	Agreed. Green belt is being developed in a phased manner in and around mine site in consulting with the local DFO and Agriculture department.
28.	Project Proponent shall follow the mitigation measures provided in Office Memorandum No. Z-11013/57/2014-IA.II (M), dated 29th October, 2014, tiled "Impact of mining activities on Habitation-Issues related to the mining projects wherein Habitations and villages are the part of mine lease areas or Habitation and villages are surrounded by the mine lease area.	Noted & Complied.
29.	The Project Proponent shall make necessary alternatives arrangements, where required, in consultation with the State Government to provide alternate area for livestock grazing, if any. In this context, Project Proponent should implement the directions of the Hon'able Supreme Court with regard to acquiring grazing and. The scarse trees on such grazing ground, which provide mid-day shelter from the scorching sun, should be scrupulously guarded against felling and plantation of such trees should be promoted.	Noted & Complied.
30.	The Project Proponent shall take all precautionary measures during mining operation for conservation and protection of endangered fauna, if any, spotted in the study area. Action Plan for conservation of flora and fauna shall be prepared and implemented in consultation with the State Forest and Wildlife Department. A copy of action plan shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office.	Agreed. An amount of Rs. 30 Lakh has been deposited as conservation plan to the Divisional Wildlife Officer, Gurugram, Haryana-122001 Cheque of the submitted amount is attached as **Annexure-22.**
31.	As per the Company Act, the CSR cost should be 2% of average net profit of last three years .Hence CSR expenses should be as per the Company Act/Rule for the Socio Economic Development of the neighbourhood Habitats which could be planned and executed by the Project Proponent more systematically based on the "Need based door to door survey' by established Social Institutes /workers. The report shall be submitted to the Ministry of	Agreed. A total of Rs. 76.93 Lakh have been spent in ESC heads like development of school library, installation and repairs of the water pump at village, development of stadium, Bharthari Temple, and other village development activities through Gram Panchayat Bayal. **Budgetary Allocation for Enterprise Social**

<table>
<tr><td></td><td>Environment, Forest and Climate Change and its Regional Office on six monthly basis.</td><td>Commitment is as follows-

<table>
<tr><th>S.No.</th><th>Expenditure Head</th><th>Certified Amount</th></tr>
<tr><td colspan="3">For Financial Year (October1, 2023 to September 30, 2024)</td></tr>
<tr><td>1.</td><td>Contribution for providing uniforms, furniture and infrastructure support to school children at Bayal</td><td>Rs. 183,500.00/-</td></tr>
<tr><td>2.</td><td>Re-flooring of the Bharthari Baba Temple, Bayal and contribution for annual fair at the temple.</td><td>Rs. 398,000.00/-</td></tr>
<tr><td>3.</td><td>Contribution to the Bhairu Baba Temple and Hiramal Baba Temple, and donation to the Gaushala.</td><td>Rs 511,000.00/-</td></tr>
<tr><td>4.</td><td>Donation to the Jeen Mata Temple for refurbishment</td><td>Rs. 181,000.00/-</td></tr>
<tr><td>5.</td><td>Contribution for community works</td><td>Rs. 458,000.00/-</td></tr>
<tr><td>6.</td><td>Contribution for village development</td><td>Rs. 8,66,500.00/-</td></tr>
<tr><td>7.</td><td>Donation to Baba Ratiram Ashram</td><td>Rs. 252,000.00/-</td></tr>
<tr><td colspan="2">Total CSR Expenditure so far (2018-Sept 30, 2024)</td><td>Rs. 76,93,311.00/-</td></tr>
</table>

CA Certificate for M/s Bayal Quartz and Feldspar Mines
For CSR Expenditure is attached as Annexure-11.</td></tr>
<tr><td>32.</td><td>Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.</td><td>Agreed.

Housing facilities for labour has been completed with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, safe drinking water, crèche etc. within the site which will be removed after completion of the project.</td></tr>
<tr><td>33.</td><td>Measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operation of HEMM, etc. Should be provided with ear plugs/muffs.</td><td>The lease holder has engaged with NABL accredited Laboratory to conduct Monitoring. Regular Noise monitoring is being conducting at the mine site. (Lab report is attached as Annexure-10.)

Ear plugs has been provided to the persons working in the mining area.</td></tr>
<tr><td>34.</td><td>Industrial waste water (workshop and waste water from the mine) shall be properly collected & treated so as to confirm to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 (amended to date). Oil and grease trap shall be installed before discharge of workshop effluents.</td><td>Not Applicable.</td></tr>
</table>

35.	Personnel working in dusty areas shall wear protective respiratory devices they shall also be provided with adequate training and information on safety and health aspects.	Agreed. Following mitigation measures has been initiated for the workers who worked at critically dusty area. ➢ Sprinkling with water at regular intervals ➢ Operators and other persons near loading area will use dust mask ➢ Scientific Mining has been proposed to minimize the effect of air pollution. ➢ Wet drilling is being practiced PPE kit wearing is required at work place during the work.
36.	A separate environment management cell with suitable qualified personnel should be set-up under the control of a senior executive, who will report directly to the Head of the Organization.	Agreed & Complied.
37.	The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year wise expenditure shall be reported to the Ministry and its Regional office.	Agreed & Complied. We are reporting Year wise expenditure of Environment protection Measures to the competent Authority.
38.	The project authorities should inform to the Regional Office regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.	Noted & complied.
39.	The project proponent shall submit six monthly reports on the status of the implementation of the stipulated environment safeguard to the Ministry of Environment, Forest and Climate Change, its Regional Office, Central Pollution Control Board and state pollution control board.	Agreed & Complied. Submission Receipt of Previous compliance report is attached as **Annexure-23.**
40.	The Regional Office of the Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the office(s) of the Regional Office by furnishing the requisite data/ information/ monitoring reports.	Noted & Complied.
41.	A copy of clearance letter will be marked to concerned Panchayat/ local NGO, if any, from whom suggestion / representation has been received while processing the proposal.	Noted & Complied.
42.	State Pollution Control Board should display a copy of the Clearance letter at the regional office, District Industry Centre and Collector's office /Tehsildar office for 30 days.	Noted & Agreed.
43.	The project proponent should advertise in at least two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned within 7 days of the issue of the clearance letter informing that the project has been accorded environment clearance and a copy of the clearance letter is available with SPCB and also at website of the Ministry of Environment ,Forest and Climate Change at www.enviroemnentclearnce.nic.in and a copy of	Noted & Agreed.

	the same should be forwarded to the Regional Office.	

3 DETAILS OF ENVIRONMENTAL MONITORING

3.0 Monitoring Portfolio:

This report is prepared for the period of **April 2024 to September 2024** as per EC conditions. The samples were analysed at NABL approved Environmental laboratory. Following environmental components has been monitored and analysed.

1. Ambient Air Quality
2. Noise Quality
3. Water Quality
4. Soil Quality

3.1 AMBIENT AIR QUALITY MONITORING

3.1.1 Ambient Air Quality Monitoring Stations

Ambient air quality monitoring has been carried out at 6 locations as mentioned below. This will enable to have a comparative analytical understanding about air quality and the changes in the air environment in the study area with respect to the condition prevailing. The locations of the ambient air quality monitoring stations are given in **Table 3.1**.

Table 3.1 Details of Ambient Air Quality Monitoring Stations

S. No.	Location Code	Location Name
1.	**AAQ-1**	Near Mine Site
2.	**AAQ-2**	Haul Road
3.	**AAQ-3**	Loading Point
4.	**AAQ-4**	Village- Bayal
5.	**AAQ-5**	100 mtr from Mine Site
6.	**AAQ-6**	Village -Doyala

AAQ-1: Near Mining site
The sampler was placed near mine site and was free from any obstructions. Mine site is selected because due to mining activity pollution should be increase in the nearby area.

AAQ-2: Haul Road
The sampler was placed haul road, for estimate the pollution level due to movement of vehicles.

AAQ-3: Loading Point
The sampler was placed at loading area to estimate the pollution level due to loading activity.

AAQ-4: Village- Bayal

The sampler was placed at village- Bayal, was free from any obstructions. Surroundings of the sampling site represent residential environmental setting.

AAQ-5:100 mtr from Mine Site

The sampler was placed 100 mtr from mine site and was free from any obstructions. Surroundings of the sampling site represent Industrial environmental setting.

AAQ-6:Village -Doyala

The sampler was placed **Village –Doyala** was free from any obstructions. Surroundings of the sampling site represent residential environmental setting.

3.1.2 Ambient Air Quality Monitoring Methodology

Monitoring was conducted in respect of the following parameters:

- Particulate Matter 2.5 (PM 2.5)
- Particulate Matter 10 (PM 10)
- Sulphur Dioxide (SO_2)
- Oxides of Nitrogen (NO_x)

The duration of sampling of PM $_{2.5}$, PM_{10}, SO_2 and NOx was 24 hourly continuous sampling per day. The monitoring was conducted for one day at each location. This is to allow a comparison with the National Ambient Air Quality Standards.

The air samples were analyzed as per standard methods specified by Central Pollution Control Board (CPCB) and IS: 5182. The techniques used for ambient air quality monitoring and minimum detectable levels are given in **Table 3.2**.

Fine Particulate Sampler instruments have been used for monitoring Particulate Matter 2.5 ($PM_{2.5}$ i.e. <2.5 microns), and Respirable Dust Sampler was used for sampling Respirable fraction (<10 microns), gaseous pollutants like SO_2andNO_x.

Table 3.2 Techniques used for Ambient Air Quality Monitoring

S. No.	Parameter	Technique	Technical Protocol
1	**Particulate Matter ($PM_{2.5}$)**	Fine Particulate Sampler, Gravimetric Method	#SOP No. VEL/SOP/01, Section No. SP 63
2	**Particulate Matter (PM_{10})**	Respirable Dust Sampler, with cyclone separator, Gravimetric Method	IS: 5182 (P-23)
3	**Sulphur dioxide (SO_2)**	Modified West and Gaeke	IS: 5182 (P-2)
4	**Oxides of Nitrogen (NO_X)**	Jacob & Hochheiser	IS: 5182 (P-6)

#SOP-Laboratory Standard Operating Procedure

3.1.3 Ambient Air Quality Monitoring Results

The detailed on-site monitoring results of PM $_{2.5}$, PM $_{10}$, SO_2, NO_x are presented as **Table 3.3**

Table 3.3 Ambient Air Quality Monitoring Results

S. No.	Parameter	AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	NAAQS*
1	**Particulate Matter ($PM_{2.5}$), µg/m³**	**51.22**	**56.38**	**58.36**	**56.36**	**54.22**	**52.27**	60
2	**Particulate Matter (PM_{10}), µg/m³**	**81.25**	**90.21**	**90.22**	**79.24**	**85.19**	**71.54**	100
3	**Nitrogen Dioxide (NO_2), µg/m³**	**15.38**	**24.57**	**20.17**	**16.28**	**18.27**	**14.3**	80
4	**Sulphur Dioxide (SO_2), µg/m³**	**7.8**	**10.45**	**11.25**	**7.1**	**9.8**	**7.1**	80

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]16.11.2009

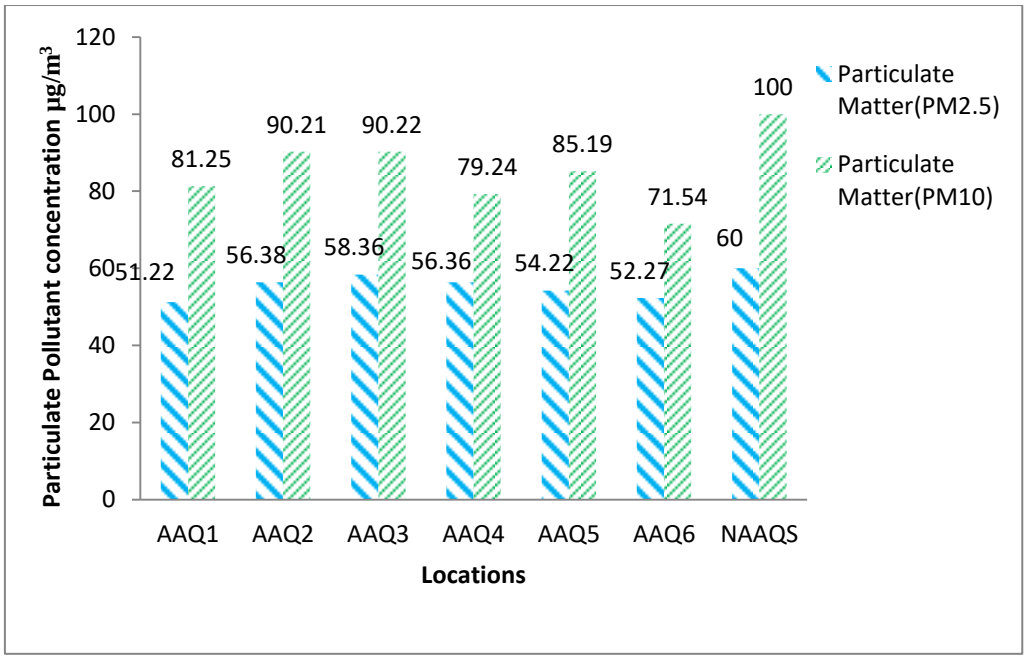

Figure 3.1 Graphical Presentation of Particulate pollutants

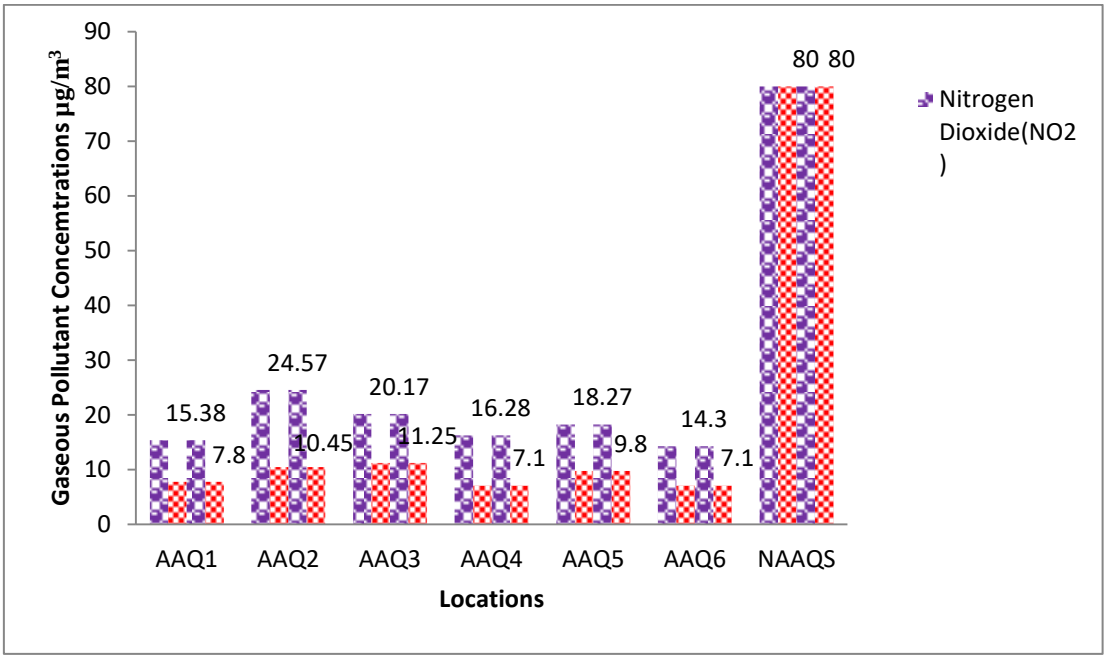

Figure 3.2 Graphical Presentation of Gaseous pollutants

3.1.4 Discussion on Ambient Air Quality in the Study Area

The level of $PM_{2.5}$ and PM_{10} at all locations was found to be in range of 51.22 to 58.36 µg/m³ and 71.54 to 90.22 µg/m³ respectively. The level of NO_x and SO_2 at all locations were found to be in range of 14.3 to 24.57 µg/m³ and 7.1 to 11.25 µg/m³ respectively. All the results were found to be well within the prescribed NAAQS limits.

3.2 AMBIENT NOISE MONITORING

3.2.1 Ambient Noise Monitoring Locations

The main objective of noise monitoring in the study area is to assess the present ambient noise levels due to various mining allied activities and increased vehicular movement. A preliminary reconnaissance survey has been undertaken to identify the major noise generating sources in the area. Ambient noise monitoring was conducted at 6 locations near the mining area as given in **Table 3.4**.

Table 3.4 Details of Ambient Noise Monitoring Stations

S. No.	Location Code	Location Name
1	**N1**	**Near Mine site**
2	**N2**	**Haul Road**
3	**N3**	**Loading Area**
4	**N4**	**Village-Bayal**
5	**N5**	**100 Meter from Mine Site**
6	**N6**	**Village- Doyala**

3.2.2 Methodology of Noise Monitoring

Noise levels were measured using sound level meter. Noise level monitoring was carried out continuously for 24-hours. The noise levels were monitored on working days only. During each hour Leq were directly computed by the instrument based on the sound pressure levels. Monitoring was carried out at 'A' response and fast mode.

3.2.3 Ambient Noise Monitoring Results

The location wise ambient noise monitoring results is summarized in **Table 3.5.** Graphical presentation of location wise variation of ambient noise level is shown in **Figure 3.3.**

Table 3.5 Location Wise variation of ambient Noise Level

Parameter	N1		N2		N3		N4		N5		N6	
	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time
Lmax	83.4	78.6	81.4	74.2	80.1	72.3	60.9	54.3	79.3			
Lmin	576	52.7	58.4	50.8	56.4	55.2	48.3	35.4	54.1			
Leq	66.81	56.21	65.48	54.39	66.48	54.28	52.11	43.67	67.25	58.21	50.85	39.27
DGMS Limits in dB(A) Leq	75.00	70.00	75.00	70.00	75.00	70.00	55.00	45.00	75.00	70.00	55.00	45.00

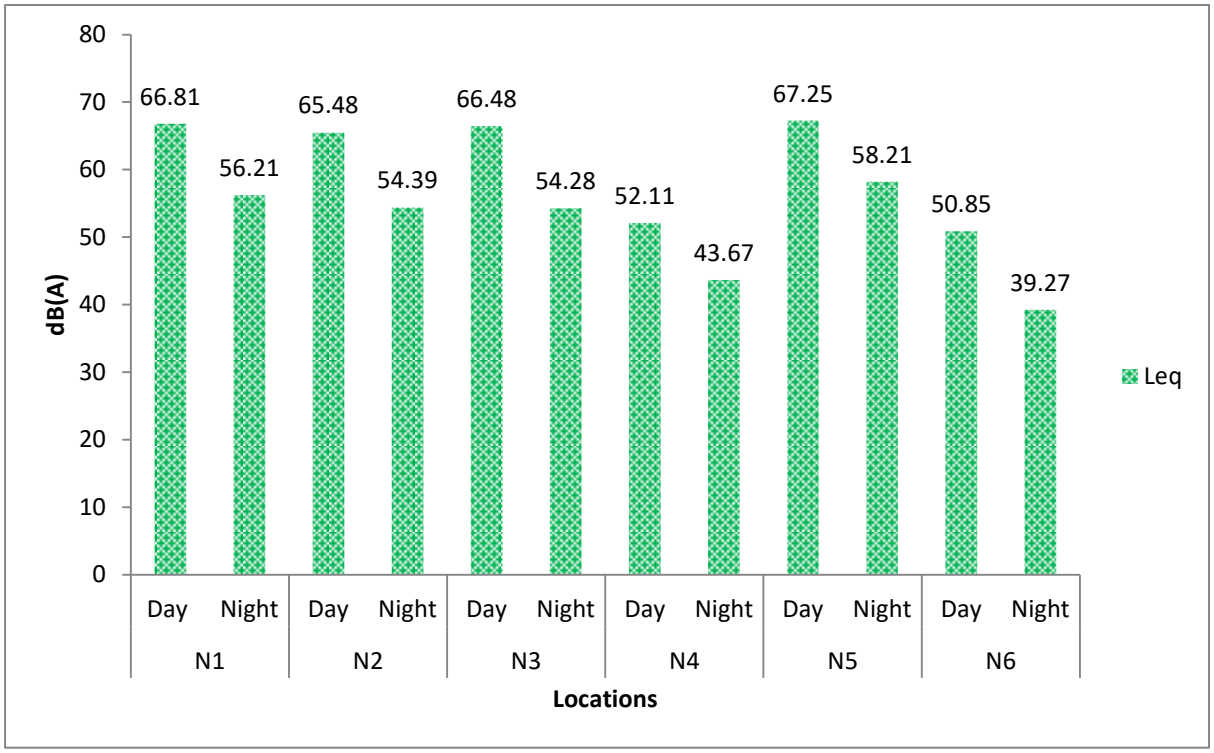

Figure 3.2 Graphical presentation of location wise variation of Ambient Noise Level

3.2.4 Discussion on Ambient Noise Levels in the Study Area

The Equivalent noise levels for day and night was found to be in range of 50.85 to 67.25 dB (A) and 39.27 to 56.21 dB (A) respectively. The noise levels were well within the permissible limits of NAAQS w.r.t Noise.

3.3 WATER QUALITY MONITORING

3.3.1 Ground Water Quality Monitoring Locations

Keeping in view the importance of water as important source to the local population, sample of water were collected from the mine site for the assessment of impacts of the project on the water quality.

Water sample were collected from the Near Mine Site and Village - Doyala. The samples were analyzed for various parameters to compare with the standards for water as per IS: 10500-2012. The details of water sampling locations are given in **Table 3.6**.

Table3.6 Details of Ground Water Quality Monitoring Station

S. No.	Location Code	Location Name/ Description
1.	**GW1**	Near Mine Site (Ground Water Sample) in **May 2024 and August 2024**
2.	**GW2**	Village- Doyala (Ground Water Sample) in **May 2024 and August 2024**

3.3.2 Methodology of Ground Water Quality Monitoring

Sampling of ground water was carried out on **Pre- Monsoon (May 2024) and Monsoon (August 2024)** . Samples were collected as grab sample and sampling forms are filled in as per the sampling plan. The preservative sample were properly added to preserve as per standard operating procedures (SOP) and stored immediately in ice boxes, which were ensured for appropriate temperatures. Sample for chemical analysis was collected in polyethylene carboys. Samples collected for metal content were acidified to <2 pH with 1 ml HNO_3. Samples for bacteriological analysis were collected in sterilized glass bottles.

Soon after the completion of sampling, chain of custody sheets for the samples are filled in and then they were transported by road for further analysis. Proper care was taken during packing and transportation of samples. All the samples reached the central laboratory within the holding times for different parameters. After ensuring the same the samples were forwarded immediately for analysis.

The samples were analysed as per the standard procedures specified in 'Standard Methods for the Examination of Water and Wastewater' published by American Public Health Association (APHA) and CPCB. The analytical techniques and the test methods adopted for testing of water are given in **Table 3.7, 3.8, 3.9 &3.10.**

3.3.3 Ground Water Quality Monitoring Results

The detailed ground water quality monitoring results are presented in **Table 3.7, 3.8, 3.9&3.10.**

Table 3.7 Ground Water Quality Monitoring Results (May Pre Monsoon 2024) Near Mine site

S. No.	Parameter	Unit	Result	Limits of IS:10500 -2012	
				Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 ^{0}C)	--	**7.41**	6.5 to 8.5	No Relaxation
2.	Colour	Hazen	***BLQ(LOQ-1.0)**	5	15
3.	Turbidity	NTU	***BLQ(LOQ-1.0)**	1	5
4.	Odour	--	**Agreeable**	Agreeable	Agreeable
5.	Taste	--	**Agreeable**	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	mg/l	**212.65**	200	600
7.	Calcium as Ca	mg/l	**65.83**	75	200
8.	Total Alkalinity as $CaCO_3$	mg/l	**282.00**	200	600
9.	Chloride as Cl	mg/l	**91.28**	250	1000
10.	Cyanide as CN	mg/l	**BLQ(LOQ-0.02)**	0.05	No Relaxation
11.	Magnesium as Mg	mg/l	**11.68**	30	100
12.	Total Dissolved Solids	mg/l	**559.00**	500	2000
13.	Sulphate as SO_4	mg/l	**46.38**	200	400
14.	Fluoride as F	mg/l	**BLQ(LOQ-0.2)**	1.0	1.5
15.	Nitrate as NO_3	mg/l	**38.65**	45	No Relaxation
16.	Iron as Fe	mg/l	**BLQ(LOQ-0.01)**	1.0	No Relaxation
17.	Aluminium as Al	mg/l	**BLQ(LOQ-0.005)**	0.03	0.2
18.	Boron	mg/l	**BLQ(LOQ-0.01)**	0.5	2.4
19.	Chromium as Cr	mg/l	**BLQ(LOQ-0.002)**	0.05	No Relaxation
20.	Phenolic Compounds	mg/l	**BLQ(LOQ-0.0005)**	0.001	0.002
21.	Mineral Oil	mg/l	**BLQ(LOQ-0.1)**	0.5	No Relaxation
22.	Anionic Detergents as MBAS	mg/l	**BLQ(LOQ-0.05)**	0.2	1.0
23.	Zinc as Zn	mg/l	**2.98**	5	15
24.	Copper as Cu	mg/l	**BLQ(LOQ-0.002)**	0.05	1.5
25.	Manganese as Mn	mg/l	**BLQ(LOQ-0.01)**	0.1	0.3
26.	Cadmium as Cd	mg/l	**BLQ(LOQ-0.002)**	0.003	No Relaxation
27.	Lead as Pb	mg/l	**BLQ(LOQ-0.002)**	0.01	No Relaxation
28.	Selenium as Se	mg/l	**BLQ(LOQ-0.001)**	0.01	No Relaxation
29.	Arsenic as As	mg/l	**BLQ(LOQ-0.005)**	0.01	No Relaxation
30.	Mercury as Hg	mg/l	**BLQ(LOQ-0.0005)**	0.001	No Relaxation
31.	Total Coliform	/100ml	**<1.8**	---	
32.	E. Coli	/100ml	**<1.8**	---	

Note: - Note:-This Report Complies as per IS: 10500:2012 (RA: 2018)
*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.
@Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.Coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).

Table 3.8 Ground Water Quality Monitoring Results (May Pre Monsoon 2024) Vill-Bayal

S. No.	Parameter	Unit	Result	Limits of IS:10500 -2012	
				Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 ^{0}C)	--	**7.26**	6.5 to 8.5	No Relaxation
2.	Colour	Hazen	***BLQ(LOQ-1.0)**	5	15
3.	Turbidity	NTU	***BLQ(LOQ-1.0)**	1	5
4.	Odour	--	**Agreeable**	Agreeable	Agreeable
5.	Taste	--	**Agreeable**	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	mg/l	**228.30**	200	600
7.	Calcium as Ca	mg/l	**58.26**	75	200
8.	Total Alkalinity as $CaCO_3$	mg/l	**274.25**	200	600
9.	Chloride as Cl	mg/l	**81.32**	250	1000
10.	Cyanide as CN	mg/l	**BLQ(LOQ-0.02)**	0.05	No Relaxation
11.	Magnesium as Mg	mg/l	**20.08**	30	100
12.	Total Dissolved Solids	mg/l	**520.00**	500	2000
13.	Sulphate as SO_4	mg/l	**41.22**	200	400
14.	Fluoride as F	mg/l	**BLQ(LOQ-0.2)**	1.0	1.5
15.	Nitrate as NO_3	mg/l	**44.36**	45	No Relaxation
16.	Iron as Fe	mg/l	**BLQ(LOQ-0.01)**	1.0	No Relaxation
17.	Aluminium as Al	mg/l	**BLQ(LOQ-0.005)**	0.03	0.2
18.	Boron	mg/l	**BLQ(LOQ-0.01)**	0.5	2.4
19.	Chromium as Cr	mg/l	**BLQ(LOQ-0.002)**	0.05	No Relaxation
20.	Phenolic Compounds	mg/l	**BLQ(LOQ-0.0005)**	0.001	0.002
21.	Mineral Oil	mg/l	**BLQ(LOQ-0.1)**	0.5	No Relaxation
22.	Anionic Detergents as MBAS	mg/l	**BLQ(LOQ-0.05)**	0.2	1.0
23.	Zinc as Zn	mg/l	**1.69**	5	15
24.	Copper as Cu	mg/l	**BLQ(LOQ-0.002)**	0.05	1.5
25.	Manganese as Mn	mg/l	**BLQ(LOQ-0.01)**	0.1	0.3
26.	Cadmium as Cd	mg/l	**BLQ(LOQ-0.002)**	0.003	No Relaxation
27.	Lead as Pb	mg/l	**BLQ(LOQ-0.002)**	0.01	No Relaxation
28.	Selenium as Se	mg/l	**BLQ(LOQ-0.001)**	0.01	No Relaxation
29.	Arsenic as As	mg/l	**BLQ(LOQ-0.005)**	0.01	No Relaxation
30.	Mercury as Hg	mg/l	**BLQ(LOQ-0.0005)**	0.001	No Relaxation
31.	Total Coliform	/100ml	**<1.8**	---	
32.	E. Coli	/100ml	**<1.8**	---	

Note:-This Report Complies as per IS: 10500:2012 (RA: 2018)
`*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.
@Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.Coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).

Table 3.9 Ground Water Quality Monitoring Results (Monsoon August 2024) Near Mine site

S. No.	Parameter	Unit	Result	Limits of IS:10500 -2012	
				Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 ^{0}C)	--	**7.24**	6.5 to 8.5	No Relaxation
2.	Colour	Hazen	***BLQ(LOQ-1.0)**	5	15
3.	Turbidity	NTU	***BLQ(LOQ-1.0)**	1	5
4.	Odour	--	**Agreeable**	Agreeable	Agreeable
5.	Taste	--	**Agreeable**	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	mg/l	**234.00**	200	600
7.	Calcium as Ca	mg/l	**72.33**	75	200
8.	Total Alkalinity as $CaCO_3$	mg/l	**294.21**	200	600
9.	Chloride as Cl	mg/l	**98.26**	250	1000
10.	Cyanide as CN	mg/l	**BLQ(LOQ-0.02)**	0.05	No Relaxation
11.	Magnesium as Mg	mg/l	**12.92**	30	100
12.	Total Dissolved Solids	mg/l	**588.00**	500	2000
13.	Sulphate as SO_4	mg/l	**49.24**	200	400
14.	Fluoride as F	mg/l	**BLQ(LOQ-0.2)**	1.0	1.5
15.	Nitrate as NO_3	mg/l	**42.12**	45	No Relaxation
16.	Iron as Fe	mg/l	**BLQ(LOQ-0.01)**	1.0	No Relaxation
17.	Aluminium as Al	mg/l	**BLQ(LOQ-0.005)**	0.03	0.2
18.	Boron	mg/l	**BLQ(LOQ-0.01)**	0.5	2.4
19.	Chromium as Cr	mg/l	**BLQ(LOQ-0.002)**	0.05	No Relaxation
20.	Phenolic Compounds	mg/l	**BLQ(LOQ-0.0005)**	0.001	0.002
21.	Mineral Oil	mg/l	**BLQ(LOQ-0.1)**	0.5	No Relaxation
22.	Anionic Detergents as MBAS	mg/l	**BLQ(LOQ-0.05)**	0.2	1.0
23.	Zinc as Zn	mg/l	**2.96**	5	15
24.	Copper as Cu	mg/l	**BLQ(LOQ-0.002)**	0.05	1.5
25.	Manganese as Mn	mg/l	**BLQ(LOQ-0.01)**	0.1	0.3
26.	Cadmium as Cd	mg/l	**BLQ(LOQ-0.002)**	0.003	No Relaxation
27.	Lead as Pb	mg/l	**BLQ(LOQ-0.002)**	0.01	No Relaxation
28.	Selenium as Se	mg/l	**BLQ(LOQ-0.001)**	0.01	No Relaxation
29.	Arsenic as As	mg/l	**BLQ(LOQ-0.005)**	0.01	No Relaxation
30.	Mercury as Hg	mg/l	**BLQ(LOQ-0.0005)**	0.001	No Relaxation
31.	Total Coliform	/100ml	**<1.8**	---	
32.	E. Coli	/100ml	**<1.8**	---	

Note:-This Report Complies as per IS: 10500:2012 (RA: 2018)
*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.
@Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.Coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).

Table 3.10 Ground Water Quality Monitoring Results (Monsoon August 2024) Vill-Bayal

S. No.	Parameter	Unit	Result	Limits of IS:10500 -2012	
				Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 ^{0}C)	--	**7.33**	6.5 to 8.5	No Relaxation
2.	Colour	Hazen	***BLQ(LOQ-1.0)**	5	15
3.	Turbidity	NTU	***BLQ(LOQ-1.0)**	1	5
4.	Odour	--	**Agreeable**	Agreeable	Agreeable
5.	Taste	--	**Agreeable**	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	mg/l	**243.20**	200	600
7.	Calcium as Ca	mg/l	**63.16**	75	200
8.	Total Alkalinity as $CaCO_3$	mg/l	**289.16**	200	600
9.	Chloride as Cl	mg/l	**89.10**	250	1000
10.	Cyanide as CN	mg/l	**BLQ(LOQ-0.02)**	0.05	No Relaxation
11.	Magnesium as Mg	mg/l	**20.73**	30	100
12.	Total Dissolved Solids	mg/l	**550.00**	500	2000
13.	Sulphate as SO_4	mg/l	**47.26**	200	400
14.	Fluoride as F	mg/l	**BLQ(LOQ-0.2)**	1.0	1.5
15.	Nitrate as NO_3	mg/l	**46.12**	45	No Relaxation
16.	Iron as Fe	mg/l	**BLQ(LOQ-0.01)**	1.0	No Relaxation
17.	Aluminium as Al	mg/l	**BLQ(LOQ-0.005)**	0.03	0.2
18.	Boron	mg/l	**BLQ(LOQ-0.01)**	0.5	2.4
19.	Chromium as Cr	mg/l	**BLQ(LOQ-0.002)**	0.05	No Relaxation
20.	Phenolic Compounds	mg/l	**BLQ(LOQ-0.0005)**	0.001	0.002
21.	Mineral Oil	mg/l	**BLQ(LOQ-0.1)**	0.5	No Relaxation
22.	Anionic Detergents as MBAS	mg/l	**BLQ(LOQ-0.05)**	0.2	1.0
23.	Zinc as Zn	mg/l	**BLQ(LOQ-0.01)**	5	15
24.	Copper as Cu	mg/l	**BLQ(LOQ-0.002)**	0.05	1.5
25.	Manganese as Mn	mg/l	**BLQ(LOQ-0.01)**	0.1	0.3
26.	Cadmium as Cd	mg/l	**BLQ(LOQ-0.002)**	0.003	No Relaxation
27.	Lead as Pb	mg/l	**BLQ(LOQ-0.002)**	0.01	No Relaxation
28.	Selenium as Se	mg/l	**BLQ(LOQ-0.001)**	0.01	No Relaxation
29.	Arsenic as As	mg/l	**BLQ(LOQ-0.005)**	0.01	No Relaxation
30.	Mercury as Hg	mg/l	**BLQ(LOQ-0.0005)**	0.001	No Relaxation
31.	Total Coliform	/100ml	**<1.8**	Shall not be Detectable in 100ml	
32.	E. Coli	/100ml	**<1.8**	Shall not be Detectable in 100ml Sample	

Note:-This Report Complies as per IS: 10500:2012 (RA: 2018)
*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.
@Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.Coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).

3.3.4 Discussion on Ground water Quality in the Study Area

The Ground water quality of all location were observed to be slightly alkaline in nature with total alkalinity reaching up to 274.25 and 294.21 mg/L against the permissible limit of 600 mg/l. Total Hardness in the water of all location were observed 212.65 mg/L and 243.20 mg/L at project site against permissible limit of 600 mg/L. However, remaining parameters are within the CPCB prescribed limits.

3.3.5 Ground Water Level in and Around the Mine area

Ground water level was monitored villages and locations located approx. 5 Km in and around mine area. Water level of the water sources was measured manually in Pre Monsoon (May 2024) and Monsoon (August 2024). The data is given below in Table 3.11. This shows no impact of mining activities undertaken in the area on ground water.

Table 3.11 Ground Water level in and around the mine site

S.No.	Location /Village	Location	GWL in mbgl (Pre Monsoon May, 2024)	GWL in mbgl (Monsoon (August, 2024)
1	Biharipur	27.861402°N 75.973027°E	88.70	84.21
2	Shyam Pura	27.848855°N 75.956965°E	87.24	83.54
3	Jat ki Nangal	27.826299°N 75.971735°E	88.74	85.20
4	Rawanta ki Dhani	27.843844°N 76.005033°E	69.52	65.92
5	Dabla	27.889168°N 75.951103°E	56.88	53.76

3.4 SOIL MONITORING

3.4.1 Soil Monitoring Locations

The objective of the soil monitoring is to identify the impacts of ongoing project activities on soil quality and also predict impacts, which have arisen due to execution of various mining activities. Accordingly, a study of assessment of the soil quality has been carried out

To assess impacts of ongoing project activities on the soil in the area, the Physico-chemical characteristics of soils were examined by obtaining soil samples from selected points and analysis of the same. Single sample of soil was collected from the mine site for studying soil characteristics, the location of which is listed in **Table 3.12**

Table 3.12 Details of Soil Quality Monitoring Location

S. No.	Location Code	Location Name/ Description
1.	**S1**	**Near Mine Site**
2.	**S2**	**Village- Doyala**

3.4.2 Methodology of Soil Monitoring

The sampling has been done in line with IS: 2720 & Methods of Soil Analysis, Part-1, 2nd edition, 1986 of American Society for Agronomy and Soil Science Society of America. The homogenized samples were analyzed for physical and chemical characteristics (physical, chemical and heavy metal concentrations). The soil samples were collected in the month of **September 2024.**

The samples have been analyzed as per the established scientific methods for Physico-chemical parameters. The heavy metals have been analyzed by using Atomic Absorption Spectro-photometer.

3.4.3 Soil Monitoring Results

Single sample of soil is collected from the site to check the quality of soil of the study area .The Physico-chemical characteristics of the soil, as obtained from the analysis of the soil sample, are presented in **Table 3.13 & 3.14**.

Table 3.13Physico-Chemical Characteristics of Soil (S1)in the Study Area

S. No.	Parameter	Protocol	Unit	Result
1.	pH (at 25 ^{0}C)	IS : 2720 (P-26) by pH Meter	--	**7.11**
2.	Conductivity	IS:14767 by Conductivity meter	mS/cm	**0.358**
3.	Soil Texture	IS : 2720 (P-22, RA2003)	--	**Sandy Loam**
4.	Color	SOP , SP-78,Issue No.-01& Issue Date-14/02/2013	--	**Yellowish Brown**
5.	Water holding capacity	SOP , SP-81,Issue No.-01& Issue Date-14/02/2013	%	**31.28**
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	gm/cc	**1.31**
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	mg/100gm	**125.38**
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	mg/100gm	**112.85**
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	mg/100gm	**95.57**
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	kg/hec.	**108.39**
11.	Organic Matter	IS:2720 (P-22) Titrimetric Method	%	**0.31**
12.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	mg/100gm	**28.35**
13.	Available Nitrogen as N	IS:14684 Distillation Method	kg./hec.	**175.84**
14.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	kg./hec.	**29.38**
15.	Zinc as Zn	USEPA 3050B	mg/100gm	**6.45**
16.	Manganese as Mn	USEPA 3050B	mg/100gm	**5.19**
17.	Chromium as Cr	USEPA 3050B	mg/100gm	**0.72**
18.	Lead as Pb	USEPA 3050B	mg/100gm	**0.92**
19.	Cadmium as Cd	USEPA 3050B	mg/100gm	**BLQ(LOQ-0.5)**
20.	Copper as Cu	USEPA 3050B	mg/100gm	**1.88**

Table 3.14 Physico-Chemical Characteristics of Soil (S2)in the Study Area

S. No.	Parameter	Protocol	Unit	Result
1.	pH (at 25 ^{0}C)	IS : 2720 (P-26) by pH Meter	--	**7.33**
2.	Conductivity	IS:14767 by Conductivity meter	mS/cm	**0.384**
3.	Soil Texture	IS : 2720 (P-22, RA2003)	--	**Sandy Loam**
4.	Color	SOP , SP-78,Issue No.-01& Issue Date-14/02/2013	--	**Yellowish Brown**
5.	Water holding capacity	SOP , SP-81,Issue No.-01& Issue Date-14/02/2013	%	**33.16**
6.	Bulk density	SOP , SP-80,Issue No.-01& Issue Date-14/02/2013	gm/cc	**1.27**
7.	Chloride as Cl	SOP , SP-85,Issue No.-01& Issue Date-14/02/2013	mg/100gm	**118.55**
8.	Calcium as Ca	SOP , SP-82,Issue No.-01& Issue Date-14/02/2013	mg/100gm	**106.26**
9.	Sodium as Na	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	mg/100gm	**102.45**
10.	Potassium as K	SOP , SP-84,Issue No.-01& Issue Date-14/02/2013	kg/hec.	**142.26**
11.	Organic Matter	IS:2720 (P-22) Titrimetric Method	%	**0.34**
12.	Magnesium as Mg	SOP , SP-83,Issue No.-01& Issue Date-14/02/2013	mg/100gm	**32.26**
13.	Available Nitrogen as N	IS:14684 Distillation Method	kg./hec.	**184.20**
14.	Available Phosphorus	SOP , SP-86,Issue No.-01& Issue Date-14/02/2013	kg./hec.	**32.12**
15.	Zinc as Zn	USEPA 3050B	mg/100gm	**10.28**
16.	Manganese as Mn	USEPA 3050B	mg/100gm	**8.26**
17.	Chromium as Cr	USEPA 3050B	mg/100gm	**0.93**
18.	Lead as Pb	USEPA 3050B	mg/100gm	**1.61**
19.	Cadmium as Cd	USEPA 3050B	mg/100gm	**BLQ(LOQ-0.5)**
20.	Copper as Cu	USEPA 3050B	mg/100gm	**1.26**

3.4.4 Discussion on Soil Characteristics in the Study Area

The soil in study area is characterized by moderate organic content. The soil quality in the project area has not been affected by the Mining activities.

3.5 MONITORING PHOTOGRAPHS

Project Site

Ambient Air Quality Monitoring

Noise Monitoring

Soil Sample

Water Sample

Shelter for labours

Workers Toilet

Plantation

Blasting Shelter

Retaining Wall

First Aid

By Speed Post/Online

No. J-11015/10/2017-IA.II (M)
Government of India
Ministry of Environment, Forest and Climate Change
Impact Assessment Division
***

Indira Paryavaran Bhavan,
Vayu Wing, 3rd Floor,
Aliganj, Jorbagh Road,
New Delhi-110 003

E-mail: s.kumar1958@gov.in
Tele: 011-24695304

Dated: 4th May, 2018

To,
M/s Bayal Quartz & Feldspar Mine
Shri Manmohan Bhadana,
S/o Kartar Singh Bhadana
R/O V & PO- Anaganpur
Dist: Faridabad (Haryana)

Sub.: Environment Clearnace to Bayal Quartz & Feldspar Mine of M/s Mr. Manmohan Bhadana, S/o Kartar Singh Bhadana is situated at Khasra No.- 201, 223 & 224 Village Bayal, Taluka- Narnaul, District:- Mahendragarh, Haryana, over an area of 76.75 hectares & rate of production is 55,00,000 TPA (ROM)-Reg.

Ref: Online application No: IA/HR/MIN/62041/2017

Sir,

This has reference to your online application for the above mentioned Environemtal Clerance proposal of **Bayal Quartz & Feldspar Mine** for proposed production of Quartz , Feldspar quartzite & Stone with total production capacity up to 55,00,000 TPA (ROM)in the Mining Lease (76.75 Ha)situated at Khasra No- 201, 223 & 224 Village Bayal, Taluka- Narnaul, District:- Mahendragarh, Haryana . The Project Proponent submitted that the mining lease area is in two blocks (North & South Blocks). The North Block falls between Latitude: 27° 51.485'N to 27° 51.970'N & Longitude: 75° 58.642'E to 75° 58.932'E and South Block falls between Latitude 27°50'54.20"N to 27°51.203' N & Longitude:75°58'37.58"E to 75°59.041' E. The mining lease comes under Survey of India topo-sheet no G43 D13 and G43 E1. The mining lease area falls in seismic zone III.The PP also presented the KML file during the presentation to indicate the location of mine lease on Google Earth/ DSS.

2. The proposal of Term of References (ToR) was considered by the EAC in its meeting held during20-21 February, 2017 wherein the Committee recommended for grant of ToR. The Ministry has issued ToR, vide letter even no. dated May17, 2017. PP has submitted the EIA/EMP Report on 30.11.2017 for appraisal of the Project before EAC The proposal of EC was earlier considered in EAC meeting held during **December 21-22, 2017** wherein the Committee deferred the proposal and sought requisite information. In this context, the PP vide letter dated **08.02.2018** submitted the informationand accordingly the proposal was re-considered by the EAC in its meeting held during **February 26-27, 2018** wherein the Committee deferred the proposal and sought requisite information. In this context, the PP vide letter dated **21.03.2018** submitted the informationand accordingly the proposal was re-considered by the EAC in its meeting held during **March 22-23, 2018** wherein the Committee **recommended** the proposal for grant of Environmental Clearance for mining of Quartz , Feldspar Quartzite & Stone with total production capacity up to 55,00,000 TPA (ROM) from Bayal Quartz & Feldspar Mine (76.75 Ha) situated at Khasra No.- 201, 223 & 224 Village Bayal, Taluka- Narnaul, District:- Mahendragarh, Haryana.

3. The proponent submitted that the mining lease over an area of 228.60 hectares falling in Khasra Nos 198, 201, 202, 223 & 224 in village Bayal, District: Mahendragarh was granted on 09.07.2002 for a period of 20 years and Quartz and Feldspar, were both considered as Major Minerals as per provisions of Mines & Mineral (Development & Regulation) Act, 1957. As per the subsequent amendment dated 12.01.2015 made by Central Government in the Mines and Minerals (Development & Regulation) Act, 1957 and notification dated 10.02.2015 qua category of minerals, the proponent has submitted that the lease period has been extended up to 08.07.2057 and Quartz & Feldspar have been treated as minor minerals. The proponent submitted that part area of the ease falling under Khasra numbers 198 and 202 (comprising total area of 151.85 hectares) is under Aravalli and cannot be used for mining as per orders dated 16.03.2004 of the Hon'ble Supreme Court in WP (C) 4677 of 1985 in matter of M.C Mehta vsUoI&Ors. Therefore, the proponent submitted letter to DMG, Haryana for surrender of 151.85 ha area falling in Aravalli Plantation area and the same was accepted by DMG, Haryana vide letter no. Glg/Hy/E-2578/279 dated 11.01.2017. The supplementary lease deed falling in village Bayal over an area of 76.75 ha was executed on 12th May, 2017, after surrender of 151.85 Ha (Khasra no 198 & 202 Aravali Plantation area) and is valid till 08.07.2057 . The EAC is its meeting held on 21-22 December, 2017 observed that the waste proposed by the Project Proponent was masonry stone, which is salable as construction material and has an economic value. The committee was therefore of the view that if the waste has market value, then same needs to be included in lease deed document as the list of minerals to be mined and asked the proponent to submit the revised mining lease deed after inclusion of all the minerals. The Project Proponent submitted the letter No Glg/HY/E-2578/926 dated 23.02.2018 issued by DMG for registration of supplementary lease deed on addition of quartzite and stone The supplementary lease deed after inclusion of all the minerals viz. Quartz, Feldspar, Quartzite and Stone was executed on 23.02.2018 and valid till 08.07.2052. The Proponent submitted a no objection certificate issued by Nayab Thasildar, Sikar, Rajasthan vide letter No S-P-1 dated 10.01.2018 to the effect that mining lease does not falls under Rajasthan. The Project Proponent submitted the District Survey Report.

4. The Project Proponent submitted that mining plan was approved by Department of Mining and Geology, Govt. of Haryana vide LR No. DMG/HY/MP/Bayal/2017/2733-36 dated 23.06.2017. The mining plan was thereafter modified as per recommendation of EAC made during its meeting held on 21-22 December, 2017 & 27-28 February, 2018vide LR No. DMG/HY/MP/Bayal/2018/493-496 dated 01.02.2018 and LR No. DMG/HY/MP/Bayal/2018/1380 dated 19.03.2018 respectively. The Proponent submitted that as per the modified mining plan the estimated Geological Reserve is 140,905,315 Tonnes and estimated mineable reserve is 12, 6,81,4776 Tonnes. The proposed rate of production is 55, 00,000 TPA (ROM). The anticipated life of mine is 23 years. The mining will be carried out by mechanized opencast mining method. The material will be dislodged with rock breaker & terminator in no blasting zone and in remaining area with drilling & blasting. The excavation of minerals, waste and top soil will be with the help of excavator and transportation with the help of dumpers/tippers. The Project Proponent submitted that there is a thin soil cover 0-50 cm in the proposed area. Little amount of soil is also generated from joints and cracks. Top soil will be stripped and preserved by stacking in separate dump yards. Yearly generations of soil/fines will be 34000 MT (18900 cum) out of which about 250 MT shall be used for plantation on upper layer on the dumps. The proponent submitted that total waste generated during the life of the mine will be 941850Tonne . The waste will be dump separately in the dump yard near pillar number 23 & 24 of south block and ultimately used for backfilling. The proponent submitted municipal wastewater generated at the site will be treated through dedicated septic tanks followed by soak pit. The proponent submitted that total water requirement for the project will be 50 KLD (dust suppression 36 KLD, Drinking & Domestic use 04 KLD, Green Belt/plantation 10 KLD). The proponent submitted that 1870 plant per annum will be planted and at the end of life of mine 11.23 Ha of ML area will be under green belt with tree density 2500 plant/ha, 34.12 Ha will be converted into water reservoir and 30.29 Ha will be backfilled and reclaimed with plantation.

5. The primary baseline data for site specific micro meteorology data, ambient air quality, water quality, noise level, soil and flora & fauna has been collected during Summer Season i.e. from March–May, 2017. The monitoring results of ambient air, surface water, soil, ambient noise and ground water have been reported and no major divergence was observed with respect to concentration values of various parameters between collected samples. The Proponent submitted that Level of Service (LoS) pre project scenario is in category A and post project scenario will be in category B. The noise level in day time is slightly above the residential limit of 55 dB (A) in daytime but less than industrial limit 75 dB (A). The soil is neutral to moderately alkaline in nature. The Ground water quality in and around the core zone is well within the permissible limit. But in Munsnauta village which is 6 Km from the project site the total dissolve solid (TDS) and Total hardness as CaCo3 is exceeded the permissible limit. The proponent submitted that the Ground Water Table (GWT) around Bayal village is located about 346 MASL. The mine working during the plan period will be up to 399 MASL and ground water shall not be intersected. The proponent committed to mine 10 meters above the ground water table i.e. up to 356 MASL. The Committee in its meeting held on 22-23 March, 2018 observed that in the mining lease document it has mentioned that *"A safety margin of two meters shall be maintained above the ground water table and no mining operations shall be permissible below this level unless a specific permission is obtained from the competent authority"* and in the instant case, the PP has already committed to keep a safety margin of 10 meters above the ground water table. Further, during the plan period, as per approved mining plan the mine working will go up to 399 MASL i.e. above the ground water table of the area. Thus, the Committee was of the view that the mine working should be restricted at 356

MASL till the PP submits the detailed hydrogeological study and obtain permission from competent authority for intersecting ground water table, if any, for mining beyond 356 MASL.

6. The Proponent submitted that the Public Hearing / Consultation was conducted on 24.10.2017 and chaired by Dr. Garima Mittal, Deputy Commissioner, Mahendragarh. The advertisement for public hearing was published in English News Paper (Tribune) and Hindi Newspaper (AajSamaj) on 21.09.2017. The various issues raised during the public hearing mainly involve the concerns of villagers as how mining could be possible near habitation, temple and school and what would be the employment and business opportunity for the villagers. The issue raised during public hearing were also considered and discussed during the meeting.The proponent submitted that budget earmarked for the Enterprise Social Commitment (ESC) will be ₹ 26.55 Lakh which include supply of medical equipment to the Govt. hospitals, installation of RO Plant in village Panchayat, Supply of books to Govt. School & libraries, organizing heath camp for villagers, rainwater harvesting structures and installation of roof top solar panel in village Panchayat Bhawan . The Committee recommended that no mining should be carried out within 50 meters of the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs), temple and no mining should be carried out within 100 meters by using explosive from the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs), temple even if, PP obtained permission from DGMS. For mining in the remaining area the proponent should conduct the blast vibration study by engaging CSIR-Central Institute of Mining and Fuel Research (CIMFR), Dhanbad or National Institute of Rock Mechanics (NIRM), Karnataka. The report so obtained should be submitted to DGMS for obtaining the permission for carrying out mining by using explosive. The proponent submitted that the budget earmarked for blasting study would be ₹ 34 Lakh. .

7. The Project Proponent submitted a certificate issued from State Forest Department vide letter no 2946 dated 14.11.2017, wherein, certifying that there is no forest land in the mining lease area and there is no National Park, Wildlife Sanctuary within 10 Km of mining lease area and the project site is outside National Park, sanctuary, Biosphere reserve, Tiger/Elephant Reserve or notified Eco-Sensitive Zone falling within the territory of Haryana Boundary.The Project Proponent submitted that there are 6 shedule-1 species viz. *Indian Peafowl, Black Partridge, Leopard, Chikara, Common Indian Krait and Indian Monitor Lizard* are present in the study area. The project site was inspected on 1-08-2017 by a team comprising of Conservator of Forest (WL), Gurugram, DFO (T), Mahendergarh and DWLP, Gurugram. As per the direction of Forest Department, Govt of Haryana the proponent submitted the Wildlife Conservation Plan to Chief Wildlife Warden on 30.10.2017. The proponent submitted the conservation plan for Sehdule-1 & II species for 35 years with a budgetary provision of ₹ 160 Lakh.

8. The Project Proponent submitted that the Budget earmarked for Environmental Management Plan ₹ 172.35 Lakh (Capital Cost) and ₹ 458.0 Lakh (Recurring). The activates proposed under EMP are a) Environment Monitoring for Air, Noise, Water and Soil Quality, b) Purchase of minimum two water tanker having mist cannon fogger, c) construction of garland drains, d) Green Belt Development along the mine boundary, e) Afforestation & Reclamation activities, f) Rain water harvesting pits, g) mine waste/overburden management and h) Implementation of Conservation plan for schedule-1 species. The Project Proponent submitted that budget earmarked for Management of Labour Camps will be ₹ 28.25 Lakh (Capital) and ₹ 46.0 Lakh (Recurring). The Project Proponent submitted that occupational health and safety measures of the workers including identification of work related health hazards, training on health effect of mineral dust shall be

carried out. Initial and periodical medical examination of each worker and record of the same shall be maintained. The budget earmarked for the occupational health surveillance will be ₹ 2.62 Lakh (Capital) and ₹ 81.31 Lakh (recurring). The Project Proponent submitted to compensate all the 43 identified families within the mining lease and ₹ 6.19 Cr is earmarked under R&R Plan.

9. The Ministry of Environment, Forest & Climate Change has examined the proposal in accordance with the Environmental Impact Assessment Notification, 2006 and further amendments thereto and hereby accords the Environmental Clearance under the provisions thereof to the above **mentioned proposal of M/s Bayal Quartz & Feldspar Mine** for mining of Quartz , Feldspar Quartzite & Stone with total production capacity up to 55,00,000 TPA (ROM) from Bayal Quartz & Feldspar Mine (76.75 Ha) situated at Khasra No.- 201, 223 & 224 Village Bayal, Taluka- Narnaul, District:- Mahendragarh, Haryanasubject to compliance of the followings terms and conditions and environmental safeguards mentioned below:-

A. Specific conditions

i) Environmental clearance is granted subject to final outcome of Hon'ble Supreme Court of India, Hon'ble High Court of Haryana, Hon'ble NGT and any other Court of Law, if any, as may be applicable to this project.

ii) No mining activities will be allowed in forest area, if any, for which the Forest Clearance is not available.

iii) The Project Proponent shall obtain Consent to Operate from the State Pollution Control Board, Haryana and effectively implement all the conditions stipulated therein.

iv)No mining should be carried out within 50 meters of the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs), temple and no mining should be carried out within 100 meters by using explosive from the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs), temple even if, PP obtained permission from DGMS. For mining in the remaining area the proponent should conduct the blast vibration study by engaging CSIR-Central Institute of Mining and Fuel Research (CIMFR), Dhanbad or National Institute of Rock Mechanics (NIRM), Karnataka. The report so obtained should be submitted to DGMS for obtaining the permission for carrying out mining by using explosive.

v) Shelter belt i.e. wind barrier of 30 meter width and consisting of at least 5 tiers around lease facing the habitation/school/public road (if any in the vicinity) shall be raised.

vi)Adequate protection against the dust and other environmental pollution arising due to mining activity shall be made so that human habitation located near the lease is not adversely affected. The status of implementation shall be report to Regional Office, MOEF&CC and SPCB, Haryana.

vii) The proponent should ensure that mine working shall not intersect the ground water table of the area. The mining should be restricted till 356 masl till the PP submits the detailed hydro-geological study and obtained permission from CGWA for intersection of ground water table, if any, for mining beyond 356 masl.

viii) Regular monitoring of ground water level and quality shall be carried out in and around the mine lease by establishing a network of existing wells and constructing new piezometers during the mining operation. The project proponent shall ensure that no natural water course and/or water resources shall be obstructed due to any mining operations. The monitoring shall be carried out four times in a year pre- monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to Ministry of Environment, Forest and Climate Change and its Regional Office, Central Ground Water Authority and Regional Director, Central Ground Water Board.

ix) The Budget earmarked for Environmental Management Plan ₹ 172.35 Lakh (Capital Cost) and ₹ 458.0 Lakh (Recurring) should be kept in separate account (except amount to be submitted to Forest Department for implementation of the conservation plan) and same needs to be audited annually. The activates proposed under EMP are a) Environment Monitoring for Air, Noise, Water and Soil Quality, b) Purchase of minimum two water tanker having mist cannon fogger, c) construction of garland drains, d) Green Belt Development along the mine boundary, e) Afforestation & Reclamation activites, f) Rain water harvesting pits, g) mine waste/overburden management and h) Implementation of Conservation plan for schedule-1 species. The Proponent should submit the detailed report to Regional Office, MoEF&CC on implementation of EMP along with audited report of expenditure incurred, purchase documents, photographs in support of implementation of activities, Geo-location of the monitoring stations etc.

x) The budget earmarked for Management of labour Camps will be ₹ 28.25 Lakh (Capital) and ₹ 46.0 Lakh (Recurring) and same needs to be kept in a separate account. The account needs to be audited annually and report of the same shall be submitted to Regional Office, MoEF&CC along with supporting documents, photographs and geo-location.

xi) Occupational health and safety measures of the workers including identification of work related health hazards, training on health effect of mineral dust shall be carried out. Initial and periodical medical examination of each worker and record of the same shall be maintained. The budget earmarked for the occupational health surveillance will be ₹ 2.62 Lakh (Capital) and ₹ 81.31 Lakh (recurring). The proponent shall engage a doctor who is well trained in occupational health and has NIOSH B Reader Certification (using the ILO 2000 Classification of Radiographs of Pneumoconiosis). The Project Proponent shall maintain a separate account for budget earmarked for occupational health surveillance plan and the same needs to be audited annually. The annual report of implementation of the occupational health surveillance plan shall be submitted to Regional Office, MoEF&CC. The Project proponent shall increase the budget earmarked for occupational health surveillance plan as per requirement.

xii) The budget earmarked for the Enterprise Social Commitment (ESC) will be ₹ 26.55 Lakh which include supply of medical equipment to the Govt. hospitals, installation of RO Plant in village Panchayat, Supply of books to Govt. School & libraries, organizing heath camp for villagers, rainwater harvesting structures and installation of roof top solar panel in village Panchayat Bhawan. The amount earmarked for ESC should be kept in separate account and same shall to be audited annually. The PP shall submit an annual report of compliance of activities proposed under ESC, to Regional Office, MoEF&CC with audited statement, photographs etc.

xiii) The Project Proponent shall get the blasting studies done by engaging CSIR-Central Institute of Mining and Fuel Research (CIMFR), Dhanbad or National Institute of Rock Mechanics (NIRM), Karnataka or any other institute of national repute before commencement of any blasting operation within 500 meters of the habitation. The budget earmarked for conducting blasting studies will be ₹ 34.0 Lakh. The blasting study report shall be submitted to Ministry of Environment, Forest and Climate Change and its Regional Office within three month of its finalization. The proponent shall monitor ground vibration and air overpressure of each blast and shall keep a record of the same which include logs generated from Blastmate, geo-location of the blast, dated and time of blast, number of holes blasted, charge per holes, explosive used, bench parameters, drill hole parameters etc.

xiv) The Project proponent shall compensate all 43 identified families as per proposed R&R plan. The ₹ 6.19 Cr earmarked for R&R plan shall be kept in separate account and same needs to be audited. The details of the compensation paid to the project affected families shall to be sent to Regional Office, MoEF&CC within one year of the commencement of the mining operation.

B. Standard conditions

i. A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment, Forest and Climate Change 5 years in advance of final mine closure for approval.

ii. This Environmental Clearance is subject to obtaining requisite NBWL Clearance from the Standing Committee of National Board for Wildlife as applicable for this Mining project.

iii. No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment, Forest and Climate Change.

iv. No change in the calendar plan including excavation, quantum of mineral and waste should be made.

v. The project proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of water (surface water and ground water) for the project.

vi. Mining shall be carried out as per the provisions outlined in mining plan approved by Indian Bureau of Mines (IBM)/State Mines and Geology Department as well as by abiding to the guidelines of Directorate General Mines Safety (DGMS).

vii. Project Proponent shall obtain the necessary prior permission from the Central Ground Water Authority (CGWA) in case of intersecting the Ground water table. The intersecting ground water table can only be commence after conducting detailed hydrogeological study and necessary permission from the CGWA. The Report on six monthly basis on changes in Ground water level and quality shall be submitted to the Regional Office of the Ministry, CGWA and State Pollution Control Board.

viii. The lands which are not owned by Proponent, mining will be carried out only after obtaining the consents from all the concerned land owners as per the provisions of the Mineral Concession Rules, 1960 and MMDR Act, 1957.

ix. Digital processing of the entire lease area using remote sensing technique shall be carried out regularly once in three years for monitoring land use pattern and report submitted to Ministry of Environment, Forest and Climate Change its Regional Office.

x. The critical parameters as per the Notification 2009 such as PM_{10}, $PM_{2.5}$, NO_x, and SOx etc. in the ambient air within the impact zone, peak particle velocity at 300m distance or within the nearest habitation, whichever is closer shall be monitored periodically. Further, quality of discharged water shall also be monitored [(TDS, DO, PH and Total Suspended Solids (TSS)]. The monitored data shall be uploaded on the website of the company as well as displayed on a display board at the project site at a suitable location near the main gate of the Company in public domain. The circular No. J-20012/1/2006-IA.II (M) dated 27.05.2009 issued by Ministry of Environment, Forest and Climate Change shall also be referred in this regard for its compliance.

xi. The Proponent shall install online Ambient Air Quality Monitoring System and there should be system for display of digital AAQ data with in 03 months at least at three locations as per wind direction. Online provisions of pH and turbidity meters at discharge points of STP and ETP and also at water storage ponds in the mining area may be made. Project Proponent should display the result digitally in front of the main Gate of the mine site.

xii. Effective safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of PM_{10} and $PM_{2.5}$ such as haul road, loading and unloading point and transfer points. Fugitive dust emissions from all the sources shall be controlled regularly. It shall be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard. Monitoring of Ambient Air Quality to be carried out based on the Notification 2009, as amended from time to time by the Central Pollution Control Board.

xiii. Regular monitoring of ground water level and quality shall be carried out in and around the mine lease by establishing a network of existing wells and constructing new piezometers during the mining operation. The project proponent shall ensure that no natural water course and/or water resources shall be obstructed due to any mining operations. The monitoring shall be carried out four times in a year pre- monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to Ministry of Environment, Forest and Climate Change

and its Regional Office, Central Ground Water Authority and Regional Director, Central Ground Water Board.

xiv. Regular monitoring of the flow rate of the springs and perennial nallahs flowing in and around the mine lease shall be carried out and records maintain. The natural water bodies and or streams which are flowing in an around the village, should not be disturbed. The Water Table should be nurtured so as not to go down below the pre-mining period. In case of any water scarcity in the area, the Project Proponent has to provide water to the villagers for their use. A provision for regular monitoring of water table in open dug wall located in village should be incorporated to ascertain the impact of mining over ground water table.

xv. Regular monitoring of water quality upstream and downstream of water bodies shall be carried out and record of monitoring data should be maintained and submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office, Central Ground Water Authority, Regional Director, Central Ground Water Board, State Pollution Control Board and Central Pollution Control Board.

xvi. Transportation of the minerals by road passing through the village shall not be allowed. A 'bypass' road should be constructed (say, leaving a gap of at least 200 meters) for the purpose of transportation of the minerals so that the impact of sound, dust and accidents could be mitigated. The project proponent shall bear the cost towards the widening and strengthening of existing public road network in case the same is proposed to be used for the Project. No road movement should be allowed on existing village road network without appropriately increasing the carrying capacity of such roads.

xvii. The illumination and sound at night at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right for darkness and minimal noise levels at night. PPs must ensure that the biological clock of the villages is not disturbed; by orienting the floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day light/night hours.

xviii. Main haulage road in the mine should be provided with permanent water sprinklers and other roads should be regularly wetted with water tankers fitted with sprinklers. Crusher and material transfer points should invariably be provided with Bag filters and or dry fogging system. Belt-conveyors should be fully covered to avoid air borne dust.

xix. Main haulage road in the mine should be provided with permanent water sprinklers and other roads should be regularly wetted with water tankers fitted with sprinklers. The material transfer points should invariably be provided with Bag filters and or dry fogging system. In

case of Belt-conveyors facilities the system should be fully covered to avoid air borne dust; Use of effective sprinkler system to suppress fugitive dust on haul roads and other transport roads shall be ensured.

xx. Sufficient number of Gullies to be provided for better management of water. Regular Monitoring of pH shall be included in the monitoring plan and report shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office on six monthly basis.

xxi. The pollution due to transportation load on the environment will be effectively controlled and water sprinkling will also be done regularly. Vehicular emissions shall be kept under control and regularly monitored. Project should obtain 'PUC' certificate for all the vehicles from authorized pollution testing centres.

xxii There shall be planning, developing and implementing facility of rainwater harvesting measures on long term basis and implementation of conservation measures to augment ground water resources in the area in consultation with Central Ground Water Board.

xxiii. The Project Proponent has to take care of gullies formed on slopes. Dump mass should be consolidated with proper filling/leveling with the help of dozer/compactors.

xxiv. The reclamation at waste dump sites shall be ecologically sustainable. Scientific reclamation shall be followed. The local species may be encouraged and species are so chosen that the slope, bottom of the dumps and top of the dumps are able to sustain these species. The aspect of the dump is also a factor which regulates some climatic parameters and allows only species adopted to that micro climate.

xxv. The top soil, if any, shall temporarily be shored at earmarked site(s) only and it should not be kept unutilized for long. The topsoil shall be used for land reclamation and plantation. The over burden (OB) generated during the mining operations shall be stacked at earmarked dump site(s) only and it should not be kept active for a long period of time. The maximum height of the dumps shall not exceed 8m and width 20 m and overall slope of the dumps shall be mairtained to 45^{0}. The OB dumps should be scientifically vegetated with suitable native species to prevent erosion and surface run off. In critical areas, use of geo textiles shall be undertaken for stabilization of the dump. The entire excavated area shall be backfilled and afforested. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office on six monthly basis.

xxvi. Catch drains and siltation ponds of appropriate size shall be constructed around the mine working, mineral and OB dumps to prevent run off of water and flow of sediments directly into the river

and other water bodies. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drains shall be regularly desilted particularly after monsoon and maintained properly. The drains, settling tanks and check dams of appropriate size, gradient and length shall be constructed both around the mine pit and over burden dumps to prevent run off of water and flow of sediments directly into the river and other water bodies and sump capacity should be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material. Sedimentation pits shall be constructed at the corners of the garland drains and desilted at regular intervals.

xxvii. Plantation shall be raised in a 7.5 m wide green belt in the safety zone around the mining lease, backfilled and reclaimed area, around water body, along the roads etc. by planting the native species in consultation with the local DFO/Agriculture Department and as per CPCB Guidelines. The density of the trees should be around 2500 plants per ha. Greenbelt shall be developed all along the mine lease area in a phased manner and shall be completed within first five years.

xxviii. Project Proponent shall follow the mitigation measures provided in Office Memorandum No. Z-11013/57/2014-IA.II (M), dated 29th October, 2014, titled "Impact of mining activities on Habitations-Issues related to the mining Projects wherein Habitations and villages are the part of mine lease areas or Habitations and villages are surrounded by the mine lease area".

xxix. The Project Proponent shall make necessary alternative arrangements, where required, in consultation with the State Government to provide alternate areas for livestock grazing, if any. In this context, Project Proponent should implement the directions of the Hon'ble Supreme Court with regard to acquiring grazing land. The sparse trees on such grazing ground, which provide mid-day shelter from the scorching sun, should be scrupulously guarded against felling and plantation of such trees should be promoted.

xxx. The project proponent shall take all precautionary measures during mining operation for conservation and protection of endangered fauna, if any, spotted in the study area. Action plan for conservation of flora and fauna shall be prepared and implemented in consultation with the State Forest and Wildlife Department. A copy of action plan shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office.

xxxi. As per the Company Act, the CSR cost should be 2 % of average net profit of last three years. Hence CSR expenses should be as per the Company Act/Rule for the Socio Economic Development of the neighborhood Habitats which could be planned and executed by the Project Proponent more systematically based on the "Need based door to door survey" by established Social Institutes/Workers. The report shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office on six monthly basis.

xxxii. Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.

xxxiii Measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs / muffs.

xxxiv. Industrial waste water (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December, 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.

xxxv. Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.

xxxvi. A separate environmental management cell with suitable qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.

xxxvii. The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office.

xxxviii. The project authorities should inform to the Regional Office regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.

xxxix. The project proponent shall submit six monthly reports on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment, Forest and Climate Change, its Regional Office, Central Pollution Control Board and State Pollution Control Board.

xl. The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full

cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring reports.

xli. A copy of clearance letter will be marked to concerned Panchayat / local NGO, if any, from whom suggestion / representation has been received while processing the proposal.

xlii. State Pollution Control Board should display a copy of the clearance letter at the Regional office, District Industry Centre and Collector's office/ Tehsildar's Office for 30 days.

xliii. The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment, Forest and Climate Change at www.environmentclearance.nic.inand a copy of the same should be forwarded to the Regional Office.

10. The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.

11. Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

12. The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/ High Court and any other Court of Law relating to the subject matter.

13. Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

4/5/18

(Surendra Kumar)
Scientist 'G'/Adviser

Copy to:-

1. **The Secretary**, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.

2. **The Secretary,** Department of Mines & Geology, Government of Haryana, Chandigarh.

3. **The Secretary**, Department of Environment, Government of Haryana, Chandigarh.

4. **The Secretary**, Department of Forest, Government of Haryana, Chandigarh.

5. **The Chief Wildlife Warden**, Government of Haryana, C-18, Van Bhawan, Sec-6,Panchkula -134109

6. **The Principal Chief Conservator of Forests (C)**, Ministry of Environment, Forest and Climate Change, Regional Office (NZ), Bays No. 24-25, Sector 31 A, Dakshin Marg,Chandigarh – 160030

7. **The Chairman**, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.

8. **The Chairman**, Haryana Pollution Control Board, C-11, Sector-6, Panchkula, Haryana 134109

9. **The Member Secretary,** Central Ground Water Authority, A-2, W3, Curzon Road Barracks, K.G. Marg, New Delhi-110001.

10. **The Executive Engineer**, Department of Irrigation, Government of Haryana, Sinchai Bhawan, Sector-5, Panchkula , Haryana

11. **The District Collector**, District Mahendragarh, State of Haryana

12. Guard File.

13. MoEFCC website.

(Surendra Kumar)
Scientist 'G'/Adviser

HARYANA STATE POLLUTION CONTROL BOARD
Lala Nemi Chand Singhal Enc.Sohna Road, Near Hanuman Mandir,Dharuhera Ph. 01274-244440-41(O) Email:- hspcbrodr@gmail.com
E-mail: hspcb@hry.nic.in

No. HSPCB/Consent/ : 313100422MAHCTO25082187 **Dated:25/07/2022**

To.

M/s :BAYAL QUARTZ AND FELDSPAR MINE
KHASRA NO. 201, 223 & 224, VILLAGE-BAYAL, TEHSIL-NANGAL CHAUDHARY, DISTRICT-MOHINDERGARH

Subject: Grant of consent to operate to M/s BAYAL QUARTZ AND FELDSPAR MINE .

Please refer to your application no. 25082187 received on dated 2022-06-10 in regional office Dharuhera.With reference to your above application for consent to operate,M/s BAYAL QUARTZ AND FELDSPAR MINE is here by granted consent as per following specification/Terms and conditions.

Consent Under	BOTH
Period of consent	01/10/2022 - 30/09/2025
Industry Type	Mining and ore beneficiation
Category	RED
Investment(In Lakh)	323.0
Total Land Area(Sq. meter)	767500.0
Total Builtup Area(Sq. meter)	767500.0
Quantity of effluent	
1. Trade	0.0 KL/Day
2. Domestic	0.3 KL/Day
Number of outlets	1.0
Mode of discharge	
1. Domestic	Septic Tank
2. Trade	
Domestic Effluent Parameters	
1. NA	
Trade Effluent Parameters	
1. NA	
Number of stacks	1
Height of stack	
1. Attached to DG set	3 m
Emission parameters	
1. SPM	100 mg/m3
2. SPM	60 mg/m3

3. SOX	80 mg/m3
4. NOX	80 mg/m3
Product Details	
1. Mining of stone alongwith Assos. Minor Minerals	18333 Metric Tonnes/day
Capacity of boiler	
1. NA	Ton/hr
Type of Furnace	
1. Na	
Type of Fuel	
1. Electricity	Kilowatt/day
Raw Material Details	
Mining of stone alongwith Assos. Minor Minerals	18333 Metric Tonnes/Day

Regional Officer, Dharuhera
Haryana State Pollution Control Board.

Terms and conditions

1. The applicants shall maintain good house keeping both within factory and in the premises. All hose pipelines values, storage tanks etc. shall be leak proof. In plant allowable pollutants levels, if specified by State Board should be met strictly.
2. The applicant/company shall comply with and carry out directive/orders issued by the Board in this consent order at all subsequent times without negligence of his /its part. The applicant/company shall be liable for such legal action against him as per provision of the law/act in case of violation of any order/directives. Issued at any time and or non compliance of the terms and conditions of his consent order.
3. The applicant shall make an application for grant of consent at least 90 days before the date of expiry of this consent.
4. Necessary fee as prescribed for obtaining renewal consent shall be paid by the applicant alongwith the consent application.
5. If due to any technological improvement or otherwise this Board is of opinion that all or any of the conditions referred to above required variation (including the change of any control equipment either in whole or in part) this Board shall after giving the applicant an opportunity of being heard vary all or such condition and there upon the applicant shall be bound to comply with the conditions so varied.
6. The industry shall provide adequate arrangement for fighting the accidental leakages, discharge of any pollutants gas/liquids from the vessels, mechanical equipment etc. which are likely to cause environment pollution.
7. The industry shall comply noise pollution (Regulation and control) Rules, 2000.
8. The industry shall comply all the direction/Rules/Instructions as may be issued by the MOEF/CPCB/HSPCB from time to time.
9. The industry shall ensure that various characteristics of the effluents remain within the tolerance limits as specified in EPA Standard and as amended from time to time and at no time

the concentration of any characteristics should exceed these limits for discharge.
10. The industry would immediately submit the revised application to the Board in the event of any change in the raw material in process, mode of treatment/discharge of effluent. In case of change of process at any stage during the consent period, the industry shall submit fresh consent application alongwith the consent to operate fee, if found due, which may be on any account and that shall be paid by the industry and the industry would immediately submit the consent application to the Board in the event of any change during the year in the raw material, quantity, quality of the effluent, mode of discharge, treatment facilities etc.
11. The officer/official of the Board shall reserve the right to access for the inspection of the industry in connection with the various process and the treatment facilities. The consent to operate is subject to review by the Board at any time.
12. Permissible limits for any pollutants mentioned in the consent to operate order should not exceed the concentration permitted in the effluent by the Board.
13. The industry shall pay the balance fee, in case it is found due from the industry at any time later on.
14. If the industry fails to adhere to any of the conditions of this consent to operate order, the consent to operate so granted shall automatically lapse.
15. If the industry is closed temporarily at its own, they shall inform the Board and obtain permission before restart of the unit.
16. The industry shall comply all the Directions/ Rules/Instructions issued from time to time by the Board.

HARYANA STATE

Specific Conditions :

1. The unit will comply with provision of all applicable Acts/Rules/Direction of the Board / CPCB/ CAQM along with general conditions of the board. 2. The unit will maintain its APCM / dust suppression system in well working condition. 3. The unit will plant & maintain trees within & outside the premises. 4. The proponent shall maintain online ambient air quality monitoring system & submit its compliance report in this office. 5. As per the company act, the CSR cost should be 2% of average net profit of last three years. Hence CSR expenses should be as per the company act/rule for the socio Economic Development of the neighborhood Habitats which could be planned and executed by the project proponent more systematically based on the “Need based door to door survey” by establishment social institutes/workers. 6. The unit will strictly comply with all the conditions of EC granted by MoEF&CC, CTE & CTO granted by the Board and in case of non compliance of the conditions, the CTO shall be revoked without giving any more opportunity. 7. The unit will abide by all the directions / orders issued from time to time by all the court i.e. District Courts, Hon'ble Punjab & Haryana High Court, Chandigarh, Hon'ble NGT and Hon'ble Supreme Court of India w.r.t. mining projects. 9. Unit will deposit balance CTO fee if found pending at on later stage as per prescribed schedule.

Regional Officer, Dharuhera
Haryana State Pollution Control Board.

Cat.AMech.O/c

MINING SCHEME AND PROGRESSIVE MINE CLOSURE PLAN
Of BAYALQUARTZ & FELSPAR MINE

(Prepared under sub-rule 8 of Rule 70 of Haryana Minor Mineral Concession, Stocking, Transportation of Minerals & Prevention of Illegal Mining Rules, 2012.)

VILLAGE: BAYAL
DISTRICT: MOHINDERGARH. STATE: HARYANA.
TOTAL LEASE AREA -76.75 HA. (NON- FOREST)
PERIOD OF MINIG SCHEME-2023 to 2028(5 Years)
Targeted production 55, 00,000 MT /year
Lease period: 50 Years (09-07-2002 to 08-07-2052)

APPLICANT-

Manmohan Bhadana S/o Sh. Kartar Singh Bhadana
V&PO- Anangpur;Tehsil& District- Faridabad(Haryana)

Haryana Panchkula
APPROVED DMG/HY/MP/Bayal/2022/4651-4654
With Conditions
Vide Letter No.
Date/Dated 17-08-2023
State Geologist

PREPARED BY

S.N.Sharma RQP /DDN/0135/2001/A
&
D.C.Yadav RQP/DMG/HRY/2018/03,

#282, Sector 11-D Faridabad (Haryana)

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5	Copy of Demarcation report showing corner coordinates
6	Testing reports of quartz, Quartzite and feldspar (9 Nos.))

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PART -I
CHAPTER -I
REVIEW OF MINING PLAN

INTRODUCTION

Mr. Manmohan Bhadana s/o Shri Kartar Singh, VPO :Anangpur, Tehsil and District : Faridabad) hold a mining lease over an area of 76.75 hectares falling in Khasra Nos 201, 223 & 224 in village Bayal, District: Mahendergarh which was granted on 09.07.2002 for a period of 20 years for Quartz and Felspar, both as Major Minerals as per provisions of Mines & Mineral (Development & Regulation) Act, 1957. Now, the lease which was granted on 09.07.2002 shall be up to 08.07.2052 as per the Central Government Ordinance dated 12.01.2015.

With subsequent notification dated 10.02.2015, 31 minerals (as notified in the Act) have been declared as Minor Minerals. Therefore, minerals namely Quartz &Felspar for which lease was granted Major Mineral now have fallen under category of Minor Minerals and shall be under the purview and provisions of the " Haryana Minor Mineral Concession, Stocking, Transportation and Prevention of Illegal Mining Rule, 2012"

The first Mining Plan and Progressive Mine Closure Plan for Bayal Quartz and Feldapar (Minor Minerals) has been approved vide memo Memo No, DMG/HY/MP/Bayal/2017/2733-36 dated 23rd June, 2017.

In the meantime, Lessee applied for Environmental Clearance from MoEF& CC, Government of India, New Delhi. Terms of Reference were approved by Environmental Committee on vide letter No. J-11015/10/2017-IA.II(M) dated 17th May, 2017. Public Hearing was held at mine site on 24th October, 2017 under the Chairmanship of the D.C, Mahendergarh.

After doing the needful Final EIA report was submitted to the MOEF & CC on 30th November, 2017. The EAC during the course of presentation of Final EIA report held on 21st December, 2017 observed that the proponent has mentioned that waste generate (Quartzite & Masonry Stone) during the mining is saleable and has market value. The EAC noted that as per MCDR, 2017 the mineral rejects "include all the excavated materials that do not constitute useful material, which may be rejected either on the basis of grade or size" but in the instant case as it is salable and has market value the same cannot be treated as waste and asked the applicant to add the salable mineral (Quartzite/Stone-Minor Mineral) in the lease deed. This will not only lead to mineral conservation but also the state government will generate revenue.

In view of above development lessee submitted application on 22nd December, 2017 to the Director General, Department of Mines & Geology, Haryana for addition of associated mineral (Quartzite/stone) in the Bayal Quartz and Feldspar lease deed. This application has been

considered by Mines & Geology Department Haryana vide their Memo No. Glg/Hy/E-2578/229, Dated Chandigarh the 12.01.2018

Consequent upon addition of Quartzite and Stone and as directed through memo no. Memo No.Glg/Hy/E-2578/229, Dated Chandigarh the 12.01.2018 , that lessee is required to get the Modified Mining Plan for additional minerals as minor minerals and get the same approved from the competent authority.

In view of above observations, a modified mining plan was prepared for all the four Minor Minerals namely, Quartz, Feldspar and Quartzite and Stone. The Modified Mining Plan got approved vide memo no DMG/HY/MP/Bayal/2018/493 dated Chandigarh 01.02.2018 from DMG, Haryana .

EC Proposal (1A/HR/MN/62041/2017) for Bayal Quartz, Feldspar, Quartzite and Stone Mine was again considered in the 28th EAC meeting held on 27th Feb, 2018 at MoEF&CC, New Delhi. The Committee in its minutes for 28th EAC Meeting mentioned that mining is not to be carried out within 50 meters of the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs) and temple and blasting is not be carried out within 100 meters of outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs) and temple. In view of these restrictions and other shortcomings the committee directed to correct the spatial configuration of the lease boundary, surface features, distance of habitation, type of blasting, danger zone, quantity of the mineral, ultimate pit limit , post mining land use details, mineral reserves in the mining plan.

Finally EC was granted on 4th May 2018 for production of 55, 00,000 TPA vide letter no. J-11015/10/2017-IA-II(M).(Copy of EC enclosed as annexure-1).

It was mentioned in the EC at page no.3 condition no.5 "that proponent submitted that the Ground water table(GWT) around Bayal Village is located about 346 MASL.The mine workings will be up to 3910 mASL and ground water shall not intersected. The proponent committed to mine 10 m above the ground water table i.e. up to 356 MASL. The Committee in its meeting held on 22-23 March 2018 observed that in the ining lease document it has mentioned that "A safety margin of two meters shall be maintained above the ground water table and no mining operations shall be permissible below this level unless a specific permission is obtained from competent authority" ad in the instant case, the PP has already committed to keep a safety margin of 10 meters above the ground water table. Further during the plan period, as per approved mining plan the mine working will go up to 3910 mASL i.e. above the ground water table of the area.Thus, the Committee was of the view that the mine working should be restricted at 356MASL till the PP submits the detailed hydrological study and obtain permission

from competent authority for intersecting the ground water table,ifonyfor mining beyond 356 MASL.

In Compliance to above condition proponent got the detailed Hydro geological report prepared through an authorized Consultant namely Earth hood Services Private Limited (Guru gram) Copy enclosed as (Annexure-2).It is a very exhaustive report. Hydrological report covering 5km radiusaroundBayal mine was carried out. Detailed analysis of Geological formations,geological setting, structural behavior of formations,satellite imagery, study of CGWB tube wells, ground water levels in and around Bayal Mine area was done.

In the hydrological report ground water level monitored by Central Ground Water Board (CGWB) has been collected and analyzed. Bayal CGWB observation well location is the nearest location to the mine blocks which is about 2 km. The ground water levels of the CGWB observation well for the period of May 2016 and November 2016 was 26.75 m and 18.50 m below ground level respectively. Considering the elevation at Bayal CGWB observation well location, which is 2 km from the mines block, the water table (water table AMSL = MSL-Static water level) at Bayal village would be around 333 m above mean sea level during May 2016 and 346 m amsl during November 2016. Since the study area is heterogeneous, composed of only secondary porosity (no uniform porosity and permeability) the ground water level at the mine site is much deeper than Bayal village. Considering the above and the ground water level at mine site, it is clear that the reserve depth is much above the ground water table. The digital elevation model showing the mines and CGWB observation well is presented in Plate

S. No	Location	Latitude	Longitude	MSL In m	Depth to water level in m (AMSL)	Static water level in m	Depth to spring / fracture (AMSL)
1	Bore well in Southern Block	27° 51' 16.308"	75° 58' 49.613"	374	278	96	214
2	Bore well in Southern Block	27° 51' 13.151"	75° 58' 44.717"	375	283	92	235
3	Near Bhagwala Village	27° 49' 10.42"	75° 57' 37.958"	402	316	86	282
4	Raickeen Wala Village	27° 50' 20.069"	75° 58' 26.346"	390	302	88	280
5	Salodra	27° 51' 57.143"	75° 58' 5.308"	379	289	90	264
6	Lima	27° 51' 43.798"	75° 59' 7.951"	380	291	89	270

Since the mine pit is open, the rainwater and seepage from the mine dump may accumulate in the mine pit which requires pumping. The pumping of stored or accumulated water in the mine pit would not create cone of depression.

During the study period, it is observed that the Mine area falls in 95.5-96.0 m ground water level zones. The area is tectonically highly disturbed zone; hence the behavior of ground water movement is highly disturbed. During the drilling of bore well the spring stuck below 110 - 160 m. After drilling, the static water level raises to 86-96 m.

As per the Hydrological report the depth of water level is reported to be at 278 to 282mAMSL in lease area.

In view of the above Hydro geological report it is concluded that the mining up to 280 m above mean sea level (AMSL) is safe .Reserves are now estimated up to 280 m, which would not intersect the ground water. It is therefore concluded that Proponent can work the mine up to & below water table with due permission from Competent Authority in Consonance with the EC dated 4th May, 2018.Further if the conditions so warrants and ground water intersection is needed the proponent would seek permission under Haryana Water Resource Authority Gazette Notification No.191-2020/Ext dated 23rd Dec . 2020. The Mining projects are location specific, there is no ban on grant of NOC for abstraction of ground water and hence all mining projects are required to obtain NOC for water abstraction, and it is mandatory for all mining projects/industries to ensure that water available from dewatering activity/ operations is properly treated and should be gainfully utilized for supply of irrigation, dustsuppression, miningprocess, recharge in downstream.

Since the 5 years of last approved Mining Plan & Progressive Mine Closure Plan ends on May 2023. Therefore a Mining Scheme is required to be prepared and got approved from DMG, Haryana as per the sub-rule 8 of Rule 70 of Haryana Minor Mineral Concession, Stocking, Transportation of Minerals & Prevention of Illegal Mining Rules, 2012.(Consent to prepare mining Scheme enclosed as annexure-3)

The objective of preparation of this Mining Scheme and Progressive Mine Closure Plan is to fulfill the conditions stipulated by the Department of Mines & Geology, Haryana required under Haryana Minor Mineral Concession Rules, 2012.

1.0 REVIEW OF MINING PLAN

1.1. Name of the mine: BayalQuartz,Felspar,Quartzite and stone mines Distt. Mohindergarh (Haryana)

1.2 Particulars of approval of mining plan (under MCR or MCDR, indicate approval letter No. and date:

The last modified mining plan was prepared and approved vide letter No. DMG/Hr/MP/Bayal/2018/1380 dated 19-03-2018. Mining started in June 2018 after grant of EC.

1.3 Date of commencement of mining operations:-

Mining started during June 2018 after approval of EIA and EMP on 4th May 2018 and since then the workings are continued.

1.4 A review of compliance position of salient features of the mining plan including conditions and stipulations imposed, if any, on year wise basis.

During all these years the mining and other allied activities were undertaken as per the approved mining plan/ scheme of mining. No specific conditions were imposed while approving the first mining plan. The mining plan was followed in the field as per the approval by the Director General Department of Mines & Geology Haryana.

1.5.0 Important chapters of the approved mining plan are reviewed and deviation and justification area as follows:-

1.5.1 **Geology &Exploration**: As the reserves are very well established for quartz, and quartzite. No exploration was proposed in the last mining plan for quart and quartzite. The area is prominently marked by outcrops of Quartz, Feldspar and Quartzite/Stone as seen in Surface geological Plan. Therefore no such exploration was carried out during the plan period.

1.5.2. Mine Development:

- As per detailed proposal under the last approved mining plan & modified mining plan, two pits were proposed and the same is followed. The development work was to be carried out to produce targeted year wise production of Stone mineral. The mining and development works were proposed by developing the mine from top downward by forming proper

benches. The mine was developed in a systematic manner by mining from top downwards. It was proposed to develop the mine fully mechanized system of miming by deploying Heavy Earth Moving Machines and deep hole drilling and blasting by forming benches of 10 mx10 m . A latest surface and geological plan plate no.3 shows the type of working done by lessee. The av. Depth of benches is kept 10 m & the width more than 10 m. A barrier of 7.5m was proposed all along the lease boundary & the same is adhered to in the lease area.

- It was proposed in the last mining plan to make benches of 10 m height, width more than height and bench slope 60^0 from vertical. The bench height is maintained 10 m and the width is more than 10 m and the bench slope is also found more than 60^0.
- Back filling proposal: There was no backfilling proposal during the plan in last approved mining plan. Therefore there is no deviation from original proposal.

The following was the annual production plan in the last approved mining plan.

Year	QUARTZ (TPA)	FELDSPAR (TPA)	QUARTZITE/STONE(TPA)	Waste/Reject (TPA)	Total Production (ROM) (TPA)	Soil (TPA)
Ist	4,00,000	2,50,000	42,26,000	74000	49,50,000	40000
2nd	4,00,000	2,50,000	42,70,000	30000	49,50,000	35000
3rd	5,00,000	3,25,000	4464000	36000	53,25,000	35000
4th	5,00,000	3,25,000	44,66,000	34000	53,25,000	30,000
5th	6,00,000	4,00,000	4469250	30750	55,00,000	30,000

The lease holder produced and dispatched the following quantities of mineral from the mine during the 1st plan period.

YEAR	STONE	QUARTZ	QUARTZITE	FELSPAR	TOTAL
from June 2018	306630.88	108611.6	0	112516.77	527759.25

2019	716919.31	539111.72	366488.56	210594.33	1833113.92
2020	760565.56	12.1	2107341.66	289.53	2868208.85
2021	636381.55	196.61	1455508.2	0.0	2092086.36
2022	1126539.35	302126.94	1968153.44	272208.96	3669028.69
2023 Jan to March	270266.36	65307.14	458034.28	66745.92	860353.70

1.5.3 Generation of soil and overburden during plan period.

The following quantities of soil and reject waste was handled during plan period

Year	Top Soil in MT	reject waste In MT	Low grade mineral	Total
1st	5000	15832	36943	52775
2nd	7500	36600	146710	183310
3rd	4500	57000	229820	286820
4th	3000	40000	169208	209208
5th	2500	26000	106874	132874
Total	22500	175432	689555	864987

Entire Soil generated has been used for plantation. The rejects and low grade minerals are stored in the lease hold area as shown in the plan plate no.3 about2-3% rejects are generated from this mine. These rejects are not salable. These will be used for reclamation/backfilling at the final closure period. About 5-7% low grade mineral is generated based on the last 5 years experiences which are stacked in stack yard. Low grade mineral is salable. At present there is a slump in the demand of low grade mineral. Low grade mineral is salable when there is good

demand in the market. Same is proposed to be sold during the plan period. Efforts will be made to sale low grade mineral with blending of high grade mineral.

1.5.4 A forestation

It was proposed in the last approved mining Plan to plant 1870 No of plants annually. The applicant has planted 10000 nos. of plants Year wise plantation proposed in the last mining plan and actually planted is as follows:-

Year	No. of plants proposed in the mining plan	No. of plants actually planted	Plants actually surviving	Area under plantation
1st	1870	4000	3885	1.60
2nd	1870	2000	1940	0.80
3rd	1870	1500	1420	0.60
4th	1870	1000	950	0.40
5th	1870	1500	1435	0.60
Total	9300	10000	9630	4.00

1.5.3 Prohibitory orders under Metalliferous Mines sub Rule 22(3) of Regulation, 1952 or any other Regulations by DGMS, Ghaziabad Region if any.

The applicant has worked the mine in systematic manner and no such prohibitory orders were ever imposed during the plan period by Authority

1.5.4 Financial Assurance: It was proposed in the first mining plan, as per agreement condition no.6, it was proposed to deposit fund in Joint account of Government against reclamation and rehabilitation. The same is followed by lessee and there was no deviation noticed from original proposal. As per Haryana Minor Mineral Concession, Stocking, Transportation of minerals and

prevention of illegal Mining Rules-2012, lessee is required to deposit @ Rs 15000/per ha for the broken area/used area against the financial assurance. It was proposed to deposit the financial amount in advance.

Review of Financial assurance. There is no deviation of land use at the start of mine and at the end of five years plan period proposed in the first mining plan.

Sr No.	Item details	Area in ha Proposed for use	Actual area at the end of plan	Remarks
1	Area under mining	13.39	15.00	0.80 ha area was found broken at the Start of plan period. about11.70 ha broken during plan period
2	Storage of top soil	0.001	0.0	Soil generated during last 5 years is Spread over the area proposed for plantation. No soil storage is kept.
3	Storage of waste dump	0.64	1.00	Entire waste generated during last 5 years is stored in dump yard. Same will be used at the time of final closure
4	Mineral storage low grade	2.00	3.0	Low grade mineral is stored temporarily. Entirelow grade mineral Will be sold in due course of time.
5	Infrastructure, Workshop etc.	0.020	0.50	Office and other infrastructure facilities are already developed within the lease area.

6	Roads	1.50	1.50	1.50 ha are covered under roads
7	Railways	0	0	-
8	Effluent treatment plant	0	0	-
9	Tailing pond	0	0	-
10	Mineral separation plan	0	0	-
11	Township area	0	0	-
12	Green belt	4.0	4.0	-
13	Others(undisturbed)	55.199	51.01	-
	Total	76.75	76.75	

1.5.5CSR and EMP activities proposed during the plan as advised by EC committee and actually done are as under:

It was proposed during the clearance of EC that proponent will make budgetary provisions for EMP measures, CSR, R&R plans, wildlife conservation plan etc. as detailed below:

Sr No.	Head	Amount
1.	CSR/ESC	26.55 lakhs
2.	Blasting Study	34.00 lakhs
3.	Wild life conservation plan	160.00 lakhs
4.	EMP	172.35 lakhs Capital cost 458.00 lakhs for recurring cost
5.	Budget for Management of Labour Camps etc	28.25 lakhs Capital cost 46.00 lakhs recurring cost
6.	Occupational HealthSurvilane	02.62 lakhs capital

		81.00 Recurring cost
7.	R&R Plan for 43 families	600.19 Lakhs
8.	CSR @ 2% of the average net profit of last years	

Against the above proposals, proponent has done very good work for Village development, Education, Sanitation, assistance during Covid-19,green belt development and R&R plan in a very systematic and responsibleway.Details of actual expenditure done against various heads during the plan period are as under:

Actual Expenditure towards Environment Management Plan (EMP)

A. Capital Expenditure.

Sr No.	Expenditure head from FY2018-19 to till date	Amount in Rs.
1.	Land for Green belt development and construction of GI sheet parapet wall including procurement,leveling and development etc	50,00,000.00
2.	Purchase and erection of wind barrier walls	58,60,000.00
3.	Development of garland drains around dumps	1,00,000.00
4.	Development of desilting Chamber	1,00,000.00
5.	Development of rainwater harvesting system	8,00,000.00
6.	Installation of Fixed water sprinklers around 1000 ft	1,00,000.00
7.	Procurement of plant saplings, their upkeep and maintenance	15,00,000.00
8.	Purchase of water tanker with mist fogger arrangement	6,50,000.00

9.	Dressing and stabilization of slope of OB	33,00,000.00
10.	Contribution to Mines safety & Environment celebration/drives	40,000.00
11.	Total	1,74,50,000

B. Recurring expenditure.

Sr.No.	Expenditure head (from 2018-19 to till date)	Amount
1	Payment towardshiring, operation and maintenance of mobile water tankers-6nos. from 2018 to Dec.2021	1,08,00,000.00
2	Periodic monitoring of Air, water, noise etc from 2018 to Dec.2021	3,00,000.00
3	Total	1,11,00,000

Expenditure towards CSR/ESC

Sr.No.	Expenditure head	Amount
	For FinancialYear 2018-19	
1	Contribution to gram Panchayat Bayal for village Development Activities	4,00,000.00
2	Development of School Library	35,000.00
	For Financial Year 2019-20	
3	Installation of Water Pump at Bayal Village	4,00,000.00
4	Contribution to Gram Panchayat Bayal for village development, health and sanitation etc	6,00,000.00

5	Medicine and stationery to GovBayal and Salodra	28,035.00
6	Development of School Library at Bayal and salodra	1,36,000.00
7	Construction of Sports Stadium in Bayal Village	6,00,000.00
8	Development of Baba Bharthri Temple in Bayal Village	5,00,000.00
	For Financial Year 2020-21	
9	Development of Baba Bharthri Temple in Bayal Village	5,00,000.00
10	Distribution of Food, medicines, mask etc during Covid-19 Pandemic	3,00,000.00
11	Total CSR	38,99,000.00

Expenditure Towards Rehabilitation and Resettlement (R&R)

Sr.No.	Expenditure head from FY 2018-19 to till date	Amount
1	Procurement of land near and surrounding Mining lease area	2.15 Crores
2	One time compensation of houses for families shifted at owned land	1204 Crores
3	Monthly Compensation to 53 families	2.14 crores
4	Total R&R expenses till date	16.33 Crores

CHAPTER-2

PROPOSAL UNDER SCHEME OF MINING FOR THE NEXT FIVE YEARS

<table>
<tr><td>2.1</td><td>Name &address of the Applicant</td><td>Sh. Manmohan Bhadana S/o Sh. Kartar Singh Bhadana R/o V& PO-Anangpur; Distt.- Faridabad (Haryana)</td></tr>
<tr><td>2.2</td><td>Status of the Applicant</td><td>Individual</td></tr>
<tr><td>2.3</td><td>Mineral which the Applicant
Intends to mine/ lease granted</td><td>Quartz, feldspar, quartzite and stone (minor minerals)</td></tr>
<tr><td>2.4</td><td>Details of Lease area</td><td>District : Mohindergarh
State : Haryana
Taluka :Nangal Chaudhary .
<table>
<tr><th>Village</th><th>Khasra no.</th><th>Area in hect.</th><th>Owner ship</th></tr>
<tr><td>Bayal</td><td>201,223 & 224</td><td>76.75 hectares</td><td>Gram panchayat</td></tr>
</table>
Area lies between coordinates (Plate No 2 and annexure-5)
<table>
<tr><td>Block 1 (North Block):</td><td>Lat: 27°51.485'N to Lat: 27°51.970'N
Long: 75°58.642'E to Long: 75° 58.932'E</td></tr>
<tr><td>Block 2 (South Block):</td><td>Lat: 27°50'54.20"N to Lat: 27 51.203' N
Long: 75°58'37.58"E To Long: 75°59.041' E</td></tr>
</table></td></tr>
</table>

2.5	Period for which the mining Lease was granted	which was granted on 09.07.2002 for a period of 20 years for Quartz and Feldspar, both as Major Minerals as per provisions of Mines & Mineral (Development & Regulation) Act, 1957. Now, the lease which was granted on 09.07.2002 shall be up to 08.07.2052 as per the Central Government Ordinance dated 12.01.2015.			
2.6	Name, Address and Registration Number of RQPs Preparing Mining Scheme and Progressive Mine Closure plan (Annexure-3)	Name	:	S.N.Sharma& D.C. Yadav	
		Address	:	282, sector 11-D Faridabad.	
		Mob. NO	:	+91-9560848579; +91-9416214247,	
		E-mail	:	snsharma@jbbtechocrat.com dcyadav747@gmail.com	
		Regd No. S.N.Sharama Regd No. D.C.Yadav	: :	RQP /DDN /0135 /2001 / A DMG/HRY/RQP/2018/03	
2.7	**Date of Expiry of 5 years period for which approved on the last occasion**	Last modified mining plan was prepared for all the four Minor Minerals namely, Quartz, Feldspar and Quartzite and Stone. The Modified Mining Plan got approved vide memo no DMG/HY/MP/Bayal/2018/493 dated Chandigarh 01.02.2018 from DMG, Haryana			
2.8	**Date of approval Environment clearance(EIA/EMP)**	4th May 2018 for production of 55, 00,000 TPA vide letter no. J-11015/10/2017-IA-II (M).			

Consent letter enclosed as Annexure -3and RQP certificate attached as Annexure-4

LOCATION AND ACCESSIBILITY:

DETAILS OF THE AREA (WITH LOCATION MAP)

A general location and vicinity map are attached as Plate no.1

Key plan: key plan on 1: 50,000 scale covering an area in a radius of 5 km showing salient features as per Rule 28(5) (a)of MCDR, 1988 has been prepared on Toposheet no.G43 D13 &G3 E1. The area is marked on the enclosed key map(Plate no. 2).

Block 1 (North Block):	Lat: 27°51.485'N to Lat: 27°51.970'N Long: 75°58.642'E to Long: 75° 58.932'E
Block 2 (South Block):	Lat: 27°50'54.20"N to Lat: 27 51.203' N Long: 75°58'37.58"E To Long: 75°59.041' E

Further Coordinates of all corner points are enclosed as **annexure-5** in the demarcation map certified by HalkaPatwari,forester and mining inspector dated 04-02-2017

Infrastructure facilities in the nearby area and within mine are as detailed below

Nearest railway station	Nizampur 15 km
Police station	Nangal Chaudhary
Post office	All the nearby villages
Medical facilities	Narnaul, Nangal Chaudhary, Mohindergarh
Electricity	Electrical supply is available in all nearby villages.
Education facilities	Most of the nearby villages have secondary schools and for higher education institutes are available at Narnaul, NangalChaudhary,Mohindergarh , Rohtak& other nearby towns
Mode of transportation of mineral	Mineral stone will be transported by tippers/ trucks. Loaded trucks will travel on Kuccha road made for plying of trucks up to the crushers in the nearby area. Village Bayal and the lease area is connected with metaled road which further joins the Narnaul- Nizampur –Patan and Nangal Chaudhary State Highways and nearby cities.

Infrastructure developed in the mine is as under.

Mine office, Rest shelter and first aid station and security Guard Rooms	Mine office ,First aid station , rest shelter,canteenand security guard room Developed within lease area.
Weigh bridge	Installed within lease boundary
Store room/ servicing and repair maintenance of vehicles	Developed near the mine
Medical facilities	First aid room setup in Managers office. A doctor visits the site as and when required
Electricity	Connection available in the mine office as well as extension given into mines as well.
Water	Masonry water tank as well as Syntax tanks provided near mine office.

CHAPTER 3
GEOLOGY & RESERVES

3.1.1 Physiography, Drainage and Climate

There are two rivers namely Dohan and Krishnawati which passing through the district . Krishnawati River is originated from the hillocks of Sikar district of Rajasthan and Dohan is originated from the hillocks near Khetri . Both the rivers remained dry except during rainy days. Physiographical the district consists of flat and level plain interrupted from place to place by clusters of sand dunes, isolated hillocks and rocky ridges. A few isolated rocky ridges elevated sharply from the plain occur in the west and south west portion of the district.

The lease area is consists of ridges and valleys. The highest point in the lease area is recorded to be 480mRL and the lowest point recorded is 290 mRL .

The lease area does not have any water body. There are dry nalas in which water flows during rains for a short duration, otherwise they remain dry for the rest of the months. The rain water from these nalas drains either into local Johars or in agriculture fields.

3.1.2 Hydrogeology

The geological formation met within the district are phyllites, mica schist and quartzite of Delhi & Aravalli. Ground water occurs in alluvium and Aeolian sands and under lying jointed and fractured hard rock formations also form the aquifers, in alluvium, sands, silt , and hard bed rock. In-shallow aquifers zones, ground water occurs under water table conditions where as in the deeper zones, confined/semi - confined condition exist, hard rocks comprising of Aravalli group of rocks, Malani suite of volcanic and Alwar Quartzite's of Delhi system are water bearing but have yet not been explored thoroughly. Proponent has carried out Hydrological study of the lease area as well as nearby area and it is concluded that the water table is 95 m below the general ground level of 370 mRL.

3.1.3 Climate &Rainfall:

The climate of Mahindra Garh district can be classified as tropical steppe, semi -arid and hot which is mainly dry with very hot summer and cold winter except during monsoon season when moist air of oceanic origin penetrates into the district. There are four

seasons in a year. The hot weather season starts from mid-March to last week of the June followed by the south- west monsoon which lasts up to September. The transit ion period from September to October forms the post –monsoon season. The winter season starts late in November and remains up to first week of March. The normal annual rainfall of the district is 420 mm which is unevenly distributed over the area 22 days. The south west monsoon sets in from last week of June and withdraws in end of September, contributed about 85% of annual rainfall. July and August are the wet test months. Rest 15% rainfall is received during non-monsoon period in the wake of western disturbances and thunder storms. Generally rainfall in the district increases from southwest to northeast.

Normal Annual Rainfall: 420 mm

Normal monsoon Rainfall: 355 mm

Temperature

Mean Maximum: 41oC (May & June)

Normal Rain days: 22

(Source: Meteorological Department, Govt. of Haryana)

3.2 REGIONAL GEOLOGY OF THE AREA

The rocks of Delhi super Group constitute a part of the main Aravali Range originating from Gujrat in the south to Haryana in the northeast. The super group comprising of meta sediments with 6000m thickness which is divided older alwar Group and Younger Ajabgarh Group. The detailed stratigraphic sequence of the sequence of Delhi Super group are detailed here below. The general regional strike varies from N15^{0}E-S15^{0}W to N45^{0}E –S45^{0}W Regionally the area belongs to the Alwar Series of Delhi Super Group. The regional stratigraphic sequence in Mohindergarh District is as follows:

	Ajabgarh series	Biotite-schist, phyllites, quartzite and impure biotitic limestone and calciphyres.
Delhi System	*Alwar series*	Quartzites, arkose, conglomerates and mica-schists with bedded lavas.

Rialo series	Rialo limestone and Rialo marble, quartzite

3.3 LOCAL GEOLOGY:

The Geology of the area has been described under regional geology. Local Geology of the lease area with the description of different formations found in the area along with its physical and chemical properties and reserves have been detailed in this chapter.

The area was surveyed geologically. A geological plan and sections are prepared on 1:2000 scale as plate No. 3

The following sequence of rock formations belonging to Delhi Super group are found in the lease area have been as under

Alluvium

Quartz mixed with Quartzite

Feldspar mixed with Quartzite

Amphibolites

Micaceous Phyllite with quartzite

GENERAL DESCRIPTION OF FORMATIONS (REF. PLATE NO.3) :-

Alluvium:

It is the top layer and the youngest sedimentary layer in the lease area. Though there is no soil exposure on the top of the hill but on the foot hill or at the bottom, there is brown sand and detritus soil. It is mainly exposed in the foot hill side of the lease area. It is reddish, brown in color. Thickness varies from 0.5m to 2.0m.

Quartz:

The quartz is very well mineralized in the area. It is milky white in color, fine grained and cryptocrystalline. Quartz veins have intruded and mixed in the country rock which is pre-dominantly Phyllites Quartzite. One sample of quartz has been collected from the main vein and was analyzed.

Feldspar

There is a good deposit of Feldspar in the lease area. Feldspar is also intruded and mixed with country rock which is pre-dominantly Phyllite and Quartzite.

Amphibolite

Small and thin veins of amphibolite are also found in the lease area. It is the product of dynamo thermal metamorphism of basic igneous rocks.

Micaceous Phyllite with Quartzite

Micaceous phyllite is also found in the lease area. Micaceous Phyllite is the country rock in this area. The quartz has intruded in to the country rock i.e. micaceous phyllite and Quartzite and is itself sheared at the margins. This has given rise to quartz schist. Quartzite is metamorphic rock formed when quartz rich sandstone or chert has been exposed to high temperatures and pressures. Such conditions fuse the quartz grains together forming a dense, hard and equigranular rock.

The strike of the quartzite formation varies from N 20^0 - 25^0 E to S 20^0 - 25^0 W with dip of 65 to 70^0 due south east. The strike and dip of the quartzite bands is not uniform since there are structural disturbances and intrudes and mix with Quartz and Feldspar.9 Nos of Samples of different minerals of Bayal Mine were got tested from Gujrat Minerals Laboratory, as under

9 Nos of Samples of different minerals of Bayal Mine (annexure-6) were got tested from Gujrat Minerals Laboratory, Bewar(Rajasthan).Summary of testing reports of Bayal Mine Minerals are as under:

Sample No	1	2	3	4	5	6	7	8	10
properties	Felspar	Felspar	Felspar	Quartz	Quartzite	Quartz	Quartzite	Quartz	Quartz
SiO2 %	72.080	72.86	78.710	95.885	93.910	96.765	88.965	92.450	98.425
Al2 O3 %	15.730	15.055	11.885	2.145	2.605	1.085	7.125	4.365	0.895
Fe2O3 %	0.265	0.235	0.105	0.048	0.085	0.310	0.625	0.185	0.00
CaO %	1.035	0.985	1.455	0.520	0.695	0.765	0.995	0.810	0.0
Mg O %	0.255	0.105	0.265	0.065	0.065	0.105	0.145	0.065	0.370
LOI %	0.645	0.615	0.895	0.435	0.385	0.430	0.750	0.560	0.085
Na2O %	6.730	4.110	0.785	0.235	0.835	0.145	0.710	0.850	0.155
K2O %	3.145	5.925	5.795	0.635	1.375	0.295	1.065	0.530	0.017
TiO2 %	0.105	0.105	0.090	0.017	0.025	0.097	0.105	0.085	0.00
Sp. Gravity	2.68	2.685	2.69	2.70	2.69	2.68	2.63	2.71	2.69
Bulk Density gm/cc	2.69	2.84	2.70	2.60	2.80	2.7	2.63	2.70	2.70
Hardness on MOHS scale	6	6	5.5	7	6.5	7	7	6.5	7

GEOLOGICAL CROSS SECTIONS

8 nos of Geological Cross sections have been drawn across the strike of the host rock as shown in plate in plate no. 3 &4.

APPROVED Deepak Kumar

DETAILS OF EXPLORATION

The area is prominently marked by outcrops of Quartz, Feldspar and Quartzite/Stone as seen in Surface geological Plan. Moreover, the area has undergone quartz, feldspar, quartzite and stone mining Mineral has been proved very well.Therefore, no further exploration to prove the reserves is needed.

METHODS OF ESTIMATION OF RESERVES

For estimating the reserve of Quartz, Feldspar and Quartzite and Stone, the following

Parameters are considered are as follows:

The reserves are calculated on the basis of established width, thickness and strike length/influence of the mineralized formation in the area where good pits are available such area in put under proved category.

The entire reserves of quartz ,quartzite,feldspar and stone are put under proved category up to and above 300MRL. Next 10 meters i.e up to 290 MRL are considered as probable and further 10 meters (up to 280 MRL) as possible.

The Av.bulk density of Quartz, Feldspar and Quartzite/Stone is considered 2.7 Tonne/M3

Since the mineral Quartz, Feldspar have been intruded and mixed with country rock (Phyllite and Quartzite), the Geological Reserves are calculated separately for Quartz, Feldspar and country rock Quartzite. While mining of the Quartz and Feldspar, quartzite rock shall also be mined as host rock (Quartzite).

Grade and use of minerals: The entire minerals produced from the areas are usable in glass, ceramic and other chemical industries as well as in construction/RCC work.

Quartz

Section Line	Cross sectional Area (m2)	Influence Length (m)	Bulk Density (Tonne/m3)	Proved (Tonne)	Probable (Tonne)	Possible (Tonne)
AA'	890	170	2.70	408510		
	113	170	2.70		51867	
	113	170	2.70			51867
BB'	8108	200	2.70	4378320		

Section Line	Cross sectional Area (m2)	Influence Length (m)	Bulk Density (Tonne/m3)	Proved (Tonne)	Probable (Tonne)	Possible (Tonne)
	642	200	2.70		346680	
	646	200	2.70			348840
CC'	9945	200	2.70	5370300		
	782	200	2.70		422280	
	785	200	2.70			423900
DD'	5108	200	2.70	2758320		
	595	200	2.70		321300	
	595	200	2.70			321300
EE'	1510	96	2.70	391392		
	92	96	2.70		23846	
	92	96	2.70			23846
Category wise Reserves =				13306842	1165973	1169753

Total Geological Reserves=15642568 MT

Mineable reserves @90% Recovery (Quartz) =14078310 MT

Quartzite (Masonry Stone) mixed with Quartz

Section Line	Cross sectional Area (m2)	Influence Length (m)	Bulk Density (Tonne/m3)	Proved (Tonne)	Probable (Tonne)	Possible (Tonne)
AA'	15632	170	2.70	7175088		
	1945	170	2.70		892755	
	1952	170	2.70			895968

BB'	47741	200	2.70	25780140		
	4542	200	2.70		2452680	
	4556	200	2.70			2460240
CC'	64421	200	2.70	34787340		
	5755	200	2.70		3107700	
	5712	200	2.70			3134700
DD'	54044	200	2.70	29183760		
	5777	200	2.70		3119580	
	5805	200	2.70			3134700
EE'	23685	96	2.70	6139152		
	2661	96	2.70		689731	
	2667	96	2.70			691286
Category wise Reserves =				103065480	10262446	10266674

Total Geological Reserves = 12, 35, 94,600 MT

Mineable Reserves @90%Recovery = 11, 12, 35,140MT

Out of Mineable Reserves 40% is Quartz and 60% is Quartzite (Masonry Stone)

40% Quartz =4, 44, 94,056 MT

60 % Quartzite (Stone) = 6, 67, 41,084MT

Feldspar Mixed with Quartzite (Masonry Stone)

Section	Cross sectional	Influence	Bulk Density	Proved	Probable	Possible

Line	Area (m2)	Length (m)	(Tonne/m3)	(Tonne)	(Tonne)	(Tonne)
FF'	22998	130	2.7	8072298		
	3115	130	2.7		1093365	
	3115	130	2.7			1093365
GG'	42178	200	2.7	22776120		
	5513	200	2.7		2977020	
	5805	200	2.7			3134700
HH'	41858	240	2.7	27123984		
	4456	240	2.7		2887488	
	4456	240	2.7			2887488
Category wise Reserves =				57972402	6957893	7115553

Total Geological Reserves = 72045828 MT

Mineable Reserves @90% Recovery = 64841245 MT (Including both)

Out of Mineable Reserves, 40 % is Feldspar and 60 % Quartzite (Masonry Stone)

Quartzite = 60%= 38904747 MT

Feldspar = 40% = 25936498 MT

SUMMARY OF UP DATED MINERAL RESERVES OF QUARTZ, FELDSPAR & QUARTZITE (HOST ROCK)

Mineral	Proved	Probable	Possible	Total	Total Geological Reserves recoverable @ 90%
Quartz	13306842	1165973	1169753	15642568	14078310
	41226192	4104978	4106670	49437840	44494056
Total	**54533034**	**5270951**	**5276423**	**65080408**	**58572366**
Quartzite	61839288	6157467	6160004	74156759	66741084
	34783441	4174736	4269332	43227509	38904747
Total	**96622729**	**10332203**	**10429336**	**117384268**	**105645831**
Felspar	23188961	2783157	2846221	28818339	25936498
Total	**23188961**	**2783157**	**2846221**	**28818339**	**25936498**

Mineral	Proved	Probable	Possible	Total	Total Geological

					Reserves recoverable @ 90%
Quartz	54533034	5270951	5276423	65080408	58572366
Quartzite	96622729	10332203	10429336	117384268	105645831
Feldspar	23188961	2783157	2846221	28818339	25936498
G.Total	174344724	18386311	18551980	211283015	190154695

Mineral blocked in 7.5m lease boundry,road and end benches and total mineable Reserves

Description	Quartzite (Stone) MT	Quartz MT	Feldspar MT	Total MT
Blocked in 7.5m along lease boundary	2770569	1313800	1198804	5283173
Blocked in Road	5741280	0	8611920	14353200
Blocked in end benches	19658070	9110320	8988878	37757268
Total Blocked	28169919	10424120	18799602	57393641
Total Geological reserves	105645831	58572366	25936498	190154695
Total mineable Reserves	77475912	48148246	7136896	132761054

Total Mineral available for mining=13, 27, 61,054 MT

Life of the mine @55, 00,000 MT/year=13, 27, 61,054/5500000=24 years

The mineral reserves are computed as per UNFC. The reserves are as follows: -

Reserves of Stone

Total Mineral Resources (A+B)		Code	Reserves in MT
A.	Mineral Reserves		
1.	Proved Mineral Reserves		
2.	Probable Mineral Reserves	111	**17,43,44,724**
		121 & 122	**1,83,86,311**
B.	Remaining Mineral		
1.	Feasibility Mineral Resources	211	**1,85,51,980**
2.	Prefeasibility Mineral Resources		

3.	Measured Mineral Resources	221 & 222	**5,73,93,641**
4.	Indicated Mineral Resources	331	Nil
5.	Inferred Mineral Resources	332	Nil
6.	Reconnaissance Mineral Resources	333	Nil
		334	

C. Details of UNFC classification

UNFC is a three digit code based system, the economic viability axis representing the first digit, the feasibility axis the second digit and the geological axis the third digit. Each digit provided. Codes 1, 2 and 3 in decreasing order. The highest category of resources under UNFC system has code (111) and for lowest category the code is (334).

Code (111): This code is provided for the economically mineable part of the measured mineral resources (proved category reserves).

Code (121): This code is provided for the economically mineable part of the indicated mineral resources (probable category reserves).

Code (211): The part of the measured mineral resources (proved category), which as per feasibility study has not found economically mineable. The reserves blocked in 7.5 meters buffer zone and 45 meters from permanent structure.

Code (222): The part of the indicated mineral resources (probable category), which as per feasibility study has not found economically mineable. The reserves blocked in 7.5 meters buffer zone and 45 meters from permanent structure.

Code (333): Tonnage, Grade and mineral contents can be estimated with low level of confidence and resources are also inferred from geological.

Life of mine

Total Mineral available for mining=13, 27, 61,054 MT

Life of the mine @55, 00,000 MT/year=13, 27, 61,054/5500000=24 years

3.5 Grade & Uses of Minerals: -Quartz, Quartzite, feldspar and stone available in the area are useful as road metal and masonry stone, glass, ceramics and other industries in and around NCR. Stone is having very good strength. The raw/lumps stone of the Bayal area is crushed as rori , chips, and dust/crushed stone in the nearby stone crushers. This material is finally used as road metal and for RCC material in building industry mostly in the NCR area.

3.6 Year wise exploration proposed to be carried out during the ensuing 5 years period.

No further exploration is required as the mineral is very well exposed laterally as well as depth wise. The mine has reached up to 300 mRL and no deviation of mineral is noticed. Reserves are sufficient to cater to the need of the proponent. Therefore no further exploration is needed/proposed.

CHAPTER -4
MINING

The lease area is being worked since June 2018 i.e. after getting the environmental clearance from designated authority. Further, it is proposed to continue systematic and scientific mining for extraction of minerals namely Quartz, feldspar, Quartzite and stone/building stone during the next plan period of Mining Scheme. At present fully mechanized method of mining by deploying heavy Earth moving machines and deep hole drilling and blasting by forming benches of 10 mx10 m from top downward is followed. It was proposed to mine 55, 00,000 MT per annum and the actual productions are as under

YEAR	STONE	QUARTZ	QUARTZITE	FELSPAR	TOTAL
from June 2018	306630.88	108611.6	0	112516.77	527759.25
2019	716919.31	539111.72	366488.56	210594.33	1833113.92
2020	760565.56	12.1	2107341.66	289.53	2868208.85
2021	636381.55	196.61	1455508.2	0.0	2092086.36
2022	1126539.35	302126.94	1968153.44	272208.96	3669028.69
2023 Jan to March	270266.36	65307.14	458034.28	66745.92	860353.70
Total Mineral Mined during plan period	3817303.01	1015366.11	6355526.14	662355.51	11850550.77

Proposed method of mining: The existing method of mining is proposed to be continued which is fully mechanised open cast method of mining. The working bench width is kept more than 10 m with pit slope of 60^0 and non working benches are kept 10x10 m. The same will continue by making the rectifications of existing benches by maintain the proper height and widths and further formation of systematic benches in mineral will continue. Haulage roads and ramps will

be further developed during the mining with combination of dozer,excavator,and dumpers. The underlying minerals will be excavated in benches of 10 m in depth in succession. The bench width is proposed to be kept more than 10 m in working benches having pit slope of 60^0 or more. Transportation of mineral/ stone is from face to consumer is being done by dumpers of 25-30MT capacity. About 2% waste is stacked in the yard proposed for it. About 5-7% low grade mineral is also generated during the mining which will be disposed off/ sold at consumer end.

Working for the next 5 years is proposed to be continued in both the blocks laterally as well as depthwise as shown in plan plate no to 5-9. Drilling & loading activities are proposed/done at present in three shifts.Blasting will be takenup in daylight hours only with all safeguards. Adequate lightning arrangements are/ and will be made by mobile portable lighting towers.

PRE-PRODUCTION ACTIVITIES:

As it is a working mine. No preproduction activities are required. Roads from lease boundary to top most entry to the mining area, from mining faces to the proposed dump area, from ground level to the mining area, to the mines office complex, plantation area, and to the garage / workshop have been developed. Access roads / haul roads from topmost bench to benches at lower levels have been developed. As mining operations advance to lower levels, larger face lengths and width shall be available. Face management, which is a continuous process, shall be taken into account to secure shortest (average) lead distance up to mine exit, waste dump yard and top soil dump as also to prevent clustering of dumpers. Following activities shall be undertaken during quarry development phase:

Removal of vegetation and top soil to expose mineral beds – It is a working mine and no such vegetation need to be removed

To make the access road to the mine working area.-All access roads are already developed. Pl. refer Plate no.3.Making of parapet wall/retaining walls along gradient of haul road.

Construction of mine office, first aid station, crèche, canteen, workshop and other ancillary infrastructural facilities have been undertaken during first plan period.

MINING OPERATIONS:

The mining operations will comprise of following activities for excavation of mineral.

Drilling of "Down-the-Hole" holes as per specified pattern.

Blasting of holes (only Primary Blasting)Loading of blasted material by deploying hydraulic excavators

Loading of broken material (in no blasting zone) by Rock Breaker and Terminator by deploying hydraulic excavators. Transportation of material to Crushers located outside lease area. Thus, these mining operations are proposed to be continued by fully mechanized opencast method utilizing Heavy Earth Moving Equipment (HEMM) in conjunction with deep hole drilling by crawler mounted DTH drills, blasting and by breaking of the rock (in no blasting zone) with the help of rock breaker and terminator. To start with benches shall be kept narrow and then gradually widened. To the extent possible, benches shall be kept along dip and advanced along the strike to give a fairly well blended material in each bench. The direction may be varied in due course based on experience gained, to give wider benches, longer faces and proper alignment along haul roads / ramps.

It was proposed in the last mining plan to adopt mechanized opencast mining method for exploitation of the mineral. Drilling, dislodging the mineral with help of explosive (primary blasting) and without use of explosive (with the help of terminator & rock breaker). Loading of blasted & broken up material with the use excavators and transportation with the help of dumpers.The same will continue during the next plan period.

Since there is certain inhabitations near the lease hold area, applicant has sought necessary permission from the Directorate General of Mines Safety under the Regulation 164 of MMR-1961 for conducting deep hole blasting. The contents of Regulation 164 of MMR-1961 are re-produced here below for reference purpose:-

164. Taking shelter etc. – 1(1) The blaster shall, before a shot is charged, stemmed or fired, see that all persons other than his assistants, if any, in the vicinity, have taken proper shelter and he shall also take suitable steps to prevent any person approaching the shot and shall himself take adequate shelter, along with his assistants if any, before firing the shots.

(1-A) in the case of an opencast working the blaster shall not charge or fire a shot (a) Unless he has taken the precautions laid down in sub-regulation (1). (b) Unless sufficient warning, by efficient signals or other means approved by the manager, is given over the entire area falling within a radius of 300 m from the place of firing (hereinafter referred to as the danger zone) and also he has ensured that all persons within such area have taken proper shelter, and (1-B) (a) In the case of an opencast working, where any permanent building or structure of permanent nature, not belonging to the owner, lies within the danger zone, the aggregate maximum charge in all the holes fired at one time shall not exceed two kilograms unless permitted in writing by the Chief Inspector of the Regional Inspector and subject to such conditions as he may specify therein :

Provided that if blasting is done with delay detonators or other means an that there is a delay of at least half a second between successive shots fired, a maximum charge of two kilograms can be used in each hole;

no blasting shall be done except with the permission in writing of the Chief Inspector or the Regional Inspector and subject to such conditions as he may specify therein. Further, in compliance of Ministry's Office Memorandum No. Z-11013/57/2014-IA.II (M) dated 29.10.2014, it is proposed to undertake vibration studies (within 500 m of such site vulnerable to blasting vibrations) through competent agency for evaluation of zone of influence and impact of blasting on the neighborhood. Blasting/Vibration study report will be submitted to the Directorate General of Mines Safety and according to the permission/approval from DGMS, the blasting pattern shall be followed up.

Note: Danger Zone as mentioned above is now changed to 500 meters as per DGMS circular No. DGMS (SOMA)/(Tech)Cir.No.2 of 2003 dated 31.01.2003.

4.1 PIT DESIGN PARAMETERS:-

In view of the geological setting of the deposit it is proposed to work the mine by machines open cast mine using shovel and dumper combination. The rate of production is proposed 55, 00,000 MT/ year by the following mentioned parameters so that not only the production is achieved but mine also takes a proper / regular shape and size .

It is proposed to work the mine by 3.5 cubic meters Hydraulic Excavators with combination of Hydraulic Breaker and Hydraulic Terminator Equipment and 25 tones dumpers with bench height 10 m and width 10 m

Sr.no	Particulars	Dimensions with unit
1	Bench Height and width	10 mx10 m
2	Ultimate pit slope	45^0
3	Face length	All along the strike length
4	Bench Alignment and bench slope	Parallel to each other; 80^0
5	Depth of pit.	85 m
6	Blast hole diameter	110 mm
7	Inclination of blast hole	Vertical
8	Gradient of haul Road	1 in 16

Ultimate pit slope: -

The quartzite rock is hard and compact. Once the pits reach the ultimate limit, it is necessary that it does not start collapsing due to weathering and other effects. This can be achieved by planning ultimate pit slope at a maximum of 45 degree to avoid collapse of the pit sides. There is no overburden except a thin sol cover. Entire mineral produced will be useful.

Bench height and width

Since the host rock quartzite is hard and compact, the same parameters are considered for making benches.

In view of mechanized method of mining to be adopted, the bench height is proposed 10 mtrs and bench width 10 mtrs.

Formation of benches in this manner will result in an overall safe slope of 45^0 or less in the ultimate pit position.

Face lengt :-

The following parameters have been followed to arrive at the face length to facilitate the required production of 55, 00, 000 MT (ROM) per annum.

Since only two pits are developedin the area to obtain targeted production, the optimum face length available along the strike length is sufficient to cater to the optimum production required. The face length will attain the maximum face length on closure of mining operations.

Bench alignment: -

The benches are gradually aligned in a regular shape. In general the benches will advance in all directions parallel to each other. Since geological formation in the area are of simple nature, there will not be difficulty in maintaining the proposed bench alignment.

Depth of pit:

The reserves are calculated up to 280 MRL for Quartz , Feldspar and quartzite are sufficient to cater the needs of the applicant. Workings are proposed up to 280mRL during the next 5 years. Further the water table is about 92-95 m below the general ground surface. It is proposed to keep the working 2 m above the water table in line with theMineral Concession Rules & conditions laid down in EC.

In order to exploit optimum mineral with proper mine safety the benches in minerals are of 9.00 m height and width will be 15-20 m , the same will continue during the next plan period.

4.3 DEVELOPMENT DURING THE NEXT FIVE YEARS:

No Pre- production development work is required as it is a working mine.Workings are already started from top downwards .Roads have been aligned to reach the mine for mining. Working is going on in North and south blocks. The gradient of the road was proposed 1:16 which is maintained. The construction of garland parapet, wire fencing etc, are provided yearwise.Provision of stack yard for mineral is not proposed as the same is loaded and transported directly to the consumers. However low grade mineral is produced/generated during mining.It has not been dispatched due to slump in rates. Same is proposed to be sold in due course of time. About 2-3 Waste is generated and the same is stacked.

Stack yard is properly maintained. A boundary wall around soil stack yard shall be made. Stack yards shall be stabilized by plantation, garland drains will be provided at the bottom of the dump and stone masonry wall will be erected for arresting the sediments.

Dump yard	Size	Location
Waste dump Yard	290m x 80 m	NW side Near pillar no.23,24,
Soil dump Yard	80m x 40 m	NW side Near pillar no.S 62

Working area occupied at the end of 5th year mining is= (13.39) Hectares

A part from the stations site service have been developed as shown in surface and geological plan plate no.3which include construction of manager's office, Crèche, Canteen etc.

Approach road from mine to mineral stack yard, soil stack yard and dump yard and site services have been developed.

Sr.No	Year	Bench Level in north block	Bench levels in north block south of main road	Bench levels south block	Production MT
1	1st year	435 to 295mRL	363 -323mRL	426 to 356 mRL	55,00,000
2	2nd year	435 to 295mRL	363 -313mRL	426 to 346 mRL	55,00,000

3	3rd year	435 to 295mRL	363 -303mRL	426 to 336 mRL	55,00,000
4	4th year	435 to 295mRL	363-293mRL	426 to 326 mRL	55,00,000
5	th year	435 to 295mRL	363 -283mRL	426 to 316 mRL	55,00,000

Year wise Production & Development for the next Five years

The general surface level within the area selected for mining is varying from 363 mRL to 435 mRL. The terrain is hilly with scanty vegetation.

Individual Year wise plan and sections

The position of mine workings and dump at the end of 1st year to5th year along with sections are shown in plate no. 5 to 9.

SUMMERY OF YEARWISE PRODUCTION OF MINERAL & REJECT DURING 5 YEARS (In MT)

Year	QUARTZ (TPA)	FELDSPAR(TPA)	QUARTZITE/STONE(TPA)	Waste/Reject (TPA)	Total Production (ROM) (TPA)	Soil (Tonne)
1st year	5,00,000	2,50,000	47,00,000	50000	55,00,000	5000MT
2nd year	5,00,000	2,50,000	47,08,000	42000	55,00,000	3500MT
3rd year	5,00,000	3,00,000	46,64,000	36000	55,00,000	3000MT
4th year	5,00,000	4,00,000	45,66,000	34,000	55,00,000	1000MT
5th year	6,00,000	4,00,000	44,69,250	30,750	55,00,000	500MT

4.4.2 Proposed rate of production when the mine is fully developed

As it is aimed to prepare this Mining Plan for 55, 00,000 T (ROM) per annum. The required rate of production shall be achieved by the end of 1st year of plan period. Further quantum of production will depend upon the market demand of mineral.

4.4.3 Mine able Reserves and Anticipated Life of the mines

As discussed in the chapter of geology, the Mineable reserves are calculated as 13, 27, 61,054 T .Lease is up to July, 2052. The production targets for next are proposed @ 55, 00,000MT.However the market demand plays a major role in achieving the production.

Life of the mine @55, 00,000 MT/year=13, 27, 61,054/5500000=24 years

4.4.4 Proposed Method of Mining

The present mining operations are going on and further proposed to be continued/ carried out by open cast mining means. The entire mining operations proposed are mechanized. Apart of mining, the loading and transportation up to stack yard shall be done mechanically. It is proposed to load the mineral in the trucks/dumpers directly to the destinations and mineral is not put up in this stack yard to avoid the double handling. In the present operation the bench height shall be 10 mtrs. Each bench will advance one by one. While carrying out the mining operations in accordance with the above provision the overall pit slope shall be maintained the 450 the mineral bearing rocks being hard and compact.

(Refer Chapter 4 of first mining plan and modified mining plan) .Details of Mining Method, working days, per day proposed production, Requirement of excavator- dupers, drilling machines, blasting method etc and other allied machineries are elaborated in the first mining plan and modified mining plan. The same procedure is proposed to be followed to do scientific mining of mineral.

As per MMR 1961, following precautions shall be undertaken during operations of HEMM.

Shovel/ excavator: -

1. Excavators will be provided with efficient warning devices, front & rear lights and efficient brakes.
2. Excavator will be under the charge of a competent person authorized in writing by the manager designated as operator.
3. No person other than the operator or his helper if any will ride on the excavator or even enter the excavator's cabin.
4. No person will be permitted to ride in the bucket of a Shovel/ excavator.
5. No inflammable material will be stored in the excavator housing or cab.
6. Shovel/ excavator dippers will be lowered to the ground during greasing operation.

7. When a Shovel/ excavator is to be moved from one point to another its boom shall be kept in strict alignment with direction of travel while the bucket/ dipper shall be held m above the ground.
8. No Shovel/ excavator will be operated in the position where any part of the machines, suspended loads or lines are brought closer than 3 m to the exposed high voltage line.
9. Every movement of a Shovel/ excavator shall be preceded by warning signals.
10. When not in use, the Shovel/ excavator will be moved to and stood on stable ground, the bucket shall be kept resting on stable ground and will never be left hanging.
11. The Shovel/ excavator will be so spaced that there will be no danger of accident from flying & falling objects.
12. Safety appliances, booms will be examined thoroughly once in a year.
13. Emergency switches, safety limit switches will be examined and tested once in four months.
14. All brakes will be tested for their operation worthiness once in a week.
15. The following signboards will be carried in and around the machine: -

(i) "Warning— Do not enter the working Range of the Machine".

(ii) "Lubricating Prohibited While the Machine in Running Condition".

Duties of Shovel/ excavator operator: -

1. At the commencement of every shift the operator will personally inspect and test the machine, paying special attention to the following details: -

(i) The brakes and every warning device are in working order.

(ii) Lights are in working order.

(iii) The operator will neither take out the machine for work nor will he work the machine unless he is satisfied that it is mechanically shown and in efficient working order.

(iv) The operator will maintained a record of every inspection made in a bond paged book, kept for the purpose and shall sign every entry made there in.

(v) The operator will keep the cab window clean so as to ensure clear vision at all times.

(vi) The operator will not operate the machine when persons are in such proximity as to be endangered.

(vii) Before leaving the machine, the operator will lower the bucket to the ground.

(viii) The operator will not leave his machine during the shift. Whenever, he finishes his work, he will hand over the machine to his relief or lock the excavators cab.

(ix) The operator will not allow any unauthorized person to ride on the machine.

Dumper: -

1. Every dumper will be provided with efficient brakes.
2. Efficient audible warning devices will be provided with the dumpers.
3. The dumper, if required to work after daylight hours, efficient headlights and taillights will be used.
4. Every dumper will be under the charge of a competent person, authorized in writing by the manager.
5. No person, other than the driver or his helper, if any, will ride on a dumper.
6. No person will be permitted to ride in the running board of a dumper.
7. The loaded dumpers will not be reversed on gradients.
8. Sufficient stop blocks will be provided at every tipping point and these will be used on every occasion when material is dumped.
9. Standard traffic rules shall be adopted and followed during movement of all dumpers. They shall be prominently displayed at relevant places in the opencast workings and haulm roads.
10. When not in use, every dumper will be moved to and stood on proper parking places.
11. No person will be permitted to work on a chassis of a dumper, with the body in rest position, until after the dumper body has been securely blocked in position.
12. The mechanical wised mechanism will not be depended upon to whole the body of a dumper in a rest position.
13. No unauthorized person will be permitted to enter or remain in any turning points.
14. While inflating tyres, suitable protective cages shall be used.
15. Tyres will never be inflated by sitting either in the front or on the top of the same.
16. While the vehicle is being loaded / unloaded on gradient, the same will be secured stationary by the parking brake, and other means suitably designed stopper block, which could be placed below the tyres.

17. At least once in every two weeks the brakes of every dumper will be tested as below: -

(a) Service Brake test: - The brake will be tested on a specified gradient and speed when the vehicle is fully loaded. The vehicle should stop within the specified distance when the brake is applied.

(b) Parking brake test: - The parking brake shall be capable to hold the vehicle when it is fully loaded and placed at the maximum gradient. Maximum gradient of the roadway which is permitted only for a period of at least 10 minutes.

(c) A record of such test will be maintained in a bound paged book and will be signed by the competent person carrying out the test. These records will be countered signed by the engineer and manager.

(d) All vehicles shall be tested and examined once at least in every 6 months.

(e) A notice shall be displayed outside every vehicle that **"No Unauthorized Travelling Allowed".**

Duties of dumper operators: -

1. At the commencement of every shift, the operator shall personally inspect and test the machine, paying special attention to the following details: -

(i) Tyre pressure, brakes, horn and the Lights are in working order.

(ii) The driver will neither take out the machine for work nor will he work the machine unless he is satisfied that it is mechanically shown and in efficient working order.

(iii) The driver will maintained a record of every inspection made in a bound paged book, kept for the purpose and shall sign every entry made there in.

(iv) The driver will keep the cab window clean so to ensure clear vision at all times.

(v) Driver will ensure that the gear is in neutral position before stopping the engine. He will park the vehicle: -

(a) In reverse gear, on level roads and down gradients.

(b) In low gear, on up gradients.

(vi) The driver will negotiate downhill gradients in low gear, so that minimum of braking is required.

(vii) The driver will not drive too fast, avoid distractions and drive defensively.

(viii) Before crossing a road / railway line he will reduce his speed looking both directions along the road or railway line and will proceed across the road or line only if it is safe to do so.

(ix) The driver will not operate the dumper in reverse unless he has a clear view of the area behind the vehicle.

(x) The driver will see that : -

(a) The vehicle is not overloaded.

(b) The material is not loaded in a dumper so as to project horizontally beyond the sides of its body.

(xi) The driver will not allow any unauthorized person to ride on the vehicle.

(xii) When there is a poor visibility, the speed of a vehicle will be restricted in a manner that the braking distance is maintained shorter the distance of visibility.

(xiii) The driver will not leave his machine during the shift. When he finishes his work, he will hand over the machine to his reliever or lock the excavators cab.

4.5 Conceptual mine plan parameter:

During the first 5 years mining will be done in north and south blocks by mechanized method of mining forming 10 m high and 10 m wide benches and protective work and blasting studies for the safety of the nearby habitation will be carried out in the North Block.

In view of the proposed planned production of 55, 00,000 MT (ROM) per annum the life of the mine is calculated 24year. However the life may vary depending on the demand and the quality and reserves of the deposit.

The production targets as proposed the approved mining plan were followed. Necessary permission for mechanized mining under MMR'1961from competent Authority has already obtained. The same will continue in the next five year plan also. The formation of benches shall be continued up to the ultimate pit limit after the drilling and blasting of the bench. The boulders shall be sized with the help of rock breaker, excavated and loaded in the trucks/ dumpers by hydraulic Excavators. The mining operations will continue as were done during the last five years .It will comprise of following activities for excavation of mineral as were proposed in the approved mining plan detailed as under.

a) Drilling of "Down-the-Hole" holes as per specified pattern.

b) Blasting of holes

I) Primary Blasting

II) Secondary Blasting – No secondry blasting proposed. Rock breakes will be used to size the bgboulders .Loading of blasted material by deploying hydraulic excavators

c) Transportation of material to Crushers/desinations

4.5.1 Drilling and blasting operations required to blast / dislodge the host rock as well as stone will be undertaken with the help of 110 mm dia crawler mounted drill machine with following drilling and blasting pattern :-s

Sr.no	Particulars	Dimensions with unit
1	Bench Height and width	10 mx10 m
2	Working Bench Width	15-20m
3	Overall Ultimate pit slope	49^{0}
4	Bench Alignment and bench slope	Parallel to each other; 60^{0}
5	Face length	All along the strike length
6	Depth of pit (Below General Ground)	80 m at the end of 10^{th} year
7	Blast hole diameter	100-110 mm
8	Inclination of blast hole	Vertical
9	Width of Haul Road	12m
10	Gradient of haul Road	1 in 16

The detailed mining parameters proposed are as under

Sr.No.	Iteams	Details
i	Method of mining with bench parameters	It is A category open cast mecanised mine with deep hole drilling and blasting. Mining from top to bottom is proposed. Bench height is proposed 10 m in mineral and non working bench width is proposed to be kept more then 10 m.
ii	Drilling	Will be done by 100-110 mm wagon drills 10 m with 10% sub grade drilling. The drilling pattern will be 4mx5m as burden and spacing. The holes will be drilled in rows. Power factor is kept 6.0.
iii	Blasting	Blasting is proposed in day light time. each10 m hole will be charged with 75kg of explosive which will comprise of class II explosive. Non electric ignition delay station NONEL will be used for delayed detonation
iv	Excavation	Excavation is being done by deploing heavy earth moving machinery by making 10 m heigh and more than 10 wide benches. The heigh walls will be kept at 85° inclinations. Face will advance in north to south direction. With the help of shoal,dumpers, dozers, tippers, hydrolicrockbreakers and water sprinklers

		etc.
v	Loading	Loading is proposed by deploying showel,dumpers and tippers etc.
vi	Transportation	Mineral and waste/ associated minerals is being transported by dumpers,tippers loaded by excavators/loaders.
vii	Crushing/screening	No crushing proposed within mine
ix	Ultimate pit limit	282 mRL

Ultimate Size of the pit:

The size of the pits at the conceptual stage in the North block will cover an area of 10.48 h pit in the north of ODR and 9.44 hectares in the south of ODR respectively.

The size of the pit at the conceptual stage in the South block will cover an area of 42.94 hectares..

Final Slope angle:

The deposit dips at 64° to 75° towards south - east. The final slope angle will be 45°.

Ultimate Capacity of dumps:

The quartz, feldspar quartzite and stone are very well exposed, except overburden and inter mixed. The size of the dump during the five years will be about 2.64 hectares up to 6m height.

Post Mining Reclamation plan including a forestation:

Plantation at 3mx3m grid is done and will continue further. Total 9.36 hectares area will be planted. 1870 nos of plants will be planted annually for the next five years. Saplings will be selected with the consultation of Forest Department. Thus total of 9360 nos of plants are proposed during plan period.

Extent of Mechanization

4.5.1 Drilling

It is proposed to use drill machines of 110 mm dia. As per the production target of about 18,333 MT (6790 M^3per day),

a) Tonnage of mineral excavated per hole = 10 m x 4m x 5m x 2.7= 540 T

b) No. of holes required per day= 18333 T/540 T = 33.95 or say 34 Nos

c) Total meter age of drilling/day= 34 holes x10 =340 m

d) Capacity of each drill machine= 10 m per hour or 80 m per shift or 160 m per day

It is estimated that about 34 holes of 10 m depth per day, 340 m drill meter age will be required to maintain the proposed production targets . Therefore at least (three in working ad one stand by) four drill machines of higher drilling rate with availability of 75% of time as well and 70 % utilization hours will be required

The details of machinery and performance will be as under

Sr.no	Details	
1	A machine can drill total of meters in a shift	100-110 m
2	Total drill meters required per day	340 m
3	Total no of machines required per day	3
4	Stand by drill machine	1
5	Total no of machines required	4

Loading Equipment, Haulage and other mining Machinery

The productivity of excavator is decided based on the following consideration i.e. two shifts per day working and 300 working days in a year

	Excavator Category	Capacity
A	Diesel hydraulic shovel	3.5 m3
B	Fill Factor	85 %
C	Tonnage Factor	2.70
D	Availability of excavator	80 %

E	Utilization of excavator	60%

Standard annual productivity of Excavator

Sr.no	Type of excavator	No. of shift
1	3.5 m3 Diesel hydraulic shovel	6
2	25 tonne rear dumper	40

Therefore, the requirement of HEMM i.e. Hydraulic Excavator, Hydraulic Breaker, Terminator Hydraulic Equipment, dumpers, drill machines and dozers have been estimated based on the adopted productivity norms and workload determined by the calendar plan . For calculation of number of dumpers it is the lead from the mine to the destination which will determine the no of dumpers. At least 40 no. of dumpers at an average lead of 2-5 Km will be needed which are already provided by proponent. Considering 55,00,000 MT (ROM) production it proposed to deploy Two hydraulic shovel in conjunction with 40 no. of 25 T dumpers along with two back hoe with combination of Hydraulic Breaker and Terminator. Thus the total population of equipment required will be as under

S. No.	Equipment	Size	Nos
1	Diesel hydraulic Excavator	3.5 cu.m	2
2	Diesel back hoe	3.5 cu.m	2
3.	Hydraulic Breaker		1
4	Terminator Hydraulic Equipment		1
5	Rear dumpers	25T	40
6	Drill	110 mm	5
7	Track chain Dozer	440 HP	1
8	Grader	145 HP	1
9	Crane	40T	1
10	Heavy duty tow truck		1
11	Water tanker with sprinkler & mist generator system	10 KL	4
12	Maintenance van		1

S. No.	Equipment	Size	Nos
13	Tractor	50 HP	1
14	Tractor mounted compressor	80 HP	1
15	Ambulance		1
16	Jeep/Van	Mahindra	2

Quantity of Diesel / Energy fuel Consumption per day: -

S. No.	Equipment	Size	Nos	Total fuel requirement per day
1	Diesel hydraulic Excavator	3.5 cu.m	2	720
2	Diesel back hoe	3.5 cu.m	2	720
3.	Hydraulic Breaker		1	300
4	Terminator Hydraulic Equipment		1	200
5	Rear dumpers	25T	40	1600
6	Drill	110 mm	5	810
7	Track chain Dozer	440 HP	1	144
8	Grader	145 HP	1	144
9	Crane	40T	1	50
10	Heavy duty tow truck		1	50
11	Water tanker with sprinkler & mist generator system	10 KL	4	250
12	Maintenance van		1	30
13	Tractor	50 HP	1	30
14	Tractor mounted compressor	80 HP	1	50

S. No.	Equipment	Size	Nos	Total fuel requirement per day
15	Ambulance		1	10
16	Jeep/Van	Mahindra	2	20
				5128

Any change in the proposed method of mining, drilling and blasting and development of machinery, if so, give details.

The mining is undergoing with mechanized methods of miming and the same will be continued during the next 5 years. No other changes proposed for drilling and blasting.

CHAPTER-5

BLASTING

5. 1 BLASTING PARAMETERS:-

For mining of Quart, Feldspar and Quartzite/stone, drilling and blasting is required. The job of drilling and blasting is of continues nature.

Considering the time frame of mining and total requirement of material, the daily mineral production comes out to 18,333 MT (6790 m3) The above target will be utilized to frame the pattern and size of blast. The blasting parameters are described as below.

Bench height	10 m
Hole depth	10.5m
Hole Diameter	100-115mm
Loading density	8.5 Kg/m
Burden	4m
Spacing	5m
Charge factor	0.5kg/m3
Charge per hole	85 kg
Top Stemming	3m
Volume per hole	200 m3
No. of holes per round	34
Total Explosive to be fired per round	2890 kg
Explossiverequirement per month@6.0MT/kg	76389 kg
Yearly Requirment	916666 kg

The calculation of explosive is done for planned production of 55, 00,000 Tonne (ROM)/Annum. The explosive quantity may reduce proportionately where hydraulic breaker or terminator hydraulic equipment is deployed as these equipment will dislodge the mineral by drilling and hammering actions and no explosives shall be used.

5.2 TYPE OF EXPLOSIVES

Emulsion- Primer charge (20% of charge per hole)

Slurry Explosive--- column charge 80 % of charge per hole Initiation System and minimum charge per delay

Delay ---------- milliseconds delay detonators

Drilling pattern ------ staggered

Firing pattern------- V pattern

5.3 STORAGE OF EXPLOSIVE

The company will construct a licensed magazine for storage of explosives at suitable location. The capacity of the explosive magazine will be:-

Explosive class 220 T.

Detonators 10000 Nos.

fuse 30000 meters

The required permissions shall be obtained from the Explosive Controller under the Indian Explosive Act-1882.

OR

Alternatively, preferably, project proponent may purchase and use the required quantity of explosives from the near bye licensed explosive magazine.

The explosive will be transported by licensed explosive from the magazine to blasting site.

PRECAUTIONS TO BE TAKEN IN STORAGE, HANDLING AND USE OF EXPLOSIVES:

All precautions regarding storage, handling and use of explosives will be followed as per the conditions laid down in Metalliferous Mines Regulations, 1961 and Explosives Act, 1983 and Explosives Rules 1984.

PROTECTIVE EQUIPMENT:

Dust will be generated while drilling shot holes. It is proposed to provide protective equipment such as respirators, goggles, muffles etc. to the operators of drill machines and compressors.

RELEVANT PROVISIONS UNDER MMR-1961 REGARDING BLASTING

Regulation160. Blasters –

The preparation of charges and the charging and stemming of holes shall be carried out by or under the personal supervision of a competent person, in these regulations referred to as a 'blaster'. The blaster shall fire the shots himself.

No person shall be appointed to be a blaster unless he is the holder of Manager's, Foreman's Mate's or Blaster's certificate.

The manger shall fix, from time to time, the maximum number of shots that a blaster may fire in any one shift; and such number shall not unless the Regional Inspector by an order in writing and subject to such conditions as he may specify therein otherwise permits, exceed 80 in case they are fired electrically or by means of an ignite cord and 50 in other cases, and shall be based upon –

the time normally require to prepare and fire a shot in accordance with the provisions of these regulations;

the time required for that blaster to move between places where shots are fired;

the assistance, if any, available to him in the performance of his said duties; and

any other duties assigned to him, whether statutory or otherwise :

Provided that the Director General of Mine Safety may, by an order in writing and subject to such conditions as he may specify, permit the manager to fix the maximum number of shots to be fired by a blaster differently from the limits specified in this sub-regulation.

The number of detonators issued to, and in the possession of, a blaster during his shift shall not exceed the maximum number of shots that he is permitted to fire under sub -regulation (5).

Regulation: 161 Shotfiring tools –

1 Every blaster on duty shall be provided with –

a suitable electric lamp or torch ;

b a tool, made entirely of wood, suitable for charging and stemming shot holes;

c a scraper made of brass or wood suitable for cleaning out shot holes;

d where fuses are used, a knife for cutting off fuses an, unless machine capped fuses are provided, also a pair of suitable crimpers for crimping detonators; and

e where detonators are used, a pricker made of wood or a non-ferrous metal for priming cartridges.

2 No tool or appliance other than that provided as above shall be used by a blaster.

Regulation 162. Drilling, charging, stemming and firing of shot holes –

No drill shall be used for boring a shot hole unless it allows a clearance of at least 0.3 centimeter over the diameter of the cartridge of explosive which it is intended to use.

No shot hole shall be charged before it is thoroughly cleaned.

Before any shot hole is charged, the direction of the hole shall, where practicable, be distinctly marked on the roof or other convenient place.

No detonator shall be inserted into a priming cartridge until immediately before it is to be use. Detonators once inserted into a priming cartridge shall not be taken out.

Unless otherwise permitted by the Chief Inspector by an order in writing and subject to such conditions as he may specify therein, the charge in any shot hole shall consist of one or more complete cartridges of the same diameter and the same type of explosive.

The blaster shall, to the best of his judgment, ensure that no charge in a shot hole is over-charged of under-charged, having regard to the task to be performed.

No shot hole shall be fired by a fuse less than 1.2 meters in length.

Every shot hole shall be stemmed with sufficient an suitable non- inflammable stemming so as to prevent the shot from blowing out. Only sand loosely filled in, or soft clay lightly pressed home, or a compact but not hard mixture of sand and clay or water shall be used as stemming.

In charging or stemming a shot hole, no metallic tool, scraper or rod shall be used; an no explosive shall be forcibly pressed into a hole of insufficient size.

No shot shall be fired except in a properly drilled, charged and stemmed shot hole.

All surplus explosives shall be removed from the vicinity of a shot hole before a light is brought near it for the purpose of lighting the fuse.

As far as practicable, a shot shall be fired by the same blaster who charged it.

In any mine in which explosives other than gunpowder are used, every shot shall, if so required by the Regional Inspector, be fired electrically.

No more than 10 holes shall be fired in one round unless they are fired electrically or by means of an igniter cord.

No shot hole shall be charged except those which are to be fired in that round; and all shot holes which have be charged shall be fired in one round.

Where a large number of shots have to be fired, a shot firing shall, as far as practicable, be carried out between shifts.

No person shall remove any stemming otherwise than by means of water or an approved device, or pull out nay detonator lead or remove any explosive from any charged shot hole.

Regulation 163 Electric Shot firing: – Where shots are fired electrically, the following provisions shall have effect, namely:-

No shot shall be fired except by means of a suitable shot firing apparatus; and the number of shots fired at any one time by the apparatus shall not exceed the number for which it is designed.

Every electrical shot firing apparatus shall be so constructed and used that –

i it can only be operated by a removable handle or plug. This handle or plug shall not be placed in position until a shot is about to be fired and shall be removed as soon as a shot has-been fired; and

ii the firing circuit is made an broken either automatically or bymeans of a push-button switch.

No apparatus shall be used which is defective; an every apparatus shall m once at least in every three months, be cleaned an thoroughly overhauled by a competent person.

2 No current from a signalling, lighting or power circuit shall be used for firing shots.

3 The blaster shall –

(a) retain the key of the firing apparatus in his possession throughout his shift;

(b) use a well- insulated cable of sufficient length to permit him to take proper shelter, and in no case, shall this cable be less than 20 meters in length;

(c) Before coupling the cable to the firing apparatus, couple up the cable himself to the detonator leads;

(d) Take care to prevent the cable from coming into contact with any power or lighting cable or other electrical apparatus;

(e) Take adequate precautions to protect electrical conductors and apparatus from injury;

(f) Himself couple the cable to the firing apparatus; an before doing so, see that all persons in the vicinity have taken proper shelter as provided under regulation 164; and

(g) After firing the shots and before entering the place of firing, disconnect the

Cable from the firing apparatus.

4 Where more than one shot are to be fire at the same time:-

(a) Care shall be taken that all connections are properly made;

(b) All shots if fired belowground shall be connected in series;

(c) The circuit shall be tested either for electrical resistance or for continuity before connecting it to the firing apparatus. Such a test shall be made with an apparatus specifically designed for the purpose and after the provisions of regulation 164 have been complied with; and

(d) The cable to the shot firing apparatus shall be connected last.

GROUND VIBRATION CONTROL MEASURES IN DEEP HOLE BLASTING:

Whenever a blast is conducted the vibration is felt in the form of ground vibration. The ground motion is essentially a wave motion. The particles of the ground through which the blasting/sound wave travels, set themselves to oscillating motions with respect to their rest positions. These waves can affect buildings and structures by forming visible cracks on the surface, because of compression and tension waves and through vertical and horizontal shearing effects. The peak velocity is defined as the rate of change of the amplitude of the particle, which is measured in " millimetres per second". The Peak Particle Velocity (PPV) existing in a place will give an idea as to how powerful the vibration effects are at that location. The peak particle velocity limit for buildings with concrete are 50 millimetres per second.

The limits of PPV in different structures are as under. These are the recommended values by researchers throughout the world. These vibrations due to blasting can be controlled with following measures:

The charge of explosive per hole shall be optimized and be limited to minimum.

During blasting care shall be taken such that the explosive blasted per delay is minimum. This will not only control the vibrations but also will produce good blast results like minimum back break, good heap, less flying fragments.

Blasting practices like plaster shooting shall be avoided to reduce noise, vibration and flying fragments. It is proposed to deploy hydraulic rock breakers to break big boulders.

The vibrations that any structure receives shall be kept minimum and measurements shall be taken frequently.

To reduce the vibrations of heavy earth moving equipment, preventive maintenance of machinery is recommended so that moving parts of machinery are not loose and mountings are of rubber as far as possible.

The machine operators shall be trained to run the machine smoothly such that the vibrations generated due to rough operations are minimized. For example, rough operation of down-the-drill machine produces huge vibrations.

A computer model for blast design to be designed taking into considerations the parameters like spacing, burden, bench height, decking, stemming, sub-grade drilling, angle between floor and free face, angle between floor and hole axis, delay time in seconds between rows.

Optimum considerations of explosive parameters related to the energy per unit length of the explosive column. The lateral resistance parameters reflect the lateral resistance to motion from blocks on either side of block for a given site; this value is a function of blast hole spacing. This parameter ranges from 0.1 to 1.0.

Another parameter is Delay Parameter. This parameter is the site constant value. This is used to take into account the movement of overburden rock, which is affected by delay time and its value varies from 0 to 1.

Note: In addition to above study from CMRI or other reputed institute will also be conducted at two locations for blast vibration monitoring and recommendation of the same will also be followed for control of ground vibration. In addition to this permission from DGMS will also be obtained for blasting and condition stipulated by DGMS in its permission will be implemented.

FLYING FRAGMENTS AND ITS CONTROL MEASURES:

The flying fragments in any mine are caused due to either overcharging or inadequate front row burden or loose stemming. It is found in most of the cases that the flying fragments have high trajectory velocities, by which the pieces of blasted rock are thrown much beyond the danger zone. These flying fragments can be reduced optimizing explosive charge per hole and by conducting muffle blasting.

The geological disturbances and the fissures are one of the reasons of fly rock. It is important to map fissures and joints that can cause problems during drilling and blasting.

To minimize the risk of fly rock, drill holes shall be set out as accurately as possible.

It is very important to follow charging as per design, bottom charge shall be of correct length and the column charge must have the correct charge concentration, appropriate length of stemming be used.

During initiation, using interval time higher than 100 milli seconds between drill holes shall be avoided.

Top initiation shall be avoided as from field observations it is evident that the probability for collar fly rock is greater.

Precautions are required to undertaken to prevent over confined holes, partial ignition failure where a hole in a next row is ignited without the rows in front being ignited, invariably results in greatly increased fly rock.

Where fly rock is likely to eject in spite of all precautions and if blasting required to be done in vicinity of village where danger zone is less than 500 mts, then covering/muffling of holes from sand bags or holes covered with strong net weighed with gunny/sand bags to be used to arrest fly rocks.

Note: In addition to above study from CMRI or other reputed institute will also be conducted at two locations for blast vibration monitoring and recommendation of the same will also be followed for control flying fragments. In addition to this permission from DGMS will also be obtained for blasting and condition stipulated by DGMS in its permission will be implemented.

CHAPTER-6
MINE DRAINAGE

6.1 GENERAL:

Open cast mining projects requires effective arrangements for drainage and provision of adequate dewatering capacity in the pits under mining. In the area under mining water can reach the workings from surface drainage, rainwater and due to seepage through joints and fissures. Therefore, the problem can be solved by preventing drainage water from entering the pits on one hand and pumping out the percolated and direct rain water from the pits on the other hand. The general water table around the lease area at 95 meters below ground.

6.2 DRAINAGE AROUND AND WITHIN MINE:

The proposed area is hilly terrain. The mining area will become a depression during the next five years, which warrant accumulation of water during rainy season. A plan is proposed to prevent the accumulation of such water.

1) Drainage as shown in the mine plan (plate no 5-10) shall be made all round the pit to prevent the entry of surface/ rain water inside the pits.

2) All the benches will be provided with mild inward slope to keep the benches in drained condition. Provision of sumps is provided as shown in plate No 5-9. The lowest bench shall be slightly sloped towards the sump so that the entire drain water goes to the sump.

3) The working faces will be advanced with a mild upward gradient to facilitate the drainage. The water shall be gradually drained from the upper most bench to the lowest bench and then ultimately to the sump.

4) Similarly in the ultimate pit position, large sump will be provided at the pit bottom to accumulate drained water as well as direct rain water.

A few bore wells (4Nos) are proposed to be drilled up to 150m deep and 10 inches diameter areproposed to be drilled in the bottom most levels of the pit to facilitate the faster recharging of water table during the monsoon period when the water is accumulated in the mine. The locations of bore wells are shown in the progressive mine closure plan plate no.11. Necessary filters will be provided to stop the chocking of the bore wells. Specialized designs will be erected around the bores to stop the clogging due to silt and clay material in to the bore well.

6) Following measures shall be taken to prevent fall of side as per mine statute.

Provisions under MMR 1961 regarding Mine Workings (Slope angle, fall of sides, overhangs etc)

Regulation 106. Opencast workings –

In opencast workings, the following precautions shall be observed, namely: -

1 In alluvial soil, morum gravel, clay, debris or other similar ground -

(a)

(i) the sides shall be sloped at an angle of safety not exceeding 45 degrees from the horizontal or such other angle as the Regional Inspector may permit by an order in writing and subject to such conditions as he may specify therein; or

(ii) the sides shall be kept benched and the height of any bench shall not exceed 10.0 mtrs meters and the breadth thereof shall not be less than the height:

Provided that the Regional Inspector may, by an order in writing and subject to such conditions as he may specify therein, exempt from the operation of this clause any working in the case of which special difficulties exist, which in his opinion make compliance with the provisions thereof not reasonably practicable; and

(2)

(a) Where 'float' or other similar deposit is worked by manual means on a sloping face, the face shall be benched and the sides shall be sloped at an angle of not more than 60 degrees from the horizontal. The height of any bench shall not exceed six meters and the breadth thereof shall not be less than the height: Provided that where the ore-body consists of comparatively hard and compact rock, the Regional Inspector may, by an order in writing an subject to such conditions as he may specify therein, permit the height of the bench to be increased up to 7.5 meters while its width is not less than six metres:Provided further that in case of a mine or part where special difficulties exist, the Chief Inspector may, by an order in writing an subject to such conditions as he may specify therein, relax the provisions of this sub-regulation.

(b) Where in any mine or part it is proposed to work by a system of deep-hole blasting and/or with the help of heavy machinery for its digging, excavation and removal in such manner as would not permit of compliance with the requirement of sub-regulation (1) the owner, agent or manager shall, not less than 60days before starting such work, give notice in writing of the method of working to the Chief Inspector and the Regional Inspector; and no such work shall be commenced or carried out except in accordance with such conditions as the Chief Inspector may specify by an order in writing. Every such notice shall be induplicate, and shall give the details of the method of working including the precautions that are proposed to be taken against the anger from falls of sides and material

3 In an excavation in any hard and compact ground or in prospecting trenches or pits, the sides shall be adequately benched, slopped or secured so as to prevent danger from fall of sides.

4 No tree, loose stone or debris shall unless otherwise permitted in writing by the Chief Inspector be allowed to remain within a distance of three metres from the edge or side of the excavation.

5 No person shall undercut any face or side or cause or permit such undercutting as to cause any overhanging.

6.3 DEWATERING:

Since the depth of mining proposed is below the valley level and water table is about 95 m below the general ground surface, there will be no chance of encountering the ground water table during the mining operations. Hence normal-pumping operations will be required during the monsoon season only. The water accumulates within the pits will be due to direct rainfall over the pit and seepage from adjoining areas, if any. No dewatering will be done except in extreme conditions. Water accumulated if any in the pit will be allowed to recharge the water table through recharging wells. Further if need arises for dewatering in the mine it will be done after obtaining the permission from the competent authority.

The average rainfall of the district during all these years is 420 mm only.

6.4.1 An examination of the above reveals that the rainy season extends from June to September. Although in the above period under consideration there has been rainfall in other months also, but it can be considered as stray occurrence and will not after all proposed pumping scheme.

6.4.2 The water to be pumped out from the open pits will be contributed both by direct precipitation over the open pits and seepage. The water due to direct precipitation will depend upon the rainfall and the area of the pit.

6.4.3 Based on the rainfall records, the sumps of the sizes as shown plates No. 5-9 shall be provided at the bottom most bench. During the monsoon period a continuous process of dewatering the sumps shall be there to facilitate the mining at the lower benches.

6.4.5 Based on the Rainfall data it is proposed to have two diesel engine operated water pumps of 25H.P which may dewater 200^3/hour from the pit. The water will be sent to the drain of 0.5mtr depth as shown in the year wise plans Plate No. 5-9. This water will finally go into the natural nallah.

CHAPTER 7

STACKING OF MINERAL REJECTS AND DISPOSAL OF WASTE

7.1 DISPOSAL OF WASTE

Soil: There is a thin soil cover 10-50 cms and weathered rock waste 50-100 cms in the proposed area. Little amount of soil is also generated from joints and cracks. Top soil will be stripped and preserved by stacking. Soil and weathered quartzite/quartz/feldspar will be stacked separately

7.2 MAXIMUM HEIGHT AND SLOPE OF DUMPS

The area ear marked for the stacking the soil mixed finer material of stone is 3200 M2 Plate no 5-9 which can accommodate at least 8000 MT of material. In the present case soil generated shall be sorted out and stacked in separate dump yards. Yearly generation of soil/ fines which only about 250 tones shall be used for plantation and as a upper layer on the dumps. The dump may attain a maximum height of 6 mtr with gentle slope of 30^0 . Around 40% of the soil shall be stacked for future plantation and around 60% shall be used for on-going plantation.

The dump yard proposed for waste/rejects will be of the size of 290mx80mx6m.This can accommodate the entire rejects generated during plan period. About 910 m toe wall (provide dimensions) will be made around dumps and 910 m drain will also made around dump yard to arrest the sediments if any and to allow the rain water to go into natural drain. The annual quantum for construction of retaining walls/ dump yards for soil and mineral will be done in the 1st year itself. The length of the soil stack yard will be 240 mtr all along with height of one meter. Rest of the height will be made in the coming years as per the requirements of dumps. The thickness of the wall will be half meter. The height proposed 6 mtr. Maximum.

Year	Reject/Waste (MT)
Ist	74,000
2nd	30,000
3rd	36,000
4th	34,000
5th	30750
Total	204750

As already the optimum height of dumps shall be kept 6 mtr. with gentle slope of 30^0 for soil stack and with moderate slope of 39^0 for rejects/ inter burden stacks. Around 60% of the

rejects/waste shall be used for construction of toe-walls, parapet wall etc and rest will be stacked.

LAND CHOSEN FOR DISPOSAL OF WASTE AND JUSTIFICATION:

The part of lease area which is not going to be worked in next 15 years, shall be used for stacking of the waste.

CHAPTER 8
USE OF MINERAL

8.1 USE OF MINERALS:-

The massive crystalline quartz is hard and tough and it is very expensive to crush in raw form. But it becomes very brittle on heating and sudden quenching in water; it can be easily crushed or finely grinded.

This quartz is used in manufacturing of fused quartz, Chemicals, apparatuses, white and enamel ware, glass, ceramic abrasives, for acid tower packing, as a filter in various industries.

Quartz found in this area is of refractory and glass grade.

8.2 PHYSICAL AND CHEMICAL SPECIFICATIONS:-

The physical properties of quartz can be summarized as under:

The quartz found in the area is fine grained, milky white cryptocrystalline. No other impurities are visible except some iron stains.

It has hardness of 7 in Moh's scale

It has specific gravity 2.70

It has vitreous luster

It has concoidal to subconcoidal fracture and has no cleavage

It is very resistant to weathering.

Chemical Specifications of quartz for manufacture of glass are as under

Figures in percentage			
Minimum SiO2	Grade-A	Grade-B	Grade-C
Minimum SiO2	99.5	99.5	98.5
Maximum Fe2O3	0.008	0.013	0.03-
Maximum TiO2	0.03	-	-
Chromium Cr2O3	0.0002	0.0002	0.0006

Quartz found in this area is of refractory and glass grade.

8.3 Feldspar: Feldspar is a common raw material used in glass making, ceramics, and to some extent as filler and extender in paint, plastics, rubber. In glass making, alumina from feldspar improves product hardness, durability and resistance to chemical corrosion.

Quartzite and Stone: This is used as construction material.

8.4 MINERAL BENEFICIATION

In view of the availability of direct market for Quartz, Felspar and Quartzite/stone, presently there is no proposal of beneficiation. Run-off-mine (ROM) Minerals will be sold to various industries directly. Quartz & Feldspar will be sold in the form of lumps to the buyers. The Quartzite (Masonry stone) from host rock, which will generated during mining of Quartz and Feldspar shall be sold/disposed of as construction material to the near bye area and crusher clusters.

In the view of its direct use there is no proposal to beneficiate it at present. As no beneficiation of minerals is envisaged, therefore free silica generation shall not be there.

8.5 PHYSICAL AND CHEMICAL SPECIFICATIONS:-

The physical properties of quartz can be summarized as under:

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Figures In percentage			
Minimum SiO2	Grade-A	Grade-B	Grade-C
Minimum SiO2	99.5	99.5	98.5
Maximum Fe2O3	0.008	0.013	0.03
Maximum TiO2	0.03	-	-

Chromium Cr2O3	0.0002	0.0002	0.0006

Quartz found in this area is of refractory and glass grade.

Feldspar: Feldspar is a common raw material used in glass making, ceramics, and to some extent as filler and extender in paint, plastics, rubber. In glass making, alumina from feldspar improves product hardness, durability and resistance to chemical corrosion.

Quartzite and Stone: This is used as construction material.

9 Nos of Samples from this were got tested and their results are summarized below

Sample No	1	2	3	4	5	6	7	8	10
properties	Felspar	Felspar	Felspar	Quartz	Quartzite	Quartz	Quartzite	Quartz	Quartz
SiO2 %	72.080	72.86	78.710	95.885	93.910	96.765	88.965	92.450	98.425
Al2 O3 %	15.730	15.055	11.885	2.145	2.605	1.085	7.125	4.365	0.895
Fe2O3 %	0.265	0.235	0.105	0.048	0.085	0.310	0.625	0.185	0.00
CaO %	1.035	0.985	1.455	0.520	0.695	0.765	0.995	0.810	0.0
Mg O %	0.255	0.105	0.265	0.065	0.065	0.105	0.145	0.065	0.370
LOI %	0.645	0.615	0.895	0.435	0.385	0.430	0.750	0.560	0.085
Na2O %	6.730	4.110	0.785	0.235	0.835	0.145	0.210	0.850	0.155
K2O %	3.145	5.925	5.795	0.635	1.375	0.295	1.065	0.530	0.017
TiO2 %	0.105	0.105	0.090	0.017	0.025	0.097	0.105	0.085	0.00
Sp. Gravity	2.68	2.685	2.69	2.70	2.69	2.68	2.63	2.71	2.69
Bulk Density gm/cc	2.69	2.84	2.70	2.60	2.80	2.7	2.63	2.70	2.70
Hardness on MOHS scale	6	6	5.5	7	6.5	7	7	6.5	7

CHAPTER 9
MINERAL BENEFICIATION& PROCESSING

In view of the availability of direct market for all minerals produced from this mine in nearby area of Haryana ,Rajasthan and NCR area.There is no proposal to beneficiate it. The same practice is proposed to be continued during the next plan period.

CHAPTER 10
SURFACE TRANSPORT

The transportation of mineral from pit head to the consumer pulverizers, crushers / traders will be carried out by the trucks of the applicant of generally 25 MT Capacity. There is all weather metaled road and then a katcha road right up to mines to dispatch the material from mines to the market/crushers. It will be purchased by the parties at mine site and transported by them through their own arrangement of trucks. The practice is quite sound in the area and ensure continuous lifting of the material. Customers come with transport arrangement of their own.

To accommodate and to ensure smooth production of mineral the following points shall be considered:

Existing Kachcha road which joins mine to metalled road shall be widened, strengthened and shall be maintained regularly so that dumpers of 25 T capacity can ply on it smoothly.

Proper traffic control shall be done at road crossings.

Road crossings shall be wide enough to ensure that dumpers plying on the roads are safe to cross/overtake, where ever necessary.

Along the both side of kachchca road, plantation shall be done as it will arrest the dust and will act as sound barrier to larger extent.

Regular/Daily, water spraying shall be done on main haulage road in South and North Block through water tankers fitted with sprinklers.

CHAPTER -11
SITE SERVICE

11.1 MANAGER'S OFFICE:-

As detailed in the preceding chapter the mine is designed to produce some 55, 00,000tonnes of Quartz & feldspar & Quartzite. The activities shall be supervised by one competent person i.e. Mines Manager, one Mining Mate cum blaster to supervise the drilling and blasting operation. Since this is very large mines. The office of Manager and other supporting staff has already developed.

11.2 CANTEEN -CUM-REST SHELTER:-

In order to provide the rest shelter for the personnel working in the mine and also to provide tea/refreshment etc.as per the Mines act, 1952. The arrangement shall be made to install a rest shelter-cum-canteen as shown in plate no.4 and shall be utilized by the workers. Applicant has already developed a canteen-cum rest shelter.

11.3 STORE

Since the mining operations involve heavy earth moving machinery, a storeroom is alredy provided for day to day operations. No provisions for a separate workshop is being made as the heavy repairs will be carried out elsewhere.

11.4 FIRST AID ROOM:

To provide the first aid for any sort of injuries encountered during the mining operation, one small first aid room is provided. First aid kit and sufficient stock of material / medicines needed for first aid are provided as per requirement. As the mining engineer / Manager and mining mates are qualified first aiders they can provide first aid to the injured on the spot. More ever the Govt. Hospitals is there at Nangal Chaudhary and Narnaul which are just 16 Kms and 30 km. respectively from the mine and necessary medical aid can be provided from there.

11.5 CRÈCHE :

At present provision of crèche is not provided, however in future if women workers are employed , arrangement for a small crèche shall be made as per the requirement.

11.6 V.T. CENTRE

Necessary arrangement are made for conducting refresher course as laid down in Mines vocational training rules.

11.7 MAGAZINE:

Both primary / mass blast and secondary blasting is carried out in the mines . At preset explosive is procured from the authorized source complying with the provisions of Indian Explosives act 1884 .Explosives are and will be transported to site from the magazine by approved explosive van.

All statutory provisions made under the Explosive act and modifications thereof are proposed to be followed

.11.8 ELECTRICITY SUPPLIES:

Presently there is arrangement for supply, at the mine office as well as in mines.

11.9 WATER SUPPLY

The water supply for drinking purpose as well as for dust suppression is done through hired water tankers. The requirement of water for various activities is detailed here below. Water requirement is increased to ensure better control fugitive dust emission and for development of green belt and for afforestation purpose. The water is initially sourced fromand thereafter rain water collected in mine sump.

S. No	Particular	Proposed KLD
1	Dust suppression	36
2	Drinking	2
2	Green Belt/ Plantation	10
3	Domestic	2
	Total Water Requirement	50

CHAPTER 12
EMPLOYMENT POTENTIAL

12.1 GENERAL CONSIDERATION

In this project the mechanized mining is going on for production of building stone. The proposed organizational structure for the project for mining system adopted and the need of effective environment Management Plan. The following technical and non-technical personnel are deployed as per norms :-

1. The mine is worked in three shifts and same will continue in future as well.
2. In estimating the requirement of magazine attendants, and provision of competent person, mates, blaster etc. due consideration has been given to the statutory provisions.

In estimating the requirement of magazine attendants, and provision of competent person, mates, blaster etc. due consideration has been given to the statutory.

Man power requirement and its distribution .As The applicant is working the mine in Two/three shifts. The following manpower is proposed and shall deployed keeping in view the provisions of Mines Act, 1952 and MMR-1961.

12.2 Man power requirement and its distribution.

The following manpower is Deployed and also proposed to continue during next plan period.

S.No.	Designation	Category	Nos
1	Mines manager	Highly skilled	1
2	Assistant Managers	Highly skilled	3
3	Mining Mate cum Blaster	Highly skilled	3
4	Clerical and other staff	Skilled	1
5	Security Guard & Water man	Semi skilled	4

6	Environment Assistance	Skilled	1
7	Diesel hydraulic shovel operator	Highly skilled	4
8	Diesel back hoe operator	Highly skilled	4
9	Rear dumpers operators	Highly skilled	40
10	Drill operators	Highly skilled	4
11	Track chain Dozer operators	Highly skilled	1
12	Grader	Highly skilled	1
13	Crane	Highly skilled	1
14	Heavy duty tow truck	Highly skilled	1
15	Tyre handler	Highly skilled	1
16	Water sprinkler	Skilled	1
17	Maintenance van driver	Skilled	1
18	Tractor operator/driver	Skilled	1
19	Tractor compressor operator	Skilled	1
20	Helpers/labour	Semi skilled	25
	Total		98

In addition to the above mentioned staff rest of the function i.e. supply of explosives, preparation and amendment of plans etc. are performed from the professional on contract basis.

The above mentioned manpower is already deployed by the lessee for Scientific and systematic working of the mine.

CHAPTER- 13
ENVIRONMENT MANAGMENT PLAN

Particulars	Proposal as per approved mining plan	Position at the end of 5th year of Mining Plan Period	Proposal for the next 5 years plan.
Top Soil storage preservation and utilization	Proposed to stack separately as per the approved mining plan dt.18-08-2016.	About 22500 MT soil is generated during last plan period .It was removed and stacked separately. Part of it is used for plantation. Rest is stacked separately. It will be used for progressive reclamation in due course as proposed in the chapter of PMCP.	Proposed to remove separately and stacked for plantation/ reclamation purpose.
Land reclamation and rehabilitation	The mined out area was proposed to be reclaimed after depletion of reserves.	None of the pits has attained the, ultimate pit limit. Therefore the actual land reclamation shall be done at the later stage of mining.	None of the pits has attained the, ultimate pit limit. Therefore the actual land reclamation shall be done at the later stage of mining
Waste dump management	About 1-2% waste is generated which is non salable. Entire reject waste is stacked in stack yard meant for reject waste	About 175432 MT waste/OB was generated during the last plan period. It is stacked inside the lease area	About 204750 MT waste/OB may be generated during the next plan period. The same will be properly stacked and will be used at the time of final/progressive closure plan.Therefore no further management is required except protective measures.
A forestation program	Proposed to plant 1875 no. of trees with survival rate of 70%,(Total plants proposed 9300 during last plan period	Over 10000 no. of plants have been planted (covering about 4.00 ha area) out of which 9630 plants are surviving with survival rate of over 90 %.	The area is mostly rocky or sandy with very poor density of vegetation. Plantation will be carried out around the mine, to arrest the dust at source. It is therefore proposed to cover 3.6 hectare area

			during this plan period at the lease boundary (7.50m buffer zone and the area (benches) where mining is not to be done further. Considering 2500 trees per hectare as a tree density, the applicant will plant 10000 saplings during plan period or 2000 saplings per year. The survival rate is 80%. The dead plants will be replaced by fresh plants during next year and 20% as replenishment during second year. About 4.0 ha additional area will covered under plantation within next five years period.
Quality of Air	Air is unpolluted except the dust generated due to plying of trucks and blasting. It was proposed to spray water on roads to suppress the dust .	Water is sprayed on the kuchha roads regularly. The area is scarce in ground water as well as low rainfall area. Regular air quality Monitoring is done and same is sent to concerned Authorities regularly.	It is proposed that regular air monitoring shall be done and ambient air analysis shall be carried out from time To time. The proposed mining method is not likely to produce much of dust and fugitive emissions to cause damage to ambient air quality of the area.Workerswill be provided with personnel protective equipment like face mask, ear plug/ muffs.For air pollution

			management at the progressive mine closure of mine, green belt will be developed to prevent and control air pollution.*In addition to it is proposed to install two nos of anti smog guns to suppress the dust and other emissions and improve the air quality during the mining.* Regular air quality Monitoring is proposed to be done and same is sent to concerned Authorities regularly.
Quality of Surface and ground water.	Above mining was proposed well above the water table. No course of water encountered. There is no effect on the surface as well as ground water.	Quartz/Stone mining as such does not affect the water regime as neither the surface watercourse is there, nor any ground water table is touched	*Since the depth of mining proposed is below the valley level and water table is about 95 m below the general ground surface, there will be no chance of encountering the ground water table during the mining operations. Hence normal-pumping operations will be required during the monsoon season only. The water accumulates within the pits will be due to direct rainfall over the pit and seepage from adjoining areas, if any. No dewatering will be*

			done except in extreme conditions and that too with the prior permission of competent authority. Water accumulated if any in the pit will be allowed to recharge the water table through recharging wells.
Noise level and vibration fly rock problem and precaution.	As the working were proposed mechanically. There will be some noise	There is limited time for blasting which is only for a few minutes. The machines are repaired properly. The effect of noise level is very limited. Further the area is far away from village population	It is proposed to keep the noise level within the limits by giving proper charging, giving a proper pattern. The entire manpower proposed to be deploy will be provided with necessary safety equipments to safeguard from dust and noise.
Environment Management Plan Budget	It was proposed in the approved EC: (EIA/EMP) that proponent will spent Rs172.35lakhs Capital cost and 458 Lakhs for recurring cost for EMP Purposes	Proponent has done EMP Measures as proposed	It is further proposed to spent more amount during the next plan period for this purpose in consultation of SPCB, Forest Authorities and Gram Panchayat.
Corporate Social Responsibly	As a corporate responsibility following measures along with budget provision ofRs/ 26.55 lakhs was proposed. **Description** — **Amount lacs)** Health check up camps — 3.0 Surveillance programme of the workers — 2.0 Insurance cover of workers — 5.0 Assistance to — 4.5	As a corporate responsibility expenses on account of the following heads was spents **Description** — **Amount (in la** Contribution to gram Panchayat Bayalovillage Development Activities — 4.0 Development of School Library — 0.35 Installation — 4.0	It is proposed to spent Rs 26.55 lakhs in consultation with local authorities (Gram Panchayat/ZilaParishadjfor the benefit of local villagers as part of CSR during the next plan period.

	local schools, scholarship to students 4.55 Sanitations and drinking water facilities 2.50 Vocational training to persons for income generation 5.0 Assistance to self help groups 26.55 Lacs.	ofWater pump in Bayal		
		Contribution to Bayal village Panchayat for development	6.0	
		Medicine and Stationery to School	0.28035	
		Development of Library in village	1.36	
		Construction of sports statdium in Bayal	6.00	
		Development of temple in village	10.0	
		Distribution of food,medicine,maskets during Covid-19	3.0	
		Total	38.99 lakhs	

PART –II
PROGRESSIVE MINE CLOSURE PLAN

1.0 Introduction:-

Vide notification GSR 330(E) date 10-04-2003, MCDR, 1988 has been amended incorporating preparation of Mine Closure Plan. Corresponding amendments has been made in MCDR, 1960. Accordingly Haryana Government has also amended the mineral concession rules which requires the Mine Closure Plan (Progressive & Final) as per chapter 10 of the "Haryana Minor Mineral Concession, Stocking, Transportation of Minerals and Prevention of Illegal Mining Rules, 2012".In the present case as it is a working mine a progressive mine closure plan, as a component of the mining scheme is required. The present rate of production in this mine will require progressive closure of the parts where mineral is fully exhausted/ no more mineable/ economically viable. Such part of the pits will be progressively closed and are proposed for reclamation. *At the proposed pace of work in the next coming years it will not be possible to close down any part except doing protective works like fencing and making of a drain, plantation etc. At the final closure stage which is not yet comining, the maximum part of the mine will become like a water reservoir/lake and it will be used for fissiculture/ Boating site. It can be used as a water body for canal based water supply site. It will help in faster recharging of ground water.*

(A) Name & address of the lessee

Sh. Manmohan Bhadana S/o Sh. Kartar Singh Bhadana R/o V& PO- Anangpur; Distt.- Faridabad (Haryana)

(B) LOCATION OF THE LEASE AREA

District:Mohindergarh

State:Haryana

Taluka:Nangal Chaudhary

Village:BayalBakhrija

(C) EXTENT OF THE LEASE AREA

The mine is located in the revenue estates of Villages BayalinDistt. Mohindergarh,Tehsil-Nangal Chaudhary, Haryana and is about 15 Kms from Nangal Chaudhary . The lease area lies between coordinates as under:

Block 1 (North Block):	Lat: 27°51.485'N to Lat: 27°51.970'N Long: 75°58.642'E to Long: 75° 58.932'E
Block 2 (South Block):	Lat: 27°50'54.20"N to Lat: 27 51.203' N Long: 75°58'37.58"E To Long: 75°59.041' E

The total lease area granted is 76.75 hectares (valid for 50 years from date of grant of lease. The details of extent of area is as follows –

Village	Khasra no.	Area in hect.
Bayal	201,223,224	76.75 hectares

The lease area is located on the mineroad and then a metalled road up to village Bayal and is easily approachable from Narnaul,Nangal Chaudhary, Mohindergarh and other important towns.

(D) PRESENT and proposed LAND USE PATTERN at various stages

Details are given below:

Sr.no	Details	Land use at the start of 1st plan Area in hectares	Present land use Area in hectares	At the end of lease period Area in hectares
1	Pit	0.085	15.00	0.0
2	Dump	0.0	2.64	0.00
3	Road	1.50	1.50	1.06
4	Plantation	0.0	4.0	15.35
5	Infrastructure	0.0	2.60	0.05
6	undisturbed	75.165	51.01	0.0
7	Water body	0.0	0.0	34.12
8	Reclaimed area	0.	0.0	30.29
	Total	76.75	76.75	76.75

(E) METHOD OF MINING:

(Details are given in Chapter 4 of the main Mining plan as well a chapter 4 of this scheme)

The present mining operations are designed to be carried out by open cast mining means. The entire mining operations proposed are mechanized. A part of mining, the loading and transportation up to stack yard shall be done mechanically. It is proposed to load in the trucks/dumpers directly to the destinations and mineral is not put up in this stack yard to avoid the double handling. In the present operation the bench height shall be 10 mtrs. Each bench will advance one by one. While carrying out the mining

operations in accordance with the above provision the overall pit slope shall be maintained the 49^{0}as the mineral bearing rocks being hard and compact.

(F) MINERAL PROCESSING OPERATION:

The quart, quartzite and other minerals are proposed to be sold in raw form in the form of lumps . Same practice is proposed to be continued.

1.1 Reasons for closure:

The progressive mine closure plan has been prepared in compliance of Rule 70 (1) of Haryana Minor Mineral Concession Rules 2012 under MMCR 1986.This is reproduced as under:

Rule 70.(1) Every mineral concession holder shall prepare a Mining Plan along with the Mine Closure Plan (Progressive & Final) and shall not commence mining operations in any area except in accordance with such Mining Plan duly approved by an officer authorized by the Director in this behalf.

As entire mineral is not going to be depleted during the plan period no immediate closure is planned. Therefore no closure plan is proposed at this stage.

1.2 Statutory Obligations:

The lessee is bound to submit the Progressive Mine Closure Plan either with Mining plan or Scheme of Mining Lessee is bound to follow the terms and conditions as will be stipulated in the lease deed /LOI.

In addition to it the rules pertaining to the Protection of Environment i.eEnvironmentAct. Environment Rules and other associated rules for the protection of environment will have to be followed during the course of mining. The rules stipulated in Mines Act, Mines Rules Metalliferous Mines Regulation 1961 and Haryana Mineral Rules, 2012 will be followed.

1.3 Closure plan preparations

Name, address and registration number of the Recognized Qualified Persons who prepared the progressive closure plan and name and address of the executing agency who is involved in the preparation of progressive mine closure plan.

D.C.Yadav RQP/DMG/HRY/2018/03

Lessee will himself implement the closure plan; no outside agency will be involved.

2.0 MINE DESCRIPTION

2.1 General Geology and Local Geology

(Details are given in the Chapter 3 of main mining plan)

2.1.1 Regional Geology

(Details are given in the Chapter 3 of main mining plan)

2.1.2 Local Geology

(Details are given in the Chapter 3 of main mining plan)

2.2 Reserves

(Details are given in the Chapter 3 of main mining plan as well as modified Mining Plan.

2.3 Mining Method:

Mining method to be followed is described in Chapter 4 of mining plan

2.4 Mineral Beneficiation

(Details are given in the Chapter 9 of main mining plan)

3 Review of implementation of mining plan including five years progressive closure plan upto the final closure plan

Mining scheme and Progressive mine closure plan is being submitted for the first time. It will be reviewed after five years and review of implementation will be given in the final closure plan at that time.

4.0 CLOSURE PLAN

4.1 Mined - out land

Land use at various stages is given in the table below:

Table : Land Use at various Stages

Sr.no	Details	Land use at the start of 1st plan Area in hectares	Present land use Area in hectares	At the end of lease period Area in hectares
1	Pit	0.085	15.00	0.0
2	Dump	0.0	2.64	0.00
3	Road	1.50	1.50	1.06
4	Plantation	0.0	4.0	15.35
5	Infrastructure	0.0	2.60	0.05
6	undisturbed	75.165	51.01	0.0
7	Water body	0.0	0.0	34.12
8	Reclaimed area	0.	0.0	30.29
	Total	76.75	76.75	76.75

4.2 Water quality management

There are no water courses in the area except dry nallahs .The precipitated water also flows along the depressions formed in between the outcrop of country rocks. The water table in the area is reported to be about 95 m bgl/ below the ground surface .There is no flow of water in the lease in post monsoon period. Area is having 420 mm rainfall in a year. During rainy season, water will be accumulated the pit which will be drained out and finally it will be sent in to natural drain. A settling tank will be provided so that the finer sediments are settled down. These finer sediments will be collected after rain is over.

The general water table around the lease area is about 95 meters below ground and the same is going down yearly.As reported by lessee and the nearby villagers the water table is receding by about 2-3 meters annually. It is therefore estimated that the same may be about 100 m below the general ground level at the end of 5years.The project proponent shall ensure that the mining operations shall not intersect groundwater table and the mining operations should be restricted at least 2m above the ground water table .

Regular monitoring of ground water level and quality shall be carried out in and around the mine lease area. The monitoring shall be carried out as per the conditions of EC dated 04-05-2018.

4.3 Air Quality Management:

The proposed mining method is not likely to produce much of dust and fugitive emissions to cause damage to ambient air quality of the area. Workers will be provided with personnel protective equipment like facemask, ear plug/ muffs.

For air pollution management at the progressive mine closure of mine, greenbelt will be developed to prevent and control air pollution.

4.4 Waste Management:

As stated in mining method, soil dump yard shall be maintained for stacking the top soil. It is also proposed a stack yard for mineral in case of emergency or downfall in sales. waste is generated/ available at the mine, which will be stacked in a scientific manner and will be used at the progressive closure or final closure as the case may be.

4.5 Top Soil Management

About 22500 MT soil has been generated during last plan period and additional about 10000 MT more may be generated during the current plan period. The entire quantity of soil is proposed to be used for reclamation/plantation on the buffer zone, benches and un-mineralized area .

4.6 Tailing dam management

There is no proposal of beneficiation of mineral. No tailing dam is envisaged.

4.7 Infrastructure:

The infrastructure facilities like site office, first–aid station, rest shelter/ store, drinking water etc. are already established and maintained.

4.8 Disposal of mining machinery:

It is propose to deploy heavy earth moving machineries in the mine. As this plan is for 5 years period and hence during plan period no disposal or decommissioning of machineries is proposed. But at the end of the lease period Small set up of office complex shall be maintained even after expiry of lease, to look after the plantation and other proposed reclamation measures.

Machinery is available on hire basis. Hence no decommissioning of mining machinery is proposed.

4.9 Safety & Security:

Safety measures will be implemented to prevent access to excavation area by un-authorized persons as per Mine Act 1952, MMR 1961.

i. Safety measures will be implemented as per Mine Act1952, MMR1961,MinesRules1955.
ii. Provisions of MMR1961 shall be followed strictly and all roads shall be 12 m wide and have a gradient of not more than 1 in 16.
iii. The bench height will be 9.0 mtr.
iv. Width of working bench will be kept around 15-20 m for ease of operations and provide sufficient room for the movement of equipment.
v. Protective equipment like dust masks, earplugs/ muffs and other equipment shall be provided for use by the work persons.
vi. Notices giving warning to prevent inadvertent entry of persons shall be displayed at all conspicuous places and in particular near mine entries.
vii. Danger signs shall be displayed near the excavations.
viii. Security guards will be posted.
ix. In the event of temporary closer, approaches will be fenced off and notice displayed.

4.10 Disaster Management and Risk Assessment:

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

- The mechanized mining activities in the hilly area may involve any high risk accident due to side falls/collapse, flying stones due to blasting etc.
- The complete mining operation will be carried out under the Management and control of experienced and qualified Mines Manager having Certificate of Competency to manage the mines granted by DGMS.
- All the provisions of Mines Act 1952, MMR 1961 and Mines Rules 1955, Haryana Mineral Rules, 2012 and other laws applicable to mine will strictly be complied with.

- During heavy rainfall the mining activities will be suspended
- All persons in supervisory capacity will be provided with proper communication facilities.

Competent persons will be provided First aid kits which they will always carry.

4.11 Care and Maintenance during Temporary Discontinuance:

In case of any temporary discontinuance due to court order or due to statutory requirement or any other unforeseen circumstance following measures shall be taken for care, maintenance and monitoring of conditions.

- Notice of temporary discontinuance of work in mine shall be given to the DGMS as per the MMR 1961.
- All the mining machinery shall be shifted to a safe place.
- Entrance to the mine or part of the mine, to be discontinued shall be fenced off. Fencing shall be as per the circular 11/1959 from DGMS.
- Security Guards shall be posted for the safety and to prevent any unauthorized entry to the area.
- Carry out regular maintenance of the facilities/area detailed below in such a way as would have been done as if the mines were operation:

  Mine roads and approach roads,

  Fencing on approach roads,

  Checking and maintenance of machines and equipment,

  Drinking water arrangements,

  Mine office, first aid stations etc.

- Competent persons shall inspect the area regularly.
- Air, water and other environmental monitoring shall be carried out as per CPCB and IBM Guideline.
- Care and upkeep of plantation shall be carried out on regular basis.

- Status of the working and status monitoring for re-opening of the mines shall be discussed daily.

In case of discontinuance due to any natural calamities/abnormal conditions, mining operation will be restarted as early as possible after completing rescue work, restoring safety and security, repairs of roads etc.

5.0 ECONOMIC REPERCUSSION OF CLOSURE OF MINE AND MANPOWER RETRENCHMENTS

Lease area has been granted for a period of 50 years . As per the production programme envisaged, at the end of plan period, sufficient reserves would be left available for continuing production activities further. Hence, no I closure is planned at this stage. There will be no effect on the man power as the persons belong to nearby villages and will have an option either to be available for employment for the next contract/ lease or do the agriculture in their fields.

6.0 TIME SCHEDULING FOR ABANDONMENT

The lease area has enormous potential for continuance of operations up to the present contract period.. The details of time schedule of all abandonment will be given at the time of final closer plan.

7.0 ABANDONMENT COST

As at present mining is not going to be closed so abandonment cost could not be assessed. However based on the progressive mine closure activities during the plan period, cost is assessed as given below:

Table: Abandonment Cost

ACTIVITY	YEAR					Rate	Amount (inRs.)
	First	Second	Third	Fourth	Fifth		
Plantation (in no.)	1870	1870	1870	1870	1870	@150 Rs per sapling Including maintenance	225000
Plantation cost	280000	280000	280000	280000	280000		
Wire fencing (meter)1000m	200000	200000	200000	200000	200000	@ of 200 Rs per meter	1000000
Toe walls (m)200m	200000	200000	200000	200000	200000	@ Rs 1000/m	1000000
Drain(m) 250m	125000	125000	125000	125000	125000	@ Rs500/m	625000
	Total						2850000

8.0 FINANCIAL ASSURANCE

Total 76.75 ha area will be put in use up to the end of the plan period. Details of area put in use as given below (As per circular No.4/2006 issued by CCOM, Nagpur following table has been considered for calculation for financial assurance).

Table: Calculation for Financial Assurance

S. No.	Item	Area put on use at start of plan (Ha) (A)	Requirement at the end of plan period (Ha)	Total area put to use (Ha) (B)	Area considered as fully reclaimed & rehabilitation (Ha) (C)	Net area considered for calculation (Ha) D = (B-C)
1.	Area to be excavated	15.00	15.00	30.00	0.0	30.00
2.	Storage for topsoil	1.0	1.0	1.0	0.0	1.0
3.	Overburdon/ dumps	00	1.0	3.64	0.0	3.64
4.	Mineral storage	0.0	0.0	0.0	0.0	0.0
5.	Infrastructure (Workshop, Adm. Building & Road)	2.60	0.20	2.80	0.0	2.80
6.	Green belt	4.0	4.0	8.0	4.0	4.0
7.	Tailing pond	0.0	0.0	0.0	0.0	0.0
8.	Effluent treatment plan	0.0	0.0	0.0	0.0	0.0
9.	Mineral separation plant	0.0	0.0	0.0	0.0	0.0
10.	Township area	0.0	0.0	0.0	0.0	0.0
11.	Others to specify	0.0	0.0	0.0	0.0	0.0
	Total	22.6	21.2	45.44	4.0	41.44

Total 41.44 ha area will be put to use at the end of plan period.However total 76.75 ha area is considered for calculation. The total financial assurance (@15000/- per ha.) will be of Rs11,51,250/- This will be given by lessee as per Rule no 70 (1) (6) amended in 2012 as Surety Bond / Bank Guarantee.

9.0 CERTIFICATE

It is enclosed with the report.

10.0 PLAN AND SECTION

Plan and section are prepared and enclosed with the mining scheme.

Duli Chand Yadav
DMG/HRY/RQP/2018/03

By Speed Post/Online

No. J-11015/10/2017-IA.II (M)
Government of India
Ministry of Environment, Forest and Climate Change
Impact Assessment Division
***

Indira Paryavaran Bhavan,
Vayu Wing, 3rd Floor,
Aliganj, Jorbagh Road,
New Delhi-110 003

E-mail: s.kumar1958@gov.in
Tele: 011-24695304

Dated: 4th May, 2018

To,
M/s Bayal Quartz & Feldspar Mine
Shri Manmohan Bhadana,
S/o Kartar Singh Bhadana
R/O V & PO- Anagarpur
Dist: Faridabad (Haryana)

Sub.: Environment Clearnace to Bayal Quartz & Feldspar Mine of M/s Mr. Manmohan Bhadana, S/o Kartar Singh Bhadana is situated at Khasra No.- 201, 223 & 224 Village Bayal, Taluka- Narnaul, District:- Mahendragarh, Haryana, over an area of 76.75 hectares & rate of production is 55,00,000 TPA (ROM)-Reg.

Ref: Online application No: IA/HR/MIN/62041/2017

Sir,

This has reference to your online application for the above mentioned Environemtal Clerance proposal of **Bayal Quartz & Feldspar Mine** for proposed production of Quartz , Feldspar quartzite & Stone with total production capacity up to 55,00,000 TPA (ROM)in the Mining Lease (76.75 Ha)situated at Khasra No- 201, 223 & 224 Village Bayal, Taluka- Narnaul, District:- Mahendragarh, Haryana . The Project Proponent submitted that the mining lease area is in two blocks (North & South Blocks). The North Block falls between Latitude: 27° 51.485'N to 27° 51.970'N & Longitude: 75° 58.642'E to 75° 58.932'E and South Block falls between Latitude 27°50'54.20"N to 27°51.203' N & Longitude:75°58'37.58"E to 75°59.041' E. The mining lease comes under Survey of India topo-sheet no G43 D13 and G43 E1. The mining lease area falls in seismic zone III.The PP also presented the KML file during the presentation to indicate the location of mine lease on Google Earth/ DSS.

2. The proposal of Term of References (ToR) was considered by the EAC in its meeting held during20-21 February, 2017 wherein the Committee recommended for grant of ToR. The Ministry has issued ToR, vide letter even no. dated May17, 2017. PP has submitted the EIA/EMP Report on 30.11.2017 for appraisal of the Project before EAC.The proposal of EC was earlier considered in EAC meeting held during **December 21-22, 2017** wherein the Committee deferred the proposal and sought requisite information. In this context, the PP vide letter dated **08.02.2018** submitted the informationand accordingly the proposal was re-considered by the EAC in its meeting held during **February 26-27, 2018** wherein the Committee deferred the proposal and sought requisite information. In this context, the PP vide letter dated **21.03.2018** submitted the informationand accordingly the proposal was re-considered by the EAC in its meeting held during **March 22-23, 2018** wherein the Committee **recommended** the proposal for grant of Environmental Clearance for mining of Quartz , Feldspar Quartzite & Stone with total production capacity up to 55,00,000 TPA (ROM) from Bayal Quartz & Feldspar Mine (76.75 Ha) situated at Khasra No.- 201, 223 & 224 Village Bayal, Taluka- Narnaul, District:- Mahendragarh, Haryana.

3. The proponent submitted that the mining lease over an area of 228.60 hectares falling in Khasra Nos 198, 201, 202, 223 & 224 in village Bayal, District: Mahendragarh was granted on 09.07.2002 for a period of 20 years and Quartz and Feldspar, were both considered as Major Minerals as per provisions of Mines & Mineral (Development & Regulation) Act, 1957. As per the subsequent amendment dated 12.01.2015 made by Central Government in the Mines and Minerals (Development & Regulation) Act, 1957 and notification dated 10.02.2015 qua category of minerals, the proponent has submitted that the lease period has been extended up to 08.07.2052 and Quartz & Feldspar have been treated as minor minerals. The proponent submitted that part area of the lease falling under Khasra numbers 198 and 202 (comprising total area of 151.85 hectares) is under Aravalli and cannot be used for mining as per orders dated 18.03.2004 of the Hon'ble Supreme Court in WP (C) 4677 of 1985 in matter of M.C Mehta vsUoI&Ors. Therefore, the proponent submitted letter to DMG, Haryana for surrender of 151.85 ha area falling in Aravalli Plantation area and the same was accepted by DMG, Haryana vide letter no. Gig/Hy/E-2578/279 dated 11.01.2017. The supplementary lease deed falling in village Bayal over an area of 76.75 ha was executed on 12th May, 2017, after surrender of 151.85 Ha (Khasra no 198 & 202 Aravalli Plantation area) and is valid till 08.07.2052 . The EAC is its meeting held on 21-22 December, 2017 observed that the waste proposed by the Project Proponent was masonry stone, which is salable as construction material and has an economic value. The committee was therefore of the view that if the waste has market value, then same needs to be included in lease deed document as the list of minerals to be mined and asked the proponent to submit the revised mining lease deed after inclusion of all the minerals. The Project Proponent submitted the letter No Gig/HY/E-2578/926 dated 23.02.2018 issued by DMG for registration of supplementary lease deed on addition of quartzite and stone. The supplementary lease deed after inclusion of all the minerals viz. Quartz, Feldspar, Quartzite and Stone was executed on 23.02.2018 and valid till 08.07.2052. The Proponent submitted a no objection certificate issued by Nayab Thasildar, Sikar, Rajasthan vide letter No S-P-1 dated 10.01.2018 to the effect that mining lease does not falls under Rajasthan. The Project Proponent submitted the District Survey Report.

4. The Project Proponent submitted that mining plan was approved by Department of Mining and Geology, Govt. of Haryana vide LR No. DMG/HY/MP/Bayal/2017/2733-36 dated 23.06.2017. The mining plan was thereafter modified as per recommendation of EAC made during its meeting held on 21-22 December, 2017 & 27-28 February, 2018vide LR No. DMG/HY/MP/Bayal/2018/493-496 dated 01.02.2018 and LR No. DMG/HY/MP/Bayal/2018/1380 dated 19.03.2018 respectively. The Proponent submitted that as per the modified mining plan the estimated Geological Reserve is 140,905,315 Tonnes and estimated mineable reserve is 12, 6,81,4776 Tonnes. The proposed rate of production is 55, 00,000 TPA (ROM). The anticipated life of mine is 23 years. The mining will be carried out by mechanized opencast mining method. The material will be dislodged with rock breaker & terminator in no blasting zone and in remaining area with drilling & blasting. The excavation of minerals, waste and top soil will be with the help of excavator and transportation with the help of dumpers/tippers. The Project Proponent submitted that there is a thin soil cover 0-50 cm in the proposed area. Little amount of soil is also generated from joints and cracks. Top soil will be stripped and preserved by stacking in separate dump yards. Yearly generations of soil/fines will be 34000 MT (18900 cum) out of which about 250 MT shall be used for plantation on upper layer on the dumps. The proponent submitted that total waste generated during the life of the mine will be 941850Tonne . The waste will be dump separately in the dump yard near pillar number 23 & 24 of south block and ultimately used for backfilling. The proponent submitted municipal wastewater generated at the site will be treated through dedicated septic tanks followed by soak pit. The proponent submitted that total water requirement for the project will be 50 KLD (dust suppression 36 KLD, Drinking & Domestic use 04 KLD, Green Belt/plantation 10 KLD). The proponent submitted that 1870 plant per annum will be planted and at the end of life of mine 11.23 Ha of ML area will be under green belt with tree density 2500 plant/ha, 34.12 Ha will be converted into water reservoir and 30.29 Ha will be backfilled and reclaimed with plantation.

5. The primary baseline data for site specific micro meteorology data, ambient air quality, water quality, noise level, soil and flora & fauna has been collected during Summer Season i.e. from March–May, 2017. The monitoring results of ambient air, surface water, soil, ambient noise and ground water have been reported and no major divergence was observed with respect to concentration values of various parameters between collected samples. The Proponent submitted that Level of Service (LoS) pre project scenario is in category A and post project scenario will be in category B. The noise level in day time is slightly above the residential limit of 55 dB (A) in daytime but less than industrial limit 75 dB (A). The soil is neutral to moderately alkaline in nature. The Ground water quality in and around the core zone is well within the permissible limit. But in Munsnauta village which is 6 Km from the project site the total dissolve solid (TDS) and Total hardness as CaCo3 is exceeded the permissible limit. The proponent submitted that the Ground Water Table (GWT) around Bayal village is located about 346 MASL. The mine working during the plan period will be up to 399 MASL and ground water shall not be intersected. The proponent committed to mine 10 meters above the ground water table i.e. up to 356 MASL. The Committee in its meeting held on 22-23 March, 2018 observed that in the mining lease document it has mentioned that *"A safety margin of two meters shall be maintained above the ground water table and no mining operations shall be permissible below this level unless a specific permission is obtained from the competent authority"* and in the instant case, the PP has already committed to keep a safety margin of 10 meters above the ground water table. Further, during the plan period, as per approved mining plan the mine working will go up to 399 MASL i.e. above the ground water table of the area. Thus, the Committee was of the view that the mine working should be restricted at 356

MASL till the PP submits the detailed hydrogeological study and obtain permission from competent authority for intersecting ground water table, if any, for mining beyond 356 MASL.

6. The Proponent submitted that the Public Hearing / Consultation was conducted on 24.10.2017 and chaired by Dr. Garima Mittal, Deputy Commissioner, Mahendragarh. The advertisement for public hearing was published in English News Paper (Tribune) and Hindi Newspaper (AajSamaj) on 21.09.2017. The various issues raised during the public hearing mainly involve the concerns of villagers as how mining could be possible near habitation, temple and school and what would be the employment and business opportunity for the villagers. The issue raised during public hearing were also considered and discussed during the meeting.The proponent submitted that budget earmarked for the Enterprise Social Commitment (ESC) will be ₹ 26.55 Lakh which include supply of medical equipment to the Govt. hospitals, installation of RO Plant in village Panchayat, Supply of books to Govt. School & libraries, organizing heath camp for villagers, rainwater harvesting structures and installation of roof top solar panel in village Panchayat Bhawan . The Committee recommended that no mining should be carried out within 50 meters of the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs), temple and no mining should be carried out within 100 meters by using explosive from the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs), temple even if, PP obtained permission from DGMS. For mining in the remaining area the proponent should conduct the blast vibration study by engaging CSIR-Central Institute of Mining and Fuel Research (CIMFR), Dhanbad or National Institute of Rock Mechanics (NIRM), Karnataka. The report so obtained should be submitted to DGMS for obtaining the permission for carrying out mining by using explosive. The proponent submitted that the budget earmarked for blasting study would be ₹ 34 Lakh. .

7. The Project Proponent submitted a certificate issued from State Forest Department vide letter no 2946 dated 14.11.2017, wherein, certifying that there is no forest land in the mining lease area and there is no National Park, Wildlife Sanctuary within 10 Km of mining lease area and the project site is outside National Park, sanctuary, Biosphere reserve, Tiger/Elephant Reserve or notified Eco-Sensitive Zone falling within the territory of Haryana Boundary.The Project Proponent submitted that there are 6 shedule-1 species viz. *Indian Peafowl, Black Partridge, Leopard, Chikara, Common Indian Krait and Indian Monitor Lizard* are present in the study area. The project site was inspected on 1-08-2017 by a team comprising of Conservator of Forest (WL), Gurugram, DFO (T), Mahendergarh and DWLP, Gurugram. As per the direction of Forest Department, Govt of Haryana the proponent submitted the Wildlife Conservation Plan to Chief Wildlife Warden on 30.10.2017. The proponent submitted the conservation plan for Sehdule-1 & II species for 35 years with a budgetary provision of ₹ 160 Lakh.

8. The Project Proponent submitted that the Budget earmarked for Environmental Management Plan ₹ 172.35 Lakh (Capital Cost) and ₹ 458.0 Lakh (Recurring). The activates proposed under EMP are a) Environment Monitoring for Air, Noise, Water and Soil Quality, b) Purchase of minimum two water tanker having mist cannon fogger, c) construction of garland drains, d) Green Belt Development along the mine boundary, e) Afforestation & Reclamation activities, f) Rain water harvesting pits, g) mine waste/overburden management and h) Implementation of Conservation plan for schedule-1 species. The Project Proponent submitted that budget earmarked for Management of Labour Camps will be ₹ 28.25 Lakh (Capital) and ₹ 46.0 Lakh (Recurring). The Project Proponent submitted that occupational health and safety measures of the workers including identification of work related health hazards, training on health effect of mineral dust shall be

carried out. Initial and periodical medical examination of each worker and record of the same shall be maintained. The budget earmarked for the occupational health surveillance will be ₹ 2.62 Lakh (Capital) and ₹ 81.31 Lakh (recurring). The Project Proponent submitted to compensate all the 43 identified families within the mining lease and ₹ 6.19 Cr is earmarked under R&R Plan.

9. The Ministry of Environment, Forest & Climate Change has examined the proposal in accordance with the Environmental Impact Assessment Notification, 2006 and further amendments thereto and hereby accords the Environmental Clearance under the provisions thereof to the above **mentioned proposal of M/s Bayal Quartz & Feldspar Mine** for mining of Quartz , Feldspar Quartzite & Stone with total production capacity up to 55,00,000 TPA (ROM) from Bayal Quartz & Feldspar Mine (76.75 Ha) situated at Khasra No.- 201, 223 & 224 Village Bayal, Taluka- Narnaul, District:- Mahendragarh, Haryanasubject to compliance of the followings terms and conditions and environmental safeguards mentioned below:-

A. Specific conditions

i) Environmental clearance is granted subject to final outcome of Hon'ble Supreme Court of India, Hon'ble High Court of Haryana, Hon'ble NGT and any other Court of Law, if any, as may be applicable to this project.

ii) No mining activities will be allowed in forest area, if any, for which the Forest Clearance is not available.

iii) The Project Proponent shall obtain Consent to Operate from the State Pollution Control Board, Haryana and effectively implement all the conditions stipulated therein.

iv)No mining should be carried out within 50 meters of the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs), temple and no mining should be carried out within 100 meters by using explosive from the outer boundary of any village abadi, National Highway, State Highway, Major District Roads (MDR) and other District Roads (ODRs), temple even if, PP obtained permission from DGMS. For mining in the remaining area the proponent should conduct the blast vibration study by engaging CSIR-Central Institute of Mining and Fuel Research (CIMFR), Dhanbad or National Institute of Rock Mechanics (NIRM), Karnataka. The report so obtained should be submitted to DGMS for obtaining the permission for carrying out mining by using explosive.

v) Shelter belt i.e. wind barrier of 30 meter width and consisting of at least 5 tiers around lease facing the habitation/school/public road (if any in the vicinity) shall be raised.

vi)Adequate protection against the dust and other environmental pollution arising due to mining activity shall be made so that human habitation located near the lease is not adversely affected. The status of implementation shall be report to Regional Office, MOEF&CC and SPCB, Haryana.

vii) The proponent should ensure that mine working shall not intersect the ground water table of the area. The mining should be restricted till 356 masl till the PP submits the detailed hydro-geological study and obtained permission from CGWA for intersection of ground water table, if any, for mining beyond 356 masl.

viii) Regular monitoring of ground water level and quality shall be carried out in and around the mine lease by establishing a network of existing wells and constructing new piezometers during the mining operation. The project proponent shall ensure that no natural water course and/or water resources shall be obstructed due to any mining operations. The monitoring shall be carried out four times in a year pre- monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to Ministry of Environment, Forest and Climate Change and its Regional Office, Central Ground Water Authority and Regional Director, Central Ground Water Board.

ix) The Budget earmarked for Environmental Management Plan ₹ 172.35 Lakh (Capital Cost) and ₹ 458.0 Lakh (Recurring) should be kept in separate account (except amount to be submitted to Forest Department for implementation of the conservation plan) and same needs to be audited annually. The activates proposed under EMP are a) Environment Monitoring for Air, Noise, Water and Soil Quality, b) Purchase of minimum two water tanker having mist cannon fogger, c) construction of garland drains, d) Green Belt Development along the mine boundary, e) Afforestation & Reclamation activities, f) Rain water harvesting pits, g) mine waste/overburden management and h) Implementation of Conservation plan for schedule-1 species. The Proponent should submit the detailed report to Regional Office, MoEF&CC on implementation of EMP along with audited report of expenditure incurred; purchase documents, photographs in support of implementation of activities, Geo-location of the monitoring stations etc.

x) The budget earmarked for Management of Labour Camps will be ₹ 28.25 Lakh (Capital) and ₹ 46.0 Lakh (Recurring) and same needs to be kept in a separate account. The account needs to be audited annually and report of the same shall be submitted to Regional Office, MoEF&CC along with supporting documents, photographs and geo-location.

xi) Occupational health and safety measures of the workers including identification of work related health hazards, training on health effect of mineral dust shall be carried out. Initial and periodical medical examination of each worker and record of the same shall be maintained. The budget earmarked for the occupational health surveillance will be ₹ 2.62 Lakh (Capital) and ₹ 81.31 Lakh (recurring). The proponent shall engage a doctor who is well trained in occupational health and has NIOSH B Reader Certification (using the ILO 2000 Classification of Radiographs of Pneumoconiosis). The Project Proponent shall maintain a separate account for budget earmarked for occupational health surveillance plan and the same needs to be audited annually. The annual report of implementation of the occupational health surveillance plan shall be submitted to Regional Office, MoEF&CC. The Project proponent shall increase the budget earmarked for occupational health surveillance plan as per requirement.

xii) The budget earmarked for the Enterprise Social Commitment (ESC) will be ₹ 26.55 Lakh which include supply of medical equipment to the Govt. hospitals, installation of RO Plant in village Panchayat, Supply of books to Govt. School & libraries, organizing heath camp for villagers, rainwater harvesting structures and installation of roof top solar panel in village Panchayat Bhawan. The amount earmarked for ESC should be kept in separate account and same shall to be audited annually. The PP shall submit an annual report of compliance of activities proposed under ESC, to Regional Office, MoEF&CC with audited statement, photographs etc.

xiii) The Project Proponent shall get the blasting studies done by engaging CSIR-Central Institute of Mining and Fuel Research (CIMFR), Dhanbad or National Institute of Rock Mechanics (NIRM), Karnataka or any other institute of national repute before commencement of any blasting operation within 500 meters of the habitation. The budget earmarked for conducting blasting studies will be ₹ 34.0 Lakh. The blasting study report shall be submitted to Ministry of Environment, Forest and Climate Change and its Regional Office within three month of its finalization. The proponent shall monitor ground vibration and air overpressure of each blast and shall keep a record of the same which include logs generated from Blastmate, geo-location of the blast, dated and time of blast, number of holes blasted, charge per holes, explosive used, bench parameters, drill hole parameters etc.

xiv) The Project proponent shall compensate all 43 identified families as per proposed R&R plan. The ₹ 6.19 Cr earmarked for R&R plan shall be kept in separate account and same needs to be audited. The details of the compensation paid to the project affected families shall to be sent to Regional Office, MoEF&CC within one year of the commencement of the mining operation.

B. Standard conditions

i. A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment, Forest and Climate Change 5 years in advance of final mine closure for approval.

ii. This Environmental Clearance is subject to obtaining requisite NBWL Clearance from the Standing Committee of National Board for Wildlife as applicable for this Mining project.

iii. No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment, Forest and Climate Change.

iv. No change in the calendar plan including excavation, quantum of mineral and waste should be made.

v. The project proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of water (surface water and ground water) for the project.

vi. Mining shall be carried out as per the provisions outlined in mining plan approved by Indian Bureau of Mines (IBM)/State Mines and Geology Department as well as by abiding to the guidelines of Directorate General Mines Safety (DGMS).

vii. Project Proponent shall obtain the necessary prior permission from the Central Ground Water Authority (CGWA) in case of intersecting the Ground water table. The intersecting ground water table can only be commence after conducting detailed hydrogeological study and necessary permission from the CGWA. The Report on six monthly basis on changes in Ground water level and quality shall be submitted to the Regional Office of the Ministry, CGWA and State Pollution Control Board.

viii. The lands which are not owned by Proponent, mining will be carried out only after obtaining the consents from all the concerned land owners as per the provisions of the Mineral Concession Rules, 1960 and MMDR Act, 1957.

ix. Digital processing of the entire lease area using remote sensing technique shall be carried out regularly once in three years for monitoring land use pattern and report submitted to Ministry of Environment, Forest and Climate Change its Regional Office.

x. The critical parameters as per the Notification 2009 such as PM_{10}, $PM_{2.5}$, NO_x, and SOx etc. in the ambient air within the impact zone, peak particle velocity at 300m distance or within the nearest habitation, whichever is closer shall be monitored periodically. Further, quality of discharged water shall also be monitored [(TDS, DO, PH and Total Suspended Solids (TSS)]. The monitored data shall be uploaded on the website of the company as well as displayed on a display board at the project site at a suitable location near the main gate of the Company in public domain. The circular No. J-20012/1/2006-IA.II (M) dated 27.05.2009 issued by Ministry of Environment, Forest and Climate Change shall also be referred in this regard for its compliance.

xi. The Proponent shall install online Ambient Air Quality Monitoring System and there should be system for display of digital AAQ data within 03 months at least at three locations as per wind direction. Online provisions of pH and turbidity meters at discharge points of STP and ETP and also at water storage ponds in the mining area may be made. Project Proponent should display the result digitally in front of the main Gate of the mine site.

xii. Effective safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of PM_{10} and $PM_{2.5}$ such as haul road, loading and unloading point and transfer points. Fugitive dust emissions from all the sources shall be controlled regularly. It shall be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard. Monitoring of Ambient Air Quality to be carried out based on the Notification 2009, as amended from time to time by the Central Pollution Control Board.

xiii. Regular monitoring of ground water level and quality shall be carried out in and around the mine lease by establishing a network of existing wells and constructing new piezometers during the mining operation. The project proponent shall ensure that no natural water course and/or water resources shall be obstructed due to any mining operations. The monitoring shall be carried out four times in a year pre- monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to Ministry of Environment, Forest and Climate Change

and its Regional Office, Central Ground Water Authority and Regional Director, Central Ground Water Board.

xiv. Regular monitoring of the flow rate of the springs and perennial nallahs flowing in and around the mine lease shall be carried out and records maintain. The natural water bodies and or streams which are flowing in an around the village, should not be disturbed. The Water Table should be nurtured so as not to go down below the pre-mining period. In case of any water scarcity in the area, the Project Proponent has to provide water to the villagers for their use. A provision for regular monitoring of water table in open dug wall located in village should be incorporated to ascertain the impact of mining over ground water table.

xv. Regular monitoring of water quality upstream and downstream of water bodies shall be carried out and record of monitoring data should be maintained and submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office, Central Ground Water Authority, Regional Director, Central Ground Water Board, State Pollution Control Board and Central Pollution Control Board.

xvi. Transportation of the minerals by road passing through the village shall not be allowed. A 'bypass' road should be constructed (say, leaving a gap of at least 200 meters) for the purpose of transportation of the minerals so that the impact of sound, dust and accidents could be mitigated. The project proponent shall bear the cost towards the widening and strengthening of existing public road network in case the same is proposed to be used for the Project. No road movement should be allowed on existing village road network without appropriately increasing the carrying capacity of such roads.

xvii. The illumination and sound at night at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right for darkness and minimal noise levels at night. PPs must ensure that the biological clock of the villages is not disturbed; by orienting the floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day light/night hours.

xviii. Main haulage road in the mine should be provided with permanent water sprinklers and other roads should be regularly wetted with water tankers fitted with sprinklers. Crusher and material transfer points should invariably be provided with Bag filters and or dry fogging system. Belt-conveyors should be fully covered to avoid air borne dust.

xix. Main haulage road in the mine should be provided with permanent water sprinklers and other roads should be regularly wetted with water tankers fitted with sprinklers. The material transfer points should invariably be provided with Bag filters and or dry fogging system. In

case of Belt-conveyors facilities the system should be fully covered to avoid air borne dust; Use of effective sprinkler system to suppress fugitive dust on haul roads and other transport roads shall be ensured.

xx. Sufficient number of Gullies to be provided for better management of water. Regular Monitoring of pH shall be included in the monitoring plan and report shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office on six monthly basis.

xxi. The pollution due to transportation load on the environment will be effectively controlled and water sprinkling will also be done regularly. Vehicular emissions shall be kept under control and regularly monitored. Project should obtain 'PUC' certificate for all the vehicles from authorized pollution testing centres.

xxii. There shall be planning, developing and implementing facility of rainwater harvesting measures on long term basis and implementation of conservation measures to augment ground water resources in the area in consultation with Central Ground Water Board.

xxiii. The Project Proponent has to take care of gullies formed on slopes. Dump mass should be consolidated with proper filling/leveling with the help of dozer/compactors.

xxiv. The reclamation at waste dump sites shall be ecologically sustainable. Scientific reclamation shall be followed. The local species may be encouraged and species are so chosen that the slope, bottom of the dumps and top of the dumps are able to sustain these species. The aspect of the dump is also a factor which regulates some climatic parameters and allows only species adopted to that micro climate.

xxv. The top soil, if any, shall temporarily be stored at earmarked site(s) only and it should not be kept unutilized for long. The topsoil shall be used for land reclamation and plantation. The over burden (OB) generated during the mining operations shall be stacked at earmarked dump site(s) only and it should not be kept active for a long period of time. The maximum height of the dumps shall not exceed 8m and width 20 m and overall slope of the dumps shall be maintained to 45°. The OB dumps should be scientifically vegetated with suitable native species to prevent erosion and surface run off. In critical areas, use of geo textiles shall be undertaken for stabilization of the dump. The entire excavated area shall be backfilled and afforested. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office on six monthly basis.

xxvi. Catch drains and siltation ponds of appropriate size shall be constructed around the mine working, mineral and OB dumps to prevent run off of water and flow of sediments directly into the river

and other water bodies. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drains shall be regularly desilted particularly after monsoon and maintained properly. The drains, settling tanks and check dams of appropriate size, gradient and length shall be constructed both around the mine pit and over burden dumps to prevent run off of water and flow of sediments directly into the river and other water bodies and sump capacity should be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material. Sedimentation pits shall be constructed at the corners of the garland drains and desilted at regular intervals.

xxvii. Plantation shall be raised in a 7.5 m wide green belt in the safety zone around the mining lease, backfilled and reclaimed area, around water body, along the roads etc. by planting the native species in consultation with the local DFO/Agriculture Department and as per CPCB Guidelines. The density of the trees should be around 2500 plants per ha. Greenbelt shall be developed all along the mine lease area in a phased manner and shall be completed within first five years.

xxviii. Project Proponent shall follow the mitigation measures provided in Office Memorandum No. Z-11013/57/2014-IA.II (M), dated 29th October, 2014, titled "Impact of mining activities on Habitations-Issues related to the mining Projects wherein Habitations and villages are the part of mine lease areas or Habitations and villages are surrounded by the mine lease area".

xxix. The Project Proponent shall make necessary alternative arrangements, where required, in consultation with the State Government to provide alternate areas for livestock grazing, if any. In this context, Project Proponent should implement the directions of the Hon'ble Supreme Court with regard to acquiring grazing land. The sparse trees on such grazing ground, which provide mid-day shelter from the scorching sun, should be scrupulously guarded against felling and plantation of such trees should be promoted.

xxx. The project proponent shall take all precautionary measures during mining operation for conservation and protection of endangered fauna, if any, spotted in the study area. Action plan for conservation of flora and fauna shall be prepared and implemented in consultation with the State Forest and Wildlife Department. A copy of action plan shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office.

xxxi. As per the Company Act, the CSR cost should be 2 % of average net profit of last three years. Hence CSR expenses should be as per the Company Act/Rule for the Socio Economic Development of the neighborhood Habitats which could be planned and executed by the Project Proponent more systematically based on the 'Need based door to door survey' by established Social Institutes/Workers. The report shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office on six monthly basis.

xxxii. Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.

xxxiii. Measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs / muffs.

xxxiv. Industrial waste water (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December, 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.

xxxv. Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.

xxxvi. A separate environmental management cell with suitable qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.

xxxvii. The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office.

xxxviii. The project authorities should inform to the Regional Office regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.

xxxix. The project proponent shall submit six monthly reports on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment, Forest and Climate Change, its Regional Office, Central Pollution Control Board and State Pollution Control Board.

xl. The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full

cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring reports.

xii. A copy of clearance letter will be marked to concerned Panchayat / local NGO, if any, from whom suggestion / representation has been received while processing the proposal.

xiii. State Pollution Control Board should display a copy of the clearance letter at the Regional office, District Industry Centre and Collector's office/ Tehsildar's Office for 30 days.

xiiii. The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment, Forest and Climate Change at www.environmentclearance.nic.inand a copy of the same should be forwarded to the Regional Office.

10. The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.

11. Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

12. The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/ High Court and any other Court of Law relating to the subject matter.

13. Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

(Surendra Kumar)
Scientist 'G'/Adviser

Copy to:-

1. **The Secretary**, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.

2. **The Secretary**, Department of Mines & Geology, Government of Haryana, Chandigarh.

3. **The Secretary**, Department of Environment, Government of Haryana, Chandigarh.

4. **The Secretary**, Department of Forest, Government of Haryana, Chandigarh.

5. **The Chief Wildlife Warden**, Government of Haryana, C-18, Van Bhawan, Sec-6,Panchkula -134109

6. **The Principal Chief Conservator of Forests (C)**, Ministry of Environment, Forest and Climate Change, Regional Office (NZ), Bays No. 24-25, Sector 31 A, Dakshin Marg,Chandigarh - 160030

7. **The Chairman**, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.

8. **The Chairman**, Haryana Pollution Control Board, C-11, Sector-6, Panchkula, Haryana 134109

9. **The Member Secretary**, Central Ground Water Authority, A-2, W3, Curzon Road Barracks, K.G. Marg, New Delhi-110001.

10. **The Executive Engineer**, Department of Irrigation, Government of Haryana, Sinchai Bhawan, Sector-5, Panchkula , Haryana

11. **The District Collector**, District Mahendragarh, State of Haryana.

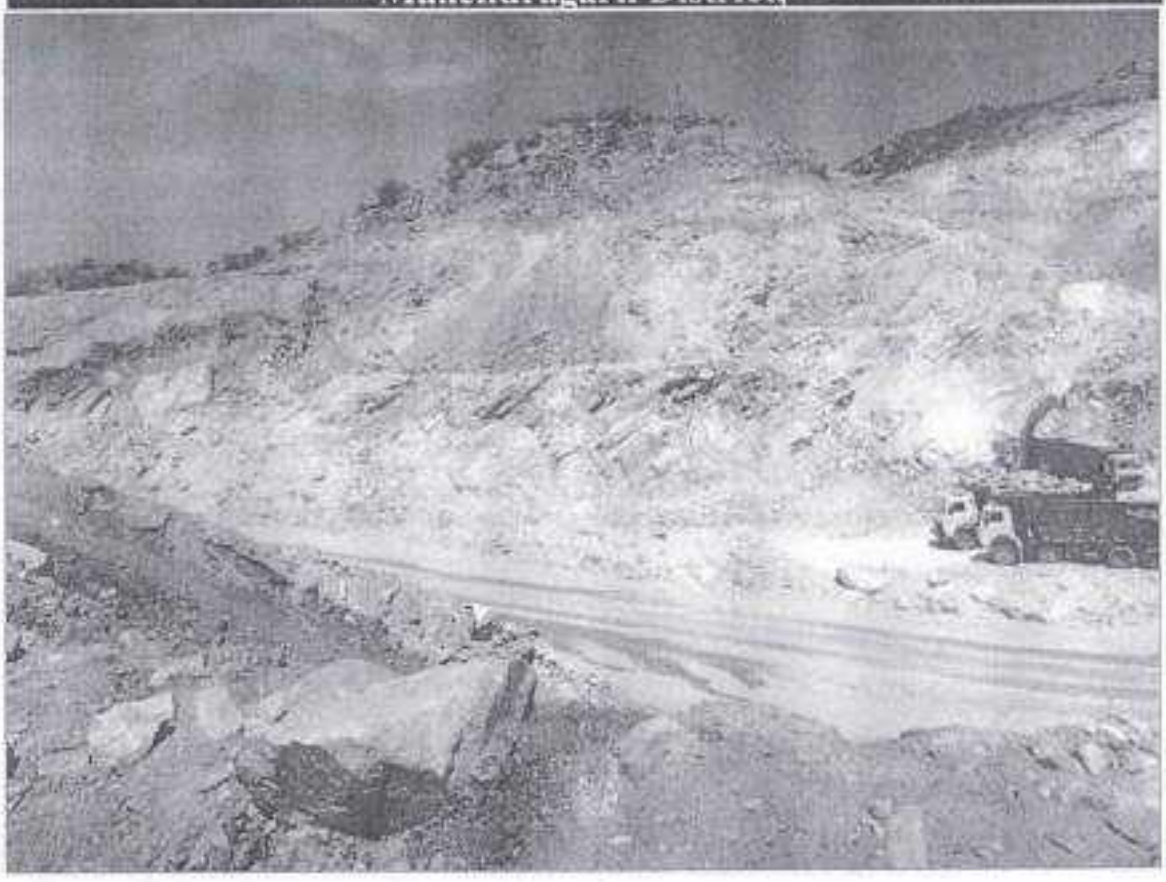
12. Guard File.

13. MoEFCC website.

(Surendra Kumar)
Scientist 'G'/Adviser

Hydrogeological Study Report

Bayal Quartz and Feldspar (Minor Mineral) Mine, Khasra No. 201,223 &224 of Bayal Village, Narnaul Taluk, Mahendragarh District,



PREPARED FOR:

Bayal Quartz and Feldspar Mines, Haryana State

REF: EN.19.050-HG BAYAL MINE (REV. 0)

AUTHOR

This report was prepared by

Earthood Services Private Limited
424A, Tower B3, Spaze I-Tech Park,
Sector 49, Sohna Road, Gurgaon-122018, India.

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Hydrogeological Study Report

CHAPTER 1

Bayal Quartz and Feldspar (Minor Mineral) Mine, Khasra of Bayal Village, Narnaul Taluk, Mahendragarh District, Haryana State

1.Introduction

Mr. Manmohan Bhadana s/o Shrikartar Singh , hold a mining lease over an area of 76.75 Hectares falling in Khasra nos. 201, 223 & 224 in Bayal village, Mahendragarh which was granted on 09.07.2002 for period of 20 years for mining of Quartz and Feldspar, both as Major Minerals as per provisions of Mines & Mineral (Development & Regulation) Act, 1957. Environmental Clearance was issued on 4th May 2018.

In the Environment Clearance to the above mines, it was stated that detailed hydrogeological study has to be undertaken in and around the mine lease area. Bayal Mines, in order to study the Hydrogeological aspects in and around Mine, entrusted the job of carrying out the Hydrogeological Study to Earthood Services Private Limited, Gurgaon.

The details of Mine area and capacity are given below.

S No	Facility	Area	Capacity
1.	Quartz, Feldspar Mine	76.75 Hectares The area is located in 2 Blocks (North and South block)	55,00,000 TPA

Bayal Quartz and Feldspar (Minor Mineral) Mine located at Khasra no. 201, 223 & 224 of Bayal village, Narnaul Taluk, Mahendragarh District Haryana State.

1.1 Need for the Study

The present Hydrogeological study of the mine depicts the ground water condition of villages falling within the study area covering 5 km radius from the Mine boundary (as per CGWA Guidelines).

The basic data such as the villages falling within the study area and the land use, irrigation water requirement, domestic water requirement, rainfall and aquifer parameters of the study area have been considered for the study. The ground water estimation has been made over an area of 91.62 Sq.km covering 5 km radius for the Mine based on the Ground Water Estimation Committee Methodology – 1997 (GEC-1997) of Government of India.

1.2 Scope of Study

Hydrological and Hydrogeological Studies include assessment of ground water potential, identifying and suggesting recharge measures to augment the ground water sources as per the MoEF and CGWA Guidelines. The study is also focused on the Ground water level in and around the mine lease area and to study the impact of mining on the ground water regime.

1.3 Methodology

To achieve the above scope the following methodology has been adopted

1) Pre-field preparation

- Collection of satellite data, maps and literatures about the aquifer characters etc.,
- Preparation of base map, drainage and water body map, geology map, geomorphology map, soil map, land use map using satellite imagery from available literatures.

2) Field Work

- Field verification of geomorphic features and structures such as fold, fault, fractures and fissures
- Collection of well inventory data & measurement of well depth, water level, yield and water quality

3) Post-Field Interpretation

- Preparation of ground water level zone map, water table contour
- Interpolation and superimposition of the observed data using statistical and standard hydro-geological methods
- Estimation of aquifer parameters
- Study of aquifer within 5 km of the project site (Mine) and preparation of management plan for recharging the aquifer
- Identification of location for construction of recharge structures
- Suggesting recharge structures to augment the ground water sources in around the project site

1.4 Location and Extent of the Study Area

The administrative unit within the study area from the project boundary comprises of 24 villages within 5 km radius from the mine blocks boundary.

The study area (covering 5 km radius) lies in between North Latitude 27° 49' 30" and 27°54'10" and East Longitude of 76° 55'50" and 76°02'00" and forms part of the Survey of India Topo Sheet Nos. 45 M/13, 55 A/1.

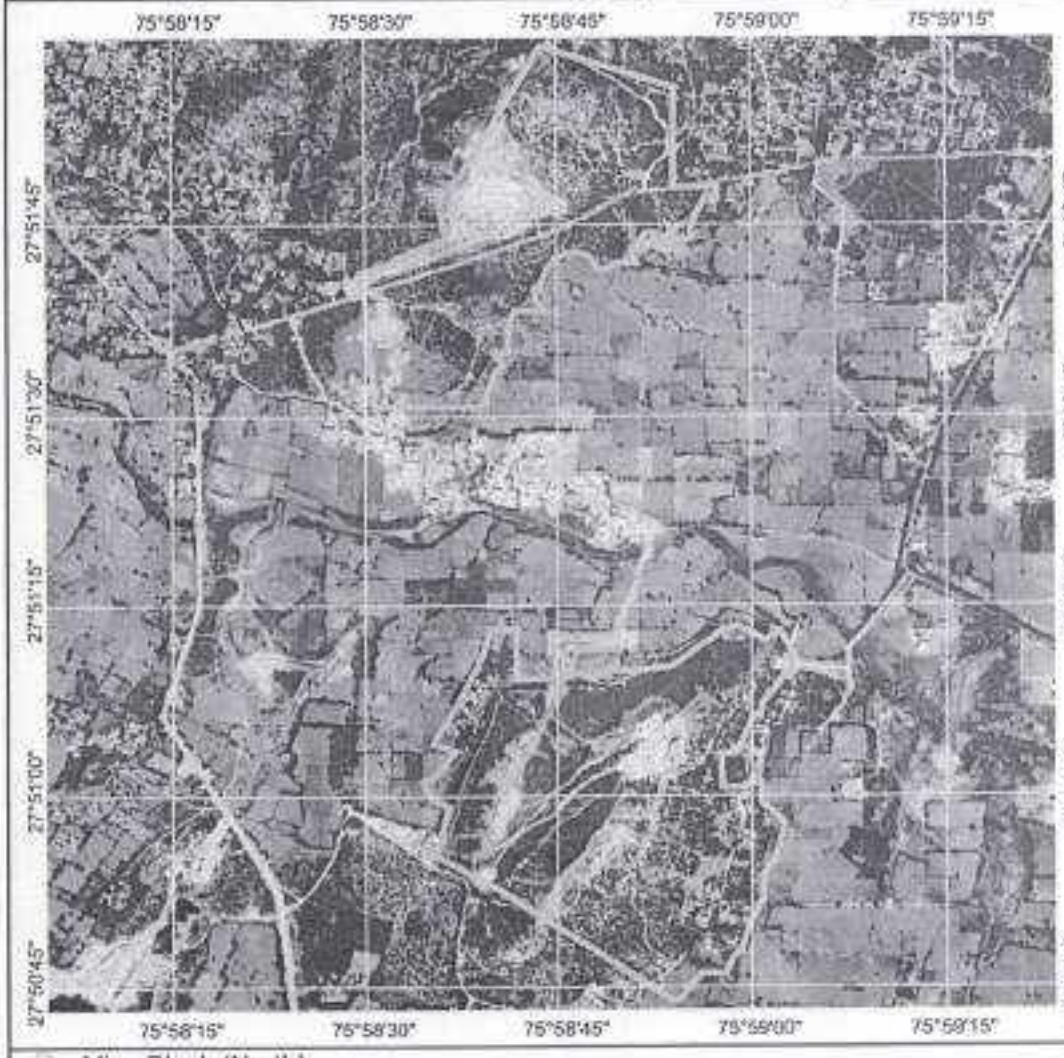
The mine blocks falls in 45 M/13. The total aerial extent of the study area covering 5 km radius from the Mine is **91.62 Sq.km.**

The details of study area (covering 10 km radius) are given below.

Feature	Details
Mines	Mine Blocks located at Khasra No. 201, 223 & 224 of Bayal village, Narnaul Taluk, Mahendragarh District Haryana State
Topography	Hilly (Mines located in the Hill)
SOI Toposheet	45 M/13, 55 A/1
Above Mean Sea level	Height point 480 m amsl and Lowest point 370m amsl
Nearest habitation	Bayal village
Nearest Town	Nangal Chowdhary
Nearest Highway	Inter State Highway of Haryana& Rajasthan
Nearest Railway Station	Rewat

High resolution satellite imagery showing the mine blocks and the SOI topo maps presented in Plates 1 & 2:

Bayal Quartz and Feldspar (Minor Mineral) Mine Khasra of Bayal Village, Narnaul Taluk, Mahendragarh District, Haryana State
High Resollution Satellite Imagery Showing Project Site 1:15000



Mine Block (North)
Mine Block (South)

Block 1 (North Block)	Latitude : 27°51.485' N to 27°51.970'N Longitude: 75°58.642' E to 75°58.932'E
Block 2 (South Block)	Latitude : 27°50.54.20' N to 27°51.203'N Longitude: 75°58.37.58' E to 75°59.041'E

Plate – 1 - High resolution Satellite Imagery showing the mine blocks. The Satellite imagery showing the present condition of excavated mine blocks. The small nallah (Stream) is bisecting the two mine blocks. Image also clearly shows that the mine blocks are in the hill. There is no major habitation in the vicinity of the mine blocks.

Bayal Quartz and Feldspar (Minor Mineral) Mine Khasra of Bayal Village, Narnaul Taluk, Mahendragarh District, Haryana State

5 Km Radius TOPO Map Showing the Project Site

1:50000

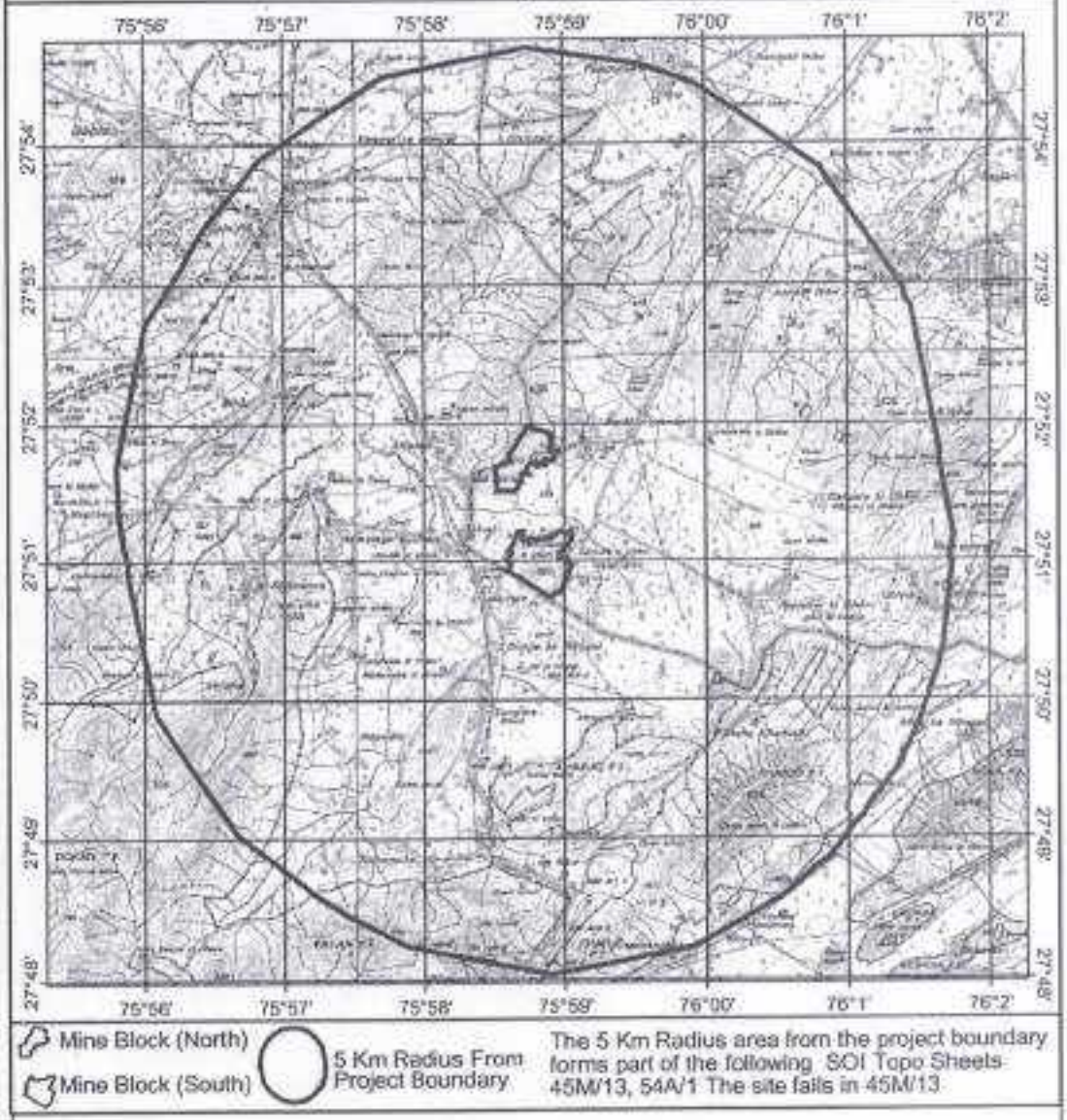


Plate – 2 - Survey of India topo sheet showing the mine blocks. The 5 km radius boundary from the mine blocks falls in 2 toposheets. Hills and the plains are visible in the vicinity of the mine blocks.

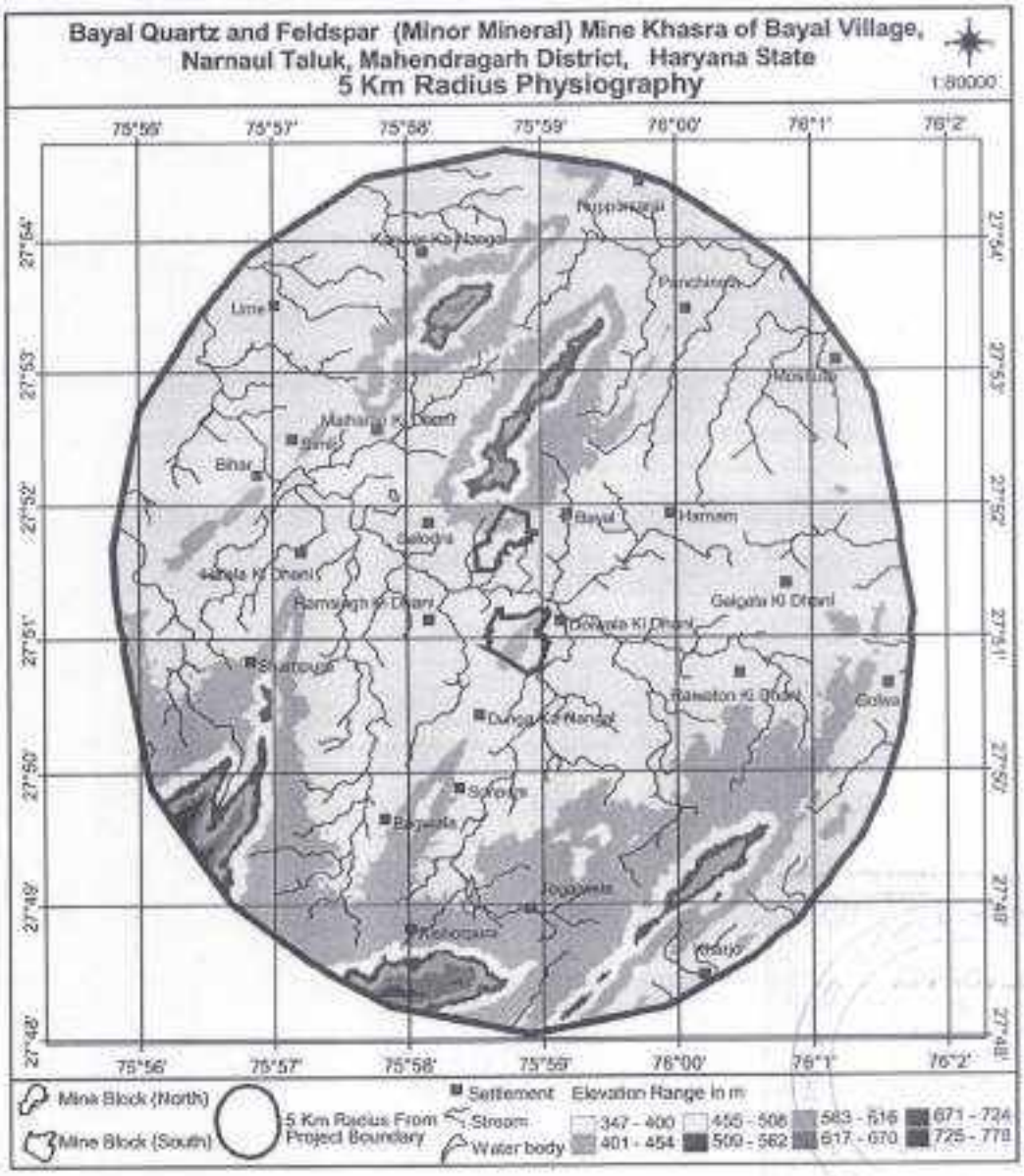
Photograph of Mine Block - North

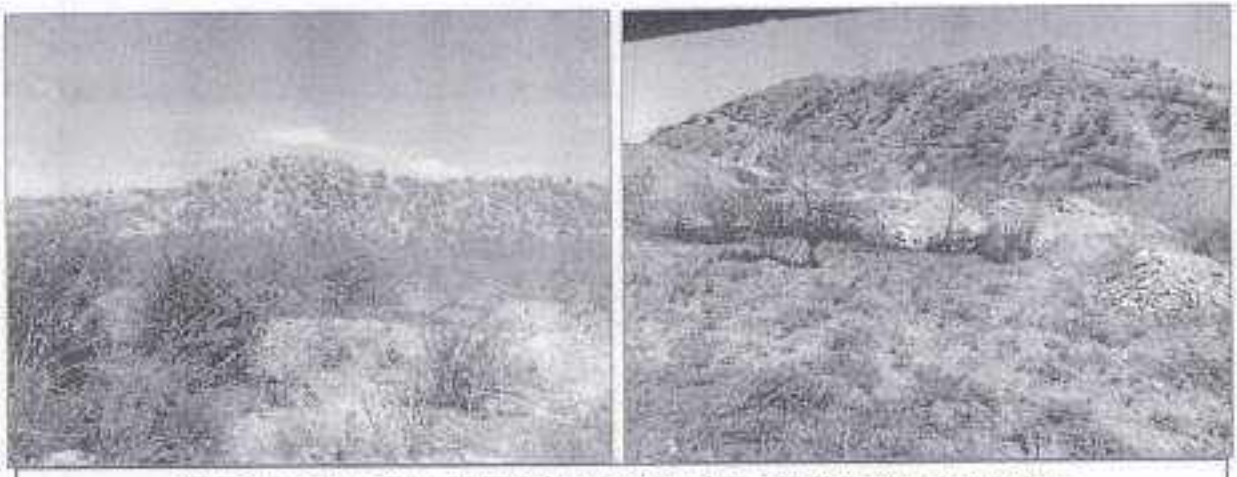
Photograph of Mine Block - South

Photograph of Mining Operations

1.5 Physiography

The study area exhibits undulating terrain and the maximum elevation is observed in the northern boundary of mine block north and southern part of 5 km radius. The minimum and maximum elevation of the study area of 5 km radius is 347 m and 778 m amsl (above mean sea level) respectively. Both the blocks of the mine are located relatively in higher elevation. The minimum and maximum elevation of the Mine is 374 & 471 m above mean sea level respectively. Physiographic map is presented in Plate-3:





Physiographic features within 5 km radius from the mine blocks boundary

1.6 Drainage and Water Bodies

There is no perennial river in Haryana States joining the Indus Basin. Most of the rivers have turned seasonal and carry floodwaters during monsoon.

There is no major river system within 5 km radius from the mines. The streams are only seasonal and very lean flow in the river during the monsoon period. Some years flash flood reported in the rivers. There are no major reservoirs / Dam or irrigation tanks in the 5 km radius study area.

No diversion of streams due to mining activity has taken place. The mining activity has not abstracted the free flow of water in the streams during the rainy seasons.

The Drainage map is presented in Plate-4:

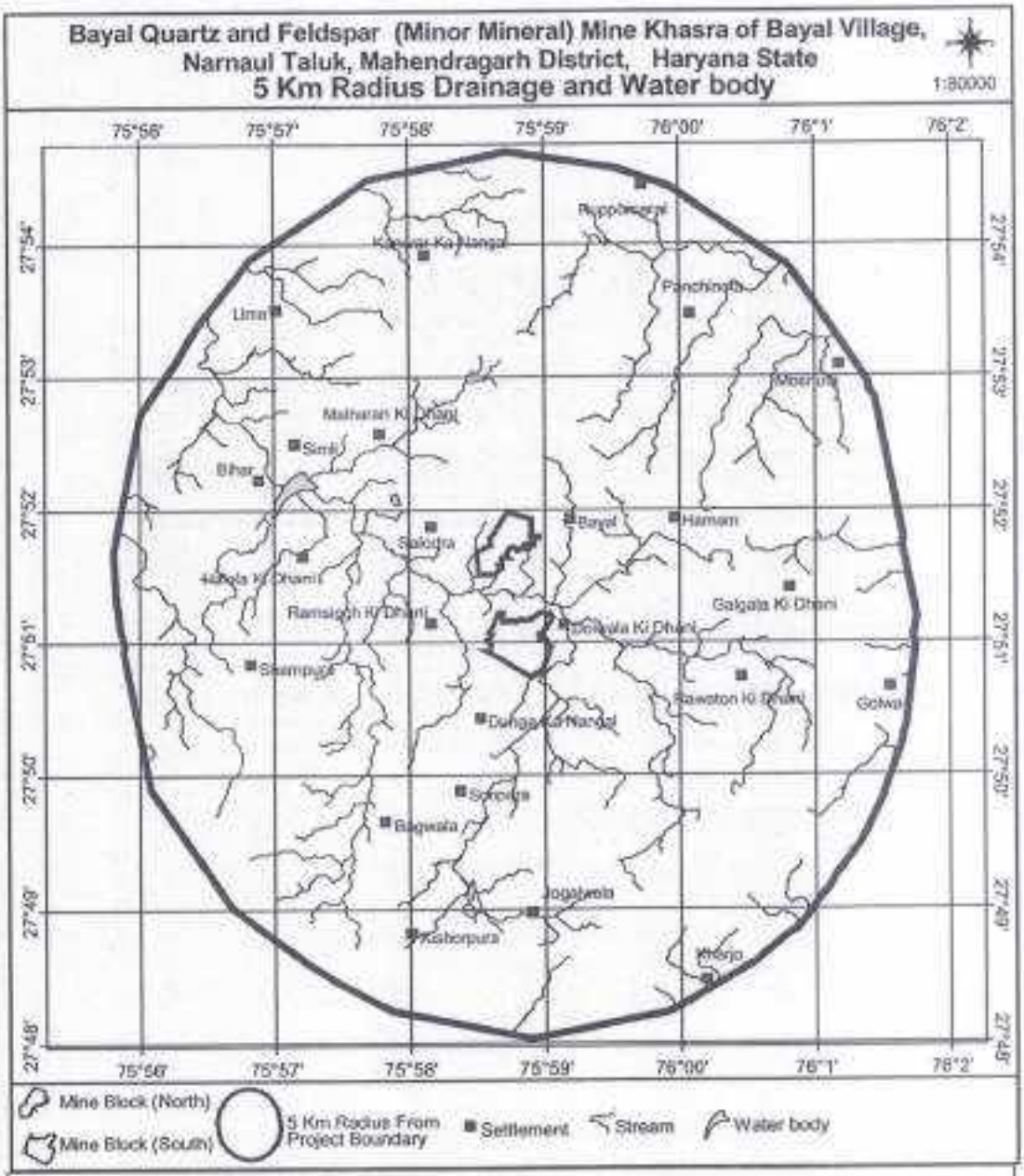


Plate – 4

5 km radius drainage map shows that the streams are dendritic to sub-dendritic. The rivers are seasonal. A stream bisecting the two mine blocks. The mining activity has not affected the flow of water during the monsoon seasons.

1.7 Climate and Rainfall

The climate of Mahendragarh District can be classified as tropical steppe, semi-arid and hot which is mainly dry with very hot summer and cold winter except during monsoon season when moist air of oceanic origin penetrates into the district. There are four seasons in a year. The hot weather season starts from mid March to last week of the June followed by the south- west monsoon which lasts up to September. The transition period from September to October forms the post-monsoon season. The winter season starts late in November and remains up to first week of March.

The normal annual rainfall of the District is 500 mm which is unevenly distributed over the area 26 days. The south west monsoon sets in from last week of June and withdraws in end of September, contributed about 84% of annual rainfall. July and August are the wettest months. Rest 16% rainfall is received during non-monsoon period in the wake of western disturbances and thunder storms. Generally rainfall in the district increases from southwest to northeast.

The Monthly rainfall data for the period 2013 -18 for Mahendragarh District collected from IMD is presented below.

From the rainfall data it is inferred that the study area is one of the poor rainfall area / rain shadow region of Haryana State.

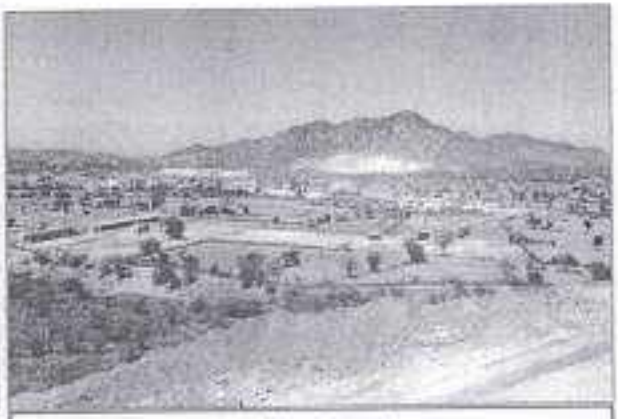
Rainfall Data

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	Total
2013	25	68	0	0	0	23.4	91.1	157	41.6	0.1	1	0	407.7
2014	0	13	23.2	23	8.9	56	54.1	39.9	49.8	23.8	0	1.8	293.6
2015	9.8	0	57.9	23.4	0.3	40.7	76.1	43.9	14.4	7.2	0	0	273.7
2016	0	0	9	0	37.9	49.9	157	131	2.2	0	0	0	386.4
2017	17.2	0	3.3	8	33.5	147	73	58.9	35.9	0	0	1.6	378.8
2018	7.8	2.3	50.6	24.3	1.1	42.2	76.9	44.6	16.2	7.8	0	1.1	274.9
Average	**10.0**	**13.9**	**24.0**	**13.1**	**13.6**	**59.9**	**88.0**	**79.2**	**26.7**	**6.5**	**0.2**	**0.8**	**335.85**

1.8 Land use Pattern

The land use in the village reflects the socio-economic conditions of the people in addition to the natural environmental factors. The land use is also one of the prime parameters to be considered for the ground water estimation. Primarily, 5 Km radius from the mine blocks form part of scrub forest. The second major land use is land with or without scrub. The crop land occupies less area in the plains. Rain fed agriculture is observed in the area. During the site visit, it has been observed that most of the area is not irrigated and left as fallow land. Very less area is irrigated by ground water as the ground water availability is poor. River or tank based irrigation systems have not been observed in the area.

Land with Scrub



Fallow Land

Barren Land

Scrub Forest

1.8.1 Land Use of Mines area

S.No	Type of Land Use	Area in Ha
1	Quarry Area	0.085
2	Infrastructure (Road . material handling / stock yard)	0.00
3	Road	1.50
4	Agriculture	0.00
5	Plantation	0.00
6	Water body	0.00
7	Habitation	0.00
8	Undisturbed Land	75.165
9	OB Dump	0.00
Total		**76.75**

After all the statuary clearance, mining operations is underway and the present land use has changed in the mine lease area.

1.9 Geology

The regional stratigraphic sequence of Mahendragarh District and southern part of Haryana State is as follows:

Delhi System	Ajabharh Series	Biotitic Schist, phyllites, Quartzites
		Biotitic Schist, phyllites, Qquartzites,
		Impure limestone, & Claciphyres
	Alwar Series	Dolomite, Quartizite, Arkoses
		Conglomerates and mica schist with bedded Lavas
	Railo Series	Railo limestone and marble, Railo Quartzites.

Out of the above sequence of formations, Quartzite associated with vein of Quartz and Feldspar belongs to Alwar series of Delhi System are exposed in the study area.

1.9.1 Geology of the Study Area

The study area including the mine lease area comprises of Alluvium (Top soil), Quartz mixed with Quartzite, Feldspar mixed with Quartzite, Amphibolites and Micaceous phyllite with quartize of Delhi Super group.

No soil exposure is observed on the top of the hill ie., in the mine lease area. However, in the foot hills reddish brown soil extends from 0.5m to 2.0m. The quartz and Feldspar beneath the soil cover.

The strike of the quartzite formation varies from N20-250 E to S 200-250 west dip of 65 to 70 southeast. The ground water movement takes place along the strike of the formation.

The geological formation of as per Geological Survey of India (GSI) is as follows:

Geological Notation as per GSI	Geological Formation
Pt12dabp4	Massive Quartzite
oPt2i49	Amphibolite / Meta – Basic Rock
Quq7	Quaternary, fine sand silt and clay
yPt3di1	Acid / Basic Intrusive

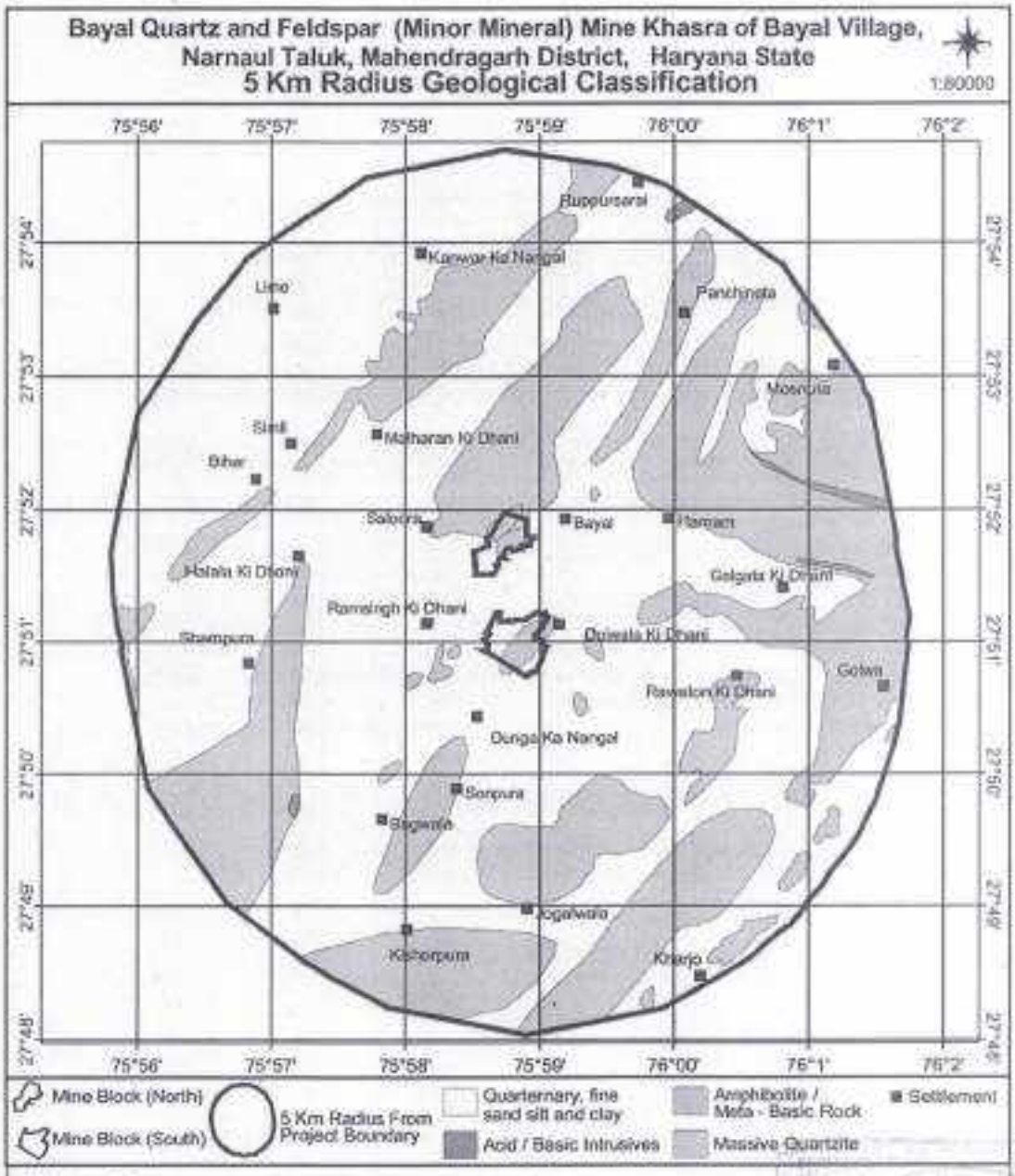


Plate – 5

The geology map obtained from Geological Survey India (GSI) for 5 km radius area depicts that most of the area is composed of Massive Quartzite. No Minor fractures exist in Quartzite and infiltration of rain water in quartzite is poor.

1.10 Geomorphology and Structure

The land forms / geomorphic units and structures such as fractures, fissures and faults have been interpreted from the recent satellite image. All the landform / geomorphic units and structures occurring in the study area are mapped.

The geomorphology and structures of the area play a vital role in identifying the ground water potential zones. The following geomorphic units have been interpreted.

1. Pediment - Denudational Origin
2. Highly Dissected Hills - Denudational Origin

The Pediment is poor respect of ground water occurrence and movement. The Mine is located in highly dissected hills.

Apart from the above there are numerous fractures occur in and around the project site. The fractures are the good ground water conduit. High yielding bore wells / open wells are expected in the intersection of fractures. Within 1 km radius from the Mine boundary, there are fracture systems. However, the fractures are deep seated which is confirmed by geophysical survey results and bore well drilling results. The bore wells located in and around the mines area exhibits deep seated fractures.

The Satellite Imagery, and the Geomorphology and structure maps are presented in Plate 6 &7:

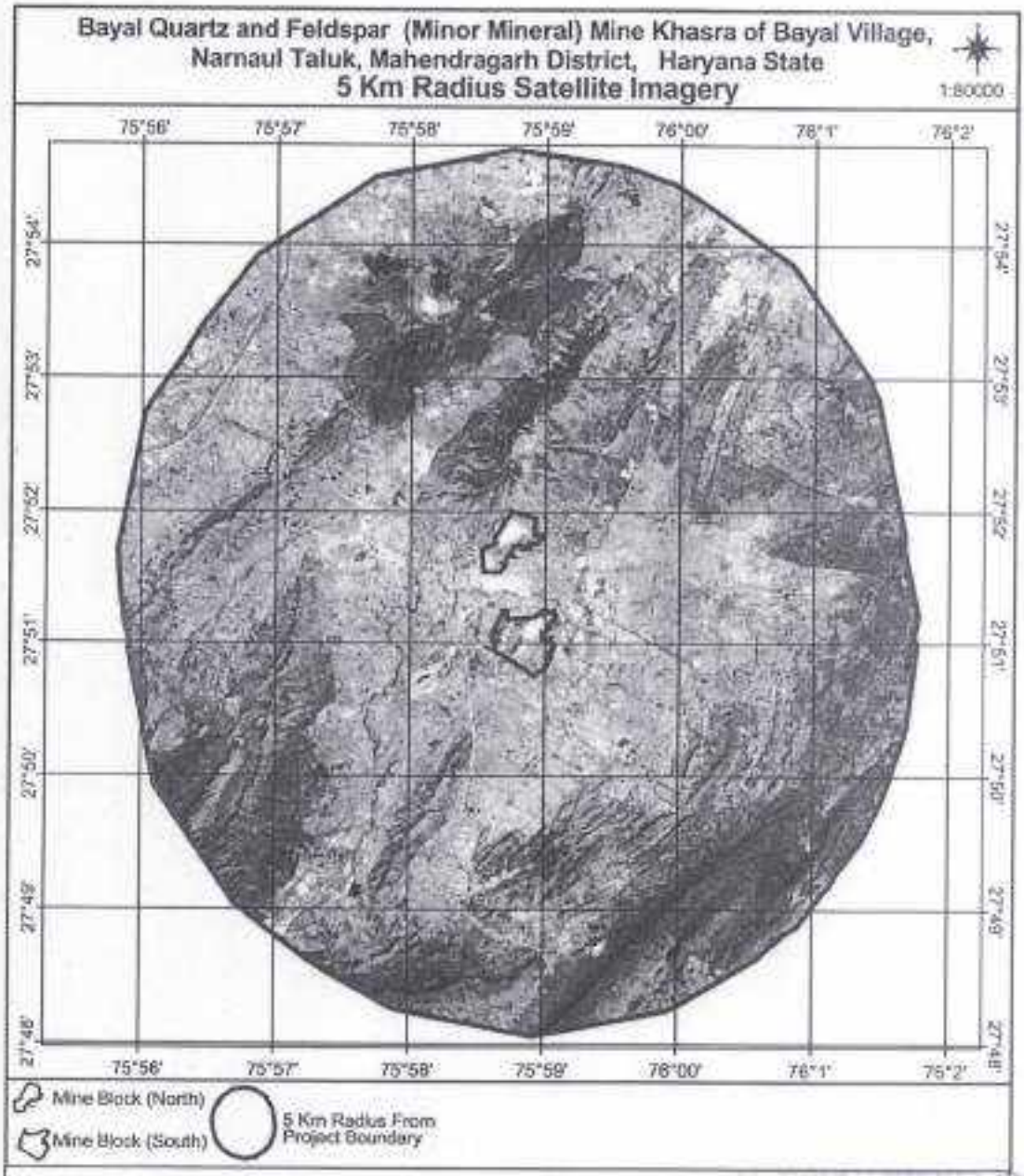


Plate – 6

The recent Satellite imagery (April-2019) shows different land use pattern surrounding the mines area. Imagery also exhibits the structural disturbances and the orientation of hills within the study area.

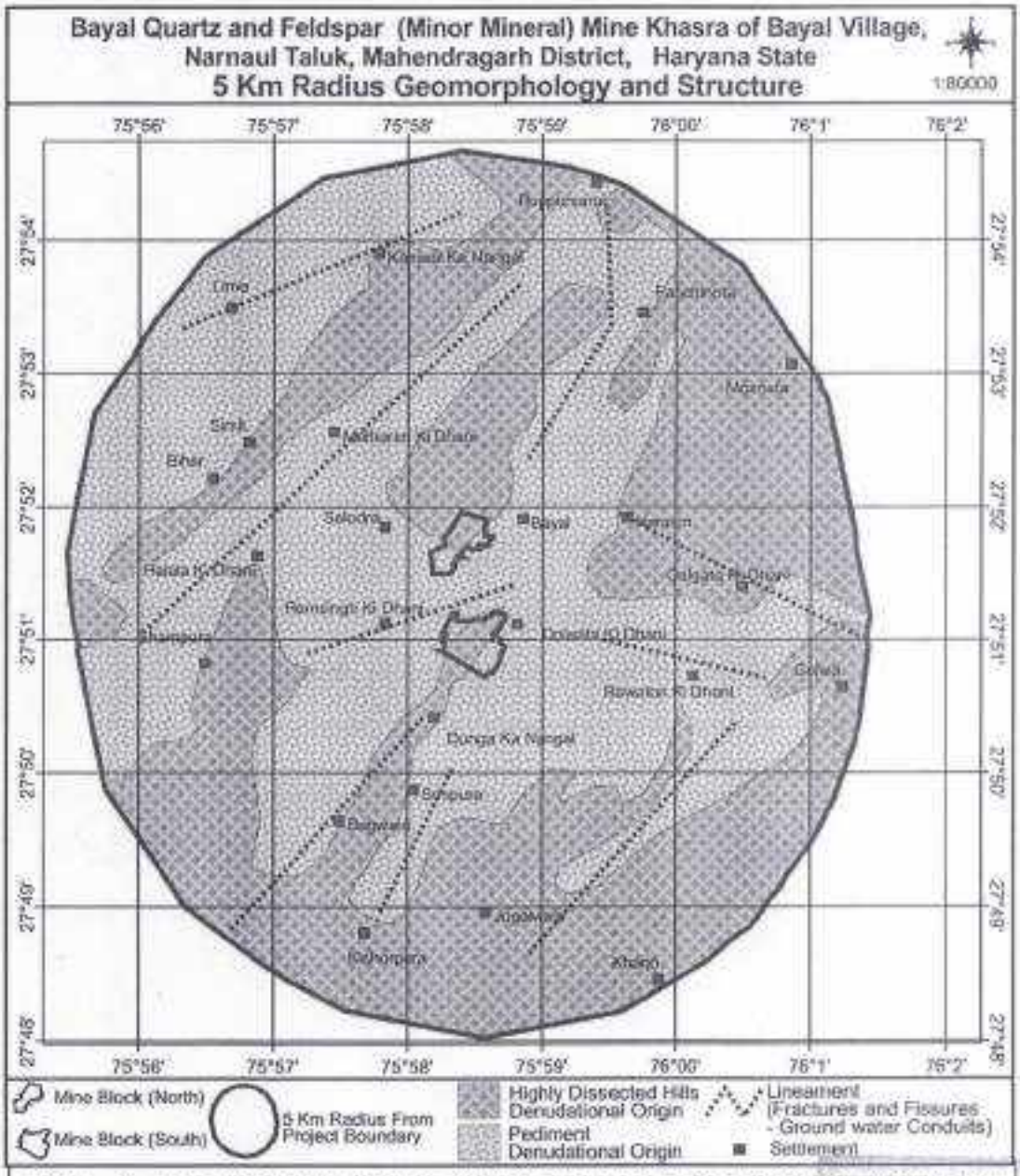


Plate – 6- The geomorphic features and the structures such as fractures, fissures are interpreted using satellite imagery. The entire 5 km radius area covered by 2 geomorphic units such as highly dissected hills and pediment. Both the geomorphic units are mostly acts as runoff zone. The occurrence and movement of ground water is controlled by the fractures and fissures.

1.11 Regional Hydrogeology

The Study area is underlain by alluvium and Hard formations,. In hard rock area the depth of bore holes ranges between 70 to 200 m and the water bearing zones in weathered fractured quartzite and limestone were tapped. The discharge of tube wells varies between 100 to 1000 lpm (Liters per Minutes) with 8m to 20m draw down in lime stone aquifers whereas, in other hard rock aquifers the yield varies between 30-300 lpm.

The generalized aquifer parameters of geological formations of District have been estimated by the State ground water government department is given below:

Formation	Transmissivity (T) m^2/day
Sedimentary (Alluvium)	90-300
Hard rock	20-70

The study area forms part of hard compact formation. The occurrence and movement of ground water in this area is controlled by fractures and fissures.

1.11.1 Hydrogeology of the Study Area

The ground water levels have been observed in the study area during the study period of April 2016 (During Field visit 02 - 03 April 2019). Ground water level has been observed in 7 bore wells in the study area. During the ground water level observation / measurement, the locations of the wells were captured using Trimble Global Positioning System (GPS). Using the GPS data, the location were marked on the map.

The bore well depth varies between 130 -330 m and the static water level is around 86-96 m below ground level. It is also observed the spring depth (Depth at which the ground water encounters) is around 110 – 160 m. from the legacy data. The yield of deeper fractures in and around mine area is relatively high. It is very clear that the deeper fracture system (blow 120 m) is very active

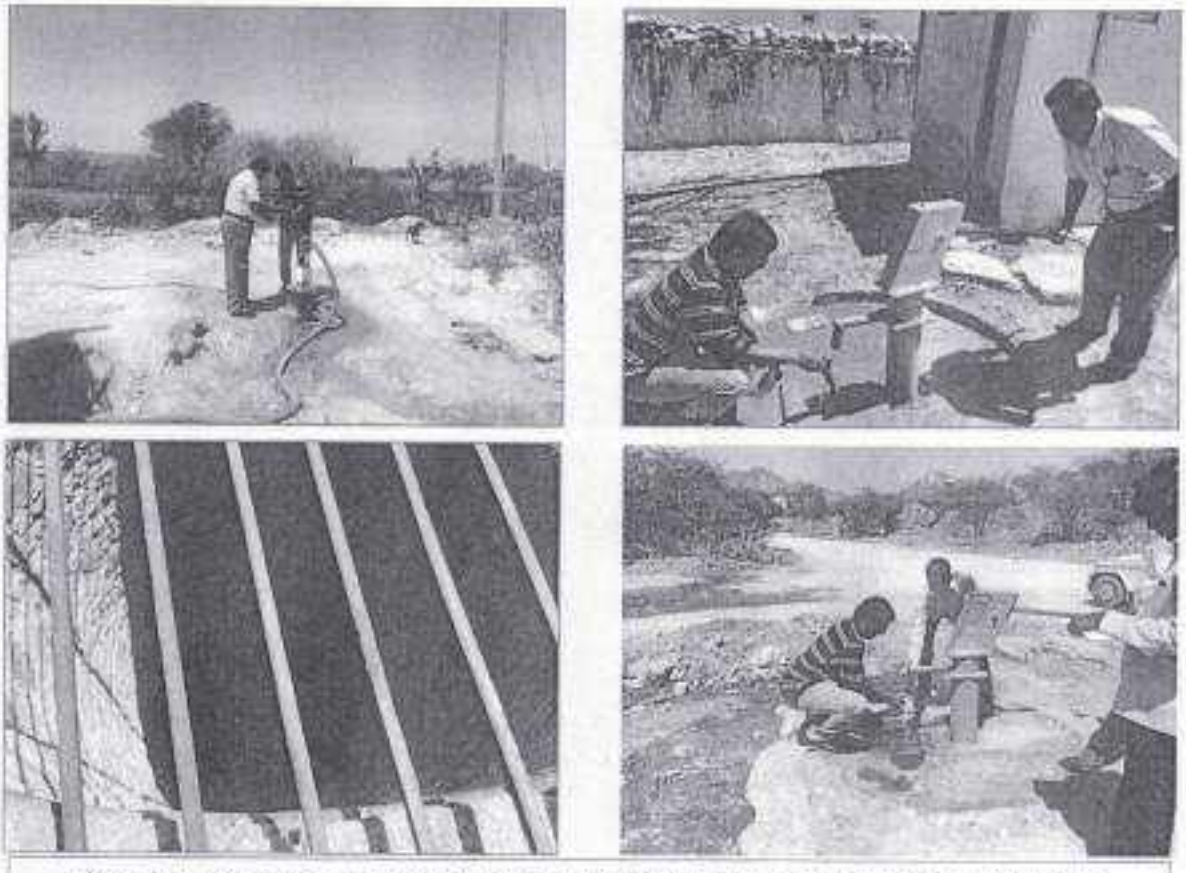
Based on the ground water level data, ground water level zones and ground water table (Ground water table = Mean Sea Level – water level below ground level) have been developed and presented below. From the ground water level zone map it is clear that moderately deepest water level zone of 95.5 - 96.0 m is observed in the central part of the study area (in and around the mine) and it is also noticed that relatively, Moderately shallow water level zones occupied surrounding the mines area.

During the study period, it is observed that the Mine area falls in 95.5-96.0 m ground water level zones. The area is tectonically highly disturbed zone; hence the behavior of ground water movement is highly disturbed. During the drilling of bore well the spring stuck below 110 - 160 m. After drilling, the static water level raises to 86-96 m.

No spring is observed above 110 m within 10 km of the mines boundary. The ground water level from the fractured aquifer which is under pressure will rise in the bore well till the pressure in the aquifer water is equal to hydrostatic pressure. The above clearly indicates that the ground water level observed in the bore wells are due to the upward leaky condition of the fractured aquifer from deeper depths. Moderate steep hydraulic gradient is observed in the mine area.

Ground water level observed locations, Depth and Ground water level in m

No	Location	Latitude	Longitude	Depth in m	Static water level in m	Fractured depth (Spring Depth in m)	Yield in liters /minutes
1	Bore well in Southern Block	27° 51' 16.308"	75° 58' 49.613"	330	96	160	350
2	Bore well in Southern Block	27° 51' 13.151"	75° 58' 44.717"	260	92	140	260
3	Open well	27° 51' 11.02"	75° 58' 45.93"	22	22 m Dry		
4	Near Bhagwala Village	27° 49' 10.42"	75° 57' 37.958"	140	86	120	100
5	Raickeen Wala Village	27° 50' 20.069"	75° 58' 26.346"	130	88	110	100
6	Salodra	27° 51' 57.143"	75° 58' 5.308"	130	90	115	80
7	Lima	27° 51' 43.798"	75° 59' 7.951"	140	89	110	90



Photograph showing the ground water and quality measurement during the field visit

1.11.2. Location of Piezometer

In order to monitor the ground water level variations due to the mining activities, 2 Piezometers are recommended (one in the upstream side and another in the down stream side) based on the ground water flow directions – given in Plate - 11. Before drilling the bore wells for piezometers detailed geophysical investigation has to be under taken.

Bayal Quartz and Feldspar (Minor Mineral) Mine Khasra of Bayal Village, Narnaul Taluk, Mahendragarh District, Haryana State
High Resollution Satellite Imagery Showing location of Piezometer 1:15000

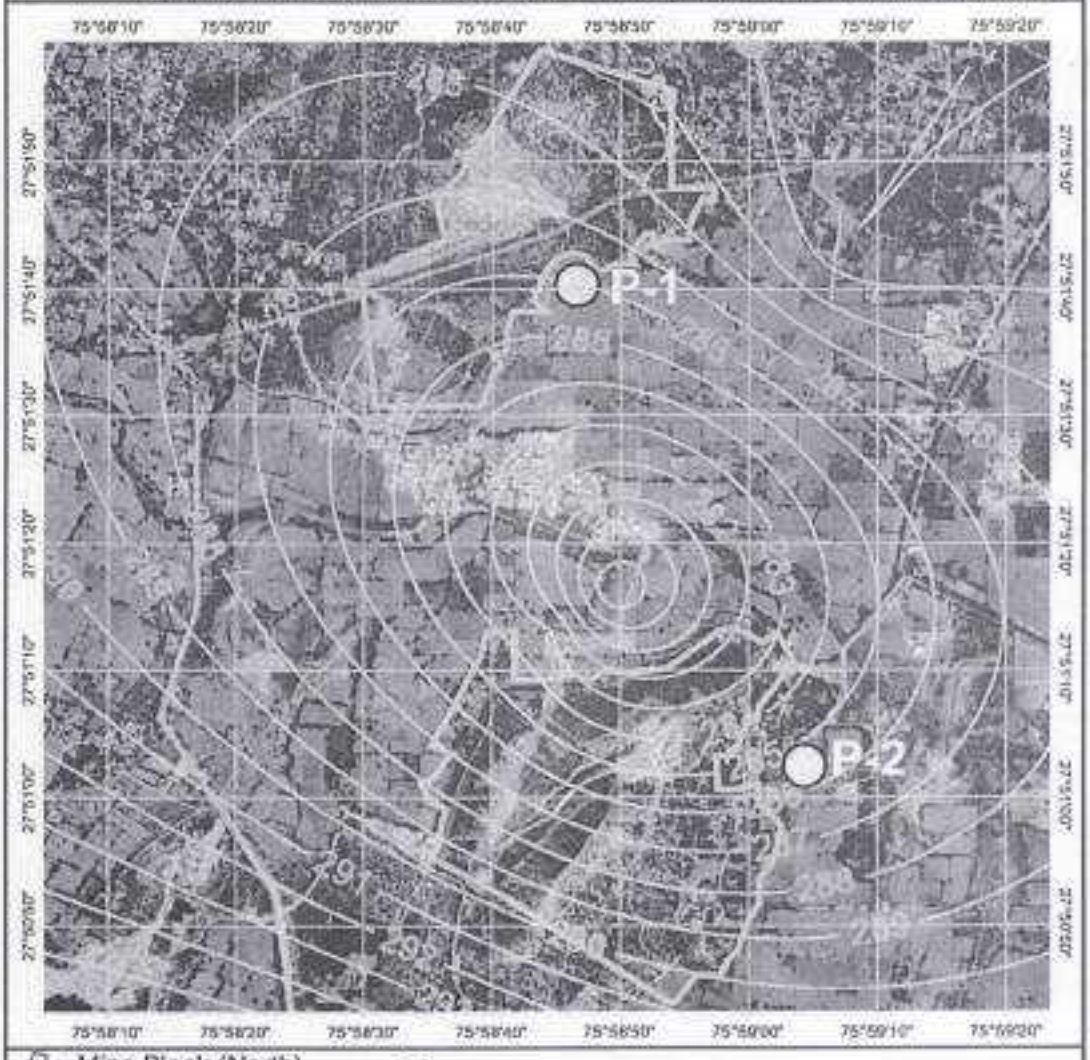


Plate – 11-Location of **Piezometer Latitude and Longitude**

P-1	**Piezometer 1**	**27°51'40.29"N**	**75°58'46.64"E**
P-2	**Piezometer 2**	**27°51'02.46"N**	**75°59'04.43"E**

APPROVED
Deepak Kumar
Team Leader

1.12 Estimation of Ground Water Potential – 5 km around Mines Area

The estimation of ground water potential has been made based on the Ground water Estimation Committee (GEC) norms 2015 of Government of India. The study area has been considered for the estimation of ground water potential. The estimation is made based on the Rain fall infiltration Factor method. The specific yield, infiltration factors have been considered as per the recommendations given by the estimation committee.

The computation of ground water potential estimation as per the estimation committee norms for Rainfall infiltration factor method is as follows:

Monsoon Recharge

Normal Rainfall Recharge – Ri mon = A X If X Rf

Ri_mon = Rainfall recharge during monsoon

A = Area

If = Infiltration factor

Rf = Rainfall

Recharge from other uses – Ro mon = Rc+Rsw+Rgw+Rt+Rwc

Ro mon = Recharge from other uses (infiltration and seepages)

Rc = Canal Seepage

Rsw= Return seepage from surface water irrigation

Rgw= Return seepage from ground water irrigation

Rt = Recharge from Tank

Rwc= Recharge from water conservation Structures

Ground water Draft – Dg mon = Ird+Dd+Id

Dg mon = Gross ground water draft in monsoon season

Ird = Irrigation Draft

Dd = Domestic Draft

Id = Industrial Draft

Non-Monsoon Recharge

Normal Rainfall Recharge – Ri nm = A X If X Rf

Ri_nm = Rainfall recharge during monsoon

A = Area

If = Infiltration factor

Rf = Rainfall

Recharge from other uses – Ro nm = Rc+Rsw+Rgw+Rt+Rwc

Ro nm = Recharge from other uses (infiltration and seepages)

Rc = Canal Seepage

Rsw= Return seepage from surface water irrigation

Rgw= Return seepage from ground water irrigation

Rt = Recharge from Tank

Rwc= Recharge from water conservation Structures

Ground water Draft – Dg nm = Ird+Dd+Id

Dg nm = Gross ground water draft in Non monsoon season

Ird = Irrigation Draft

Dd = Domestic Draft

Id = Industrial Draft

ARGWS-Annual Replenishable Ground Water Resources = **Ri_mon + Ri_nm**

ANDnm-Allocation of Natural Discharge during non-monsoon period= 10%

NAGW-Net Annual Ground Water availability = ARGWS-ANDnm

SGWD-Stage of Ground water Development:

(Dg mon+Dgnm)/NAGWX100

The ground water estimation has been made considering the following:

- Actual monsoon and non-monsoon rainfall data of Mahendragarh Distirct 5 years from the Indian Meteorological Department
- Geological formation based infiltration factor
- Infiltration factor of 2% for silty sand and Quartzite (as per estimation committee norms)
- Streamlet flowing within 5 km radius and its contribution to the ground water system
- Computation of Ground water draft considering crop water requirement
- Norms for return flow from irrigation based on the source of irrigation i.e. ground water or surface water, type of crops and depth to water table below ground level
- Allocation for domestic and industrial water supply based on population density and relative load on ground water
- Deeper aquifer system has not been considered for the ground water estimation

1.12.1. Ground Water Scenario

1. Recharge from rainfall during monsoon season in Ham =	170.35
2. Recharge from other sources during monsoon season in Ham =	126.34
3. Recharge from rainfall during Non-monsoon season in Ham =	32.45
4. Recharge from other sources during Non-monsoon season in Ham =	63.95
5. Total annual ground water recharge =	393.09

6. Natural discharge during non-monsoon in Ham =	39.31
7. Net Ground water availability Ham =	353.78
8 .Existing gross ground water draft for irrigation	165.05
9 Existing ground water draft for domestic water supply Ham =	4.96
10 Existing ground water draft for all uses in Ham	170.01
11 Allocation for domestic requirement up to next 25 years in Ham =	6.45
12.Net ground water availability for further development in Ham =	216.63
13.Stage of ground water development in percentage =	45
Categorization	**Safe**

Source: Estimation based on Field data

The above estimation clearly states that the Categorization of the study area "Safe"

The stage of ground water development is 48%.

1.12.2.Ground Water Estimation – Narnaul Taluk

(As per Estimation Committee Report - 2013)

As per the ground water resource estimation (CGWB Report) the Narnaul Taluk has been categorized as **'SAFE'** Taluk where the stage of ground water development is 49%. The net ground water resource of Narnaul taluk is as follows:

Net Ground Water Availability (ham)	Existing Gross Ground Water Draft for Irrigation (ham)	Existing Gross Ground Water Draft for Domestic and Industrial Water Supply (ham)	Existing Ground Water Draft for All Uses (ham)	Provision for Domestic and Industrial Requirement Supply to Next 25 Years (ham)	Net Ground Water Availability fFor Future Development (ham)	Stage of Ground Water Development (%)
3726	1694	116	1715	108	24	49

The Narnaul Taluk was over exploited during 2011 and it has become safe during 2013

1.13. Water Requirement for the Mines

The Quantity of water requirement for the mine is 50 KLD. The total water requirement is as follows.

Activity	Proposed Ground water Requirement (m^3/day)	Annual Requirement (m^3/year) (340 Days)
Dust Suppression	36	12240
Drinking	2	680
Green Belt / Plantation	10	3400
Domestic	2	680
Grand total	50	17000

Source: Mine Plan

In order to meet the requirement 2 bore well were drilled in the mines area. The bore well depths are 330 and 260 m respectively. The fracture depth of the bore wells are 160 and 140 m. The drilling yield reported as 350 lpm and 260 lpm. To assess the yield of the bore well and under sand the fractured aquifer parameters, pumping test has been conducted during the field visit.

The quality of water (TDS) has been tested in the field using TDSScan and the quality of bore well water found to be within drinking water standards.

CHAPTER

2

2. Evaluation of Aquifer Parameters

Pumping test is the most accurate reliable and commonly used method to evaluate the hydraulic parameters of an aquifer, efficiency of a well / bore well, safer operational rates of pumping and selection of suitable pump. The methods of a pumping test are highly varying in its application. The main objective of pumping test is to determine the aquifer parameters such as Transmissivity (T), Storage Co-efficient (S) Hydraulic Conductivity (K), Well Performance and Safe Yield for execution of water supply.

In order to evaluate the aquifer characteristics, constant discharge test has been conducted in the existing bore well for the pumping test purpose. The draw down and recovery have been observed in the pumping well. The draw down and recovery has been measured.

Pumping Test Methodology

- The constant discharge test has been carried out with the help of tripod and accessories like 5 HP pump and electronic water level indicator etc.,
- During the pumping test, discharge has been measured by volumetric methods and ground water level has been measured using electronic indicator.
- Draw down and recovery have been measured both bore wells and observation wells.

The most important part of the pumping test is measuring the depth of water level at different stages. This could be achieved using the electronic water level indicator. During the initial stage of pumping the frequency of water level measurement should be

at closer time intervals and in the later part of the pumping the frequency may be at larger intervals. The time duration adopted for measuring the water level as follows.

Constant Discharge Test		Recovery Test	
Time since Pumping started (minute)	Time intervals (minute)	Time since Pumping stopped (minute)	Time interval in (minute)
0-10	1	0-20	1
10-20	2	980	After 980 Minutes
20-50	5		

Recovery Test

Recovery test involves measuring the water level rise after pumping is stopped. Recovery rest is used to calculate the transmissivity value of the aquifer as well as to check the results of the draw down data. The duration of recovery test conducted is 20 minutes. (Recovery was again measured after 24 Hours)

Results of the Pumping Test

Depth of Bore Well	330 m
Static Water level	96 m
Pump capacity	5 HP
Discharge in lpm	100 lpm
Time	50 minutes
Drawdown	45 m
Rate of recovery	In 24 Hours 90 % recovery of static water level was attained

Estimation of Safe Yield of the Borewell

In order to estimate the average yield of the bore well the water level recovery data has been used. The calculation is as follows:

$Q = 0.7\ TH/1.281$

Where

Q – Safe Yield cum/day

T – Transmissivity Sq.m/day

H – Available Draw down in m

Optimum yield of the Bore well is **40 m^3/day**

Safe Yield of the bore well worked out to be 40 m^3/day at the rate of 115 lpm discharge for 80 m drawdown for 6 hours of pumping. The total requirement of 50 m^3/day can be met out by the available 2 bore wells.

The pumping test reveals that the drawdown was very drastic initially (25 m in 15 min) subsequently the draw down was low. The above shows that initial draw down due to the stored water discharge not from the aquifer. Later part of draw down indicates that the discharge is from the fractured aquifer.

CHAPTER

3

3. Prediction of Ground Water Inflow in to the Mines

In general the digging of any Mine below the ground water yielding zone will create lowering of water table in the surrounding area due to the development of cone of depression. The Radius of Influence depends on the depth of the water table and the quantum of dewatering of the Mines.

Year wise Mine Production and development Plant:

S.No	Year	Depth from in m RL	Depth to in mRL	Depth in m
1	Year 1	471	444	27
2	Year 2	444	426	18
3	Year 3	426	417	9
4	Year 4	417	408	9
5	Year 5	408	399	9
Total				72

It is proposed to mine to a depth of 72 m below RL of 471m. At the end of 5 years period the mined RL would be around 399 m. The calculated reserves are as follows:

Quartz	Up to 355 mRL
Feldspar	Up to 340 mRL

The Total estimated depth of reserved is **131 m below RL of 471m.**

In order to mine the total reserved of Quartz and Feldspar (up to 340mRL / MSL) the ground water inflow assessment has been made based on the data collected from State and Central Government Department and field observations made during the site visit.

Static Water level

Static water level refers to the level of water in a well under normal, undisturbed, no-pumping conditions. Static water level is best determined when the well has not been pumped for several hours prior to measuring.

Piezometric level

Thus, 'Piezometric level' is an imaginary position to which the water level will rise in a borewell tapping a confined / Fractured aquifer. Piezometric level in two dimensions is called 'piezometric surface'.

Ground water inflow depth:

Normally, the ground water inflow depth for the mining projects, the static water level and the piezometric level of the well in the surrounding area are not considered. The water struck depth (first spring depth) of the bore wells are considered for the calculation of ground water inflow in to the mine pit.

The drilling logs of the bore wells will depict the exact depth of the spring depth in the bore wells located in the fractured aquifer (Hard rock).

In the mine pit, the water collected due to the surface runoff from rainfall and the seepage water from the dump may not be considered as ground water. The above water is considered as storage water / accumulated water (during pumping the water in the mine pit may have no connectivity with the regional aquifer of the area). No cone of depression may develop around the mine pit.

On the contrary, the mine pit excavated beyond the fracture depth (which yields water to the bore wells) the ground water inflow occurs.

Ground water Scenario in and around the Mines:

During the Field Visit, the open well and bore well in and around the mines area has been studied. The details area are as follows:

No	Location	Latitude	Longitude	MSL In m	Depth in m	Diameter in mm	Static water level in m	Fractured depth (Spring Depth in m)	Yield in liters /minutes
1	Bore well in Southern Block	27° 51' 16.308"	75° 58' 49.613"	374	330	200	96	160	350
2	Bore well in Southern Block	27° 51' 13.151"	75° 58' 44.717"	375	260	200	92	140	260
3	Open well	27° 51' 11.02"	75° 58' 45.93"	376	22	6 m	22 m Dry		
4	Near Bhagwala Village	27° 49' 10.42"	75° 57' 37.958"	402	140	150	86	120	100
5	Raickeen Wala Village	27° 50' 20.069"	75° 58' 26.346"	390	130	150	88	110	100
6	Salodra	27° 51' 57.143"	75° 58' 5.308"	379	130	150	90	115	80
7	Lima	27° 51' 43.798"	75° 59' 7.951"	380	140	150	89	110	90

From the above, it is clear that the bore well depth varies between 130-330 m and the static water level is around 86-96 m below ground level. It is also observed the spring depth (Depth at which the ground water encounters) is around 110 – 160 m. The yield of deeper fractures in and around mine area is relatively high. It is very clear that the deeper fracture system (blow 120 m) is very active.

The analysis of the data collected during field visit reveals that the inflow of ground water in to the mines would be below 80 m from the ground level. The below table shows the depth to water level above mean sea level in m (AMSL) and depth to spring / fracture above mean sea level in m (AMSL)

The ground water level monitored by Central Ground Water Board (CGWB) has been collected and analysed. Bayal CGWB observation well location is the nearest location to the mine blocks which is about 2 km. The ground water levels of the CGWB observation well for the period of May 2016 and November 2016 was 26.75 m and 18.50 m below ground level respectively. Considering the elevation at Bayal CGWB observation well location, which is 2 km from the mines block, the water table (water table AMSL = MSL-Static water level) at Bayal village would be around 333 m above mean sea level during May 2016 and 346 m amsl during November 2016. Since the study area is heterogeneous, composed of only secondary porosity (no uniform porosity and permeability) the ground water level at the mine site is much deeper than Bayal village. Considering the above and the ground water level at mine site, it is clear that the reserve depth is much above the ground water table. The digital elevation model showing the mines and CGWB observation well is presented in Plate -11

S.No	Location	Latitude	Longitude	MSL In m	Depth to water level in m (AMSL)	Depth to spring / fracture (AMSL)
1	Bore well in Southern Block	27° 51' 16.308"	75° 58' 49.613"	374	278	214
2	Bore well in Southern Block	27° 51' 13.151"	75° 58' 44.717"	375	283	235
3	Near Bhagwala Village	27° 49' 10.42"	75° 57' 37.958"	402	316	282
4	Raickeen Wala Village	27° 50' 20.069"	75° 58' 26.346"	390	302	280
5	Salodra	27° 51' 57.143"	75° 58' 5.308"	379	289	264
6	Lima	27° 51' 43.798"	75° 59' 7.951"	380	291	270

The table above indicates that the mining up to **320 m above mean sea level (AMSL) is safe (However, the reserve depth is estimated up to 340m)** which would not intersect the ground water. Since the mine pit is open, the rainwater and seepage from the mine dump may accumulate in the mine pit which requires pumping. The pumping of stored or accumulated water in the mine pit would not create cone of depression.

Ground water inflow Estimation:

The depletion of shallower deposits has led to a considerable increase in the economic working depth of Open Pit Mining. As a consequence, many Surface Mining operations are now being carried out below the ground water table.

When a Pit penetrates into an aquifer, the significant amount of ground water flow occurs to the Pit. Therefore, the large volume of water must be pumped to provide a dry mining condition.

Recognition of ground water regime in and around the Mine Pit and hydraulic prosperities of layers in the Mine vicinity is important to control water inflows to Mine. To design an effective dewatering system for the Mine Pit, the modeling of water related problems and prediction of water inflow into the Mine Pit is necessary.

The results of such simulations have been used to develop an appropriate water management strategy in order to minimize the operational problems below the water surface and long-term environmental problems, in the feasibility stage of mine design.

When Mining Operations are to be carried out below the water table, Mine operators potentially face with two important water-related problems.

These are the amount and pressure of groundwater that could flow into an Open Pit and the effect of pore water pressure on the stability of an Open Pit are high.

The amount of water inflow into a Mine Pit is very important for development of a Mine-dewatering program. Numerical models can provide a more realistic representation of the interaction between groundwater systems and Mine excavations.

Governing Equation of Inflow Model

The governing partial differential equation for a two dimensional saturated/ unsaturated flow condition can be obtained by coupling the Darcy's law and continuity equation

(Freeze and Cherry, 1979) as given below:

$$\frac{\partial}{\partial x}(K_x \frac{\partial h}{\partial x}) + \frac{\partial}{\partial y}(K_y \frac{\partial h}{\partial y}) = C\frac{\partial}{\partial t}(h) + Q$$

where, K_x and K_y are the hydraulic conductivities in the X and Y directions respectively, Q is the recharge or discharge per unit volume, H is the hydraulic head and t is the time. The hydraulic head is correlated to the volumetric water content (θ) using the following equation:

$$\frac{\partial \theta}{\partial t} = C\frac{\partial h}{\partial t}$$

where C is the slope of the water storage curve.

Prediction of Ground Water Inflow in the Mine

In order to predict the groundwater inflow to a deep Open Pit Mine, two analytical equations were used. The first analytical equation was presented by Vandersluis et al. (1995). This equation is used in arid and semiarid areas where precipitation is generally limited and water inflow to a Pit in an unconfined aquifer is normally controlled by horizontal ground water inflow.

Analytical Equation presented by Vandersluis et al. (1995)

$$Q = \frac{366.1 \times K\,(2H\Delta - h)\Delta h}{\log(R + r) - \log r_o}$$

The second analytical equation quoted in Krusseman and De Ridder (1979) and Singh et al. (1985) is based on well hydraulics and can be used for estimation of steady state inflow rate to an Open Pit Mine. This equation was derived from Thiem-Dupuit equation and can be applied for unconfined aquifer. Analytical Equation presented by Krusseman and De Ridder (1979) and Singh et al. (1985)

$$Q = \frac{\pi K(H^2 - h^2)}{\ln(\frac{R}{r})}$$

The Radius of Influence R is reduced to:

$R = 5755(HK)^{0.5}$

In above equations:

Q = groundwater inflow (m^3/day)

K = permeability of the unconfined aquifer (m/day)

H = potentiometeric surface or initial water table elevation (m)

R = radius of influence (m)

0 = reduced radius of the Open Pit by level (m)

h = potentiometric surface elevation at a specific point (m)

p = radius of the Pit at the desired level (m)

Δh = drawdown at the desired level (m)

The above calculation has been used to evaluate the inflow in to the Mine Pits located in Bayal mines area.

Results

The maximum and minimum static water level in and around the mine pits are 86 and 96 m respectively. The water bearing fractures encountered at depth of 110-160 m. (water struck below 110 m from the fracture systems). The above has been ascertained at the time of drilling of bore well. The same has also been ascertained during the pumping test. Hence upto 110 m from ground level has been considered as non-inflow zone. The inflow for different benches of the Mine Pit has been estimated and results are as follows.

Mine North and South Block– Ground Water Cumulative Inflow

5 years Period

Bench 1-8 (Up to Five Years) - Depth From 471 to 399 m AMSL (RL) (Ground Water Level at 86 m and Water bearing fracture depth 110 m) No Ground water inflow		
$Q=\frac{\pi K(H^2-h^2)}{\ln(\frac{R}{r_p})}$		**Cumulative Inflow into the Mine (m^3/day)**
T = Transmissivity of the Aquifer (m^2/day)	0	0
K =Permeability of the Unconfined Aquifer (m/s)	0	
H = Potentiometric surface or Initial Water Table Elevation (m)	0	
R = Radius of Influence (m)		
h = Potentiometric Surface Elevation at a Specific Point (m)	0	
rp = Radius of the Pit at the Desired Level (Sq.m)	0	
Q = Ground Water Inflow (m^3/day)	**0**	
Estimation of inflow up to the reserved depth of 340 m		
399 – 340 m AMSL (RL) No ground water inflow		
T = Transmissivity of the Aquifer (m^2/day)	0	0
K =Permeability of the Unconfined Aquifer (m/s)	0	
H = Potentiometric surface or Initial Water Table Elevation (m)	0	
R = Radius of Influence (m)		
h = Potentiometric Surface Elevation at a Specific Point (m)	0	
rp = Radius of the Pit at the Desired Level (Sq.m)	0	
Q = Ground Water Inflow (m^3/day)	**0**	

340-320 m AMSL (RL) Ground water inflow expected at 320 m		
T = Transmissivity of the Aquifer (m^2/day)	0.6	948
K =Permeability of the Unconfined Aquifer (m/s)	0.00000069	
H = Potentiometric surface or Initial Water Table Elevation (m)	320	
R = Radius of Influence (m)	1200	
h = Potentiometric Surface Elevation at a Specific Point (m)	310	
rp = Radius of the Pit at the Desired Level (Sq.m)	343	
Q = Ground Water Inflow (m^3/day)	**948**	

Ground Water Cumulative Inflow

Description	Ground water inflow (m^3/day)	Cumulative Inflow into the Mine (m^3/day)
Bench 1-8 (Up to Five Years) - Depth From 471 to 399 m AMSL (RL) (Ground Water Level at 86 m and Water bearing fracture depth 110 m) No Ground water inflow	Nil	Nil
Estimation of inflow up to the reserved depth of 340 m. 399 – 340 m AMSL (RL) No ground water inflow	Nil	Nil
340-320 m AMSL (RS) Ground water inflow expected at 320 m	948	948

The 5 years mines workable depth is 399 m RL. The ground water level and fractured depth data indicate that there is no ground water inflow in the mine pit.

From the analysis it is clear that mining up to 320 m above mean sea level (AMSL) is safe (However, the reserve depth is estimated up to 340m) which would not intersect the ground water. Since the mine pit is open, the rainwater and seepage from the mine dump may accumulate in the mine pit which requires pumping. The pumping of stored or accumulated water in the mine pit would not create cone of depression. Below 320m RL ground water inflow is expected from the fracture system. Hence, it is advisable that the mining operations may be restricted up to the depth of 340 m RL.

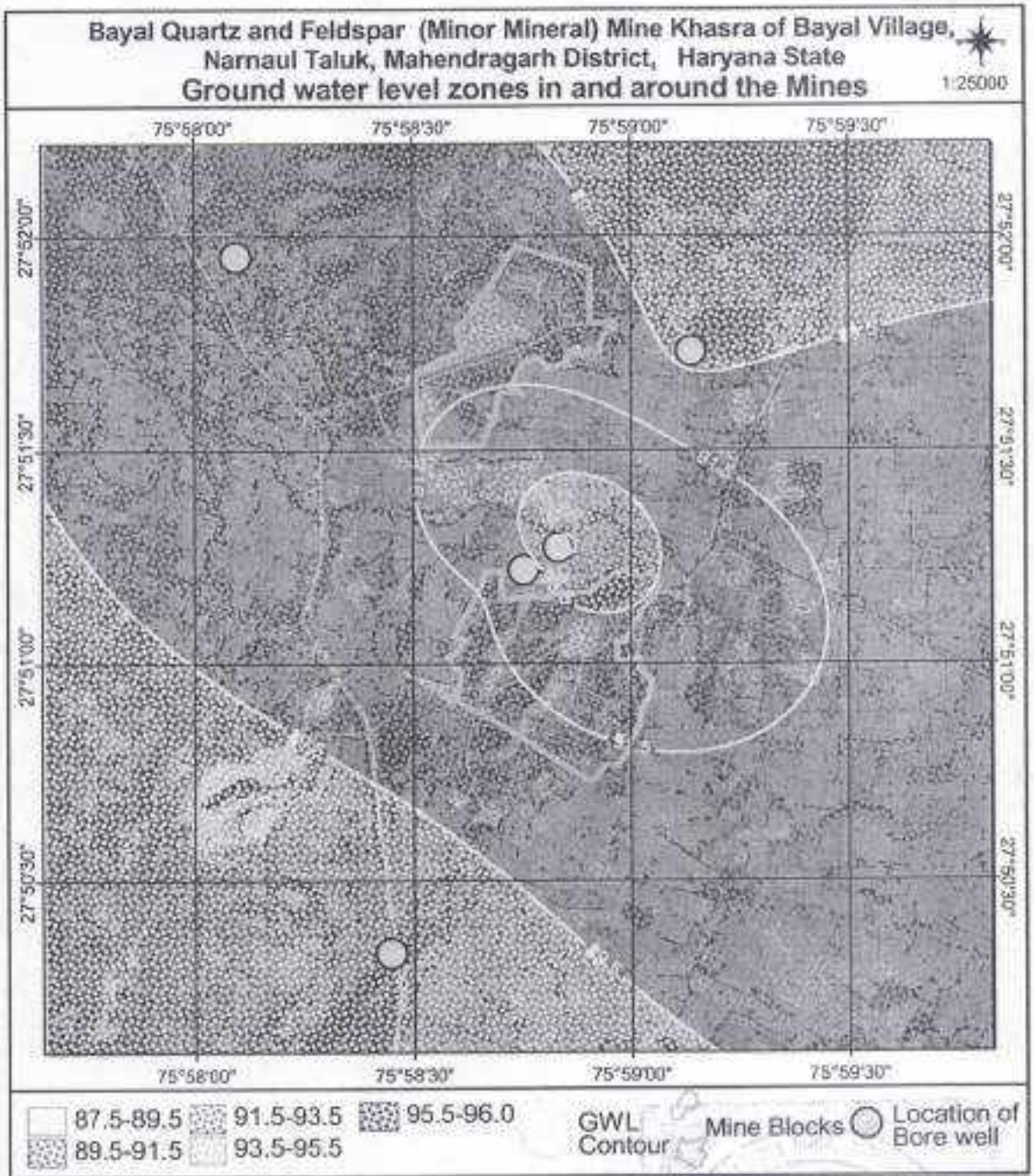


Plate – 8 The above spatial distribution of ground water level zones depicts that the mines area falls in the ground water level zones of 89.5 to 96.0. The mining operations are taking place in the relatively elevated area.

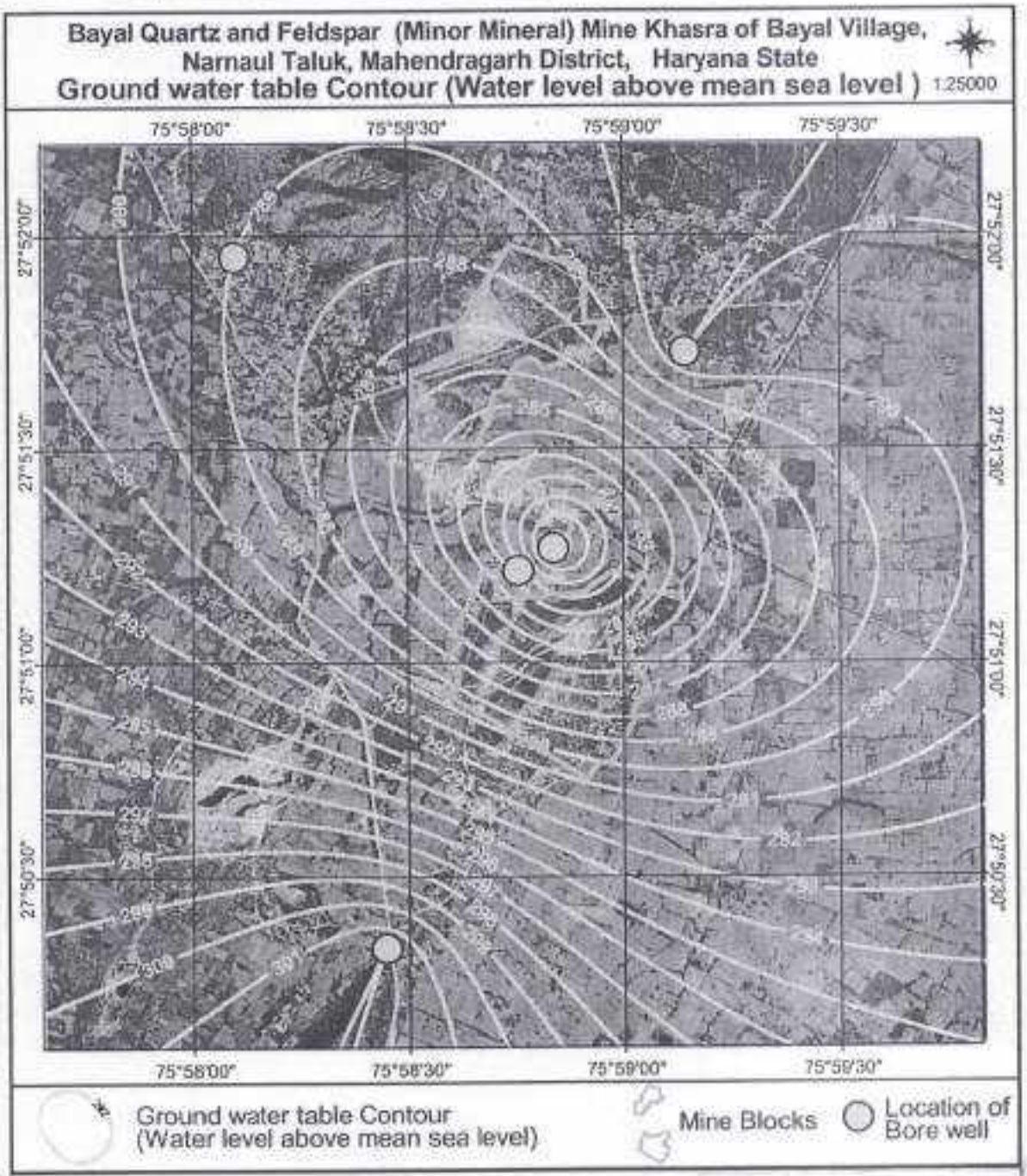


Plate –9 The above contour map shows the ground water table zone (Ground water level above mean sea level). In the mines area the average ground water table is around 320 m amsl (RL). The estimated reserve depth is around 340 m amls (RL). Hence the ground water table is much below ie., 20m below the mine reserve.

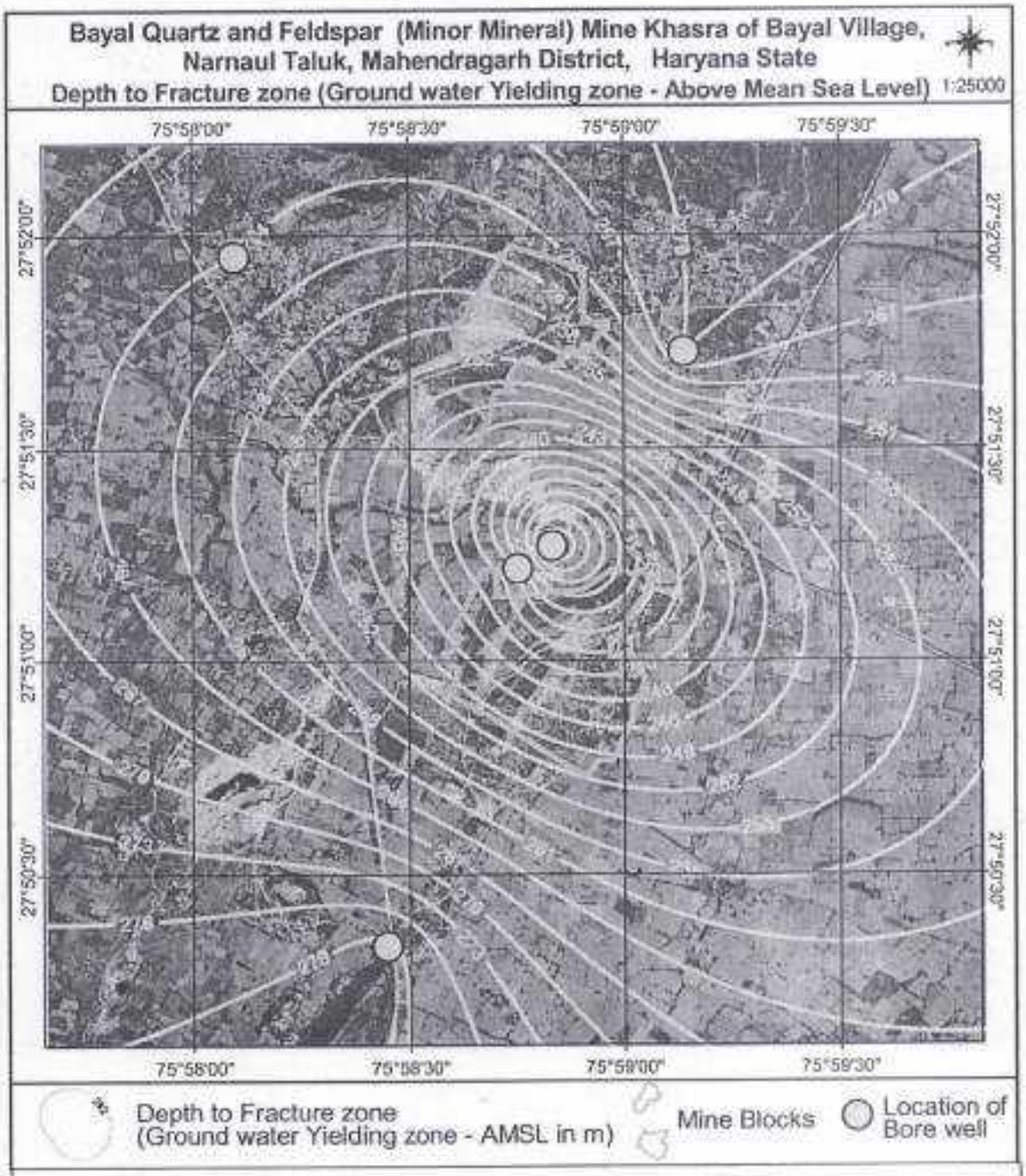


Plate – 10 The depth to fracture zone (Ground water yielding zone) above mean sea level contour has been constructed. The above contour map shows the fracture depth ie., ground water yielding zone. In the mines area the average fracture depth is around 250 m amsl (RL). The estimated reserve depth is around 340 m amsl (RL). The water yielding zone is much below the estimated reserve.

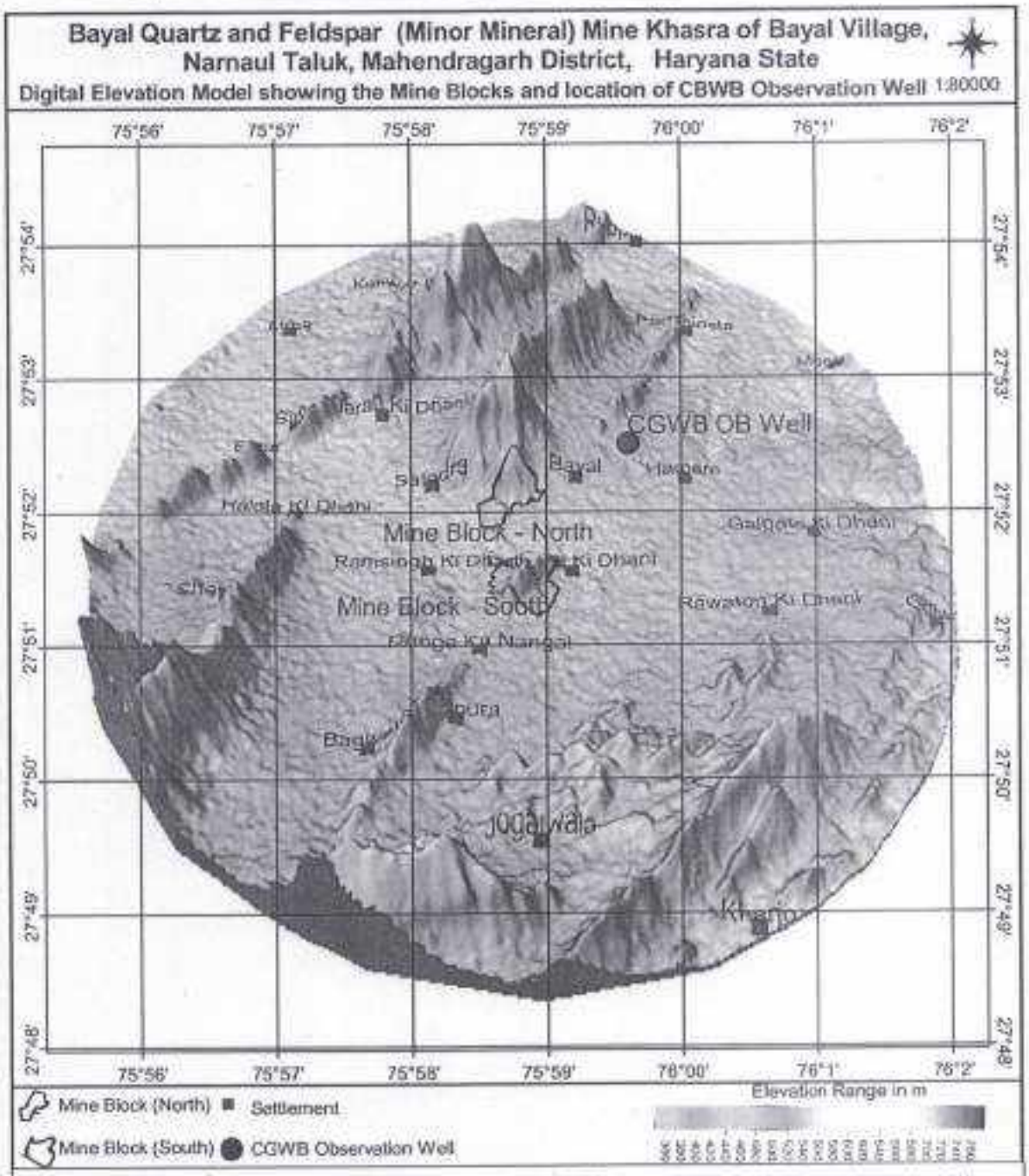


Plate – 11 The Digital Elevation Model derived from Carto-DEM showing the Mines location and the CGWB Observation locations. It is clear that the mines and observation wells located 2 km apart and the mines are located relatively located at higher altitude.

The above interpretation and analysis of primary and secondary data clearly reveals the following:

1) Mine blocks are located in the hilly area
2) The ground water level is much deeper in the plains and no inflow of ground water observed in the excavated mine pits (36 m from the hill top)
3) Considering the ground water table and the depth to fracture depth (water yielding zone) the reserve depth is much above.
4) Hence mining up the total reserve depth of 340m RL may not intersect the ground water table.
5) However, the rainfall storage in the excavated mine pit and the seepage from the mine dump has to be dewatered for the smooth operation of mining activity.
6) The dewatering operation of the dead storage (storage due to rainfall over the mine pit and seepage mine dump) may not develop cone of depressions which may not affect the ground water in the nearby drinking and irrigation wells.

CHAPTER

4

4. Ground Water Recharge Measures around the Mines

The Ground water assessment studies around 5 km radius zone reveals that the area is safe as per estimation committee norms. The mine area is located in the safe Taluk. In order to protect the ground water of the study area, artificial recharge measures in and around the Mine has to be taken up. This would ameliorate the ground water levels of the area and also to prevent over exploitation.

Watershed based runoff has been estimated covering the mines area. Based on the normal rainfall the quantity of runoff generated using Soil Conservation Services (SCS) Method.

Watershed has been delineated using the Carto-DEM data and the estimation has been made. Based on the availability of runoff water artificial recharge structures have been suggested.

The area of watershed is 30.85 Sq.km. Based on the land use and the soil characteristics, the estimated CN value is 80. The month wise runoff for the period from 2013 to 2018 has been estimated and presented in the table below:

The watershed map is presented in Plate - 12

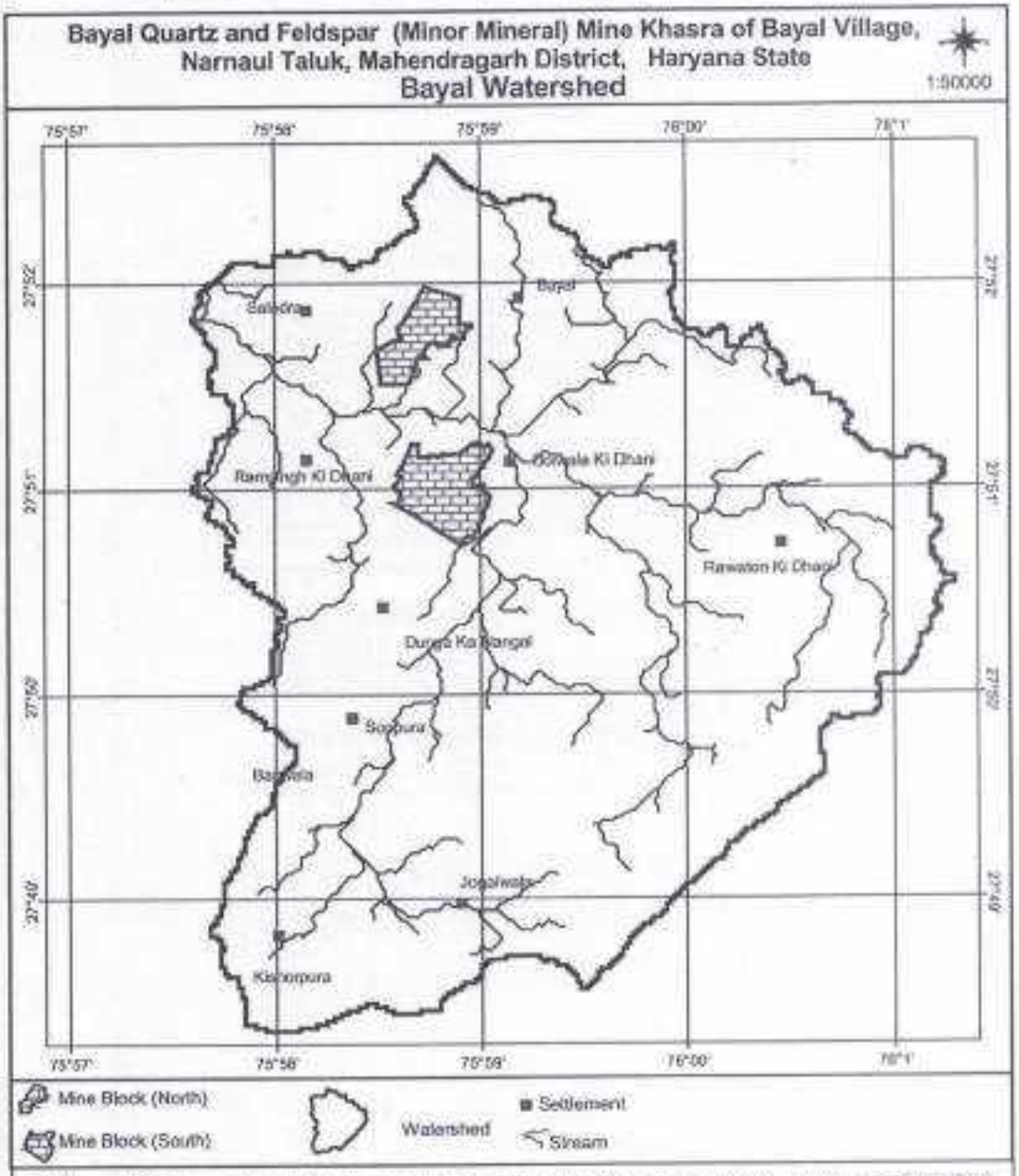


Plate – 12 shows the Bayal watershed covering *the mine blocks. The streams flow towards north west.*

Bayal Watershed						
Area of watershed Sq.km				CN		
30.85				80		
Month	Runoff in MCM					
	2013	2014	2015	2016	2017	2018
January	0.06	0	0.00	0	0.01	0.01
February	0.80	0.00	0	0	0	0.06
March	0	0.05	0.58	0.01	0.05	0.44
April	0	0.04	0.05	0	0.01	0.06
May	0	0.01	0.09	0.22	0.16	0.08
June	0.05	0.54	0.26	0.42	2.82	0.29
July	1.34	0.50	0.98	3.08	0.91	1.00
August	3.10	0.25	0.32	2.37	0.60	0.33
September	0.28	0.42	0.00	0.06	0.19	0.01
October	0.10	0.05	0.02	0	0	0.01
November	0.08	0	0	0	0	0
December	0	0.07	0	0	0.07	0.08
Total	**5.80**	**1.94**	**2.30**	**6.17**	**4.82**	**2.36**

From the above table it is clear that there is considerable quantity of runoff is available. The runoff water can very well be harvested within the watershed area. Based on the runoff, in 3 locations, check dam with recharge bore wells have been suggested. As corporate social responsibility, the corporate may create the recharge structures.

The location of recharge structures marked on the map and the same is presented in Plate – 13

The Schematic diagram of Check dam and the recharge bore well is presented as annexure

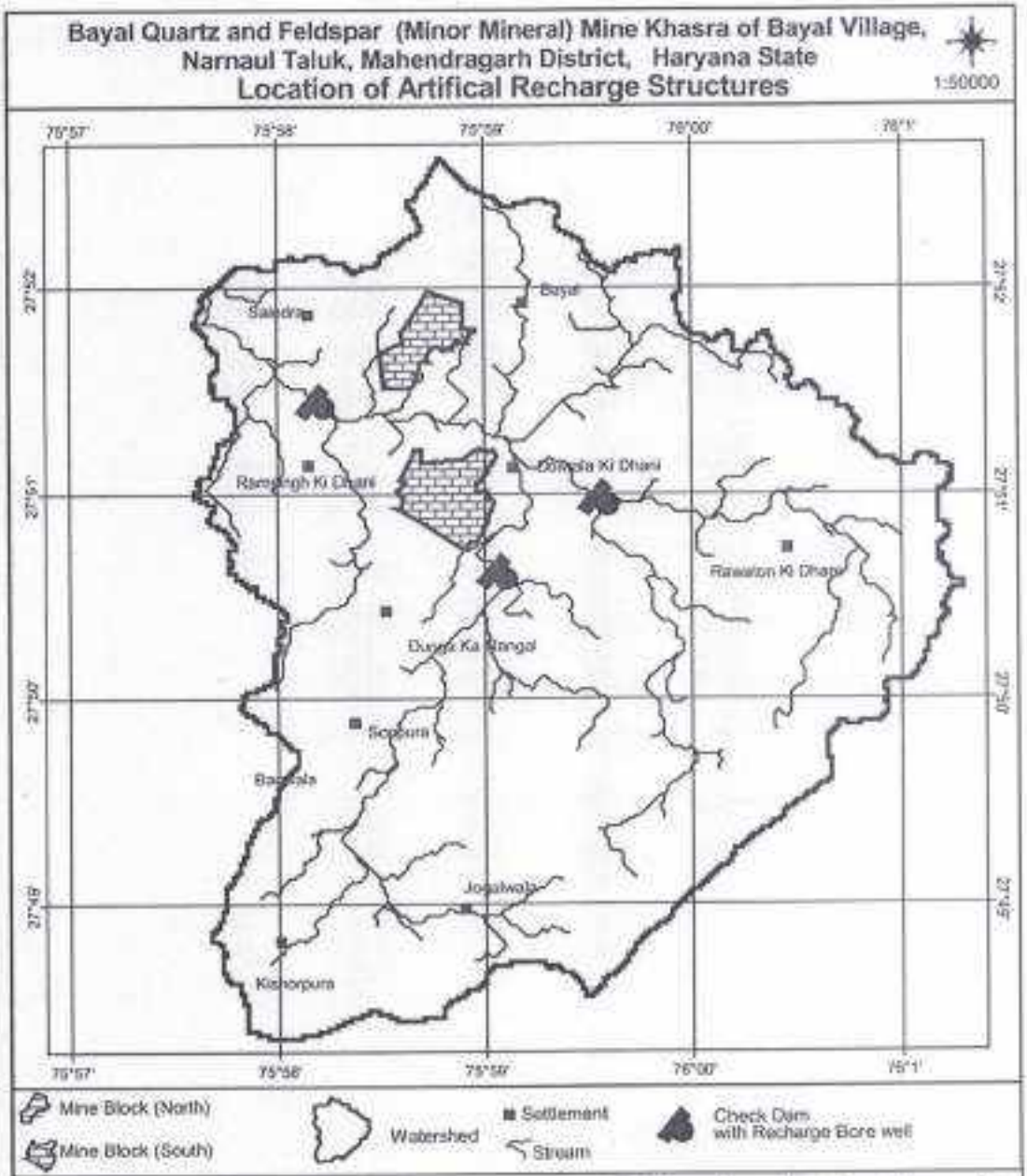
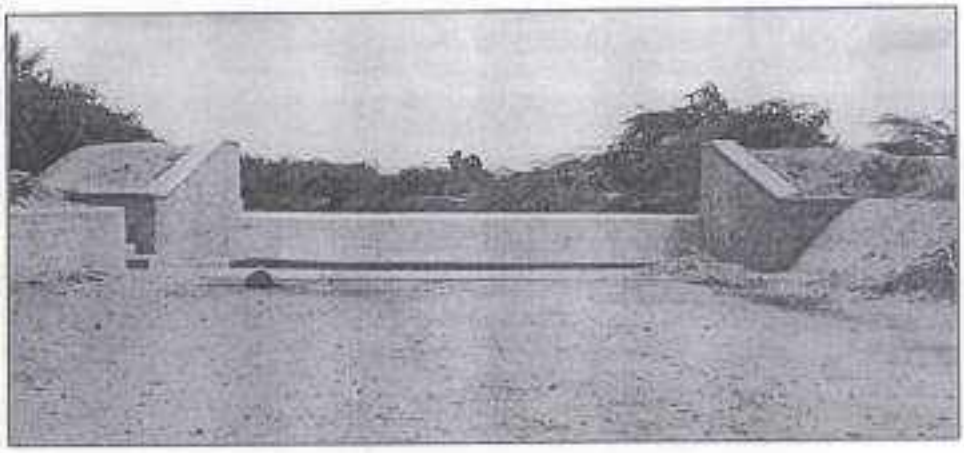
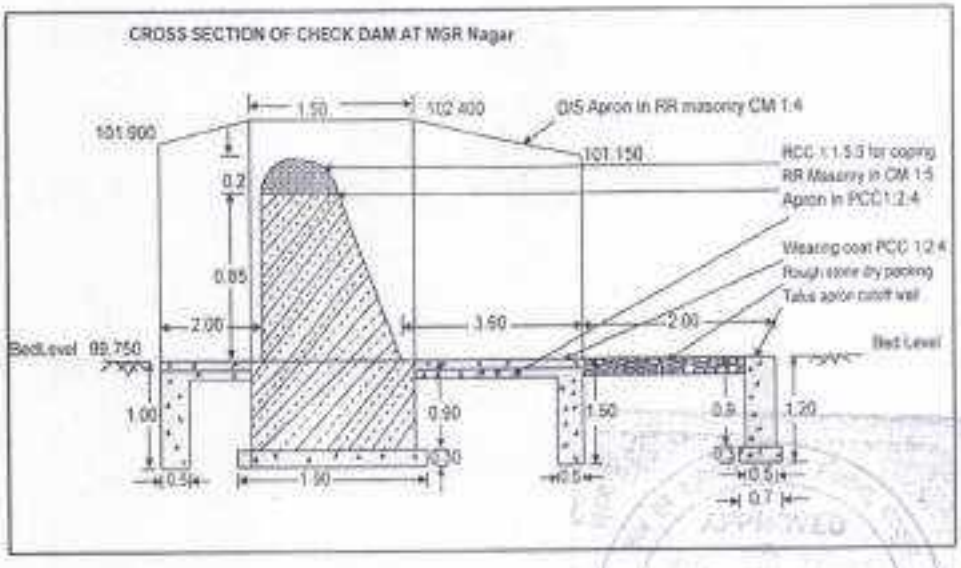


Plate – 13 shows location of recharge structures. In 3 locations the check dam with recharge bore wells are suggested.

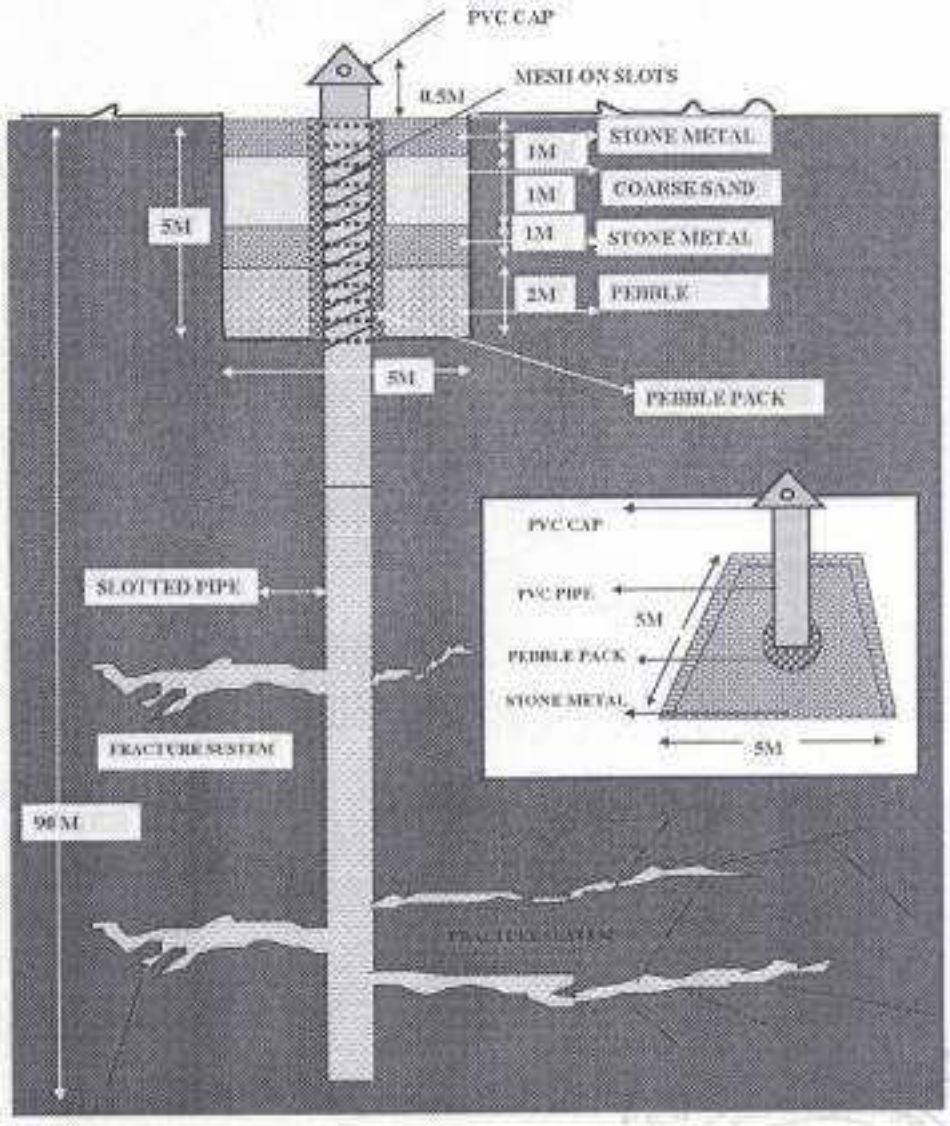
Annexure

Check Dam and its Design





DESIGN OF RECHARGE TRENCH WITH BORE WELL



CHAPTER

5

5. Discussion and Recommendation

The mine lease area is 76.75 Hectares. The mines are located in two blocks such as north block and south block.

The administrative unit within the study area from the project boundary comprises of 24 villages within 5 km radius from the mine blocks boundary.

The study area (covering 5 km radius) lies in between North Latitude 27° 49' 30" and 27°54'10" and East Longitude 76° 55'50" and 76°02'00" and forms part of the Survey of India Topo Sheet Nos. 45 M/13, 55 A/1.

The mine blocks falls in 45 M/13. The total aerial extent of the study area covering 5 km radius from the Mine is **91.62 Sq.km.**

Both the blocks of the mine are located relatively higher elevation. The minimum and maximum elevation of the Mine is 374 & 471 m above mean sea level respectively.

There is no major river system within 5 km radius from the mines. The streams are only seasonal and very lean flow in the river during the monsoon period.

There are no major reservoirs / Dam or irrigation tanks in 5 km radius study area.

No diversion of streams due to mining activity has taken place. The mining activity has not abstracted the free flow of water in the streams during the rainy seasons.

The normal annual rainfall of the District is 500 mm which is unevenly distributed over the area 26 days. Generally rainfall in the district increases from southwest to northeast.

Primarily, 5 km radius from the mine blocks farm part of scrub forest. The second major land use is land with or without scrub. The crop land occupies less area in the plains. Rain fed agriculture is observed in the area.

Very less area is irrigated by ground water as the ground water availability is poor. River or tank based irrigation systems are not observed in the area.

The study area including the mine lease area comprised of Alluvium (Top soil), Quartz mixed with Quartzite, Feldspar mixed with Quartzite, Amphibolites and Micaceous phyllite with quartize of Delhi Super group.

No soil exposure on the top of the hill ie., in the mine lease area

The strike of the quartzite formation varies from N20-250 E to S 200-250 west dip of 65 to 70 southeast. The ground water movement takes place along with the strike of the formation.

Geomorphologically, the study area covered by Pediment which is poor respect of ground water occurrence and movement. The Mine is located in highly dissected hills.

Apart from the above there are numerous fractures occur in and around the project site. The fractures are the good ground water conduit.

High yielding bore wells / open wells are expected in the intersection of fractures. Within 1 km radius from the Mine boundary, there are fracture systems. However, the fractures are deep seated which is confirmed by geophysical survey results and bore well drilling results. The bore wells located in and around the mines area exhibits deep seated fractures.

The bore well depth varies between 130m - 330 m and the static water level is around 86m -96 m below ground level. It is also observed the spring depth (Depth at which the ground water encounters) is around 110m – 160 m.

The yield of deeper fractures in and around mine area is relatively high. It is very clear that the deeper fracture system (below 120 m) is very active

Ground water level of the Mine area falls in 95.5 - 96.0 m zones during the study period. The area is tectonically highly disturbed zone, hence the behavior of ground water movement is highly disturbed.

During the drilling of bore well the spring stuck below 110- 160 m. After drilling, the static water level raises to 86-96 m.

No spring is observed above 110 m within 10 km of the mines boundary. The above clearly indicates that the ground water level observed in the bore wells are due to the upward leaky condition of the fractured aquifer from deeper depths.

In order to monitor the ground water level variations due to the mining activities, installations of 2 Piezometers are recommended (one in the upstream side and another in the downstream side) based on the ground water flow directions.

Before drilling the bore wells for piezometer detailed geophysical investigation has to be under taken.

The ground water estimation within 5 km radius indicates that the Categorization of the study area "Safe" The stage of ground water development is 48%.

As per the ground water resource estimation (CGWB Report) Narnaul Taluk has been categorized as 'SAFE' Taluk where the stage of ground water development is 49%.

Narnaul Taluk was over exploited during 2011 and it has become safe during 2013

The Quantity of water requirement for the Mine is 50 KLD. The total water requirement is as follows.

In order to meet the requirement of 2 bore well were drilled in the mines area. The bore well depths are 330 and 260 m respectively. The fracture depth of the bore wells are 160 and 140 m. The drilling yield reported as 350 lpm and 260 lpm.

The quality of water (TDS) has been tested in the field using TDSScan and the quality of bore well water found to be within drinking water standards

Pumping test in one of the bore well shows that Safe Yield of the bore well is **40 m^3/day** at the rate of 115 lpm discharge for 80 m drawdown for 6 hours of pumping. **The total requirement of 50 m^3/day can be met out by the available 2 bore wells.**

The pumping test reveals that the drawdown was very drastic initially (25 m in 15 m) subsequently the draw down was low. The above shows that initial draw down due to the stored water discharge not from the aquifer. Later part of draw down indicates that the discharge is from the fractured aquifer.

Bayal CGWB observation well location is the nearest location to the mine blocks which is about 2 Km.

The ground water levels of the CGWB observation well for the period of May 2016 and November 2016 was 26.75 m and 18.50 m below ground level respectively.

Considering the elevation at Bayal CGWB observation well location, which is 2 km from the mines block, the water table (water table AMSL = MSL-Static water level) at Bayal village would be around 333 m above mean sea level during May 2016 and 346 m amsl during November 2016.

Since the study area is heterogeneous, composed of only secondary porosity (no uniform porosity and permeability) the ground water level at the mine site is much deeper than Bayal village.

Considering the above and the ground water level at mine site, it is clear that the reserve depth is much above the ground water table

The prediction of ground water inflow in to the mines depicts as follows:

1) **Mine blocks are located in the hilly area**
2) **The ground water level is much deep in the plains and no inflow of ground water observed in the excavated mine pits (36 m from the hill top)**
3) **Considering the ground water table and the depth to fracture depth (water yielding zone) the reserve depth is much above.**
4) ***Hence mining up the total reserve depth of 340m RL may not intersect the ground water table.***
5) **However, the rainfall storage in the excavated mine pit and the seepage from the mine dump has to be dewatered for the smooth operation of mining activity.**
6) **The dewatering operation of the dead storage (storage due to rainfall over the mine pit and seepage mine dump) may not develop cone of depressions which may not affect the ground water in the nearby drinking and irrigation wells.**

The Ground water assessment studies around 5 km radius zone reveals that the area is safe as per estimation committee norms.

In order to protect the ground water of the study area, artificial recharge measures in and around the mine has to be taken up. This would ameliorate the ground water levels of the area and also to prevent over exploitation.

Watershed based runoff has been estimated covering the mines area. Based on the normal rainfall the quantity of runoff generated using Soil Conservation Services (SCS) Method.

Watershed has been delineated using the Carto-DEM data and the estimation has been made. Based on the availability of runoff water artificial recharge structures have been suggested.

The area of watershed is 30.85 Sq.km. Based on the land use and the soil characteristics, the estimated CN value is 80.

There is considerable quantity of runoff is available. The runoff water can be harvested very well within the watershed area.

Based on the runoff, in **3 locations, check dam with recharge bore wells** have been suggested. As corporate social responsibility, the corporate may create the recharge structures.

ANNEXURE- 3

CONSENT LETTER/, UNDERTAKING/CERTIFICATE FROM APPLICANT

01. I ,Manmohan Singh Bhadana, hereby authorize Sh. D.C.Yadav RQP DMG/HRY/RQP/2018/03 & S.N.Sharma QP to prepare the Mining Scheme including Progressive Mine closure Plan under Haryana Minor Mineral Concession, Stocking,Transporting of Minerals and prevention of Illegal Mining Rules 2012,in respect of Minor Mineral Mines of" Stone along with associated minor minerals" of Bayal over an area of 76.75 Hectares (Area in hectares area); District- Mohindergarh State –Haryana . I request The Director Mines and Geology, Govt. of Haryana to make further correspondence regarding modification/corrections of the mining scheme with the said RQP on the following address:-

D.C.Yadav

282 Sector 11-D,Faridabad (Haryana)

09416214247

Mail id- dcyadav7@gmail.com

We hereby undertake that all modifications/updating as made in the Mining Scheme by the said RQP be deemed to have been made with our consent and shall be acceptable on us and binding in all respects.

02. It is certified that CCOM Circular No.2/2010 will be implemented and complied with when an authorized agency is approved by the State Govt.

03. It is certified that the progressive Mine closure plan of Bayal uartz ,and feldspar mine of Sh.Manmohan Bhadana over an area o 76.75 ha complies all statutory rules Regulations, orders made by the Central or The State Government, Courts etc. which have been taken into consideration and where any specific permission is required the lessee will approach the concerned authorities. The information furnished in the mining Scheme & progressive mine closure plan is true and correct to the best of my knowledge and records.

04. The provisions of Mines Act, Rules & Regulations made there under have been observed in this Mining Plan and whenever specific permission is required the applicant will approach the Director General of Mines Safety. Other standards prescribed by DGMS in respect of Miners health will be strictly implemented

Place:

Date: Signature of the applicant/Authorized Signatory

CERTIFICATE

I D.C.Yadav RQP hereby certify that,

1. "The provisions of Haryana Minor Mineral Concession, Stocking, Transportation of Minerals and Prevention of Illegal Mining Rules, 2012 have been observed in the Mining Scheme including Progressive Mine Closure Plan for Minor mineral mines of "Bayal over an area of 76.75 ha for Quartz,Felspar and Quartzite/stone Minor Minerals in Village- BayalDistrict- Narnaul, State- Haryana of Sh. Manmohan Bhadana and wherever specific permission is required the applicant will approach the concerned authorities of Department of Mines & Geology for granting the permission."

2. It is also certified that the provisions of Mines Act, Rules and Regulations made there under have been observed in the aforesaid Mining Plan including Progressive Mine Closure Plan and wherever specific permissions are required the applicant will approach the Director General of Mines Safety.

3. It is further certified that the aforesaid Mining Plan Including Progressive Mine Closure Plan is prepared as per the copies of the records and documents provided by licensee and information given as per discussions held with applicants' representative.

4. It is also certified that the information furnished in the aforesaid Mining Plan including Progressive Mine Closure Plan are true and correct to the best of my knowledge & belief and in case of default the approval would be withdrawn.

5. It is also certified that the plans and sections are prepared based on the lease map authenticated by the State Governments.

Duli Chand Yadav
D.C.YADAV/RQP/GMG/HRY/RQP/2018/03

Place :Faridabad

Date :

ANNEXURE-4

No. 138

THE UNIVERSITY OF JODHPUR

PROVISIONAL CERTIFICATE

Roll No. 16 Enrolment No. Jo '76/167

It is certified that SATYA NARAYAN SHARMA

Son/Daughter of KRISHNA CHANDRA had pursued a course of study in this University for the Degree of Bachelor of Engineering (MINING)

and found qualified for the degree on having passed the Final Examination held in OCT 1981.

He/She secured 2052 marks out of 3170 marks in the aggregate and was placed in FIRST Division.

JODHPUR, the 13 May 1982

REGISTRAR

NOTE : The printed certificate/diploma of passing the examination will be issued to him/her in due course at the Convocation.

ANNEXURE-4

GOVERNMENT OF HARYANA

DIRECTORATE OF MINES AND GEOLOGY, HARYANA,
30-BAYS BUILDING, SECTOR 17, CHANDIGARH.

CERTIFICATE OF RECOGNITION AS A QUALIFIED PERSON TO PREPARE MINING PLAN/SCHEME OF MINING FOR MINOR MINERAL MINES

(Under Rule 67 of Haryana Minor Mineral Concession, Stocking, Transportation of Minerals and Prevention of Illegal Mining Rules, 2012)

Shri Duli Chand Yadav S/o Shri Ramji Lal, resident of village Dhani Bania Wali, PO Nangal Chaudhary, District Mahendergarh having given satisfactory evidence of his qualifications and experience, is hereby granted recognition under Rule 67 of the Haryana Minor Mineral Concession, Stocking, Transportation of Minerals and Prevention of Illegal Mining Rules, 2012, as a "Qualified Person" to prepare Mining Plans/Scheme of Mining in respect of minor minerals mines in the State of Haryana.

2. His registration No. is DMG/HRY/RQP/2018/03.

3. This recognition shall be valid for a period of ten years ending on 26.04.2028

Place : Chandigarh
Dated : 26.04.2018

(Sanjay Jodhka)
Director,
Mines & Geology, Haryana,
Chandigarh.

GUJRATI MINERALS LABORATORY

LABORATORY : 6, RIICO Commercial Complex, Ajmer Road, BEAWAR-305 901 (Raj.)
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SPECIALIST IN

METAL, MINERALS, ORES, CHEMICALS, FERTILIZERS, WATER/EFFLUENTS
SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

ANALYSIS CERTIFICATE

Ref. No. 8048 /21/O Date 22.12.2021

1. Name of the Party	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	LUMPS - NORTH-II-NNE
	Sample Collected by Party

RESULTS OF ANALYSIS

SiO_2	72.080	%
Al_2O_3	15.730	%
Fe_2O_3	00.265	%
CaO	01.035	%
MgO	00.255	%
LOI	00.645	%
Na_2O	06.730	%
K_2O	03.145	%
TiO_2	00.105	%
Cr_2O_3	00.000	%
WHITENESS	34.000	%
L VALUE	64.500	%
A VALUE	+04.600	%
B VALUE	+08.600	%
SPECIFIC GRAVITY	02.680	
BULK DENSITY	02.695	gm/cc
HARDNESS	6	ON MOH'S SCALE
WHITENESS	48.500	%
BRIGHTNESS	46.100	%

For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

GUJRATI MINERALS LABORATORY

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SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

Ref. No 8044 /21/O

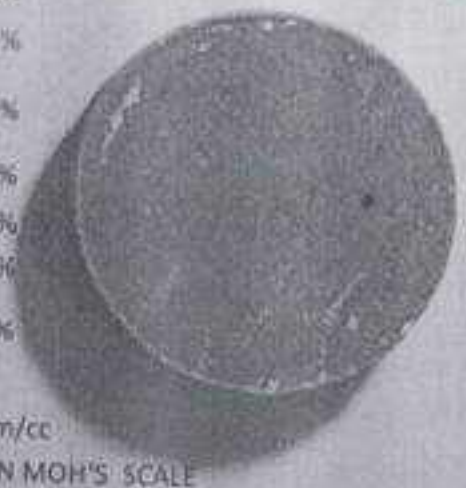
ANALYSIS CERTIFICATE

Date 22.12.2021

1. Name of the Party	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	LUMPS - FELDSPAR DUMP
	Sample Collected by Party

RESULTS OF ANALYSIS

SiO_2	72.860	%
Al_2O_3	15.055	%
Fe_2O_3	00.235	%
CaO	00.985	%
MgO	00.105	%
LOI	00.615	%
Na_2O	04.110	%
K_2O	05.925	%
TiO_2	00.105	%
Cr_2O_3	00.000	%
WHITENESS	18.000	%
L VALUE	48.500	%
A VALUE	+06.500	%
B VALUE	+05.500	%
SPECIFIC GRAVITY	02.685	
BULK DENSITY	02.840	gm/cc
HARDNESS	6	ON MOH'S SCALE
WHITENESS	64.500	%
BRIGHTNESS	61.700	%



For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

GUJRATI MINERALS LABORATORY

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SPECIALIST IN

METAL, MINERALS, ORES, CHEMICALS, FERTILIZERS, WATER/EFFLUENTS
SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

ANALYSIS CERTIFICATE

Ref. No 5050 /21/O Date 22.12.2021

1. Name of the Party	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	LUMPS - SOUTH NORTH EAST
Sample Collected by Party	

RESULTS OF ANALYSIS

SiO_2	78.710	%
Al_2O_3	11.885	%
Fe_2O_3	00.105	%
CaO	01.455	%
MgO	00.265	%
LOI	00.895	%
Na_2O	00.785	%
K_2O	05.795	%
TiO_2	00.090	%
Cr_2O_3	00.000	%
WHITENESS	45.000	%
L VALUE	73.700	%
A VALUE	+04.500	%
B VALUE	+10.500	%
SPECIFIC GRAVITY	02.690	
BULK DENSITY	02.720	gm/cc
HARDNESS	5.5	ON MOH'S SCALE
WHITENESS	63.500	%
BRIGHTNESS	60.800	%

For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

GUJRATI MINERALS LABORATORY

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SPECIALISTAN

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SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

ANALYSIS CERTIFICATE

Ref. No. 8043 /21/O

Date 22.12.2021

1. Name of the Party	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	LUMPS SOUTH BOTTOM
Sample Collected by Party	

RESULTS OF ANALYSIS

SiO_2	95.825	%
Al_2O_3	02.145	%
Fe_2O_3	00.062	%
CaO	00.520	%
MgO	00.065	%
LOI	00.435	%
Na_2O	00.235	%
K_2O	00.535	%
TiO_2	00.037	%
Cr_2O_3	00.000	%
WHITENESS	70.000	%
L VALUE	85.500	%
A VALUE	+02.000	%
B VALUE	+06.500	%
SPECIFIC GRAVITY	02.705	
BULK DENSITY	02.810	gm/cc
HARDNESS	7	ON MOH'S SCALE
WHITENESS	79.000	%
BRIGHTNESS	76.800	%

For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

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SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

ANALYSIS CERTIFICATE

Ref. No 8054 /21/O Date 22.12.2021

1. Name of the Party	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	LUMPS : 12
	Sample Collected by Party

RESULTS OF ANALYSIS

SiO_2	93.910	%
Al_2O_3	02.605	%
Fe_2O_3	00.085	%
CaO	00.695	%
MgO	00.065	%
LOI	00.385	%
Na_2O	00.835	%
K_2O	01.375	%
TiO_2	00.025	%
Cr_2O_3	00.000	%
WHITENESS	72.000	%
L VALUE	86.700	%
A VALUE	+03.400	%
B VALUE	+05.000	%
SPECIFIC GRAVITY	02.695	
BULK DENSITY	02.810	gm/cc
HARDNESS	6.5	ON MOH'S SCALE
WHITENESS	78.500	%
BRIGHTNESS	75.700	%

For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

GUJRATI MINERALS LABORATORY

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SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

ANALYSIS CERTIFICATE

Ref. No. 8053 /21/O

Date 22.12.2021

1. Name of the Party	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	LUMPS WEST HILL - LOOSE
	Sample Collected by Party

RESULTS OF ANALYSIS

SiO_2	96.765	%
Al_2O_3	01.085	%
Fe_2O_3	00.310	%
CaO	00.765	%
MgO	00.105	%
LOI	00.430	%
Na_2O	00.145	%
K_2O	00.295	%
TiO_2	00.097	%
Cr_2O_3	00.000	%
WHITENESS	33.000	%
L VALUE	63.500	%
A VALUE	+09.500	%
B VALUE	+10.500	%
SPECIFIC GRAVITY	02.685	
BULK DENSITY	02.755	gm/cc
HARDNESS	7	ON MOH'S SCALE
WHITENESS	56.500	%
BRIGHTNESS	53.100	%

For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result

GUJRATI MINERALS LABORATORY

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SPECIALIST IN

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SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

ANALYSIS CERTIFICATE

Ref. No. 8052 /21/O Date. 22.12.2021

1. Name of the Party	RAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	LUMPS : WEST HILL : I-SIZE
Sample Collected by Party	

RESULTS OF ANALYSIS

SiO_2	68.965	%
Al_2O_3	07.125	%
Fe_2O_3	00.625	%
CaO	00.995	%
MgO	00.145	%
LOI	00.750	%
Na_2O	00.010	%
K_2O	01.065	%
TiO_2	00.105	%
Cr_2O_3	00.000	%
WHITENESS	17.000	%
L VALUE	45.700	%
A VALUE	+05.800	%
B VALUE	+09.500	%
SPECIFIC GRAVITY	02.630	
BULK DENSITY	02.645	gm/cc
HARDNESS	7	ON MOH'S SCALE
WHITENESS	40.500	%
BRIGHTNESS	38.100	%

For. GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

GUJRATI MINERALS LABORATORY

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SPECIALIST IN

METAL, MINERALS, ORES, CHEMICALS, FERTILIZERS, WATER/EFFLUENTS
SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

ANALYSIS CERTIFICATE

Ref. No. 8051 /21/O

Date 22.12.2021

1. Name of the Party	:	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	:	LUMPS - SOUTH TOP MIDDLE
Sample Collected by Party		

RESULTS OF ANALYSIS

SiO_2	92.450	%
Al_2O_3	04.365	%
Fe_2O_3	00.185	%
CaO	00.810	%
MgO	00.065	%
LOI	00.560	%
Na_2O	00.850	%
K_2O	00.530	%
TiO_2	00.085	%
Cr_2O_3	00.000	%
WHITENESS	43.000	%
L VALUE	71.500	%
A VALUE	+05.800	%
B VALUE	+09.500	%
SPECIFIC GRAVITY	02.710	
BULK DENSITY	02.790	gm/cc
HARDNESS	6.5	ON MOH'S SCALE
WHITENESS	64.500	%
BRIGHTNESS	61.900	%

For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

GUJRATI MINERALS LABORATORY

LABORATORY : 6, RIICO Commercial Complex, Ajmer Road, BEAWAR-305 901 (Raj.)
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SPECIALIST IN

METAL, MINERALS, ORES, CHEMICALS, FERTILIZERS, WATER/EFFLUENTS
SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

ANALYSIS CERTIFICATE

Ref. No. 8049 /21/0 Date 22.12.2021

1. Name of the Party	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	LUMPS SOUTH BLACK
	Sample Collected by Party

RESULTS OF ANALYSIS

SiO_2	55.065	%
Al_2O_3	23.765	%
Fe_2O_3	08.975	%
CaO	02.710	%
MgO	03.035	%
LOI	01.975	%
Na_2O	00.895	%
K_2O	01.365	%
TiO_2	02.145	%
Cr_2O_3	00.000	%
WHITENESS	01.300	%
L VALUE	20.500	%
A VALUE	+02.200	%
B VALUE	+01.000	%
SPECIFIC GRAVITY	02.655	
BULK DENSITY	02.980	gm/cc
HARDNESS	2	ON MOH'S SCALE
WHITENESS	22.500	%
BRIGHTNESS	19.100	%

For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

GUJRATI MINERALS LABORATORY

LABORATORY : 5, RIICO Commercial Complex, Ajmer Road, BEAWAR-305 901 (Raj.)
Ph. : (01462) 227077, 226043, 94130-83214, Fax No. : 01462-226088, Mobile : 98290-72188

SPECIALIST IN

METAL, MINERALS, ORES, CHEMICALS, FERTILIZERS, WATER/EFFLUENTS
SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

ANALYSIS CERTIFICATE

Ref. No. 8047 /21/O Date 22.12.2021

1. Name of the Party	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	LUMPS NORTH-I-NNE
Sample Collected by Party	

RESULTS OF ANALYSIS

SiO_2	98.425	%
Al_2O_3	00.895	%
Fe_2O_3	00.040	%
CaO	00.000	%
MgO	00.000	%
LOI	00.370	%
Na_2O	00.085	%
K_2O	00.155	%
TiO_2	00.017	%
Cr_2O_3	00.000	%
WHITENESS	75.000	%
L VALUE	88.500	%
A VALUE	+02.500	%
B VALUE	+05.300	%
SPECIFIC GRAVITY	02.695	
BULK DENSITY	02.705	gm/cc
HARDNESS	7	ON MOH'S SCALE
WHITENESS	79.500	%
BRIGHTNESS	77.200	%

For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

GUJRATI MINERALS LABORATORY

LABORATORY : 6, RIICO Commercial Complex, Ajmer Road, BEAWAR-305 901 (Raj.)
Ph. : (01462) 227077, 226043, 94130-83214, Fax No. : 01462-226088, Mobile : 98290-72188

SPECIALIST IN

METAL, MINERALS, ORES, CHEMICALS, FERTILIZERS, WATER/EFFLUENTS
SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

ANALYSIS CERTIFICATE

Ref. No. 8046 /21/O Date 22.12.2021

1. Name of the Party	:	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	:	LUMPS - EAST HILL
		Sample Collected by Party

RESULTS OF ANALYSIS

SiO_2	96.350	%
Al_2O_3	01.325	%
Fe_2O_3	00.365	%
CaO	00.695	%
MgO	00.055	%
LOI	00.395	%
Na_2O	00.310	%
K_2O	00.435	%
TiO_2	00.055	%
Cr_2O_3	00.000	%
WHITENESS	45.800	%
L VALUE	73.300	%
A VALUE	+06.000	%
B VALUE	+09.500	%
SPECIFIC GRAVITY	02.670	
BULK DENSITY	02.755	gm/cc
HARDNESS	7	ON MOH'S SCALE
WHITENESS	49.500	%
BRIGHTNESS	47.100	%

For : GUJRATI MINERALS LABORATORY

Chemist

Sample will be preserved up to one month from the date of submission of result.

GUJRATI MINERALS LABORATORY

LABORATORY : 5, RIICO Commercial Complex, Ajmer Road, BEAWAR-305 901 (Raj.)
Ph. : (01462) 227077, 228043, 94130 43214, Fax No. : 01462-228095, Mobile : 98290-72135

SPECIALISTS IN

METAL, MINERALS, ORES, CHEMICALS, FERTILIZERS, WATER/EFFLUENTS
SOIL & OIL ANALYSIS & TECHNICAL CONSULTANCY

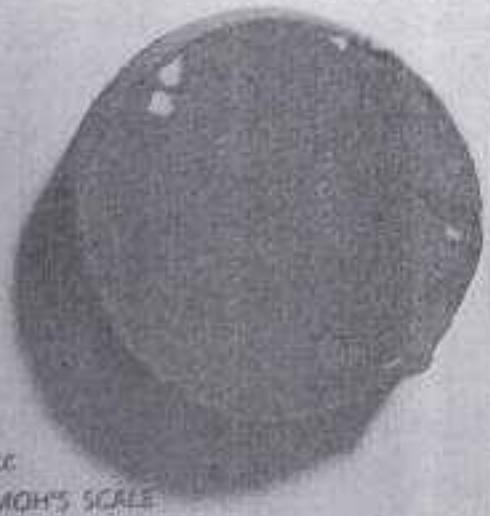
ANALYSIS CERTIFICATE

Ref. No. 3045 /21/0 Date 27.12.2021

1. Name of the Party	BAYAL QUARTZ AND FELDSPAR MINE
2. Details of Sample	GRAINS - SCREENED SAND
	Sample Collected by Party

RESULTS OF ANALYSIS

SiO_2	21.410	%
Al_2O_3	07.535	%
Fe_2O_3	00.815	%
CaO	04.165	%
MgO	00.730	%
LOI	03.210	%
Na_2O	01.145	%
K_2O	00.850	%
TiO_2	00.030	%
Cr_2O_3	00.000	%
WHITENESS	10.000	%
L VALUE	38.500	%
A VALUE	+05.800	%
B VALUE	+11.000	%
SPECIFIC GRAVITY	02.605	
BULK DENSITY	01.995	gm/cc
HARDNESS	7	ON MOH'S SCALE
WHITENESS	23.500	%
BRIGHTNESS	20.100	%



For : GUJRATI MINERALS LABORATORY

Chemist

Samples will be preserved up to one month from the date of submission of result.

OFFICE OF THE DIVISIONAL FOREST OFFICER,
FOREST COMPLEX, MAHENDERGARH.

Tel./Fax: +91 1285 220229, E-mail: dfomgarh@yahoo.co.in

No: 68 Dated : 12.04.2017

To:

Shri Manmohan Bhadana s/o Sh. Kartar Singh,
V.P.O. Anangpur, Tehsil and District Faridabad.

No. Dated:-

Sub: Permission for surrender part area of 151.85 hectare out of total area of 228.60 hectare in village Bayal, Tehsil Narnaul, District Mahendergarh and retain remaining area of 76.75 hectare-regarding.

Applicant Shri Manmohan Bhadana s/o Sh. Kartar Singh,V.P.O. Anangpur, Tehsil and District Faridabad vide online SRN No. TRH-M8U-XO2R dated 17.02.2017 made a request in connection with land khasra no. 201, 223 and 224 total area 76.75 ha. located at village Bayal, Tehsil Narnaul, District Mahendergarh. The detailed report pertaining to this areas as under:_

a) As per records available above said land is not part of notified Reserved Forest, Protected Forest under Indian Forest Act. 1927 or any areas closed under section 4 & 5 of Punjab Land Preservation Act. 1900.

b) It is clarified that by the Notification No. S.O.8/P.A. 2/1900/S.4/2013 dated 4th January, 2013, all ravenue Estate of Mahendergarh is notified u/s 4 of PLPA 1900 and S.O.81/PA.2/1900/S.3/2012 dated 19th December, 2012 u/s 3 of PLPA 1900. The area is however not recorded as forest in the Government record but felling of any tree is strictly prohibited without the permission of Divisional Forest Officer, Mahendergarh.

c) As per the records available with the Forest Department Mahendergarh the area does not fall in areas where plantations were raised by the Forest Department under Aravalli project, But Khasra No. 201 is zero distance from Aravalli Plantation area.

d) There is no notified Wild Life Sanctuary, Bird Sanctuary, National Parks and Conservation Reserve in Mahendergarh district. However for conservation of wild animals in area conservation plan should be prepared in consultation with Chief Wild Life Warden.

e) If approach road is required from Protected Forest/Aravalli plantation area by the user agency clearance/regulatization under Forest Conservation Act 1980 will be required. Without prior clearance from Forest Department, the use of Forest land for approach road is strictly prohibited.

f) All other statutory clearance, mandated under the Environment Protection Act. 1986, as per the notification of Ministry of Environment and Forests, Government of India, dated 07.05.1992 or any other Act/order shall be obtained as applicable by the project proponents from the concerned authorities.

g) It is clarified the Hon'ble Supreme Court has issued various judgment dated 07.05.2002., 29.10.2002, 16.12.2002, 18.03.2004, 14.05.2008, etc. pertaining to Aravali region in Haryana, which should be compiled with.

h) It shall be the responsibility of user agency/applicant to get necessary clearances/permissions under various Acts and Rules applicable if any, from the respective authorities/Department.

Divisional Forest Officer,
Mahendergarh.

Endst. No. Dated :

A copy is forwarded to following for information and necessary action :-

1. Conservator of Forest South Circle, Gurgaon.
2. Dy. Commissioner, Mahendergarh at Narnaul.

Divisional Forest Officer,
Mahendergarh.

OM HOSPITAL SINGHANA ROAD NARNAUL
INDEX 40 Y CHEST 3-10-19 107 M 02:52 PM

[1](FORM – O)
(See rule 29F (2) and 29L)

Report of medical examination under rule 29E
(To be issued in triplicate)**

Certificate No. 43

Certified that Shri/Shrimati* Jaiveer Inder employed as Mazdur
in Bayal Quartzs & Feldsphar mines; Form B No. 43 has been examined for an initial/periodical medical examination. He/she* appears to be 40 years of age. The findings of the examining authority are given in the attached sheet. It is considered that Shri/Shrimati* Inder

(a) * is medically fit for any employment in mines. ✓
(b) * is suffering from ——— and is medically unfit for
(b) any employment in mine; or —
(c) any employment below ground; or —
(d) any employment or work ✓

©* is suffering from ——— as should get this disability* cured/controlled and should be again examined
within a period of ——— months. He/She will appear for re-examination with the result of test of ———
and the opinion of ——— Specialist from ——— He/She may be permitted/not* permitted to carry on his duties during this period.

Space for affixing Passport
Size Photograph of the
candidate

Dr. S.N. SHARMA

Signature of the [illegible]

Dr. S.N. Sharma
M.B.B.D, MD. (Path)
Regn. No. HN-3521
Om Hospital Singhana Road
Nathaur-123401

Place : HNL

Name and designation

Date : 3-10-19

---

* Delete whatever is not applicable.
** One copy of the certificate shall be handed over to the person concerned and another copy shall be sent to the manager of the mine concerned by registered post, and the third copy shall be retained by the examining authority.

Report of the Examining Authority

(to be filled in for every medical examination whether initial or periodical or re-examination or after cure/control of disability).

Annexure to Certificate No. ——— as result of medical examination on ———
Identification Mark. Black Mole over (L) Elbow

Left thumb impression of
the candidate

1. General development---Good/Fair/Poor ✓
2. Height... 170 Cms.
3. Weight... 57 kg.

(ii) any organic disease of eyes
(iii) Night blindness-
(iv) Colour blindness -
(v)Squint-] Nil

4* to be tested in special cases)

* Inserted vide notification No GSR 656 dated 5.6.1980

5. Ears:
(i)Hearing: Right ear ..N.. Left ear ..N..
(ii)Any organic diseases. Nil

6. Respiratory system.
Chest measurement :

(i) After full inspiration ..93.. cms.
(ii) After full expiration ..87.. cms.

7. Circulatory system:

Blood Pressure ..120/80.. mm Hg
Pulse ..72.. /mt

8. Abdomen :
Tenderness. Nil
Liver.] NAD
Spleen.
Tumour. — Nil

9. Nervous system:
History of fits or epilepsy] Nil
Paralysis.
Mental health. — N

10. Locomotory system N
11. Skin. N
12. Hydrocele.] Nil
13. Hernia.
14. Any other abnormality Nil
15. Urine :
Reaction — Acidic
Albumin.] Nil
Sugar.
16. Skiagram of chest. — NAD
17. Any other test considered necessary by the examining authority. Nil
18. Any opinion of specialist considered necessary. Nil

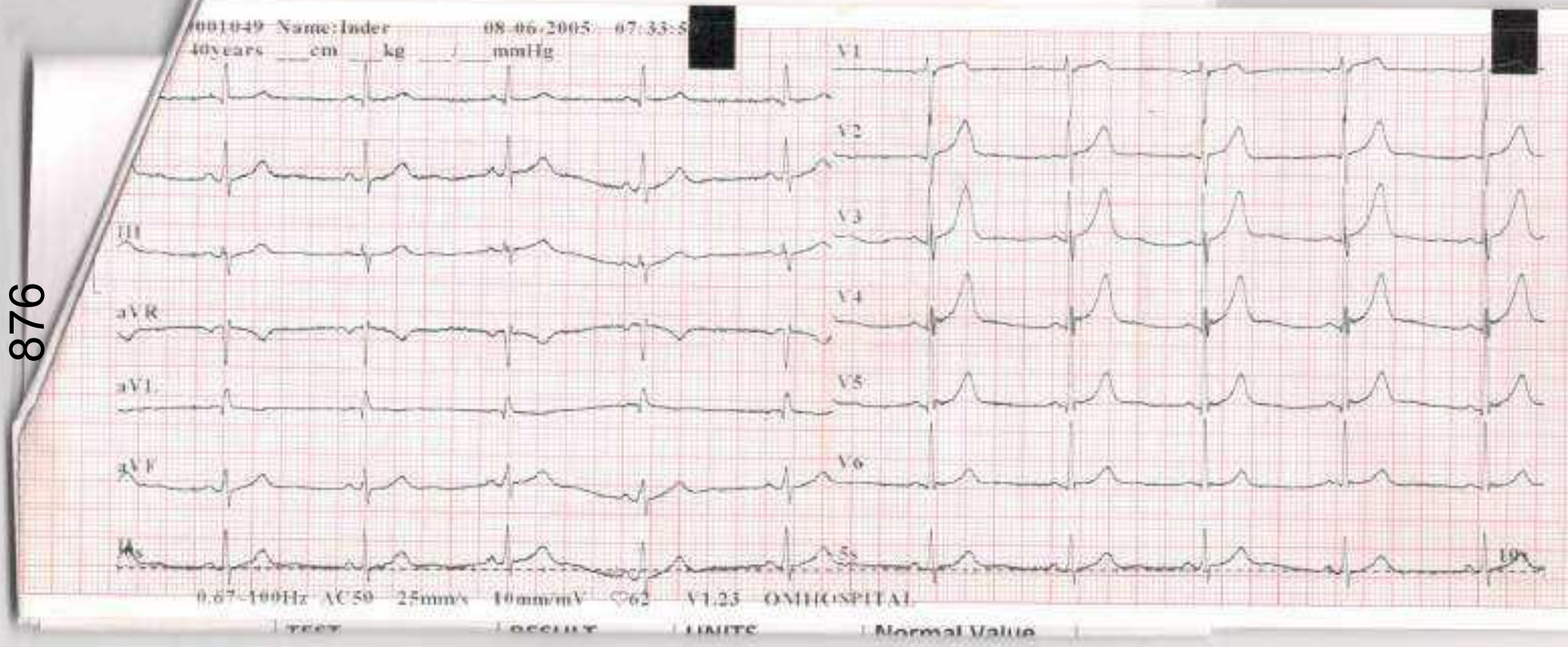
19) - Bl. group = O Negative

Signature of the examining authority

20) ECG = WNL

Place- NNL

Dr. S.N. Sharma
M.B.B.D, MD. (Path)
Regn. No. HN-3521
Om Hospital Singhana Road
Narnaul-123001


0001049 Name:Inder 08-06-2005 07:33:5
40years ___cm ___kg ___/___mmHg
I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
0.67-100Hz AC50 25mm/s 10mm/mV 62 V1.23 OMHOSPITAL
TEST RESULT UNITS Normal Value

OM HOSPITAL

Gali No. 3, Keshav Nagar, Singhana Road, Narnaul-123001 (Hry.)

☎ 01282-250490

Fully Computrised Lab.

Dr. S. N. Sharma
(M.B.B.S., M.D.)
(भूतपूर्व सिविल सर्जन)

Dr. Pankaj Parasher
M.B.B.S., D-Ortho, DNB-Ortho (N.Delhi)
(हड्डी एवं जोड़ रोग विशेषज्ञ)

Dr. Vartika Parasher
M.S. (Obs. & Gynae)
(स्त्री रोग विशेषज्ञ)

Name:- INDER ,Age & Sex:-40 M, Date:- 03-10-19

URINE R/M

TEST	RESULT	UNITS	Normal Value
Physical :-			
Quantity	30	ml	
Colour	P.Yellow		Pale yellow
Appearance	clear		Clear
Reaction	Acidic		
Chemical :-			
Albumin	Nil		Nil
Sugar	Nil		Nil

Blood Group :- (O) NEGATIVE

Pathologist

Note:-Isolated Lab investigations do not confirm the diagnosis of the disease .They only help in arriving at a diagnosis in conjunction with the clinical presentation & other related investigations. If results are beyond expectations, please contact the lab within 2 days. This report is not for medico legal purpose.

OM HOSPITAL SINCHANA ROAD NARNAUL
LOVELY 30 Y CHEST 29-9-19 25432 M 11:00 AM

[1](FORM – O)
(See rule 29F (2) and 29I.)

Report of medical examination under rule 29E
(To be issued in triplicate)**

Certificate No. 39

Certified that Shri/Shrimati* Lovely employed as Machine operator.
---In Bayal Quartzs & Feldsphar mines; Form B No. 36 has been examined for an initial/periodical medical examination. He/she* appears to be 32 years of age. The findings of the examining authority are given in the attached sheet. It is considered that Shri/Shrimati* Lovely

(a) * is medically fit for any employment in mines. ✓
(b) * is suffering from — and is medically unfit for
(b) any employment in mine; or —
(c) any employment below ground; or —
(d) any employment or work —

©* is suffering from —is should get this disability* cured/controlled and should be again examined
within a period of — months. He/She will appear for re-examination with the result of test of.....
and the opinion of — Specialist from — He/She may be permitted/not* permitted to carry on his duties during this period.

Space for affixing Passport Size Photograph of the candidate.

S.N. SHARMA
Dr. S.N. Sharma
M.S.B.D, MD. (Path)
Regn. No. HN-3521
Om Hospital Singhana
Narnaul-123

Signature of the examining authority

Name of the examining authority in block letters

Place : NML

Date : 29-9-19

---

* Delete whatever is not applicable.
** One copy of the certificate shall be handed over to the person concerned and another copy shall be sent to the manager of the mine concerned by registered post, and the third copy shall be retained by the examining authority.

Report of the Examining Authority

(to be filled in for every medical examination whether initial or periodical or re-examination or after cure/control of disability).

Annexure to Certificate No. 39 as result of medical examination on 29-9-19.
Identification Mark ..... (R) .....

LTI of Lovely

Left thumb impression of the candidate

1. General development—Good/Fair/Poor ✓
2. Height 170 Cms.
3. Weight 70-72 kg.
4. Eyes:

(ii) any organic disease of eyes
(iii) Night blindness-
(iv) Colour blindness -
(v)Squint-

] Nil

(* to be tested in special cases)

1. Inserted vide notification No GSR 656 dated 5.6.1980

5. Ears:
(i)Hearing: Right ear ..... N ..... Left ear ..... N .....
(ii)Any organic diseases Nil

6. Respiratory system:
Chest measurement :

(i) After full inspiration ..... 94 ..... cms.
(ii) After full expiration ..... 91 ..... cms.

7. Circulatory system:

Blood Pressure 124/84
Pulse 86/mt

8. Abdomen :
Tenderness. – Nil
Liver.] NAD
Spleen.
Tumour. – Nil

9. Nervous system:
History of fits or epilepsy] Nil
Paralysis.
Mental health. – N
10. Locomotory system – N
11. Skin. N
12. Hydrocele.] Nil
13. Hernia.
14. Any other abnormality – Nil
15. Urine :
Reaction. – Acidic
Albumin.] Nil
Sugar.
16. Skiagram of chest.
17. Any other test considered necessary by the examining authority. Nil
18. Any opinion of specialist considered necessary. Nil

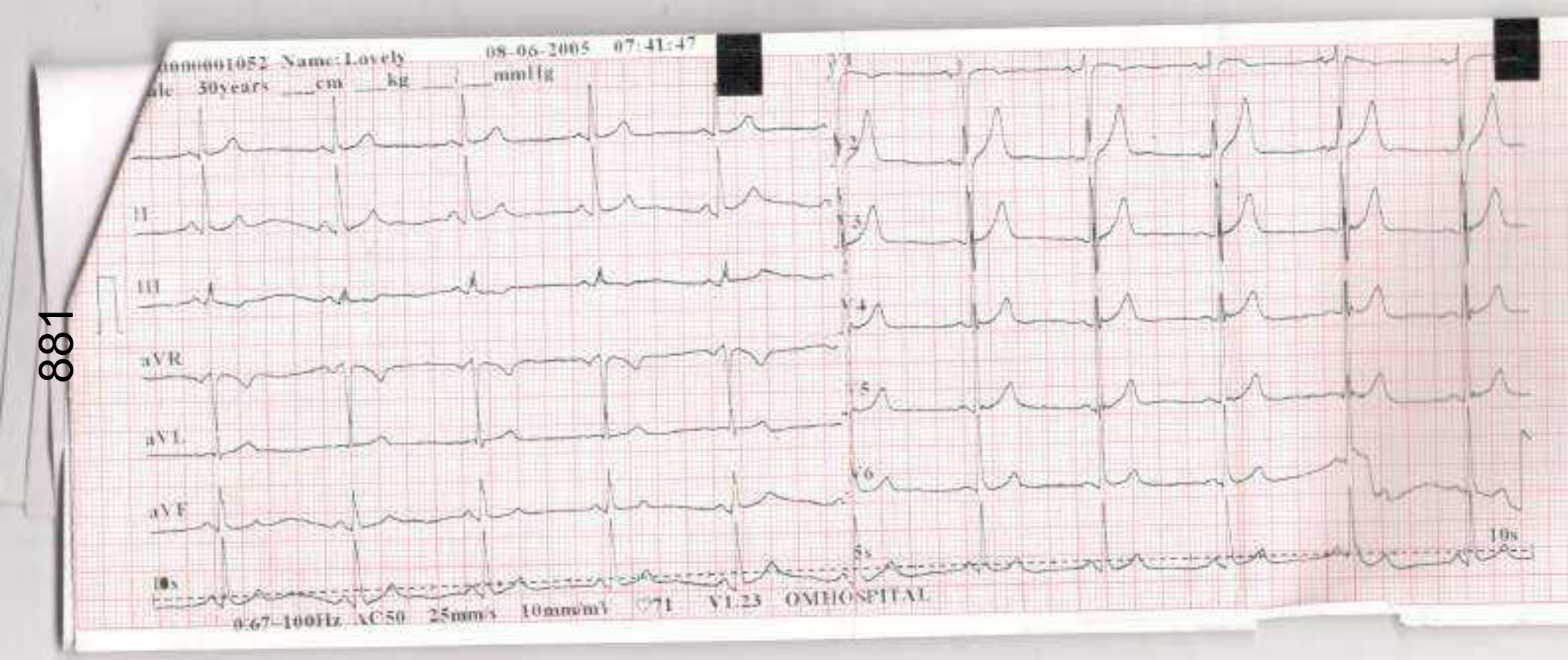
19) Bl. group = O+

19) E.C.G = WNL

Signature of the examining authority

Place-
Narnaul
NNL

Dr. S.N. Sharma
M.B.B.D, MD. (Path)
Regn. No. HN-3521
Om Hospital Singhana Road
Narnaul-123001


08-06-2005 07:41:47
Name:Lovely
30years
cm
kg
mmHg
I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
10s
0.67-100Hz AC50 25mm/s 10mm/mV 71 V1.23 OMRONSPITAL

39

Name: Lovely ,Age & Sex:-30M, Date:- 29-9-19 Ref by –Self

URINE R/M

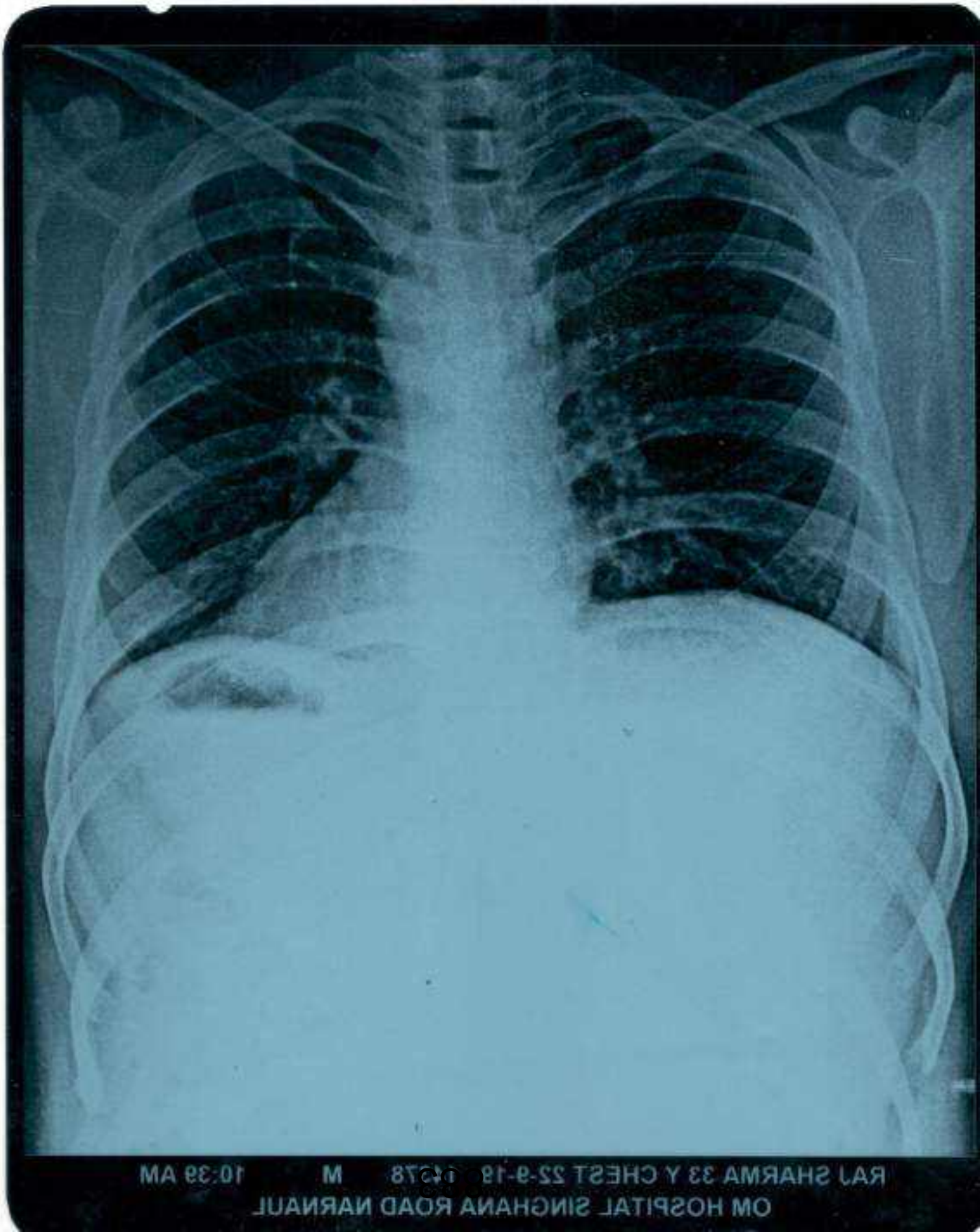
TEST	RESULT	UNITS	Normal Value
Physical :-			
Quantity	45	ml	
Colour	P.Yellow		Pale yellow
Appearance	clear		Clear
Reaction	Acidic		
Chemical :-			
Albumin	Nil		Nil
Sugar	Nil		Nil

Blood Group :- O Positive

Dr Sharma

Pathologist

Note:-Isolated Lab investigations do not confirm the diagnosis of the disease .They only help in arriving at a diagnosis in conjunction with the clinical presentation & other related investigations. If results are beyond expectations, please contact the lab within 2 days. This report is not for medico legal purpose.


RAJ SHARMA 33 Y CHEST 22-9-19 M 10:39 AM
OM HOSPITAL SINGHANA ROAD NARNAUL

[1](FORM – O)
(See rule 29F (2) and 29L)

Report of medical examination under rule 29B
(To be issued in triplicate)**

Certificate No. 4

Certified that Shri/Shrimati* Raj Sharma employed as Ex-fireman
In Bayal Quartzs & Feldsphar Mines; Form B No———— has been examined for an initial/periodical medical examination. He/she* appears to be 33 years of age. The findings of the examining authority are given in the attached sheet. It is considered that Shri/Shrimati* Raj Sharma

(a) * is medically fit for any employment in mines. ✓
(b) * is suffering from ——— and is medically unfit for
(b) any employment in mine; or
(c) any employment below ground; or
(d) any employment or work ———.

(c)* is suffering from ——— It should get this disability* cured/controlled and should be again examined within a period of ——— months. He/She will appear for re-examination with the result of test of ——— and the opinion of ——— Specialist from MNL. He/She may be permitted/not* permitted to carry on his duties during this period.

Space for affixing Passport Size Photograph of the candidate.

Raj Sharma
Dr. S.N. SHARMA

Dr. S.N. Sharma
M.B.B.D, MD. (Path)
Regn. No. HN-3521
Om Hospital Singhana Road
Narnaul-123001

Signature of the examining authority

Place : MNL

Name and designation in Block letters

Date : 22/9/19

---

* Delete whatever is not applicable.
** One copy of the certificate shall be handed over to the person concerned and another copy shall be sent to the manager of the mine concerned by registered post, and the third copy shall be retained by the examining authority.

Report of the Examining Authority

(to be filled in for every medical examination whether initial or periodical or re-examination or after cure/control of disability).

Annexure to Certificate No. 3 as result of medical examination on 22/9/19
Identification Mark Scar supra sternal notch

Left thumb impression of the candidate

LTI
Raj Sharma

1. General development—Good/Fair/Poor ✓
2. Height 176 Cms.
3. Weight 77 kg.
4. Eyes

(ii) any organic disease of eyes Nil
(iii) Night blindness-
(iv) Colour blindness - } Nil
(v) Squint-

(* to be tested in special cases)

* Inserted vide notification No GSR 656 dated 5.6.1980

5. Ears:
(i) Hearing: Right ear ..... N ..... Left ear ..... N
(ii) Any organic diseases. Nil

6. Respiratory system.
Chest measurement :

(i) After full inspiration ..... 103 ..... cms.
(ii) After full expiration ..... 100 ..... cms.

7. Circulatory system:

Blood Pressure 128/88
Pulse 84

8. Abdomen :
Tenderness. Nil
Liver. } NAD
Spleen.
Tumour. Nil

9. Nervous system:
History of fits or epilepsy Nil
Paralysis. Nil
Mental health. N — Normal

10. Locomotory system N
11. Skin.
12. Hydrocele. } Nil
13. Hernia.
14. Any other abnormality Nil

15. Urine :
Reaction. Acidic
Albumin. Nil
Sugar. Nil

16. Skiagram of chest.
17. Any other test considered necessary by the examining authority.
18. Any opinion of specialist considered necessary.

Signature of the examining authority

Dr. S.N. Sharma
M.B.B.D, MD. (Path)
Regn. No. HN-3521
Om Hospital Singhana Road
Narnaul-123001

Place- NNL

OM HOSPITAL

Near Gali No. 3, Keshav Nagar, Singhana Road, Narnaul-123001 (Hry.)

☎ 01282-250490

Fully Computrised Lab.

Dr. S. N. Sharma
(M.B.B.S., M.D.)
(भूतपूर्व सिविल सर्जन)

Dr. Pankaj Parasher
M.B.B.S., D-Ortho, DNB-Ortho (N.Delhi)
(हड्डी एवं जोड़ रोग विशेषज्ञ)

Dr. Vartika Parasher
M.S. (Obs. & Gynae)
(स्त्री रोग विशेषज्ञ)

Name:- RAJ SHARMA Age & Sex:- 33 Y M, Date:- 22-9-19

URINE R/M

TEST	RESULT	UNITS	Normal Value
Physical :-			
Quantity	30	ml	
Colour	P.Yellow		Pale yellow
Appearance			Clear
Reaction	Acidic	-----	
Chemical :-			
Albumin	Nil		Nil
Sugar	Nil		Nil

Pathologist

Note:-Isolated Lab investigations do not confirm the diagnosis of the disease .They only help in arriving at a diagnosis in conjunction with the clinical presentation & other related investigations. If results are beyond expectations, please contact the lab within 2 days. This report is not for medico legal purpose.

Calibration Certificate

#158

Description	:	**Micromate**
Serial Number	:	**UM 14894**
Geophone Number	:	**UM 14894**
Calibration Date	:	**December 01. 2021**
Next Calibration Date	:	**December 01, 2022**

TEST INSTRUMENTS	Model	Serial No.
Bruel & Kjaer Accelerometer	4370	30066
Bruel & Kjaer Charge Amplifier (Nexus)	2693	2503969
Bruel & Kjaer Charge to Deltatron Converter	2647	2500768
Vibration Exciter	LDS V556	95493/2
Power Amplifier	PA 1000L	N413S0114-005
Field Power Supply	FPS-10L	N419S0114-007
Stanford Spectrum Analyzer	SR-760	14165
Synthesized Function Generator	GFG3015	EF90710
Micromate Remote Facility Calibration Tool	721A1601	21496

Ultra Enviro-Systems (P) Ltd., New Delhi (UES) certifies that the above product was calibrated in accordance with the applicable Instantel procedures. These procedures are part of a quality system that is certified to the Instantel quality standard, and are designed to assure that the product listed above meets or exceeds manufacturer specifications.

UES further certifies that the measurement instruments used during the calibration of this product are traceable to National Standards (NPL New Delhi India). Evidence of traceability is on file at UES and is available upon request.

The environment in which this product was calibrated is maintained within the operating specifications of the instrument.

Instantel recommends that products be returned to Instantel or UES, New Delhi (India) a authorized service and calibration facility for annual calibration.

For ULTRA ENVIRO-SYSTEMS (P) LTD.

Calibrated By :_____

JITENDER KUMAR
Service Engineer
Ultra Enviro-Systems (P) Ltd.
(Instantel Authorised Calibration Centre)

Form 59

888

(See Rule 115 (2))

Pollution Under Control Certificate

Authorised By
Government of Haryana

Date	:	**18/12/2024**
Time	:	**17:48:45 PM**
Validity upto	:	**17/12/2025**

Chassis/VIN No.	:	HR066002800154447
Registration No.	:	HR66B6765
Date of Registration	:	18/Jan/2018
Month & Year of Manufacturing	:	November-2017
Engine/Motor Number	:	******7570
Emission Norms	:	BHARAT STAGE IV
Fuel	:	DIESEL
PUC Code	:	HR0660028
Battery	:	
PUC observation	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High Idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	1.62	0.04

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note: 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator
60mm x 20 mm

Form 59

889

[See Rule 115 (2)]

Pollution Under Control Certificate

Authorised By :
Government of Haryana

Date : **18/12/2024**
Time : **17:43:50 PM**
Validity upto : **17/12/2025**

Certificate Srl. No.	:	HR06600280015444
Registration No.	:	HR66B3589
Date of Registration	:	23/Jan/2021
Month & Year of Manufacturing	:	September-2020
Last Mobile Number	:	******7570
Emission Norms	:	BHARAT STAGE VI
Fuel	:	DIESEL
PUC Centre	:	HR0660028
Centre	:	
Air Conditioner	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High Idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	0.7	0.08

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator
(20 mm x 20 mm)

Form 59

[See 890 (2)]

Pollution Under Control Certificate

Issued by
Government of Haryana

Date	:	**18/12/2024**
Time	:	**17:42:30 PM**
Validity upto	:	**17/12/2025**

Certificate SL No.	:	HR05600280015443
Registration No.	:	HR66B0330
Date of Registration	:	23/Jan/2021
Model & Year of Manufacturing	:	September-2020
Vehicle Number	:	******7570
Emission Norms	:	BHARAT STAGE VI
Fuel	:	DIESEL
PUC Code	:	HR0660028
OBD2	:	
MIL observation	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
	CO	percentage (%)		
High Idling emissions	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	0.7	0.04

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator
60mm x 20 mm

Form 59

[See [illegible] 5 (2)]

891

Pollution Under Control Certificate

Authorised By
Government of Haryana

Date	:	**18/12/2024**
Time	:	**19:18:57 PM**
Validity upto	:	**17/12/2025**

Certificate SL No	:	HR06600280015459
Registration No	:	HR39F4201
Date of Registration	:	29/Jan/2019
Month & Year of Manufacturing	:	August-2018
Chassis Number	:	******7570
Emission Norms	:	BHARAT STAGE IV
Fuel	:	DIESEL
PUC Code	:	HR0660028
Centre	:	
RSI observation	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High Idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	1.62	0.08

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator
50 mm x 20 mm

Form 59

892

[Se... 5 (2)]

Pollution Under Control Certificate

Authorised By :
Government of Haryana

Date : **18/12/2024**
Time : **19:16:07 PM**
Validity upto : **17/12/2025**

Certificate Sl. No.	:	HR06600280015458
Registration No.	:	HR6688171
Date of Registration	:	29/Aug/2019
Month & Year of Manufacturing	:	May-2019
Last Mobile Number	:	******7570
Owner's Name	:	
Fuel	:	BHARAT STAGE IV
PUC Code	:	DIESEL
Centre	:	HR0660028
RTO observation	:	
		No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
	CO	percentage (%)		
High Idling Emissions	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	1.62	0.09

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator
80mm x 20 mm

Form 59

893

[See rule 115(2)]

Pollution Under Control Certificate

Authorised By :

Government of Haryana

Date	:	**18/12/2024**
Time	:	**19:59:35 PM**
Validity upto	:	**17/12/2025**

Certificate SL No	:	HR06600280015462
Registration No	:	HR47D3143
Date of Registration	:	07/Jan/2019
Month & Year of Manufacturing	:	September-2018
Last Mobile Number	:	******7570
Emission Norms	:	BHARAT STAGE IV
Fuel	:	DIESEL
PUC Centre	:	HR0660028
OBD Test	:	
Any observation	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
	CO	percentage (%)		
High idling emissions	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	1.62	0.08

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator
40 mm x 20 mm

Form 59

894

[See rules 115 (2)]

Pollution Under Control Certificate

Authorised By :
Government of Haryana

Date	:	**18/12/2024**
Time	:	**17:35:33 PM**
Validity upto	:	**17/12/2025**

Certificate Sl. No	:	HR06600280015442
Registration No	:	HR66B7563
Date of Registration	:	23/Jan/2021
Month & Year of Manufacturing	:	September-2020
Valid Mobile Number	:	******7570
Emission Norms	:	BHARAT STAGE VI
Fuel	:	DIESEL
PUC Code	:	HR0660028
Owner	:	
Re-inspection	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High Idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	0.7	0.06

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator
50mm x 20 mm

Form 59

[See rule 115(2)]

895

Pollution Under Control Certificate

Authorised By
Government of Haryana

Date	:	**18/12/2024**
Time	:	**17:46:31 PM**
Validity upto	:	**17/12/2025**

Certificate Srl. No.	:	HR06600280015446
Registration No.	:	HR66B8228
Date of Registration	:	23/Jan/2021
Month & Year of Manufacturing	:	September-2020
Last Mobile Number	:	******7570
Emission Norms	:	BHARAT STAGE VI
Fuel	:	DIESEL
PUC Code	:	HR0660028
Colour	:	
VIC conversion	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	0.7	0.04

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator
50 mm x 20 mm

Form 59

[Se... 5 (2)]

896

Pollution Under Control Certificate

Authorised By :
Government of Haryana

Date : **18/12/2024**
Time : **19:14:59 PM**
Validity upto : **17/12/2025**

Certificate SL No.	:	HR06600280015457
Registration No.	:	HR39D6165
Date of Registration	:	06/Aug/2018
Month & Year of Manufacturing	:	June-2018
Last Mobile Number	:	******7570
Emission Norms	:	BHARAT STAGE IV
Fuel	:	DIESEL
PUC Code	:	HR0660028
Colour	:	
VIN (observation)	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
	CO	percentage (%)		
High idling emissions	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	1.62	0.09

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator
40 mm x 20 mm

Form 59

897

[See Rule 115 (2)]

Pollution Under Control Certificate

Authorised By :

Government of Haryana

Date	:	**18/12/2024**
Time	:	**17:45:21 PM**
Validity upto	:	**17/12/2025**

Certificate SL. No.	:	HR066002800154445
Registration No.	:	HR66B2565
Date of Registration	:	23/Jan/2021
Month & Year of Manufacturing	:	September-2020
Vehicle Mobile Number	:	******7570
Emission norms	:	BHARAT STAGE VI
Fuel	:	DIESEL
PUC Code	:	HR0660028
VOTP	:	
PUC Observation	:	No

Vehicle Photo with Registration plate

80 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Tailpipe Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
	CO	percentage (%)		
High Idling with Engine	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	0.7	0.07

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator

50mm x 20 mm

898

Form 59

[See rules 115 (2)]

Pollution Under Control Certificate

Authorised By :
Government of Haryana

Date	:	**18/12/2024**
Time	:	**19:11:37 PM**
Validity upto	:	**17/06/2025**

Certificate SL No.	:	HR06600280015456
Registration No.	:	RJ32GB7347
Date of Registration	:	24/Apr/2017
Month & Year of Manufacturing	:	September-2016
Valid Mobile Number	:	******7570
Emission Norms	:	BHARAT STAGE III
Fuel	:	DIESEL
PUC Code	:	HR0660028
VCR	:	
Mfg observation	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High Idling Emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	2.45	0.05

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator
40mm x 20 mm

Form 59

899

[See [illegible] (2)]

Pollution Under Control Certificate

Authorised By :

Government of Haryana

Date	:	**18/12/2024**
Time	:	**19:10:15 PM**
Validity upto	:	**17/12/2025**

Certificate SL No	:	HR06600280015455
Registration No	:	HR17B0753
Date of Registration	:	05/Oct/2020
Month & Year of Manufacturing	:	July-2020
Vehicle Engine Number	:	******7670
Emission Norms	:	BHARAT STAGE VI
Fuel	:	DIESEL
PUC Code	:	HR0660028
Status	:	
Re-Inspection	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	0.7	0.06

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator
50 mm x 20 mm

Form 59

900

[See rule 115 (2)]

Pollution Under Control Certificate

Authorised By :

Government of Haryana

Date	:	**18/12/2024**
Time	:	**19:08:45 PM**
Validity upto	:	**17/12/2025**

Certificate Srl. No.	:	HR06600280015454
Registration No.	:	HR38Y9927
Date of Registration	:	06/Jul/2018
Month & Year of Manufacturing	:	May-2018
Last Mobile Number	:	******7570
Emission Norms	:	BHARAT STAGE IV
Fuel	:	DIESEL
PUC Code	:	HR0660028
OBD's	:	
VIN Verification	:	No

Vehicle Photo with Registration plate

60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Exhaust Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
	CO	percentage (%)		
High Idling emissions	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	1.62	0.1

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator

50 mm x 20 mm

Form 59

[See Rule 115 (2)]

901

Pollution Under Control Certificate

Authorised By :
Government of Haryana

Date : **18/12/2024**
Time : **19:03:55 PM**
Validity upto : **17/12/2025**

Certificate SL No	:	HR06600280015452
Registration No	:	HR39E3888
Date of Registration	:	10/Aug/2019
Month & Year of Manufacturing	:	July-2019
User Mobile Number	:	******7570
Emission Norms	:	BHARAT STAGE IV
Fuel	:	DIESEL
PUC Code	:	HR0660028
OBD No	:	
VIN Generation	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
	CO	percentage (%)		
High idling emissions	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	1.62	0.08

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator
40mm x 20 mm

Form 59

902

[See Rule 115 (2)]

Pollution Under Control Certificate

Authorised By

Government of Haryana

Date	:	**18/12/2024**
Time	:	**19:05:17 PM**
Validity upto	:	**17/12/2025**

Certificate SL No.	:	HR06600280015453
Registration No.	:	RJ32GC0988
Date of registration	:	31/Aug/2018
Month & Year of Manufacturing	:	June-2018
Vehicle Mobile Number	:	******7570
Emission Norms	:	BHARAT STAGE IV
Fuel	:	DIESEL
PUC Code	:	HR0660028
VIN	:	
Any Convenience	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	1.62	0.08

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note: 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator
30 mm x 20 mm

Form 59

903

[See rules 115 (2)]

Pollution Under Control Certificate

Authorised By

Government of Haryana

Date	:	**18/12/2024**
Time	:	**18:34:32 PM**
Validity upto	:	**17/12/2025**

Certificate ID No	:	HR06600280015451
Registration No	:	HR39E7213
Date of Registration	:	09/Aug/2019
Month & Year of Manufacturing	:	June-2019
Valid Mobile Number	:	******7670
Emission Norms	:	BHARAT STAGE IV
Fuel	:	DIESEL
PUC Code	:	HR0660028
OBTN	:	
Any observation	:	No

Vehicle Photo with Registration plate

60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
	CO	percentage (%)		
High idling emissions	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	1.62	0.08

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator

40 mm x 20 mm

Form 59

904

[See Rule 115 (2)]

Pollution Under Control Certificate

Authorised By :
Government of Haryana

Date	:	**18/12/2024**
Time	:	**18:32:13 PM**
Validity upto	:	**17/12/2025**

Certificate SL. No.	:	HR06600280015450
Registration No.	:	HR66B6164
Date of Registration	:	07/Nov/2019
Month & Year of Manufacturing	:	June-2019
Valid Mobile Number	:	******7570
Emission Norms	:	BHARAT STAGE IV
Fuel	:	DIESEL
PUC Centre	:	HR0660028
Owner	:	
PUC Exemption	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	1.62	0.08

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator
80 mm x 20 mm

Form 59

[See rules 115 (2)]

Pollution Under Control Certificate

Authorised By :
Government of Haryana

Date	:	**18/12/2024**
Time	:	**18:29:17 PM**
Validity upto	:	**17/12/2025**

Certificate Sr. No	:	HR06600280015449
Registration No	:	HR38X7727
Date of Registration	:	17/Nov/2017
Month & Year of Manufacturing	:	October-2017
Last Mobile Number	:	******7570
Emission Norms	:	BHARAT STAGE IV
Fuel	:	DIESEL
PUC Code	:	HR0660028
Cat No	:	
Re observation	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
	CO	percentage (%)		
High idling emissions	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absurption coefficient	1/metre	1.62	0.09

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator
50mm x 20 mm

Form 59

906

[See Rule 115 (2)]

Pollution Under Control Certificate

Authorised By :

Government of Haryana

Date	:	**18/12/2024**
Time	:	**19:41:06 PM**
Validity upto	:	**17/06/2025**

RJ32GB5641

Certificate SL. No	:	HR06600280015461
Registration No.	:	RJ32GB5641
Date of Registration	:	17/Jun/2016
Month & Year of Manufacturing	:	April-2016
Last Mobile Number	:	******7570
Emission Norms	:	BHARAT STAGE III
Fuel	:	DIESEL
PUC Code	:	HR0660028
OBFM	:	
Any modification	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	2.45	0.06

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator
40mm x 20 mm

907

Form 59

[See Rule 115 (2)]

Pollution Under Control Certificate

Authorised By :

Government of Haryana

Date	:	**18/12/2024**
Time	:	**19:39:50 PM**
Validity upto	:	**17/06/2025**

Certificate SL. No	:	HR06600280015460
Registration No	:	RJ14GG5253
Date of Registration	:	24/Jul/2015
Month & Year of Manufacturing	:	June-2015
Last Mobile Number	:	******7570
Emission Norms	:	BHARAT STAGE I
Fuel	:	DIESEL
PUC Code	:	HR0660028
OSTA	:	
MS observation	:	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)		
	Hydrocarbon, (THC/HC)	ppm		
High Idling emissions	CO	percentage (%)		
	RPM	RPM	2500 ± 200	
	Lambda	-	1 ± 0.03	
Smoke Density	Light absorption coefficient	1/metre	2.45	0.06

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://puc.parivahan.gov.in

Authorised Signature with stamp of PUC Operator
(Min 20 mm)

बायल

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PLANTATION

दो गज की दूरी,
मास्क है जरूरी।

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BAYAL QUARTZ
FELDSPAR AND STONE MINES
www.cbmltec.in

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number	:	VEL/AP/01	**Report No.**	:	VEL/AP/240919/001
Name and Address of the Party	:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.**	:	7.8F – 03
			Party Reference No.	:	NIL
			Reporting Date	:	25/09/2024
			Period of Analysis	:	19/09/2024-25/09/2024
			Receipt Date	:	19/09/2024
Name of Sample	:	**AMBIENT AIR**			
Sample Group	:	Atmospheric Pollution			

General Information

Sampling Location	:	Near Mining Site
Sample Collected By	:	VEL Representative
Sampling Equipment Used	:	RDS and FPS with all accessories
Instrument Code	:	VEL/RDS/02 & FPS/06
Instrument Calibration Status	:	Calibrated
Meteorological Condition during Monitoring	:	Clear Sky
Date of Monitoring	:	18/09/2024 - 19/09/2024
Time of Monitoring	:	10:00 AM to 10:00 AM
Ambient Temperature (°C)	:	22.0 Min to 33.0 Max
Surrounding Activity	:	Mining, Vehicular and Human Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS:5182
Sample Duration	:	24.0 Hrs.
Parameter Required	:	As per Work Order

S.No.	Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter (as PM_{10})	IS:5182 (P-23):2006 RA 2017	81.25	$\mu g/m^3$	100
2	Particulate Matter (as $PM_{2.5}$)	IS:5182 (P-24):2019	51.22	$\mu g/m^3$	60
3	Nitrogen Dioxide (NO_2)	IS:5182 (P-6):2006 RA:2022	15.38	$\mu g/m^3$	80
4	Sulphur Dioxide (SO_2)	IS:5182 (P-2): RA:2023	7.8	$\mu g/m^3$	80
5	#Carbon monoxide (CO)	IS 5182 (P-10), NDIR Method	0.91	mg/m^3	4.0

Note: # - indicates CO monitoring for 1 hour

*** End of Report ***

VARDAN ENVIROLAB GURGRAM

(Reviewed By)

VARDAN ENVIROLAB GURGRAM

(Authorized Signatory)

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number	:	VEL/AP/02	**Report No.**	:	VEL/AP/240919/002
Name and Address of the Party	:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.**	:	7.8F – 03
			Party Reference No.	:	NIL
			Reporting Date	:	25/09/2024
			Period of Analysis	:	19/09/2024-25/09/2024
			Receipt Date	:	19/09/2024
Name of Sample	:	**AMBIENT AIR**			
Sample Group	:	Atmospheric Pollution			

General Information

Sampling Location	:	Haul Road
Sample Collected By	:	VEL Representative
Sampling Equipment Used	:	RDS and FPS with all accessories
Instrument Code	:	VEL/RDS/03 & FPS/05
Instrument Calibration Status	:	Calibrated
Meteorological Condition during Monitoring	:	Clear Sky
Date of Monitoring	:	18/09/2024 - 19/09/2024
Time of Monitoring	:	11:45 AM to 11:45 AM
Ambient Temperature (°C)	:	22.0 Min to 33.0 Max
Surrounding Activity	:	Human and Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS:5182
Sample Duration	:	24.0 Hrs.
Parameter Required	:	As per Work Order

S.No.	Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter (as PM_{10})	IS:5182 (P-23):2006 RA 2017	90.21	$\mu g/m^3$	100
2	Particulate Matter (as $PM_{2.5}$)	IS:5182 (P-24):2019	56.38	$\mu g/m^3$	60
3	Nitrogen Dioxide (NO_2)	IS:5182 (P-6):2006 RA:2022	24.57	$\mu g/m^3$	80
4	Sulphur Dioxide (SO_2)	IS:5182 (P-2): RA:2023	10.45	$\mu g/m^3$	80
5	Carbon monoxide (CO)	IS 5182 (P-10), NDIR Method	0.95	mg/m^3	4.0

Note: # - indicates CO monitoring for 1 hour

*** End of Report ***

VARDAN ENVIROLAB GURUGRAM

(Reviewed By)

(Authorized Signatory)

VARDAN ENVIROLAB GURUGRAM

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number	:	VEL/AP/03	**Report No.**	:	VEL/AP/240919/003
Name and Address of the Party	:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.**	:	7.8F – 03
			Party Reference No.	:	NIL
			Reporting Date	:	25/09/2024
			Period of Analysis	:	19/09/2024-25/09/2024
			Receipt Date	:	19/09/2024
Name of Sample	:	**AMBIENT AIR**			
Sample Group	:	Atmospheric Pollution			

General Information

Sampling Location	:	Loading Point
Sample Collected By	:	VEL Representative
Sampling Equipment Used	:	RDS and FPS with all accessories
Instrument Code	:	VEL/RDS/04 & FPS/03
Instrument Calibration Status	:	Calibrated
Meteorological Condition during Monitoring	:	Clear Sky
Date of Monitoring	:	18/09/2024 - 19/09/2024
Time of Monitoring	:	10:20 AM to 10:20 AM
Ambient Temperature (°C)	:	22.0 Min to 33.0 Max
Surrounding Activity	:	Human and Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS:5182
Sample Duration	:	24.0 Hrs.
Parameter Required	:	As per Work Order

S.No.	Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter (as PM_{10})	IS:5182 (P-23):2006 RA 2017	90.22	$\mu g/m^3$	100
2	Particulate Matter (as $PM_{2.5}$)	IS:5182 (P-24):2019	58.36	$\mu g/m^3$	60
3	Nitrogen Dioxide (NO_2)	IS:5182 (P-6):2006 RA:2022	20.17	$\mu g/m^3$	80
4	Sulphur Dioxide (SO_2)	IS:5182 (P-2): RA:2023	11.25	$\mu g/m^3$	80
5	Carbon monoxide (CO)	IS 5182 (P-10), NDIR Method	0.95	mg/m^3	4.0

Note: # - indicates CO monitoring for 1 hour

*** End of Report ***

VARDAN ENVIROLAB GURUGRAM

(Reviewed By)

(Authorized Signatory)

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number	:	VEL/AP/04	**Report No.**	:	VEL/AP/240919/004
Name and Address of the Party	:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.**	:	7.8F – 03
			Party Reference No.	:	NIL
			Reporting Date	:	25/09/2024
			Period of Analysis	:	19/09/2024-25/09/2024
			Receipt Date	:	19/09/2024
Name of Sample	:	**AMBIENT AIR**			
Sample Group	:	Atmospheric Pollution			

General Information

Sampling Location	:	Village- Bayal
Sample Collected By	:	VEL Representative
Sampling Equipment Used	:	RDS and FPS with all accessories
Instrument Code	:	VEL/RDS/07 & FPS/02
Instrument Calibration Status	:	Calibrated
Meteorological Condition during Monitoring	:	Clear Sky
Date of Monitoring	:	18/09/2024 - 19/09/2024
Time of Monitoring	:	10:45 AM to 10:45 AM
Ambient Temperature (°C)	:	22.0 Min to 33.0 Max
Surrounding Activity	:	Human and Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS:5182
Sample Duration	:	24.0 Hrs.
Parameter Required	:	As per Work Order

S.No.	Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter (as PM_{10})	IS:5182 (P-23):2006 RA 2017	79.24	$\mu g/m^3$	100
2	Particulate Matter (as $PM_{2.5}$)	IS:5182 (P-24):2019	56.36	$\mu g/m^3$	60
3	Nitrogen Dioxide (NO_2)	IS:5182 (P-6):2006 RA:2022	16.28	$\mu g/m^3$	80
4	Sulphur Dioxide (SO_2)	IS:5182 (P-2): RA:2023	7.1	$\mu g/m^3$	80
5	Carbon monoxide (CO)	IS 5182 (P-10), NDIR Method	0.79	mg/m^3	4.0

Note: # - indicates CO monitoring for 1 hour

*** End of Report ***

VARDAN ENVIROLAB GURUGRAM

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VARDAN ENVIROLAB GURUGRAM

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number	:	VEL/AP/05	**Report No.**	:	VEL/AP/240919/005
Name and Address of the Party	:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.**	:	7.8F – 03
			Party Reference No.	:	NIL
			Reporting Date	:	25/09/2024
			Period of Analysis	:	19/09/2024-25/09/2024
			Receipt Date	:	19/09/2024
Name of Sample	:	**AMBIENT AIR**			
Sample Group	:	Atmospheric Pollution			

General Information

Sampling Location	:	100 mtr from Mine Site
Sample Collected By	:	VEL Representative
Sampling Equipment Used	:	RDS and FPS with all accessories
Instrument Code	:	VEL/RDS/05 & FPS/07
Instrument Calibration Status	:	Calibrated
Meteorological Condition during Monitoring	:	Clear Sky
Date of Monitoring	:	18/09/2024 - 19/09/2024
Time of Monitoring	:	11:20 PM to 11:20 PM
Ambient Temperature (°C)	:	22.0 Min to 33.0 Max
Surrounding Activity	:	Human and Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS:5182
Sample Duration	:	24.0 Hrs.
Parameter Required	:	As per Work Order

S.No.	Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter (as PM_{10})	IS:5182 (P-23):2006 RA 2017	85.19	$\mu g/m^3$	100
2	Particulate Matter (as $PM_{2.5}$)	IS:5182 (P-24):2019	54.22	$\mu g/m^3$	60
3	Nitrogen Dioxide (NO_2)	IS:5182 (P-6):2006 RA:2022	18.27	$\mu g/m^3$	80
4	Sulphur Dioxide (SO_2)	IS:5182 (P-2): RA:2023	9.8	$\mu g/m^3$	80
5	Carbon monoxide (CO)	IS 5182 (P-10), NDIR Method	0.94	mg/m^3	4.0

Note: # - indicates CO monitoring for 1 hour

*** End of Report ***

VARDAN ENVIROLAB GURUGRAM

(Reviewed By)

(Authorized Signatory)

VARDAN ENVIROLAB GURUGRAM

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number	:	VEL/AP/06	**Report No.**	:	VEL/AP/240919/006
Name and Address of the Party	:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.**	:	7.8F – 03
			Party Reference No.	:	NIL
			Reporting Date	:	25/09/2024
			Period of Analysis	:	19/09/2024-25/09/2024
			Receipt Date	:	19/09/2024
Name of Sample	:	**AMBIENT AIR**			
Sample Group	:	Atmospheric Pollution			

General Information

Sampling Location	:	Village - Doyala
Sample Collected By	:	VEL Representative
Sampling Equipment Used	:	RDS and FPS with all accessories
Instrument Code	:	VEL/RDS/07 & FPS/04
Instrument Calibration Status	:	Calibrated
Meteorological Condition during Monitoring	:	Clear Sky
Date of Monitoring	:	18/09/2024 - 19/09/2024
Time of Monitoring	:	12:15 PM to 12:15 PM
Ambient Temperature (°C)	:	22.0 Min to 33.0 Max
Surrounding Activity	:	Human and Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS:5182
Sample Duration	:	24.0 Hrs.
Parameter Required	:	As per Work Order

S.No.	Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter (as PM_{10})	IS:5182 (P-23):2006 RA 2017	71.54	$\mu g/m^3$	100
2	Particulate Matter (as $PM_{2.5}$)	IS:5182 (P-24):2019	52.27	$\mu g/m^3$	60
3	Nitrogen Dioxide (NO_2)	IS:5182 (P-6):2006 RA:2022	14.3	$\mu g/m^3$	80
4	Sulphur Dioxide (SO_2)	IS:5182 (P-2): RA:2023	7.1	$\mu g/m^3$	80
5	Carbon monoxide (CO)	IS 5182 (P-10), NDIR Method	0.71	mg/m^3	4.0

Note: # - indicates CO monitoring for 1 hour

*** End of Report ***

VARDAN ENVIROLAB GURUGRAM

(Reviewed By)

(Authorized Signatory)

VARDAN ENVIROLAB GURUGRAM

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number	:	VEL/AP/07	**Report No.**	:	VEL/AP/240906/007
Name and Address of the Party	:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.**	:	7.8F – 03
			Party Reference No.	:	NIL
			Reporting Date	:	25/09/2024
			Period of Analysis	:	19/09/2024-25/09/2024
			Receipt Date	:	19/09/2024
Name of Sample	:	**AMBIENT NOISE**			
Sample Group	:	Atmospheric Pollution			

General Information

Sampling Location	:	Near Mining Site
Sample Collected By	:	VEL Representative (Mr. Mukesh)
Sampling Equipment Used	:	Sound Level Meter
Instrument Code	:	VEL/ENV/SLM/05
Instrument Calibration Status	:	Calibrated
Meteorological Condition during Monitoring	:	Clear Sky
Date of Monitoring	:	18/09/2024- 19/09/2024
Time of Monitoring	:	10:10 AM to 10:10 AM
Ambient Temperature (°C)	:	22.0 Min to 33.0 Max
Surrounding Activity	:	Human, Vehicular and Other Mining Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	CPCB & IS:9989
Sample Duration	:	24.0 Hrs.
Parameter Required	:	As per Work Order

S.No.	Parameters	Test Method	Test Results		Units
			Day Time (06:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	**$L_{eq.}$**	**IS – 9989**	66.81	56.21	**dB(A)**

Ambient Noise Quality Standards as per Noise Pollution (Regulations and Control), 2000

Area Code	Category of Area/Zone	Limits in dB (A) eq.	
		Day Time	Night Time
A	Industrial Area	75.00	70.00
B	Commercial Area	65.00	55.00
C	Residential Area	55.00	45.00
D	Silence Zone	50.00	40.00

Day time shall mean from 06:00 AM to 10:00 PM., Night time shall mean from 10:00 PM to 06:00 AM. Silence Zone is an area comprising not less than 100 m around the hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority, Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.
*dB(A) L_{eq} denotes the time weighted average of the level of sound in decibels on scale 'A' which is related to human hearing.

*** End of Report ***

(Reviewed By) **(Authorized Signatory)**

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number	:	VEL/AP/08	**Report No.**	:	VEL/AP/240906/008
Name and Address of the Party	:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.**	:	7.8F – 03
			Party Reference No.	:	NIL
			Reporting Date	:	25/09/2024
			Period of Analysis	:	19/09/2024-25/09/2024
			Receipt Date	:	19/09/2024
Name of Sample	:	**AMBIENT NOISE**			
Sample Group	:	Atmospheric Pollution			

General Information

Sampling Location	:	Haul Road
Sample Collected By	:	VEL Representative (Mr. Mukesh)
Sampling Equipment Used	:	Sound Level Meter
Instrument Code	:	VEL/ENV/SLM/02
Instrument Calibration Status	:	Calibrated
Meteorological Condition during Monitoring	:	Clear Sky
Date of Monitoring	:	18/09/2024- 19/09/2024
Time of Monitoring	:	11:55 AM to 11:55 AM
Ambient Temperature (°C)	:	22.0 Min to 33.0 Max
Surrounding Activity	:	Human and Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	CPCB & IS:9989
Sample Duration	:	24.0 Hrs.
Parameter Required	:	As per Work Order

S.No.	Parameters	Test Method	Test Results		Units
			Day Time (06:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	**$L_{eq.}$**	**IS – 9989**	65.48	54.39	**dB(A)**

Ambient Noise Quality Standards as per Noise Pollution (Regulations and Control), 2000

Area Code	Category of Area/Zone	Limits in dB (A) eq.	
		Day Time	Night Time
A	Industrial Area	75.00	70.00
B	Commercial Area	65.00	55.00
C	Residential Area	55.00	45.00
D	Silence Zone	50.00	40.00

Day time shall mean from 06:00 AM to 10:00 PM., Night time shall mean from 10:00 PM to 06:00 AM. Silence Zone is an area comprising not less than 100 m around the hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority, Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.
*dB(A) L_{eq} denotes the time weighted average of the level of sound in decibels on scale 'A' which is related to human hearing.

*** End of Report ***

(Reviewed By) **(Authorized Signatory)**

Vardan Enviolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number	:	VEL/AP/09	**Report No.**	:	VEL/AP/240906/009
Name and Address of the Party	:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.**	:	7.8F – 03
			Party Reference No.	:	NIL
			Reporting Date	:	25/09/2024
			Period of Analysis	:	19/09/2024-25/09/2024
			Receipt Date	:	19/09/2024
Name of Sample	:	**AMBIENT NOISE**			
Sample Group	:	Atmospheric Pollution			

General Information

Sampling Location	:	Loading Point
Sample Collected By	:	VEL Representative (Mr. Mukesh)
Sampling Equipment Used	:	Sound Level Meter
Instrument Code	:	VEL/ENV/SLM/08
Instrument Calibration Status	:	Calibrated
Meteorological Condition during Monitoring	:	Clear Sky
Date of Monitoring	:	18/09/2024- 19/09/2024
Time of Monitoring	:	10:30 AM to 10:30 AM
Ambient Temperature (°C)	:	22.0 Min to 33.0 Max
Surrounding Activity	:	Human and Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	CPCB & IS:9989
Sample Duration	:	24.0 Hrs.
Parameter Required	:	As per Work Order

S.No.	Parameters	Test Method	Test Results		Units
			Day Time (06:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	**$L_{eq.}$**	**IS – 9989**	66.48	54.28	**dB(A)**

Ambient Noise Quality Standards as per Noise Pollution (Regulations and Control), 2000

Area Code	Category of Area/Zone	Limits in dB (A) eq.	
		Day Time	Night Time
A	Industrial Area	75.00	70.00
B	Commercial Area	65.00	55.00
C	Residential Area	55.00	45.00
D	Silence Zone	50.00	40.00

Day time shall mean from 06:00 AM to 10:00 PM., Night time shall mean from 10:00 PM to 06:00 AM. Silence Zone is an area comprising not less than 100 m around the hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority, Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.
*dB(A) L_{eq} denotes the time weighted average of the level of sound in decibels on scale 'A' which is related to human hearing.

*** End of Report ***

VARDAN ENVIROLAB GURUGRAM

(Reviewed By)

(Authorized Signatory)

VARDAN ENVIROLAB GURUGRAM

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number	:	VEL/AP/10	**Report No.**	:	VEL/AP/240906/010
Name and Address of the Party	:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.**	:	7.8F – 03
			Party Reference No.	:	NIL
			Reporting Date	:	25/09/2024
			Period of Analysis	:	19/09/2024-25/09/2024
			Receipt Date	:	19/09/2024
Name of Sample	:	**AMBIENT NOISE**			
Sample Group	:	Atmospheric Pollution			

General Information

Sampling Location	:	Village- Bayal
Sample Collected By	:	VEL Representative (Mr. Mukesh)
Sampling Equipment Used	:	Sound Level Meter
Instrument Code	:	VEL/ENV/SLM/03
Instrument Calibration Status	:	Calibrated
Meteorological Condition during Monitoring	:	Clear Sky
Date of Monitoring	:	18/09/2024- 19/09/2024
Time of Monitoring	:	11:00 AM to 11:00 AM
Ambient Temperature (°C)	:	22.0 Min to 33.0 Max
Surrounding Activity	:	Human and Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	CPCB & IS:9989
Sample Duration	:	24.0 Hrs.
Parameter Required	:	As per Work Order

S.No.	Parameters	Test Method	Test Results		Units
			Day Time (06:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	**$L_{eq.}$**	**IS – 9989**	52.11	43.67	**dB(A)**

Ambient Noise Quality Standards as per Noise Pollution (Regulations and Control), 2000

Area Code	Category of Area/Zone	Limits in dB (A) eq.	
		Day Time	Night Time
A	Industrial Area	75.00	70.00
B	Commercial Area	65.00	55.00
C	Residential Area	55.00	45.00
D	Silence Zone	50.00	40.00

Day time shall mean from 06:00 AM to 10:00 PM., Night time shall mean from 10:00 PM to 06:00 AM. Silence Zone is an area comprising not less than 100 m around the hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority, Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.
*dB(A) L_{eq} denoted the time weighted average of the level of sound in decibels on scale 'A' which is related to human hearing.

*** End of Report ***

(Reviewed By) **(Authorized Signatory)**

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number	:	VEL/AP/11	**Report No.**	:	VEL/AP/240906/011
Name and Address of the Party	:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.**	:	7.8F – 03
			Party Reference No.	:	NIL
			Reporting Date	:	25/09/2024
			Period of Analysis	:	19/09/2024-25/09/2024
			Receipt Date	:	19/09/2024
Name of Sample	:	**AMBIENT NOISE**			
Sample Group	:	Atmospheric Pollution			

General Information

Sampling Location	:	100 mtr from Mine Site
Sample Collected By	:	VEL Representative (Mr. Mukesh)
Sampling Equipment Used	:	Sound Level Meter
Instrument Code	:	VEL/ENV/SLM/09
Instrument Calibration Status	:	Calibrated
Meteorological Condition during Monitoring	:	Clear Sky
Date of Monitoring	:	18/09/2024- 19/09/2024
Time of Monitoring	:	11:30 PM to 11:30 PM
Ambient Temperature (°C)	:	22.0 Min to 33.0 Max
Surrounding Activity	:	Human and Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	CPCB & IS:9989
Sample Duration	:	24.0 Hrs.
Parameter Required	:	As per Work Order

S.No.	Parameters	Test Method	Test Results		Units
			Day Time (06:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	**$L_{eq.}$**	**IS – 9989**	67.25	58.21	**dB(A)**

Ambient Noise Quality Standards as per Noise Pollution (Regulations and Control), 2000

Area Code	Category of Area/Zone	Limits in dB (A) eq.	
		Day Time	Night Time
A	Industrial Area	75.00	70.00
B	Commercial Area	65.00	55.00
C	Residential Area	55.00	45.00
D	Silence Zone	50.00	40.00

Day time shall mean from 06:00 AM to 10:00 PM., Night time shall mean from 10:00 PM to 06:00 AM. Silence Zone is an area comprising not less than 100 m around the hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority, Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.
*dB(A) L_{eq} denotes the time weighted average of the level of sound in decibels on scale 'A' which is related to human hearing.

*** End of Report ***

(Reviewed By) **(Authorized Signatory)**

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number	:	VEL/AP/12	**Report No.**	:	VEL/AP/240906/012
Name and Address of the Party	:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.**	:	7.8F – 03
			Party Reference No.	:	NIL
			Reporting Date	:	25/09/2024
			Period of Analysis	:	19/09/2024-25/09/2024
			Receipt Date	:	19/09/2024
Name of Sample	:	**AMBIENT NOISE**			
Sample Group	:	Atmospheric Pollution			

General Information

Sampling Location	:	Village - Doyala
Sample Collected By	:	VEL Representative (Mr. Mukesh)
Sampling Equipment Used	:	Sound Level Meter
Instrument Code	:	VEL/ENV/SLM/07
Instrument Calibration Status	:	Calibrated
Meteorological Condition during Monitoring	:	Clear Sky
Date of Monitoring	:	18/09/2024- 19/09/2024
Time of Monitoring	:	12:30 PM to 12:30 PM
Ambient Temperature (°C)	:	22.0 Min to 33.0 Max
Surrounding Activity	:	Human and Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	CPCB & IS:9989
Sample Duration	:	24.0 Hrs.
Parameter Required	:	As per Work Order

S.No.	Parameters	Test Method	Test Results		Units
			Day Time (06:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	**$L_{eq.}$**	**IS – 9989**	50.85	39.27	**dB(A)**

Ambient Noise Quality Standards as per Noise Pollution (Regulations and Control), 2000

Area Code	Category of Area/Zone	Limits in dB (A) eq.	
		Day Time	Night Time
A	Industrial Area	75.00	70.00
B	Commercial Area	65.00	55.00
C	Residential Area	55.00	45.00
D	Silence Zone	50.00	40.00

Day time shall mean from 06:00 AM to 10:00 PM., Night time shall mean from 10:00 PM to 06:00 AM. Silence Zone is an area comprising not less than 100 m around the hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority, Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.
*dB(A) L_{eq} denotes the time weighted average of the level of sound in decibels on scale 'A' which is related to human hearing.

*** End of Report ***

VARDAN ENVIROLAB GURGRAM

(Reviewed By)

(Authorized Signatory)

VARDAN ENVIROLAB GURGRAM

Vardan Enviolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/W/01
Name & Address of the Project: M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR)
Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka- Narnaul
Sample Description: **Ground Water Sample**
Sample Group: Water/ Residues and contaminants in water
Sample Location: Near Mining Site
Sample Collected by: Vardan Enviro Lab Representative
Environmental Conditions: 25 ± 2°C
Sampling and Analysis Protocol: IS, APHA & STP

Report No.: VEL/W/240508/001
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 14/05/2024
Period of Analysis: 08/05/2024-14/05/2024
Receipt Date: 08/05/2024
Sampling Date: 08/05/2024
Sampling Quantity: 5.0 Ltr + 250ml.
Sampling Type: Grab
Preservation: Ice Box
Preservation: Ice Box

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 - 2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 :Part 11:1983(Electrode Method)	7.41	--	6.5 to 8.5	No Relaxation
2.	Colour, max	IS:3025 :Part-4:1983(Visual Comparison Method)	*BLQ(**LOQ-1.0)	Hazen	5	15
3.	Turbidity, max	IS: 3025:P-10:1984(Nephlometric Method)	*BLQ(**LOQ-1.0)	NTU	1	5
4.	Odour	IS: 3025:P-5:1983	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS: 3025:P-8: 1984	Agreeable	mg/L	Agreeable	Agreeable
6.	Total Dissolved Solids (at 180°C ± 1ºC)	IS: 3025:P-16:1984(Gravimetric Method)	559.00	mg/L	500	2000
7.	Calcium (as Ca), max	IS: 3025 (P-40): 1991(EDTA Titrimetric Method)	65.83	mg/L	75	200
8.	Alkalinity (as $CaCO_3$)	IS:3025 :Part 23:: 1986(indicator Method)	282.00	mg/L	200	600
9.	Chloride (as Cl), max	IS:3025 (Part 32):1988(Argentometric Method)	91.28	mg/L	250	1000
10.	Magnesium (as Mg), max	APHA 23rd Edition2017: 3500 Mg B	11.68	mg/L	30	100
11.	Total Hardness (as $CaCO_3$), max	IS 3025:P-21:2009(EDTA Titrimetric Method)	212.65	mg/L	200	600
12.	Sulphate (as SO_4), max	IS:3025 (P-24/Sec-1): 2022 Turbidity Method	46.38	mg/L	200	400
13.	Fluoride (as F), max	APHA 23rd Edition : 2017: 4500 F-D: (SPADNS Method)	0.44	mg/L	1.0	1.5
14.	Nitrate (as NO_3), max	APHA 23rd Edition:2017, 4500 NO3. B (Ultraviolate Screening Method)	38.65	mg/L	45	No Relaxation
15.	Iron (as Fe), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.28	mg/L	1.0	No relaxation
16.	Aluminium (as Al), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.005)	mg/L	0.03	0.2
17.	Boron (as B), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.12	mg/L	0.5	2.4

VARDAN ENVIROLAB GURGRAM

(Reviewed By)

VARDAN ENVIROLAB GURGRAM

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Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: **VEL/W/01**					**Report No.: VEL/W/240508/001**	
S. No.	**Parameter**	**Test-Method**	**Result**	**Unit**	**Limits of IS:10500 - 2012**	
					Requirement (Acceptable Limit)	**Permissible limit in the Absence of Alternate Source**
18.	Total Chromium (as Cr), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.02)	mg/L	0.05	No Relaxation
19.	Phenolic Compounds (as C_6H_5OH), max	Clause-6 of IS 3025 (P-43/Sec-1):2022(With Chloroform Extraction Method)	*BLQ(**LOQ-0.0005)	mg/L	0.001	0.002
20.	Mineral Oil	IS:3025 :Part 39: 2021(Infrared Spectroscopic Method)	*BLQ(**LOQ-0.1)	mg/L	1.0	No Relaxation
21.	Anionic Detergents (as MBAS), max	IS:3025 :P-68: : 2019(Methylene Blue Method)	*BLQ(**LOQ-0.05)	mg/L	0.2	1.0
22.	Zinc (as Zn), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	2.98	mg/L	5	15
23.	Copper (as Cu), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.02)	mg/L	0.05	1.5
24.	Manganese (as Mn), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.01)	mg/L	0.1	0.3
25.	Selenium (as Se), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.001)	mg/L	0.01	No Relaxation
26.	Cadmium (as Cd), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.002)	mg/L	0.01	No Relaxation
28.	Cyanide(as CN), max	IS:3025 (P-27/Sec1):2021,Pyridin Barbituric Acid Method	*BLQ(**LOQ-0.02)	mg/L	0.05	No Relaxation
29.	Arsenic (as As), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.005)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.0005)	mg/L	0.001	No Relaxation

Note - *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification

S. No.	**Parameter**	**Test-Method**	**Result**	**Unit**	**Limits of IS:10500 - 2012**	
					Requirement (Acceptable Limit)	**Permissible limit in the Absence of Alternate Source**
31.	Total Coliform	APHA 9221 B	< 1.8	MPN/100ml	-	
32.	E. Coli	APHA 9221 F	< 1.8	MPN/100ml	-	

*** End of Report ***

(Reviewed By) **(Authorized Signatory)**

Vardan Enviolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/W/02	**Report No.:**	VEL/W/240508/002
Name & Address of the Project:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka- Narnaul	**Format No.:**	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	14/05/2024
		Period of Analysis:	08/05/2024-14/05/2024
		Receipt Date:	08/05/2024
		Sampling Date:	08/05/2024
Sample Description:	**Ground Water Sample**	**Sampling Quantity:**	5.0 Ltr + 250ml.
Sample Group:	Water/ Residues and contaminants in water	**Sampling Type:**	Grab
Sample Location:	Village - Doyala	**Preservation:**	Ice Box
Sample Collected by:	Vardan Enviro Lab Representative	**Preservation:**	Ice Box
Environmental Conditions:	25 ± 2°C		
Sampling and Analysis Protocol:	IS, APHA & STP		

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 - 2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 :Part 11:1983(Electrode Method)	7.26	--	6.5 to 8.5	No Relaxation
2.	Colour, max	IS:3025 :Part-4:1983(Visual Comparison Method)	*BLQ(**LOQ-1.0)	Hazen	5	15
3.	Turbidity, max	IS: 3025:P-10:1984(Nephlometric Method)	*BLQ(**LOQ-1.0)	NTU	1	5
4.	Odour	IS: 3025:P-5:1983	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS: 3025:P-8: 1984	Agreeable	mg/L	Agreeable	Agreeable
6.	Total Dissolved Solids (at 180°C ± 1ºC)	IS: 3025:P-16:1984(Gravimetric Method)	520.00	mg/L	500	2000
7.	Calcium (as Ca), max	IS: 3025 (P-40): 1991(EDTA Titrimetric Method)	58.26	mg/L	75	200
8.	Alkalinity (as $CaCO_3$)	IS:3025 :Part 23:: 1986(indicator Method)	274.25	mg/L	200	600
9.	Chloride (as Cl), max	IS:3025 (Part 32):1988(Argentometric Method)	81.32	mg/L	250	1000
10.	Magnesium (as Mg), max	APHA 23rd Edition2017: 3500 Mg B	20.08	mg/L	30	100
11.	Total Hardness (as $CaCO_3$), max	IS 3025:P-21:2009(EDTA Titrimetric Method)	228.30	mg/L	200	600
12.	Sulphate (as SO_4), max	IS:3025 (P-24/Sec-1): 2022 Turbidity Method	41.22	mg/L	200	400
13.	Fluoride (as F), max	APHA 23rd Edition : 2017: 4500 F-D: (SPADNS Method)	0.51	mg/L	1.0	1.5
14.	Nitrate (as NO_3), max	APHA 23rd Edition:2017, 4500 NO3. B (Ultraviolate Screening Method)	44.36	mg/L	45	No Relaxation
15.	Iron (as Fe), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.31	mg/L	1.0	No relaxation
16.	Aluminium (as Al), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.005)	mg/L	0.03	0.2
17.	Boron (as B), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.16	mg/L	0.5	2.4

VARDAN ENVIROLAB GURGRAM

(Reviewed By)

VARDAN ENVIROLAB GURGRAM

(Authorized Signatory)

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: **VEL/W/02**					**Report No.: VEL/W/240508/002**	
S. No.	**Parameter**	**Test-Method**	**Result**	**Unit**	**Limits of IS:10500 - 2012**	
					Requirement (Acceptable Limit)	**Permissible limit in the Absence of Alternate Source**
18.	Total Chromium (as Cr), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.02)	mg/L	0.05	No Relaxation
19.	Phenolic Compounds (as C_6H_5OH), max	Clause-6 of IS 3025 (P-43/Sec-1):2022(With Chloroform Extraction Method)	*BLQ(**LOQ-0.0005)	mg/L	0.001	0.002
20.	Mineral Oil	IS:3025 :Part 39: 2021(Infrared Spectroscopic Method)	*BLQ(**LOQ-0.1)	mg/L	1.0	No Relaxation
21.	Anionic Detergents (as MBAS), max	IS:3025 :P-68: : 2019(Methylene Blue Method)	*BLQ(**LOQ-0.05)	mg/L	0.2	1.0
22.	Zinc (as Zn), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	1.69	mg/L	5	15
23.	Copper (as Cu), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.02)	mg/L	0.05	1.5
24.	Manganese (as Mn), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.01)	mg/L	0.1	0.3
25.	Selenium (as Se), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.001)	mg/L	0.01	No Relaxation
26.	Cadmium (as Cd), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.002)	mg/L	0.01	No Relaxation
28.	Cyanide(as CN), max	IS:3025 (P-27/Sec1):2021,Pyridin Barbituric Acid Method	*BLQ(**LOQ-0.02)	mg/L	0.05	No Relaxation
29.	Arsenic (as As), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.005)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.0005)	mg/L	0.001	No Relaxation

Note - *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification

S. No.	**Parameter**	**Test-Method**	**Result**	**Unit**	**Limits of IS:10500 - 2012**	
					Requirement (Acceptable Limit)	**Permissible limit in the Absence of Alternate Source**
31.	Total Coliform	APHA 9221 B	< 1.8	MPN/100ml	-	
32.	E. Coli	APHA 9221 F	< 1.8	MPN/100ml	-	

*** End of Report ***

(Reviewed By) **(Authorized Signatory)**

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/W/01
Name & Address of the Project: M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR)
Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka- Narnaul
Sample Description: **Ground Water Sample**
Sample Group: Water/ Residues and contaminants in water
Sample Location: Near Mining Site
Sample Collected by: Vardan Enviro Lab Representative
Environmental Conditions: 25 ± 2°C
Sampling and Analysis Protocol: IS, APHA & STP

Report No.: VEL/W/240809/001
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 15/08/2024
Period of Analysis: 09/08/2024-15/08/2024
Receipt Date: 09/08/2024
Sampling Date: 09/08/2024
Sampling Quantity: 5.0 Ltr + 250ml.
Sampling Type: Grab
Preservation: Ice Box
Preservation: Ice Box

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 - 2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 :Part 11:1983(Electrode Method)	7.24	--	6.5 to 8.5	No Relaxation
2.	Colour, max	IS:3025 :Part-4:1983(Visual Comparison Method)	*BLQ(**LOQ-1.0)	Hazen	5	15
3.	Turbidity, max	IS: 3025:P-10:1984(Nephlometric Method)	*BLQ(**LOQ-1.0)	NTU	1	5
4.	Odour	IS: 3025:P-5:1983	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS: 3025:P-8: 1984	Agreeable	mg/L	Agreeable	Agreeable
6.	Total Dissolved Solids (at 180°C ± 1ºC)	IS: 3025:P-16:1984(Gravimetric Method)	588.00	mg/L	500	2000
7.	Calcium (as Ca), max	IS: 3025 (P-40): 1991(EDTA Titrimetric Method)	72.33	mg/L	75	200
8.	Alkalinity (as $CaCO_3$)	IS:3025 :Part 23:: 1986(indicator Method)	294.21	mg/L	200	600
9.	Chloride (as Cl), max	IS:3025 (Part 32):1988(Argentometric Method)	98.26	mg/L	250	1000
10.	Magnesium (as Mg), max	APHA 23rd Edition2017: 3500 Mg B	12.92	mg/L	30	100
11.	Total Hardness (as $CaCO_3$), max	IS 3025:P-21:2009(EDTA Titrimetric Method)	234.00	mg/L	200	600
12.	Sulphate (as SO_4), max	IS:3025 (P-24/Sec-1): 2022 Turbidity Method	49.24	mg/L	200	400
13.	Fluoride (as F), max	APHA 23rd Edition : 2017: 4500 F-D: (SPADNS Method)	0.48	mg/L	1.0	1.5
14.	Nitrate (as NO_3), max	APHA 23rd Edition:2017, 4500 NO3. B (Ultraviolate Screening Method)	42.12	mg/L	45	No Relaxation
15.	Iron (as Fe), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.35	mg/L	1.0	No relaxation
16.	Aluminium (as Al), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.005)	mg/L	0.03	0.2
17.	Boron (as B), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.18	mg/L	0.5	2.4

VARDAN ENVIROLAB GURGRAM

(Reviewed By)

VARDAN ENVIROLAB GURGRAM

(Authorized Signatory)

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: **VEL/W/01**					**Report No.: VEL/W/240809/001**	
S. No.	**Parameter**	**Test-Method**	**Result**	**Unit**	**Limits of IS:10500 - 2012**	
					Requirement (Acceptable Limit)	**Permissible limit in the Absence of Alternate Source**
18.	Total Chromium (as Cr), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.02)	mg/L	0.05	No Relaxation
19.	Phenolic Compounds (as C_6H_5OH), max	Clause-6 of IS 3025 (P-43/Sec-1):2022(With Chloroform Extraction Method)	*BLQ(**LOQ-0.0005)	mg/L	0.001	0.002
20.	Mineral Oil	IS:3025 :Part 39: 2021(Infrared Spectroscopic Method)	*BLQ(**LOQ-0.1)	mg/L	1.0	No Relaxation
21.	Anionic Detergents (as MBAS), max	IS:3025 :P-68: : 2019(Methylene Blue Method)	*BLQ(**LOQ-0.05)	mg/L	0.2	1.0
22.	Zinc (as Zn), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	2.96	mg/L	5	15
23.	Copper (as Cu), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.02)	mg/L	0.05	1.5
24.	Manganese (as Mn), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.01)	mg/L	0.1	0.3
25.	Selenium (as Se), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.001)	mg/L	0.01	No Relaxation
26.	Cadmium (as Cd), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.002)	mg/L	0.01	No Relaxation
28.	Cyanide(as CN), max	IS:3025 (P-27/Sec1):2021,Pyridin Barbituric Acid Method	*BLQ(**LOQ-0.02)	mg/L	0.05	No Relaxation
29.	Arsenic (as As), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.005)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.0005)	mg/L	0.001	No Relaxation

Note - *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification

S. No.	**Parameter**	**Test-Method**	**Result**	**Unit**	**Limits of IS:10500 - 2012**	
					Requirement (Acceptable Limit)	**Permissible limit in the Absence of Alternate Source**
31.	Total Coliform	APHA 9221 B	< 1.8	MPN/100ml	-	
32.	E. Coli	APHA 9221 F	< 1.8	MPN/100ml	-	

*** End of Report ***

(Reviewed By) **(Authorized Signatory)**

Vardan Enviolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/W/02
Name & Address of the Project: M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR)
Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka- Narnaul
Sample Description: **Ground Water Sample**
Sample Group: Water/ Residues and contaminants in water
Sample Location: Village - Doyala
Sample Collected by: Vardan Enviro Lab Representative
Environmental Conditions: 25 ± 2°C
Sampling and Analysis Protocol: IS, APHA & STP

Report No.: VEL/W/240809/002
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 15/08/2024
Period of Analysis: 09/08/2024-15/08/2024
Receipt Date: 09/08/2024
Sampling Date: 09/08/2024
Sampling Quantity: 5.0 Ltr + 250ml.
Sampling Type: Grab
Preservation: Ice Box
Preservation: Ice Box

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 - 2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 :Part 11:1983(Electrode Method)	7.33	--	6.5 to 8.5	No Relaxation
2.	Colour, max	IS:3025 :Part-4:1983(Visual Comparison Method)	*BLQ(**LOQ-1.0)	Hazen	5	15
3.	Turbidity, max	IS: 3025:P-10:1984(Nephlometric Method)	*BLQ(**LOQ-1.0)	NTU	1	5
4.	Odour	IS: 3025:P-5:1983	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS: 3025:P-8: 1984	Agreeable	mg/L	Agreeable	Agreeable
6.	Total Dissolved Solids (at 180°C ± 1ºC)	IS: 3025:P-16:1984(Gravimetric Method)	550.00	mg/L	500	2000
7.	Calcium (as Ca), max	IS: 3025 (P-40): 1991(EDTA Titrimetric Method)	63.16	mg/L	75	200
8.	Alkalinity (as $CaCO_3$)	IS:3025 :Part 23:: 1986(indicator Method)	289.16	mg/L	200	600
9.	Chloride (as Cl), max	IS:3025 (Part 32):1988(Argentometric Method)	89.10	mg/L	250	1000
10.	Magnesium (as Mg), max	APHA 23rd Edition2017: 3500 Mg B	20.73	mg/L	30	100
11.	Total Hardness (as $CaCO_3$), max	IS 3025:P-21:2009(EDTA Titrimetric Method)	243.20	mg/L	200	600
12.	Sulphate (as SO_4), max	IS:3025 (P-24/Sec-1): 2022 Turbidity Method	47.26	mg/L	200	400
13.	Fluoride (as F), max	APHA 23rd Edition : 2017: 4500 F-D: (SPADNS Method)	0.56	mg/L	1.0	1.5
14.	Nitrate (as NO_3), max	APHA 23rd Edition:2017, 4500 NO3. B (Ultraviolate Screening Method)	46.12	mg/L	45	No Relaxation
15.	Iron (as Fe), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.38	mg/L	1.0	No relaxation
16.	Aluminium (as Al), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.005)	mg/L	0.03	0.2
17.	Boron (as B), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.21	mg/L	0.5	2.4

VARDAN ENVIROLAB GURGRAM

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(Authorized Signatory)

VARDAN ENVIROLAB GURGRAM

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: **VEL/W/02**					**Report No.: VEL/W/240809/002**	
S. No.	**Parameter**	**Test-Method**	**Result**	**Unit**	**Limits of IS:10500 - 2012**	
					Requirement (Acceptable Limit)	**Permissible limit in the Absence of Alternate Source**
18.	Total Chromium (as Cr), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.02)	mg/L	0.05	No Relaxation
19.	Phenolic Compounds (as C_6H_5OH), max	Clause-6 of IS 3025 (P-43/Sec-1):2022(With Chloroform Extraction Method)	*BLQ(**LOQ-0.0005)	mg/L	0.001	0.002
20.	Mineral Oil	IS:3025 :Part 39: 2021(Infrared Spectroscopic Method)	*BLQ(**LOQ-0.1)	mg/L	1.0	No Relaxation
21.	Anionic Detergents (as MBAS), max	IS:3025 :P-68: : 2019(Methylene Blue Method)	*BLQ(**LOQ-0.05)	mg/L	0.2	1.0
22.	Zinc (as Zn), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	1.98	mg/L	5	15
23.	Copper (as Cu), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.02)	mg/L	0.05	1.5
24.	Manganese (as Mn), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.01)	mg/L	0.1	0.3
25.	Selenium (as Se), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.001)	mg/L	0.01	No Relaxation
26.	Cadmium (as Cd), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.002)	mg/L	0.01	No Relaxation
28.	Cyanide(as CN), max	IS:3025 (P-27/Sec1):2021,Pyridin Barbituric Acid Method	*BLQ(**LOQ-0.02)	mg/L	0.05	No Relaxation
29.	Arsenic (as As), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.005)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg), max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	*BLQ(**LOQ-0.0005)	mg/L	0.001	No Relaxation

Note - *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification

S. No.	**Parameter**	**Test-Method**	**Result**	**Unit**	**Limits of IS:10500 - 2012**	
					Requirement (Acceptable Limit)	**Permissible limit in the Absence of Alternate Source**
31.	Total Coliform	APHA 9221 B	< 1.8	MPN/100ml	-	
32.	E. Coli	APHA 9221 F	< 1.8	MPN/100ml	-	

*** End of Report ***

(Reviewed By) **(Authorized Signatory)**

Vardan Enviolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/PE/01	**Report No.:**	VEL/PE/240919/001
Name & Address of the Project:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.:**	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	25/09/2024
		Period of Analysis:	19/09/2024-25/09/2024
		Receipt Date:	19/09/2024
Sample Description:	**Soil**	**Sampling Date:**	19/09/2024
Sample Group:	Pollution and Environment	**Sampling Quantity:**	2.0 Kg.
Sample Location:	Near Mining Site	**Sampling Type:**	Composite
Sample Collected by:	Vardan Enviro Lab Representative	**Preservation:**	Temp Sealed
Environmental Conditions:	25 ± 2°C		
Sampling and Analysis Protocol:	IS 2720, APHA & USDA		

S. No.	Parameter	Test-Method	Result	Unit
1.	**pH (at 25 ^{0}C)**	IS : 2720 (P-26)	7.11	--
2.	**Conductivity**	IS:14767	0.358	mS/cm
3.	**Colour**	VEL/STP/EN/67, Issue No.-01, 01/11/2021	Yellowish Brown	--
4.	**Water holding capacity**	VEL/STP/EN/86, Issue No.-01, 01/11/2021	31.28	%
5.	**Bulk density**	VEL/STP/EN/59, Issue No.-01, 01/11/2021	1.31	gm/cc
6.	**Chloride as Cl**	VEL/STP/EN/69, Issue No.-01, 01/11/2021	125.38	mg/kg
7.	**Calcium as Ca**	VEL/STP/EN/72, Issue No.-01, 01/11/2021	112.85	mg/kg
8.	**Sodium as Na**	VEL/STP/EN/62, Issue No.-01, 01/11/2021	95.57	mg/kg
9.	**Potassium as K**	VEL/STP/EN/61, Issue No.-01, 01/11/2021	108.39	mg/kg
10.	**Organic Matter**	IS : 2720 (P-22), Titrimetric Method	0.31	%
11.	**Magnesium as Mg**	VEL/STP/EN/72, Issue No.-01, 01/11/2021	28.35	mg/kg
12.	**Available Nitrogen as N**	IS:14684 Distillation Method	175.84	kg./hec.
13.	**Available Phosphorus**	VEL/STP/EN/73, Issue No.-01, 01/11/2021	29.38	kg./hec.
14.	**Total Zinc (as Zn)**	VEL/STP/HW/03, Issue No.-01, 01/11/2021	6.45	mg/kg
15.	**Total Manganese (as Mn)**	VEL/STP/HW/03, Issue No.-01, 01/11/2021	5.19	mg/kg
16.	**Total Chromium (as Cr)**	VEL/STP/HW/03, Issue No.-01, 01/11/2021	0.72	mg/kg
17.	**Total Lead (as Pb)**	VEL/STP/HW/03, Issue No.-01, 01/11/2021	0.92	mg/kg
18.	**Total Cadmium (as Cd)**	VEL/STP/HW/03, Issue No.-01, 01/11/2021	BLQ(LOQ-0.5)	mg/kg
19.	**Total Copper (as Cu)**	VEL/STP/HW/03, Issue No.-01, 01/11/2021	1.88	mg/kg
20.	**Soil Texture**	VEL/STP/EN/64, Issue No.-01, 01/11/2021	Sandy Loam	--

Note - *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification

*** End of Report ***

VARDAN ENVIROLAB GURGRAM

(Reviewed By)

(Authorized Signatory)

VARDAN ENVIROLAB GURGRAM

Vardan Envirolab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (HR)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/PE/02	**Report No.:**	VEL/PE/240919/002
Name & Address of the Project:	M/s Bayal Quartz & Feldspar Mine Shri Manmohan Bhadana, s/o Shri Kartar Singh Bhandana R/o V & PO – Anaganpur, Distt. Faridabad (HR) Project Name – Bayal Quartz & Feldspar Mine, Khasra No.201, 223, 224, Vill-Bayal, Taluka-Narnaul	**Format No.:**	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	25/09/2024
		Period of Analysis:	19/09/2024-25/09/2024
		Receipt Date:	19/09/2024
Sample Description:	**Soil**	**Sampling Date:**	19/09/2024
Sample Group:	Pollution and Environment	**Sampling Quantity:**	2.0 Kg.
Sample Location:	Village - Bayal	**Sampling Type:**	Composite
Sample Collected by:	Vardan Enviro Lab Representative	**Preservation:**	Temp Sealed
Environmental Conditions:	25 ± 2°C		
Sampling and Analysis Protocol:	IS 2720, APHA & USDA		

S. No.	Parameter	Test-Method	Result	Unit
1.	**pH (at 25 ^{0}C)**	IS : 2720 (P-26)	7.33	--
2.	**Conductivity**	IS:14767	0.384	mS/cm
3.	**Colour**	VEL/STP/EN/67, Issue No.-01, 01/11/2021	Yellowish Brown	--
4.	**Water holding capacity**	VEL/STP/EN/86, Issue No.-01, 01/11/2021	33.16	%
5.	**Bulk density**	VEL/STP/EN/59, Issue No.-01, 01/11/2021	1.27	gm/cc
6.	**Chloride as Cl**	VEL/STP/EN/69, Issue No.-01, 01/11/2021	118.55	mg/kg
7.	**Calcium as Ca**	VEL/STP/EN/72, Issue No.-01, 01/11/2021	106.26	mg/kg
8.	**Sodium as Na**	VEL/STP/EN/62, Issue No.-01, 01/11/2021	102.45	mg/kg
9.	**Potassium as K**	VEL/STP/EN/61, Issue No.-01, 01/11/2021	142.26	mg/kg
10.	**Organic Matter**	IS : 2720 (P-22), Titrimetric Method	0.34	%
11.	**Magnesium as Mg**	VEL/STP/EN/72, Issue No.-01, 01/11/2021	32.26	mg/kg
12.	**Available Nitrogen as N**	IS:14684 Distillation Method	184.20	kg./hec.
13.	**Available Phosphorus**	VEL/STP/EN/73, Issue No.-01, 01/11/2021	32.12	kg./hec.
14.	**Total Zinc (as Zn)**	VEL/STP/HW/03, Issue No.-01, 01/11/2021	10.28	mg/kg
15.	**Total Manganese (as Mn)**	VEL/STP/HW/03, Issue No.-01, 01/11/2021	8.26	mg/kg
16.	**Total Chromium (as Cr)**	VEL/STP/HW/03, Issue No.-01, 01/11/2021	0.93	mg/kg
17.	**Total Lead (as Pb)**	VEL/STP/HW/03, Issue No.-01, 01/11/2021	1.61	mg/kg
18.	**Total Cadmium (as Cd)**	VEL/STP/HW/03, Issue No.-01, 01/11/2021	BLQ(LOQ-0.5)	mg/kg
19.	**Total Copper (as Cu)**	VEL/STP/HW/03, Issue No.-01, 01/11/2021	1.26	mg/kg
20.	**Soil Texture**	VEL/STP/EN/64, Issue No.-01, 01/11/2021	Sandy Loam	--

Note - *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification

*** End of Report ***

VARDAN ENVIROLAB GURUGRAM

(Reviewed By)

(Authorized Signatory)

VARDAN ENVIROLAB GURUGRAM

ID:1

Date	Time	PM2.5 ug/m3	PM10 ug/m3	COX ppm	NOX ppm	SOX ppm
17-12-2024	00:00	42	52	664	0.5	0
17-12-2024	00:01	45	54	655	0.5	0
17-12-2024	00:02	41	51	647	0.5	0
17-12-2024	00:03	40	47	640	0.5	0
17-12-2024	00:04	41	49	631	0.5	0
17-12-2024	00:05	40	52	624	0.5	0
17-12-2024	00:06	40	45	623	0.5	0
17-12-2024	00:07	44	52	629	0.5	0
17-12-2024	00:08	43	51	624	0.5	0
17-12-2024	00:09	44	52	625	0.5	0
17-12-2024	00:10	41	51	635	0.5	0
17-12-2024	00:11	42	50	637	0.5	0
17-12-2024	00:12	41	47	626	0.5	0
17-12-2024	00:13	42	50	616	0.5	0
17-12-2024	00:14	43	51	614	0.5	0
17-12-2024	00:15	42	49	615	0.5	0
17-12-2024	00:16	41	49	612	0.5	0
17-12-2024	00:17	41	47	613	0.5	0
17-12-2024	00:18	43	51	610	0.5	0
17-12-2024	00:19	45	57	609	0.5	0
17-12-2024	00:20	43	54	612	0.5	0
17-12-2024	00:21	43	51	607	0.5	0
17-12-2024	00:22	44	54	608	0.5	0
17-12-2024	00:23	45	56	614	0.5	0
17-12-2024	00:24	43	50	615	0.5	0
17-12-2024	00:25	45	53	616	0.5	0
17-12-2024	00:26	45	55	614	0.5	0
17-12-2024	00:27	45	54	610	0.5	0
17-12-2024	00:28	42	50	606	0.5	0
17-12-2024	00:29	42	51	617	0.5	0
17-12-2024	00:30	45	54	651	0.5	0
17-12-2024	00:31	44	53	672	0.5	0
17-12-2024	00:32	43	51	661	0.5	0
17-12-2024	00:33	43	53	644	0.4	0
17-12-2024	00:34	43	51	636	0.4	0
17-12-2024	00:35	43	53	636	0.4	0
17-12-2024	00:36	45	54	633	0.4	0
17-12-2024	00:37	45	55	635	0.4	0
17-12-2024	00:38	42	52	638	0.4	0
17-12-2024	00:39	41	51	635	0.4	0
17-12-2024	00:40	41	51	632	0.4	0
17-12-2024	00:41	42	49	632	0.4	0
17-12-2024	00:42	39	46	631	0.4	0
17-12-2024	00:43	40	51	631	0.4	0

17-12-2024	00:44	43	52	631	0.4	0
17-12-2024	00:45	42	50	627	0.4	0
17-12-2024	00:46	41	49	627	0.4	0
17-12-2024	00:47	44	54	627	0.4	0
17-12-2024	00:48	42	51	625	0.4	0
17-12-2024	00:49	43	52	624	0.4	0
17-12-2024	00:50	40	48	619	0.4	0
17-12-2024	00:51	44	54	619	0.4	0
17-12-2024	00:52	40	47	620	0.4	0
17-12-2024	00:53	43	51	623	0.4	0
17-12-2024	00:54	41	52	627	0.4	0
17-12-2024	00:55	43	52	631	0.4	0
17-12-2024	00:56	40	51	629	0.4	0
17-12-2024	00:57	41	49	630	0.4	0
17-12-2024	00:58	40	49	628	0.4	0
17-12-2024	00:59	43	53	624	0.4	0
17-12-2024	01:00	40	49	616	0.4	0
17-12-2024	01:01	44	52	615	0.4	0
17-12-2024	01:02	40	47	619	0.4	0
17-12-2024	01:03	43	52	622	0.4	0
17-12-2024	01:04	40	48	623	0.4	0
17-12-2024	01:05	42	51	625	0.4	0
17-12-2024	01:06	42	51	619	0.4	0
17-12-2024	01:07	43	52	620	0.4	0
17-12-2024	01:08	43	52	618	0.4	0
17-12-2024	01:09	41	50	612	0.4	0
17-12-2024	01:10	41	49	614	0.4	0
17-12-2024	01:11	42	52	619	0.4	0
17-12-2024	01:12	42	51	617	0.4	0
17-12-2024	01:13	40	49	613	0.4	0
17-12-2024	01:14	43	54	615	0.4	0
17-12-2024	01:15	44	53	617	0.4	0
17-12-2024	01:16	41	52	614	0.4	0
17-12-2024	01:17	42	50	612	0.4	0
17-12-2024	01:18	41	49	615	0.4	0
17-12-2024	01:19	42	49	616	0.4	0
17-12-2024	01:20	41	52	614	0.4	0
17-12-2024	01:21	41	51	608	0.4	0
17-12-2024	01:22	42	49	608	0.4	0
17-12-2024	01:23	43	52	607	0.4	0
17-12-2024	01:24	43	51	611	0.4	0
17-12-2024	01:25	40	49	615	0.4	0
17-12-2024	01:26	44	53	621	0.4	0
17-12-2024	01:27	39	48	620	0.4	0
17-12-2024	01:28	43	52	621	0.4	0
17-12-2024	01:29	42	52	624	0.4	0
17-12-2024	01:30	42	51	627	0.4	0

17-12-2024	01:31	43	51	630	0.4	0
17-12-2024	01:32	44	54	625	0.4	0
17-12-2024	01:33	44	54	626	0.4	0
17-12-2024	01:34	42	53	631	0.4	0
17-12-2024	01:35	43	52	631	0.4	0
17-12-2024	01:36	44	52	630	0.4	0
17-12-2024	01:37	44	52	630	0.4	0
17-12-2024	01:38	42	48	631	0.4	0
17-12-2024	01:39	43	54	632	0.4	0
17-12-2024	01:40	43	53	633	0.4	0
17-12-2024	01:41	40	50	629	0.4	0
17-12-2024	01:42	43	52	627	0.3	0
17-12-2024	01:43	43	53	628	0.4	0
17-12-2024	01:44	43	54	628	0.4	0
17-12-2024	01:45	45	54	626	0.3	0
17-12-2024	01:46	42	51	628	0.4	0
17-12-2024	01:47	42	52	631	0.3	0
17-12-2024	01:48	44	55	630	0.3	0
17-12-2024	01:49	41	49	623	0.3	0
17-12-2024	01:50	43	51	630	0.3	0
17-12-2024	01:51	41	51	642	0.3	0
17-12-2024	01:52	41	49	647	0.3	0
17-12-2024	01:53	43	54	643	0.3	0
17-12-2024	01:54	43	52	646	0.3	0
17-12-2024	01:55	42	49	649	0.3	0
17-12-2024	01:56	41	49	647	0.3	0
17-12-2024	01:57	45	54	643	0.3	0
17-12-2024	01:58	42	52	635	0.3	0
17-12-2024	01:59	44	52	635	0.3	0
17-12-2024	02:00	42	51	652	0.3	0
17-12-2024	02:01	43	51	664	0.3	0
17-12-2024	02:02	42	52	668	0.3	0
17-12-2024	02:03	41	52	683	0.3	0
17-12-2024	02:04	42	51	717	0.3	0
17-12-2024	02:05	42	51	724	0.3	0
17-12-2024	02:06	40	48	719	0.3	0
17-12-2024	02:07	41	49	712	0.3	0
17-12-2024	02:08	41	49	705	0.3	0
17-12-2024	02:09	43	51	690	0.3	0
17-12-2024	02:10	41	49	683	0.3	0
17-12-2024	02:11	42	50	682	0.3	0
17-12-2024	02:12	43	52	682	0.3	0
17-12-2024	02:13	40	46	680	0.3	0
17-12-2024	02:14	41	48	688	0.3	0
17-12-2024	02:15	42	50	705	0.3	0
17-12-2024	02:16	43	51	708	0.3	0
17-12-2024	02:17	41	50	699	0.3	0

17-12-2024	02:18	44	52	682	0.3	0
17-12-2024	02:19	43	52	668	0.3	0
17-12-2024	02:20	42	51	658	0.3	0
17-12-2024	02:21	44	54	654	0.3	0
17-12-2024	02:22	51	66	653	0.3	0
17-12-2024	02:23	52	66	649	0.3	0
17-12-2024	02:24	51	64	640	0.3	0
17-12-2024	02:25	51	62	640	0.3	0
17-12-2024	02:26	52	66	643	0.3	0
17-12-2024	02:27	51	62	640	0.3	0
17-12-2024	02:28	51	65	637	0.3	0
17-12-2024	02:29	52	64	635	0.3	0
17-12-2024	02:30	50	62	636	0.3	0
17-12-2024	02:31	51	62	635	0.3	0
17-12-2024	02:32	50	61	639	0.2	0
17-12-2024	02:33	52	65	639	0.3	0
17-12-2024	02:34	52	64	633	0.2	0
17-12-2024	02:35	52	65	625	0.3	0
17-12-2024	02:36	52	63	621	0.2	0
17-12-2024	02:37	49	60	622	0.2	0
17-12-2024	02:38	47	59	627	0.2	0
17-12-2024	02:39	50	61	627	0.2	0
17-12-2024	02:40	49	61	627	0.2	0
17-12-2024	02:41	45	55	636	0.2	0
17-12-2024	02:42	46	57	644	0.2	0
17-12-2024	02:43	46	58	654	0.2	0
17-12-2024	02:44	49	61	657	0.2	0
17-12-2024	02:45	46	57	656	0.2	0
17-12-2024	02:46	45	57	658	0.2	0
17-12-2024	02:47	45	56	659	0.2	0
17-12-2024	02:48	45	56	664	0.2	0
17-12-2024	02:49	45	55	670	0.2	0
17-12-2024	02:50	45	55	679	0.2	0
17-12-2024	02:51	47	56	683	0.2	0
17-12-2024	02:52	45	53	685	0.2	0
17-12-2024	02:53	45	56	688	0.2	0
17-12-2024	02:54	45	54	685	0.2	0
17-12-2024	02:55	47	58	684	0.2	0
17-12-2024	02:56	48	60	685	0.2	0
17-12-2024	02:57	45	54	687	0.2	0
17-12-2024	02:58	45	55	680	0.2	0
17-12-2024	02:59	45	57	676	0.2	0
17-12-2024	03:00	47	58	671	0.2	0
17-12-2024	03:01	47	58	674	0.2	0
17-12-2024	03:02	45	56	678	0.2	0
17-12-2024	03:03	44	56	683	0.2	0
17-12-2024	03:04	46	55	688	0.2	0

17-12-2024	03:05	43	51	690	0.2	0
17-12-2024	03:06	45	52	693	0.2	0
17-12-2024	03:07	44	52	696	0.2	0
17-12-2024	03:08	45	55	690	0.2	0
17-12-2024	03:09	44	54	686	0.2	0
17-12-2024	03:10	45	56	685	0.2	0
17-12-2024	03:11	44	55	684	0.2	0
17-12-2024	03:12	46	56	680	0.2	0
17-12-2024	03:13	47	56	675	0.2	0
17-12-2024	03:14	45	55	675	0.2	0
17-12-2024	03:15	46	57	679	0.2	0
17-12-2024	03:16	45	54	684	0.2	0
17-12-2024	03:17	44	52	685	0.2	0
17-12-2024	03:18	46	56	681	0.2	0
17-12-2024	03:19	45	54	682	0.2	0
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17-12-2024	03:21	45	54	675	0.2	0
17-12-2024	03:22	43	52	675	0.2	0
17-12-2024	03:23	43	51	680	0.2	0
17-12-2024	03:24	47	59	682	0.2	0
17-12-2024	03:25	45	57	680	0.2	0
17-12-2024	03:26	48	57	680	0.2	0
17-12-2024	03:27	45	54	678	0.2	0
17-12-2024	03:28	44	54	680	0.2	0
17-12-2024	03:29	44	57	680	0.2	0
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17-12-2024	03:31	45	57	675	0.2	0
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17-12-2024	03:33	46	59	671	0.2	0
17-12-2024	03:34	45	54	668	0.2	0
17-12-2024	03:35	45	59	666	0.2	0
17-12-2024	03:36	49	59	667	0.2	0
17-12-2024	03:37	45	54	675	0.2	0
17-12-2024	03:38	45	55	690	0.2	0
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17-12-2024	03:41	45	56	711	0.2	0
17-12-2024	03:42	44	55	706	0.2	0
17-12-2024	03:43	45	55	702	0.2	0
17-12-2024	03:44	45	54	691	0.2	0
17-12-2024	03:45	45	54	697	0.2	0
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17-12-2024	03:50	43	53	711	0.2	0
17-12-2024	03:51	43	52	711	0.2	0

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17-12-2024	03:53	46	57	726	0.2	0
17-12-2024	03:54	43	54	722	0.2	0
17-12-2024	03:55	43	53	708	0.2	0
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17-12-2024	03:58	44	55	684	0.2	0
17-12-2024	03:59	43	52	676	0.2	0
17-12-2024	04:00	43	55	684	0.2	0
17-12-2024	04:01	44	55	686	0.2	0
17-12-2024	04:02	45	53	689	0.2	0
17-12-2024	04:03	43	51	696	0.2	0
17-12-2024	04:04	44	53	696	0.1	0
17-12-2024	04:05	44	53	692	0.1	0
17-12-2024	04:06	43	53	690	0.1	0
17-12-2024	04:07	41	51	685	0.2	0
17-12-2024	04:08	43	50	682	0.1	0
17-12-2024	04:09	42	51	695	0.1	0
17-12-2024	04:10	44	52	689	0.1	0
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17-12-2024	04:12	42	52	677	0.1	0
17-12-2024	04:13	43	52	664	0.1	0
17-12-2024	04:14	43	55	650	0.1	0
17-12-2024	04:15	43	54	637	0.1	0
17-12-2024	04:16	43	52	632	0.1	0
17-12-2024	04:17	44	53	647	0.1	0
17-12-2024	04:18	45	54	651	0.1	0
17-12-2024	04:19	42	50	654	0.1	0
17-12-2024	04:20	42	52	657	0.1	0
17-12-2024	04:21	42	50	659	0.1	0
17-12-2024	04:22	43	51	665	0.1	0
17-12-2024	04:23	41	50	671	0.1	0
17-12-2024	04:24	45	55	678	0.1	0
17-12-2024	04:25	43	52	683	0.1	0
17-12-2024	04:26	43	51	685	0.1	0
17-12-2024	04:27	45	55	689	0.1	0
17-12-2024	04:28	43	53	691	0.1	0
17-12-2024	04:29	42	50	686	0.1	0
17-12-2024	04:30	42	52	685	0.1	0
17-12-2024	04:31	43	50	687	0.1	0
17-12-2024	04:32	40	49	687	0.1	0
17-12-2024	04:33	44	54	675	0.1	0
17-12-2024	04:34	44	52	665	0.1	0
17-12-2024	04:35	40	49	659	0.1	0
17-12-2024	04:36	45	53	649	0.1	0
17-12-2024	04:37	44	55	643	0.1	0
17-12-2024	04:38	43	54	651	0.1	0

17-12-2024	04:39	44	53	656	0.1	0
17-12-2024	04:40	45	53	659	0.1	0
17-12-2024	04:41	42	51	655	0.1	0
17-12-2024	04:42	42	50	646	0.1	0
17-12-2024	04:43	43	52	641	0.1	0
17-12-2024	04:44	44	52	637	0.1	0
17-12-2024	04:45	43	51	640	0.1	0
17-12-2024	04:46	42	49	663	0.1	0
17-12-2024	04:47	43	54	677	0.1	0
17-12-2024	04:48	43	53	683	0.1	0
17-12-2024	04:49	42	52	684	0.1	0
17-12-2024	04:50	44	55	680	0.1	0
17-12-2024	04:51	43	52	677	0.1	0
17-12-2024	04:52	45	54	671	0.1	0
17-12-2024	04:53	43	49	669	0.1	0
17-12-2024	04:54	43	52	669	0.1	0
17-12-2024	04:55	46	55	666	0.1	0
17-12-2024	04:56	46	56	671	0.1	0
17-12-2024	04:57	42	53	678	0.1	0
17-12-2024	04:58	45	55	676	0.1	0
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17-12-2024	05:00	47	56	665	0.1	0
17-12-2024	05:01	44	55	659	0.1	0
17-12-2024	05:02	45	54	647	0.1	0
17-12-2024	05:03	45	56	643	0.1	0
17-12-2024	05:04	43	52	647	0.1	0
17-12-2024	05:05	48	57	658	0.1	0
17-12-2024	05:06	44	55	665	0	0
17-12-2024	05:07	47	61	671	0.1	0
17-12-2024	05:08	45	55	671	0	0
17-12-2024	05:09	46	56	683	0	0
17-12-2024	05:10	45	54	689	0.1	0
17-12-2024	05:11	45	54	695	0.1	0
17-12-2024	05:12	47	57	696	0.1	0
17-12-2024	05:13	46	56	693	0.1	0
17-12-2024	05:14	47	57	690	0	0
17-12-2024	05:15	45	52	686	0	0
17-12-2024	05:16	43	53	683	0	0
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17-12-2024	05:18	45	55	693	0	0
17-12-2024	05:19	43	54	696	0	0
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17-12-2024	05:22	46	57	650	0	0
17-12-2024	05:23	44	55	655	0	0
17-12-2024	05:24	46	57	659	0	0
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17-12-2024	05:28	46	59	658	0	0
17-12-2024	05:29	45	55	638	0	0
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17-12-2024	06:04	44	54	703	0	0
17-12-2024	06:05	44	52	709	0	0
17-12-2024	06:06	61	70	717	0	0
17-12-2024	06:07	86	87	702	0	0
17-12-2024	06:08	86	89	694	0	0
17-12-2024	06:09	82	85	699	0	0
17-12-2024	06:10	80	83	710	0	0
17-12-2024	06:11	84	85	721	0	0
17-12-2024	06:12	80	80	731	0	0

17-12-2024	06:13	88	88	733	0	0
17-12-2024	06:14	83	89	730	0	0
17-12-2024	06:15	87	86	722	0	0
17-12-2024	06:16	92	94	711	0	0
17-12-2024	06:17	83	88	699	0	0
17-12-2024	06:18	90	92	699	0	0
17-12-2024	06:19	92	96	695	0	0
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17-12-2024	06:21	106	109	692	0	0
17-12-2024	06:22	110	113	693	0	0
17-12-2024	06:23	109	114	703	0	0
17-12-2024	06:24	111	113	710	0	0
17-12-2024	06:25	115	119	708	0	0
17-12-2024	06:26	118	120	706	0	0
17-12-2024	06:27	132	133	711	0	0
17-12-2024	06:28	139	140	722	0	0
17-12-2024	06:29	139	144	733	0	0
17-12-2024	06:30	154	157	740	0	0
17-12-2024	06:31	154	156	743	0	0
17-12-2024	06:32	154	158	750	0	0
17-12-2024	06:33	145	145	749	0	0
17-12-2024	06:34	142	146	740	0	0
17-12-2024	06:35	161	164	725	0	0
17-12-2024	06:36	152	155	722	0	0
17-12-2024	06:37	158	161	721	0	0
17-12-2024	06:38	156	162	721	0	0
17-12-2024	06:39	151	158	717	0	0
17-12-2024	06:40	171	174	699	0	0
17-12-2024	06:41	183	185	697	0	0
17-12-2024	06:42	176	180	706	0	0
17-12-2024	06:43	172	175	725	0	0
17-12-2024	06:44	178	180	738	0	0
17-12-2024	06:45	193	197	741	0	0
17-12-2024	06:46	197	201	759	0	0
17-12-2024	06:47	220	224	765	0	0
17-12-2024	06:48	216	225	773	0	0
17-12-2024	06:49	192	191	763	0	0
17-12-2024	06:50	209	213	671	0	0
17-12-2024	06:51	206	213	670	0	0
17-12-2024	06:52	207	212	687	0	0
17-12-2024	06:53	231	237	722	0	0
17-12-2024	06:54	215	221	771	0	0
17-12-2024	06:55	219	217	800	0	0
17-12-2024	06:56	223	227	807	0	0
17-12-2024	06:57	231	237	812	0	0
17-12-2024	06:58	252	261	799	0	0
17-12-2024	06:59	228	233	786	0	0

17-12-2024	07:00	210	218	792	0	0
17-12-2024	07:01	222	228	762	0	0
17-12-2024	07:02	217	220	775	0	0
17-12-2024	07:03	210	217	780	0	0
17-12-2024	07:04	210	223	778	0	0
17-12-2024	07:05	207	213	781	0	0
17-12-2024	07:06	182	190	774	0	0
17-12-2024	07:07	187	193	729	0	0
17-12-2024	07:08	190	197	721	0	0
17-12-2024	07:09	189	195	729	0	0
17-12-2024	07:10	182	191	736	0	0
17-12-2024	07:11	172	181	723	0	0
17-12-2024	07:12	165	170	718	0	0
17-12-2024	07:13	156	161	698	0	0
17-12-2024	07:14	158	162	673	0	0
17-12-2024	07:15	155	162	674	0	0
17-12-2024	07:16	155	158	680	0	0
17-12-2024	07:17	154	159	682	0	0
17-12-2024	07:18	153	161	682	0	0
17-12-2024	07:19	151	161	684	0	0
17-12-2024	07:20	153	155	685	0	0
17-12-2024	07:21	148	151	687	0	0
17-12-2024	07:22	155	161	688	0	0
17-12-2024	07:23	149	155	692	0	0
17-12-2024	07:24	131	136	691	0	0
17-12-2024	07:25	130	133	667	0	0
17-12-2024	07:26	124	127	649	0	0
17-12-2024	07:27	119	123	645	0	0
17-12-2024	07:28	121	127	643	0	0
17-12-2024	07:29	109	116	634	0	0
17-12-2024	07:30	111	110	635	0	0
17-12-2024	07:31	116	117	638	0	0
17-12-2024	07:32	121	119	638	0	0
17-12-2024	07:33	105	109	637	0	0
17-12-2024	07:34	100	105	631	0	0
17-12-2024	07:35	107	112	627	0	0
17-12-2024	07:36	102	109	626	0	0
17-12-2024	07:37	99	103	617	0	0
17-12-2024	07:38	97	101	614	0	0
17-12-2024	07:39	104	106	619	0	0
17-12-2024	07:40	95	97	627	0	0
17-12-2024	07:41	84	89	592	0	0
17-12-2024	07:42	86	90	554	0	0
17-12-2024	07:43	87	91	551	0	0
17-12-2024	07:44	81	86	548	0	0
17-12-2024	07:45	77	80	538	0	0
17-12-2024	07:46	79	85	529	0	0

17-12-2024	07:47	81	89	524	0	0
17-12-2024	07:48	79	84	522	0	0
17-12-2024	07:49	83	87	537	0	0
17-12-2024	07:50	83	84	557	0	0
17-12-2024	07:51	86	92	565	0	0
17-12-2024	07:52	81	83	577	0	0
17-12-2024	07:53	82	89	576	0	0
17-12-2024	07:54	70	79	578	0	0
17-12-2024	07:55	75	81	552	0	0
17-12-2024	07:56	73	79	550	0	0
17-12-2024	07:57	78	83	567	0	0
17-12-2024	07:58	84	88	589	0	0
17-12-2024	07:59	75	81	598	0	0
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17-12-2024	08:02	73	78	609	0	0
17-12-2024	08:03	70	77	607	0	0
17-12-2024	08:04	70	79	592	0	0
17-12-2024	08:05	71	77	592	0	0
17-12-2024	08:06	71	76	599	0	0
17-12-2024	08:07	65	75	599	0	0
17-12-2024	08:08	73	76	604	0	0
17-12-2024	08:09	65	75	607	0	0
17-12-2024	08:10	69	76	614	0	0
17-12-2024	08:11	68	76	608	0	0
17-12-2024	08:12	73	78	605	0	0
17-12-2024	08:13	65	74	605	0	0
17-12-2024	08:14	68	74	603	0	0
17-12-2024	08:15	63	73	601	0	0
17-12-2024	08:16	68	74	604	0	0
17-12-2024	08:17	64	73	605	0	0
17-12-2024	08:18	62	72	604	0	0
17-12-2024	08:19	64	73	596	0	0
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17-12-2024	08:22	60	69	580	0	0
17-12-2024	08:23	59	71	582	0	0
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17-12-2024	08:25	58	70	570	0	0
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17-12-2024	08:27	60	71	570	0	0
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17-12-2024	08:29	55	66	572	0	0
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17-12-2024	08:31	56	69	557	0	0
17-12-2024	08:32	60	70	561	0	0
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17-12-2024	08:37	58	67	580	0	0
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17-12-2024	08:41	53	67	557	0	0
17-12-2024	08:42	50	62	553	0	0
17-12-2024	08:43	52	65	548	0	0
17-12-2024	08:44	52	65	546	0	0
17-12-2024	08:45	51	63	549	0	0
17-12-2024	08:46	48	60	545	0	0
17-12-2024	08:47	49	59	538	0	0
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17-12-2024	08:49	49	60	542	0	0
17-12-2024	08:50	48	60	531	0	0
17-12-2024	08:51	50	62	527	0	0
17-12-2024	08:52	51	60	533	0	0
17-12-2024	08:53	49	61	536	0	0
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17-12-2024	08:56	48	57	530	0	0
17-12-2024	08:57	46	57	522	0	0
17-12-2024	08:58	46	55	521	0	0
17-12-2024	08:59	45	54	520	0	0
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17-12-2024	09:04	41	51	526	0	0
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17-12-2024	09:08	42	52	526	0	0
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17-12-2024	09:14	38	46	472	0	0
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17-12-2024	09:18	35	42	476	0	0
17-12-2024	09:19	38	45	471	0	0
17-12-2024	09:20	34	39	460	0	0

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17-12-2024	09:22	37	44	447	0	0
17-12-2024	09:23	37	42	460	0	0
17-12-2024	09:24	37	43	484	0	0
17-12-2024	09:25	37	44	492	0	0
17-12-2024	09:26	37	44	490	0	0
17-12-2024	09:27	35	42	490	0	0
17-12-2024	09:28	40	45	492	0	0
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17-12-2024	09:30	37	44	499	0	0
17-12-2024	09:31	36	42	499	0	0
17-12-2024	09:32	38	44	483	0	0
17-12-2024	09:33	34	40	480	0	0
17-12-2024	09:34	36	41	485	0	0
17-12-2024	09:35	34	38	498	0	0
17-12-2024	09:36	37	43	507	0	0
17-12-2024	09:37	36	42	503	0	0
17-12-2024	09:38	32	37	488	0	0
17-12-2024	09:39	35	40	484	0	0
17-12-2024	09:40	32	39	483	0	0
17-12-2024	09:41	37	42	485	0	0
17-12-2024	09:42	34	38	485	0	0
17-12-2024	09:43	32	34	481	0	0
17-12-2024	09:44	33	40	476	0	0
17-12-2024	09:45	33	37	465	0	0
17-12-2024	09:46	32	37	449	0	0
17-12-2024	09:47	31	35	453	0	0
17-12-2024	09:48	32	34	454	0	0
17-12-2024	09:49	30	31	453	0	0
17-12-2024	09:50	31	36	449	0	0
17-12-2024	09:51	31	35	446	0	0
17-12-2024	09:52	29	30	440	0	0
17-12-2024	09:53	29	32	433	0.1	0
17-12-2024	09:54	31	35	428	0.1	0
17-12-2024	09:55	32	35	430	0.1	0
17-12-2024	09:56	31	33	442	0.1	0
17-12-2024	09:57	32	37	455	0.1	0
17-12-2024	09:58	28	31	471	0.1	0
17-12-2024	09:59	32	38	470	0.1	0
17-12-2024	10:00	28	31	465	0.1	0
17-12-2024	10:01	29	30	460	0.1	0
17-12-2024	10:02	29	33	458	0.1	0
17-12-2024	10:03	33	35	458	0.1	0
17-12-2024	10:04	32	37	461	0.1	0
17-12-2024	10:05	29	29	460	0.1	0
17-12-2024	10:06	30	32	458	0.1	0
17-12-2024	10:07	29	32	460	0.1	0

17-12-2024	10:08	31	33	463	0.1	0
17-12-2024	10:09	32	36	464	0.1	0
17-12-2024	10:10	29	33	456	0.1	0
17-12-2024	10:11	31	33	442	0.1	0
17-12-2024	10:12	29	31	440	0.1	0
17-12-2024	10:13	28	29	440	0.1	0
17-12-2024	10:14	27	27	444	0.1	0
17-12-2024	10:15	30	33	448	0.1	0
17-12-2024	10:16	29	29	450	0.1	0
17-12-2024	10:17	29	30	453	0.1	0
17-12-2024	10:18	30	32	454	0.1	0
17-12-2024	10:19	26	27	456	0.1	0
17-12-2024	10:20	29	29	462	0.1	0
17-12-2024	10:21	32	36	464	0.1	0
17-12-2024	10:22	31	34	467	0.1	0
17-12-2024	10:23	26	30	470	0.1	0
17-12-2024	10:24	31	37	470	0.1	0
17-12-2024	10:25	30	31	467	0.1	0
17-12-2024	10:26	31	32	467	0.1	0
17-12-2024	10:27	31	35	469	0.1	0
17-12-2024	10:28	28	28	473	0.1	0
17-12-2024	10:29	31	32	475	0.1	0
17-12-2024	10:30	30	33	475	0.1	0
17-12-2024	10:31	27	31	474	0.1	0
17-12-2024	10:32	32	38	478	0.1	0
17-12-2024	10:33	31	33	481	0.1	0
17-12-2024	10:34	29	32	481	0.1	0
17-12-2024	10:35	29	30	489	0.1	0
17-12-2024	10:36	27	26	492	0.1	0
17-12-2024	10:37	27	26	492	0.1	0
17-12-2024	10:38	27	30	487	0.1	0
17-12-2024	10:39	29	30	487	0.1	0
17-12-2024	10:40	31	32	489	0.1	0
17-12-2024	10:41	32	34	488	0.1	0
17-12-2024	10:42	28	31	492	0.1	0
17-12-2024	10:43	29	33	502	0.1	0
17-12-2024	10:44	30	31	507	0.1	0
17-12-2024	10:45	29	32	509	0.1	0
17-12-2024	10:46	25	26	508	0.1	0
17-12-2024	10:47	31	33	503	0.1	0
17-12-2024	10:48	29	33	502	0.1	0
17-12-2024	10:49	30	34	499	0.1	0
17-12-2024	10:50	27	29	495	0.1	0
17-12-2024	10:51	31	32	494	0	0
17-12-2024	10:52	30	29	492	0	0
17-12-2024	10:53	29	32	492	0	0
17-12-2024	10:54	32	34	490	0	0

17-12-2024	10:55	29	33	489	0	0
17-12-2024	10:56	34	48	487	0	0
17-12-2024	10:57	40	56	486	0.1	0
17-12-2024	10:58	42	54	489	0.1	0
17-12-2024	10:59	45	56	487	0.1	0
17-12-2024	11:00	37	54	477	0.1	0
17-12-2024	11:01	43	52	465	0.1	0
17-12-2024	11:02	41	50	464	0.1	0
17-12-2024	11:03	38	45	469	0.1	0
17-12-2024	11:04	40	50	469	0.1	0
17-12-2024	11:05	39	51	462	0.1	0
17-12-2024	11:06	46	57	461	0.1	0
17-12-2024	11:07	43	54	463	0.1	0
17-12-2024	11:08	42	54	455	0.1	0
17-12-2024	11:09	41	52	444	0.1	0
17-12-2024	11:10	45	54	438	0.1	0
17-12-2024	11:11	45	56	433	0.1	0
17-12-2024	11:12	45	57	431	0.1	0
17-12-2024	11:13	46	55	433	0.1	0
17-12-2024	11:14	41	53	430	0.1	0
17-12-2024	11:15	42	51	429	0.1	0
17-12-2024	11:16	42	52	428	0.1	0
17-12-2024	11:17	42	52	428	0.1	0
17-12-2024	11:18	41	50	428	0.1	0
17-12-2024	11:19	41	52	428	0.1	0
17-12-2024	11:20	39	47	428	0.1	0
17-12-2024	11:21	42	52	428	0.1	0
17-12-2024	11:22	40	49	431	0.1	0
17-12-2024	11:23	42	51	431	0.1	0
17-12-2024	11:24	39	46	431	0.1	0
17-12-2024	11:25	40	49	428	0.1	0
17-12-2024	11:26	39	47	423	0.1	0
17-12-2024	11:27	35	43	420	0.1	0
17-12-2024	11:28	36	45	420	0.1	0
17-12-2024	11:29	35	42	420	0.1	0
17-12-2024	11:30	37	44	422	0.1	0
17-12-2024	11:31	38	46	422	0.1	0
17-12-2024	11:32	37	43	419	0.1	0
17-12-2024	11:33	34	40	418	0.1	0
17-12-2024	11:34	34	41	417	0.1	0
17-12-2024	11:35	35	42	419	0.1	0
17-12-2024	11:36	35	41	420	0.1	0
17-12-2024	11:37	35	41	423	0.1	0
17-12-2024	11:38	40	48	426	0.1	0
17-12-2024	11:39	40	48	436	0.1	0
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17-12-2024	11:41	39	46	437	0.1	0

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17-12-2024	11:43	37	44	430	0.1	0
17-12-2024	11:44	38	45	430	0.1	0
17-12-2024	11:45	38	45	429	0.1	0
17-12-2024	11:46	38	46	428	0.1	0
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17-12-2024	11:48	35	41	444	0.1	0
17-12-2024	11:49	34	44	441	0.1	0
17-12-2024	11:50	35	40	436	0.1	0
17-12-2024	11:51	34	40	431	0.2	0
17-12-2024	11:52	37	43	422	0.2	0
17-12-2024	11:53	38	44	415	0.2	0
17-12-2024	11:54	34	41	417	0.2	0
17-12-2024	11:55	34	38	420	0.2	0
17-12-2024	11:56	34	42	422	0.2	0
17-12-2024	11:57	39	47	427	0.2	0
17-12-2024	11:58	37	44	433	0.2	0
17-12-2024	11:59	38	44	442	0.2	0
17-12-2024	12:00	35	42	446	0.2	0
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17-12-2024	12:02	34	37	447	0.2	0
17-12-2024	12:03	38	44	444	0.2	0
17-12-2024	12:04	35	42	445	0.2	0
17-12-2024	12:05	35	41	451	0.2	0
17-12-2024	12:06	35	39	453	0.2	0
17-12-2024	12:07	37	46	451	0.2	0
17-12-2024	12:08	35	40	460	0.2	0
17-12-2024	12:09	37	44	470	0.2	0
17-12-2024	12:10	36	42	475	0.2	0
17-12-2024	12:11	33	37	473	0.2	0
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17-12-2024	12:22	34	39	472	0.2	0
17-12-2024	12:23	34	40	479	0.2	0
17-12-2024	12:24	34	38	490	0.2	0
17-12-2024	12:25	33	38	503	0.2	0
17-12-2024	12:26	35	40	512	0.2	0
17-12-2024	12:27	33	38	515	0.2	0
17-12-2024	12:28	34	39	508	0.2	0

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17-12-2024	12:31	37	44	492	0.2	0
17-12-2024	12:32	32	36	496	0.2	0
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17-12-2024	12:35	38	44	489	0.2	0
17-12-2024	12:36	34	39	487	0.2	0
17-12-2024	12:37	38	44	488	0.2	0
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17-12-2024	12:41	37	43	492	0.2	0
17-12-2024	12:42	37	43	491	0.2	0
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17-12-2024	12:45	39	46	490	0.2	0
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17-12-2024	12:47	36	44	497	0.2	0
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17-12-2024	12:49	41	49	494	0.2	0
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17-12-2024	12:53	41	49	492	0.2	0
17-12-2024	12:54	40	49	490	0.2	0
17-12-2024	12:55	41	50	488	0.2	0
17-12-2024	12:56	39	48	483	0.2	0
17-12-2024	12:57	41	49	482	0.2	0
17-12-2024	12:58	42	51	481	0.2	0
17-12-2024	12:59	41	49	481	0.2	0
17-12-2024	13:00	43	51	478	0.2	0
17-12-2024	13:01	41	48	479	0.2	0
17-12-2024	13:02	40	47	481	0.2	0
17-12-2024	13:03	39	46	478	0.2	0
17-12-2024	13:04	40	49	475	0.2	0
17-12-2024	13:05	40	49	472	0.2	0
17-12-2024	13:06	40	47	470	0.2	0
17-12-2024	13:07	42	51	469	0.3	0
17-12-2024	13:08	39	46	468	0.2	0
17-12-2024	13:09	39	44	469	0.3	0
17-12-2024	13:10	40	46	469	0.3	0
17-12-2024	13:11	39	47	467	0.3	0
17-12-2024	13:12	41	49	466	0.3	0
17-12-2024	13:13	39	46	463	0.2	0
17-12-2024	13:14	40	48	461	0.3	0
17-12-2024	13:15	39	46	461	0.3	0

17-12-2024	13:16	41	46	461	0.3	0
17-12-2024	13:17	37	44	464	0.3	0
17-12-2024	13:18	38	45	461	0.3	0
17-12-2024	13:19	38	44	459	0.3	0
17-12-2024	13:20	38	45	457	0.3	0
17-12-2024	13:21	38	43	457	0.3	0
17-12-2024	13:22	36	43	456	0.3	0
17-12-2024	13:23	38	48	456	0.3	0
17-12-2024	13:24	35	42	454	0.3	0
17-12-2024	13:25	35	42	450	0.3	0
17-12-2024	13:26	38	46	447	0.3	0
17-12-2024	13:27	37	44	447	0.3	0
17-12-2024	13:28	36	46	447	0.3	0
17-12-2024	13:29	38	45	445	0.3	0
17-12-2024	13:30	35	39	442	0.3	0
17-12-2024	13:31	34	38	442	0.3	0
17-12-2024	13:32	37	44	440	0.3	0
17-12-2024	13:33	37	44	441	0.3	0
17-12-2024	13:34	38	44	437	0.3	0
17-12-2024	13:35	36	41	433	0.3	0
17-12-2024	13:36	35	40	431	0.3	0
17-12-2024	13:37	34	39	429	0.3	0
17-12-2024	13:38	38	45	428	0.3	0
17-12-2024	13:39	34	39	428	0.3	0
17-12-2024	13:40	34	37	429	0.3	0
17-12-2024	13:41	35	41	429	0.3	0
17-12-2024	13:42	34	42	428	0.3	0
17-12-2024	13:43	35	44	427	0.3	0
17-12-2024	13:44	34	38	429	0.3	0
17-12-2024	13:45	32	38	429	0.3	0
17-12-2024	13:46	35	40	429	0.3	0
17-12-2024	13:47	32	38	427	0.3	0
17-12-2024	13:48	34	40	424	0.3	0
17-12-2024	13:49	36	40	422	0.3	0
17-12-2024	13:50	34	37	422	0.3	0
17-12-2024	13:51	34	40	422	0.3	0
17-12-2024	13:52	34	37	423	0.3	0
17-12-2024	13:53	35	42	425	0.3	0
17-12-2024	13:54	38	44	428	0.3	0
17-12-2024	13:55	35	41	431	0.3	0
17-12-2024	13:56	34	38	429	0.3	0
17-12-2024	13:57	32	35	424	0.4	0
17-12-2024	13:58	35	37	418	0.4	0
17-12-2024	13:59	35	38	417	0.4	0
17-12-2024	14:00	31	37	418	0.4	0
17-12-2024	14:01	38	46	415	0.4	0
17-12-2024	14:02	33	38	415	0.4	0

17-12-2024	14:03	34	40	417	0.4	0
17-12-2024	14:04	32	35	417	0.4	0
17-12-2024	14:05	33	38	414	0.4	0
17-12-2024	14:06	33	39	410	0.4	0
17-12-2024	14:07	31	34	410	0.4	0
17-12-2024	14:08	33	35	410	0.4	0
17-12-2024	14:09	33	39	414	0.4	0
17-12-2024	14:10	34	39	415	0.4	0
17-12-2024	14:11	34	41	411	0.4	0
17-12-2024	14:12	32	37	414	0.4	0
17-12-2024	14:13	36	42	420	0.4	0
17-12-2024	14:14	33	36	419	0.4	0
17-12-2024	14:15	34	37	416	0.4	0
17-12-2024	14:16	33	37	411	0.4	0
17-12-2024	14:17	34	40	410	0.4	0
17-12-2024	14:18	32	34	410	0.4	0
17-12-2024	14:19	31	34	410	0.4	0
17-12-2024	14:20	32	35	410	0.4	0
17-12-2024	14:21	31	33	411	0.4	0
17-12-2024	14:22	34	37	413	0.4	0
17-12-2024	14:23	32	36	415	0.4	0
17-12-2024	14:24	33	36	415	0.4	0
17-12-2024	14:25	32	34	413	0.4	0
17-12-2024	14:26	34	40	412	0.4	0
17-12-2024	14:27	32	37	411	0.4	0
17-12-2024	14:28	33	37	411	0.4	0
17-12-2024	14:29	31	35	413	0.5	0
17-12-2024	14:30	34	37	411	0.4	0
17-12-2024	14:31	32	35	410	0.5	0
17-12-2024	14:32	32	36	410	0.5	0
17-12-2024	14:33	30	34	410	0.5	0
17-12-2024	14:34	36	41	411	0.5	0
17-12-2024	14:35	31	36	413	0.5	0
17-12-2024	14:36	30	31	416	0.5	0
17-12-2024	14:37	32	38	420	0.5	0
17-12-2024	14:38	34	38	420	0.5	0
17-12-2024	14:39	34	38	413	0.5	0
17-12-2024	14:40	32	36	410	0.5	0
17-12-2024	14:41	34	37	410	0.5	0
17-12-2024	14:42	31	33	410	0.5	0
17-12-2024	14:43	32	34	410	0.5	0
17-12-2024	14:44	33	36	410	0.5	0
17-12-2024	14:45	31	32	409	0.5	0
17-12-2024	14:46	35	42	409	0.5	0
17-12-2024	14:47	32	36	409	0.5	0
17-12-2024	14:48	34	38	410	0.5	0
17-12-2024	14:49	34	38	410	0.5	0

17-12-2024	14:50	33	42	410	0.6	0
17-12-2024	14:51	32	36	410	0.6	0
17-12-2024	14:52	32	38	410	0.6	0
17-12-2024	14:53	34	37	410	0.6	0
17-12-2024	14:54	34	37	410	0.6	0
17-12-2024	14:55	33	39	410	0.6	0
17-12-2024	14:56	34	40	410	0.6	0
17-12-2024	14:57	42	52	410	0.6	0
17-12-2024	14:58	41	46	410	0.6	0
17-12-2024	14:59	39	44	416	0.6	0
17-12-2024	15:00	37	42	418	0.6	0
17-12-2024	15:01	35	41	418	0.6	0
17-12-2024	15:02	34	39	415	0.6	0
17-12-2024	15:03	34	39	410	0.6	0
17-12-2024	15:04	34	41	411	0.6	0
17-12-2024	15:05	35	39	410	0.6	0
17-12-2024	15:06	32	39	410	0.6	0
17-12-2024	15:07	34	41	410	0.6	0
17-12-2024	15:08	31	35	410	0.6	0
17-12-2024	15:09	32	36	410	0.6	0
17-12-2024	15:10	31	36	410	0.6	0
17-12-2024	15:11	32	36	410	0.6	0
17-12-2024	15:12	33	37	410	0.7	0
17-12-2024	15:13	33	39	410	0.6	0
17-12-2024	15:14	32	37	410	0.6	0
17-12-2024	15:15	33	37	410	0.6	0
17-12-2024	15:16	34	39	410	0.7	0
17-12-2024	15:17	35	41	410	0.7	0
17-12-2024	15:18	34	37	410	0.7	0
17-12-2024	15:19	54	73	410	0.7	0
17-12-2024	15:20	126	123	410	0.7	0
17-12-2024	15:21	66	71	410	0.7	0
17-12-2024	15:22	57	67	410	0.7	0
17-12-2024	15:23	45	56	410	0.7	0
17-12-2024	15:24	40	48	410	0.7	0
17-12-2024	15:25	38	48	410	0.7	0
17-12-2024	15:26	40	46	410	0.7	0
17-12-2024	15:27	37	42	410	0.7	0
17-12-2024	15:28	37	45	410	0.7	0
17-12-2024	15:29	37	42	410	0.7	0
17-12-2024	15:30	36	43	410	0.7	0
17-12-2024	15:31	38	47	410	0.7	0
17-12-2024	15:32	35	38	410	0.7	0
17-12-2024	15:33	38	43	410	0.7	0
17-12-2024	15:34	33	40	410	0.7	0
17-12-2024	15:35	33	40	410	0.7	0
17-12-2024	15:36	34	38	410	0.7	0

17-12-2024	15:37	35	38	410	0.7	0
17-12-2024	15:38	35	41	410	0.7	0
17-12-2024	15:39	34	39	413	0.7	0
17-12-2024	15:40	35	38	413	0.7	0
17-12-2024	15:41	34	39	413	0.7	0
17-12-2024	15:42	35	38	417	0.7	0
17-12-2024	15:43	37	45	424	0.7	0
17-12-2024	15:44	36	42	430	0.7	0
17-12-2024	15:45	36	43	433	0.7	0
17-12-2024	15:46	35	40	439	0.7	0
17-12-2024	15:47	36	43	443	0.7	0
17-12-2024	15:48	33	39	445	0.8	0
17-12-2024	15:49	35	39	446	0.7	0
17-12-2024	15:50	34	42	450	0.8	0
17-12-2024	15:51	33	40	450	0.8	0
17-12-2024	15:52	36	42	451	0.8	0
17-12-2024	15:53	36	39	454	0.8	0
17-12-2024	15:54	35	43	457	0.8	0
17-12-2024	15:55	36	42	459	0.8	0
17-12-2024	15:56	38	45	455	0.8	0
17-12-2024	15:57	36	45	456	0.8	0
17-12-2024	15:58	34	39	455	0.8	0
17-12-2024	15:59	37	43	450	0.8	0
17-12-2024	16:00	35	43	446	0.8	0
17-12-2024	16:01	33	37	441	0.8	0
17-12-2024	16:02	36	43	434	0.8	0
17-12-2024	16:03	35	39	434	0.8	0
17-12-2024	16:04	38	45	438	0.8	0
17-12-2024	16:05	34	41	437	0.8	0
17-12-2024	16:06	36	43	441	0.8	0
17-12-2024	16:07	34	37	441	0.8	0
17-12-2024	16:08	33	37	443	0.8	0
17-12-2024	16:09	36	42	437	0.8	0
17-12-2024	16:10	34	40	428	0.8	0
17-12-2024	16:11	33	36	427	0.8	0
17-12-2024	16:12	33	40	429	0.9	0
17-12-2024	16:13	36	43	434	0.9	0
17-12-2024	16:14	33	36	438	0.9	0
17-12-2024	16:15	34	41	443	0.9	0
17-12-2024	16:16	37	43	453	0.9	0
17-12-2024	16:17	38	45	452	0.9	0
17-12-2024	16:18	34	38	457	0.9	0
17-12-2024	16:19	35	41	476	0.9	0
17-12-2024	16:20	36	42	479	0.9	0
17-12-2024	16:21	36	44	463	0.9	0
17-12-2024	16:22	35	46	443	0.9	0
17-12-2024	16:23	35	42	430	0.9	0

17-12-2024	16:24	34	37	427	0.9	0
17-12-2024	16:25	32	39	431	0.9	0
17-12-2024	16:26	31	39	439	0.9	0
17-12-2024	16:27	33	39	448	0.9	0
17-12-2024	16:28	33	39	450	0.9	0
17-12-2024	16:29	33	38	448	0.9	0
17-12-2024	16:30	33	39	451	0.9	0
17-12-2024	16:31	36	41	454	0.9	0
17-12-2024	16:32	33	39	452	0.9	0
17-12-2024	16:33	31	35	450	1	0
17-12-2024	16:34	31	34	446	1	0
17-12-2024	16:35	33	38	445	1	0
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17-12-2024	16:39	33	39	454	1	0
17-12-2024	16:40	33	40	453	1	0
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17-12-2024	16:42	31	35	450	1	0
17-12-2024	16:43	33	37	454	1	0
17-12-2024	16:44	34	38	455	1	0
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17-12-2024	16:47	32	36	453	1	0
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17-12-2024	16:49	32	34	453	1	0
17-12-2024	16:50	34	37	452	1	0
17-12-2024	16:51	31	34	455	1	0
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17-12-2024	16:56	31	33	494	1	0
17-12-2024	16:57	31	37	487	1	0
17-12-2024	16:58	31	34	481	1	0
17-12-2024	16:59	33	39	482	1	0
17-12-2024	17:00	30	34	481	1	0
17-12-2024	17:01	30	31	475	1	0
17-12-2024	17:02	33	39	483	1	0
17-12-2024	17:03	31	35	481	1	0
17-12-2024	17:04	33	36	477	1	0
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17-12-2024	17:08	32	38	462	1	0
17-12-2024	17:09	30	33	461	1	0
17-12-2024	17:10	32	34	459	1	0

17-12-2024	17:11	32	33	462	1	0
17-12-2024	17:12	31	33	466	1	0
17-12-2024	17:13	31	36	467	1	0
17-12-2024	17:14	31	34	468	1	0
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17-12-2024	17:16	32	36	463	1	0
17-12-2024	17:17	31	33	463	1	0
17-12-2024	17:18	31	38	465	1	0
17-12-2024	17:19	33	37	467	1	0
17-12-2024	17:20	33	39	468	1	0
17-12-2024	17:21	33	39	467	1	0
17-12-2024	17:22	33	38	472	1	0
17-12-2024	17:23	31	34	477	1.1	0
17-12-2024	17:24	31	36	479	1.1	0
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17-12-2024	17:26	33	35	472	1.1	0
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17-12-2024	17:28	31	34	470	1.1	0
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17-12-2024	17:30	33	36	472	1.1	0
17-12-2024	17:31	33	39	472	1.1	0
17-12-2024	17:32	30	36	472	1.1	0
17-12-2024	17:33	33	38	468	1.1	0
17-12-2024	17:34	31	35	463	1.1	0
17-12-2024	17:35	29	31	460	1.1	0
17-12-2024	17:36	33	36	458	1.1	0
17-12-2024	17:37	31	35	452	1.1	0
17-12-2024	17:38	30	32	454	1.1	0
17-12-2024	17:39	28	30	460	1.1	0
17-12-2024	17:40	32	36	460	1.1	0
17-12-2024	17:41	29	30	456	1.1	0
17-12-2024	17:42	30	33	449	1	0
17-12-2024	17:43	30	34	447	1.1	0
17-12-2024	17:44	31	34	454	1.1	0
17-12-2024	17:45	36	40	459	1.1	0
17-12-2024	17:46	34	40	454	1.1	0
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17-12-2024	17:51	31	36	472	1.1	0
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17-12-2024	17:53	33	37	467	1.1	0
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17-12-2024	17:55	33	39	463	1.1	0
17-12-2024	17:56	31	36	464	1.1	0
17-12-2024	17:57	30	33	459	1.1	0

17-12-2024	17:58	30	34	452	1.1	0
17-12-2024	17:59	31	33	452	1.1	0
17-12-2024	18:00	30	32	454	1.1	0
17-12-2024	18:01	29	33	458	1.1	0
17-12-2024	18:02	31	33	457	1.1	0
17-12-2024	18:03	31	40	458	1.1	0
17-12-2024	18:04	30	31	456	1.1	0
17-12-2024	18:05	31	34	450	1.1	0
17-12-2024	18:06	31	34	447	1.1	0
17-12-2024	18:07	30	32	449	1.1	0
17-12-2024	18:08	31	37	450	1.1	0
17-12-2024	18:09	30	32	449	1.1	0
17-12-2024	18:10	31	37	450	1.1	0
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17-12-2024	18:12	32	37	453	1.1	0
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17-12-2024	18:19	33	38	453	1.1	0
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17-12-2024	18:21	31	34	450	1.1	0
17-12-2024	18:22	33	35	453	1.1	0
17-12-2024	18:23	33	37	449	1.1	0
17-12-2024	18:24	30	32	441	1.1	0
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17-12-2024	18:26	30	36	447	1.1	0
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17-12-2024	18:32	34	39	454	1.1	0
17-12-2024	18:33	38	45	447	1.1	0
17-12-2024	18:34	40	47	437	1.1	0
17-12-2024	18:35	39	48	444	1.1	0
17-12-2024	18:36	45	53	447	1.1	0
17-12-2024	18:37	59	69	456	1.1	0
17-12-2024	18:38	57	67	465	1.1	0
17-12-2024	18:39	60	69	469	1.1	0
17-12-2024	18:40	56	66	480	1.1	0
17-12-2024	18:41	50	59	494	1.1	0
17-12-2024	18:42	53	64	503	1.1	0
17-12-2024	18:43	53	63	499	1.1	0
17-12-2024	18:44	51	63	491	1.1	0

17-12-2024	18:45	62	70	489	1.1	0
17-12-2024	18:46	63	70	502	1.1	0
17-12-2024	18:47	64	70	513	1.1	0
17-12-2024	18:48	63	70	518	1.1	0
17-12-2024	18:49	56	67	526	1.1	0
17-12-2024	18:50	60	69	530	1.1	0
17-12-2024	18:51	64	69	532	1.1	0
17-12-2024	18:52	70	75	537	1.1	0
17-12-2024	18:53	69	74	545	1.1	0
17-12-2024	18:54	87	91	549	1.1	0
17-12-2024	18:55	87	90	556	1.1	0
17-12-2024	18:56	85	87	555	1.1	0
17-12-2024	18:57	88	91	545	1.1	0
17-12-2024	18:58	87	89	541	1.1	0
17-12-2024	18:59	78	78	538	1.1	0
17-12-2024	19:00	60	69	522	1.1	0
17-12-2024	19:01	60	68	468	1.1	0
17-12-2024	19:02	54	64	445	1.1	0
17-12-2024	19:03	48	58	423	1.1	0
17-12-2024	19:04	48	60	410	1.1	0
17-12-2024	19:05	49	60	410	1.1	0
17-12-2024	19:06	48	58	409	1.1	0
17-12-2024	19:07	57	67	410	1.1	0
17-12-2024	19:08	51	62	420	1.1	0
17-12-2024	19:09	56	67	432	1.1	0
17-12-2024	19:10	59	68	431	1.1	0
17-12-2024	19:11	54	65	436	1.1	0
17-12-2024	19:12	59	70	434	1.1	0
17-12-2024	19:13	64	72	433	1.1	0
17-12-2024	19:14	68	73	440	1.1	0
17-12-2024	19:15	78	80	451	1.1	0
17-12-2024	19:16	74	76	465	1.1	0
17-12-2024	19:17	72	77	476	1.1	0
17-12-2024	19:18	89	89	485	1.1	0
17-12-2024	19:19	94	93	500	1.1	0
17-12-2024	19:20	98	100	514	1.1	0
17-12-2024	19:21	96	96	522	1.1	0
17-12-2024	19:22	90	93	525	1.1	0
17-12-2024	19:23	79	80	535	1.1	0
17-12-2024	19:24	83	83	531	1.1	0
17-12-2024	19:25	84	85	518	1.1	0
17-12-2024	19:26	96	99	500	1.1	0
17-12-2024	19:27	81	85	502	1.1	0
17-12-2024	19:28	73	76	505	1.1	0
17-12-2024	19:29	70	73	504	1.1	0
17-12-2024	19:30	55	65	494	1.1	0
17-12-2024	19:31	55	66	461	1.1	0

17-12-2024	19:32	60	68	443	1.1	0
17-12-2024	19:33	51	63	463	1.1	0
17-12-2024	19:34	58	68	461	1.1	0
17-12-2024	19:35	55	63	456	1.1	0
17-12-2024	19:36	51	62	456	1.1	0
17-12-2024	19:37	52	65	454	1.1	0
17-12-2024	19:38	51	63	453	1.1	0
17-12-2024	19:39	52	65	471	1.1	0
17-12-2024	19:40	50	61	484	1.1	0
17-12-2024	19:41	55	66	490	1.1	0
17-12-2024	19:42	55	64	494	1.1	0
17-12-2024	19:43	47	58	492	1.1	0
17-12-2024	19:44	46	56	467	1.1	0
17-12-2024	19:45	47	59	438	1.1	0
17-12-2024	19:46	50	59	445	1.1	0
17-12-2024	19:47	46	54	458	1.1	0
17-12-2024	19:48	47	58	468	1.1	0
17-12-2024	19:49	48	60	474	1.1	0
17-12-2024	19:50	48	58	477	1.1	0
17-12-2024	19:51	48	59	480	1.1	0
17-12-2024	19:52	46	56	481	1.1	0
17-12-2024	19:53	45	54	485	1.1	0
17-12-2024	19:54	47	57	485	1.1	0
17-12-2024	19:55	45	54	485	1.1	0
17-12-2024	19:56	45	55	483	1.1	0
17-12-2024	19:57	46	54	476	1.1	0
17-12-2024	19:58	46	56	479	1.1	0
17-12-2024	19:59	49	60	485	1.1	0
17-12-2024	20:00	46	55	491	1.1	0
17-12-2024	20:01	48	58	494	1.1	0
17-12-2024	20:02	46	55	481	1.1	0
17-12-2024	20:03	43	53	476	1.1	0
17-12-2024	20:04	42	51	475	1.1	0
17-12-2024	20:05	44	52	470	1.1	0
17-12-2024	20:06	44	52	454	1.1	0
17-12-2024	20:07	43	51	440	1.1	0
17-12-2024	20:08	42	50	425	1.1	0
17-12-2024	20:09	41	50	420	1.1	0
17-12-2024	20:10	41	50	417	1.1	0
17-12-2024	20:11	43	50	413	1.1	0
17-12-2024	20:12	40	48	410	1.1	0
17-12-2024	20:13	37	44	410	1.1	0
17-12-2024	20:14	39	45	410	1.1	0
17-12-2024	20:15	37	43	410	1.1	0
17-12-2024	20:16	37	45	410	1.1	0
17-12-2024	20:17	35	41	409	1.1	0
17-12-2024	20:18	41	48	409	1.1	0

17-12-2024	20:19	33	38	409	1.1	0
17-12-2024	20:20	37	46	409	1.1	0
17-12-2024	20:21	35	40	409	1.1	0
17-12-2024	20:22	33	40	409	1.1	0
17-12-2024	20:23	31	33	408	1.1	0
17-12-2024	20:24	33	38	408	1.1	0
17-12-2024	20:25	33	38	408	1.1	0
17-12-2024	20:26	34	43	409	1.1	0
17-12-2024	20:27	30	33	409	1.1	0
17-12-2024	20:28	31	34	409	1.1	0
17-12-2024	20:29	32	37	409	1.1	0
17-12-2024	20:30	33	36	409	1.1	0
17-12-2024	20:31	30	31	409	1.1	0
17-12-2024	20:32	29	33	409	1.1	0
17-12-2024	20:33	30	31	409	1.1	0
17-12-2024	20:34	31	33	409	1.1	0
17-12-2024	20:35	29	33	409	1.1	0
17-12-2024	20:36	29	32	409	1.1	0
17-12-2024	20:37	32	37	409	1.1	0
17-12-2024	20:38	30	31	409	1.1	0
17-12-2024	20:39	28	29	409	1.1	0
17-12-2024	20:40	31	36	409	1.1	0
17-12-2024	20:41	30	32	409	1.1	0
17-12-2024	20:42	30	31	409	1.1	0
17-12-2024	20:43	31	34	409	1.1	0
17-12-2024	20:44	30	32	409	1.1	0
17-12-2024	20:45	30	32	409	1.1	0
17-12-2024	20:46	31	34	409	1.1	0
17-12-2024	20:47	31	40	409	1.1	0
17-12-2024	20:48	31	36	409	1.1	0
17-12-2024	20:49	30	32	409	1.1	0
17-12-2024	20:50	30	33	409	1.1	0
17-12-2024	20:51	30	33	410	1.1	0
17-12-2024	20:52	33	37	410	1.1	0
17-12-2024	20:53	29	31	418	1.1	0
17-12-2024	20:54	31	37	420	1.1	0
17-12-2024	20:55	33	38	425	1.1	0
17-12-2024	20:56	31	34	430	1.1	0
17-12-2024	20:57	30	32	428	1.1	0
17-12-2024	20:58	31	33	430	1.1	0
17-12-2024	20:59	33	38	432	1.2	0
17-12-2024	21:00	29	31	434	1.2	0
17-12-2024	21:01	31	35	437	1.2	0
17-12-2024	21:02	32	36	439	1.2	0
17-12-2024	21:03	33	40	454	1.2	0
17-12-2024	21:04	31	34	463	1.2	0
17-12-2024	21:05	32	34	473	1.2	0

17-12-2024	21:06	31	35	477	1.2	0
17-12-2024	21:07	31	35	478	1.2	0
17-12-2024	21:08	33	37	479	1.2	0
17-12-2024	21:09	34	38	477	1.2	0
17-12-2024	21:10	32	37	473	1.2	0
17-12-2024	21:11	30	33	466	1.2	0
17-12-2024	21:12	31	35	467	1.2	0
17-12-2024	21:13	30	32	475	1.2	0
17-12-2024	21:14	31	34	479	1.2	0
17-12-2024	21:15	33	37	484	1.2	0
17-12-2024	21:16	33	36	485	1.2	0
17-12-2024	21:17	30	35	483	1.2	0
17-12-2024	21:18	31	33	487	1.2	0
17-12-2024	21:19	30	32	495	1.2	0
17-12-2024	21:20	31	35	499	1.2	0
17-12-2024	21:21	30	32	501	1.2	0
17-12-2024	21:22	28	31	505	1.2	0
17-12-2024	21:23	31	35	513	1.3	0
17-12-2024	21:24	30	33	514	1.3	0
17-12-2024	21:25	27	31	507	1.3	0
17-12-2024	21:26	30	33	504	1.3	0
17-12-2024	21:27	29	31	503	1.2	0
17-12-2024	21:28	31	34	506	1.2	0
17-12-2024	21:29	26	27	506	1.2	0
17-12-2024	21:30	29	32	511	1.2	0
17-12-2024	21:31	28	29	522	1.2	0
17-12-2024	21:32	32	37	534	1.2	0
17-12-2024	21:33	30	34	539	1.2	0
17-12-2024	21:34	31	36	539	1.2	0
17-12-2024	21:35	30	33	535	1.2	0
17-12-2024	21:36	28	31	534	1.2	0
17-12-2024	21:37	28	31	508	1.2	0
17-12-2024	21:38	28	30	503	1.2	0
17-12-2024	21:39	29	31	510	1.2	0
17-12-2024	21:40	25	27	518	1.2	0
17-12-2024	21:41	28	30	523	1.2	0
17-12-2024	21:42	27	27	526	1.2	0
17-12-2024	21:43	31	36	526	1.2	0
17-12-2024	21:44	30	33	522	1.2	0
17-12-2024	21:45	28	29	523	1.2	0
17-12-2024	21:46	27	27	524	1.2	0
17-12-2024	21:47	27	28	530	1.2	0
17-12-2024	21:48	28	31	544	1.2	0
17-12-2024	21:49	26	26	545	1.2	0
17-12-2024	21:50	28	30	541	1.2	0
17-12-2024	21:51	26	26	545	1.2	0
17-12-2024	21:52	25	27	547	1.2	0

17-12-2024	21:53	28	28	550	1.2	0
17-12-2024	21:54	27	26	550	1.2	0
17-12-2024	21:55	27	27	548	1.2	0
17-12-2024	21:56	27	27	548	1.2	0
17-12-2024	21:57	27	27	555	1.2	0
17-12-2024	21:58	29	30	557	1.2	0
17-12-2024	21:59	27	26	553	1.2	0
17-12-2024	22:00	26	26	549	1.2	0
17-12-2024	22:01	27	26	547	1.2	0
17-12-2024	22:02	26	28	550	1.2	0
17-12-2024	22:03	26	27	551	1.2	0
17-12-2024	22:04	27	31	551	1.2	0
17-12-2024	22:05	26	28	549	1.2	0
17-12-2024	22:06	28	30	557	1.2	0
17-12-2024	22:07	28	31	569	1.2	0
17-12-2024	22:08	25	25	578	1.2	0
17-12-2024	22:09	26	28	592	1.2	0
17-12-2024	22:10	28	30	600	1.2	0
17-12-2024	22:11	29	31	608	1.2	0
17-12-2024	22:12	24	24	609	1.2	0
17-12-2024	22:13	28	30	607	1.2	0
17-12-2024	22:14	26	25	604	1.2	0
17-12-2024	22:15	29	31	604	1.2	0
17-12-2024	22:16	26	27	599	1.2	0
17-12-2024	22:17	33	35	590	1.2	0
17-12-2024	22:18	27	33	581	1.2	0
17-12-2024	22:19	26	26	577	1.2	0
17-12-2024	22:20	28	29	576	1.2	0
17-12-2024	22:21	30	33	577	1.2	0
17-12-2024	22:22	29	30	584	1.2	0
17-12-2024	22:23	28	28	589	1.2	0
17-12-2024	22:24	26	25	598	1.2	0
17-12-2024	22:25	28	28	601	1.2	0
17-12-2024	22:26	26	28	601	1.2	0
17-12-2024	22:27	28	31	608	1.2	0
17-12-2024	22:28	26	25	617	1.2	0
17-12-2024	22:29	25	25	615	1.2	0
17-12-2024	22:30	23	26	603	1.2	0
17-12-2024	22:31	25	25	588	1.2	0
17-12-2024	22:32	29	30	577	1.2	0
17-12-2024	22:33	28	29	571	1.2	0
17-12-2024	22:34	25	26	574	1.2	0
17-12-2024	22:35	27	29	575	1.2	0
17-12-2024	22:36	25	27	572	1.2	0
17-12-2024	22:37	25	25	572	1.2	0
17-12-2024	22:38	24	26	570	1.2	0
17-12-2024	22:39	28	27	577	1.2	0

17-12-2024	22:40	25	25	589	1.2	0
17-12-2024	22:41	25	27	590	1.2	0
17-12-2024	22:42	25	25	581	1.2	0
17-12-2024	22:43	27	27	569	1.2	0
17-12-2024	22:44	23	25	564	1.2	0
17-12-2024	22:45	27	28	566	1.2	0
17-12-2024	22:46	25	26	571	1.2	0
17-12-2024	22:47	24	25	569	1.2	0
17-12-2024	22:48	24	24	553	1.2	0
17-12-2024	22:49	22	23	541	1.2	0
17-12-2024	22:50	25	25	530	1.2	0
17-12-2024	22:51	25	25	522	1.2	0
17-12-2024	22:52	26	27	521	1.2	0
17-12-2024	22:53	31	35	510	1.2	0
17-12-2024	22:54	28	30	496	1.1	0
17-12-2024	22:55	38	44	468	1.1	0
17-12-2024	22:56	39	47	445	1.1	0
17-12-2024	22:57	39	46	434	1.1	0
17-12-2024	22:58	42	50	433	1.1	0
17-12-2024	22:59	42	51	431	1.1	0
17-12-2024	23:00	40	48	422	1.1	0
17-12-2024	23:01	39	47	418	1.1	0
17-12-2024	23:02	40	46	418	1.1	0
17-12-2024	23:03	40	48	416	1.1	0
17-12-2024	23:04	40	47	416	1.1	0
17-12-2024	23:05	39	45	414	1.1	0
17-12-2024	23:06	42	50	413	1.1	0
17-12-2024	23:07	52	64	411	1.1	0
17-12-2024	23:08	60	69	410	1.1	0
17-12-2024	23:09	63	70	410	1.1	0
17-12-2024	23:10	65	72	410	1.1	0
17-12-2024	23:11	57	67	410	1.1	0
17-12-2024	23:12	54	65	410	1.1	0
17-12-2024	23:13	50	61	410	1.1	0
17-12-2024	23:14	48	59	410	1.1	0
17-12-2024	23:15	45	54	410	1.1	0
17-12-2024	23:16	38	47	410	1.1	0
17-12-2024	23:17	40	47	420	1.1	0
17-12-2024	23:18	39	47	438	1.1	0
17-12-2024	23:19	39	45	471	1.1	0
17-12-2024	23:20	35	43	488	1.1	0
17-12-2024	23:21	37	43	492	1.1	0
17-12-2024	23:22	36	43	493	1.1	0
17-12-2024	23:23	36	40	496	1.1	0
17-12-2024	23:24	35	40	500	1.1	0
17-12-2024	23:25	36	43	502	1.1	0
17-12-2024	23:26	34	40	504	1.1	0

17-12-2024	23:27	34	43	510	1.1	0
17-12-2024	23:28	35	41	508	1.1	0
17-12-2024	23:29	34	41	505	1.1	0
17-12-2024	23:30	34	39	503	1.1	0
17-12-2024	23:31	34	40	501	1.1	0
17-12-2024	23:32	31	36	507	1.1	0
17-12-2024	23:33	31	38	506	1.1	0
17-12-2024	23:34	34	41	497	1.1	0
17-12-2024	23:35	34	39	499	1.1	0
17-12-2024	23:36	34	39	507	1.1	0
17-12-2024	23:37	34	37	508	1.1	0
17-12-2024	23:38	32	37	500	1.1	0
17-12-2024	23:39	33	40	497	1.1	0
17-12-2024	23:40	34	43	502	1.1	0
17-12-2024	23:41	32	40	502	1.1	0
17-12-2024	23:42	31	33	497	1.1	0
17-12-2024	23:43	27	28	485	1.1	0
17-12-2024	23:44	27	28	442	1	0
17-12-2024	23:45	28	26	410	1	0
17-12-2024	23:46	23	25	409	1	0
17-12-2024	23:47	24	25	409	1	0
17-12-2024	23:48	22	23	409	1	0
17-12-2024	23:49	20	20	408	1	0
17-12-2024	23:50	25	28	408	1	0
17-12-2024	23:51	28	30	409	1	0
17-12-2024	23:52	28	28	409	1	0
17-12-2024	23:53	30	34	409	1	0
17-12-2024	23:54	28	28	410	0.9	0
17-12-2024	23:55	30	32	410	0.9	0
17-12-2024	23:56	31	34	410	0.9	0
17-12-2024	23:57	32	35	410	0.9	0
17-12-2024	23:58	30	32	410	0.9	0
17-12-2024	23:59	32	36	410	0.9	0

S L PRASAD & CO.

Chartered Accountants

Kowgachi More, Shyamagar, 24 Parganas (N) West Bengal, PIN 743127 Email: casohanji@gmail.com

Certification of the Expenditures in respect of Bayal Quartz and Feldspar Mine

I/We, hereby certify the following expenses, in respect of Bayal Quartz and Feldspar Mine, situated at Khasra Number 201, 223, and 224, Village – Bayal, Tehsil – Nangal Choudhary, District Mahendragarh (Haryana) and having its registered office at House No. 196-P, HUDA Sector-1, Mahendragarh Road, Narnaul, District Mahendragarh (Haryana) –

EXPENDITURES TOWARDS ENVIRONMENT MANAGEMENT PLAN (EMP)

A. CAPITAL EXPENDITURE

S. N.	Expenditure Head	Certified Amount (January 1, 2018 to September 30, 2023)	Certified Amount (October 1, 2023 to September 30, 2024)	Total Certified Expenses (January 1, 2018 -September 30, 2024)
1	Land for green belt development and construction of GI sheet parapet wall including procurement, levelling and other necessary development	Rs. 50,00,000/-	-	Rs. 50,00,000/-
2	Purchase and erection of wind barrier walls	Rs. 58,60,000/-	-	Rs. 58,60,000/-
3	Development of Garland Drains around the dump	Rs. 200,000/-	-	Rs. 200,000/-
4	Development of Desilting Chamber	Rs. 100,000/-	-	Rs. 100,000/-
5	Development of Rain Water Harvesting Pits along with retaining wall and incoming drains	Rs. 800,000/-	-	Rs. 800,000/-
6	Installation of Fixed Water Sprinklers around 1000 Ft.	Rs. 100,000/-	-	Rs. 100,000/-
7	Procurement of plant saplings – total around 13000, including plantation and guards	Rs. 1,650,000/-	Rs. 400,000	Rs. 2,050,000/-
8	Procurement of ambient air quality monitoring station (AAQMS)	Rs. 725,000/-	-	Rs. 725,000/-
9	Purchase of Water Tanker with Mist Fogger arrangement.	Rs. 650,000/-	-	Rs. 650,000/-
10	Dressing and stabilizing slope of the OB Dump yard.	Rs. 3,800,000/-	Rs. 800,000	Rs. 4,600,000/-
11	Contribution to Mines Safety, Environment and Cleanliness Celebration / Drive	Rs. 100,000/-	Rs. 140,000/-	Rs. 240,000/-
12	**Total Capital Expenditures so far for EMP**	**Rs. 189.85 Lakh only.**	**Rs. 13.40 Lakh only.**	**Rs. 203.25 Lakh only.**

EMP expenses continued….

S L PRASAD & CO.

Chartered Accountants

Kowgachi More, Shyamagar, 24 Parganas (N) West Bengal, PIN 743127 Email: casohanji@gmail.com

B.RECURRING EXPENDITURE

S. N.	Expenditure Head	Certified Amount (January 1, 2018 to September 30, 2023)	Certified Amount (October 1, 2023 to September 30, 2024)	Total Certified Expenses (January 1, 2018 -September 30, 2024)
1	Payment towards hiring, operation and maintenance of the mobile water tankers – 6 Nos.	Rs. 1,65,60,000/-	Rs. 28,80,000/-	Rs. 1,94,40,000/-
2	Periodic Monitoring for Environmental Parameters i.e. AAQ, Water etc. through NABL accredited agency.	Rs. 500,000/-	Rs. 100,000/-	Rs. 600,000/-
3	**Total Recurring Expenses so far for EMP**	**Rs. 170.60 Lakh only.**	**Rs. 29.80 Lakh only.**	**Rs. 200.40 Lakh only.**

GROSS TOTAL EXPENSES FOR EMP (CAPITAL + RECURRING) = Rs. 403.65 Lakh.

The above-mentioned details are true to the best my knowledge and verification and hence, stands certified.

FOR S L PRASAD & CO.
CHARTERED ACCOUNTANTS
FRN NO. 332736E

(CA, SOHAN LAL PRASAD)
PROPRIETOR
M.NO. 064828
UDIN: 24064828BKAQUJ7841
PLACE : Kolkata

DATE: 16/12/2024

S L PRASAD & CO.

Chartered Accountants

Kowgachi More, Shyamagar, 24 Parganas (N) West Bengal, PIN 743127 Email: casohanji@gmail.com

Certification of the Expenditures in respect of Bayal Quartz and Feldspar Mine

I/We, hereby certify the following expenses, in respect of Bayal Quartz and Feldspar Mine, situated at Khasra Number 201, 223, and 224, Village – Bayal, Tehsil – Nangal Choudhary, District Mahendragarh (Haryana) and having its registered office at House No. 196-P, HUDA Sector-1, Mahendragarh Road, Narnaul, District Mahendragarh (Haryana) –

EXPENDITURES TOWARDS CORPORATE / ENTERPRISE SOCIAL RESPONSIBILITY (CSR/ESC)

S. N.	Expenditure Head	Certified Amount
For Financial Year 2018-19		
1	Contribution to the Gram Panchayat, Bayal for Village Development Activities	Rs. 400,000.00/-
2	Development of School Library at Bayal and Syalodra.	Rs. 35,000.00/-
For Financial Year 2019-20		
3	Installation of the Water Pump at Bayal Village	Rs. 80,480.00/-
4	Contribution to the Gram Panchayat, Bayal for Village Development, Health and Sanitation Activities	Rs. 600,000.00/-
5	Medicines and Stationaries to the School at Bayal and Syalodra.	Rs. 28,035.00/-
6	Development of School Library at Bayal and Syalodra.	Rs. 136,000.00/-
7	Construction of Sports Stadium in Bayal Village	Rs. 819,485.00/-
8	Development of Baba Bharthahari Temple in Bayal Village	Rs. 500,000.00/-
For Financial Year 2020-21		
9	Development of Baba Bharthahari Temple in Bayal Village	Rs. 1,000,000.00/-
10	Distribution of Food, Medicines, Masks and other necessary materials to the Villagers during Covid-19 Pandemic.	Rs. 300,000.00/-
For Financial Year 2021-22 and 2022-23 (till September 30, 2022)		
11	Contribution for village development	Rs. 230,000.00/-
12	Contribution for community works	Rs. 114,474.00/-
13	Contribution for development of Baba Bhartahari Temple in Bayal village	Rs. 285,980.00/-
For Financial Year 2022-23 (October 1, 2022 to September 30, 2023)		
14	Contribution for upgradation of library at Government Higher Secondary School, Bayal.	Rs. 122,651.00/-

Continued…

S L PRASAD & CO.

Chartered Accountants

Kowgachi More, Shyamagar, 24 Parganas (N) West Bengal, PIN 743127 Email: casohanji@gmail.com

15	Contribution for village development	Rs. 84,666.00/-
16	Contribution for community works	Rs. 75,540.00/-
17	Contribution for development of Baba Bhartahari Temple in Bayal village	Rs. 31,000.00/-
For Financial Year 2023-24 (October 1, 2023 to September 30, 2024)		
18	Contribution for providing uniforms, furniture and infrastructure support to school children at Bayal	Rs. 183,500.00/-
19	Re-flooring of the Bharthari Baba Temple, Bayal and contribution for annual fair at the temple	Rs. 398,000.00/-
20	Contribution to the Bhairu Baba Temple and Hiramal Baba Temple, and donation to the Gaushala	Rs. 511,000.00/-
21	Donation to the Jeen Mata Temple for refurbishment	Rs. 181,000.00/-
22	Contribution for community works	Rs. 458,000.00/-
23	Contribution for village development	Rs. 8,66,500.00/-
24	Donation to Baba Ratiram Ashram	Rs. 252,000.00/-
25	**Total CSR Expenditure so far (2018-Sept 30, 2024)**	**Rs. 76,93,311.00/-**

The above-mentioned details are true to the best my knowledge and verification and hence, stands certified.

FOR S L PRASAD & CO.
CHARTERED ACCOUNTANTS
FRN NO. 332736E

(CA, SOHAN LAL PRASAD)
PROPRIETOR
M.NO. 064828
PAN- ALSPP5301L
UDIN: 24064828BKAQUL5571
PLACE : Kolkata
DATE : 16/12/2024

S L PRASAD & CO.

Chartered Accountants

Kowgachi More, Shyamagar, 24 Parganas (N) West Bengal, PIN 743127 Email: casohanji@gmail.com

Certification of the Expenditures in respect of Bayal Quartz and Feldspar Mine

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EXPENDITURES TOWARDS STUDY BY CENTRAL INSTITUITE FOR MINING AND FUEL RESEARCH (CIMFR) AND PERMISSION UNDER REGULATION 164(1-B) OF THE METALIFERROUS MINES REGULATIONS, 1961

S. No.	Expenditure Head	Certified Amount
For Financial Year 2018-19		
1	Study Fee paid to the Central Institute for Mining and Fuel Research, Dhanbad for conducting the blast vibration study at Bayal Mines	Rs. 10,00,000.00
For Financial Year 2019-20		
2	Purchase of Seismograph for measurement of Blast Induced Ground Vibration	Rs. 430,000.00/-
For Financial Year 2020-21		
3	Annual Calibration of the Seismograph	Rs. 40,000.00/-
For Financial Year 2021-22		
4	Study Fee paid to the Central Institute for Mining and Fuel Research, Dhanbad for conducting the blast vibration study at Bayal Mines	Rs. 9,00,000.00
5	Annual Calibration of the Seismograph	Rs. 40,000.00/-
6	Report printing, and other expenses (so far)	Rs. 10,000
For Financial Year 2022-23		
7	Annual Calibration of the Seismograph	Rs. 40,000.00/-
8	Report printing, and other expenses (so far)	Rs. 10,000
For Financial Year 2023-24 (From 01.04.2023 to 30.09.2023)		
9	Annual Calibration of the Seismograph	Rs. 40,000.00/-
10	Report printing, and other expenses (so far)	Rs. 10,000
For Financial Year 2023-24 (From 01.10.2023 to 30.09.2024)		
11	Study Fee paid to the Central Institute for Mining and Fuel Research, Dhanbad for conducting the blast vibration study at Bayal Mines	Rs. 920,000/-
12	Annual Calibration of the Seismograph	Rs. 40,000.00/-
	Report printing, and other expenses	Rs. 10,000
13	**Total expenditures incurred from FY 2018-19 to FY 2023-24 (Till 30.09.2024)**	**Rs. 34,90,000.00/-**

The above-mentioned details are true to the best my knowledge and verification and hence, stands certified.

FOR S L PRASAD & CO.
CHARTERED ACCOUNTANTS
FRN NO. 332736E

(CA, SOHAN LAL PRASAD)
PROPRIETOR
M.NO. 064828
PAN- ALSPP5301L
UDIN: 24064828BKAQUM9754
PLACE : Kolkata
DATE : 16/12/2024

S L PRASAD & CO.

Chartered Accountants

Kowgachi More, Shyamagar, 24 Parganas (N) West Bengal, PIN 743127 Email: casohanji@gmail.com

Certification of the Expenditures in respect of Bayal Quartz and Feldspar Mine

I/We, hereby certify the following expenses, in respect of Bayal Quartz and Feldspar Mine, situated at Khasra Number 201, 223, and 224, Village – Bayal, Tehsil – Nangal Choudhary, District Mahendragarh (Haryana) and having its registered office at House No. 196-P, HUDA Sector-1, Mahendragarh Road, Narnaul, District Mahendragarh (Haryana) –

EXPENDITURES TOWARDS REHABILITATION AND RE-SETTLEMENT (R&R)

S. No.	Expenditure Head	Certified Amount (From FY2018-19 to September 30, 2023)	Certified Amount ((From October 1, 2023 to September 30, 2024	Total Certified Expenses (January 1, 2018 - September 30, 2024)
1	Acquisition of land near and surrounding Mining Lease Area	Rs. 323.31 Lakh	-	Rs. 323.31 Lakh
2	Compensation of houses for families shifted at owned land	Rs. 1360.84 Lakh	Rs. 39.41 Lakh	Rs. 1400.25 Lakh
3	Monthly compensation to 55 families located nearby.	Rs. 333.70 Lakh	Rs. 76.90 Lakh.	Rs. 410.60 Lakh
4	**Gross total R&R expenses so far (FY 2018-19 to September 30, 2023**	**Rs. 2017.85 Lakh**	**Rs. 116.31 Lakh**	**Rs. 2134.16 Lakh**

The above-mentioned details are true to the best my knowledge and verification and hence, stands certified.

FOR S L PRASAD & CO.
CHARTERED ACCOUNTANTS
FRN NO. 332736E

(CA, SOHAN LAL PRASAD)
PROPRIETOR
M.NO. 064828
PAN- ALSPP5301L
UDIN: 24064828BKAQUN3951
PLACE : Kolkata
DATE : 16/12/2024

आपका जीवन
आपके परिवार के
लिए अनमोल है
सुरक्षित घर लौटना ही
आपका प्रथम लक्ष्य है।
आपातकाल न. 9658313727
बाईल माईन्स (BLOCK-A) 35.05 हेक्टेयर

दो गज
की दूरी,
मास्क
है जरूरी

SPEED
LIMIT
20 K.M./HOUR
BLASTING TIME
FROM 1:00 PM to 2:00 PM
FROM 4:00 PM to 5:00 PM

पेड़ हमारा हित करते है
वायु प्रदूषण कम करते है।

RETAINING
WALL

सुरक्षित कार्य
करियें
सुरक्षित घर
लौटियें
BLOCK-B

आलस्य और लापरवाही
करते जीवन की तबाही

Instantel

Event Re 984

Date/Time	Vert at 16:09:41 November 7, 2021
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.0 sec at 2048 sps
Operator/Setup:	Operator/Bayal.mmb

Serial Number	UM14894 V 10-80 Micromate ISEE
Battery Level	3.7 Volts
Unit Calibration	March 22, 2019 by Instantel
File Name	__TEMP.EVT

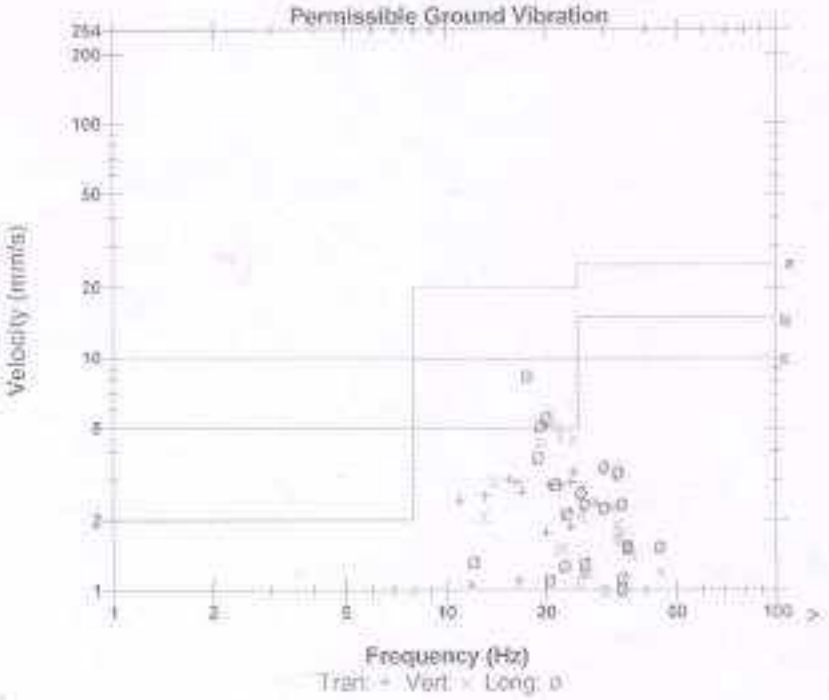
Notes
Location: BAYAL
Client: BAYAL QUARTZ
User Name: BAYAL MINES
General:

Microphone	Linear Weighting
PSPL	117.5 dB(L) 15.00 pa (L) at 0.398 sec
ZC Freq	7.5 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1230 mv)

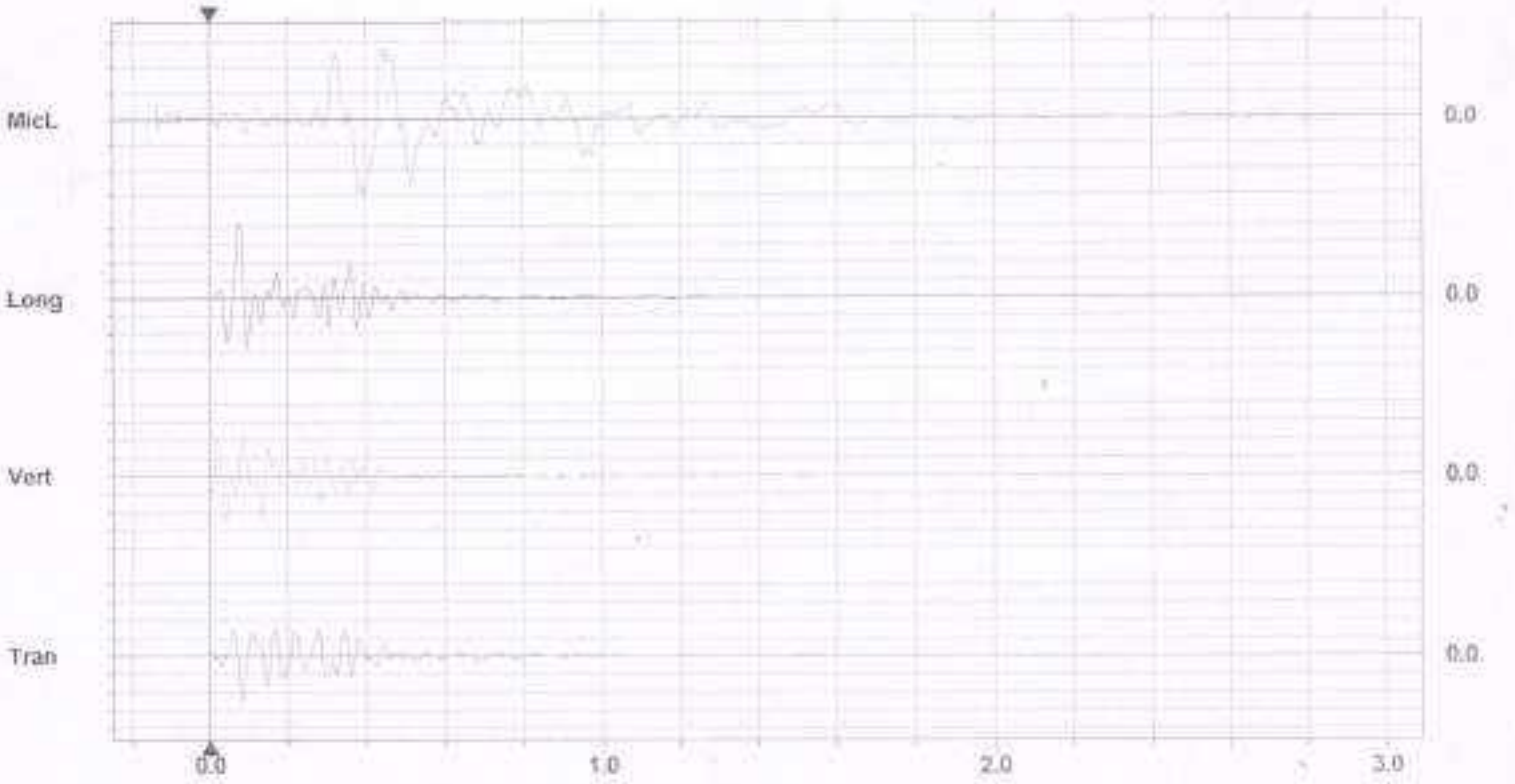
	Tran	Vert	Long	
PPV	5.084	5.084	8.457	mm/s
ZC Freq	20	22	17.7	Hz
Time (Rel. to Trig)	0.083	0.042	0.078	sec
Peak Acceleration	0.071	0.089	0.123	g
Peak Displacement	0.036	0.037	0.069	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 9.834 mm/s at 0.080 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 5.000 pa (L)/div
Trigger = ▶——◀

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Instantel

Event Re

Date/Time	Vert at 17:10:56 November 6, 2021
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.0 sec at 2048 sps
Operator/Setup:	Operator/Bayal mmb

Serial Number	UM14894 V 10-89 Micromate ISEE
Battery Level	3.7 Volts
Unit Calibration	March 22, 2019 by Instantel
File Name	__TEMP EVT

Notes
Location: BAYAL
Client: BAYAL QUARTZ
User Name: BAYAL MINES
General:

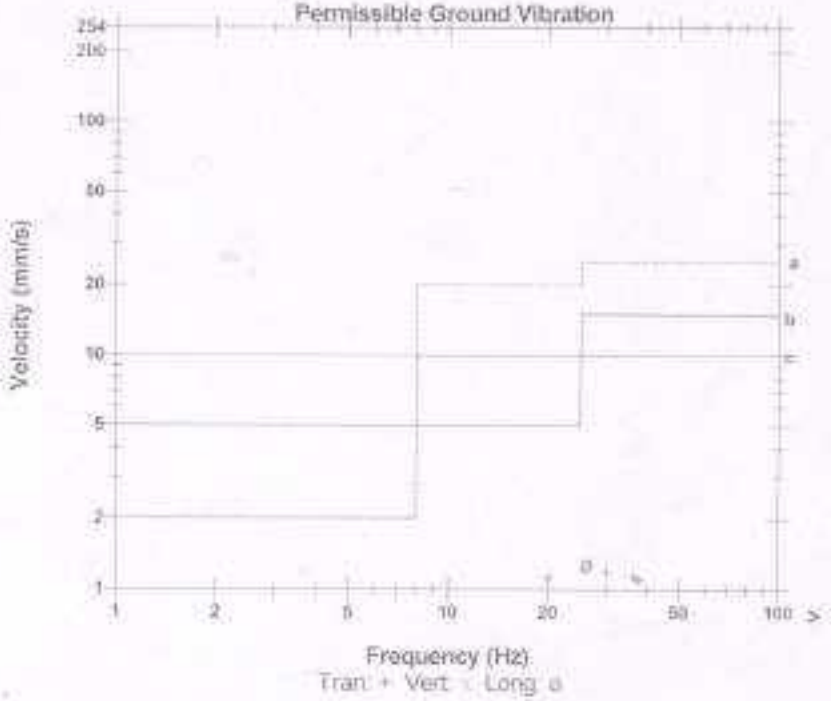
Microphone	Linear Weighting
PSPL	103.8 dB(L) 3.103 pa (L) at 0.897 sec
ZC Freq	6.8 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1242 mv)

	Tran	Vert	Long	
PPV	1.182	0.946	1.265	mm/s
ZC Freq	30	45	26	Hz
Time (Rel. to Trig)	0.221	0.152	0.461	sec
Peak Acceleration	0.041	0.036	0.044	g
Peak Displacement	0.005	0.005	0.007	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.449 mm/s at 0.480 sec

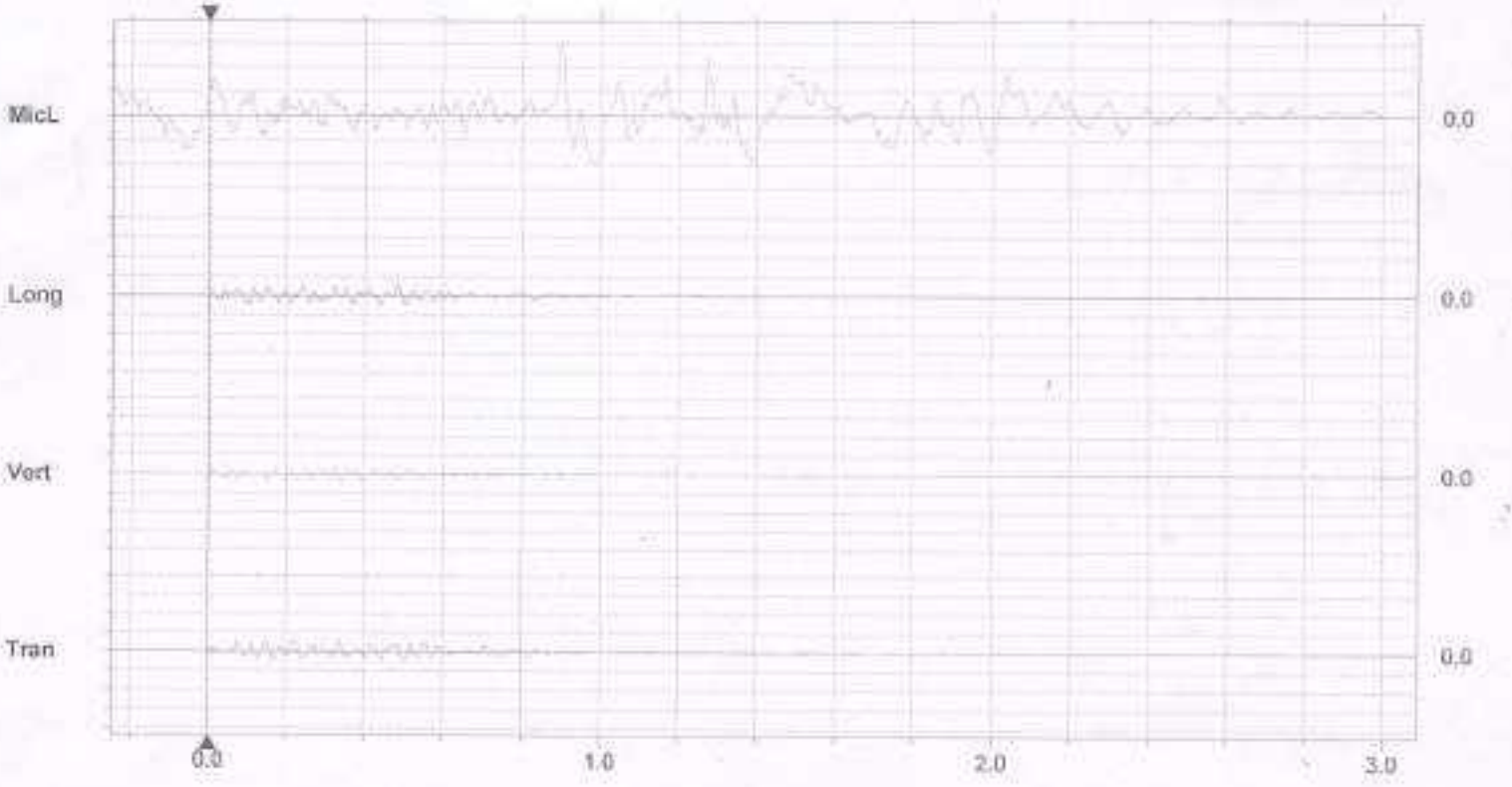
DGMS India (A)

Permissible Ground Vibration



Tran + Vert ◦ Long ⊙

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 1.000 pa (L)/div
Trigger =

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Instantel

Event R 986

Date/Time	Vert at 16:46:30 November 3, 2021
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.0 sec at 2048 sps
Operator/Setup:	Operator/Bayal.mmb

Serial Number	UM14694 V 10-89 Micromate iSEE
Battery Level	3.7 Volts
Unit Calibration	March 22, 2019 by Instantel
File Name	__TEMP.EVT

Notes
Location: BAYAL
Client: BAYAL QUARTZ
User Name: BAYAL MINES
General:

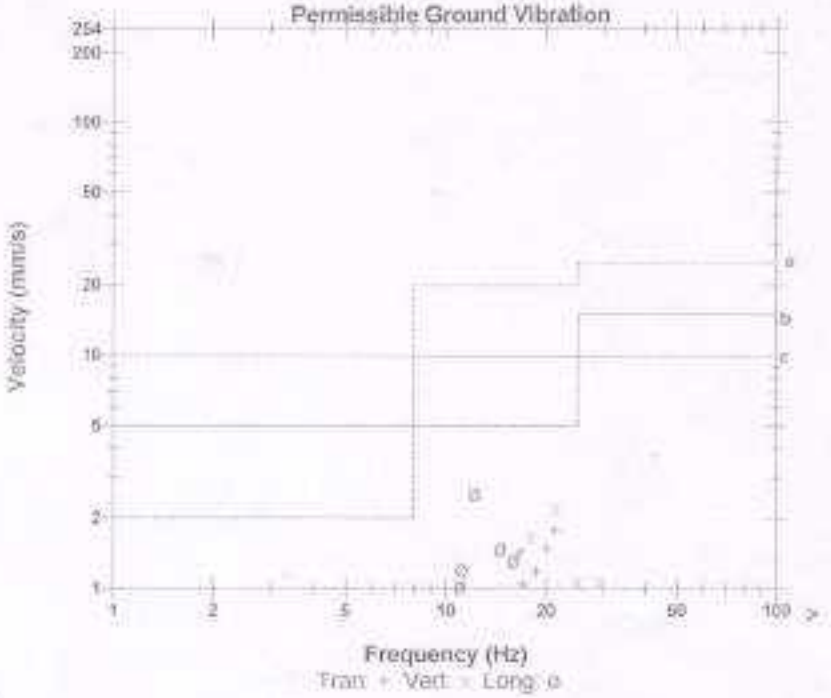
Microphone	Linear Weighting
PSPL	131.7 dB(L) 76.49 pa (L) at 0.539 sec
ZC Freq	8.0 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1210 mv)

	Tran	Vert	Long	
PPV	1.773	2.223	2.569	mm/s
ZC Freq	21	21	12.2	Hz
Time (Rel. to Trig)	0.114	0.088	0.083	sec
Peak Acceleration	0.033	0.059	0.044	g
Peak Displacement	0.012	0.016	0.033	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 3.115 mm/s at 0.090 sec

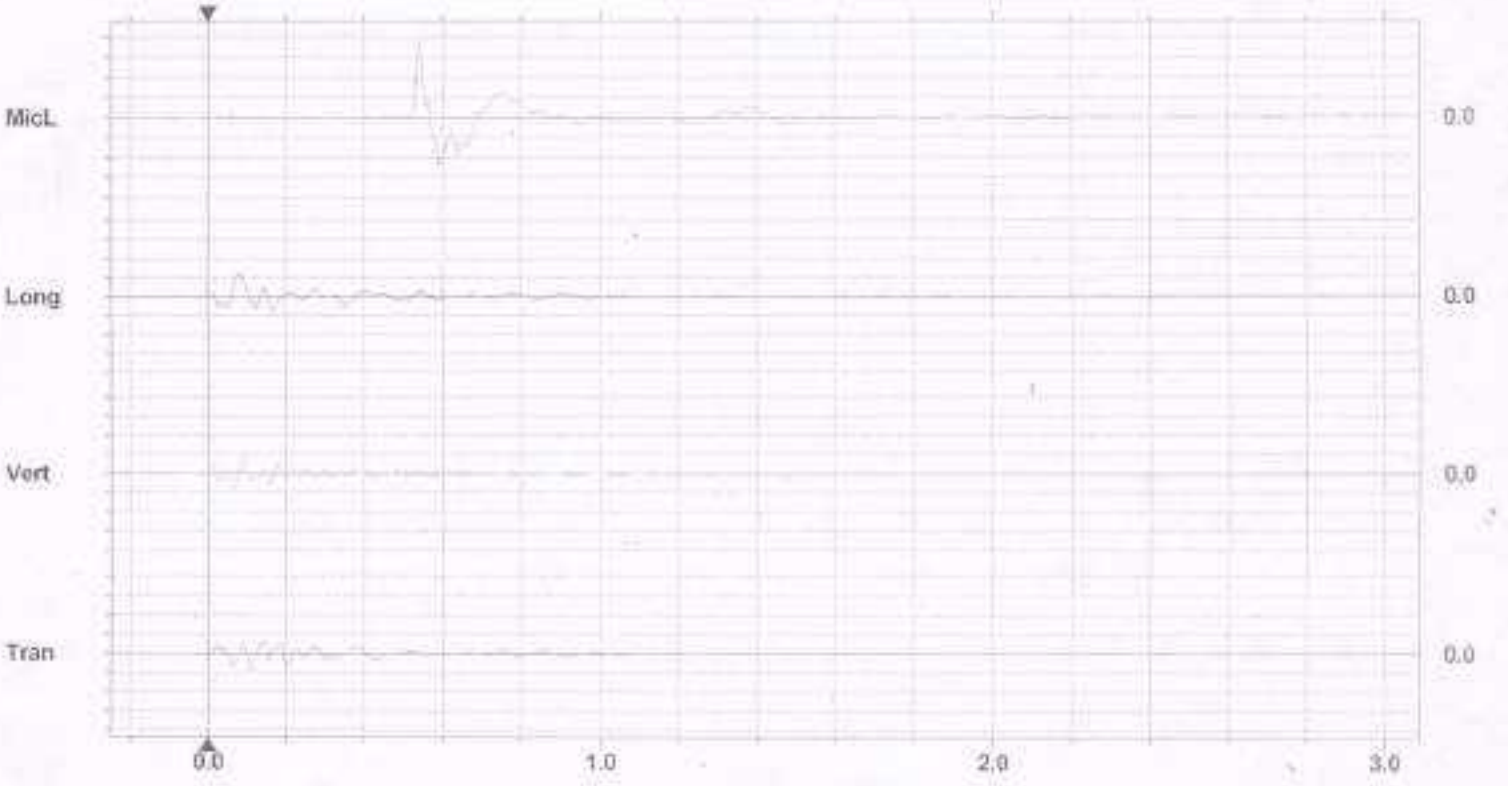
DGMS India (A)

Permissible Ground Vibration



Tran + Vert ○ Long ○

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 20.00 pa (L)/div
Trigger = ▶ ◀

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Instantel

Event Rep 987

A-Block-

Date/Time Long at 17:42:26 October 26, 2021
Trigger Source Geo: 0.500 mm/s
Range Geo: 254.0 mm/s
Record Time 3.0 sec at 2048 sps
Operator/Setup: Operator/Bayal mmb

Serial Number UM14894 V 10.89 Micromate ISEE
Battery Level 3.7 Volts
Unit Calibration March 22, 2019 by Instantel
File Name __TEMP.EVT

Notes
Location: BAYAL
Client: BAYAL QUARTZ
User Name: BAYAL MINES
General:

Microphone Linear Weighting
PSPL 98.30 dB(L) 1.645 pa (L) at 0.944 sec
ZC Freq 7.8 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 1263 mv)

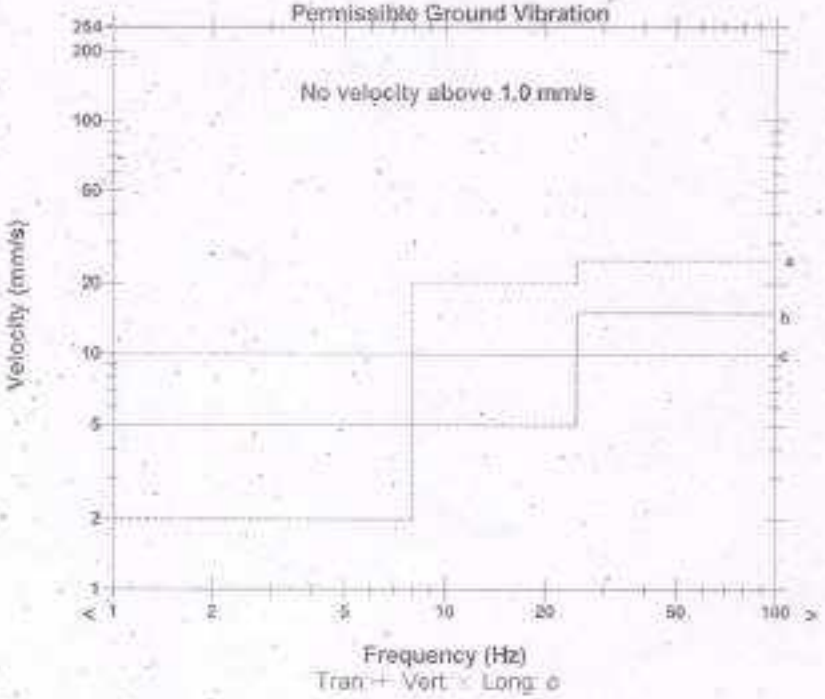
	Tran	Vert	Long	
PPV	0.867	0.862	0.946	mm/s
ZC Freq	21	15.5	22	Hz
Time (Rel. to Trig)	0.103	0.093	0.136	sec
Peak Acceleration	0.026	0.023	0.039	g
Peak Displacement	0.005	0.017	0.007	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.080 mm/s at 0.127 sec

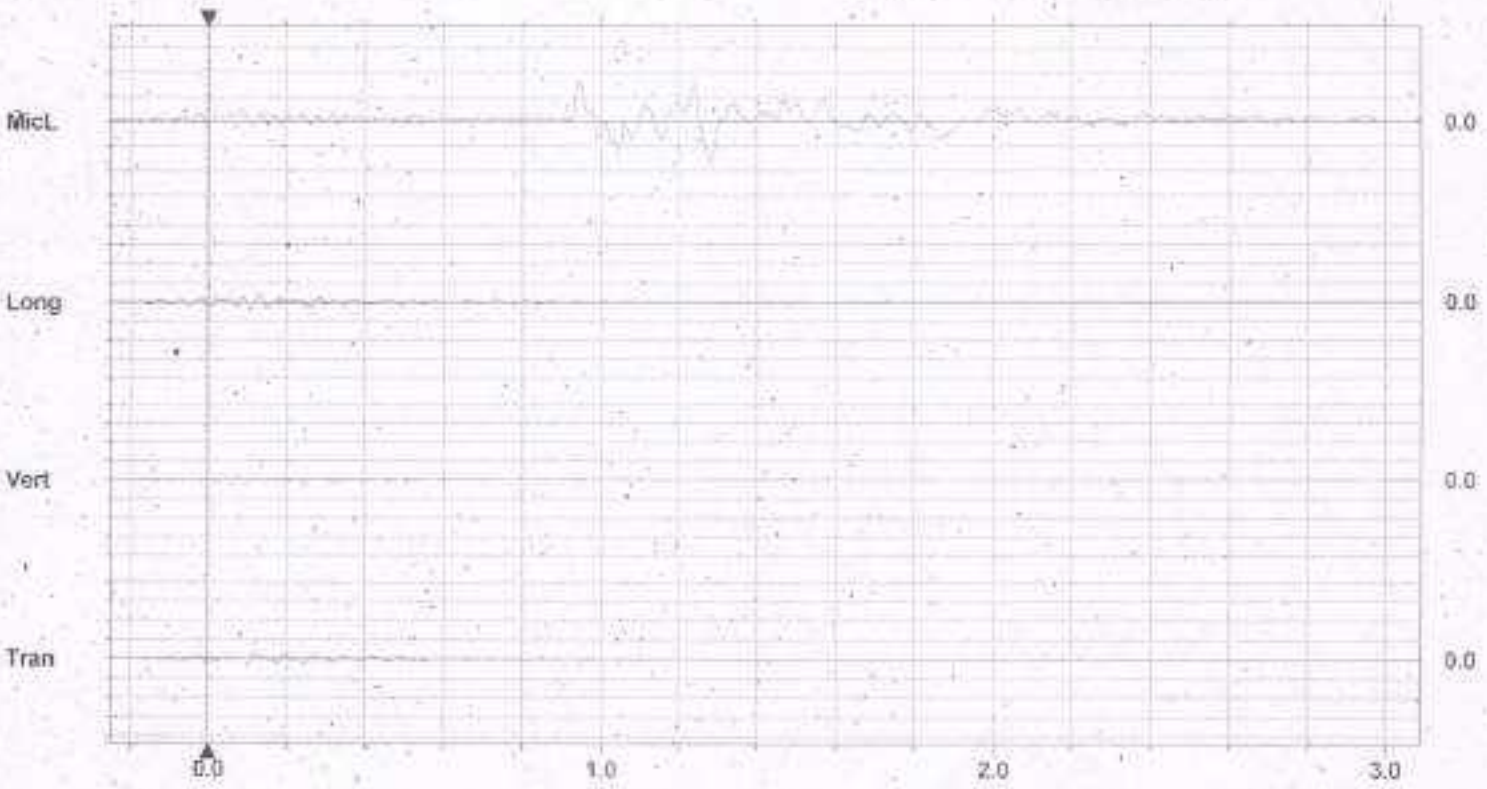
DGMS India (A)

Permissible Ground Vibration

No velocity above 1.0 mm/s



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div Mic: 1.000 pa (L)/div
Trigger = ▶ ◀

PPV - 1.080 mm/sec

Printed: October 26, 2021 (4:10:72 - 10:72)

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970

Instantel

Event Re 988 A-Block.

Date/Time	Long at 18:06:49 October 24, 2021
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.0 sec at 2048 sps
Operator/Setup	Operator/Bayal mmb

Serial Number	UM14694 V 10-89 Micromate ISEE
Battery Level	3.7 Volts
Unit Calibration	March 22, 2019 by Instantel
File Name	__TEMP.EVT

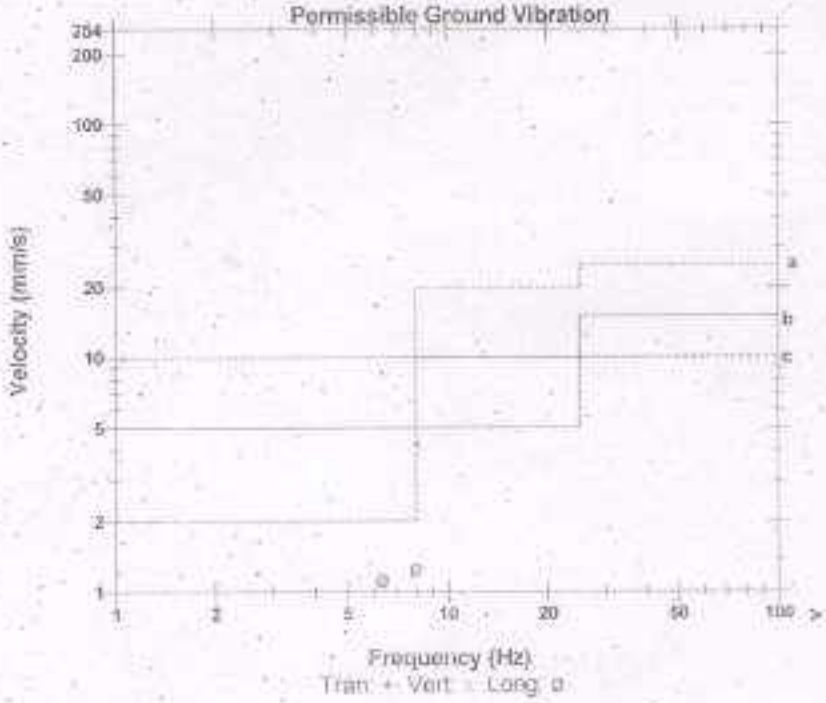
Notes
Location: BAYAL
Client: BAYAL QUARTZ
User Name: BAYAL MINES
General

Microphone	Linear Weighting
PSPL	89.39 dB(L) 0.590 pa (L) at 1.029 sec
ZC Freq	2.4 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1246 mv.)

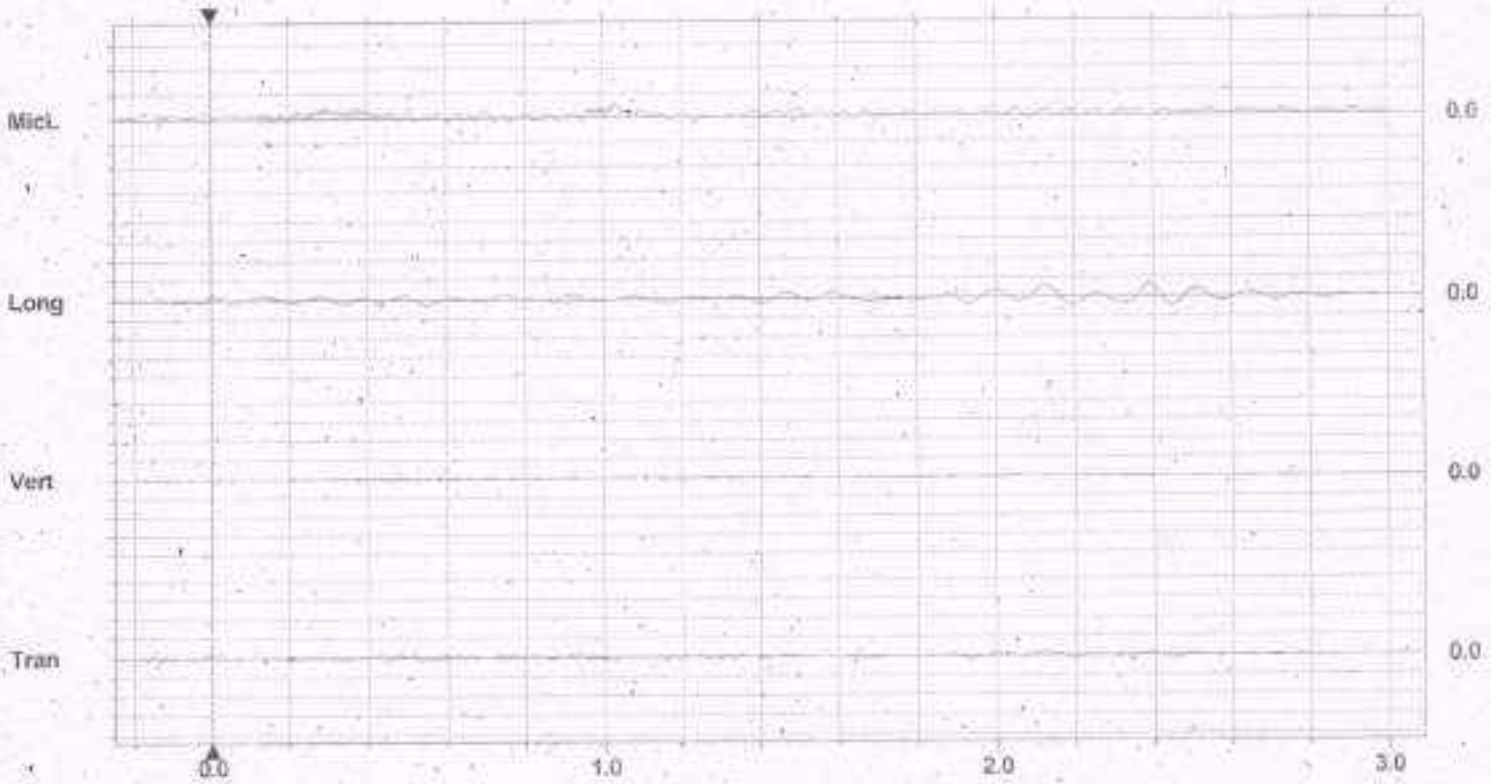
	Tran	Vert	Long	
PPV	0.497	0.323	1.261	mm/s
ZC Freq	20	26	8.0	Hz
Time (Rel. to Trig)	2.342	1.153	2.387	sec
Peak Acceleration	0.013	0.016	0.013	g
Peak Displacement	0.010	0.005	0.027	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.338 mm/s at 2.390 sec

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo 2.000 mm/s/div Mic 1.000 pa (L)/div
Trigger = ▶ ◀

PPV - 1·338 mm/sec

Printed: October 30, 2021 (V 10.72 - 10.72) Format © Instantel Xtreme Corporation

Instantel

Event Re989

North Block.

Date/Time: Long at 18:06:45 October 24, 2021
Trigger Source: Geo: 0.500 mm/s
Range: Geo: 254.0 mm/s
Record Time: 3.0 sec at 2048 sps
Operator/Setup: Operator/Bayal.mmb

Serial Number: UM14894 V 10-89 Micromate ISEE
Battery Level: 3.7 Volts
Unit Calibration: March 22, 2019 by Instantel
File Name: __TEMP.EVT

Notes
Location: BAYAL
Client: BAYAL QUARTZ
User Name: BAYAL MINES
General:

Microphone: Linear Weighting
PSPL: <88 dB(L) <0.500 pa.(L)
ZC Freq: 1.6 Hz
Channel Test: Passed (Freq = 19.7 Hz Amp = 1246 mv)

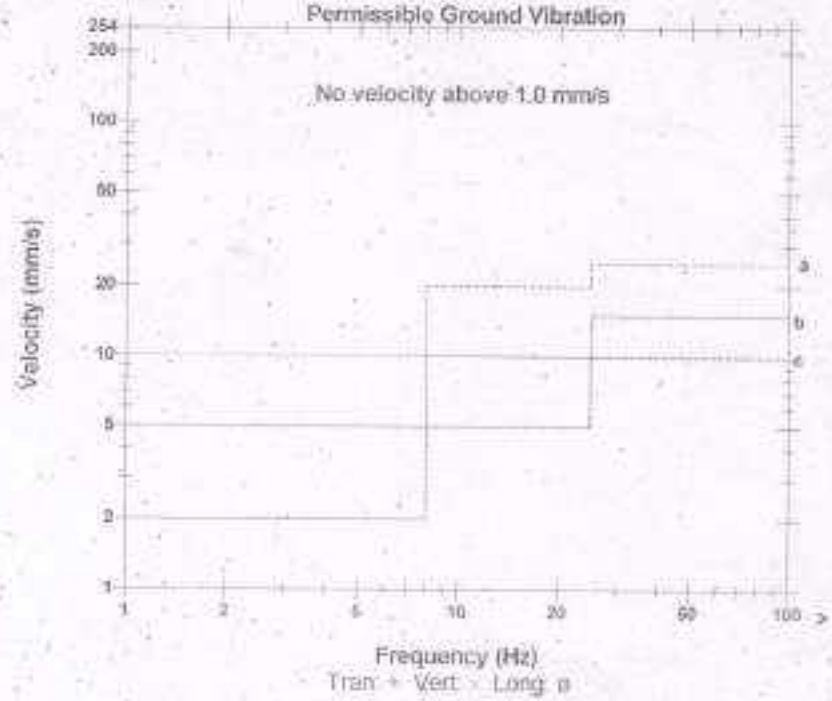
	Tran	Vert	Long	
PPV	0.378	0.158	0.954	mm/s
ZC Freq	N/A	4.9	6.4	Hz
Time (Rel. to Trig)	0.010	0.025	0.063	sec
Peak Acceleration	0.013	0.013	0.012	g
Peak Displacement	0.005	0.005	0.024	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum: 0.978 mm/s at 0.064 sec
N/A: Not Applicable

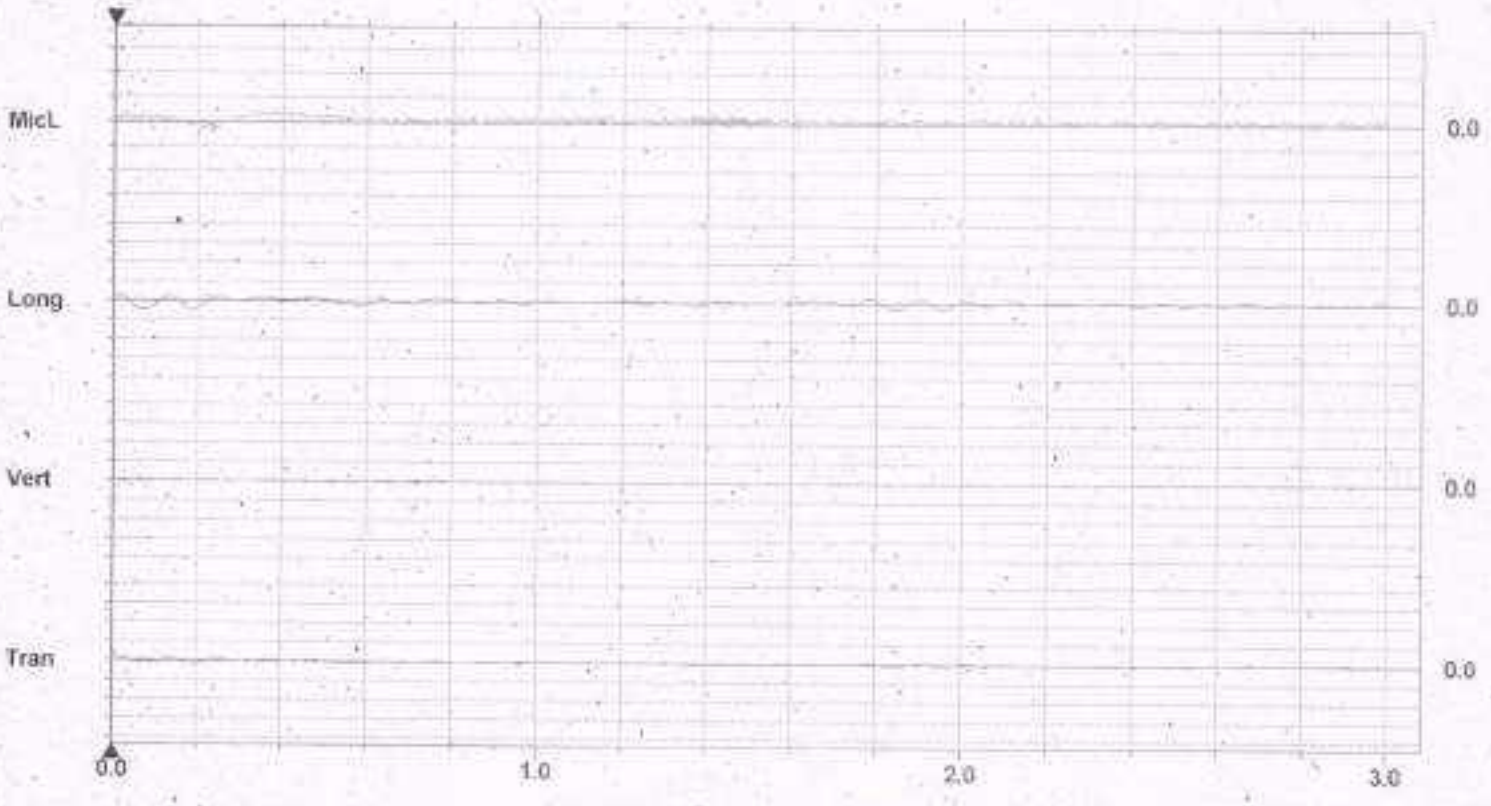
DGMS India (A)

Permissible Ground Vibration

No velocity above 1.0 mm/s



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div Mic: 1.000 pa.(L)/div
Trigger = ▶ ◀

PPV - 0.978

Format © 1995-2014 Xmark Corporation

Dist:

Instantel

Event Re 990

Date/Time	Long at 13:35:28 July 23, 2021
Trigger Source	Geo: 0.500 mm/s
Range	Geo: 254.0 mm/s
Record Time	3.0 sec at 2048 sps
Operator/Setup:	Operator/Bayal.mmb

Serial Number	UM14894 V.10-88 Micromate ISEE
Battery Level	3.6 Volts
Unit Calibration	March 22, 2019 by Instantel
File Name	__TEMP.EVT

Notes
Location: BAYAL
Client: BAYAL QUARTZ
User Name: BAYAL MINES
General:

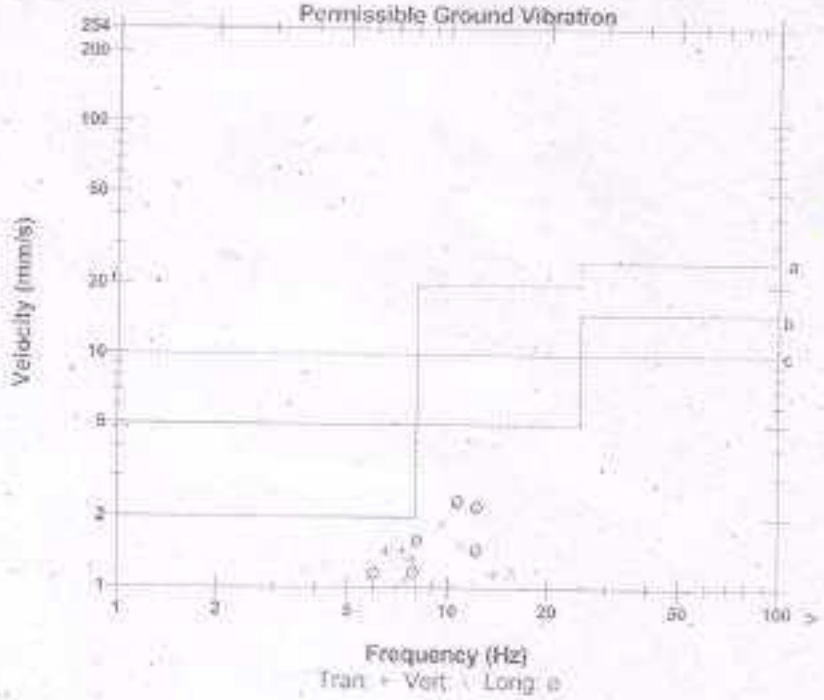
Microphone	Linear Weighting
PSPL	120.8 dB(L) 22.05 pa (L) at 0.653 sec
ZC Freq	12.8 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1113 mv)

	Tran	Vert	Long	
PPV	1.442	1.923	2.396	mm/s
ZC Freq	7.3	9.7	10.7	Hz
Time (Rel. to Trig)	0.328	0.187	0.198	sec
Peak Accoleration	0.018	0.015	0.031	g
Peak Displacement	0.026	0.031	0.033	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum: 2.858 mm/s at 0.195 sec

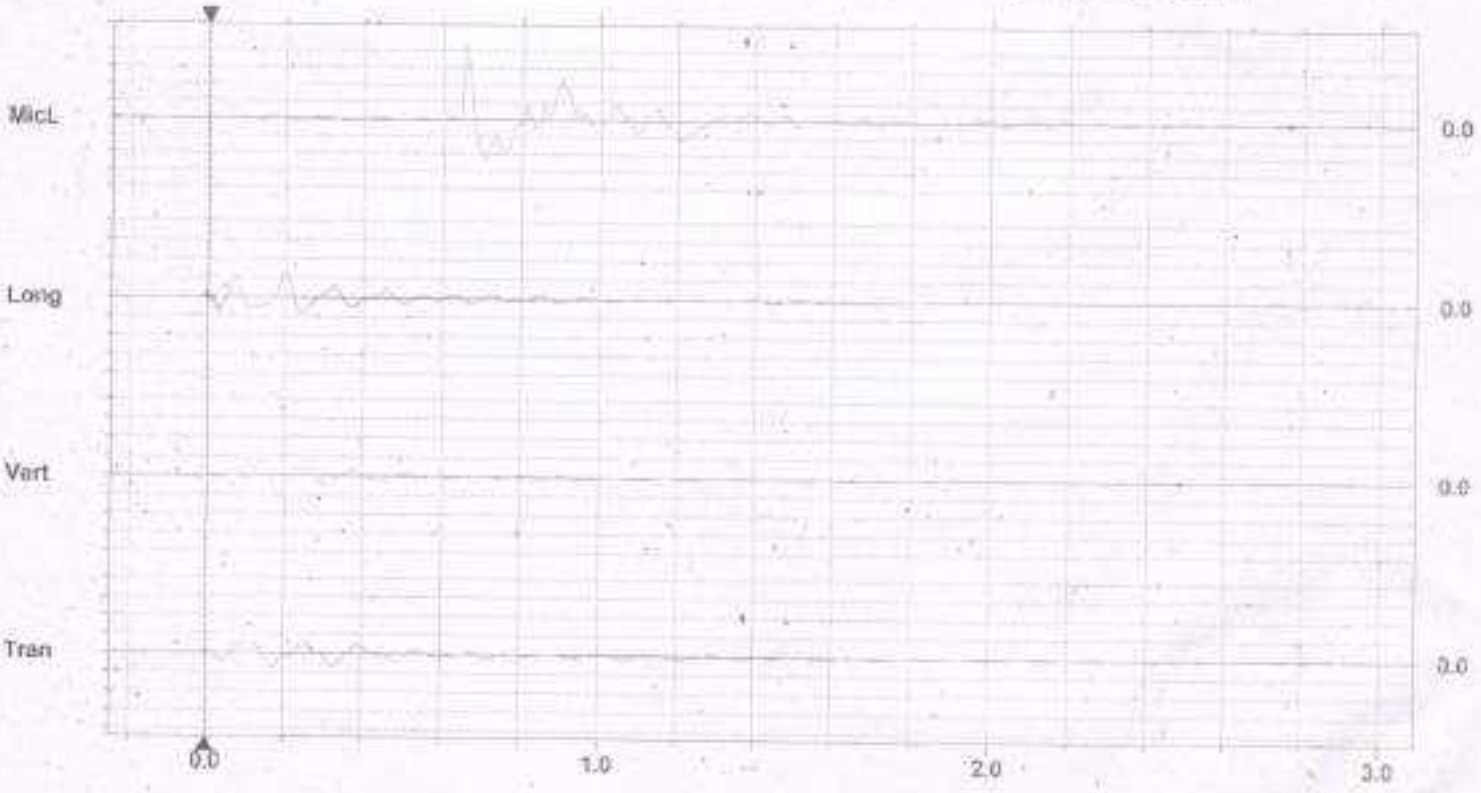
DGMS India (A)

Permissible Ground Vibration



Tran + Vert ○ Long ⊙

a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 5.000 pa (L)/div
Trigger = ▶ ◀

Format © 1996-2014 Xmark Corporation

Instantel

Event Re...

Date/Time	Tran at 17:48:19 February 17, 2021
Trigger Source	Geo: 0.500 mm/s, Mic: 130.8 dB(L)
Range	Geo: 254.0 mm/s
Record Time	3.0 sec at 2048 sps
Operator/Setup:	Operator/factory MM8

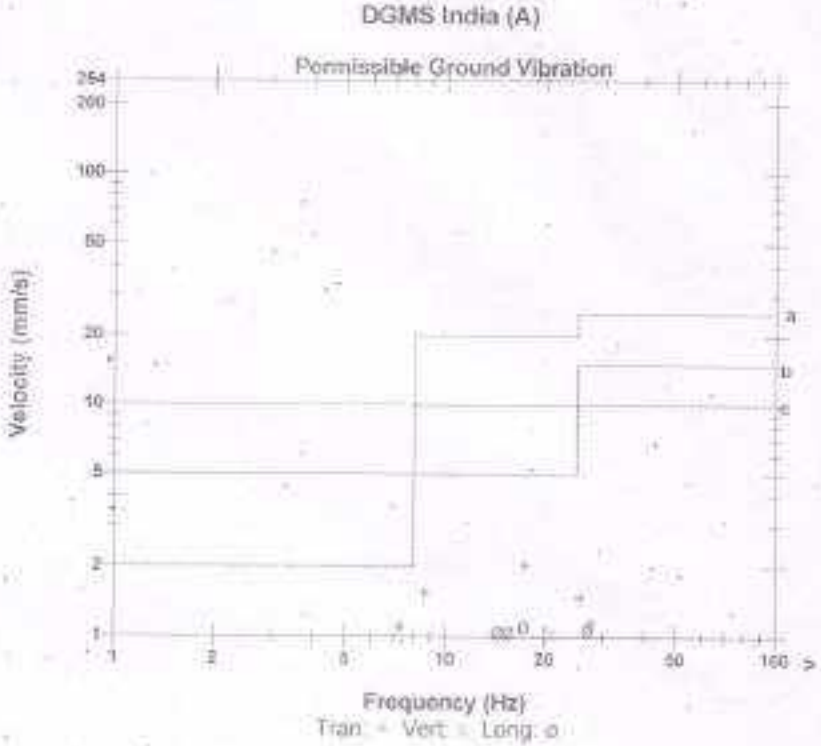
Serial Number	UM14894 V 10-89 Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	March 22, 2019 by Instantel
File Name	UM14894_20210217174619.IDFW

Notes
Location: BAYAL
Client: BAYAL QUARTZ
User Name: BAYAL MINES
General:

Microphone	Linear Weighting
PSPL	123.8 dB(L) 31.02 pa (L) at 0.600 sec
ZC Freq	5.5 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1301 mv)

	Tran	Vert	Long	
PPV	2.034	1.040	1.119	mm/s
ZC Freq	17.4	21	17.4	Hz
Time (Rel. to Trig)	0.143	0.095	0.197	sec
Peak Acceleration	0.039	0.020	0.025	g
Peak Displacement	0.027	0.011	0.018	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.064 mm/s at 0.143 sec



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div Mic: 10.000 pa (L)/div
Trigger = ▶ ◀

Format © 1995-2014 Xmark Corporation

Instantel

Event Report

992

Date/Time	Long at 18:07:32 November 8, 2020
Trigger Source	Geo: 0.500 mm/s, Mic: 130.8 dB(L)
Range	Geo: 254.0 mm/s
Record Time	3.0 sec at 2048 sps
Operator/Setup:	Operator/factory MMB

Serial Number	UM14894 V 10-89 Micromate ISEE
Battery Level	3.6 Volts
Unit Calibration	March 22, 2019 by Instantel
File Name	__TEMP.EVT

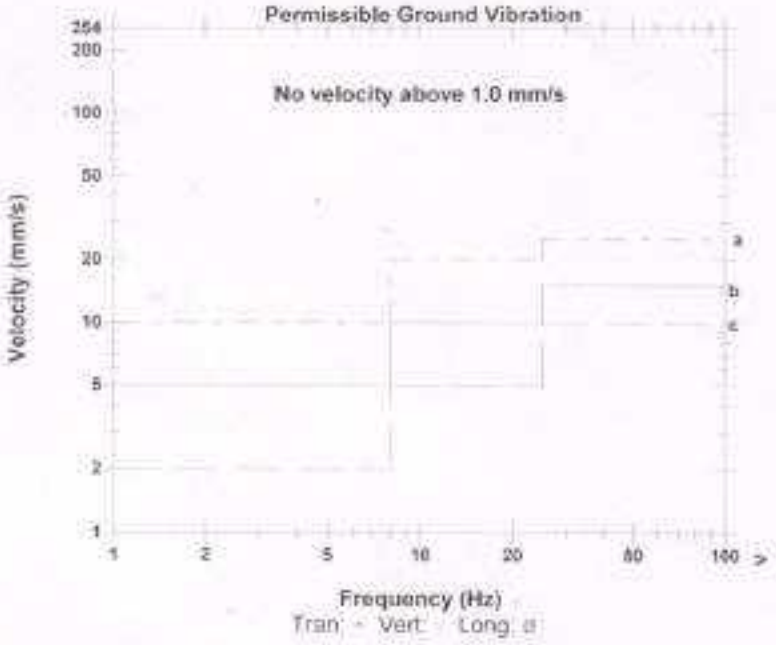
Notes
Location: BAYAL
Client: BAYAL QUARTZ
User Name: BAYAL MINES
General:

Microphone	Linear Weighting
PSPL	<88 dB(L)
ZC Freq	2.9 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1260 mv)

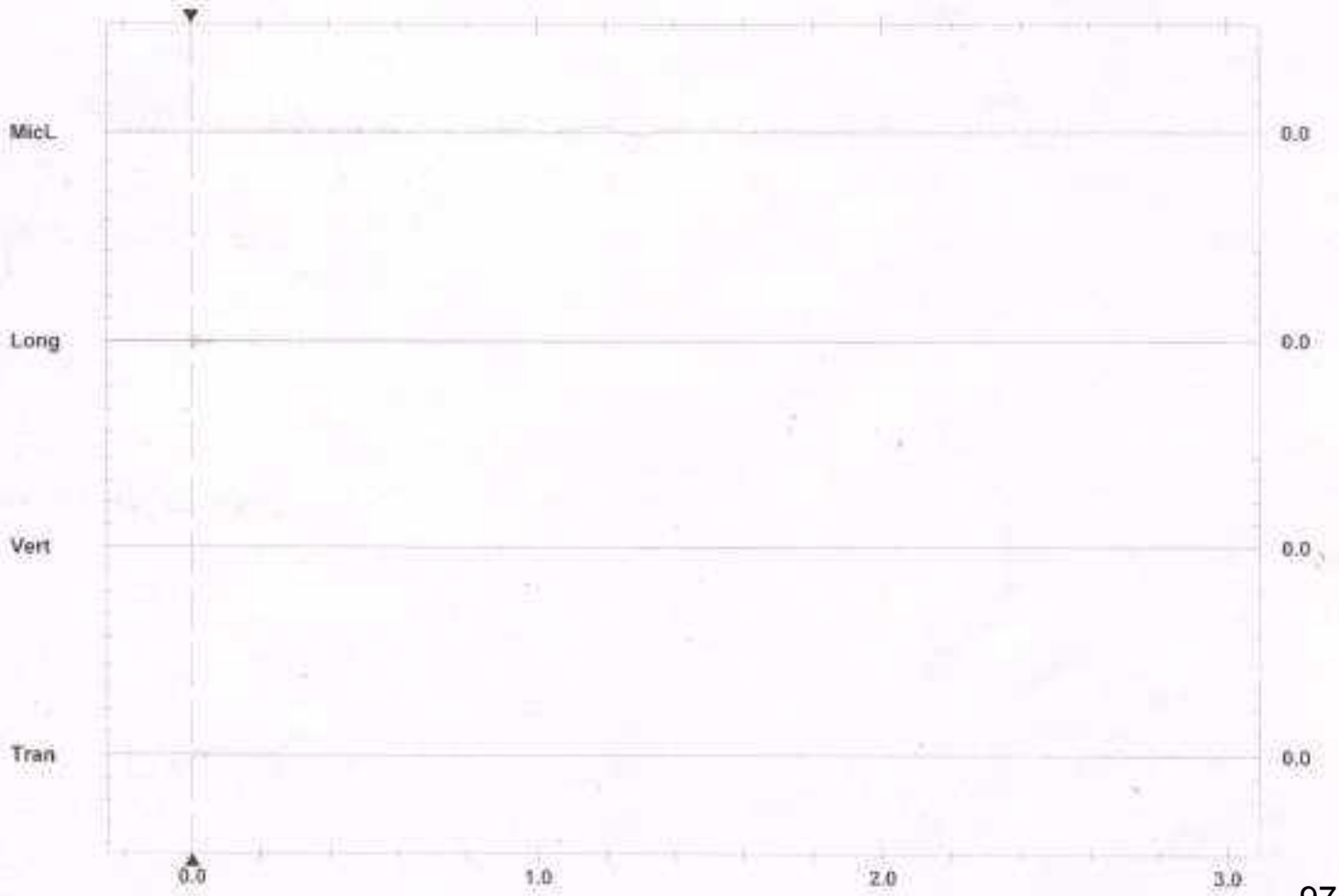
	Tran	Vert	Long	
PPV	0.468	0.102	0.780	mm/s
ZC Freq	128	79	128	Hz
Time (Rel. to Trig)	0.004	-0.001	0.001	sec
Peak Acceleration	0.039	0.010	0.064	g
Peak Displacement	0.001	0.002	0.003	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 0.837 mm/s at 0.001 sec
N/A: Not Applicable

DGMS India (A)



a)Industrial Buildings
b)Domestic houses/structures
c)Historic objects, sensitive structures



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 1.000 pa (L)/div

975

A DARUKA & CO
CHARTERED ACCOUNTANT
caabhishekdaruka@gmail.com

Certification of the Expenditures in respect of Bayal Quartz and Feldspar Mine

I/We, hereby certify the following expenses, in respect of Bayal Quartz and Feldspar Mine, situated at Khasra Number 201, 223, and 224, Village – Bayal, Tehsil – Nangal Choudhary, District Mahendragarh (Haryana) and having its registered office at House No. 196-P, HUDA Sector-1, Mahendragarh Road, Narnaul, District Mahendraagrh (Haryana) –

EXPENDITURES TOWARDS REHABILITATION AND RE-SETTLEMENT (R&R)

S. No.	Expenditure Head	Certified Amount (From FY2018-19 to March 31, 2023)	Certified Amount ((From April 1, 2023 to September 30, 2023
1	Procurement of land near and surrounding Mining Lease Area	Rs. 323.31 Lakh	-
2	Compensation of houses for families shifted at owned land	Rs. 1360.84 Lakh	-
3	Monthly compensation to 55 families located nearby.	Rs. 300.70 Lakh	Rs. 33.00 Lakh.
4	Total R&R Expenses	Rs. 1984.85 Lakh only.	Rs. 33.00 Lakh.
5	**Gross total R&R expenses so far (FY 2018-19 to September 30, 2023**	**Rs. 1984.75 Lakh**	**Rs. 2017.85**

The above-mentioned details are true to the best my knowledge and verification and hence, stands certified.

A DARUKA & CO.
Chartered Accountant
Firm Registration No. – 333378E

CA. **Abhishek Daruka**
Proprietor
Membership No. - 307427
Place: Kolkata
Date: 09/12/2023
UDIN: 23307427BHAYAG7814

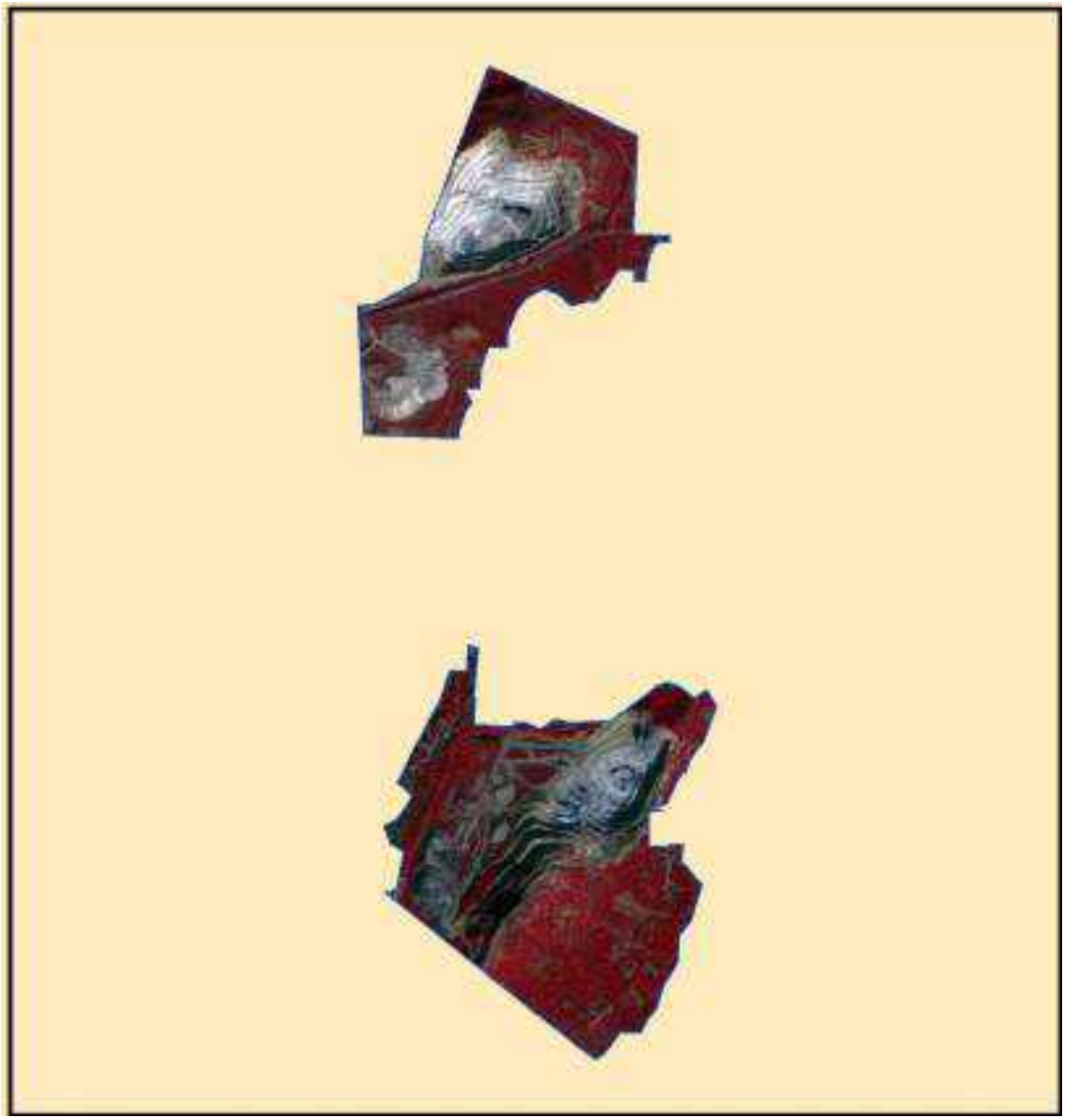
Digital Processing of the Mining Lease area

(Land Use/ Land Cover Analysis for Core Zone)

Of

Bayal Quartz, Feldspar & Quartzite/Stone

Minor Mineral Mines (ML Area 76.75 Ha.)



Client: Bayal Quartz, Feldspar & Quartzite/Stone Minor Mineral Mines

Prepared For: Mining 360 Services

Prepared by:

Kailash Meena

Landuse Expert *(B Cat.)*

(RA AC MoM - Feb 23, 2021)

Compu Sense Automation,

404-405, Iscon Plaza, Satellite Road, Ahmedabad

December 2021

Table of Contents

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2. Objectives 3
3. Study Area 3
4. Data used 4
5. General Description of the study area 4
6. Methodology 4
7. Classification system 5
8. Maps and Statistics 7
Annexure : 1 10
Annexure : 2 11

DECLARATION

I hereby declare that this project report entitled ***"Digital Processing of the Mining Lease area (Land Use / Land Cover) Analysis Report" for Core Zone of Bayal Quartz, Feldspar & Quartzite/Stone Minor Mineral Mines*** submitted by the Compu Sense Automation, 404-405, Iscon Plaza, Satellite Road, Ahmedabad is a record of original work done under the guidance of me.

This information and data give in the report is authentic to the best of my knowledge.

Kailash Meena
Landuse Expert *(B Cat.)*
(RA AC MoM - Feb 23, 2021)

1. Introduction

Present study is for mapping Land Use / Land Cover using remote sensing data for Bayal Quartz, Feldspar & Quartzite/Stone Minor Mineral Mines, near Bayal village of Mahenergarh district, Haryana. Now a days, it has become mandatory to carry out a Land Use / Land Cover analysis of the project site using satellite data similar to preliminary site survey. Comprehensive and chronological Land Use and Land Cover information is very vital for management of land. Accurate & precise compilation of this information helps in deciding the proper use of the land. Optimum economic use in accordance with minimal disturbance of the present ecology should be the prime objective of any industrial activity. Remote Sensing technology because of synoptic, repetitive and multi spectral characteristics becomes very vital technology for mapping Land Use and Land Cover. In addition to this, the study provides the facility of constant monitoring and past history of any particular area. Geographic Information System (GIS) is a tool, which allows the integration of spatial data with non - spatial data.

Systematic and comprehensive compilation of Land Use / Land Cover maps and data is necessary for planned development of agriculture, forest, grasslands, rural settlements, urban spread, Industries and a host of other land-based programs and activities. Land Use refers to the various ways, the land is being utilized for different purposes by man mainly to generate income as well as for residential purpose. Whereas 'Land Cover' refers to the natural surrounding present on the area under study. The existing information on Land Use / Land Cover is largely in the form of statistics based on compilation of village records. Whatever information available in the form of maps, suffers from the problems of spotty coverage, lack of consistency and a large time gap between data compilation and map publication.

In the present study, Land Use and Land Cover information of the study area i.e. within mine lease has been mapped using the digital data.

Data has been corrected geometrically and radiometrically. This corrected data has been used for classifying the image. Various major categories like agriculture, wasteland, built-up, etc. were identified and mapped. Area statistics is calculated for different Land Use / Land Cover categories along with generating of pie chart. A thematic map is also generated depicting various classes with different symbols.

2. Objectives

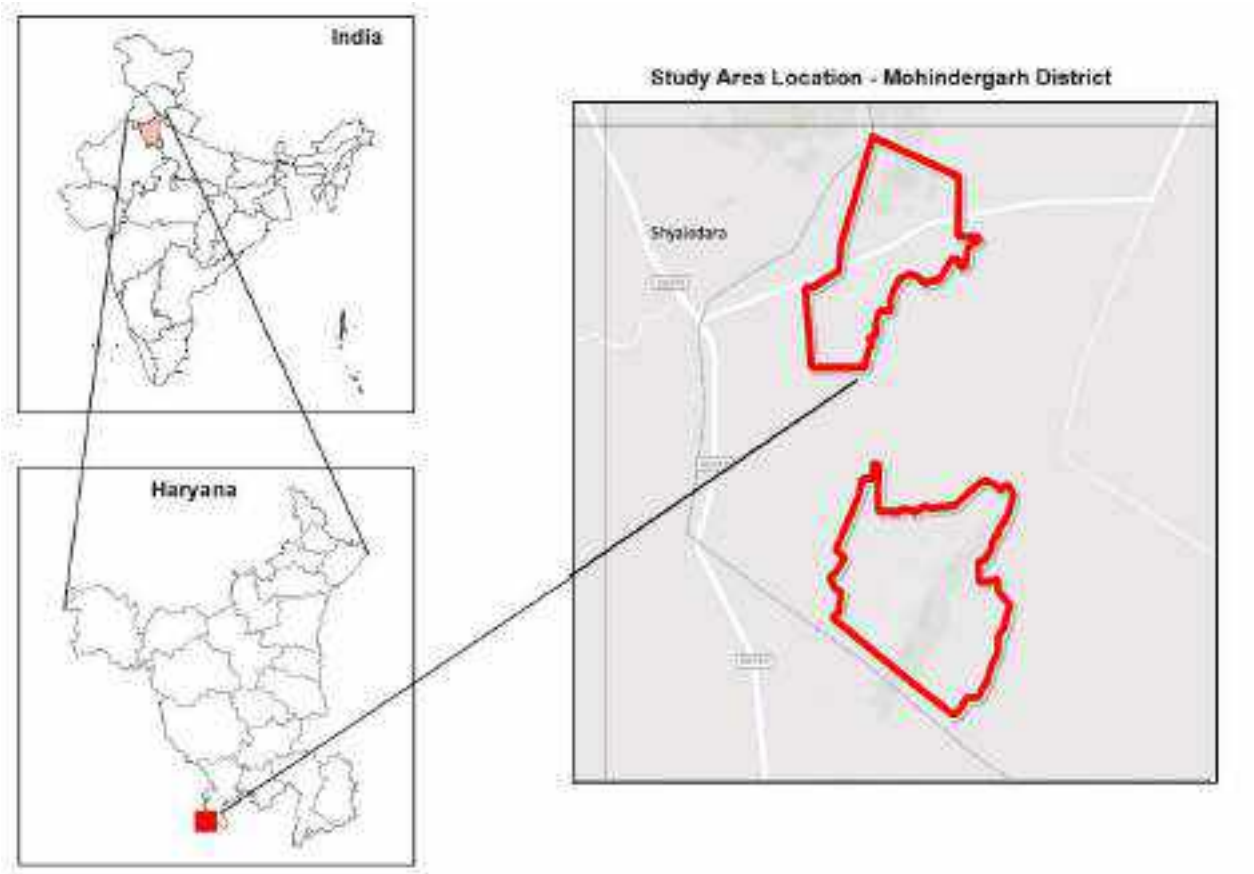
Main objectives of this analysis are:

- To analyze Land Use / Land Cover of the study area using latest remote sensing satellite data.
- To generate statistics of Land Use / Land Cover classes and thematic map.

3. Study Area

The study area falls in district of Mahendergarh, Haryana. The area falls between longitude 75°58'29.723"E to 75°59'2.149"E and latitude 27°50'43.336"N to 27°52'0.449"N.

Fig.1 Study Area Map



4. Data used

High Resolution data was used to derive land use.

Satellite	Sensor	Path-Row	Season	Date
Cartosat-2E	MX	24081_1_0_1_83	Kharif	26th October 2021

5. General Description of the study area

Location and Extent

The mine lease is located near village Bayal in Mahedergarh district. Nearest Railway Station is Dabla at a distance of 5Km.

6. Methodology

General methodology using Multi-temporal digital data, to derive Land Use / Land Cover layer. The methodology comprises of the following functional components.

6.1 Data loading and image preparation

Three bands of data were downloaded from FTP and stacked to form a false colour composite (FCC). This raw data was georeferenced and projected in Universal Transverse Mercator (UTM), zone 43N projection. This projection was adopted from National Spatial Framework (NSF). This data was radiometrically enhanced for ease of interpretation.

6.2 Geo-referencing of image

Geographic location was assigned to satellite image in terms of latitude and longitude and a projection system was defined so that distances could be measured in meters.

6.3 Developing interpretation key

The image was studied to understand the topography and general landuse. An interpretation key was developed for different landuse classes depending on color, tone and texture.

6.4 Image Interpretation

Using the above developed interpretation key, the satellite image was interpreted.

6.5 Thematic map and statistics generation

Thematic map was generated using proper symbology for the landuse polygons and statistics for each landuse class was calculated.

7. Classification system

A two level classification system based on Environmental Impact Assessment Guidance Manual for Mining of Minerals prepared by Administrative Staff College of India, Hyderabad. (February 2010) has been adopted/modified for this study area and shown in table 1.

TABLE -1 LAND USE / LAND COVER CLASSIFICATION SYSTEM

	Level – I	Level - II
1	Built-up land	Residential
		Industrial
		Transportation
2	Agricultural land	Agricultural Land
3	Waste lands	Dense Scrub
		Open Scrub
4	Others	Excavated Area
		Mining Dump
		Mining Sump

Following sections describe various classes and their definitions.

7.1 Built up land

Built-up Residential

It generally refers to an area, which is not cultivated and is used for human residential purpose. Villages come under this category. Vacant land within or near by settlements used for industrial activities are also considered under this broad category.

Built-up Industrial

These are areas where the human activity is observed in the form of manufacturing along with other supporting establishments of maintenance. Heavy metallurgical industry, thermal, cement, petrochemical, engineering plants etc., are included under this. Certain built-up structures found in mining area like mine office, workshop is further classified in Infrastructure sub category.

Transportation

Land used for transportation and communication purpose like roads,railway and airport is also categories as built-up land.

7.2 Agricultural land

These areas are primarily used for raising agricultural crops, fiber, vegetables, fruits, cultivated fodder and other plant material of medicinal and commercial value.

Crop Land

Area which is used for cultivation comes under this category. Three cropping seasons appear in India namely **Kharif** (June/July-September/October), **Rabi** (November/December-

February/March and **Zaid** (March to June) . However, in this area only two seasons Kharif and Rabi are seen.

Fallow Land

The land not sown for current season which appears to be vacant is called 'Fallow Land'. In present analysis Fallow Land and Crop Land are clubbed under Agricultural Land.

7.3 Wastelands

Wasteland is described as degraded land which is currently not used for cultivation and is deteriorating for lack of appropriate water and soil management.

Dense Scrub

The area mainly covered by dense scrub is classified under this category. This area is appears vegetated throughout the year.

Open Scrub

The area mainly covered by scrub which is sparse is classified as open scrub. It is land devoid of any vegetation and appears barren.

7.4 Others

Excavated Area

These are the areas subjected to removal of different earth material (both surfacial and sub surfacial) by manual and mechanized operations.

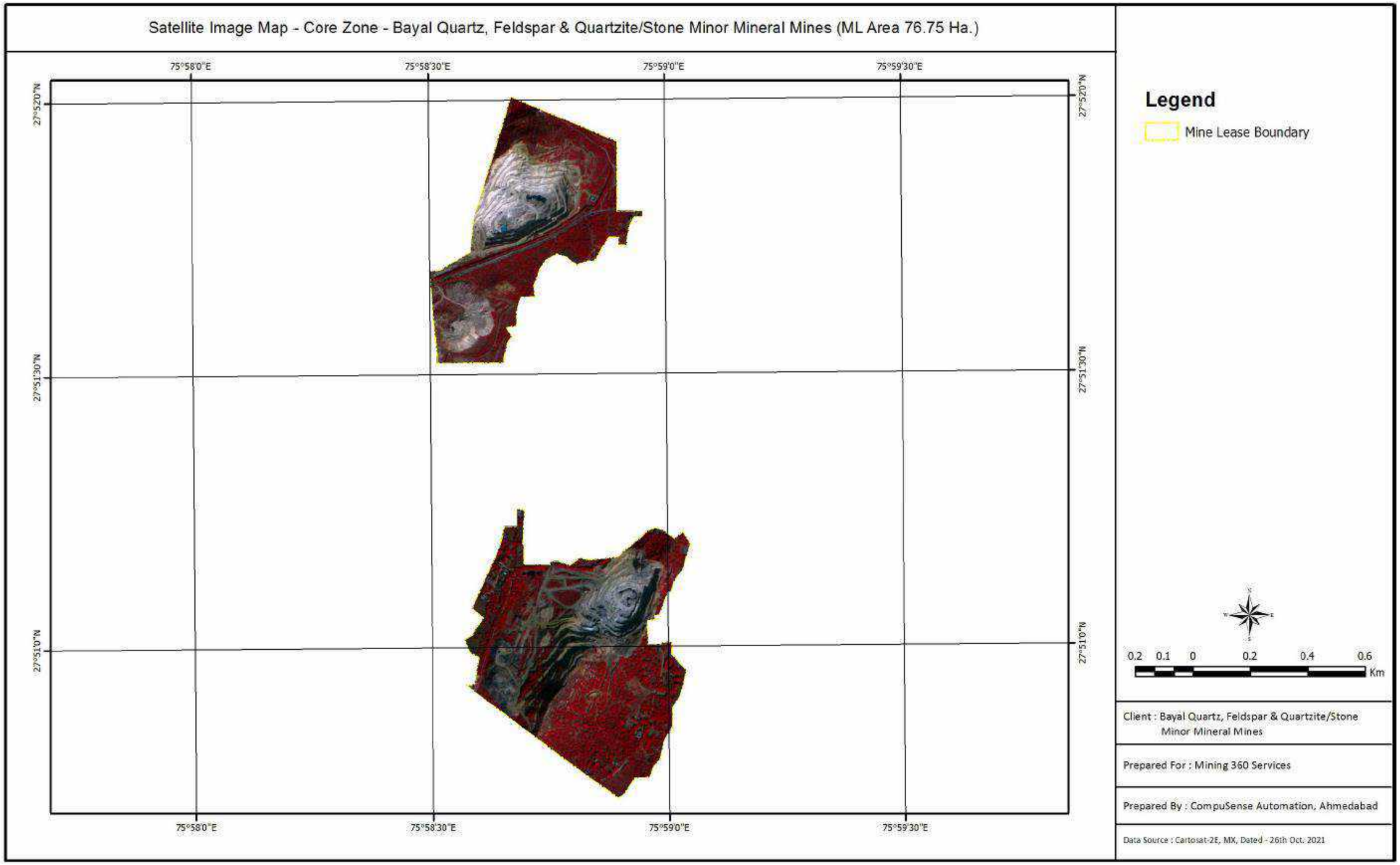
Mining Dump

Dumps are those areas where debris is accumulated after extraction of required minerals. Generally, these lands are confined to the surrounding of the active mining area.

Mining Sump

Excavated area in mines where rain water is harvested.

8. Maps and Statistics



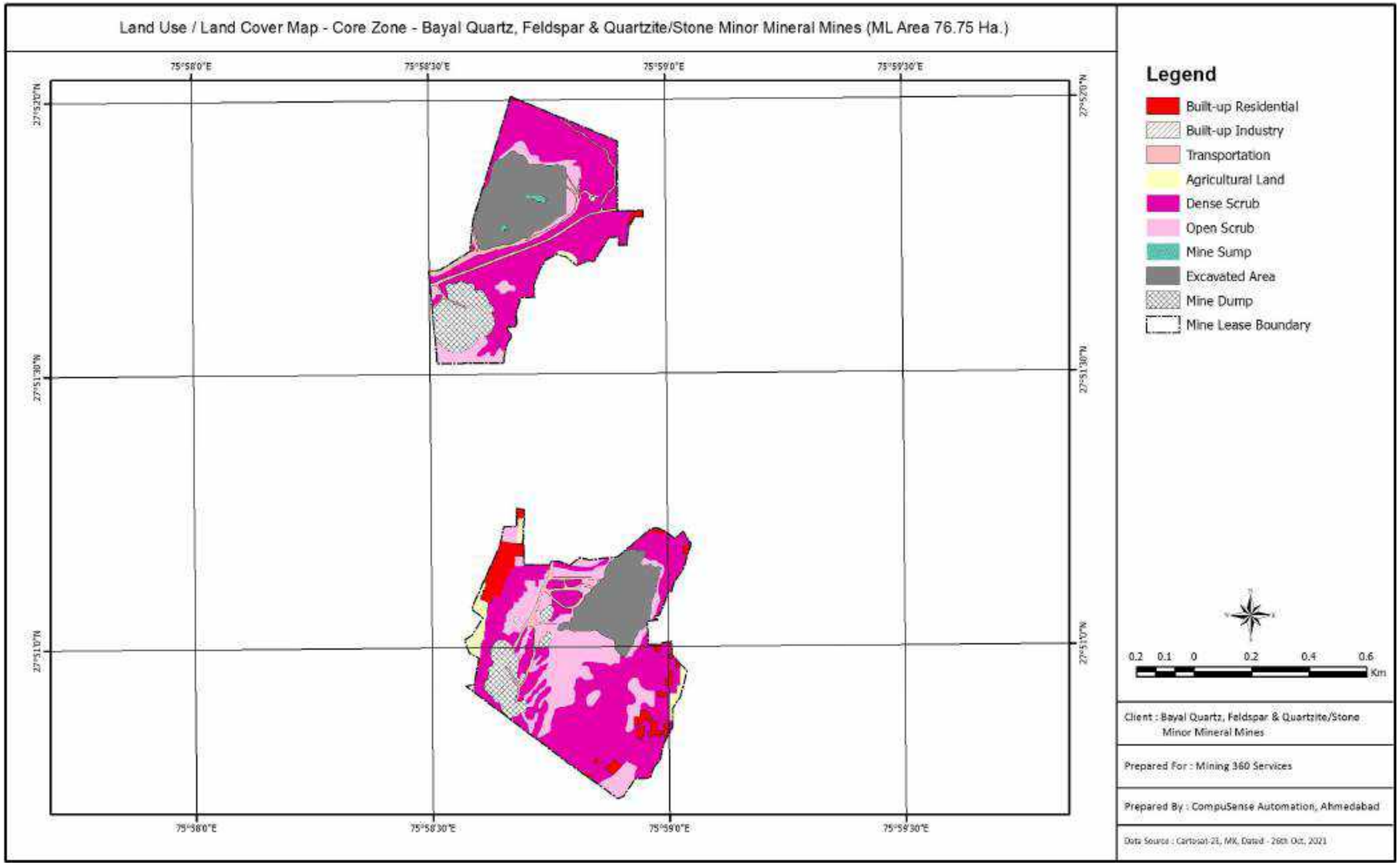
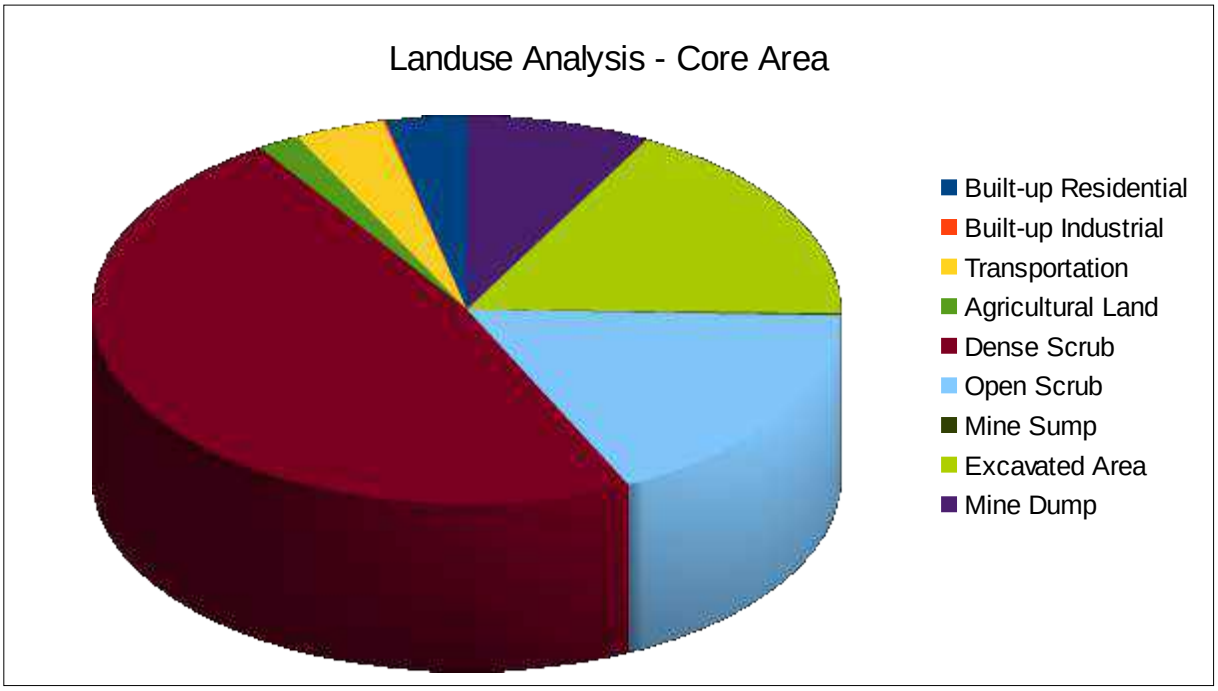

Land Use / Land Cover Map - Core Zone - Bayal Quartz, Feldspar & Quartzite/Stone Minor Mineral Mines (ML Area 76.75 Ha.)
75°58'0"E
75°58'30"E
75°59'0"E
75°59'30"E
27°52'0"N
27°51'30"N
27°51'0"N
Legend
Built-up Residential
Built-up Industry
Transportation
Agricultural Land
Dense Scrub
Open Scrub
Mine Sump
Excavated Area
Mine Dump
Mine Lease Boundary
0.2 0.1 0 0.2 0.4 0.6
Km
Client : Bayal Quartz, Feldspar & Quartzite/Stone Minor Mineral Mines
Prepared For : Mining 360 Services
Prepared By : CompuSense Automation, Ahmedabad
Data Source : Cartosat-2S, MX, Dated - 26th Oct, 2021

Table : Land Use/Land Cover Statistics – Core Zone				
CLASSIFICATION				
LEVEL – I	**LEVEL – II**		**% Area**	**Area (Ha)**
Built-up	Residential		3.48	2.67
	Industrial		0.12	0.09
	Transportation		3.87	2.97
		Sub-total	**7.47**	**5.73**
Agriculture Land	Agriculture Land		1.84	1.41
		Sub-total	**1.84**	**1.41**
Wastelands	Dense Scrub		47.78	36.67
	Open Scrub		17.41	13.36
		Sub-total	**65.19**	**50.03**
Others	Excavated Area		17.34	13.31
	Mine Sump		0.18	0.14
	Mine Dump		7.98	6.12
		Sub-total	**25.50**	**19.57**
		Total	**100.00**	**76.75**



Annexure : 1

Projection Parameters

- **Projection Type** : Universal Transverse Mercator zone 43N
- **Spheroid Name** : WGS84
- **Datum Parameters** : WGS84
- **False_Easting** : 500000.000000
- **False_Northing** : 0.000000
- **Central_Meridian** : 75.000000
- **Scale_Factor** : 0.999600
- **Latitude_Of_Origin** : 0.000000
- **Linear Unit** : Meter (1.000000)
- **Geographic Coordinate System** : GCS_WGS_1984
- **Angular Unit** : Degree (0.017453292519943299)
- **Prime Meridian** : Greenwich (0.000000000000000000)
- **Datum** : D_WGS_1984
- **Spheroid** : WGS_1984
- **Semi Major Axis** : 6378137.000000000000000000
- **Semi Minor Axis** : 6356752.314245179300000000
- **Inverse Flattening** : 298.257223563000030000

Annexure : 2

Land Use / Land Cover Interpretation Key Using Satellite Imagery

Sr. No.	Land Use / Land Cover Category	Tone / Colour	Size	Shape	Texture	Pattern
1	Built-up Land	Dark bluish green in the core and bluish on the periphery	Small to big	Irregular & Discontinuous	Coarse & mottled	Clustered to Scattered & non-contiguous
2	Transportation	Very dark to dark bluish green, light yellow for minor roads , red if vegetation along the road	Small in width for roads and narrow for rail	Regular with straight/sharp and smooth curves	Smooth to fine	Linear to sinuous and contiguous
3	Crop Land	Bright red to red	Varying in size	Regular to irregular	Medium to smooth	Contiguous to non-contiguous
4	Fallow Land	Yellow to greenish blue (depending on soil type and moisture)	Small to large	Regular to irregular	Medium to smooth	Contiguous to non-contiguous
5	Afforestation (Plantation)	Dark red to red	Small to medium	Regular with sharp edges	Coarse to medium	Dispersed, contiguous
6	Dense Forest	Bright red to dark red	Varying in size	Irregular, discontinuous	Smooth to medium depending up on crown density	Contiguous to non contiguous
7	Open Forest	Light yellow to light brown	Small	Regular to irregular	Coarse to mottled	Non-contiguous dispersed /scattered
8	Land with or without scrub	Light yellow to brown to greenish blue(subject to surface moisture and cover)	Varying in size	Irregular-discontinuous	Coarse to mottled (Subject to vegetation cover)	Contiguous dispersed in patches
9	River	Light blue to dark blue	Long narrow to wide	Irregular, Sinuous	Smooth to medium	Contiguous, nonlinear to dendritic/sub-dendritic etc.
10	Reservoirs/Pond	Light blue to dark blue(subject to weeds/vegetation)	Small/medium to large	Regular to irregular	Smooth to mottled	Non-contiguous dispersed

Interpretation keys may change for different satellite sensors depending upon their band combinations and enhancement made.

NATIONAL ACCREDITATION BOARD FOR EDUCATION & TRAINING
QUALITY COUNCIL OF INDIA

Scheme for Accreditation of EIA Consultant Organizations

Accreditation Committee Meeting for Re-Accreditation held on

Feb 23, 2021

Through Video Conference

The following members were present during the meeting:

1. Dr. G. K. Pandey - Alternative Chairman
2. Dr. P. Ahujarai - Member
3. Prof. Rajesh Khanna - Member
4. Dr. Manoranjan Hota - Member
5. Dr. Ranjini Warrier - Member
6. Dr. J. S. Sharma - Member
7. Prof. D. K. Sharma - Member

Mr AK Ghose express his inability to present in the meeting

Mr. A K Jha - Senior Director, Dr Pawan K Singh- Assistant Director and Ms. Kritika Sharma - Accreditation Officer were present in the meeting.

b. Assessed as per IA norms – approved experts for new functional areas and fresh FAEs proposed:

S. No.	Name	Functional Areas			Cat.	Remarks
		Applied	Recommended	Approved		
In-house						
1	Prerna Chauhan	HG	-	-	-	Left the organisation
		GEO	-	-	-	
		LU	-	-	-	
Empanelled						
2	Kailash Meena	LU	Yes	Yes	B	With alert

1.2.5 Functional Area Associates (FAAs) :

a. FAAs proposed:

S. No.	Name	Approval status		FAE/Mentor	Remarks
		Applied	Approved		
In-house					
1	Vinay Kalal	EB	Yes	Shraddha Panwar	None

1.2.6 Team Members (TM):

a. As FAE:

S.No.	Name	FA Applied	Accepted	Approved FAE (to work under)	Remarks

1009

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1013

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1014

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द्वारा पोस्ट आवा

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email dir.gzr@dgms.gov.in

भारतसरकार Government of India
श्रमएवंरोजगारमंत्रालय Ministry of Labour& Employment
खान सुरक्षामहानिदेशालय Directorate General of Mines Safety
गाजियाबादक्षेत्र गाजियाबाद Ghaziabad Region, Ghaziabad
कमलाटॉवरकमरा0 102,प्रथमतलएवंदेवक के
डी.डी.ओ कार्यालयभवन,हापुड़रोड, गाजियाबाद-201002

संख्या: S29024/GR/HR/Mahendragrah/0188 /Per दिनांक /2018

प्रेषक
खान सुरक्षा निदेशक,
गाजियाबाद क्षेत्र, गाजियाबाद।

सेवा में ,
श्री परमेश सिंह, नामित मालिक
मालिक– बायल क्वार्टज एण्ड फैल्सपार खान (खसरा नं0 201,223,224),
वी.पी.ओ. अंनगपुर,
तहसील व जिला फरीदाबाद(हरि0)।

विषय खानीक खान विनियम, **1961** के विनियम **106(2)(बी)** के अंतर्गत श्री परमेश बडाना, नामित मालिक की बायल क्वार्टज एण्ड फैल्सपार खान (खसरा नं0 201,223,224) में डीप होल ड्रिलिंग और ब्लास्टिंग के साथ भारी यंत्रों के प्रयोग की अनुमति।

महोदय

कृपया उपरोक्त विषय पर आपके दिनांक 12.05.2018 के पत्रांक शून्य का संदर्भ लें और उसके साथ संलग्न दिनांक 21.12.2017 का प्लान सं. SRV/BAYAL/OMTC/17-18/08 का संदर्भ लें। आपके आवेदन में किए गए तथ्यों के आलोक में मामले पर विचार किया गया।

मुख्य खान निरीक्षक (खान सुरक्षा महानिदेशक की तरह भी पढ़ाजाना) को खानीक खान विनियम, 1961 के विनियम 106(2)(बी) के अंतर्गत दिए गए अधिकारों और मुख्य खान निरीक्षक (खान सुरक्षा महानिदेशक की तरह भी पढ़ाजाना) द्वारा खान अधिनियम, 1952 की धारा 6(1) के अंतर्गत मुझे किए गए प्राधिकरण के तहत मैसर्स श्री परमेश बडाना, नामित मालिक की हरियाणा राज्य में महेन्द्रगढ़ जिले के नारनौल तहसील में बायल गाँव के पास में अवस्थित **बायल क्वार्टज एण्ड फैल्सपार खान (खसरा नं0 201,223,224) में डीप होल ड्रिलिंग और ब्लास्टिंग के साथ भारी यंत्रों के प्रयोग की अनुमति** दी जा रही है। यह अनुमति इस पत्र के निर्गत होनें की तिथि से 90 दिनों तक के लिए वैध है। इस अवधि की समाप्ति के आद अनुमति स्वत: रदद समझी जाएगी।

1.0 **सामान्य:**

इस सशर्त अनुमति में जहां भी अन्य रूप में उपबंधित किया गया है उसके अतिरिक्त खानीक खान विनियम, 1961 के सभी विनियमों का कठोरता से पालन किया जाएगा।

1.1 This permission of deep hole drilling and blasting in the mine is being granted for the specific purpose of conducting the blast vibration study by engaging CSIR-Central Institute of Mining and Fuel Research (CIMFR), Dhanbad or National Institute of Rock Mechanics (NIRM), Karnataka in pursuance with the condition no.06 of the Environment Clearance granted vide letter no. J-11015/10/2017-IA.II (M) dated 04th May, 2018, by Ministry of Environment, Forest and Climate Change, Impact Assessment Division, Govt. of India. The report so obtained should be submitted to this office for obtaining further permission for carrying out mining by using explosive.

1.2 No mining shall be carried out within 50 meters of the outer boundary of any village abadi, National Highways, State Highways, Major District Road (MDR) and any other District roads (ODRs), temple and no mining should be carried out within 100 meters by using explosive from the outer boundary of any village abadi, National Highways, State Highways, Major District Road (MDR) and any other District roads (ODRs) and temple.

1.3 Mine shall be worked top downwards only by forming benches in accordance with the stipulations of this permission.

1.4 Proper access shall be provided for transport of material and persons to reach top of the working benches and other working places of the mine.

1.5 No person shall be engaged at the bottom of high walls.

1.6 All approaches to the bottom of high sides shall be kept securely and effectively fenced so as to prevent entry of persons.

1.7 Provision of MMR 164 shall strictly be adhered to and no workings shall be extended beyond any point which is 300mts from any permanent building or structure of permanent nature, not belonging to the owner without the prior permission in writing of the Chief Inspector or Regional Inspector and subject to such conditions as he may specify therein.

2.0 Height and Width of Benches

2.0.1 The height of benches in overburden, ore body or other rock formation shall not be more than 9m or maximum digging height of the machine used for digging, excavation or removal, whichever is less.

2.0.2 Width of any bench shall not be less than-

(a) width of the widest machine plying on the bench plus 2 m, or

(b) If dumpers ply on the bench 3 times the width of the dumper, or
(c) the height of the bench, whichever is more.

2.0.3 When persons are employed within 5 m of the working face, adequate precautions shall be taken to ensure their safety by dressing the sides of the bench.

2.1 **Roads for Trucks and Dumpers etc:**

2.1.1 All roads for trucks, dumpers or other mobile machinery shall be maintained in good condition.

2.1.2 Wherever practicable, all roads from the opencast workings shall be arranged to provide one-way traffic.

2.1.3 No road shall be of width less than three time plus 5m width of the largest vehicle plying on road.

2.1.4 All corner and bends shall be made in such a way that operator of vehicle have clear view of distance of not less than 3 times the braking distance of largest HEMM working at 40Km/hour.

2.1.5 Where it is not possible to ensure a visibility for a distance as mention in clause (2.2.4), there shall be provided with two roads of width not less than 2 times plus 3m of largest vehicle plying on the road with a strong road divider at centre with adequate lighting and reflector along the divider.

2.1.6 Where any road existing above level of surrounding area it shall be provided with strong parapet wall/embankment of following dimensions:
(a) Width at top-not less than 1 m.
(a) Width at bottom-not less than 2.5 m.
(b) The height not less than the diameter of tyre of largest vehicle plying on road. It may be noted that just dumping of mud of OB shall not be treated as strong parapet wall.

2.1.7 No road shall have gradient more than 1 in 16.

3.0 Supervision :

3.1 A person possessing First Class Mine Manager's Certificate of competency under Regulation MMR, 1961 shall be appointed as the manager of the mine to look after HEMM operation. There has to be maintained two different sets of Supervisory officials for block no. 1 and 2 respectively under one 1st Class manager. This permission shall stand revoked as soon as the qualified manager ceases to work at the mine. Use of HEMM shall be suspended in the absence of manager with aforesaid qualification.

3.2 During every production shift, the opencast workings shall be placed under the charge of an Assistant Manager and during maintenance shift, the working shall be placed under the charge of a Foreman, who shall be responsible to see that all the regulations and orders made there under are strictly complied with. He shall also supervise transport and loading being done by the contractor.

3.3 The deep hole drilling and blasting shall be carried out under the personal supervision of the Assistant Manager. Blasting parameters of each blast with a sketch showing the drilling pattern and the holes charged shall be maintained in register kept for the purpose for each blast.

3.4 Manager shall in particular –

(a) make frequent inspections for evidence of slides or of material that may slide or roll from the high wall (including the face and sides) or spoil-bank;
(b) not allow any person to work under overhanging ledges or where there is evidence of slides, until such danger has been removed;
(c) ensure that every person engaged in dressing operations on high walls/sides is provided with, and uses, a safety belt of a type approved by the Chief Inspector;
(d) ensure that all loose material is removed from high wall/side before persons are engaged there; and
(e) ensure that parapet walls along truck roads are properly maintained.

4.0 Maintenance of Machines:

4.1 If the engineer, mechanical foreman or other competent person making an inspection notices any defect in any machinery, the said machinery shall not be used until the defect has been remedied.

4.2 Any defect in machinery reported by its operator shall be promptly attended to.

4.3 Any machine found to be in an unsafe operating condition shall be tagged at the operator's position 'OUT OF SERVICE DO NOT USE' and its use shall be prohibited until the unsafe condition has corrected.

4.4 All repairs to a machine shall be done at a location which will provide a safe place for the persons engaged on repairs.

4.5 Except for testing, trial or adjustment which must necessarily be done while the machine is in motion, every machine shall be shut down and positive means taken to prevent its operation while any repair or manual lubrication is being done.

4.6 Power shall be disconnected when repairs are made to any electric machine.

4.7 Any machinery, equipment or part thereof which is suspended or held apart by use of slings, hoists or jacks shall be substantially blocked or cribbed before men are permitted to work underneath or between such machinery, equipment or part thereof.

4.8 All repairs of a machinery or vehicle shall be done at properly laid repair sheds and workshops so as to ensure due protection to work persons deployed at those places from the movement of heavy earth moving machinery.

4.9 Every place of drilling and earth moving machinery or equipment and every truck, dumper etc. shall be maintained in good and safe working condition.

4.10 *Design aspects of equipments:*

4.10.1 Every machinery or vehicle shall be provided with efficient warning devices and rear lights and efficient brakes.

4.10.2 Every shovel or dragline shall be so designed as to afford the operator clear and uninterrupted vision all around and shall be provided with portable lamp for emergency, suitable portable fire extinguishers and retracting ladder.

4.10.3 The operator's cabin of heavy earth moving machinery shall be well designed and substantially built so as to ensure adequate protection to the operator against heat, dust, noise etc. and at the same time provided adequate safety to the operator in the event of overturning of heavy earth moving machinery. A seat belt for the safety of the operator shall be provided.

4.11 *Schedule of maintenance:*

4.11.1 The code of instructions furnished by the manufacturers in the matter of maintenance of various machinery and vehicles and preventive maintenance schedules for each type of machinery and vehicle shall be strictly followed.

4.11.2 Every machine and vehicle shall be allocated at least one day in every week for maintenance. Before the machine or vehicle is sent out for work after maintenance, it shall be thoroughly inspected by the Engineer or mechanical foreman or other competent person, appointed by the manager in writing, who shall satisfy himself that the machine or vehicle is mechanically sound and in efficient working order.

4.11.3 A report of every inspection made under clause (4.11.2) shall be recorded in a bound paged book kept for the purpose, and shall be signed and dated by the person making the inspection.

4.11.4 Every machine in use shall be thoroughly inspected once at least in every 24 hours by a competent person. Any damaged or worn out parts shall be replaced immediately.

4.11.5 A report of every inspection made under clause (4.11.4) shall be recorded in a bound paged book kept for the purpose and shall be signed and dated by person making the inspection.

4.12 *Shift examination of machinery and vehicle:*

4.12.1 At the commencement of every shift, the engineer or mechanic or foreman or other authorized competent persons shall personally inspect and test every machine and vehicle paying special attention to the following details:

(b) if the vehicle or machine is required to work after day light hours that the lights are in working order.

4.12.2 He shall not permit the vehicle or machine to be taken out for work nor shall he drive the vehicle unless he is satisfied that it is mechanically sound and in efficient working order.

4.12.3 He shall also maintain a record of every inspection in a bound paged book kept for the purpose. Every entry in the book shall be signed and dated by the person making the inspection.

5.0 Safety features of dumper, Excavator, dozer and drill (Cir 9/2008)

5.1.1 Dumper:

5.1.1.1 The following safety feature shall be provided in dumper:

(a) Mechanical steering locking to prevent untoward movement of steering wheel and tyre while work persons working below the cabin while engine is running.
(b) Blind spot mirror apart from rear view mirror to enable operator to have clear visibility of blind spot in and around dumpers.
(c) Mechanical type Anti collision device to avoid head to tail collision on haul road such as tail gate, bumper extension or any other strong device.
(d) Fire resistant hydraulic hoses in place of ordinary hoses to decrease the chance of fire. All the sleeves and conducts where cable / wire are passed shall be fire resistant.
(e) Seat belt for operator.
(f) The maximum speed of vehicle shall be restricted to 30 km/hour by blocking higher gear or any other automatic means.
(g) Proper shaft guard.
(h) Proximity working device.

5.1.2 Excavators:

5.1.2.1 The following safety feature shall be provided in excavator:

(a) All functions cut off switch.
(b) Swing Motor Brake.

(c) Fire resistant hydraulic hoses in place of ordinary hoses to decrease the chance of Fire. All the sleeves and conducts where cable/wire is passed shall be fire resistant.
(d) Turbo charger Guard.
(e) Seat belt.
(f) Vent valve on top of hydraulic tank should be able to be removed without any tool.
(g) A baffle plate between cold zone and hot zone.
(h) Provision for limiting of hydraulic cylinders- Stoppers

5.1.3 Drills:

5.1.3.1 The following safety feature shall be provided in drills:

(a) Approved type of dust prevention or suppression system.
(b) Each moving parts of the machinery shall be guarded/fenced and also ensure its effectiveness all the time.
(c) Emergency push button in
  (i) Operator's cabin.
  (ii) Main frame.
  (iii) Propeller pendent.
  (iv) Rear end.
(d) Tripping device to trip the field switch.
(e) Thermostat motor protection relay in winding temperature and other related parts.
(f) Explosive vent in transformer.
(g) Propel interlock (an electric interlock between drilling and propeller operation).
(h) High air discharge temperature switch.
(i) Low lube oil pressure switch.
(j) Oil stop valve (electric solenoid valve in compressor lubrication line).
(k) No bump circuit.
(l) Tower lock and lock check valve.
(m) Propel joystick-spring loaded type to return to neutral (dead man safety).
(n) Disc-brake and brake valve and its testing parameters.
(o) Lock check valve for preventing creeping in drill.
(p) Seat belt.
(q) Fire resistant hydraulic hoses and wiring near hot zone.
(r) Turbo charger guard.
(s) Cabin for the operator

5.1.4 **Dozers:**

5.1.4.1 The following safety feature shall be provided in dozers:

(a) Roll over protection.
(b) Turbo charger guard.
(c) Fire resistant hydraulic hoses and wiring near hot zone.
(d) Seat belt.

5.1.5 General:

5.1.5.1 The approved type of audio visual alarm shall be provided in all equipments.

5.1.5.2 The approved type of fire suppression system shall be provided in all equipments.

5.1.5.3 The stability test of HEMM shall be carried out at least once in year and after every major over haul by an independent agency.

5.1.5.4 The crane and overhead crane shall be subject to proof load test and NDT test once in a year from a competent authority.

5.1.5.5 The pressure vessel receiver are subjected to hydraulic and NDT test and shall be carried out by a competent authority.

5.1.5.6 In case of any defect in equipment such as brake, steering and safety device the equipment shall be immediately taken out of use and a record shall be kept.

5.1.5.7 The code of practice for installation operation and maintenance of all equipment shall be prepared and implemented before putting the equipment to use in mine.

5.1.5.8 The safety feature recommended in equipment shall be a part of notice inviting tender for new procurement and the design and drawing shall be obtained from OEM for fitting the same in old equipment.

5.1.5.9 The layout of the workshop shall be required as per DG's Circular No. 8 of 2003.

6.0 Precautions while Drilling:

6.1 The position of every deep hole to be drilled shall be distinctly marked by the mine foremen so as to be readily seen by the drillers.

6.2 No person shall be permitted to remain within a radius of 20 m or within 60 m on the same bench where charging of holes with explosives is being carried out.

7.0 Transport of Explosives:

7.1.1 Where explosives are transported in bulk for deep hole blasting, the following precautions shall be taken:

7.1.1.1 Transport of explosives from the magazine to the priming station or the site of blasting shall not be done except in original wooden or cardboard packing cases. The quantity or explosive transported at one time to the site of blasting shall not exceed the actual quantity required for use in one round of shots. Explosives shall be transported to the site of blasting not more than 90 minutes before the commencement of charging of the holes.

7.1.1.2 No mechanically propelled vehicle shall be used for the transport of explosives unless it is of a type approved in writing by the Chief Inspector. Provided that a Jeep or Land Rover may be used for the transport of detonators from magazines to 'priming stations' subject to the following conditions:

(a) not more than 200 detonators are transported in a vehicle at a time;
(b) the detonators are packed suitably in a wooden box;
(c) the wooden box containing detonators is placed inside an outer metal case of construction approved by the Chief Inspector;
(d) the outer metal case shall be suitably bolted to the floor of the vehicle or otherwise fixed in a wooden frame so that the container does not move about while the vehicle is in motion; and
(e) no person shall ride on the rear portion of the vehicle.

7.1.1.3 Every vehicle used for transportation of explosive shall be marked or placarded on both sides and ends with the word 'Explosives' in white letters not less than 15 cm high on a red background.

7.1.2 Every mechanically propelled vehicle transporting explosives shall be provided with not less than two fire extinguishers (one of carbon tetrachloride type for petroleum fire and the other of carbon dioxide under pressure type for electrical fire) suitably placed for convenient use.

7.1.2.1 The vehicle used for transport of explosives shall not be overloaded and in no case shall the explosive cases be piled higher than the sides of its body.

7.1.2.2 Explosives and detonators shall not be transported in the same vehicle, at the same time.

7.1.2.3 No persons other than the driver and his helper shall ride on a mechanically propelled vehicle used for transport of explosives.

7.1.2.4 A vehicle loaded with explosive shall not be left unattended.

7.1.2.5 Engine of a vehicle transporting explosives shall be stopped and the brakes set securely before it is unloaded or left standing.

7.1.2.6 A vehicle transporting explosives shall not be driven at a speed exceeding 25 kilometers per hour.

7.1.2.7 A vehicle loaded with explosives shall not be taken into garage or repair shop and shall not be parked in a congested place.

7.1.2.8 A vehicle transporting explosives shall not be refueled except in emergencies and only when its engine is stopped and other precautions taken to prevent accidents.

7.1.2.9 No trailer shall be attached to a vehicle transporting explosives.

7.1.3 Every vehicle used for the transport of explosives shall be carefully inspected once in every 24 hours by a competent person to ensure that:

(a) fire extinguishers are filled and in place;
(b) the electric wiring is well-insulated and firmly secured;

(c) the chassis, engine and body are clean and free from surplus oil and grease;
(d) the fuel tank and feed lines are not leaking; and
(e) lights, brakes and steering mechanism are in good working order.

7.1.4 Report of every inspection made under clause (7.3) shall be signed and dated by competent person making the inspection.

7.1.5 All operations connected with transport of explosives shall be conducted under the personal supervision of a foreman solely placed in charge of blasting operations at the mine.

7.1.6 The blaster shall personally search every person engaged in the transport and use of explosives and shall satisfy himself that no person so engaged has in his possession any cigarette, 'biri' or other smoking apparatus, or any match or any other apparatus of any kind capable of producing a light, flame or spark.

8.0 Precaution during Firing:

8.1.1 Shots shall not be fired except during hours of day-light or until adequate artificial light is provided. All holes charged on any one day shall be fired on the same day.

8.1.2 As far as practicable, shot firing shall be carried out either between shifts or during the rest interval, or at the end of work for the day.

8.1.3 During the approach and progress of an electric storm, the following precautions shall be taken:

(a) no explosive, particularly detonators, shall be handled;
(b) if charging operations have been commenced, the work shall be discontinued until the storm has passed;
(c) if the blast is to be fired electrically, all exposed wires shall be coiled up and if possible placed in the mouth of the holes, or kept covered by something other than a metal plate;
(d) all wires shall be removed from contact with the steel rails or a haulage track so as to prevent the charge being exploded prematurely by a local strike of the lightening.

8.1.4 The danger zone shall be distinctly demarcated (by means of red flags properly arranged and supported) before firing of holes is to commence.

8.1.5 Before firing, a siren installed for the purpose shall be blown three times for one minute each at intervals of one minute; and no shots shall be fired unless the blasting foreman with assistance of sufficient number of persons appointed in writing by the manager for the purpose has ensured that all persons have left the danger zone or have taken adequate shelter.

8.1.6 No shot shall be fired when there is traffic on any road or railway track within the danger zone.

9.0 Operation of machines:

9.1 a) Every heavy earth moving machinery (and Hydraulic Excavators) shall be under the charge of a competent person (herein called the `operator') authorised in writing by the Manager.

b) Operator/driver of each HEMM shall be selected from amongst persons possessing requisite qualifications. The selection process shall comprise a test to check driving/operating skill, aptitude, health and oral examination of the candidate by a competent selection committee. The selected person shall be trained and their competency shall be evaluated by a board constituted by the mining company.

c) All operators of HEMM shall undergo regular checks to test their driving/operating skill, knowledge and health once in every five years.

9.2 To prevent unauthorized driving, a system shall be evolved whereby the ignition key and /or cabin key always remain with the driver/operator or with specifically designated competent person.

9.3 No person other than the operator or his helper if any or the manager or any person so authorized in writing by the manager shall ride on a shovel or dragline.

9.4 No person shall be permitted to ride in the bucket of a shovel.

9.5 No shovel or dragline shall be operated in a position where any part of the machine, suspended loads or lines are brought closed than 3 meters to exposed high voltage lines, unless current has been cut off and the line de-energized. A notice of this requirement shall be posted at the operator's position.

9.6 Electrical cables, if any, shall be laid in such a manner that they are not endangered either by falling rocks or by a mobile equipment.

9.7 Shovel bucket shall be pulled out of the bank as soon as it is full.

9.8 When not in operation, the bucket shall be pulled out of the bank as soon as it is full.

9.9 When being operated in soft or unstable ground, every shovel (and dragline) shall be supported by heavy planks or poles so as to distribute the load of the machine over larger area and to prevent any danger of the shovel (or dragline) over-turning.

9.10 When not in use, the shovel or dragline shall be moved to and stood on stable ground.

9.11 If more than one stripping machine is in use in any area, either on the same bench or on different benches, the machines shall be so spaced that there is no danger or accident from flying or falling objects etc. from one machine to the other.

10.0 **Duties of Mechanics, Fitters and Engineers:**

10.1 At the commencement of every shift, he shall personally inspect and test every machine and vehicle paying special attention to the following details:

(a) that the brakes and the warning devices are in working order;
(b) if the vehicle or machine is required to work after day-light hours, that the lights are in working order.

10.2 He shall not permit the vehicle or machine to be taken out for work nor shall he drive the vehicle unless he is satisfied that it is mechanically sound and in efficient working order.

10.3 The mechanic shall maintain a record of every inspection in a bound paged book kept for the purpose. Every entry in the book shall be signed and dated by the person making the inspection.

11.0 ADDITIONAL DUTIES OF ENGINEERS PLACED IN CHARGE OF MACHINES AND EQUIPMENTS IN OPENCAST WORKINGS:

11.1 During each shift the machines and equipments at work shall be placed under the charge of qualified and experienced engineer to effect inspection, examination, safe operations and maintenance of the machines, equipments and accessories. During his shift the engineer/engineers shall;

(a) inspect, examine machines, equipments and accessories and satisfy himself that they are in sound and safe working order;
(b) not allow any machine, equipment to be used, if it is found defective;
(c) ensure that every machine, equipment, accessory used is in a safe and efficient order;
(d) ensure that each operation, activity is carried on in safe and efficient manner.

12.0 Operation of Truck, Dumpers and other Vehicles:

12.1 No person shall be permitted to ride on the running board of a truck or dumper.

12.2 As far as possible, loaded trucks or dumpers shall not be reversed on gradient.

12.3 Sufficient stop blocks shall be provided at every tipping point and these shall be used on every occasion the material is dumped from the truck, dumper, or other such vehicle.

12.4 Standard Traffic Rules shall be adopted and followed during movement of all trucks and dumpers. They shall be prominently displayed at the relevant places in the opencast working and truck/dumper roads.

12.5 No person shall be permitted to work on the chassis of truck or dumper with the body in a raised position until the truck or dumper body has been

securely blocked in position. The mechanical hoist mechanism alone shall not be depended upon to hold the body of the truck or dumper in raised position.

12.6 No unauthorized person shall be permitted to enter or remain in any dumping yard or turning point.

12.7 When not in use every truck or dumper shall be moved to and stood on proper parking places.

12.8 Every dumper/tipper/truck shall be provided with suitable fire extinguishers preferably automatic and suitably placed for operation/convenient use.

12.9 Every dumper/tipper/truck shall be provided with automatically operating audio-visual reversing alarm, which shall always be kept in working order.

13.0 Duties of Machine operators:

13.1 At the commencement of every shift, the operator shall also personally inspect and test the machine, paying special attention to the following details:

(i) That brakes and every warning device are in working order; and
(ii) If the machine is required to work after day-light hours, that lights are in working order.
(iii) He shall not take out the machine for work nor shall he operate the machine unless he is satisfied that it is mechanically sound and in efficient working order.

13.2 The operator shall not operate the machine when persons are in such proximity as to be endangered.

13.3 He shall not swing the bucket of shovel over passing haulage units. While the trucks/dumpers are being loaded, he shall swing over the body of the truck/dumper and not over the cab, unless the cab is protected by a substantially strong cover.

13.4 The operator shall not allow any unauthorized person to ride on the machine.

14.0 Duties of Truck / Dumper Operators:

14.1 No person shall be permitted to ride on the running board of a truck or dumper.

14.2 As far as possible loaded trucks or dumper shall not be reversed on gradient.

14.3 Sufficient stop blocks shall be provided at every tipping point and these shall be used on every occasion material is dumped from the truck, dumper or other such vehicle.

14.4 Suitable "Code of Traffic Rules" shall be framed by the Mines Manager and enforced strictly for movement of all trucks, tippers and dumpers in the mine. A copy of the traffic rules shall be submitted to this Directorate for record. They shall be prominently displayed at the relevant places in the opencast workings and truck/dumper roads.

14.5 He shall not drive too fast, shall avoid distractions, and shall drive defensively.

14.6 He shall not attempt to overtake another vehicle unless he can see clearly far enough ahead to be sure that he can pass it safely. He shall also sound the audible warning signal before overtaking.

14.7 When approaching a stripping equipment, the driver of the truck, dumper shall sound the audible warning signal and shall not attempt to pass the stripping equipment until he has received proper audible signal in reply.

14.8 Before crossing a road or railway line, he shall reduce his speed, look in both directions along the road or line and shall proceed across the road or line only if it is safe to do so.

14.9 The driver shall sound the audible warning signal while approaching 'blind' corner or any other point from where persons may walk in front unexpectedly.

14.10 The driver shall not operate the truck or dumper in reverse unless he has a clear view of the area behind the vehicle or he has the assistance of a 'spotter' duly authorized in writing for the purpose by the manager. He shall give an audible warning signal before reversing a truck or dumper.

14.11 The driver shall be sure of clearance before driving through tunnels, archways, plant structures etc.

14.12 The driver shall see that the vehicle is not overloaded and that the material is not loaded in a truck or dumper so as to project horizontally beyond the sides of its body and that any material projecting beyond the front or rear is indicated by a red flag during the day and by red light after day light hours.

14.13 The driver shall not allow any unauthorized persons to ride on the vehicle. He shall also not allow more than the authorized number of persons to ride on the vehicle.

15.0 **Miscellaneous:**

15.1 Trucks, tippers and other heavy vehicles, not belonging to management shall not be allowed in the mine premises without a valid pass issued by the competent authority of the mine. Before the pass is issued the mine engineer/competent person shall check the roadworthiness of such vehicle. In order to check the entry of such vehicle in the mine premises, properly manned check gate shall be provided at the mine entrance where the record of entry & exit of each vehicle shall be maintained. At the

check gate the license of the drivers shall also be checked for eliminating the possibility of unlicensed persons driving the vehicle.

15.1.1 Persons engaged in surface operation and in particular, the contractor's workers shall be provided closer and competent supervision.

15.1.2 All persons engaged at any work within the mine premises through the contractors shall be provided relevant training and other job related briefings and that the drivers of the vehicle belonging to contractors entering the mine premises have additionally been explained the salient provisions of "Traffic Rules".

15.1.3 Each and every operation, including the operation carried out through contractor's worker or by outside agency, shall be placed under the charge of a competent supervisor, duly appointed and authorized by the manager.

15.2 Manager shall frame code of practices for each operation and copy of it shall be handed over to all concerned. It shall be the duty of all statutory persons to enforce the code of practices so framed.

15.3 No manual workers shall be employed on any bench where HEMM is deployed or on the next lower bench. Manual workers shall be employed only after withdrawal of HEMM and only at the places where benches conform to the requirement of Regulation 106(1), 106(4) and 106(5) of the Metalliferous Mines Regulations, 1961.

15.4 No blasting shall be conducted within 300 m of building/infrastructure not belonging to the owner. The distance shall be kept marked in the field as well as on the plan mentioned under Regulation 61(1)(a) of the MMR, 1961.

15.5 Adequate general lighting arrangements shall be provided during working hours in the opencast working and Regulation 146 of MMR 1061 shall be complied with.

15.6 All the precautions and directives given in DGMS circulars issued from time to time shall be compiled with.

15.7 The Owner, Agent and Manager shall ensure that the aforesaid conditions are made known to all concerned. They shall also ensure that every such person has fully understood the same and complies with them.

15.8 Please note that this permission is subject to the following additional conditions:

15.8.1 In the event of any change in the circumstances connected with this permission which is likely to endanger the life of workmen employed in the mining operation for which this permission has been granted shall be stopped forthwith and intimation thereof sent to this Directorate. The said

mining operation shall not be resumed without an express and fresh permission in writing.

15.8.2 This permission may be amended or withdrawn at any time should it be considered necessary in the interest of safety.

15.8.3 This permission is being issued specifically under the regulations mentioned above and without prejudice to any other provision of law, which may be or may become applicable at any time.

भ व दी व

खान सुरक्षा निदेशक,
गाजियाबाद क्षेत्र, गाजियाबाद.

ज्ञापन संख्या: S29024/GR/ HR/Mahendragrah/0188 /Per 1568 दिनांक 30/5/2018

Copy forwarded for information and necessary action to:-

1. प्रबन्धक– बायल क्वार्टज एण्ड फैल्सपार खान (खसरा नं0 201,223,224), नामित मालिक– श्री परमेश [illegible], गांव बयाल, तहसील नारनौल, जिला महेन्द्रगढ(हरि0)।

खान सुरक्षा निदेशक,
गाजियाबाद क्षेत्र, गाजियाबाद.

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ROOM

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FIRST AID BOX

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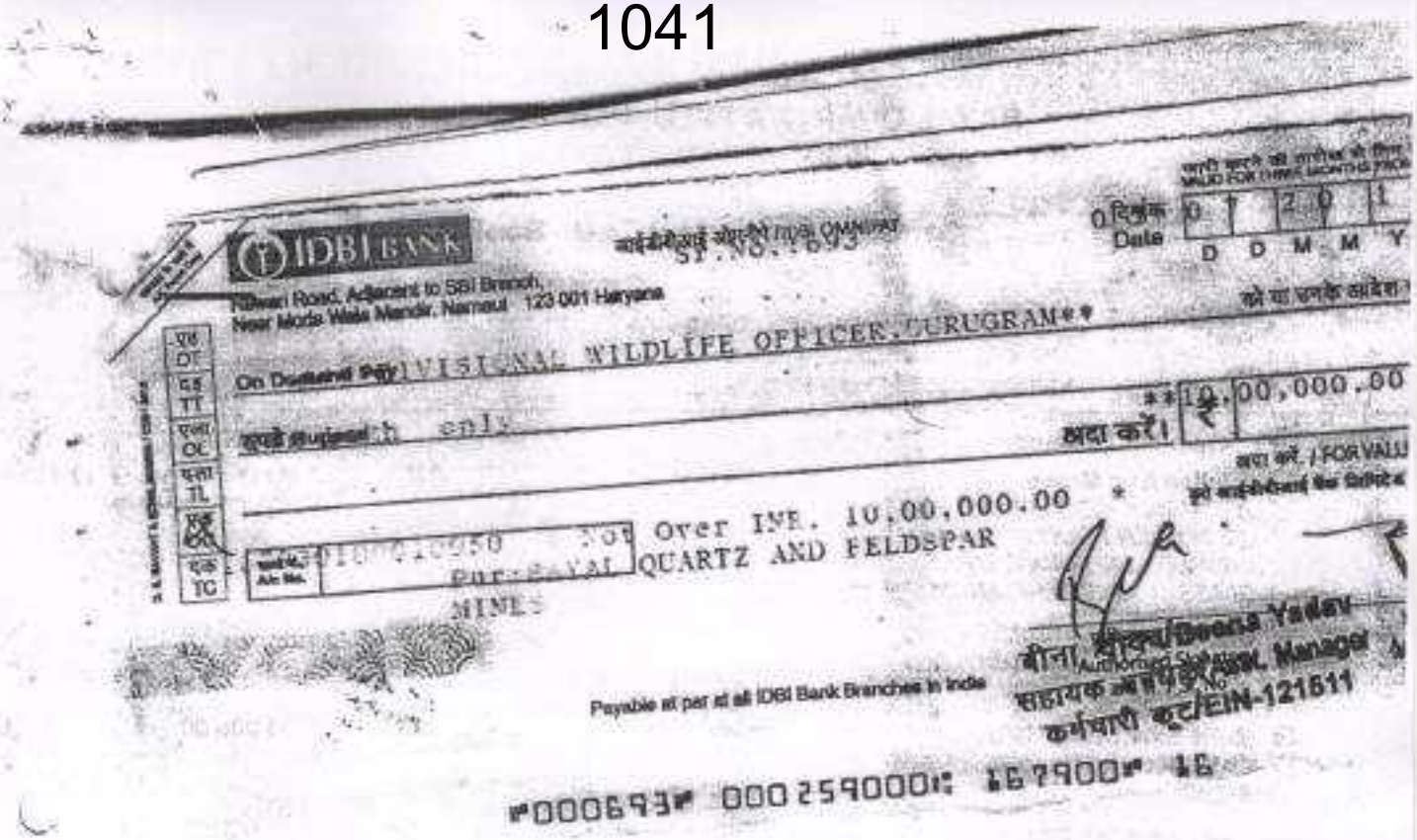

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कर्मचारी कूट/EIN-121611

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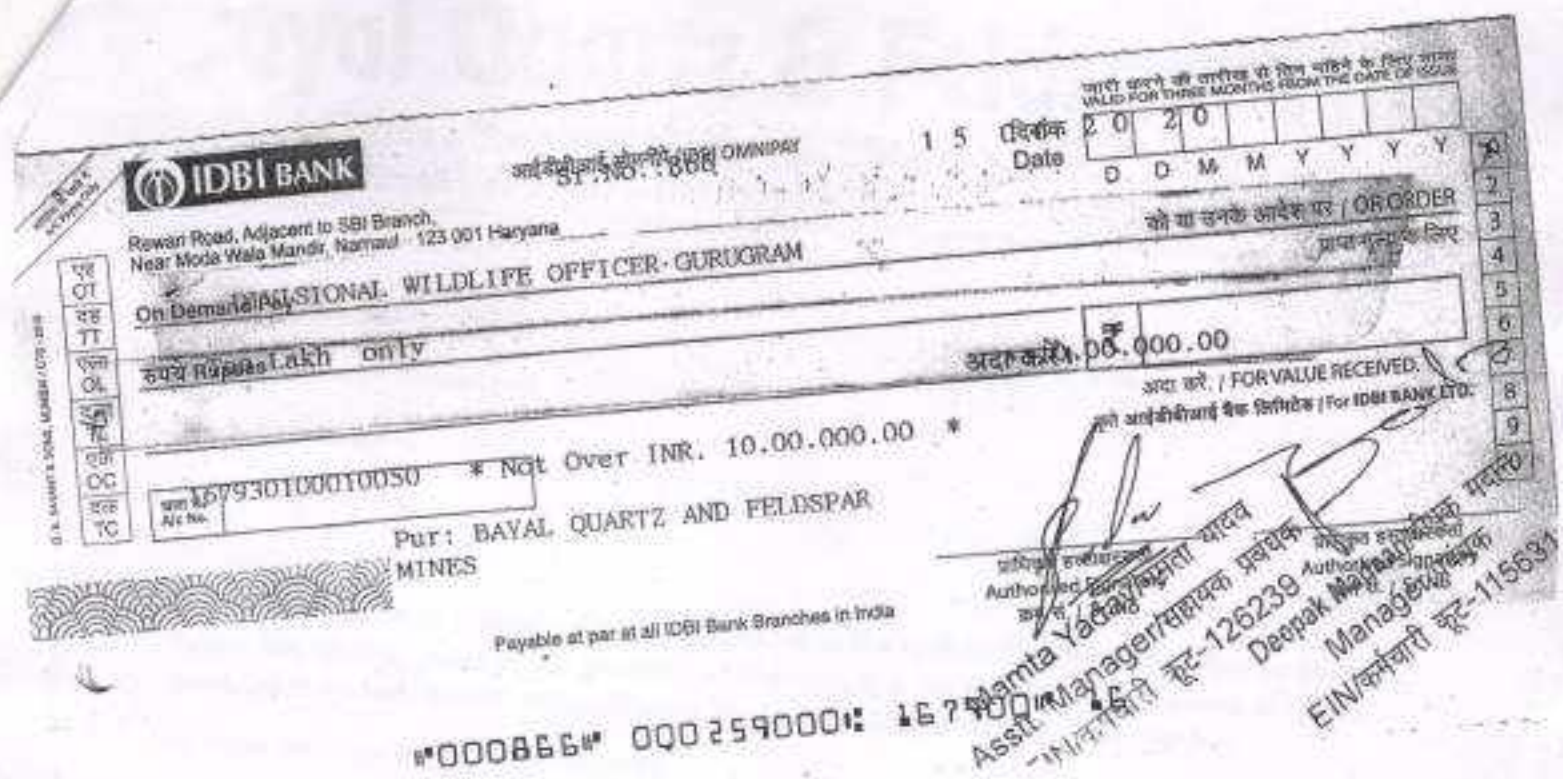

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"000866" 000259000: 167 00 16

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Bayal Quartz & Feldspar Mines

Regd. Office: Sector-1, Home No. 196-P, Narnaul-123001 (Haryana)
Email: psangwan5757@gmail.com Mob. 9215105757

To

Date: 18/06/24

The Director,
Ministry of Environment, Forests & Climate Change (IA Division),
Indira Paryavaran Bhavan, Jor Bagh Road,
New Delhi

Sub: Environmental Clearance to M/s Bayal Quartz & Feldspar Mine of Mr. Manmohan Bhadana, S/o Kartar Singh Bhadana over an area of 76.75 Ha. & rate of production is 55,00,000 TPA (ROM) situated at Khasra no. 201, 223 & 224 Village- Bayal, Tehsil- Nangal Choudhary, District – Mahendargarh (Haryana) for the Submission period of June 2024.

Ref. No. J-11015/10/2017-IA.II(M) Dated 4th May, 2018

Sir,

In accordance to the EC letter as above stated received from Ministry of Environment, Forests & Climate Change vide letter **J-11015/10/2017-IA.II(M) Dated 4th May, 2018.** We are submitting herewith six monthly compliance report of stipulated conditions of Environment Clearance (Soft only) along with laboratory analysis results the specific and general conditions and relevant annexure.

We fully assure you that we will comply with all conditions as specified in the Environment clearance granted us.

For M/s Bayal Quartz & Feldspar Mine

Authorised Signatory

Bayal Quartz And Feldspar Mines Prop.

Name - Pramesh Singh
Designation- Authorized Signatory
E-mail - psangwan5757@gmail.com
Contact No.- 09215105757

19/6/24
Haryana State Pollution Control Board
C-11, Sector 6, Panchkula

Copy to:

1. The Director, Ministry of Environment & Forests, Northern Regional Office, Sector-31, Dakshin Marg, Chandigarh-160030
2. The Chairmen, Haryana State Pollution Control Board, Sector-6, Panchkula

Bayal Quartz & Feldspar Mines

Regd Office: Sector-1, Home No. 196-P, Narnaul-123001 (Haryana)
Email: psangwan5757@gmail.com Mob. 9215105757

To,

Date 18/06/2024 24/07/2024

The Director,
Ministry of Environment, Forests & Climate Change (IA Division),
Indira Paryavaran Bhavan, Jor Bagh Road,
New Delhi

Sub: Environmental Clearance to M/s Bayal Quartz & Feldspar Mine of Mr. Manmohan Bhadana, S/o Kartar Singh Bhadana over an area of 76.75 Ha. & rate of production is 55,00,000 TPA (ROM) situated at Khasra no. 201, 223 & 224 Village- Bayal, Tehsil- Nangal Choudhary, District – Mahendargarh (Haryana) for the Submission period of June 2024.

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For M/s Bayal Quartz & Feldspar Mine

Authorised Signatory

Quartz And Feldspar Mines Bayal Prop.

Name - Pramesh Singh
Designation- Authorized Signatory
E-mail - psangwan5757@gmail.com
Contact No.- 09215105757

Copy to:

1. The Director, Ministry of Environment & Forests, Northern Regional Office, Sector-31, Dakshin Marg, Chandigarh-160030
2. The Chairmen, Haryana State Pollution Control Board, Sector-6, Panchkula

Mob. 9215105757

GSTIN-06ADUFS5109H1ZQ !! SHRI !!

M/s Shri Ram Stone Crusher Plant (2)

Vill. Panchnota Teh. Nangal Choudhary Distt. Mahendergarh-123023

M/s No..... Dated.....

Shri Ram Stone Crusher Plant-2				
Production			Sale	
Month	Quantaty (In Ton)		Month	Quantaty (In Ton)
August.2024	1,29,520.03		August.2024	87,429.12
September.2024	1,66,254.45		September.2024	89,370.57
October.2024	56,882.86		October.2024	94,700.53
November.2024	52,135.11		November.2024	21,037.59
December.2024	83,193.58		December.2024	76,398.75
January.2025	91,918.30		January.2025	81,693.58
	5,79,904.33			**4,50,630.14**

GSTIN No. :
06ADUFS5109H1ZQ

!! Jai Shree Balaji !!

M-9215105757

SHRI RAM STONE CRUSHER

Vill. Panchnota Distt. M/Garh (Haryana)

Ref. No.....

Dated.....

Shri Ram Stone Crusher				
Production			Sales	
Month	Quantaty (In Ton)		Month	Quantaty (In Ton)
August.2024	184368.83		August.2024	157368.66
September.2024	359077.82		September.2024	185980.80
October.2024	269191.82		October.2024	193838.70
November.2024	46160.39		November.2024	48940.30
December.2024	166012.26		December.2024	113791.79
January.2025	107746.4		January.2025	105995.23
	1132557.52			**805915.48**

Shri Ram Stone Cru...

Partner

Laboratory of the
Haryana State Pollution Control Board
Vikas Sadan, Ist Floor, Gurgaon

FORM IV (See Rule 14)

Report No.: 869-870
Dated-21th February, 2025

I, hereby, certify that I **Ramniwas Sharma** as Board Analyst, duly appointed under sub section (2) of section 29 of Air (Prevention and control of pollution) Act, 1981 (14 of 1981) received on the **17th day of February, 2025** from **Sh. Anuj Narwal, AEE** sample of Ambient & Process emission of **M/s Shri Ram Stone Crusher Plant-2, Village-Panchnota, Nangal Chaudhary, Mahendergarh** collected on **17/02/2025** from inward and outward wind direction of crusher. The Sample was in a condition fit for analysis reported below:-

I further certify that I have analyzed the afore-mentioned sample from **17/02/2025 to 21/02/2025** and declare the result of analysis to be as follow:-

Sr. No.		**Process Emission**	
1.	Location of Sampling Point	**Inward & Outward Direction of wind**	
2.	Date of sampling	**17/02/2025**	**17/02/2025**
3.	Sampling started at	-	-
4.	Sampling completed at	-	-
5.	Actual time of sampling	30 min	30 min
6.	Flow rate of SPM(m^3/min)	1.1	1.1
7.	Volume of air sampled for SPM(m^3)	33	33
8.	Average Ambient Temperature	36^0C	36^0C
9.	Weather condition	Normal	Normal
	RESULTS	Inward Direction	Outward Direction
10	Suspended Particulate Matter **µg /Nm³**	768	1102

The condition of the seal, fastening and container on receipt was as follows: Container had its seals founded intact in order; slip on the container had the signature of the representative of the industry and the board representative.

Signed this on 21th February, 2025

Board Analyst

Laboratory of The
Haryana State Pollution Control Board
Vikas Sadan, Gurgaon

To

The Member Secretary
Haryana State Pollution Control Board
C-11, Sec.-6, Panchkula (Haryana)

Laboratory of the
Haryana State Pollution Control Board
Vikas Sadan, Ist Floor, Gurgaon

FORM IV (See Rule 14)

Report No.: 867-868
Dated-21th February, 2025

I, hereby, certify that I **Ramniwas Sharma** as Board Analyst, duly appointed under sub section (2) of section 29 of Air (Prevention and control of pollution) Act, 1981 (14 of 1981) received on the **17th day of February, 2025** from **Sh. Anuj Narwal, AEE** sample of Ambient & Process emission of **M/s Shri Ram Stone Crusher, Village-Panchnota, Nangal Chaudhary, Mahendergarh** collected on **17/02/2025** from inward and outward wind direction of crusher. The Sample was in a condition fit for analysis reported below:-

I further certify that I have analyzed the afore-mentioned sample from **17/02/2025 to 21/02/2025** and declare the result of analysis to be as follow:-

Sr. No.		**Process Emission**	
1.	Location of Sampling Point	**Inward & Outward Direction of wind**	
2.	Date of sampling	**17/02/2025**	**17/02/2025**
3.	Sampling started at	-	-
4.	Sampling completed at	-	-
5.	Actual time of sampling	30 min	30 min
6.	Flow rate of SPM(m^3/min)	1.1	1.1
7.	Volume of air sampled for SPM(m^3)	33	33
8.	Average Ambient Temperature	36^0C	36^0C
9.	Weather condition	Normal	Normal
	RESULTS	Inward Direction	Outward Direction
10	Suspended Particulate Matter **µg /Nm³**	866	1316

The condition of the seal, fastening and container on receipt was as follows: Container had its seals founded intact in order; slip on the container had the signature of the representative of the industry and the board representative.

Signed this on 21th February, 2025

Laboratory of The
Haryana State Pollution Control Board
Vikas Sadan, Gurgaon

Board Analyst

To

The Member Secretary
Haryana State Pollution Control Board
C-11, Sec.-6, Panchkula (Haryana)

Annexure-33

Environmental Guidelines
for
Stone Crushing Units

Central Pollution Control Board

Ministry of Environment, Forest and Climate Change

Parivesh Bhawan, East Arjun Nagar

Delhi-110032

(July, 2023)

1.0 Introduction

Stone crushing sector is an important industrial sector engaged in producing crushed stone of various sizes (40 mm.20 mm.10 mm. crushed sand, stone dust etc) depending upon the requirement which acts as raw material for various construction activities.

Stone crushing operation releases a substantial amount of fugitive dust, which not only pollute the environment, but also pose a health hazards to the workers and the surrounding population. The growth in infrastructure is leading to increase in demand of raw materials, thereby resulting in the need to set up new stone crushing units or increase production from existing units. This poses a challenge to maintain the ambient air quality, which is possible if environmental guidelines predetermined by the industry concerned are followed.

Inventory and information about stone crushing units gathered from 27 SPCBs/PCCs (Arunachal Pradesh, Andaman & Nicobar island, Assam, Bihar, Chandigarh, Chhattisgarh, Daman, Dadra & Nagar Haveli, Goa, Gujarat, Haryana, Himanchal Pradesh, Jharkhand, J&K, Karnataka, Kerala, Madhya Pradesh Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Punjab, Sikkim, Tripura, Uttarakhand), and the data received indicates that there are about 16,931 stone crushing units with capacity ranges between 0.1 TPH to 1,400 TPH.

2.0 Classification of Stone Crushing Units

Based on the information received from SPCBs/PCCs, stone crushers may be classified into small, medium and large-scale in terms of production capacity.

S.No.	Category	Production capacity (TPH)
1.	Small Scale	Up to 25
2.	Medium Scale	26 to 100
3.	Large Scale	100 above

3.0 Stone Crushing Process

The stone crushing process can be broadly divided in following stages:

3.1 Transportation of raw material: Stones extracted from various sources are transported to stone-crushing units by means of trucks, trailers or automatic dumpers.

3.2 Primary crushing: Mined stones are fed directly into the primary crusher through stone feeders. The primary crusher breaks large stones and boulders into 100-140 mm size stones. Crushed stones are sent to secondary crusher for further reduction into smaller sizes. Various types of crushers are used in stone crushing industry. Jaw crushers are widely used as primary crushers.

3.3 Secondary crushing: After primary crushing, crushed stones are fed to secondary crushers through conveyor belts. In this stage, stones are further crushed to a size of 40-60 mm to 10 mm or even smaller. Stone crushing units use different types of crushers for secondary crushing. Granulator or cone crusher is usually used for secondary crushing.

3.4 Screening: From secondary crusher, crushed stones are transferred for screening through a conveyor belt. Screening is the process for segregating products of various sizes. Different mesh size screens are aligned one below the other and each screen is connected to a separate conveyor belt for discharging different size products. Mass that remains on the screen is called 'oversize' and material that passes through screen is called 'under size'. Oversize is returned to secondary crushers for further crushing and then again to screen. Under size is discharged through a 'telescopic chute' and screened products of various sizes are conveyed to stockpiles by belt conveyors. Different types of screens are used such as; grizzly-type screen, vibrating screen and rotary screen. Vibrating screens are most commonly used.

3.5 Tertiary crushing: Tertiary crushing is carried out in units that produce stone dust as their primary product. Dust is usually a by-product of stone crushing process. Units that produce dust, install a separate machine, usually roller crushers. Stones of size 10-20 mm are sent to roller crushers for grinding into fine dust.

3.6 Product storage and loading: After crushing and screening, final product is transferred to a conveyor belt which distributes the product into different stockpiles, depending on size of the product. The product/fines are either stored as stockpiles or directly loaded into trucks & dumpers and transported.

4.0 Environmental issues associated with Stone Crushing Units

The major environmental issue due to operation of a stone crushing unit is fugitive dust emissions which is contributed by the following processes:

- **Primary crushing**: Primary crushers breaks large boulders into smaller sizes. Crushing process as well as unloading of stones generate a substantial amount of fugitive dust. Mechanism for water sprinkling is provided to reduce fugitive dust. Some primary crushing areas are partially or completely covered with a shed as a measure to further prevent the fugitive dust emissions to surroundings, however at some places partial coverings provided which do not appear to be sufficient to such emissions.

- **Secondary crushing:** Compared to primary crushing, fugitive dust emitted at secondary crushing is relatively higher. Generally, insufficient covered shed provided in the process results in fugitive emissions.

- **Screening:** Screening process is also a source of fugitive dust emissions. As the material is conveyed to screen from secondary crusher, screen vibrates and thus, separates the material of different sizes resulting into huge amount of fugitive dust emissions. Generally, units provide covered shed and water sprinklers to combat

dust emissions however, improper design and operation of sprinklers and improper covering is an issue.

- **Tertiary crushing:** Fugitive emissions are generated during grinding of stones into fine dust.

- **Conveyor Belt:** Conveyor belts are primary means of transferring raw materials and products from one end to the other. Movement of products on the conveyor belts is a potential source of fugitive dust emissions. To reduce dust emissions, water sprinkling arrangement is provided on each belt. Some units cover conveyor belts either with sheets or thick cloth to reduce dust emissions.

- **Product release and storage**: Fugitive emissions generated during transfer of material through telescopic chutes is lower than that generating during direct disposal of product on stockpile. Material, such as stone dust, stored in open areas is are also a potential source of fugitive dust emissions.

- Although no process waste water is generated from stone crushing units, however, water is used for sprinkling, conveyed to settling tanks of appropriate size which is recycled and reused in process.

5.0 Environmental Guidelines for Stone Crushing Units

The stone crushing units should adopt following environmental guidelines to prevent/suppress fugitive dust emissions from their operation:

Source of emission	Measures to be Taken
Unloading of raw material for storage	Water sprinkling with adequately designed nozzle which produce tiny droplets of water should be provided during raw materials unloading .
Unloading of raw material into hopper	• Three sides and top should be covered and one side may be kept open for vehicular movement. • Water sprinklers should be provided on approach roads.

Primary Crushing/ Jaw Crusher	• Crusher should be completely enclosed by GI/MS sheets on top and at least three sides completely from the ground level. One side should have provision of movable sheet/door for movement/maintenance. • Primary crushers/jaw crushers should be covered with tarpaulin/cotton cloth/suitable materials to contain fugitive dust emissions (**Figure-1**) • Water sprinkler system with adequately designed nozzle which produce tiny droplets of water should be provided at primary crusher/jaw crusher so that fugitive emissions are contained and amount of water sprayed should be optimized.
Secondary Crushing	• Crusher should be completely enclosed by GI/MS sheets on top and at least three sides completely from the ground level. One side should have provision of movable sheet/door for movement/ maintenance. • Dry extraction cum bag filter followed by cyclone to be provided for control of emissions.
Screening	• Crusher should be completely enclosed by GI/MS sheets on top and at least three sides completely from the ground level. One side should have provision of movable sheet/door for movement/ maintenance. Door to be kept closed during operation. • Flexible covers where conveyors pass through the screen house should be installed at entries and exits of conveyors to screen house. • Dust extraction system connected with bag filter to be provided. • Provision of water mist sprinkling systems with adequately designed nozzle which produce tiny droplets of water should be made at inlet/outlet of screens.
Tertiary Crushing	• Crusher should be completely enclosed by GI/MS sheets on top and at least three sides completely from the ground level. One side should have provision of movable sheet/door for movement/ maintenance. Dust extraction system connected with bag filter to be provided. • Provision of water mist sprinkling system should be made with adequately designed nozzle which produce tiny droplets of water.

Conveyor Belts	Conveyor belts should be properly covered from node to node with a thick sheet of suitable material along with water sprinkling system with adequately designed nozzle which produce tiny droplets of water.
Discharge points	Flexible Telescopic chute from top of discharge point to the ground level should be provided (**Figure-2 & Figure-2(a)**).
Product storage	• Properly designed telescopic chute of adequate length of suitable material should be provided at ends of conveyor so that dust generated from this section is contained at source. • All open stockpiles for aggregates of size above 5 mm should be kept sufficiently wet by water spraying. • Stockpiles of aggregates of 5 mm size or less should be covered to ensure that same is not carried away (or whipped out) by wind.

5.1 General Measures

i. Wind breaking wall: GI/MS/brick wall should be provided along the periphery of crusher. Height of the wall should be 3-ft more than the highest node of the crusher.

ii. Roads: Metaled/concrete roads should be provided within the premises. Ramps and the entire ground area inside the premises should also be metaled.

iii. Housekeeping: To curb the air pollution in the crusher premises, arrangement of rotating water sprinkling system/fogger/Anti-smog gun should be provided. Water sprinklers should have adequately designed nozzle which produce tiny droplets of water, as such system is more effective in dust control with significant reduction in consumption of water**.** Fine dust accumulated and bag filters in the crushing area should be cleaned at regular intervals and the collected dust should be stored in sacks for further sale or disposal.

iv. Plantation: 2-3 rows of tall trees should be planted around the periphery of crusher.

v. Housing should be open for movement of mechanical drivers, conveyor belts, etc. should be sealed properly with flexible rubber flaps.

vi. Name of the unit, contact details of the owner and address of the unit, plant capacity and date of issue of CTE/CTO from SPCBs/PCCs should be displayed on the display board at the entrance.

vii. Transportation: Vehicles carrying any kind of material should be completely covered.

viii. Regular wetting of roads should be done to suppress dust within the premises to control dust emission re-suspension.

ix. Water consumption and handling: Unit should provide settling tanks of appropriate size and recycle & reuse of the water in process. Crusher should provide a water storage tank with adequate capacity. In case of use of groundwater, stone crushing unit should obtain permission to extract groundwater from the Central Ground Water Authority (CGWA)/Ground Water Department (GWD) of the State/UT. Unit should maintain proper log book of consumption of fresh water. Depending on availability, efforts may be made to use STP treated water instead groundwater to control emissions from process activities.

6.0 Regulatory/Monitoring Mechanism for Stone Crushing Unit

i. Stone crushing unit should obtain Consent to Establish (CTE) and Consent to Operate (CTO) from the concerned SPCBs/PCCs.

ii. Unit while applying for CTO/renewal of consent, should upload the duly filled checklist attached at **Annexure-1** along with digitally tagged photographs and videos of the crushing unit to ensure compliance of the conditions mentioned in the guidelines. SPCBs/PCCs should digitally verify the said conditions before issuance of CTE/CTO/renewal of consent.

iii. CCTV/PTZ cameras should be installed at the entrance and all corners of the premises of the unit covering entire area with minimum of 30 days data storage.

iii. Stone crushing unit shall comply with emission norms prescribed under the Environment (Protection) Rules, 1986 and conditions laid down in CTO by concerned SPCB/PCC.

v. Online/manual ambient air monitoring systems to be installed in crusher zone as per CPCB/SPCB guidelines – in upwind and downwind directions.

vi. Stone crushing unit should develop green belt as per the plan approved by concerned Department of the State/UT.

vii. Local authorities should associate with stone crusher associations for the construction of metalled road in the entire crusher zone.

viii. A District Level Committee should be constituted under chairmanship of District Magistrate/Deputy Commissioner so that surprise inspections for surveillance of stone crushing units located under their jurisdiction can be carried out on regular basis.

ix. Health survey of workers should be carried out by the stone crusher on half-yearly basis**.**

x. New Crushers should be allowed to operate only in dedicated crusher zones as per the siting policies of SPCBs/PCCs.

xi. Stone crusher unit should be operated only during day time (i.e. 6.00 AM to 10.00 PM) to avoid inconvenience to the nearby residents due to ambient noise.

Figure-1: Covering of Primary/Jaw crusher

Figure-2: Chute from top of discharge point

Figure-2(a): Chute from top of discharge point

Annexure-1

Format/Checklist for SPCBs/PCCs before issuance of CTE & CTO

S. No.	Fugitive Emission Source Locations	Checklist for compliance of conditions of Environmental guidelines	Yes/No
1.	Unloading area of raw material, primary crusher, Screener, conveyors belts and transfer points	Water sprinklers installed with adequate designed nozzles (Upload photo/videos).	
2.	Primary crushers, Secondary crushers, Screeners and tertiary crushers	Enclosures by GI/MS sheets on top and at least three sides completely from the ground level (Upload photo/videos).	
3.	Secondary, Tertiary crushers and Screener	Dry extraction cum bag filter followed by cyclone. (Upload photo).	
4.	Covering of Conveyor belts from node to node with a thick sheet of suitable material	Covering of Conveyor belts (Upload photo).	
4	At discharge points	Flexible Telescopic chute from top of discharge point to the ground level (Upload photo).	
5	GI/MS/brick wind breaking wall of 3-ft more than the highest node of the crusher along the periphery of crusher	Wind breaking wall (Upload photo)	
General			
6.	Wind breaking wall	GI/MS/brick wind breaking wall of 3-ft more than the highest node of the crusher along the periphery of crusher (Upload photo)	
7.	Roads	Metalled/concrete roads within the premises. Ramps and the entire ground area inside the premises should also be metalled	

8.	Suppression of dust within the premises	Arrangement of rotating water sprinkling system/fogger/Anti-smog gun in the premises to suppress dust within the premises to control dust emission re suspension	
9.	Green belt	Plantation of 2-3 rows of tall trees around the periphery of crusher	
9.	Display board	Display board at the entrance, having name of unit, contact details of owner and address of unit, plant capacity and date of issue of CTE/CTO from SPCB/PCC	
10	Covering of vehicles	Covering of vehicles carrying any kind of material .	
11	CCTV/PTZ camera	CCTV/PTZ cameras installed at the entrance and all corners of the premises of the unit covering entire area with minimum of 30 days data storage	
12	Photos/videos	Upload photographs/videos ensuring compliance of all conditions as mentioned in the guidelines while applying CTE/CTO/ Renewal	

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भाग–III

हरियाणा सरकार

पर्यावरण, वन और वन्यजीव विभाग

अधिसूचना

दिनांक 24 जनवरी, 2025

संख्या का०आ०6/के०अ०29/1986/धा० 5 तथा 7/2025.– चूंकि, भारत के संविधान के अनुच्छेद 48–क अन्य बातों के साथ विचार करता है कि राज्य, पर्यावरण के संरक्षण की कोशिश करेगा;

चूंकि, पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का केन्द्रीय अधिनियम 29) की धारा 5 तथा 7 और वायु (प्रदूषण निवारण और नियन्त्रण) अधिनियम, 1981 (1981 का केन्द्रीय अधिनियम 14) की धारा 19 तथा इसके अधीन बनाए गए नियमों के अधीन पर्यावरण निम्नीकरण को रोकने के लिए तथा यातायात और मानव स्वास्थ्य संबंधी खतरों से बचने के लिए राज्य में पारिस्थितिकी संतुलन बनाए रखने के लिए तुरन्त कदम उठाना आवश्यक तथा समीचीन है;

और चूंकि, राज्य सरकार, औद्योगिक विकास को ध्यान में रखते हुए पारिस्थितिकी संतुलन बनाए रखने हेतु तथा पर्यावरण की गुणवत्ता बनाए रखने तथा क्षेत्र के निवासियों को स्वास्थ्य सम्बन्धी खतरे से भी बचाने के लिए पहले ही निर्णय ले चुकी है;

और चूंकि, हरियाणा सरकार, पर्यावरण विभाग, अधिसूचना संख्या का०आ० 12/के०अ० 29/1986/धा० 5 तथा 7/2016, दिनांक 11 मई, 2016 के अनुसार, अनुसूची–I के अनुसार स्थल निर्धारण मानदण्ड मानकों, अनुसूची–II के अनुसार अपेक्षित उत्सर्जन मानकों तथा प्रदूषण नियन्त्रण उपायों, अनुसूची–III के अनुसार जोनों की पहचान तथा स्थलों की उपलब्धता तथा अनुसूची–IV के अनुसार परिलक्षित जोनों में स्थापना तथा संचालन के लिए प्रक्रिया के बारे में स्टोन क्रशिंग इकाइयों के लिए निर्देश दिए गए थे;

इसलिए, अब, भारत सरकार, पर्यावरण तथा वन मन्त्रालय, पर्यावरण, वन तथा वन्यजीव विभाग, अधिसूचना संख्या का०आ० 152 (ई), दिनांक 10 फरवरी, 1988 के साथ पठित पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का केन्द्रीय अधिनियम 29) की धारा 5 के अधीन प्रदत्त शक्तियों का प्रयोग करते हुए तथा उक्त अधिनियम की धारा 7 तथा पर्यावरण (संरक्षण) नियम, 1986 के नियम 4 के उपबन्धों के अनुसरण में और हरियाणा सरकार, पर्यावरण विभाग, अधिसूचना संख्या का०आ० 12/के०अ० 29/1986/धारा 5 तथा 7/2016, दिनांक 11 मई, 2016, के अधिक्रमण में, हरियाणा के राज्यपाल, इसके द्वारा, अनुसूची–I के अनुसार स्टोन क्रशरों के स्थल निर्धारण मानकों और अनुसूची– II के अनुसार उत्सर्जन मानकों तथा प्रदूषण नियन्त्रण उपायों की अपेक्षाओं के बारे में स्टोन क्रशरों की स्थापना के लिए निम्नलिखित निर्देश जारी करने का प्रस्ताव करते है;

इसलिए अब, पर्यावरण (संरक्षण) नियम, 1986 के नियम 4 के उप–नियम (3क) के अधीन प्रदत्त शक्तियों का प्रयोग करते हुए, इसके द्वारा, नोटिस दिया जाता है कि राजपत्र में, इस अधिसूचना के प्रकाशन की तिथि से तीस दिन की अवधि की समाप्ति को या के बाद, सरकार द्वारा ऐसे आक्षेपों तथा सुझावों, यदि कोई हों, के साथ, जो इस प्रकार विनिर्दिष्ट अवधि की समाप्ति से पूर्व अधिसूचना के प्रारूप के संबंध में किसी व्यक्ति से अपर मुख्य सचिव, हरियाणा सरकार, पर्यावरण, वन और वन्यजीव विभाग के कार्यालय में प्राप्त किए जाएं, पर विचार किया जाएगा :

अनुसूची I

हरियाणा में स्टोन क्रशरों के स्थल हेतु मानक

क्रम संख्या	मानदण्ड	किलोमीटर में दूरी
1	2	3
1.	निकटतम राष्ट्रीय राजमार्ग तथा राज्य राजमार्ग से अपेक्षित न्यूनतम दूरी	0.5
2.	राष्ट्रीय राजधानी क्षेत्र दिल्ली की सीमाओं से अपेक्षित न्यूनतम दूरी	5.0
3.	समान जिले के निकटतम नगर निगम की सीमाओं से अपेक्षित न्यूनतम दूरी	2.0
4.	निकटतम नगर/शहर/नगरपालिका की सीमाओं से अपेक्षित न्यूनतम दूरी	1.0
5.	निकटतम गांव की फिरनी से अपेक्षित न्यूनतम दूरी यदि वहां कोई फिरनी नहीं है, तो दूरी गांव की आबादी देह से मापी जाएगी तथा बे–चिराग राजस्व सम्पदा (सम्बन्धित तहसीलदार द्वारा प्रमाणित की जानी है) की दशा में मौका स्थल पर वास्तव में दूरी निकटतम बसी हुई राजस्व सम्पदा से मापी जाएगी।	0.5
6.	सड़कों, नहरों, रेल लाइनों तथा बांधों के साथ वन/पौधारोपण पट्टी के सिवाए, सरकारी रिकार्ड (राजस्व या वन विभाग) में वन के रूप में अभिलिखित किसी भूमि से अपेक्षित न्यूनतम दूरी	0.25

7.	20 किलोलीटर क्षमता वाली खुले आसमान की अनुमोदित जल आपूर्ति स्कीम से अपेक्षित न्यूनतम दूरी	0.5
8.	25 या उससे अधिक अन्तरंग रोगियों का प्रबन्ध करने वाली किसी अन्तरंग स्वास्थ्य उपचार इकाई से अपेक्षित न्यूनतम दूरी	1.0
9.	राष्ट्रीय पार्कों, वन्य जीव अभयारण्यों तथा संरक्षण आरक्षणों से अपेक्षित न्यूनतम दूरी	2.0 (एन.पी.) 1.0 (डब्ल्यू.एल.एस.)
10.	शिक्षा संस्थानों से अपेक्षित न्यूनतम दूरी	0.5
11.	किसी खनन क्षेत्र/छोटी पहाड़ी से अपेक्षित न्यूनतम दूरी	0.1

उपरोक्त कथित अनुसूची के सम्बन्ध में निम्नलिखित निर्देश भी दिए जाते हैं :-

(i) गांव से दूरी के सिवाए सभी दूरियां, जब तक कि विशेष रूप से ऊपर वर्णित नहीं की जाती हैं, सम्बद्ध आकृति (रूपक) की परिधि के लिए स्टोन क्रशर की भूमि की निकटतम सीमा से कौवा उड़ान (क्रो फ्लाई) के रूप में मापी जानी हैं।

(ii) उन गांवों की दशा में, जहां व्यक्तिगत स्टोन क्रशर तथा गांव के बीच कोई पहाड़ी/छोटी पहाड़ी/पहाड़ आता है, वहां गांव की दूरी के मानदंड के लिए पहाड़ी/छोटी पहाड़ी/पहाड़ की सबसे छोटी लाइन के साथ इस शर्त के अधीन कि पर्यावरण को सुरक्षित रखने के लिए पहाड़ी/छोटी पहाड़ी/पहाड के आधार न्यूनतम 300 मीटर की दूरी होनी चाहिए तथा इस सम्बन्ध में निर्णय, स्थानीय पर्यावरण को ध्यान में रखते हुए मामले दर मामले के आधार पर किया जाएगा।

(iii) विद्यमान, अनुमोदित क्रशर जोन तथा उनका विस्तार उपरोक्त स्थल निर्धारण न्यूनतम दूरी मानदंड से प्रभावित नहीं होगा, चूंकि उपरोक्त स्थल निर्धारण मानदंड के संयोजन में स्टोन क्रशिंग इकाइयों के समूह वाली व्यवहार्यता सम्भव नहीं हो सकती। उपरोक्त वर्णित स्थल निर्धारण मानदंड केवल विद्यमान अनुमोदित क्रशर जोन या उनके विस्तार से बाहर के क्षेत्र में स्थापित की जाने वाली स्टोन क्रशिंग इकाइयों को लागू होंगे।

(iv) क्रशर जोन, सभी पणधारी विभागों तथा हरियाणा राज्य प्रदूषण नियन्त्रण बोर्ड से सहमति लेने के बाद, खनन तथा भू–विज्ञान विभाग द्वारा पहचाने तथा अनुमोदित किए जाएंगे।

(v) किसी भी नई स्टोन क्रशर इकाई को फरीदाबाद, पलवल (पूर्व फरीदाबाद जिला) तथा गुरूग्राम जिलों में परिलक्षित क्रशर जोनों के बाहर स्थापित या संचालित किए जाने के लिए अनुज्ञात नहीं किया जाएगा।

(vi) यदि संरक्षित क्षेत्र जैसे राष्ट्रीय पार्क, वन्य जीव अभयारण्यों या संरक्षण आरक्षण के इको–अति संवेदनशील जोन एक/दो किलोमीटर, जैसी भी स्थिति हो, से अधिक दूरी का नियन्त्रण रखने के लिए अधिसूचित हैं, तो उसका पालन किया जाएगा।

(vii) विभिन्न विहित स्थानों के स्टोन क्रशरों की दूरी सम्बद्ध तहसीलदार द्वारा प्रमाणित/सत्यापित की जाएगी तथा वन भूमि के लिए स्थल निर्धारण दूरी के बारे में रिपोर्ट सम्बद्ध वन मण्डल अधिकारी से ली जाएगी। सम्बन्धित बोर्ड का क्षेत्रीय अधिकारी, वन मण्डल अधिकारी या तहसीलदार द्वारा सत्यापन से भिन्न विहित स्थानों की दूरी सत्यापित करेगा।

(viii) नवंबर से फरवरी तक, राष्ट्रीय राजधानी क्षेत्र में किसी भी स्टोन क्रशर इकाई को तब तक संचालित करने की अनुमति नहीं दी जाएगी, जब तक कि क्षेत्र का वायु गुणवत्ता सूचकांक मध्यम और अच्छा अर्थात् 200 से नीचे का न हो।

अनुसूची II

उत्सर्जन मानकों तथा प्रदूषण नियन्त्रण उपायों की अपेक्षाएं

मद I

प्रदूषण नियन्त्रण पैरामीटर :–

किसी स्टोन क्रशर इकाई के किसी प्रक्रिया उपकरण से 3 मीटर तथा 10 मीटर के बीच मापा जाने वाला आस्थगित परमाणु कण (जिसे, इसमें, इसके बाद, एस.पी.एम. के रूप में निर्दिष्ट किया गया है) 600 माईक्रोग्राम प्रति घन मीटर से अधिक नहीं होगा। एस.पी.एम. का माप पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का केन्द्रीय अधिनियम 29) तथा उसके अधीन बनाए गए नियमों के अनुसार किया जाना है।

मद II

प्रदूषण नियन्त्रण उपायः–

पर्यावरण (सरंक्षण) नियम, 1986 के अधीन स्टोन क्रशिंग इकाइयों द्वारा अनिवार्य बाध्यता के अनुसार निम्नलिखित प्रदूषण नियन्त्रण यन्त्र तथा माप लगाए जाने तथा संचालित किए जाने अपेक्षित हैं, अर्थात् :–

1. ढके हुए शेड़ों तथा फव्वारों के रूप में साधन के लिए धूल नियन्त्रण-एवं-निरोध प्रणाली;

2. सभी विद्यमान स्टोन क्रशर, अधिसूचना के जारी किए जाने की एक वर्ष की अवधि के भीतर, वायु प्रदूषण नियन्त्रण के अतिरिक्त उपाय जैसे इकाई के सम्पूर्ण क्षेत्र में अपनी इकाइयों में अपने वाहकों को पूर्ण रूप से ढकना तथा फोगर मशीनें लगाना, सुनिश्चित करेंगे।

3. दूरदर्शी जल प्रपात की व्यवस्था के साथ–साथ कम से कम 50 मीटर लम्बी तथा कम से कम 16 फुट ऊंचाई की अनुमोदित वायु रोकने वाली दीवार का निर्माण यह सुनिश्चित करने के लिए कि नोड से पीसी हुई सामग्री ऐसे बिन्दु से छोड़ी जाती है जो वायु रोकने वाली दीवार की ऊंचाई से कम से कम 2 फुट नीचे है। दीवार संरचनात्मक रूप से पक्की होगी तथा क्रशर इकाई की अतिसंवेदनशील आबादी की दिशा को आच्छादित करेगी;

4. स्थापना की सहमति देते समय हरियाणा राज्य प्रदूषण नियन्त्रण बोर्ड द्वारा यथा अनुमोदित क्रशिंग इकाइयों के परिसरों के भीतर या स्टोन क्रशिंग इकाइयों के आवासन जोन के भीतर वाहन संचालन के लिए धातु की सड़क का निर्माण तथा अनुरक्षण;

5. अनुमोदित क्रशर जोन के परिसरों के भीतर या तो व्यक्तिगत रूप से या क्रशरों द्वारा संयुक्त रूप से मुहैया कराई जाने वाली धातु सड़कें प्रमुख अभियन्ता, लोक निर्माण विभाग (भवन तथा सड़कें) के परामर्श से हरियाणा राज्य प्रदूषण नियन्त्रण बोर्ड द्वारा यथा अवधारित होंगी। ये सड़कें निर्माण तथा अनुरक्षण की सन्तोषजनक विशिष्टियों के अनुसार निर्मित की जाएंगी। हरियाणा राज्य प्रदूषण नियन्त्रण बोर्ड को जोन में स्टोन क्रशर या एकल स्थल या जोनों के भीतर, परिसरों के निरन्तर संचालन को रद्द करने का प्राधिकार होगा, जहां ऐसी धातु सड़कें, प्रश्नगत क्षेत्र को यथा लागू व्यक्तिगत रूप से या संयुक्त रूप से सन्तोषजनक रूप से निर्मित या अनुरक्षित नहीं की गई हैं।

6. क्रशिंग इकाई तथा जोन के परिसरों तथा शेष अहाते, जहां इकाई स्थित है, के भीतर भूमि की नियमित सफाई करना तथा उसे गीला करना।

7. सभी स्टोन क्रशिंग इकाइयों से सम्बन्धित वन मण्डल अधिकारी द्वारा पौधारोपण योजना के अनुमोदन के बाद दो पंक्तियों की पौधारोपण वृक्षवीथि वाली परिधि के साथ हरित पट्टी मुहैया कराई जाएगी। परिसरों के भीतर पौधारोपण के पूर्ण रूप से विकसित होने तक परियोजना प्रस्तावक, धूल उत्सर्जन को रोकने के लिए परिधि के साथ– साथ अवरोध/रूकावट का निर्माण किया जाएगा। ऐसी रूकावट सभी तरफ से परिसरों को पूर्णरूप से बन्द करने वाली होनी चाहिए तथा ये या तो चार दीवारी या लचीला कपड़ा (तारपोलिन इत्यादि) या दोनों का संयोजन हो सकता है। रूकावट की ऊंचाई, वाहक पट्टे के उच्चतम सिरे की ऊंचाई से कम नहीं होगी।

8. स्टोन क्रशिंग इकाइयां कम से कम 10 किलोलीटर क्षमता के जल भण्डारण सुविधा के साथ–साथ कम से कम 50 फव्वारों का प्रबन्ध करेंगी। आगे, उन्हें 100 टन प्रतिदिन के स्टोन क्रशिंग क्षमता तथा उच्चतर क्षमता क्रशर इकाइयों के लिए तद्नुसार यथानुपात के लिए कम से कम एक किलोलीटर जल प्रतिदिन छिड़कना होगा।

9. फव्वारा प्रणाली के नियमित संचालन को सुनिश्चित करने के उद्देश्य से, स्टोन क्रशिंग इकाइयाँ, भार सर्वेक्षण तथा मांग विशेषता वाले पृथक उर्जा मीटर के साथ–साथ अन्तःपाशन (इन्टरलॉकिंग) प्रणाली का प्रबन्ध करेंगी।

10. ऐसे प्रदूषण नियन्त्रण साधन द्वारा उर्जा की खपत के लिए उर्जा मीटर द्वारा यथा अभिलिखित दैनिक डेटा से युक्त लॉग–बुक, हरियाणा राज्य प्रदूषण नियन्त्रण बोर्ड या इसके प्राधिकृत अधिकारी को स्थल पर (ऑन–द–स्पॉट) या उसके बाद मुख्यतः तीन कार्य घण्टों की अवधि के भीतर उसकी मांग पर तुरन्त उपलब्ध कराई जाए।

11. स्टोन क्रशिंग इकाइयाँ कच्ची सामग्री केवल वैध स्रोत से ही प्राप्त करेंगी तथा केवल वैध खनन पट्टा धारकों से सम्पर्क करना होगा तथा देशविधि के अधीन उस पर यथा लागू उत्पादन डाटा, कर तथा शुल्कों के भुगतान के साथ–साथ स्टोन क्रशिंग इकाइयों द्वारा प्रयुक्त कच्ची सामग्री के स्रोत तथा मात्रा तथा उपयोग से सम्बन्धित सम्पूर्ण डाटा प्रस्तुत करेंगी।

12. किसी अनुमोदित जोन के साथ हरित पट्टी कम से कम 100 मीटर की गहराई की होंगी या क्रशर जोन की परिधि के साथ हरित पट्टी की गहराई की दिशा में ऐसे वृक्षों की कम से कम 10 पंक्तियाँ होंगी। परिधि के साथ ऐसे वृक्षों का अंतराल, परिधि के साथ आठ मीटर से अधिक नहीं होगा। बागान वृक्षों की प्रकृति तथा ऐसे वृक्ष बागान के लिए अपेक्षित उनके संरक्षण उपाय सक्षम वन मण्डल अधिकारी के अनुमोदन के अध्यधीन होंगे। हरित पट्टी लगाने तथा अनुरक्षण के लिए जिम्मेवारी संयुक्त रूप से जोन में संचालित सभी स्टोन क्रशिंग इकाईयों के स्टोन क्रशर संघ की होगी और यदि संघ, मानकों की अनुपालना सुनिश्चित करने में असफल रहता है, तो इस सम्बन्ध में अनुपालना करने तक उस जोन में सभी क्रशरों का संचालन, राज्य प्रदूषण नियन्त्रण बोर्ड द्वारा निलम्बित कर दिया जाएगा।

13. किसी भी स्टोन क्रशर को चौ, नदी या उनके बाढ़ संरक्षण तटबंध के भीतर नदी तल में स्थापित किए जाने के लिए अनुज्ञात नहीं किया जाएगा।

14. समय–समय पर यथा संशोधित, दिनांक 15 अप्रैल, 2014 को अधिसूचित हरियाणा राज्य प्रदूषण नियन्त्रण बोर्ड के दिनांक 6 मार्च, 2014 के सहमति पालिसी आदेश, जल (प्रदूषण निवारण तथा नियन्त्रण) अधिनियम, 1974 (1974 का केन्द्रीय अधिनियम 6) तथा वायु (प्रदूषण निवारण तथा नियन्त्रण) अधिनियम, 1981 (1981 का केन्द्रीय अधिनियम 14) के अधीन स्थापना की सहमति तथा संचालन की सहमति प्राप्त करने के लिए भी लागू होंगे।

15. सभी स्टोन क्रशर धूल उत्सर्जन को नियंत्रित करने के लिए प्लॉट की परिधि के साथ कम से कम छह मीटर की कंपाउंड दीवार/जीआई शीट की स्क्रीनिंग प्रदान करेंगे और यह कि स्टोन क्रशर के फीडर और डिस्चार्ज के लिए कन्वेयर बेल्ट को कवर करेंगे।

16. सभी स्टोन क्रशर समय समय पर, केन्द्रीय पर्यावरण नियंत्रण बोर्ड (सी.पी.सी.बी.) द्वारा जारी किए गए पर्यावरण दिशा–निर्देशों की अनुपालना करेंगे।

मद III

अनुपालन न करने वाली इकाइयों को स्थानान्तरित किया जाना

वे सभी स्टोन क्रशिंग इकाइयां, जो इस अधिसूचना में विहित मानदंड को पूरा नहीं करती हैं, उन्हें इस अधिसूचना के प्रकाशन की तिथि से तीस दिन के भीतर सभी अनुसूचियों में उल्लिखित स्थल निर्धारण पैरामीटरों को पूरा करने वाले किसी स्थल पर स्थानांतरित करना होगा या उन्हें संचालन बंद करना होगा, अन्यथा संबंधित विभाग, संबंधित नियमों के अनुसार उन्हें बंद करने के लिए आवश्यक कार्रवाई करेगा।

मद IV

भूमि की आवश्यकता

प्रत्येक नई स्टोन क्रशिंग इकाई, चाहे अनुमोदित जोन में है या से बाहर, यदि उसके पास केवल मशीनरी का एक सेट है, तो भूमि के कम से कम एक एकड़ के क्षेत्र में और यदि उसके पास मशीनरी के एक से अधिक सेट हैं, तो कम से कम 1.5 एकड़ भूमि में, का संचालन करना चाहिए तथा उसका मालिक होना चाहिए। यदि भूमि पट्टे पर ली गई है, तो पट्टा, राजस्व प्राधिकारी से पंजीकृत होना चाहिए तथा यदि भूमि पंचायत से पट्टे पर ली गई है, तो यह अपर मुख्य सचिव, हरियाणा सरकार, विकास तथा पंचायत विभाग की लिखित अनुमति से होनी चाहिए। पट्टा अवधि सात वर्ष से कम नहीं होगी तथा अपरिवर्तनीय होगी।

मद–V

विद्यमान स्टोन क्रशरों को प्रभावित करने वाली नई स्थापनाओं के पश्चात्वर्ती प्रवेश से सम्बन्धित मामलों का समाधान करना

उन दृष्टांतों में, जहां, स्थल मानकों (कोई नई सड़क, कोई नया अधिसूचित वन, कोई विस्तारित नगरपालिका क्षेत्र, कोई नई शिक्षा संस्था, कोई नई स्वास्थ्य देखभाल सुविधा इत्यादि) की आवश्यकता वाली किसी नई स्थापना की पश्चात्वर्ती शुरूआत के कारण मजबूरन वर्तमान स्टोन क्रशर इकाइयों को स्थानान्तरित होने के लिए बाध्य किया जा रहा है, इस तथ्य को मान्यता दी गई है कि आधुनिक विस्तारित तथा विकसित शहरी/ग्रामीण मानचित्रण में सोसाइटी के सर्वांगीण विकास तथा आधुनिकीकरण के लिए उपरोक्त वर्णित स्थापनाओं को प्रारम्भ करना अपरिहार्य है, किन्तु जिन क्रशर इकाईयों, ने स्वयं को स्थापित कर लिया है, उन्हें पर्याप्त लागत वाले स्थानान्तरण का सामना करना पड़ेगा। इसलिए, सभी स्टोन क्रशर इकाइयों को उनकी स्थापना करने से पूर्व सम्बन्धित सभी विभागों से अनापत्ति प्रमाणपत्र (एन.ओ.सी.) लेना अनिवार्य है कि प्रश्नगत अधीन क्षेत्र में कम से कम अगले पांच वर्ष के लिए अपेक्षित स्थापना हेतु कोई भी अतिरिक्त स्थल मानक अपेक्षित नहीं होंगे, जो प्रस्तावित स्टोन क्रशिंग इकाई पर प्रभाव डालते हों तथा यदि अपरिहार्य परिस्थितियों के अधीन ऐसी स्थापना अनुज्ञात की जाती है, तो ऐसे मामलों में स्टोन क्रशर इकाइयों पर अतिरिक्त प्रदूषण नियन्त्रण युक्ति लगाने के अलावा आवश्यक पूर्वोपाय करने के अतिरिक्त नई स्थापना की जिम्मेवारी होगी। इस प्रकार, सहमति केवल आवश्यक अनापत्ति प्रमाणपत्र तथा सम्बन्धित क्रशर इकाई से सहमति लेने के बाद प्रत्येक पांच वर्ष के बाद नवीकृत की जाएगी। इसके अतिरिक्त उन मामलों में, जहां नई स्थापना के लिए अपेक्षित स्थल पैरामीटर बाद में प्रस्तुत किए गए हैं, इकाई के लिए वायु प्रदूषण नियन्त्रण उपाय (ए.पी.सी.एम.) के कड़े मानकों सहित ऐसी इकाइयों के दूरी मानदण्ड के आधाको मामला दर मामला आधार पर विचार किया जाएगा। वे इकाईयां, जो आधे ईयरमार्क को भी पूरा नहीं करती है, को एक वर्ष की अवधि के भीतर पुनःस्थित किए जाने की आवश्यकता होगी।

आनंद एम. शरन,
अपर मुख्य सचिव, हरियाणा सरकार,
पर्यावरण, वन और वन्यजीव विभाग।

HARYANA GOVERNMENT

ENVIRONMENT, FOREST AND WILDLIFE DEPARTMENT

Notification

The 24th January, 2025

No. S.O.6/C.A.29/1986/S.5and7/2025.— Whereas, article 48-A of the Constitution of India *inter-alia* envisages that the State shall endeavor to protect the environment;

Whereas, it is necessary and expedient to take immediate steps under sections 5 and 7 of the Environment (Protection) Act, 1986 (Central Act 29 of 1986) and section 19 of the Air (Prevention and Control of Pollution Act, 1981 (Central Act 14 of 1981) and rules framed there under to maintain ecological balance in the State to prevent environmental degradation and to avoid human health hazards;

And whereas, the State Government has already taken a decision to maintain ecological balance keeping in the view of industrial development and also to maintain the quality of environment and to avoid health hazard for the residents of the area;

And whereas, as per Haryana Government, Environment Department, notification No. S.O. 12/C.A.29/1986/ S.5 and 7/2016, dated the 11th May, 2016, directions were given for stone crushing units in regard to siting criteria norms as per Schedule I, emission norms and pollution control measures requirement as per Schedule II, identification of zones and availability of sites as per Schedule III and procedure for establishment and operation in identified zones as per Schedule IV;

Now, therefore, in exercise of the powers conferred by section 5 of the Environment (Protection) Act, 1986, (Central Act 29 of 1986) read with Government of India, Ministry of Environment and Forests, Department of Environment, Forests and Wildlife, Notification No. S.O. 152 (E), dated the 10th February, 1988 and in pursuance of the provisions of section 7 of the said Act and rule 4 of the Environment (Protection) Rules 1986, and in supersession of the Haryana Government, Environment Department, Notification No. S.O. 12/C.A. 29/1986/Ss. 5 and 7/2016, dated the 11th May, 2016, the Governor of Haryana hereby proposes to issue the following directions for establishment of stone crushers in regard to siting criteria norms as per Schedule I and emission norms and pollution control measures requirement as per Schedule II;

Now, therefore, in exercise of the power conferred under sub-rule (3-a) of rule 4 of the Environment (Protection) Rules 1986, notice is hereby given that draft of notification shall be taken into consideration by the Government on or after expiry of a period of thirty days from the date of publication of draft notification in the Official Gazette, together with objections and suggestions, if any, which may be received in the office of the Additional Chief Secretary to Government of Haryana Environment Department, Chandigarh from any person with respect to the notification:-

SCHEDULE I

NORMS FOR SITING OF STONE CRUSHERS IN HARYANA

Serial Number	Criteria	Distance in KM
1	**2**	**3**
1.	Minimum distance required from the nearest National Highway and State Highway	0.5
2.	Minimum distance required from the limits of National Capital Territory of Delhi	5.0
3.	Minimum distance required from the limits of nearest Municipal Corporation of the same district.	2.0
4.	Minimum distance required from the nearest Town/City/Municipal Limits	1.0
5.	Minimum distance required from the nearest Village Phirni. In case if there is no phirni then the distance be measured from *abadi-deh* and in case *of be-chirag* revenue estate (to be certified by the Tehsildar concerned), actually on the spot, the distance will be measured from the nearest inhabited Revenue Estate.	0.5
6.	Minimum distance required from any land recorded as forest in Government record (Revenue or Forest Department) except strip forests / plantation along roads, canals, railway lines and bunds.	0.25

7.	Minimum distance required from approved water supply scheme open to sky of 20 KL capacity.	0.5
8.	Minimum distance required from any indoor health treatment unit catering to 25 or more bed for catering indoor patients	1.0
9.	Minimum distance required from National Parks, Wild Life Sanctuaries and Conservation Reserves	2.0 (NP) 1.0 (WLS)
10.	Minimum distance required from Education Institutions	0.5
11.	Minimum distance required from any mining area / hillock	0.1

The following directions are also given in respect of above said Schedule:-

(i) All distances, unless specifically mentioned above, except the distance from village, are to be measured as the crow flies from the nearest boundary of the land of the stone crusher to the periphery of the feature concerned.

(ii) In case of villages where any hill / hillock / mountain fall between the individual stone crusher and the village, the distance criteria from the village shall be considered along the shortest line of hill / hillock / mountain, with the condition that there should be a minimum of 300 m distance from the foot of the hill / hillock / mountain for safeguarding the environment and the decision in this regard shall be taken on case to case basis considering the local environment.

(iii) The existing, approved crusher zones and their extension shall not be affected by the above siting minimum distance criteria as the feasibility of heaving a conglomeration of stone crushing units in conjunction with the above siting criteria may not be possible. The above mentioned siting criteria shall only be applicable to stone crushing units to be established in the area outside the existing, approved crusher zones or their extension.

(iv) The crusher zones shall be identified and approved by the Mining and Geology Department, after getting concurrence from all the Stakeholder Departments and Haryana State Pollution Control Board.

(v) No new stone crushing unit shall be allowed to be set up or operate outside the identified crusher zones in Faridabad, Palwal (earstwhile Faridabad District) and Gurugram District.

(vi) In case, eco sensitive zone of a protected area like National Park, Wild Life Sanctuary or Conservation Reserve is notified having restrictions for a distance of more than one / two kms, as the case may be, then the same shall be adhered to.

(vii) The distance of the stone crushers from various prescribed locations shall be certified/verified by the concerned Tehsildar and for the forest land the report regarding the siting distance shall be taken from the Divisional Forest Officer concerned. The Regional Officer of the Board concerned, shall verify distances of the prescribed locations other than those verified by Divisional Forest Officer or Tehsildar.

(viii) From November to February, no stone crushing unit in National Capital Region be allowed to operate in the area unless the air quality index of the area is moderate and good i.e. below 200.

SCHEDULE II

EMISSION NORMS AND POLLUTION CONTROL MEASURES REQUIREMENTS

Item I

Pollution Control Parameters:

The suspended particulate matter (hereinafter referred to as SPM) measured between 3 meters and 10 meters from any process equipment of a stone crushing unit shall not exceed 600 micrograms per cubic meter. The measurements of SPM are to be conducted as per Environment (Protection) Act, 1986 (Central Act 29 of 1986) and rules made thereunder.

Item II

Pollution Control Measures:

The following pollution control devices and measures are required to be installed and operated as mandatory obligation by the stone crushing units under the Environment (Protection) Rules, 1986, namely:-

1. Dust containment cum suppressing system for the equipment in the form of covered sheds and sprinklers;

2. All existing stone crushers shall ensure additional air pollution control measures like fully covering their conveyors and installing fogger machines in their units, within a period of one year of issuance of the notification.

3. Construction of approved wind breaking wall of at least 50 meters length and minimum 16 feet height along-with provision of telescopic chute to ensure that the crushed material from the nod is released from a point which is at least 2 feet below the height of the wind breaking wall. The wall shall be structurally sound and shall cover the vulnerable abadi side of the crusher unit.

4. Construction and maintenance of metalled roads for vehicular movement within the premises of the crushing units or within the zone housing the stone crushing units as approved by the Haryana State Pollution Control Board at the time of grant of Consent to Establish.

5. The metalled roads to be provided either individually within the premises or jointly by the crushers in the approved crusher zones will be as determined by the Haryana State Pollution Control Board in consultation with Engineer-in-Chief, Public Works Department (Building & Road). These roads shall be constructed as per satisfactory specifications of construction and maintenance. Haryana State Pollution Control Board will have the authority to cancel continued operation of stone crusher in zone or isolated sites or premises within zones where such metalled roads are not satisfactorily constructed or maintained individually or jointly as applicable to the area in question.

6. Regular cleaning and wetting of the ground within the premises and the remaining enclosure of the crushing units and the zone where the unit is situated.

7. All stone crushing units shall provide a green belt along the periphery having avenue plantation of two rows after approval of plantation plan by the Divisional Forest Officer concerned. Till plantation within the premises is fully developed, the project proponent shall erect a barrier/barricade along the periphery to contain the dust emissions. Such barricade should completely enclose the premises from all sides and may be either a boundary wall or of flexible cloth (tarpaulin etc.) or a combination of two. The height of the barricade shall not be less than the height of the highest tip of the conveyor belts.

8. The stone crushing units shall provide atleast 50 number sprinklers along-with a water storage facility of minimum 10 Kiloliter capacity. Further, they must sprinkle **atleast 1** kilolitre of water per day for a stone crushing capacity of 100 tons per day and *pro rata* accordingly for higher capacity crushing units

9. In order to ensure the regular operation of sprinklers system, the stone crushing units shall provide inter locking system along-with separate energy meter having load survey and demand features.

10. A log book, containing the daily data, as recorded by the energy meter for the consumption of energy by such pollution control measure be made available to the Haryana State Pollution Control Board or its authorized officers immediately on its demand on the spot or within a period of three working hours thereafter at the most;

11. The stone crushing units shall obtain raw material only from legal sources and will have exclusive contract with legitimate mining lease holders and will submit complete data relating to the sources and quantity of raw material utilized and exploited by the stone crushing units along-with production data, taxes and duties paid as applicable thereon under the law of land;

12. A green belt along any approved zone shall be for a depth of alteast 100 meters or along the periphery of the crusher zone with minimum 10 rows of such trees in the direction of the depth of the green belt. The spacing of such trees along the periphery shall not exceed 8 meters along the periphery. The nature of trees to be planted and their protection measures required for such tree plantation shall be subject to the approval of the concerned Divisional Forest Officer. The responsibility for the planting and maintaining of green belt shall be collectively with the stone crusher association of all the stone crushing units operating in the zone and in case the association fails to ensure the compliance of the norms, the operation of all the crushers in that zone shall be suspended by the State Pollution Control Board till the compliance is made in this regard.

13. No stone crusher will be allowed to be set up in choe, steam or river bed within their flood protection embankments.

14. Consent policy orders dated the 6th March, 2014 of the Haryana State Pollution Control Board notified on 15th April, 2014 as amended from time to time shall also be applicable for obtaining consent to establish and consent to operate under the Water (Prevention and Control of Pollution) Act, 1974 (Central Act 6 of 1974) and the Air (Prevention and Control of Pollution) Act, 1981 (Central Act 14 of 1981).

15. All stone crushers shall provide a minimum of six meters compound wall/screening of GI sheets along the plot periphery to control dust emissions and that the conveyer belts for feeder and discharge of stone crushers shall be covered.

16. All Stone crushers shall comply with the Environmental guidelines for stone crushing units issued by the Central Pollution Control Board (CPCB) time to time.

Item III

Non- complying units to be shifted

All the stone crushing units, which do not meet the siting criteria prescribed in the notification shall have to shift to a site meeting the siting parameters mentioned in all the schedules within 30 days or they will have to close down the operations. Otherwise the respective department would take necessary action for their closure as per the respective rules.

Item IV

Requirement of Land

Every new stone crushing unit whether in approved zone or outside, must possess and operate in a minimum area of one acre of land, if it has only one set of machinery and at least 1.5 acres of land if it has more than one set of machinery. In case land is taken on lease, then the lease should be registered with Revenue Authority and if the land is taken on lease from Panchayat then it should be with the written permission of the Principal Secretary to Government Haryana, Development and Panchayat Department. The lease period shall not be less than seven years and shall be irrevocable.

Item V

Resolving the issues relating to subsequent introduction of new establishments, affecting the existing stone crushers

In those instances, where, due to subsequent introduction of a new establishment requiring the siting norms (a new road, a new notified forest, an expanded Municipal area, a new education institution**,** a new Health Care Facility etc.) compelling the existing stone crusher units to be shifted, the fact that in the modern, expanding and developing urban / rural mapping, it is unavoidable to introduce the above mentioned establishments for the over-all development and modernization of the society, is recognized, but the crusher units which have established themselves have to face shifting involving considerable cost. It is, therefore, mandatory for all the stone crusher units to take an NOC from all the Departments concerned, before their establishment that there would be no additional siting norm requiring establishment, at least for the next five years in the area under question which might affect the proposed stone crushing unit, and in case, if under unavoidable circumstances, such establishments are allowed, necessary precautions shall be the responsibility of the new establishment as well, besides imposition of additional pollution control measures on the stone crusher unit. Further, in cases, where the new establishments requiring siting parameters have been introduced subsequently, half of the distance criteria for such units, along with the stringent norms of Air Pollution Control Measures (APCM) for the unit shall be considered, on case to case basis. Those units, which are not even meeting the half earmark shall need to be relocated, within a period of one year.

ANAND M. SHARAN,
Additional Chief Secretary to Government, Haryana,
Environment, Forest and Wildlife Department.

11596—L.R.—H.G.P., Pkl.

A DARUKA & CO
CHARTERED ACCOUNTANT
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Certification of the Expenditures in respect of Bayal Quartz and Feldspar Mine

I/We, hereby certify the following expenses, in respect of Bayal Quartz and Feldspar Mine, situated at Khasra Number 201, 223, and 224, Village – Bayal, Tehsil – Nangal Choudhary, District Mahendragarh (Haryana) and having its registered office at House No. 196-P, HUDA Sector-1, Mahendragarh Road, Narnaul, District Mahendraagrh (Haryana) –

EXPENDITURES TOWARDS CORPORATE / ENTERPRISE SOCIAL RESPONSIBILITY (CSR/ESC)

S. N.	Expenditure Head	Certified Amount
For Financial Year 2018-19		
1	Contribution to the Gram Panchayat, Bayal for Village Development Activities	Rs. 400,000.00/-
2	Development of School Library at Bayal and Syalodra.	Rs. 35,000.00/-
For Financial Year 2019-20		
3	Installation of the Water Pump at Bayal Village	Rs. 80,480.00/-
4	Contribution to the Gram Panchayat, Bayal for Village Development, Health and Sanitation Activities	Rs. 600,000.00/-
5	Medicines and Stationaries to the School at Bayal and Syalodra.	Rs. 28,035.00/-
6	Development of School Library at Bayal and Syalodra.	Rs. 136,000.00/-
7	Construction of Sports Stadium in Bayal Village	Rs. 819,485.00/-
8	Development of Baba Bharthahari Temple in Bayal Village	Rs. 500,000.00/-
For Financial Year 2020-21		
9	Development of Baba Bharthahari Temple in Bayal Village	Rs. 1,000,000.00/-
10	Distribution of Food, Medicines, Masks and other necessary materials to the Villagers during Covid-19 Pandemic.	Rs. 300,000.00/-
For Financial Year 2021-22 and 2022-23 (till September 30, 2022)		
11	Contribution for village development	Rs. 230,000.00/-
12	Contribution for community works	Rs. 114,474.00/-
13	Contribution for development of Baba Bhartahari Temple in Bayal village	Rs. 285,980.00/-
For Financial Year 2022-23 (October 1, 2022 to September 30, 2023)		
14	Contribution for upgradation of library at Government Higher Secondary School, Bayal.	Rs. 122,651.00/-
15	Contribution for village development	Rs. 84,666.00/-
16	Contribution for community works	Rs. 75,540.00/-
17	Contribution for development of Baba Bhartahari Temple in Bayal village	Rs. 31,000.00/-
18	**Total CSR Expenditure so far**	**Rs. 48,43,311.00/-**

The above-mentioned details are true to the best my knowledge and verification and hence, stands certified.

A DARUKA & CO.

Chartered Accountant
Firm Registration No. – 333378E

A. Daruka

A DARUKA & CO. Chartered Accountants

CA. **Abhishek Daruka**
Proprietor
Membership No. - 307427
Place: Kolkata
Date: 09/12/2023
UDIN:23307427BHAYAI7771

Annexure-36

Photographs taken by the Joint Committee during site visit

Photograph 1

Photograph 2

Photograph 3

Photograph 4

Photograph 5

Photograph 6

Photograph 7

Photograph 8

Photograph 9

Photograph 10

Photograph 11

Photograph 12

Photograph 13

Photograph 14

Photograph 15

Photograph 16

Photograph 17

Photograph 18

Photograph 19

Photograph 20

Photograph 21

Photograph 22

Photograph 24

Photograph 25

Photograph 26

Photograph 27

Photograph 28

Photograph 29

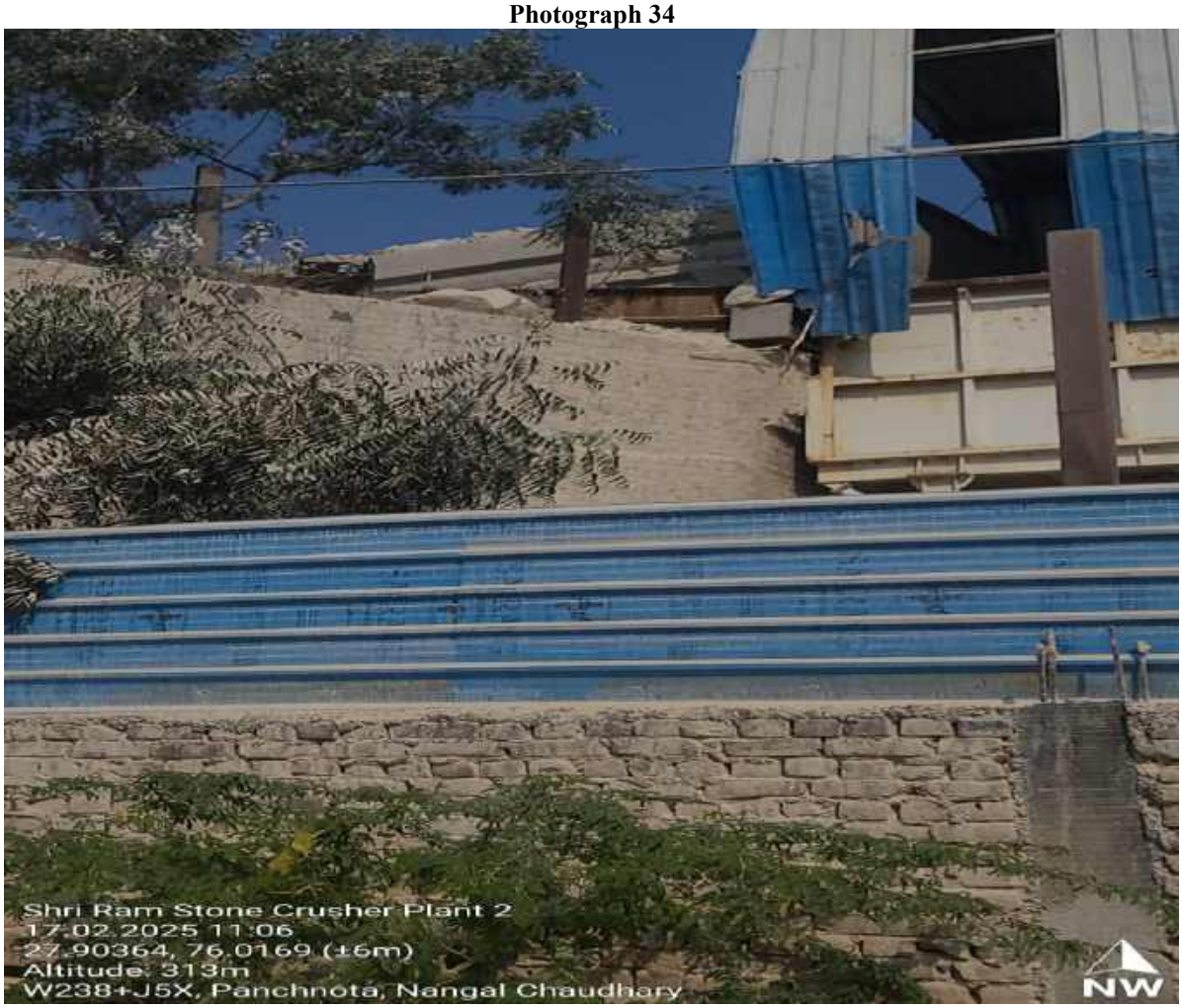
Photograph 30

Photograph 31

Photograph 32

Photograph 33

Photograph 34



Photograph 35

Photograph 36

Photograph 37

Photograph 38

Photograph 39

Photograph 40

Photograph 41

Photograph 42

Photograph 43

Photograph 44

Photograph 45

Photograph 46