



Category "A", Project or Activity 1(a) – 3" and  
Project or Activity 2 (b) - 3 for "Mineral Beneficiation"  
MoEF&CC File No. J-11015/259/2012-IA-III(M)

# **FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PLAN**

**Expansion of Zawar Group of Underground Lead  
Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production with  
Total Excavation: 7.78 Million TPA including Waste Rock 1.28 MTPA &  
Beneficiation from 4.8 Million TPA to 7.3 Million TPA  
within ML Area of 3620 ha (ML No.03/89)**



**At  
Village - Zawar,  
Tehsil: Girwa and Sarada, District- Udaipur**

**Baseline Season: Summer Season (March to May, 2021 & March to May, 2024)**

## **APPLICANT**



**M/s Hindustan Zinc Limited**

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
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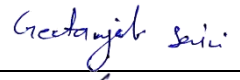
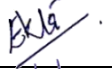

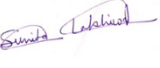


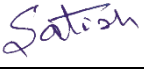
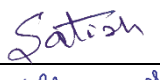

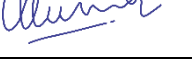
Declaration by the Experts contributing to the EIA of Expansion of Zawar Group of Underground Lead- Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total Excavation: 7.78 Million TPA including Waste rock 1.28 MTPA and Beneficiation from 4.8 Million TPA to 7.3 Million TPA within ML Area of 3620 ha (ML No.03/89) at Villages- Zawar, Kodiya Khet, Nayakheda, Rawa, Tidi, Udiyakheda, Barothi Bhaldia, Bara, Chanawada, Dhavadi Talai, Kanpur, Newa Talai, Padla, Parsad, Krishnapura, Singhatwara , Tehsil: Girwa and Sarada, District- Udaipur, Rajasthan by M/s Hindustan Zinc Ltd.

I, hereby, certify that I was a part of the EIA team in the following capacity that developed the above EIA.

**JM File No.: JMEPL/HZL/JM File no. 811/EIA/Nov., 2024/Draft Revision no. 1 (Copies printed 18)/Final Revision no. 1 (Copy no. \_\_)**



	Name	Period of involvement	Signature and Date
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	Mr. Vinay Kumar (Cat B)	May, 2021 to till date	
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S. No.	Functional areas	Name of the Expert/s		Involvement (Period and task**)	Signature & Date
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2	AQ	FAE	Ms. Ekta Arora	Feb., 2021 to till date	
4	AP	FAE	Mr. Bhana Ram Jat	Feb., 2021 to till date	
6	WP	FAE	Dr. Sunita Lakhiwal	Nov., 2023 to till date	
8	EB	FAE	Mr. Akshay Kumar	Nov., 2023 to till date	
10	SE	FAE	Ms. Geetanjali Saini	Nov., 2022 to till date	
11	NV	FAE	Ms. Nisha Sharma	Feb., 2021 to till date	
13	RH	FAE	Mr. S.C. Jain	Feb., 2021 to till date	
14	HG	FAE	Mr. Vijay Kumar	Nov., 2023 to till date	
16	Geo	FAE	Mr. Vijay Kumar	Nov., 2023 to till date	



### Declaration of Association in the EIA

S. No.	Functional areas	Name of the Expert/s		Involvement (Period and task**)	Signature & Date
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20	SHW	FAE	Mr. Khem Shankar Gour	Nov., 2022 to till date	

\*One TM against each FAE may be shown

\*\*Please attach additional sheet if required

#### Declaration by the Head of the accredited consultant organization/ authorized person

I, Dr. Deepa Taneja, Managing Director, of J.M. EnviroNet Pvt. Ltd., hereby, confirm that the above-mentioned experts prepared an EIA/EMP Report for Expansion of Zawar Group of Underground Lead- Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total Excavation: 7.78 Million TPA including Waste rock 1.28 MTPA and Beneficiation from 4.8 Million TPA to 7.3 Million TPA within ML Area of 3620 ha (ML No.03/89) at Villages- Zawar, Kodiya Khet, Nayakheda, Rawa, Tidi, Udiyakheda, Barothi Bhaladia, Bara, Chanawada, Dhavadi Talai, Kanpur, Newa Talai, Padla, Parsad, Krishnapura, Singhatwara , Tehsil: Girwa and Sarada, District- Udaipur, Rajasthan by M/s Hindustan Zinc Ltd.

I also confirm that the consultant organization shall be fully accountable for any mis-leading information mentioned in this statement.

Signature:



Name:

**Dr. Deepa Taneja**

Designation:

**Managing Director**

Name of the EIA consultant organization:

**J.M. EnviroNet Pvt. Ltd.**

NABET Certificate No.

**NABET/EIA/2326/RA 0308 Valid up to August 07, 2026**

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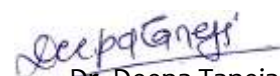
## Undertaking

We, J.M. EnviroNet Pvt. Ltd., JMEPL, Emaar Digital Greens, Tower - B, Unit No. 1517, Golf Course Ext. Road, Sector-61, Gurugram (Haryana) - 122 011, Environmental Consultants of Hindustan Zinc Limited for their Expansion of Zawar Group of Underground Lead- Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total Excavation: 7.78 Million TPA including Waste rock 1.28 MTPA and Beneficiation from 4.8 Million TPA to 7.3 Million TPA within ML Area of 3620 ha (ML No.03/89) at Villages- Zawar, Kodiya Khet, Nayakheda, Rawa, Tidi, Udiyakheda, Barothi Bhaldia, Bara, Chanawada, Dhavadi Talai, Kanpur, Newa Talai, Padla, Parsad, Krishnapura, Singhatwara , Tehsil: Girwa and Sarada, District- Udaipur, Rajasthan. give this undertaking to the effect that this Final EIA/EMP Report has been prepared as per the ToR Letter issued by MoEFCC, New Delhi, vide letter no J-11015/259/2012-IA.II(M) dated 08.09.2021 & as per data/ details provided by Project Proponent and the data submitted are factually correct.

Date: 16.11.2024

Place: Gurugram

For & behalf of J.M EnviroNet Pvt. Ltd.

  
Dr. Deepa Taneja  
Managing Director

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## Certificate of Plagiarism check

Title of EIA Report	Expansion of Zawar Group of Underground Lead- Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total Excavation: 7.78 Million TPA including Waste rock 1.28 MTPA and Beneficiation from 4.8 Million TPA to 7.3 Million TPA within ML Area of 3620 ha (ML No.03/89) at Villages- Zawar, Kodiya Khet, Nayakheda, Rawa, Tidi, Udiyakheda, Barothi Bhaladia, Bara, Chanawada, Dhavadi Talai, Kanpur, Newa Talai, Padla, Parsad, Krishnapura, Singhatwara , Tehsil: Girwa and Sarada, District- Udaipur, Rajasthan by Hindustan Zinc Limited
Name of Accredited Organization	J.M. EnviroNet Pvt. Ltd.
Unique Identification Number	<b>Project</b> – J-11015/259/2012-IA.II(M) <b>Consultant</b> - NABET/EIA/23-26/RA 0308 dated 29.11.2023
Name of EIA Co-ordinator (EC)	Mr. Bhana Ram Jat
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I hereby certify that this EIA report has been evaluated using online software viz., Plagiarism Checker X (<https://plagiarismcheckerx.com/>). The report produced has been analysed by the system and based on it, I certify that the EIA Report produced in accordance with good scientific practice.

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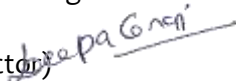


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Date and sign of Head of Accredited Organization:

Dr. Deepa Taneja (Managing Director)



Name of the EIA consultant organization: J.M. EnviroNet Pvt. Ltd.

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## INDEX

S. NO.	PARTICULAR	PAGE NO.
A.	FINAL EIA / EMP REPORT	1 - 848
B.	TOR LETTER AND COMPLIANCE	1-30
1.	TOR LETTER	1-14
2.	TOR COMPLIANCE	15-30
CHAPTER - 1	INTRODUCTION	31-37
CHAPTER - 2	PROJECT DESCRIPTION	38-88
CHAPTER - 3	DESCRIPTION OF THE ENVIRONMENT	89-187
CHAPTER - 4	ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES	188-252
CHAPTER - 5	ANALYSIS OF ALTERNATIVES	253-254
CHAPTER - 6	ENVIRONMENTAL MONITORING PROGRAM	255-264
CHAPTER - 7	ADDITIONAL STUDIES	265-367
CHAPTER - 8	PROJECT BENEFITS	368-376
CHAPTER - 9	ENVIRONMENTAL COST BENEFIT ANALYSIS	377
CHAPTER - 10	ENVIRONMENTAL MANAGEMENT PLAN	378-383
CHAPTER - 11	SUMMARY & CONCLUSION	384-391
CHAPTER - 12	DISCLOSURE OF CONSULTANTS ENGAGED	392-393
ANNEXURE - 1	MINING LEASE DOCS WITH KHASRA MAP	394 - 411
ANNEXURE - 2	MINING PLAN APPROVAL LETTER	412 - 413
ANNEXURE - 3a	ENVIRONMENT CLEARANCE DATED 30.10.2009	414 - 424
ANNEXURE - 3b	ENVIRONMENT CLEARANCE DATED 05.01.2017	425 - 436
ANNEXURE - 3c	ENVIRONMENT CLEARANCE DATED 16.10.2020	437 - 442
ANNEXURE - 4	CERTIFIED EC COMPLIANCE BY IRO DT 10.08.2024	443 - 463
ANNEXURE - 5a	FOREST CLEARANCE DATED 15.06.1998	464 - 470
ANNEXURE - 5b	FOREST CLEARANCE DATED 23.01.2015	471 - 474
ANNEXURE - 6	APPLICATION FOR FOREST DIVERSION OF 68.95 HA	475 - 477
ANNEXURE - 7	CTE FOR MINES & BENEFICIATION PLANT	478 - 490
ANNEXURE - 8a	CTO (MINE) DATED 20.12.2022	491 - 494
ANNEXURE - 8b	CTO (BENEFICIATION) DATED 28.12.2022	495 - 502
ANNEXURE - 9	CGWA NOC	503 - 519
ANNEXURE - 10a	DCF LETTER DATED 14.08.2023 FOR DISTANCE OF NP AND WS	520
ANNEXURE - 10b	WLCP APPROVAL FROM CWLW DATED 21.03.2023	521 - 560
ANNEXURE - 11	SURFACE WATER AGREEMENT TIDI DAM	561 - 565
ANNEXURE - 12	AUTHENTICATED PAST PRODUCTION FIGURES	566 - 574
ANNEXURE - 13a	DETAILED AAQM (MARCH TO MAY 2021)	575 - 589

ANNEXURE - 13b	DETAILED AAQM (MARCH TO MAY, 2024)	590 - 604
ANNEXURE - 14	CHEMICAL CHARACTERIZATION OF RSPM	605
ANNEXURE - 15	DMG LETTER DATED 22.06.2009 FOR NO ARAVALI HILLS	606
ANNEXURE - 16	FRA DATED 16.01.2015	607
ANNEXURE - 17	HYDROGEOLOGY REPORT	608 - 648
ANNEXURE - 18a	MOCHIA BLASTING STUDY	649 - 692
ANNEXURE - 18b	BALARIA BLASTING STUDY	693 - 741
ANNEXURE - 18c	BAROI BLASTING STUDY	742 - 797
ANNEXURE - 18d	ZAWARMALA BLASTING STUDY	798 - 835
ANNEXURE - 19	SUBSIDENCE REPORT	836 - 844
ANNEXURE - 20	CORPORATE ENVIRONMENT POLICY	845
ANNEXURE - 21a	SURFACE PLAN	846
ANNEXURE - 21b	GEOLOGICAL PLAN	847
ANNEXURE - 21c	SCHEMATIC DIAGRAM	848
ANNEXURE - 22	PUBLIC HEARING PROCEEDINGS	849 - 1033

## CONTENTS

S. NO.	PARTICULAR	PAGE NO.
<b>CHAPTER - 1</b>	<b>INTRODUCTION</b>	<b>31-37</b>
1.1	PURPOSE OF THE REPORT	31
1.2	IDENTIFICATION OF PROJECT AND PROJECT PROPONENT	31
1.2.1	IDENTIFICATION OF THE PROJECT	31
1.2.2	INTRODUCTION OF THE PROJECT PROPONENT	34
1.3	BRIEF DESCRIPTION OF NATURE, SIZE, LOCATION OF THE PROJECT AND ITS IMPORTANCE TO THE COUNTRY, REGION	35
1.3.1	BRIEF DESCRIPTION OF NATURE, SIZE, LOCATION OF PROJECT	35
1.3.2	PROJECT IMPORTANCE TO THE COUNTRY AND REGION	36
1.4	SCOPE OF THE STUDY AS PER TERMS OF REFERENCE (ToR) (DETAILS OF THE REGULATORY SCOPING CARRIED OUT)	36
<b>CHAPTER - 2</b>	<b>PROJECT DESCRIPTION</b>	<b>38-88</b>
2.1	TYPE OF THE PROJECT	38
2.2	NEED FOR THE PROJECT	38
2.3	LOCATION OF THE PROJECT	39
2.3.1	LOCATION MAP (GENERAL & SPECIFIC)	39
2.3.2	SHOWING GEOLOGY AND GEOMORPHOLOGY OF THE MINE SITE WITH CORNER CORDINATES	41
2.3.3	PROJECT SITE LAYOUT	43
2.4	PROJECT SITE PHOTOGRAPHS	48
2.5	SIZE OR MAGNITUDE OF OPERATION / SAILENT FEATURES OF OPERATION	48

S. NO.	PARTICULAR	PAGE NO.
2.5.1	ASSOCIATED ACTIVITIES/ FACILITIES PROPOSED	49
2.6	PROPOSED SCHEDULE FOR APPROVAL AND IMPLEMENTATION	50
2.6.1	SCHEDULE OF APPROVAL	50
2.6.2	IMPLEMENTATION	50
2.7	TECHNOLOGY AND PROCESS DESCRIPTION	51
2.7.1	PROJECT REQUIREMENTS	51
2.7.1.1	WATER REQUIREMENT	51
2.7.1.2	POWER REQUIREMENT	52
2.7.1.3	MANPOWER REQUIREMENT	53
2.7.1.4	EXTENT OF MECHANIZATION	54
2.7.2	TECHNOLOGY DESCRIPTION	57
2.7.2.1	GEOLOGY OF THE AREA	57
2.7.3	DETAILS OF MINING	59
2.7.3.1	EXPLORATION CARRIED OUT IN THE AREA	59
2.7.3.2	EXPLORATION TO BE CARRIED OUT IN THE AREA	60
2.7.3.3	ESTIMATION OF RESERVES	60
2.7.3.3.1	MINEABLE RESERVES AND ANTICIPATED LIFE OF MINE	61
2.7.4	PROCESS DESCRIPTION	62
2.7.4.1	METHOD OF MINING	62
2.7.4.2	METHOD OF BENEFICIATION	72
2.8	YEAR WISE PRODUCTION AND EXCAVATION DETAILS	78
2.8.1	EXISTING PRODUCTION	78
2.8.2	IN-SITU PROPOSED TENTATIVE EXCAVATION	80
2.8.3	WASTE MANAGEMENT	81
2.8.4	MILL TAILINGS	83
2.9	CONCEPTUAL PLAN	85
2.10	DESCRIPTION OF MITIGATION MEASURES	86
2.11	ASSESSMENT OF NEW AND TESTED TECHNOLOGY FOR THE RISK OF TECHNOLOGICAL FAILURE	88
<b>CHAPTER - 3</b>	<b>DESCRIPTION OF THE ENVIRONMENT</b>	<b>89-187</b>
3.1	INTRODUCTION	89
3.2	STUDY AREA AT A GLANCE	89
3.3	BASELINE DATA COLLECTION	93
3.3.1	INSTRUMENTS USED FOR ENVIRONMENTAL BASELINE DATA COLLECTION	94
3.4	LAND USE/LAND COVER STUDY	94
3.4.1	DATA USED	95
3.4.2	METHODOLOGY	97
3.4.2.1	LAND USE/LAND COVER DETAILS OF STUDY AREA	98
3.4.3	INTERPRETATION OF THE LULC DATA	99



S. NO.	PARTICULAR	PAGE NO.
3.5	SEISMICITY & FLOOD HAZARD ZONATION OF THE AREA	99
3.6	FLOOD HAZARD ZONATION OF THE AREA	102
3.7	TOPOGRAPHY & DRAINAGE PATTERN	103
3.8	CLIMATOLOGICAL DETAILS	103
3.9	METEOROLOGY	104
3.9.1	MICRO-METEOROLOGY AT SITE	106
3.10	AMBIENT AIR ENVIRONMENT	109
3.10.1	NATIONAL AMBIENT AIR QUALITY STANDARDS	118
3.10.2	INTERPRETATION OF AAQM RESULTS	119
3.10.3	CHEMICAL COMPOSITION FOR RSPM	120
3.11	NOISE ENVIRONMENT	121
3.11.1	INTERPRETATION OF NOISE RESULTS	123
3.12	WATER ENVIRONMENT	124
3.12.1	SURFACE WATER	124
3.12.2	INTERPRETATION OF SURFACE WATER QUALITY RESULTS	132
3.12.3	GROUND WATER QUALITY	132
3.12.4	INTERPRETATION OF GROUND WATER QUALITY RESULTS	145
3.13	SOIL ENVIRONMENT	145
3.13.1	INTERPRETATION OF SOIL QUALITY RESULTS	152
3.14	BIOLOGICAL ENVIRONMENT	153
3.14.1	INTRODUCTION	153
3.15	SOCIO-ECONOMIC STUDY	171
3.15.1	STUDY AREA	172
3.15.2	STUDY AREA DETAILS	177
3.15.3	SOCIO ECONOMIC PROFILE OF THE REGION	178
3.15.4	DEMOGRAPHY STRUCTURE	189
3.15.5	SEX RATIO	180
3.15.6	FAMILY SIZE	181
3.15.7	INFRASTRUCTURE BASE	181
3.15.8	PROVISION TO BASIC AMENITIES	182
3.15.9	SOCIAL AND CULTURAL ACTIVITIES OF THE REGION	185
3.15.10	GOVERNMENT SCHEMES	185
3.15.11	SUMMARY AND CONCLUSION OF SOCIO-ECONOMIC SETTING	186
<b>CHAPTER - 4</b>	<b>ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES</b>	<b>188-252</b>
4.1	INTRODUCTION	188
4.2	METHODOLOGY OF IMPACT ASSESSMENT	188
4.3	BASIS OF IMPACT ASSESSMENT	189
4.4	INTERACTION MATRIX	191
4.5	ENVIRONMENTAL IMPACT ASSESSMENT & MITIGATION MEASURES	195
4.5.1	IMPACT ON AIR QUALITY AND MITIGATION MEASURES	195

S. NO.	PARTICULAR	PAGE NO.
4.5.1.1	AIR POLLUTION DUE TO LEAD-ZINC MINING PROJECT	196
4.5.1.2	AMBIENT AIR QUALITY IMPACT PREDICTION MODELING	196
4.5.1.2.1	ACTIVITIES INVOLVED IN THE PROJECT	197
4.5.1.2.2	EMISSION RATE AS PER MATERIAL HANDLED	197
4.5.1.2.3	MODELING PROCEDURE	199
4.5.1.2.4	METEOROLOGICAL DATA	199
4.5.1.2.5	AMBIENT AIR QUALITY STANDARDS	199
4.5.1.2.6	PRESENTATION OF RESULTS	199
4.5.1.2.7	MITIGATION MEASURES	204
4.5.1.3	IMPACT ON AIR ENVIRONMENT DUE TO CRUSHING AND SAFEGUARD/MITIGATION MEASURES	208
4.5.1.4	IMPACT EVALUATION	208
4.5.2	IMPACT OF NOISE/VIBRATIONS & MITIGATION MAESURES	209
4.5.2.1	IMPACT OF NOISE ON WORKING ENVIRONMENT	209
4.5.2.2	MITIGATION MEASURES TO REDUCE NOISE LEVEL	210
4.5.2.3	IMPACT EVALUATION OF NOISE	212
4.5.2.4	IMPACT OF VIBRATION DUE TO BLASTING	212
4.5.2.5	IMPACT SIGNIFICANCE OF GROUND VIBRATIONS	214
4.5.3	IMPCT OF SUBSIDENCE AND MITIGATION MEASURES	214
4.5.3.1	IMPACT ON SUBSIDENCE	214
4.5.3.2	SUBSIDENCE MONITORINFG	215
4.5.3.3	SUBSIDENCE MODELLING AND PREDICTION	216
4.5.3.4	RESULTS AND FINDINGS	216
4.5.3.5	SUBBSIDENCE MANAGEMENT	217
4.5.3.6	MITIGATION MEASURES	217
4.5.4	IMPACT ON WATER ENVIRONMENT & MITIGATION MEASURES	219
4.5.4.1	IMPACT ON SURFACE WATER & MITIGATION MEASURES	219
4.5.4.2	IMPACT ON GROUND WATER & MITIGATION MEASURES	222
4.5.4.3	WASTE WATER MANAGEMENT	223
4.5.4.4	WATER CONSERVATION MEASURES	223
4.5.4.5	IMPACT EVALUATION	225
4.5.5	ACID MINE DRAINAGE	225
4.5.6	IMPACT ON SOIL/LAND USE PATTERN & MITIGATION MEASURES	225
4.5.6.1	IMPACT ON SOIL ENVIRONMENT	225
4.5.6.2	LANDSCAPE AND LAND USE PATTERN	227
4.5.6.3	IMPACT ON LAND USE PATTERN	227
4.5.6.4	IMPACT SIGNIFICANCE	228
4.5.7	SOCIO-ECONOMIC ENVIRONMENT	229
4.5.7.1	POSITIVE IMPACTS	229
4.5.7.2	ADVERSE SOCIAL IMPACT	231
4.5.7.3	MITIGATION MEASURES	232

S. NO.	PARTICULAR	PAGE NO.
4.5.7.4	IMPACT ON HUMAN SETTLEMENT	232
4.5.7.5	PUBLIC HEALTH IMPLICATION	234
4.5.7.6	IMPACT EVALUATION	235
4.5.8	IMPACT ON LOCAL TRANSPORT INFRASTRUCTURE	235
4.5.8.1	PROPOSED TRAFFIC DENSITY	237
4.5.8.2	CONCLUSION	238
4.5.8.3	MITIGATION MEASURES FOR TRANSPORTATION	238
4.5.8.4	IMPACT EVALUATION	239
4.5.9	IMPACT ON BIOLOGICAL ENVIRONMENT	239
4.5.9.1	IMPACT ON FLORA	240
4.5.9.2	IMPACT ON FAUNA	240
4.5.9.3	QUANTIFICATION OF IMPACT ON BIOLOGICAL ENVIRONMENT V/S MITIGATION MATRIX	241
4.5.9.4	MEASURES FOR IMPROVING BIOLOGICAL ENVIRONMENT & FOREST	243
4.5.9.5	GREENBELT DEVELOPMENT AND PLANTATION PROGRAMME	243
4.5.9.6	GENERAL GUIDELINES FOR GREENBELT DEVELOPMENT	243
4.5.9.7	GREENBELT DEVELOPMENT AND PLANTATION PLAN	244
4.5.9.8	SPECIES SELECTION FOR PLANTATION & GREEN BELT DEVELOPMENT	246
4.5.9.9	BUDGET FOR GREENBELT AND PLANTATION	246
4.5.9.10	IMPACT EVALUATION	246
4.5.9.11	MEASURES/TECHNOLOGY FOR PREVENTION OF ILLEGAL MINING & PILFERAGE OF MINERAL	247
4.5.9.12	TARGET FOR ACTIVITIES AWARENESS CAMPAIGN FOR ENVIRONMENTAL ISSUES	247
4.5.10	OCCUPATIONAL HEALTH AND SAFETY	247
4.5.10.1	OCCUPATIONAL HEALTH AND RELATED DISEASE	248
4.5.10.1.1	IMPLEMENTATION OF OCCUPATIONAL HEALTH AND SAFETY MEASURES	248
4.5.10.2	PRE-PLACEMENT & PERIODICAL MEDICAL EXAMINATION SCHEDULE	250
4.5.11	IRREVERSABLE AND IRREVERTABLE COMMITMENTS OF ENVIRONMENTALS COMPONENTS	252
4.5.12	CONCLUSION	252
<b>CHAPTER - 5</b>	<b>ANALYSIS OF ALTERNATIVES (TECHNOLOGY &amp; SITE)</b>	<b>253-254</b>
5.1	GENERAL	253
5.2	ANALYSIS OF SITE	253
5.3	ANALYSIS OF TECHNOLOGY	253
5.4	CONCLUSION	254
<b>CHAPTER - 6</b>	<b>ENVIRONMENTAL MONITORING PROGRAMME</b>	<b>255-264</b>
6.1	INTRODUCTION	255
6.2	FORMATION OF ENVIRONMENTAL MANAGEMENT CELL (EMC)	255



S. NO.	PARTICULAR	PAGE NO.
6.2.1	RESPONSIBILITIES OF EMC	255
6.3	MEASUREMENT METHODOLOGIES	256
6.3.1	INSTRUMENTS TO BE USED	256
6.3.2	MONITORING PROGRAMME	256
6.3.2.1	MONITORING SCHEDULE	257
6.3.3	METHODOLOGY ADOPTED	257
6.4	LOCATIONS OF MONITORING STATIONS	260
6.5	DATA ANALYSIS	264
6.6	DETAILED BUDGET	264
<b>CHAPTER - 7</b>	<b>ADDITIONAL STUDIES</b>	<b>265-367</b>
7.1	INTRODUCTION	265
7.2	PUBLIC CONSULTATION	265
7.2.1	PUBLIC HEARING NOTICE PUBLISHED IN TIMES OF INDIA AND RAJASTHAN PATRIKA	266
7.2.2	PHOTOGRAPHS OF PUBLIC HEARING	267
7.2.3	PUBLIC HEARING ACTION PLAN	268
7.3	HYDROGEOLOGY REPORT AND RAINWATER HARVESTING PLAN	325
7.4	RESETTLEMENT AND REHABILITATION	325
7.5	RISK ASSESSMENT AND DISASTER MANAGEMENT PLAN	325
7.5.1	DEFINITION	325
7.5.2	SCOPE	325
7.5.3	OBJECTIVE -RISK ANALYSIS	326
7.5.4	NEED FOR RISK ASSESSMENT	326
7.5.5	HAZARD IDENTIFICATION	326
7.5.6.	METHODOLOGY FOR RISK ANALYSIS	327
7.5.7	SEMI QUANTITATIVE METHODS	327
7.5.8	PRECAUTIONARY MEASURES FOR HAZARD	331
7.5.9	TYPE AND QUANTITY TO BE USED AND STORED	334
7.5.9.1	USE OF SODIUM CYANIDE IN BENEFICIATION PLANT	334
7.5.9.2	TAILING DISPOSAL	335
7.5.10	DISASTER MANAGEMENT PLAN	336
7.5.11	EMERGENCY RESPONSE ORGANIZATION	340
7.5.11.1	MINE GASES AND AIR MONITORING	343
7.5.11.2	EMERGENCY/CRISIS MANAGEMENT CONTROL ROOM	343
7.5.12	ROLES AND FUNCTION OF EMERGENCY TEAM	344
7.5.13	INCIDENT/ EMERGENCY SCENARIOS	348
7.5.14	PROPOSED ACTION TO BE TAKEN IN DIFFERENT CASES	351
7.5.14.1	IN CASE OF FIRE	351
7.5.14.2	IN CASE OF FLOOD	352
7.5.14.3	IN CASE OF AIR BLAST	352
7.5.14.4	IN CASE OF ACCIDENT	352

S. NO.	PARTICULAR	PAGE NO.
7.5.14.5	SUBSIDENCE MANAGEMENT PLAN	352
7.5.14.5.1	ABOUT FLAC 3D	352
7.5.14.5.2	SUBSIDENCE: SURVEILLANCE AND MONITORING	354
7.5.14.6	GROUND VIBRATION MANAGEMENT: CURRENT PRACTISES	358
7.5.15	EMERGENCY COMUNICATION	358
7.6	OCCUPATIONAL HEALTH AND SAFETY	359
7.6.1	MEDICAL SURVEILLANCE	359
7.6.2	OCCUPATIONAL HEALTH IMPACTS AND PREVENTATIVE MEASURES	360
7.6.3	PERSONAL PROTECTIVE EQUIPMENT	364
7.6.4	FACILITIES, HEALTH AWAENESS AND TREATMENT PROGRAMMES AT HZL-ZAWAR MINES AND MEDICAL FACILITIES	365
7.7	HEALTH SAFETY AND ENVIRONMENT POLICY OF HZL	366
<b>CHAPTER - 8</b>	<b>PROJECT BENEFITS</b>	<b>368-376</b>
8.1	INTRODUCTION	368
8.2.1	ENVIRONMENTAL BENEFITS	368
8.2.2	EMPLOYMENT OPPORTUNITIES	369
8.2.3	ECONOMIC BENEFITS	369
8.2.4	SOCIAL BENEFITS	369
8.2.5	CSR AT ZAWAR MINES	370
8.2.6	PROPOSED CSR ACTIVITIES	374
8.3	PROPOSED PLAN FOR SOCIO-ECONOMIC DEVELOPMENT	376
8.4	CONCLUSION	376
<b>CHAPTER - 9</b>	<b>ENVIRONMENTAL COST BENEFIT ANALYSIS</b>	<b>377</b>
9.1	ENVIRONMENTAL COST BENEFIT ANALYSIS	377
<b>CHAPTER - 10</b>	<b>ENVIRONMENT MANAGEMENT PLAN</b>	<b>378-383</b>
10.1	INTRODUCTION	378
10.1	ELEMENTS OF EMP	378
10.3	CORPORATE ENVIRONMENT POLICY	378
10.4	FORMATION OF ENVIRONMENTAL MANAGEMENTAL CELL (EMC)	379
10.4.1	RESPONSIBILITIES OF EMC	380
10.5	PERSONS RESPONSIBLE FOR IMPLEMENTATION OF EMP	380
10.6	DETAILED BUDGET FOR EMP	383
<b>CHAPTER - 11</b>	<b>SUMMARY &amp; CONCLUSION</b>	<b>384-391</b>
11.1	INTRODUCTION	384
11.2	JUSTIFICATION FOR THE PROJECT	384
11.3	PROJECT DETAILS	384
11.4	MINING DETAILS	387

S. NO.	PARTICULAR	PAGE NO.
11.5	MITIGATION MEASURES	387
11.5.1	AIR POLLUTION CONTROL MEASURES	387
11.5.2	NOISE LEVEL AND GROUND VIBRATION MANAGEMENT	388
11.5.3	SURFACE WATER QUALITY MANAGEMENT	389
11.5.4	WASTEWATER MANAGEMENT	389
11.5.5	TAILING AND STORAGE FACILITY MANAGEMENT	390
11.5.6	SUBSIDENCE MANAGEMENT	390
11.5.7	GREENBELT/ PLANTATION	390
11.6	PROJECT BENEFITS	391
11.7	CONCLUSION	391
<b>CHAPTER - 12</b>	<b>DISCLOSURE OF CONSULTANT ENGAGED</b>	<b>392-393</b>
12.1	DISCLOSURE OF CONSULTANT ENGAGED	392

#### LIST OF TABLES

S. NO.	PARTICULAR	PAGE NO.
1.1	STATUS OF PROPOSAL FOR ENVIRONMENT CLEARANCE	34
1.2	BRIEF DESCRIPTION OF THE PROJECT	35
1.3	CEMENT DEMAND FORECAST	
2.1	DOMESTIC REFINED ZINC SUPPLY AND DEMAND (KT ZN)	38
2.2	PROPOSED SCHEDULE FOR APPROVAL	50
2.3	WATER REQUIREMENTS	51
2.4	FUEL REQUIREMENTS	52
2.5	MANPOWER REQUIREMENTS	53
2.6	MANPOWER REQUIREMENTS FOR EMP	53
2.7 (A)	MACHINERY & EQUIPMENT FOR MINING FOR MOCHIA MINE	54
2.7(B)	MACHINERY & EQUIPMENT FOR MINING FOR BALARIA MINE	55
2.7(C)	MACHINERY & EQUIPMENT FOR MINING FOR BAROI MINE	55
2.7.(D)	MACHINERY & EQUIPMENT FOR MINING FOR ZAWARMALA MINE	56
2.8	SALIENT GEOLOGICAL FEATURE OF ZAWAR DEPOSIT (BLOCK -1)	58
2.9	SALIENT GEOLOGICAL FEATURE OF BARA PROSPECT (BLOCK -3)	59
2.10	SURFACE & UNDERGROUND EXPLORATORY DRILLING (2005-06 TO 2020-21)	59
2.11	ORE RESERVES AS PER UNFC (AS ON 01.04.2021)	61
2.12(A)	DETAILED PROCESS DESCRIPTION OF MOCHIA AND BALARIA MINES	67
2.12(B)	DETAILED PROCESS DESCRIPTION OF ZAWARMALA AND BAROI MINES	69
2.13	DETAILS OF CRUSHER	77
2.14	MINING DETAILS	78
2.15	EXISTING PRODUCTION FIGURES	79
2.16	YEAR-WISE PROPOSED EXCAVATION DETAILS (TONNES)	80
2.17	DETAILS OF WASTE GENERATION & MANAGEMENT	82



S. NO.	PARTICULAR	PAGE NO.
2.18	DETAILS OF TAILING STORAGE FACILITIES	83
2.19	TAILING GENERATION (IN TONNE)	84
2.20	POST MINING LAND USE OF CORE ZONE (HA)	86
2.21	DETAILS OF EMISSIONS/ POLLUTION FROM THE MINING OPERATIONS AND THEIR MANAGEMENT	86
3.1	ENVIRONMENTAL SETTINGS OF THE AREA	89
3.2	COMPOSITE BASELINE DATA COLLECTION OF MINE SITE AND CPP SUMMER SEASON (MARCH TO MAY, 2021) AND (MARCH TO MAY, 2024)	93
3.3	DETAILS OF DATA COLLECTION	95
3.4	LAND USE / LAND COVER DETAILS OF STUDY AREA	99
3.5	SEISMIC ZONES IN INDIA	99
3.6	RAINFALL DATA FOR LAST 10 YEARS	104
3.7 (A)	MICRO-METEOROLOGY AT SITE STUDY PERIOD: SUMMER SEASON (MARCH TO MAY, 2021)	106
3.7 (B)	MICRO-METEOROLOGY AT SITE STUDY PERIOD: SUMMER SEASON (MARCH TO MAY, 2024)	106
3.8	DETAILS OF TEST PROCEDURES	108
3.9	LOCATIONS OF AMBIENT AIR QUALITY AND NOISE MONITORING STATIONS	111
3.10 (A)	AMBIENT AIR QUALITY MONITORING RESULTS: SUMMER SEASON (MARCH TO MAY, 2021)	115
3.10 (B)	AMBIENT AIR QUALITY MONITORING RESULTS: SUMMER SEASON (MARCH TO MAY, 2021)	116
3.10(C)	AMBIENT AIR QUALITY MONITORING RESULTSSUMMER SEASON (MARCH TO MAY, 2024)	117
3.10.(D)	AMBIENT AIR QUALITY MONITORING RESULTS SUMMER SEASON (MARCH TO MAY, 2024)	117
3.11	NATIONAL AMBIENT AIR QUALITY STANDARDS	118
3.12(A)	CLASSIFICATION OF RSPM	121
3.12 (B)	CHEMICAL CHARACTERIZATION OF RSPM	121
3.13(A)	AMBIENT AIR QUALITY MONITORING RESULTS SUMMER SEASON (MARCH TO MAY, 2024)	122
3.13 (B)	AMBIENT NOISE LEVEL MONITORING RESULTS STUDY PERIOD: SUMMER SEASON (MARCH TO MAY, 2024)	122
3.14	CPCB NOISE STANDARDS	123
3.15	SURFACE WATER SAMPLING STATIONS: STUDY PERIOD - SUMMER SEASON (MARCH TO MAY, 2021) & (MARCH TO MAY, 2024)	124
3.16(A)	SURFACE WATER ANALYSIS: STUDY PERIOD – SUMMER SEASON (MARCH TO MAY, 2021)	126
3.16(B)	SURFACE WATER ANALYSIS: STUDY PERIOD – SUMMER SEASON (MARCH TO MAY, 2024)	128
3.17	LOCATIONS OF GROUND WATER AND SOIL SAMPLING STATIONS: STUDY PERIOD – SUMMER SEASON (MARCH TO MAY, 2021) & (MARCH TO MAY, 2024)	133

S. NO.	PARTICULAR	PAGE NO.
3.18 (A)	GROUND WATER ANALYSIS: STUDY PERIOD: SUMMER SEASON (MARCH TO MAY, 2021)	135
3.18 (B)	GROUND WATER ANALYSIS: SUMMER SEASON (MARCH TO MAY, 2021)	137
3.19 (A)	GROUND WATER ANALYSIS: STUDY PERIOD: SUMMER SEASON (MARCH TO MAY, 2024)	140
3.19 (B)	GROUND WATER ANALYSIS: STUDY PERIOD: SUMMER SEASON (MARCH TO MAY, 2024)	142
3.20 (A)	SOIL QUALITY ANALYSIS RESULTS: SUMMER SEASON (MARCH TO MAY, 2021)	147
3.20 (B)	SOIL ANALYSIS RESULTS: – SUMMER SEASON (MARCH TO MAY, 2024)	149
3.21	STANDARD SOIL CLASSIFICATION	152
3.22(A)	INVENTORY OF FLORAL DIVERSITY IN CORE & BUFFER ZONE OF MINE SITE	154
3.22(B)	INVENTORY OF AGRO BIODIVERSITY OF THE CORE & BUFFER ZONE OF MINE SITE	162
3.23	INVENTORY OF FAUNAL DIVERSITY IN CORE & BUFFER ZONE OF MINE SITE AND CPP	163
3.24	INVENTORY OF AVIFAUNAL (BIRDS) DIVERSITY IN CORE & BUFFER ZONE OF MINE SITE AND CPP	165
3.25	INVENTORY OF AQUATIC FAUNAL DIVERSITY IN CORE & BUFFER ZONE OF MINE SITE	167
3.26	INVENTORY OF AQUATIC FAUNAL (PHYTOPLANKTON & ZOOPLANKTON) DIVERSITY OF MINE SITE AND CPP	168
3.27	SCHEDULE-I FAUNA REPORTED FROM THE STUDY AREA	170
3.28	SOCIO ECONOMIC PROFILE	178
4.1	IMPACT CHARACTERISTICS	189
4.2	SIGNIFICANCE OF IMPACT	190
4.3	IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF ENVIRONMENTAL COMPONENTS	191
4.4	INTERACTION MATRIX	192
4.5	LIKELY IMPACTED RESOURCES / RECEPTORS	195
4.6	NORMATIVE AND PEAK PRODUCTION CAPACITY	196
4.7	STACK DETAILS OF PROPOSED MILL	198
4.8	AMBIENT AIR QUALITY STANDARDS	199
4.9	PEAK INCREMENTAL CONCENTRATION FOR DIFFERENT SCENARIOS	200
4.10	IMPACT EVALUATION FOR AMBIENT AIR QUALITY	208
4.11	PERMISSIBLE EXPOSURE IN CASE OF CONTINUOUS NOISE	209
4.12	IMPACT EVALUATION FOR NOISE	212
4.13	PERMISSIBLE PEAK PARTICLE VELOCITY (MM/S)	213
4.14	IMPACT EVALUATION FOR GROUND VIBRATIONS	214
4.15	MAXIMUM CHANGES IN VERTICAL STRESS AND PEAK DISPLACEMENTS AT DIFFERENT DEPTHS BY NIRM	215
4.16	ULTIMATE WORKING DEPTH OF ZAWAR MINES	222
4.17	IMPACT EVALUATION FOR WATER ENVIRONMENT	225
4.18	POST MINING LAND USE OF CORE ZONE (HA)	227
4.19	IMPACT EVALUATION TO DETERMINE THE SIGNIFICANCE (LAND USE – DURING OPERATION PHASE)	229

S. NO.	PARTICULAR	PAGE NO.
4.20	IMPACT EVALUATION TO DETERMINE THE SIGNIFICANCE (SOCIO ECONOMIC ENVIRONMENT)	235
4.21	DETAILS OF TRAFFIC SURVEY POINT	236
4.22	NO OF VEHICLES PER DAY	237
4.23	EXISTING TRAFFIC SCENARIO & LOS FOR TRAFFIC SURVEY POINT	237
4.24	TRAFFIC DENSITY	237
4.25	MODIFIED TRAFFIC SCENARIO	238
4.26	IMPACT EVALUATIONS FOR TRANSPORTATION INFRASTRUCTURE	239
4.27	PLANTATION/GREENBELT TILL DATE	244
4.28	IMPACT EVALUATION FOR BIOLOGICAL RESOURCES	246
4.29	HAZARD IDENTIFICATION AND ITS MITIGATION MEASURES	248
4.30	BUDGET FOR OCCUPATIONAL HEALTH & SAFETY MEASURES	252
6.1	POST PROJECT MONITORING	257
6.2	POST PROJECT MONITORING PROGRAMME	257
6.3	LOCATIONS OF MONITORING STATIONS	262
7.1	PUBLIC HEARING DETAILS IN BRIEF	265
7.2	PUBLIC HEARING ACTION PLAN OF VERBAL COMMENTS/ ISSUES RECEIVED DURING PUBLIC HEARING	268
7.3	PROPOSED PHYSICAL TARGETS FOR ADDRESSING ISSUES OF DURING PUBLIC HEARING AS PER MOEF&CC, OM DATED 30.09.2020 & 20.10.2020	321
7.4	ULTIMATE DEPTH OF WORKING	325
7.5	RISK AND HAZARD ANALYSIS FOR DIFFERENT PHASES OF PROJECT	328
7.6	TYPE AND QUANTITY OF CHEMICALS TO BE USED AND STORED	334
7.7.	PROPERTIES OF SODIUM CYANIDE	335
7.8	EFFECTS OF EMERGENCY SCENARIO	349
7.9	EMERGENCY MANAGEMENT COMMITTEE	351
7.10	MEDICAL EXAMINATION SCHEDULE	360
7.11	HOSPITAL STAFF DETAILS	366
8.1	ECONOMIC BENEFITS OF THE PROJECT	369
8.2	CSR ACTIVITIES WITH EXPENDITURE (IN RS. LAKHS)-FOR LAST 5 YEARS	373
8.3	PROPOSED CSE ACTIVITIES WITH EXPENDITURE (IN RS. LAKHS) - FOR 3 YEARS	375
10.1	PERSONS RESPONSIBLE FOR IMPLEMENTATION OF EMP	380
10.2	EMP COST BREAKUP (IN INR CRORES)	383
11.1	PROJECT DETAILS	364
11.2	MINING DETAILS	387

## LIST OF FIGURES

S. NO.	PARTICULAR	PAGE NO.
2.1	DEMAND FOR ZINC IN INDIA AND ITS SEGMENT WISE BREAK-UP INDIA	39
2.2	LOCATION MAP (SHOWING GENERAL AS WELL AS SPECIFIC LOCATION OF THE ML AREA)	40
2.2(A)	MAP SHOWING GEOLOGY AND GEOMORPHOLOGY OF THE MINE SITE (BLOCK-I) WITH GEOGRAPHICAL EXTENTS	41
2.3(B)	MAP SHOWING GEOLOGY AND GEOMORPHOLOGY OF THE MINE SITE (BLOCK-III) WITH GEOGRAPHICAL EXTENTS	42
2.4	KML SHOWING THE 4 OPERATING MINES IN BLOCK-I	43
2.5	KML SHOWING THE EXISTING SITE FEATURES WITHIN THE LEASE AREA	46
2.6	KML SHOWING THE INDUSTRIAL INFRASTRUCTURE WITHIN THE LEASE AREA	47
2.7	PHOTOGRAPHS OF MINE SITE	48
2.8	WATER BALANCE DIAGRAM	52
2.9	PHOTOGRAPHS OF MINING ACTIVITIES	65
2.10	DIAGRAMMATIC REPRESENTATION OF SUB-LEVEL OPEN STOPPING METHODOLOGY FOR UNDERGROUND MINING	66
2.11	DIAGRAMMATIC REPRESENTATION OF ORE TRANSPORTATION FROM VARIOUS MINES TO BENEFICIATION PLANT	73
2.12	SITE VIEW OF BENEFICIATION PLANT	77
2.13	TAILING STORAGE FACILITY SITE VIEW	83
2.14	TAILING GENERATION AND MANAGEMENT	85
3.1	MAP SHOWING 10 KM RADIUS OF STUDY AREA	92
3.2	SATELLITE IMAGERY OF STUDY AREA	96
3.3	LAND USE / LAND COVER MAP OF THE STUDY AREA	98
3.4	SEISMIC ZONE MAP (MINE SITE FALLS IN SEISMIC ZONE II)	101
3.5	FLOOD HAZARD ZONATION MAP SHOWING PROJECT LOCATION	102
3.6	WINDROSE BASED ON SECONDARY METEOROLOGICAL DATA OF UDAIPUR (DABOK) (SEASONAL AS WELL AS ANNUAL)	105
3.7(a)	WINDROSE DIAGRAM SHOWING WIND PATTERN (MARCH TO MAY, 2021)	107
3.7(b)	WINDROSE DIAGRAM SHOWING WIND PATTERN (MARCH TO MAY, 2024)	108
3.8	KEY PLAN SHOWING AMBIENT AIR QUALITY AND NOISE LEVEL MONITORING LOCATIONS (MARCH TO MAY, 2021) AND (MARCH TO MAY, 2024)	114
3.9	KEY PLAN SHOWING GROUND WATER, SURFACE WATER AND SOIL SAMPLING MONITORING LOCATIONS	125
3.10	KEY PLAN SHOWING GROUNDWATER AND SOIL SAMPLING LOCATIONS	134
4.1 (A)	ISOPLETH SHOWING INCREMENTAL GLCS OF PM <sub>10</sub> FOR ZAWAR MINE (MAX GLC – 1.82 µG/M <sup>3</sup> )	201
4.1 (B)	ISOPLETH SHOWING INCREMENTAL GLCS OF PM <sub>2.5</sub> FOR ZAWAR MINE (MAX GLC – 0.728 µG/M <sup>3</sup> )	202
4.1 (C)	ISOPLETH SHOWING INCREMENTAL GLCS OF SO <sub>2</sub> FOR ZAWAR MINE (MAX GLC – 1.49 µG/M <sup>3</sup> )	203
4.1 (D)	ISOPLETH SHOWING INCREMENTAL GLCS OF SO <sub>2</sub> FOR ZAWAR MINE (MAX GLC – 1.49 µG/M <sup>3</sup> )	204
4.2	DUST EXTRACTION SYSTEM	208

S. NO.	PARTICULAR	PAGE NO.
4.3	LOCATIONS OF SUBSIDENCE MONITORING STATIONS	216
4.4	PHOTOGRAPHS SHOWING SUBSIDENCE MONITORING	218
4.5	WASTE WATER MANAGEMENT SYSTEM	223
4.6	RAINWATER HARVESTING STRUCTURES	224
4.7	DRY TAILING PLANT	225
4.8	TRANSPORTATION ROUTE MAP	236
4.9	EXISTING PLANTATION IN THE MINING LEASE AREA	245
7.1	FRAMEWORK OF FIRST MOMENTS IN MINE EMERGENCY ESCAPE	337
7.2	PHOTOGRAPH SHOWING RESCUE ROOM	341
7.3	ORGANIZATIONAL CHART FOR EMERGENCY RESPONSE AT ZAWAR MINE	342
7.4	PHOTOGRAPHS SHOWING MEASURES FOR MINE GAS AND AIR MONITORING	343
7.5	THREE-DIMENSIONAL VIEW OF THE EXTRACTED STOPE	354
7.6	TYPICAL INSTRUMENTATION PLAN IN STOPE	355
7.7	CABLE BOLTING FOR WALL ROCK PINNING	356
7.8	SUBSIDENCE SURVEY POINTS OVER THE EARLIER EXTRACTED STOPE AND PROPOSED STOPE OF ZAWARMALA MINE	356
7.9	DESIGN OF SUBSIDENCE SURVEY PILLAR	357
7.10	PHOTOGRAPHS SHOWING GROUND VIBRATION CONTROL & MANAGEMENT AT HZL-ZAWAR MINES	358
7.11	HEALTH SAFETY AND ENVIRONMENT POLICY OF HZL	367
10.1	ORGANIZATIONAL STRUCTURE	379



### **ABBREVIATIONS**

AAQ	:	Ambient Air Quality
AAQM	:	Ambient Air Quality Monitoring
AAQS	:	Ambient Air Quality Standards
AIS & LUS	:	All India Soil and Land Use Survey
AMSL	:	Above Mean Sea Level
ANFO	:	Ammonium Nitrate Fuel Oil
Bgl	:	Below Ground Level
CTE	:	Consent to Establish
CFO	:	Consent for Operate
CWC	:	Central Water Commission
CPP	:	Captive Power Plant
CPCB	:	Central Pollution Control Board
CSR	:	Corporate Social Responsibility
CEP	:	Corporate Environment Policy
DGMS	:	Directorate General of Mines Safety
DMG	:	Department of Mines and Geology
DTH	:	Down The Hole
DCF	:	Deputy Conservator of Forest
DMF	:	District Mineral Fund
EMS	:	Environment Management System
ECO	:	Emergency Coordinating Officer
EAC	:	Expert Appraisal Committee
EC	:	Environmental Clearance
EIA	:	Environmental Impact Assessment
EMC	:	Environment Management Cell
EMP	:	Environmental Management Plan
ESE	:	East of South East
ENE	:	East of North East
EPA	:	Environmental Protection Act
EPO	:	Emergency planning officer
FMCG	:	Fast Moving Consumer Goods
FPS	:	Fine Particulate Sampler
FCC	:	False Color Composite
Govt.	:	Government
GCP	:	Ground Control Points
GLC	:	Ground Level Concentration
GOI	:	Government of India
GPS	:	Global Positioning System
GSI	:	Geological Survey of India
ha	:	Hectare
HEMM	:	Heavy Earth Moving Machinery
HFL	:	Highest Flood Level
HP	:	Horse Power
HOD	:	Head of Department
IB	:	Inter Burden
IBM	:	Indian Bureau of Mines
IMD	:	India Meteorological Department



IS	:	Indian Standards
ISO	:	International Organization of Standardization
KW	:	Kilo Watt
KLD	:	Kilo Litre Per Day
LOI	:	Letter of Intent
LULC	:	Land Use Land Cover
MT	:	Million Tonne
MOEFCC	:	Ministry of Environment, Forest and Climate Change
M.M.R	:	Metalliferous Mines Regulation
mRL	:	Meter Reduced Level
MSL	:	Mean Sea Level
MW	:	Mega Watt
N	:	North
NH	:	National Highway
NNW	:	North of North West
NW	:	North West
NAAQS	:	National Ambient Air Quality Standards
NABET	:	National Accreditation Board for Education & Training
NABL	:	National Accreditation Board for Testing and Calibration Laboratories
NOC	:	No Objection Certificate
NH	:	National Highway
NGO	:	Non-Governmental Organization
NONEL	:	Non-Electric
NRSA	:	National Remote Sensing Agency
NRSC	:	National Remote Sensing Centre
OB	:	Over Burden
OHS	:	Occupational Health and Safety
OSHA	:	Occupational Safety and Health Administration
PFR	:	Pre-Feasibility Report
pH	:	Potential of Hydrogen
PHCs	:	Public Health Centers
PM	:	Particulate Matter
PPE	:	Personal Protective Equipment
PESO	:	Petroleum and Explosives Safety Organization
PPV	:	Peak Particle Velocity
QCI	:	Quality Council of India
RSPM	:	Respirable Suspended Particulate Matter
ROM	:	Run Of Mine
RCC	:	Reinforced Concrete Cement
RDS	:	Respirable Dust Sampler
SSE	:	South of South East
SOB	:	Soft Over Burden
SW	:	South West
SC	:	Scheduled Caste
SHE	:	Safety, Health & Environment
SIA	:	Social Impact Assessment
SOI	:	Survey of India
RSPCB	:	Rajasthan State Pollution Control Board

SPM	:	Suspended Particulate Matter
ST	:	Scheduled Tribe
STP	:	Sewage Treatment Plant
TDS	:	Total Dissolved Solids
TAMRA	:	Transparency Auction Monitoring And Resource Augmentation
ToR	:	Terms of Reference
TPA	:	Tones Per Annum
TPD	:	Tones Per Day
TW	:	Tube Well
UNFC	:	United Nations Framework Classification
VT	:	Vocational Training
RF	:	Reserve Forest
PF	:	Protected Forest
$\mu\text{g}/\text{m}^3$	:	Micro gram per meter cube
$\mu\text{m}$	:	Micro Meter
dia.	:	diameter
CuM	:	Cubic meter
dB	:	Decibel
gm/sec	:	Gram per second
gm/cc	:	Gram per cubic meter
hr/day	:	Hour per day
kg	:	Kilogram
Kg/hr	:	Kilogram per hour
Kg/ha	:	Kilogram per hectare
km	:	Kilometer
m	:	Meter
mg/l	:	Milligram per Liter
mm	:	Millimeter
Sq.km	:	Square Kilometer
t/hr	:	Tones per hour
ML	:	Mining Lease



**F.No.J-11015/259/2012-IA-II(M)**  
**Government of India**  
**Ministry of Environment, Forest and Climate Change**  
**Impact Assessment Division**

\*\*\*\*\*

Prithvi Wing, 2<sup>nd</sup> Floor  
Indira Paryavaran Bhavan  
Jor Bagh Road, Aliganj  
New Delhi-110 003  
Date: 8<sup>th</sup> September, 2021

To

M/s Hindustan Zinc Limited  
Zawar Mines, Yashad Bhawan  
Uraipur – 313 304  
Rajasthan

**Sub: Proposal for expansion of Zawar Group of underground Lead- Zinc Mines from 4.8 MTPA to 6.5 MTPA Ore Production with total excavation 7.78 MTPA including Waste rock 1.28 MTPA and Beneficiation from 4.8 MTPA to 7.3 MTPA within ML Area of 3620 ha (ML No.03/89) located at Village Zawar, Tehsil Girwa and Sarada, District Udaipur, Rajasthan by M/s Hindustan Zinc Ltd. – ToR- reg.**

Sir,

This has reference to proposal no. IA/RJ/MIN/222643/2021 for Terms of Reference (ToR) for expansion of Zawar Group of underground Lead- Zinc Mines from 4.8 MTPA to 6.5 MTPA Ore Production with total excavation 7.78 MTPA including Waste rock 1.28 MTPA and Beneficiation from 4.8 MTPA to 7.3 MTPA within ML Area of 3620 ha (ML No.03/89) located at Village Zawar, Tehsil Girwa and Sarada, District Udaipur, Rajasthan by M/s Hindustan Zinc Ltd.

**1. EAC Meeting Details:**

EAC meeting	35 <sup>th</sup> EAC Meeting
Date of Meeting	16 <sup>th</sup> to 19 <sup>th</sup> August 2021

**2. Project details:**

Name of the Project	Expansion of Zawar Group of Underground Lead- Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production (Total Excavation: 7.78 Million TPA including Waste rock generation of 1.28 MTPA) and Beneficiation from 4.8 Million TPA to 7.3 Million TPA within ML Area of 3620 ha
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M/s Hindustan Zinc Limited, Rajasthan

Location	Villages	Zawar, KodiyaKhet, Nayakheda, Rawa, Tidi, Udiyakheda, Barothi Bhaldia, Bara, Chanawada, Dhavadi Talai, Kanpur, NewaTalai, Padla, Parsad, Krishnapura, Singhatwara		
	Tehsil/Taluka	Girwa & Sarada		
	District	Udaipur		
	State / UT	Rajasthan		
	Latitudes	Block 1	24019'0.3"	to
			24022'51.59"	
		Block 3	24014'43.66"	to
			24016'30.81"	
	Longitudes	Block 1	73040'23.24"	to
		73045'12.24"		
	Block 3	73041'47.03"	to	
		73043'6.58"		
SoI Toposheet No.	45 H/11, 45 H/12, 45 H/15 & 45 H/16			
Company Name	Hindustan Zinc Limited (HZL)			
Accredited Consultant Organisation and its certificate no.	J.M. EnviroNet Pvt. Ltd. NABET/EIA/2023/RA 0186, Validity: 07.02.2023			
KML file	Submitted			
Seismic zone	Zone – II			

### 3. Category details:

Category of the project	Category 'A' Project under Activity 1(a) – 3 for "Mining of Minerals" and Activity 2 (b) - 3 for "Ore Beneficiation"
Provisions	EIA Notification dated 14th September, 2006.
Mining lease Area	3620 Ha (ML 3/89) [Block 1 (3172 Ha) and Block 3 (448 Ha)]

### 4. ToR/EC Details:

ToR Proposal No.	IA/RJ/MIN/222643/2021
Online application date for Form-I	31.07.2021
Documents Submitted	PFR, Brief Summary, SOI Toposheet, Authorization Letter, KML, Surface Plan
Production capacity	Ore production: 4.8 Million TPA to 6.5 Million TPA Beneficiation capacity: 4.8 Million TPA to 7.3 Million TPA
Soil	Nil (as it is an underground mining project)
Waste	1.28 MTPA (Waste rock generation)
Total Excavation	7.78 Million TPA
Crusher	Existing- 15 crushers Proposed- 5 crushers Total- 20 crushers

Previous EC Details	EC for 4.8 Million TPA of Lead-Zinc Ore and Ore Beneficiation vide letter no: J-11015/259/2012-IA.II dated 16.10.2020
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#### 5. Lease Details:

Granted mine lease	Area	5178 Ha (Block 1, 1A, 2, 3 & 4)
	Execution date	18 <sup>th</sup> Aug. 1950 upto 1970
	ML No.	ML 3/89
First renewal (1970-1990)	In favor of	HZL
	Letter no.	F.2(4)/Khanij/70
	Date	13.03.1973
Second renewal (1990-2010)	Letter no.	i-12/26/[kku xzqi-2/90
	Date	20.10.1992
Reduction in lease area	Due to low mineralization potential, HZL opted for reduction of lease hold area from 5178 to 3620 hectares, by surrendering an area of 1558 Ha. The area surrendered consisted of 678.89 Ha of Forest land and 879.11 Ha of non-forest land. The reduced lease area of 3620 Ha consisted on 1537.91 Ha of Forest land.	
Validity of Mine Lease	31.03.2030 as per Section 8A (5) of MMRD (Amendment) Ordinance 2015 vide letter dated 26.02.2015	
Diversification of forest land	Further, as required under the Forest Conservation Act 1980, clearance for diversification of forest land was granted by MoEF for the Forest area of 1537.91 Ha including 114.94 Ha for surface use vide Order no. 8-1/97-FC Dated 15/16.6.98. HZL entered into an agreement with Govt of Rajasthan on 25.04.2000 on renewal of leasehold of 5178 hectares from 30.03.1990 to 05.01.2000 & 3620 hectares for the period from 06.01.2000 to 29.03.2010.	

#### 6. Mining plan details:

Mining Plan (approved by Indian Bureau of Mines/DMG)	Letter No.	S.no. 584 (4) (3) (1868)/ 2021 – Sh.Khani- Ajam
	Date	15.07.2021.
	Validity	2021-2022 to 2024-2025
<b>Mining Parameters</b>	<b>Quantitative Description</b>	
Bench Height	Length of slope: ~40 to 80 m (This is an underground mining project)	
Bench Width	Width of stopes ~3 to 12 m	
Method of Mining	Sub-level Open Stopping	
Individual bench slope	Slot extracted to ~30% of the stope volume	

Drilling/Blasting	Details of Drilling Blasting		
	Particulars	Parameters	
	Drilling Pattern in Ore	Burn cut/Wedge cut	
	Drilling Pattern in Ore	Ring/Parallel Hole Drilling	
	Maximum No of Hole blasted in a round	Mochia	50
		Balaria	70
		Zawarmal a	250
Baroi		225	
Type of Explosive	ANFO, Slurry Explosive		
ROM output size	- 150 mm		
Life of Mine	+20 years		
Transportation details	Hauling of ore / waste from underground to surface through 65/60T / 30T / 20T LPDTs. Primary crushing through crusher transported via surface trucks to Mill stockpile. The concentrate produced is transported to captive smelters of HZL through road transport.		
Dumpers capacity	LPDT: 65T/60T / 30T / 20T LHD: 6-7/10/15/17/21 T		

#### 7. Land Area Breakup:

Private land	931.34 ha
Government land	2688.66 ha
Total Mining lease area	3620 Ha
Private land for crusher, workshop & other infrastructure outside the MLA	Primary crusher along with other infrastructure will be available within the lease area No infrastructural activity is proposed outside the lease area.

#### 8. Nearest village / town/ highway/railway station / water bodies:

Particulars	Villages	Distance and Direction (From Block-I)	Distance and Direction (From Block-III)
Nearest village	Village	Zawar	Bara
Nearest Town / City	Udaipur city	~20 km in North direction	~38 km in North direction
Nearest State/National Highway	SH-32	~3.5 km in ENE	~16.25 km in NE
	NH- 48	passing though Block-I	passing though Block-III
Nearest Railway Station	Zawar Railway station	within block-I	~14 km in NNE
	Kharwachanda	~7.5 km in NE	~ 27 km in NNE
	Padla Railway station	~7.5 km in ESE	~12 km in NE
Nearest Water bodies	TiriNadi	Within the block-I	~14.5 km in NNE
	ChandaniNala	~2.5 Km in NNW	~17.5 km in North
	Tidi Dam	~3.0 km in WSW	~10.0 k in NNW



	DaiyaNadi	~6.5 Km in East	~15 km in NE
	PareriNadi	~11 km in South	Passing through Block-III
	ThorghatiTalav	~16 km in SSE	7.5 km in ESE
	NalNadi	~19 km in SSW	~8.5 Km in SW

**9. Water requirement:**

Total water requirement	14000 KLD	Fresh water	14000 KLD
		Treated water	100% recycle
Source	Tidi Dam		
Permission	Permission for the water was obtained from Water Resource Department, Government of Rajasthan.		

**10. Presence of Environmentally Sensitive areas in the study area:**

Forest Land/Protected Area/Environmental Sensitivity Zone	Yes/No	Details of Certificate/letter/Remarks
Forest Land	Yes	Total mining lease area is 3620 ha, wherein 1537.91 ha. is forest land for which forest diversion has been taken for the Forest area of 1537.91 Ha including 114.94 Ha for surface use. Approval for diversion of forest land was granted by MoEF with validity co-terminus with mining lease vide letter No. 8-1/97-FC dated 15/16.06.1998. Renewal of the forest diversion was granted vide letter No. 8-1/97-FC dated 23.01.2015. Application for forest diversion for additional surface rights for 68.95 ha of forest land submitted on 16.05.2017
National park	No	There is no National Park, Migratory routes of fauna and National Monuments within 10Km periphery of the lease area and same has been authenticated by DCF, Udaipur vide letter no F.9 (10) Survey/DCF/WL/Udr/2016-17/11715 dated 29.11.2016 Jaisamand Wildlife Sanctuary is situated at 10.9 km from the boundary of the mine lease area. The ESZ is present at distance of ~3.5 Km in North East direction from Block-I.
Wildlife Sanctuary & Forest	No	

Schedule- I species	Yes/No	Details of Certificate/letter/Remarks
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Schedule-I species	Yes	Osprey ( <i>Pandion Haliaeetus</i> ), Indian Peafowl ( <i>Pavocristatus</i> ), White-rumped Vulture ( <i>Gyps bengalensis</i> ), Indian Leopard ( <i>Pantherapardusfusca</i> ), Indian Pangolin ( <i>Maniscrassicaudata</i> ), Crimson rose ( <i>Pachliopta hector</i> ), and Bengal Monitor Lizard ( <i>Varanusbengalensis</i> )
Wildlife Conservation Plan	-	Conservation plan for Schedule-I species submitted to Chief Wildlife Warden, Rajasthan for approval. A total of Rs. 18.45 cr. has been earmarked towards wild life conservation over life of mine lease.

#### 11. Green belt/ plantation details:

Proposed area for green belt/plantation	Existing	Proposed	Total
	170.85 Ha	14.15 ha	185 ha
Budget for green plant & plantation till the end of life of mine.	500 Lacs		

Particulars for Green belt/plantation	Area covered (in Ha)
7.5 m barrier & non-mineralized zone	170.85 ha area covered with plantation
50 m safety zone of nallah, roads, electric lines	NA
500 m safety zones of nearest habitation villages	NA

#### 12. Court case details:

Court Case	No Litigation Pending
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#### 13. Rehabilitation & Resettlement:

R&R Details	It is an underground mining project so R&R is not applicable.
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#### 14. Affidavit/ Undertaking details:

Affidavit/Undertaking	Affidavit dated 21.07.2021 has been submitted to the Ministry as per MoEF&CC O.M. No. 3-50/2017 -IA. II(M) dated 30.05.2018 to comply with all the statutory requirements and judgment of Hon'ble Supreme Court dated the 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors.
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#### 15. Previous EC compliance and production details:

Particulars	Letter no. and date
Certified EC compliance report	EC compliance Report has been certified from Regional Office, MoEFCC vide letter no IV/ENV/R/Mine-484/794/2008/814 dated 19.06.2020

Certified production	past	Past Production details (For 1974-2016) have been authenticated by DMG, Udaipur dated 23.04.2005. Past Production details (For 2016-2020) have been authenticated by DMG, Udaipur vide letter no. Kha/Udai/S.No/ ML 3/1989/07 dated 30.0.2020. Past Production details for the year FY 2020-21 have been authenticated by Mining Engineer, Department of Mining and Geology on dated 14.06.2021.
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**16. Details of the EMP budget:**

Activities	Capital Cost (Rs. In Lakhs)	Recurring (Rs. In Lakhs)
Environment Management Plan	Rs. 120 Crore	Rs. 400 Lakh

**17. Details of project cost and employment:**

Particulars	Budget (Rs. In Crore)
Capital Cost for Environment Protection	Rs. 120 Crore
Total Cost for EMP	Rs. 120 Crore
Recurring Cost for EMP	Rs. 400 Lakh
Project Cost	Rs. 1250 Crore
Employment	Total manpower will be 4150. Out of which existing manpower will be 3400 persons and 750 persons will be directly employed. Additional 1000 persons will be directly employed during construction phase

**18. Observation and Recommendation of the Committee:**

During the 35<sup>th</sup> EAC (Non Coal Mining) meeting held during 16<sup>th</sup> to 19<sup>th</sup> August, 2021, after detailed deliberations made by the Project Proponent and the Consultant, the Committee **recommended** the proposal for standard Terms of Reference (ToR) for expansion of Zawar Group of underground Lead- Zinc Mines from 4.8 MTPA to 6.5 MTPA Ore Production with total excavation 7.78 MTPA including Waste rock 1.28 MTPA and Beneficiation from 4.8 MTPA to 7.3 MTPA within ML Area of 3620 ha (ML No.03/89) located at Village Zawar, Tehsil Girwa and Sarada, District Udaipur, Rajasthan by M/s Hindustan Zinc Ltd. for undertaking detailed EIA/EMP study with the specific conditions.

18. The Ministry of Environment, Forest and Climate Change has examined the proposal in accordance with the Environmental Impact Assessment Notification, 2006 and accepting the recommendation of EAC (non-coal) meeting during 16-19 August, 2021 for Terms of Reference for expansion of Zawar Group of underground Lead- Zinc Mines from 4.8 MTPA to 6.5 MTPA Ore Production with total excavation 7.78 MTPA including Waste rock 1.28 MTPA and Beneficiation from 4.8 MTPA to 7.3 MTPA within ML Area of 3620 ha (ML No.03/89) located at Village Zawar, Tehsil Girwa

M/s Hindustan Zinc Limited, Rajasthan

and Sarada, District Udaipur, Rajasthan by M/s Hindustan Zinc Ltd. for undertaking detailed EIA/EMP study with the following specific conditions and standard Terms of References for undertaking detailed EIA study:

#### **A. Specific Terms of References**

- 1) The project proponent needs to carry out the Public Hearing as per provisions of EIA Notification, 2006. PP should also submit the time bound action plan on concerns of the public through proper separate budget.
- 2) The project proponent shall allocate separate budget for the concerns of the local people in terms of health care facilities for COVID, betterment of schools nearby and to facilitate the online education system by providing Wi-Fi connectivity and desktops/tablets, infrastructure and environment protection.
- 3) The project proponent should prepare the EMP considering the scenario of pollution to be generated for normative and peak total excavation for assessing air and noise pollution.
- 4) The project proponent should submit approved wildlife conservation plan and incorporate the same in the EIA/EMP report.

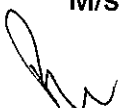
#### **B. Standard Terms of References**

- (1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification, 1994 came into force w.r.t. the highest production achieved prior to 1994. A copy of the document in support of the fact that the proponent is the rightful lessee of the mine should be given.
- (2) All documents including approved mine plan, EIA and public hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management and mining technology and should be in the name of the lessee.
- (3) All documents including approved mine plan, EIA and public hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management and mining technology and should be in the name of the lessee.
- (4) All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery / topo-sheet should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
- (5) Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA report with description of the prescribed operating process / procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms / conditions?



The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and / or shareholders or stakeholders at large may also be detailed in the EIA report.

- (6) Issues relating to mine safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study, etc. should be detailed. The proposed safeguard measures in each case should also be provided.
- (7) The study area will comprise of 10 KM zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation, etc., should be for the life of the mine / lease period.
- (8) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
- (9) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.
- (10) A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the project proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.
- (11) Status of forestry clearance for the broken up area and virgin forestland involved in the project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.
- (12) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.
- (13) The vegetation in the RF/PF areas in the study area, with necessary details, should be given.
- (14) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly detailed mitigative measures required, should be worked out with cost implications and submitted.
- (15) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Tiger / Elephant Reserves (existing as well as proposed), if any, within 10 KM of the mine lease should be clearly indicated, supported by a location map duly



authenticated by the Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the State Wildlife Department/Chief Wildlife Warden under the Wildlife (Protection) Act, 1972 and copy furnished.

- (16) A detailed biological study of the study area [core zone and buffer zone (10 KM radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any Scheduled-I fauna found in the study area, the necessary plan for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.
- (17) Proximity to Areas declared as 'Critically Polluted' or the project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.
- (18) Similarly, for coastal projects, a CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
- (19) R&R Plan / compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs / STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village located in the mine lease area will be shifted or not. The issues relating to shifting of Village including their R&R and socio-economic aspects should be discussed in the report.
- (20) One season (non-monsoon) primary baseline data on ambient air quality (PM<sub>10</sub>, SO<sub>2</sub> and NO<sub>x</sub>), water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the predominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM<sub>10</sub>, particularly for free silica, should be given.
- (21) Air quality modelling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modelling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of



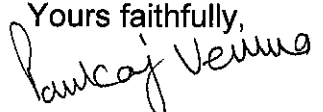
sensitive receptors, if any, and the habitation. The wind roses showing predominant wind direction may also be indicated on the map.

- (22) The water requirement for the project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the project should be indicated.
- (23) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the project should be provided.
- (24) Description of water conservation measures proposed to be adopted in the project should be given. Details of rainwater harvesting proposed in the project, if any, should be provided.
- (25) Impact of the project on the water quality, both surface and groundwater should be assessed and necessary safeguard measures, if any required, should be provided.
- (26) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.
- (27) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.
- (28) Information on site elevation, working depth, groundwater table, etc., should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.
- (29) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the project.
- (30) Impact on local transport infrastructure due to the project should be indicated. Projected increase in truck traffic as a result of the project in the present road network (including those outside the project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered.
- (31) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA report.
- (32) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
- (33) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be

covered under plantation and the species to be planted. The details of plantation already done should be given.

- (34) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP.
- (35) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
- (36) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
- (37) Detailed environmental management plan to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed project.
- (38) Public hearing points raised and commitment of the project proponent on the same along with time bound action plan to implement the same should be provided and also incorporated in the final EIA/EMP Report of the project.
- (39) Details of litigation pending against the project, if any, with direction / order passed by any Court of Law against the project should be given.
- (40) The cost of the project (capital cost and recurring cost) as well as the cost towards implementation of EMP should clearly be spelt out:
  - (a) All documents to be properly referenced with index and continuous page numbering.
  - (b) Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
  - (c) Where the documents provided are in a language other than English, an English translation should be provided.
  - (d) The Questionnaire for environmental appraisal of industrial projects as devised earlier by the Ministry shall also be filled and submitted.
  - (e) While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF O.M.No.J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should also be followed.
  - (f) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the F.R for securing the ToR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the ToR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.


- (g) As per the circular no.J-11011/618/2010-IA.II(I) dated 30.5.2012, you are requested to submit certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project by the Regional Office of Ministry of Environment & Forests, if applicable.
19. The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.
20. The prescribed ToRs would be valid for a period of four years for submission of the EIA/EMP reports as per the Ministry's O.M. No..J-11013/41/2006-IA.II(I) dated 22.3.2010, 22.08.2014, 08.10.2014 and 07.11.2014.
21. After preparing the draft EIA (as per the generic structure prescribed in Appendix- III of the EIA Notification, 2006) covering the above mentioned issues, the proponent will get the public hearing conducted and take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.

Yours faithfully,  
  
(Pankaj Verma)  
Scientist E

**Copy to:**

1. The Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi-110 001.
2. The Secretary, Department of Mines & Geology, Government of Rajasthan, Secretariat, Jaipur.
3. The Secretary, Department of Environment, Government of Rajasthan, Secretariat, Jaipur.
4. The Secretary, Department of Forests, Government of Rajasthan, Secretariat, Jaipur.
5. The Chief Wildlife Warden, Government of Rajasthan, Jaipur.
6. The Dy. Director General of Forests, Ministry of Environment, Forest and Climate Change, Regional Office (CZ), Kendriya Bhawan, 5<sup>th</sup> Floor, Sector H, Aliganj, Lucknow – 226 020
7. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110 032.
8. The Member Secretary, Central Ground Water Authority, 18/11, Jam Nagar House, Man Singh Road, New Delhi-110 011.
9. The Chairman, Rajasthan State Pollution Control Board, Jaipur, Rajasthan.
10. The Controller General, Indian Bureau of Mines, Indira Bhawan, Civil Lines, Nagpur- 440 001.

11. The District Collector, Udaipur
12. Guard File.
13. PARIVESH.

  
(Pankaj Verma)  
Scientist E



### **TOR COMPLIANCE**

Point wise compliance of ToR Points issued by MoEFCC, New Delhi vide letter no. F. No. J-11015/259/2012-IA-II (M) dated 08.09.2021 for Expansion of Zawar Group of Underground Lead-Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production Capacity with Total excavation of 7.78 Million TPA including Waste Rock 1.28 Million TPA and Beneficiation from 4.8 MTPA to 7.3 MTPA (M.L. Area- 3620 ha; ML No.03/89) at Village: Zawar, Tehsil: Girwa & Sarada, District: Udaipur, Rajasthan.

ToR No.	ToR Point	Compliance	Ref in Final EIA/EMP Report
<b>A. Specific Terms of References</b>			
1)	The project proponent needs to carry out the Public Hearing as per provisions of EIA Notification, 2006. PP should also submit the time bound action plan on the concerns of the public through separate budget.	Public hearing for the project was conducted on 22.12.2021 at Gram Panchayat Bhawan Bhaladia, Tehsil Sarada, District Udaipur. Time bound action plan has been prepared as per MoEF&CC OM dated 30.09.2020 & 20.10.2020 on the basis of the issues raised during Public Hearing.	<b>Chapter - 7 Para 7.2.3 Pg. 242</b>
2)	The project proponent shall allocate separate budget for the concerns of the local people in terms of health care facilities for COVID, betterment of schools nearby and to facilitate the online education system by providing Wi-Fi connectivity and desktops/tablets, infrastructure and environment protection.	A separate budget of 437.75 Lakh has been allocated for the concerns of the local people in terms of health care facilities for COVID, betterment of schools, infrastructure and environment protection.  As per MoEF&CC OM dated 30.09.2020 & 20.10.2020, PP has allocated funds for the development of nearby areas on the basis of the issues raised during Public Hearing.	<b>Chapter-8 Table 8.3 Pg.291</b>  <b>Chapter - 7 Para 7.2.3 Pg. 242</b>
3)	The project proponent should prepare the EMP considering the scenario of pollution to be generated for normative and peak total excavation for assessing air and noise pollution.	Capital Cost of the Project: Rs. 1250 Crores /- Capital Cost for EMP: Rs. 120 Crores /- Recurring Cost for EMP: Rs. 400 Lacs/annum Details of EMP cost is incorporated in this Final EIA/EMP Report.	<b>Chapter -10 Para 10.6 Pg.300</b>
4)	The project proponent should submit approved Wildlife Conservation Plan and incorporate the same in the EIA/EMP Report.	Seven Schedule - I species were found during the field survey. Wildlife conservation has been approved by CWLW vide letter no. F 11 (300)/CWLW/ 2022-23/174 dated 21.03.2023. Copy of the same along with Approved Wildlife Conservation Plan is enclosed with this Final EIA/EMP Report.	<b>Chapter 3 Para 3.14.1 Pg.137 Annexure 10 (b)</b>
<b>B. Standard Terms of References</b>			
1)	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically	This mine is in operation since year 1950. Production details since year 1974 to year 2021 has been duly authenticated by office of the Mining Engineer, Udaipur Div Udaipur.	<b>Chapter 2 Para 2.8.1 Pg.77</b>



ToR No.	ToR Point	Compliance	Ref in Final EIA/EMP Report
	informed whether there had been any increase in production after the EIA Notification, 1994 came into force w.r.t. the highest production achieved prior to 1994. A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.	<p>Past Production details (For 1974-2016) have been authenticated by DMG, Udaipur dated 23.04.2005.</p> <p>Past Production details (For 2016-2020) have been authenticated by DMG, Udaipur vide letter no. Kha/Udai/S.No/ ML 3/1989/07 dated 30.0.2020.</p> <p>Past Production details for the year FY 2020-21, 2022-23, 2023-24 have been authenticated by Mining Engineer, Department of Mining and Geology on dated 28.08.2024.</p> <p>Details of the same have been given in this Final EIA/EMP Report.</p> <p>The supplementary lease deed of ML area over 3620 ha has been executed in favour of M/s Hindustan Zinc Limited on 01.07.2016 (Validity till 31.03.2030) as per section 8A of the Mines and Minerals (Development &amp; Regulation) amendment Act 2015.</p> <p>Details of the same have been given in this Final EIA/EMP Report.</p>	<p><b>Annexure 12</b></p> <p><b>Chapter 1</b> <b>Para 1.2.1 (D)</b> <b>Pg-33</b></p> <p><b>Annexure 1</b></p>
2)	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.	All documents including Approved Modified Mining Plan with PMCP, EIA and Public Hearing are compatible with one another in terms of mine area, production levels, waste generation & its management and mining technology etc. and all documents are in the name of M/s. Hindustan Zinc limited.	-
3)	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.	All documents including Approved Modified Mining Plan with PMCP, EIA and Public Hearing are compatible with one another in terms of mine area, production levels, waste generation & its management and mining technology etc. and all documents are in the name of M/s. Hindustan Zinc limited.	-



ToR No.	ToR Point	Compliance	Ref in Final EIA/EMP Report
4)	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	<p>Map showing Mine Lease area with geographical corner coordinates, geomorphology and geology of the area, superimposed on SOI Toposheet has been prepared and incorporated in this Final EIA/EMP Report.</p> <p>Land use/ Land cover of study area has been assessed using satellite data.</p> <p>Land Area is covered under Forest Land (54.63 %) and Open Scrub Land (35.03 %). Vegetation and Plantation spreads over 4.54 % and Agriculture land (1.73 %) of total study area.</p> <p>Built up area is represented by human settlements (0.74 %). Due to the upcoming project, increased human settlements will be concentrated near the mine lease area as employment will be generated. There is a possibility of increase in transportation and population in the nearby villages that will result in change in the present land use and land cover. Water bodies in the study area comprise of Tidi Dam etc. (0.72 %) and River/Nala (1.04 %). Mining areas comprise of active quarries and mined out area (1.08%) and Tailing Storage Facility (0.09%).</p> <p>Land use / land cover map of the study area is given in this Final EIA/EMP Report.</p>	<p><b>Chapter 2</b> <b>Fig.2.3 (a)&amp;(b)</b> <b>Pg.40</b></p> <p><b>Chapter 3</b> <b>Para 3.4.3</b> <b>Pg.92</b></p>
5)	Does the Company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or	The Environment Policy has been given in this Final EIA/EMP Report.	<b>Annexure 20</b>





ToR No.	ToR Point	Compliance	Ref in Final EIA/EMP Report
	shareholders or stakeholders at large, may also be detailed in the EIA Report.		
6)	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	It is the case of Underground Mining and Subsidence study has been carried out by CSIR-CIMFR, Dhanbad. Details of the same are given in this Final EIA/EMP Report. All the precautionary measures laid by the DGMS will be strictly followed.	<b>Annexure 19</b>  <b>Chapter - 4</b> <b>Para 4-5.3</b> <b>Pg.196</b>
7)	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.	The study area comprises of 10 km radius zone around the mining lease periphery. Map showing study area has been incorporated in this Final EIA/EMP report. Data regarding waste generation up to end of lease period has been incorporated in this Final EIA/EMP report. <b>A) Waste Rock</b> <b>Generation:.</b> At the end of lease period, 10.89 MT rock waste will be generated. <b>B) Tailings</b> <b>Generation:</b> At the end of lease period, 48.04 million tonne of Tailing will be generated	<b>Chapter 2</b> <b>Para 2.8.3</b> <b>Pg.80</b>
8)	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	There is no National Park, Wildlife Sanctuary, Biosphere Reserves, Tiger Reserves, and Wildlife Corridors etc. within 10 km radius of the mining lease area. However there are 19 PF and 9 RF falls within 10 km radius of the study area. The ESZ of Jaisamand Wildlife Sanctuary (10.9 km) is present at distance of ~3.5 Km in North East direction from Block-I. Land use/ Land cover of study area has been assessed using satellite data. Land Area is covered under Forest Land (54.63 %) and Open Scrub Land (35.03 %). Vegetation and Plantation spreads over 4.54 % and Agriculture land (1.73 %) of total study area. Built up area is represented by human settlements (0.74 %). Due to the upcoming project, increased human settlements will be concentrated near the mine lease area as employment will be generated. There is a possibility of increase in transportation and population in the nearby villages that will result in change in the present	<b>Chapter 3</b> <b>Para 3.14.1</b> <b>Pg.137</b>  <b>Chapter 3</b> <b>Para 3.4.3</b> <b>Pg.92</b>



ToR No.	ToR Point	Compliance	Ref in Final EIA/EMP Report
		land use and land cover. Water bodies in the study area comprise of Tidi Dam etc. (0.72 %) and River/Nala (1.04 %). Mining areas comprise of active quarries and mined out area (1.08%) and Tailing Storage Facility (0.09%). At conceptual period, total land for Industrial/Mining area will be 276.52 ha, will be diverted for plantation on forest and non forest land. 183.89 ha of Forest land will be restored. Total 321.63 ha area of non forest land will be covered under plantation at the end of life of mine. An area of 1269.92 ha area will remain undisturbed.	<b>Chapter 2 Para 2.9 Pg.84</b>
9)	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given	There will be no overburden dumping outside the lease area. Same information is given in this Final EIA/EMP Report.	
10)	A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.	Total ML area is 3620 ha. Out of which 2082.09 Ha is non Forest land and 1537.91 Ha is forest area.  Clearance for diversification of forest land was granted by MoEF for the Forest area of 1537.91 Ha including 114.94 Ha for surface use F.No. 8-1/97-FC Dated 15/16.06.1998. Renewal of the forest diversion was granted. F.No. 8 1/1997-FC Dated 23.01.2015  Application for forest diversion for additional surface rights use for 68.95 ha of forest land Proposal no. FP/RJ/MIN/25404/2017 dated: 16.05.2017	<b>Chapter –2 Para 2.3.3 Pg.42</b>  <b>Chapter 1 Para 1.2.1 (D) Pg.33 Annexure 5 (a) &amp; (b)</b>  <b>Chapter 1 Para 1.2.1 (D) Pg.33 Annexure 6</b>
11)	Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also	Total ML area is 3620 ha. Out of which 2082.09 Ha is non Forest land and 1537.91 Ha is forest area. Clearance for diversification of forest land was granted by MoEF for the Forest area of 1537.91 Ha including 114.94 Ha for surface use F.No. 8-1/97-FC Dated 15/16.06.1998. Renewal of the forest diversion was granted. F.No. 8	<b>Chapter 1 Para 1.2.1 (D) Pg.33 Annexure 5 (a) &amp; (b)</b>



ToR No.	ToR Point	Compliance	Ref in Final EIA/EMP Report
	be furnished.	1/1997-FC Dated 23.01.2015  Application for forest diversion for additional surface rights use for 68.95 ha of forest land has been applied vide proposal no. FP/RJ/MIN/25404/2017 dated: 16.05.2017. Applicable NPV and CA amount for proposed diversion shall be submitted post stage-1 approval as per the required process.	<b>Chapter 1</b> <b>Para 1.2.1 (D)</b> <b>Pg.33</b> <b>Annexure 6</b>
12)	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.	Copy of certificate obtained under Forest Right Act has been given with this Final EIA/EMP report	<b>Annexure 16</b>
13)	The vegetation in the RF / PF areas in the study area, with necessary details, should be given	Details given in this Final EIA/EMP Report.	<b>Chapter 3</b>
14)	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	No existence of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Tiger / Elephant reserves (existing as well as proposed) within 10 km radius from Zawar Lead Zinc Underground Mine has been obtained from Deputy Conservator of Forest (Wildlife) Udaipur vide letter no. F.9(10) (10 km - 469) Survey/DCF/WL/2023-24/6405 dated 14.08.2023 and the same has been enclosed as along with this Final EIA/EMP Report.  The ESZ of Jaisamand Wildlife Sanctuary (10.9 km) is present at distance of ~3.5 Km in North East direction from Block-I.  Seven Schedule - I species were found during the field survey. Wildlife conservation has been approved by CWLW vide letter no. F 11 (300)/CWLW/ 2022-23/174 dated 21.03.2023. Copy of the same along with Approved Wildlife Conservation Plan is enclosed with this Final EIA/EMP Report.  Air quality & noise level will be maintained well within the standards prescribed by MoEF&CC and CPCB.  Details of the impact on surrounding wildlife & mitigative measures have been given in this Final EIA/EMP Report.	<b>Chapter 3</b> <b>Para 3.14.1</b> <b>Pg.137</b>  <b>Annexure - 10 (a)</b>         <b>Annexure - 10 (b)</b>         <b>Chapter 4</b>
15)	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors,	No existence of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Tiger / Elephant reserves	<b>Chapter 3</b> <b>Para 3.14.1</b>



ToR No.	ToR Point	Compliance	Ref in Final EIA/EMP Report
	Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished	(existing as well as proposed) within 10 km radius from Zawar Lead Zinc Underground Mine has been obtained from Deputy Conservator of Forest (Wildlife) Udaipur vide letter no. F.9(10) (10 km - 469) Survey/DCF/WL/2023-24/6405 dated 14.08.2023 and the same has been enclosed as along with this Final EIA/EMP Report.  The ESZ of Jaisamand Wildlife Sanctuary (10.9 km) is present at distance of ~3.5 Km in North East direction from Block-I.	<b>Pg.137</b>  <b>Annexure 10 (a)</b>
16)	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.	Detailed Biological Study has been conducted for the project.  During our field survey no Rare, Endangered & Threatened Species (RET) were noticed in 10 km radius study area.  Seven Schedule - I species were found during the field survey. Wildlife conservation has been approved by CWLW vide letter no. F 11 (300)/CWLW/ 2022-23/174 dated 21.03.2023. Copy of the same along with Approved Wildlife Conservation Plan is enclosed with this Final EIA/EMP Report.  Details are given in this Final EIA/EMP Report.  A budget of Rs. 18.45 Crore has been allocated for Wildlife Conservation plan.	<b>Chapter 3</b>  <b>Annexure 10 (b)</b>  <b>Chapter 10</b> <b>Table 10.2</b> <b>Pg.300</b>
17)	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravalli Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department	No Critically Polluted areas as notified by the Central Pollution Control Board are located within 10 km from the boundary of mining lease. Hence, it is not applicable.  The proposed project does not come under the Aravalli range, as the proposed project lies in Odisha.  The same has been certified from the Office of Mining Engineer, DMG, Udaipur vide letter no. Kha. A. / Udai/ CC – 3/ M. L. 3/ 89/ 387 dated 22.06.2009.	<b>Annexure 15</b>



ToR No.	ToR Point	Compliance	Ref in Final EIA/EMP Report
	should be secured and furnished to the effect that the proposed mining activities could be considered.		
18)	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).	The mining lease exists in District Udaipur of State Rajasthan, which is not a coastal zone.	
19)	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.	There will be change in land use for 68.95 ha of forest land within in mine lease due to proposed installation of beneficiation plant, tailing storage facility, surface infrastructure etc.  The application for additional surface rights of 68.95 ha has been submitted to forest division vide proposal no. FP/RJ/MIN/25404/2017 dated: 16.05.2017.	<b>Chapter 7 Para 7.4 Pg.243</b>
20)	One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009,	One season primary baseline data for ambient air quality, (as per CPCB quality Notification, 2009), water quality, noise level, soil and flora & fauna has been collected during Summer Season (March to May, 2021 and March to May, 2024). Details regarding the same have been incorporated in this Final EIA/EMP Report.	<b>Chapter 3 Para 3.10 Pg.106</b>



ToR No.	ToR Point	Compliance	Ref in Final EIA/EMP Report
	water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM <sub>10</sub> , particularly for free silica, should be given.	Detailed AAQM data for Baseline Season (March to May, 2021 & March to May, 2024) are enclosed with this Final EIA/EMP Report.  Location of the monitoring stations was selected keeping in view the pre- dominant downwind direction and location of the sensitive receptors and also that they represent whole of the study area. One location has been selected in downwind direction from the lease boundary. The selection criteria of the monitoring locations have been given in this Final EIA/ EMP report	<b>Annexure 13 (a &amp; b)</b>
21)	Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.	AERMOD version 9.9.0 Dispersion Model, based on steady state Gaussian Plume Dispersion, was used for the Prediction of incremental value due to this Mining Project. Impact of movement of vehicles for transportation of mineral has been considered.  Isopleth showing incremental concentration of PM from area source and clearly indicating the air quality contours and wind rose showing pre-dominant wind direction have been prepared. Detail of same along with details of the model used and input parameters used for modelling has been given in this Final EIA/EMP Report.	<b>Chapter 4 Table 4.9 Pg.182</b>  <b>Chapter-4 Fig.4.1 (a)-(d) Pg.183</b>
22)	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.	Total water requirement will be 14000 KLD which will be sourced from the Tidi Dam.  Permission for the same was obtained from the Water Source Department, Government of Rajasthan on 17.09.1976.	<b>Chapter -2 Para 2.7.1.1 Pg.50 Annexure 11</b>
23)	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	Permission to withdraw water was obtained from the Water Source Department, Government of Rajasthan on 17.09.1976.	<b>Annexure 11</b>



ToR No.	ToR Point	Compliance			Ref in Final EIA/EMP Report
24)	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	39 check dams have been operational for the purpose of ground water recharge of 92812 m3/year against mandatory requirement of 88293 m3/year  Details of same along with other water conservation measures are given in this Final EIA/EMP Report.			<b>Chapter 4</b> <b>Para 4.5.4.4</b> <b>Pg.204</b>  <b>Annexure 17</b>
25)	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	The Tidi nadi forms major river system in Core and peripheral area.  Mining being underground, there is no such impact.  Also, surface water bodies are far away from the surface infrastructures in the core zone. To avoid & control any contamination, the nallah or tributaries falling in the vicinity of tailing dam has been sealed.  General ground level in the area noted as 520 m AMSL. Water table level varies from Water table level varies from 517-510 mRL.  Ultimate working depth of the mining operation will be - 600 mRL, -400 mRL, -300 mRL, -100 mRL at Mochia, Balaria, Zawarmala and Baroi respectively.  Ground water intersected during mining activities shall be dewatered and recycled for process use etc. and NOC regarding the same was issued on 11th December 2013.  Application for renewal of NOC submitted on 9th Dec 2016 and the same has been further applied online on 10.06.2021 as per GGWA latest guideline dated 24.09.2020 and amendments.			<b>Chapter 4</b> <b>Para 4.5.4.1</b> <b>Pg.200</b>          <b>Chapter 4</b> <b>Para 4.5.4.2</b> <b>Pg.203</b>          <b>Annexure 9</b>
26)	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water	Elevation Range:	345-695 AMSL		<b>Chapter 4</b> <b>Para 4.5.4.2</b> <b>Pg.203</b>
		General Ground level:	520 m AMSL		
		Water Level	Pre Monsoon	513-510 AMSL	
			Post Monsoon	517-515 AMSL	
		Ultimate Working Depth:	Mochia	-600 mRL	
			Balaria	-400 mRL	
			Baroi	-100 mRL	
			Zawarmala	-300 mRL	
		Ground water intersected during mining activities shall be dewatered and recycled for process use etc. and NOC			



ToR No.	ToR Point	Compliance			Ref in Final EIA/EMP Report																		
	and for pumping of ground water should also be obtained and copy furnished	regarding the same was issued on 11th December 2013. Application for renewal of NOC submitted on 9th Dec 2016 and the same has been further applied online on 10.06.2021 as per GGWA latest guideline dated 24.09.2020 and amendments.			Annexure 9																		
27)	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	The Tidi river forms major river system in Core and peripheral area of Block-I. Mining being underground, there is no such impact.  Also, surface water bodies are far away from the surface infrastructures in the core zone.  The Parei Nadi flows in the core zone of Block-3 which requires further exploration before starting of mining activity.			Chapter 4 Para 4.5.4.1 Pg.200																		
28)	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.	Elevation Range:		345-695 AMSL	Chapter 4 Para 4.5.4.2 Pg.203  Annexure 21 (c)																		
		General Ground level:		520 m AMSL																			
		Water Level	Pre Monsoon	513-510 AMSL																			
			Post Monsoon	517-515 AMSL																			
		Ultimate Working Depth:	Mochia	-600 mRL																			
			Balaria	-400 mRL																			
			Baroi	-100 mRL																			
			Zawarmala	-300 mRL																			
		A schematic diagram showing all mining details for the same is enclosed with this Final EIA/EMP Report.																					
29)	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project.	Plantation will be carried out progressively in the area as below: <table><tr><th>Year</th><th>Nos of Plantation</th><th>Area</th></tr><tr><td>1<sup>st</sup> Year</td><td>11,000</td><td>2.15 ha + gap filling</td></tr><tr><td>2<sup>nd</sup> Year</td><td>11,000</td><td>3 ha + gap filling</td></tr><tr><td>3<sup>rd</sup> Year</td><td>11,000</td><td>3 ha + gap filling</td></tr><tr><td>4<sup>th</sup> Year</td><td>11,000</td><td>3 ha + gap filling</td></tr><tr><td>5<sup>th</sup> Year</td><td>11,000</td><td>3 ha + gap filling</td></tr></table>  Fruits bearing and native plants will be planted including Jamun, Mango, Sitafal, Guava, Goonda, Imli, Neem, Kachnar, Shisham, Palash, Amaltas, Gulmohar, Peltoforum,			Year	Nos of Plantation	Area	1 <sup>st</sup> Year	11,000	2.15 ha + gap filling	2 <sup>nd</sup> Year	11,000	3 ha + gap filling	3 <sup>rd</sup> Year	11,000	3 ha + gap filling	4 <sup>th</sup> Year	11,000	3 ha + gap filling	5 <sup>th</sup> Year	11,000	3 ha + gap filling	Chapter 4 Para 4.5.9.7 Pg.225
Year	Nos of Plantation	Area																					
1 <sup>st</sup> Year	11,000	2.15 ha + gap filling																					
2 <sup>nd</sup> Year	11,000	3 ha + gap filling																					
3 <sup>rd</sup> Year	11,000	3 ha + gap filling																					
4 <sup>th</sup> Year	11,000	3 ha + gap filling																					
5 <sup>th</sup> Year	11,000	3 ha + gap filling																					





ToR No.	ToR Point	Compliance	Ref in Final EIA/EMP Report
		<p>Pipaletc</p> <p>About Rs. 5.0 Crore, along with recurring cost of Rs. 0.14 Crore, are proposed as cost for development of plantation/greenbelt over 14.15 Ha including cost for sapling, fertilizers, tree guard, tool stackers and maintenance etc.</p>	<p><b>Chapter 4</b> <b>Para 4.5.9.9</b> <b>Pg. 227</b></p>
30)	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	<p>About 17,809 TPD of Ore after excavation will be transported to Crusher (installed underground and at surface) and then to beneficiation mill (Located within mine lease area). After the processing of Ore at Mill, The concentrates (1,424.6 TPD) are transported to end users (Smelters) through road by 35 Tonne capacity trucks.</p> <p>Details of the same are given in this Final EIA/EMP Report.</p>	<p><b>Chapter 4</b> <b>Para 4.5.8.2</b> <b>Pg.219</b></p>
31)	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	This is an existing mine and all the onsite shelter and facilities have been provided to workers. Details of the same is given in this Final EIA/EMP Report.	<p><b>Chapter 2</b> <b>Para 2.5.1</b> <b>Pg.48</b></p>
32)	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report	<ul style="list-style-type: none"> <li>➤ At conceptual period, total land for Industrial/Mining area will be 276.52 ha, will be diverted for plantation on forest and non forest land.</li> <li>➤ 183.89 ha of Forest land will be restored.</li> <li>➤ Total 321.63 ha area of non forest land will be covered under Green belt and plantation at the end of life of mine.</li> <li>➤ An area of 1269.92 ha area will remain undisturbed.</li> </ul> <p>Details of the same are given in this Final EIA/EMP Report.</p>	<p><b>Chapter 4</b> <b>Para 4.5.6.3</b> <b>Pg.208</b></p>
33)	A time bound Progressive Greenbelt Development Plan shall be prepared in a	Till date, 170.85 ha area has been covered under plantation. Additional 14.15 ha land will be taken up for	<p><b>Chapter 4</b> <b>Para 4.5.9.7</b></p>



ToR No.	ToR Point	Compliance	Ref in Final EIA/EMP Report
	tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the project. Phase wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and species to be planted. The details of plantation already done should be given.	<p>plantation purpose for the proposal period (2021-2025) in the acquired area along with gap filling in the existing area to increase density.</p> <p>Over last 6 years, carried out plantation in 100 ha under RDF-1 and 200 ha under RDF-2 through forest department in nearby area in mine lease.</p> <p>At post operational Stage, Total 321.63 ha area will be covered under Green belt and plantation.</p> <p>About Rs. 5.0 Crore, along with recurring cost of Rs. 0.14 Crore, are proposed as cost for development of plantation/greenbelt over 14.15 Ha including cost for sapling, fertilizers, tree guard, tool stackers and maintenance etc. The area designated for each year shall be planted with trees and shrubs @ 11000 Plants.</p>	<p><b>Pg.225</b></p> <p><b>Chapter 4</b> <b>Para 4.5-9.9</b> <b>Pg. 227</b></p>
34)	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	<p>Occupational health impacts are identified; suitable preventive health measures are/will be taken, and are incorporated in this Final EIA/EMP Report.</p> <p>Before joining, Initial Medical Examination test are ensured. Periodic medical examinations are taken once in 3 years for workers of age above 45 years or once in 5 years in case of workers below 45 years of age. Proper health record has been/will be maintained.</p> <p>A budget of Rs. 2863 Lakhs (for the year 2021-2030) has been proposed for Occupational Health &amp; safety measures &amp; medical examination</p> <p>Details are incorporated in this Final EIA/EMP report.</p>	<p><b>Chapter 4</b> <b>Para 4.5.10.2</b> <b>Pg.232</b></p>
35)	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	<p>Public health implications of the project and related activities for the population in the impact zone have been evaluated and common prevailing diseases in the area were identified.</p> <p>Budget is allocated as per the issues raised during public hearing and as per MoEF&amp;CC OM dated 30.09.2020 &amp; 20.10.2020.</p>	<p><b>Chapter 4</b> <b>Para 4.5.7.5</b> <b>Pg.215</b></p> <p><b>Chapter - 7</b> <b>Para 7.2.3</b> <b>Pg. 242</b></p>
36)	Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be	As per MoEF&CC OM dated 30.09.2020 & 20.10.2020, PP has allocated funds for the development of nearby areas on the basis of the issues raised during Public Hearing.	<p><b>Chapter - 7</b> <b>Para 7.2.3</b> <b>Pg. 242</b></p>



ToR No.	ToR Point	Compliance	Ref in Final EIA/EMP Report
	given with time frames for implementation		
37)	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	Detailed Environmental Management Plan and occupational health impacts for the proposed Mining Project has been incorporated in this Final EIA/EMP Report.	<b>Chapter 10</b>
38)	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same has been incorporated in this Final EIA/EMP Report	<b>Chapter - 7 Para 7.2.3 Pg. 242  Annexure - 22</b>
39)	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No Litigation pending against the court.	
40)	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	Capital Cost of the Project: Rs. 1250 Crores /- Capital Cost for EMP: Rs. 120 Crores /- Recurring Cost for EMP: Rs. 400 Lacs/annum	<b>Chapter 10 Table 10.2 Pg.300</b>
41)	<b>General Points</b>		
a.	All documents to be properly referenced with index and continuous page numbering.	Complied with	
b.	Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated	Complied with	
c.	Where the documents provided are in a language other than English, an English translation should be provided.	Complied with	
d.	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled	Questionnaire for environmental appraisal of mining projects will be submitted with Final EIA/EMP report.	



ToR No.	ToR Point	Compliance	Ref in Final EIA/EMP Report
	and submitted		
e.	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.	Instructions issued by MoEF vide O.M. No. J-11013/41/2006-IA.II (I) dated 4 <sup>th</sup> August, 2009, have been followed.	
f.	Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation	Noted and Complied with	
g.	As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	Noted and Complied with	
42)	The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	Surface plan of the area indicating contours of main topographic features, drainage and mining area are enclosed with this Final EIA/EMP Report.	<b>Annexure 21 (a)</b>
43)	The prescribed TOR would be valid for a period of four years for submission of the	Geological plan and sections of the mine and external dumps showing the land features of the adjoining area are	<b>Annexure - 21 (b)</b>



ToR No.	ToR Point	Compliance	Ref in Final EIA/EMP Report
	EIA/EMP report, as per the O.M. No. J-11013/41/2006-1A. II (I) dated 29.08.2017 and as per the notification S.O. 751(E) 17th February, 2020. The instant TOR is valid up to four years from the date of issue of the ToR.	enclosed with this Final EIA/EMP Report	
43)	After preparing the draft EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above mentioned issues, the proponent will get the public hearing conducted and take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.	Noted	





## CHAPTER-1

### INTRODUCTION

#### 1.1 PURPOSE OF THE REPORT

M/s. Hindustan Zinc Limited has proposed Expansion of Zawar Group of Underground Lead-Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total excavation of 7.78 Million TPA including Waste Rock 1.28 Million TPA and Beneficiation from 4.8 MTPA to 7.3 MTPA (M.L. Area- 3620 ha; ML No.03/89) at Village: Zawar, Tehsil: Girwa & Sarada, District: Udaipur, Rajasthan.

In accordance with the EIA Notification -2006 & subsequent amendments, Terms of Reference (ToR) was granted by MoEF&CC, New Delhi vide letter no J-11015/259/2012-IA-II (M) dated 08th September, 2021.

This report has been prepared with reference to the ToR issued by MoEF&CC, New Delhi to carry out the Environmental Impact Assessment study for the proposed expansion in Ore Production Capacity from 4.8 Million TPA to 6.5 Million TPA and Beneficiation from 4.8 MTPA to 7.3 MTPA at Village- Zawar, Tehsil: Girwa & Sarada, District: Udaipur, Rajasthan by M/s. Hindustan Zinc Limited.

The baseline data for the environmental studies has been collected during Summer Season (March to May, 2021) and Summer Season (March to May, 2024)

The main purpose of this report is to provide a coherent statement after analyzing all significant impact of the proposed mining project and measures that should be taken to eliminate and mitigate them. It contains essential information for:

- The proponent to implement the proposal in an environmentally and socially responsible way;
- The responsible authority to make an informed decision on the proposal, including the terms and conditions that must be attached to an approval or authorization; and
- The public to understand the proposal and its likely impacts on people and the environment.

#### 1.2 IDENTIFICATION OF PROJECT & PROJECT PROPONENT

##### 1.2.1 IDENTIFICATION OF THE PROJECT

###### A. PROJECT DESCRIPTION

M/s. Hindustan Zinc Limited has proposed Expansion of Zawar Group of Underground Lead-Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total excavation of 7.78 Million TPA including Waste Rock 1.28 Million TPA and Beneficiation from 4.8 MTPA to 7.3 MTPA (M.L. Area- 3620 ha; ML No.03/89) at Village: Zawar, Tehsil: Girwa & Sarada, District: Udaipur, Rajasthan.

The Zawar group of Mines is divided in 2 Blocks: Block 1 and 3 for systematic and scientific development of Deposit.



S. No	Blocks	Area (in Ha)
1.	Block-1	3172
2.	Block-3	448
	Total Area (Zawar Mine)	3620

Zawar has 4 operating mines in Block-1 and Bara deposit which falls in Block-3 requires further exploration before starting of mining activity.

The details of 4 operating mine in Block-I are as follows:

S. No	Blocks	Name of Mines	Tehsil	Area (in Ha)
1.	Block-1	Mochia Lead Zinc Mine	Sarada	157 ha
2.		Balaria Lead Zinc Mine	Sarada	103 Ha
3.		Zawarmala Lead Zinc Mine	Girwa	118 Ha
4.		Baroi Lead Zinc Mine	Girwa	284 ha

#### B. SCREENING CATEGORY

As per EIA Notification dated 14th September, 2006 as amended from time to time, the project falls under Category “A”, Project or Activity 1(a) – 3” and Project or Activity 2 (b) - 3 for “Mineral Beneficiation.”

#### C. MINING LEASE STATUS

- Original Mining Lease was granted by Rajpramukh, Rajasthan in favour of Metal Corporation of India over an area of 5178 ha in five blocks 1, 1A, 2, 3 & 4 on 18<sup>th</sup> August 1950 (Validity: 01.04.1950 to 01.04.1970)
- **1st Renewal (Validity: 01.04.1970 to 29.03.1990):** The Govt. of Rajasthan granted 1st renewal of Mining Lease in favor of M/s. Hindustan Zinc Limited vide letter no. F.2(4)/Khanij/70 dated 13.03.1973 & Memorandum no. ME/UD/C.C.III/F.1(4)(27)69/198 dated 16.01.1975.
- **2nd Renewal (Validity: 30.03.1990 to 29.03.2000):** The Govt. of Rajasthan granted 2nd renewal of Mining Lease to M/s. Hindustan Zinc Limited vide letter no. i-12/26/Khanij-2/90 dated 20.10.1992.
- Due to low mineralization potential, HZL opted for reduction of lease hold area from 5178 to 3620 ha, by surrendering an area of 1558 Ha vide letter dated 03.08.1999. **(Validity: 30.03.2000 to 29.03.2010)**
- HZL entered into an agreement with Govt of Rajasthan on 25.04.2000 on renewal of leasehold of 5178 ha from 30.03.1990 to 05.01.2000 & 3620 ha for the period from 06.01.2000 to 29.03.2010.
- Dept. of Mines & Geology, Govt. of Rajasthan extended the lease validity till 31.03.2030 as per Section 8A (5) of MMRD (Amendment) Ordinance 2015 vide letter no. Kh/Udai/CC-3/Pr/Sarada/323/08/3856 dated 26.02.2015 & Supplementary Lease Deed was executed on 06.07.2016.

Copy of lease documents is enclosed as **Annexure 1.**



#### D. STATUS OF APPROVAL OF MINING PLAN/SCHEME OF MINING/REVIEW OF MINING PLAN

The Modified Mining plan along with Progressive Mine Closure Plan in respect of Zawar Group of Mines Mining Lease for Lead-zinc and Silver mineral near village Zawar, Tehsil Sarada & Girwa, District, Udaipur over an area of 3620 Ha has been approved by IBM, Ajmer vide letter no: S.no. 584 (4) (3) (1868)/ 2021 – Sh.Khani- Ajam dated 15.07.2021 (Valid till 2024 – 2025). Copy of Mining Plan Approval Letter is enclosed as **Annexure 2**.

#### E. EXISTING ENVIRONMENTAL CLEARANCES AND CONSENTS:

S. No	Particular	Letter No & Date	Ref
<b>Existing Environmental Clearances (EC)</b>			
1.	Environment clearance for enhancement of production capacity from 1.2 to 1.5 MTPA ore production and beneficiation was granted.	11015/289/2008-IA. II (M), dated 30.10.2009	<b>Annexure 3a</b>
2.	Environment clearance for enhancement of Ore production capacity from 1.5 MTPA to 4.0 MTPA and ore beneficiation from 1.5 MTPA to 4.0 MTPA was granted in favor of Hindustan Zinc Limited	11015/259/2012-IA. II (M), dated 05.01.2017	<b>Annexure 3b</b>
3.	Environment clearance under Para 7 (ii) for expansion in Zinc Ore from 4.0 to 4.8 MTPA and expansion in beneficiation plant from 4.0 to 4.8 million TPA	11015/259/2012-IA. II (M), dated 16.10.2020	<b>Annexure 3c</b>
<b>Certified Compliance of Existing EC</b>			
4.	EC compliance Report (4.0 MTPA) has been certified from Regional Office (Monitored by IRO on 07.08.2024)	IV/ENV/R/Mine-484/794/2008/814 dated 10.08.2024	<b>Annexure 4</b>
<b>Forest Clearances (FC)</b>			
5.	Clearance for diversification of forest land was granted by MoEF for the Forest area of 1537.91 Ha including 114.94 Ha for surface use.	F. No. 8-1/97-FC dated 15/16.06.1998	<b>Annexure 5a</b>
6.	Renewal of the forest diversion for the Forest area of 1537.91 Ha including 114.94 Ha for surface use was granted.	F. No. 8-1/1997-FC dated 23.01.2015	<b>Annexure 5b</b>
7.	Application for forest diversion for additional surface rights use for 68.95 ha of forest land	Proposal no. FP/RJ/MIN/25404/2017 dated: 16.05.2017	<b>Annexure 6</b>
<b>Existing Consent to Establish</b>			
8.	CTE for 4.8 MTPA of Lead Zinc Ore Mining	F(Mines)/Udaipur (Sarada)/53(1)/2016-2017/4486 - 4490; dated 12.01.2021 (Valid till	<b>Annexure 7</b>





		31/12/2022)	
9.	CTE for 4.80 MTPA of Beneficiation of Lead Zinc Ore	F(HDF)/Udaipur (Sarada)/1(1)/2020-2021/4882-4884; Date:29.01.2021 (Valid Till 31.12.2025)	
<b>Existing Consent to Operate</b>			
10.	CTO for 4.8 Million TPA of Lead Zinc Ore Production by RSPCB	F(Mines)/ Udaipur (Sarada)/53(1)/2016-2017/5003-5007; dated: 20.12.2022 (Valid till 31.12.2027)	<b><u>Annexure8a</u></b>
11.	CTO for 4.8 Million TPA Lead Zinc ore beneficiation by RSPCB	F(HDF)/ Udaipur (Sarada)/1(1)/2020-2021/5368-5370; dated 28.12.2022 (Valid Till 31.12.2027)	<b><u>Annexure8b</u></b>

#### F. CGWA PERMISSION

Ground water intersected during mining activities shall be dewatered and recycled for process use etc. and NOC regarding the same has been obtained from CGWA for Mochia, Balaria, Baroi and Zawarmala on 18.07.2024, 18.07.2024, 11.03.2024 and 17.07.2023 respectively. All the NOCs are valid up to 10.12.2024. Copy of all the NOCs are enclosed as **Annexure 9.**

#### G. STATUS OF PROPOSED EXPANSION PROJECT FOR ENVIRONMENT CLEARANCE

The chronology of the project activities undertaken so far with respect to the process of getting Environment clearance are as given in the table below-

**Table-1.1**  
**Status of proposal for Environment clearance**

S. No.	Project Activity	Date/Duration
1.	Baseline monitoring & data collection	Summer Season (March to May 2021) & (March to May, 2024)
2.	Application (For ToR) submitted to MoEFCC	31.07.2021
3.	Technical Presentation (for ToR) held before 35 <sup>th</sup> EAC (Non - Coal Mining)	16.08.2021
4.	ToR Letter issued by MoEF&CC, New Delhi	08.09.2021
5.	Conduction of public hearing	22.12.2021
6.	PH proceeding forwarded by SPCB to MoEFCC	12.01.2022

#### 1.2.2 INTRODUCTION OF PROJECT PROPONENT

- HZL is globally one of the largest Lead-Zinc integrated producer & a leading producer of Silver with 50+ years of experience.
- Ranked “1st in Asia-Pacific region and 7th globally” in ESG by the Dow Jones Sustainability Index (DJSI) 2020 in the Metals & Mining Sector.



- Reserves & Resources of about 447 million Tons as on 01.04.2021 with +25 years mine life
- EC Capacities-Ore Production- 20.15 MTPA, Zinc metal- 9.59 lakh TPA, Lead metal- 2.20 lakh TPA, and Silver- 979 TPA.
- Captive Thermal Power generation 514 MW, Waste heat power 35 MW, Wind power 274 MW and Solar PV-40 MW
- Emission Reduction of 5, 51,695 TPA CO<sub>2</sub>.
- Total Exchequer to Government during 2020-21 was ₹ 15,008 crores, including Royalty, Taxes & Dividends.
- 60 MLD Sewage Treatment Plant at Udaipur in PPP model on DBOT basis.
- Enhancing quality of life and economic wellbeing of the communities around our operations, mainly NANDGHAR, SAKHI, KHUSHI programs, reaching over 7 lakh people spread over 184 villages across Rajasthan. HZL Contributed Rs. 214 Crores in FY 2020-21 towards Corporate Social Responsibility.

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

#### 1.3.1 BRIEF DESCRIPTION OF NATURE, SIZE & LOCATION OF PROJECT

The brief description of the nature, size and location of the project has been given in table below:

**TABLE -1.2**  
**Brief description of the project**

S. No.	Particulars	Details	
A.	Nature of the Project	Lead-Zinc Underground Mining	
B.	Size of the Project		
1.	Mining Lease area	3620 ha	
2.	Proposed Production	<ul style="list-style-type: none"> <li>➤ Ore Production Capacity :4.8Million TPA to 6.5 Million TPA</li> <li>➤ Waste Rock: 1.28 Million TPA</li> <li>➤ Total excavation of 7.78 Million TPA</li> <li>➤ Beneficiation from 4.8 MTPA to 7.3 MTPA</li> </ul>	
C.	Location Details		
1.	Tehsils	Girwa	Sarada
2.	Villages	Zawar	Bhaladia
		Kodiya Khet	Bara
		Nayakheda	Chanawada
		Rawa	DhavadiTalai
		Tidi	Kanpur
		Udiyakheda	NewaTalai
			Padla
			Parsad
			Krishnapura



S. No.	Particulars	Details		
				Singhatwara
3.	District	Udaipur		
4.	State	Rajasthan		
5.	Toposheet No.	45 H/11, 45 H/12, 45 H/15 & 45 H/16		
6.	Geographical coordinates	Block 1	Latitude	24°19'0.3" to 24°22'51.59" N
			Longitude	73° 40'23.24" to 73° 45'12.24" E
		Block 3	Latitude	24°14'43.66" to 24°16'30.81" N
			Longitude	73° 41'47.03" to 73° 43'6.58" E

### 1.3.2 PROJECT IMPORTANCE TO THE COUNTRY AND REGION

- Zinc is a very versatile non-ferrous metal. Zinc's different applications rank it as the 4th most common metal in use after iron, aluminum and copper. It is evident that the consumption is increasing and there is a gap between the demand and supply.
- The present production capacities of Zinc in India are sufficient to meet the domestic requirements. However, the demand for zinc in India is expected to grow at a rate of 8-10% per annum nearly twice the rate at which global demand is tipped to grow which makes it viable for the expansion of the zinc production capacities.
- As India is a developing economy, overall zinc consumption is forecast to continue to increase in India due to the development of large infrastructure, and the strengthening of their middle class (and subsequent improved purchasing power).
- It is expected to grow at similar rates due to primary demand of zinc in galvanizing steel which protects the steel from corrosion. Other major uses for zinc include its utility in brass and bronze among many alloys; die casting, batteries, chemical compounds such as paint, ceramics and pharmaceuticals etc.
- Exploiting this Lead-Zinc deposit is critically important for the country's long-term economic growth. By expansion of mining and beneficiation, HZL will provide the country with increased Government earnings and revenues, transform the region's economy from predominantly agricultural to significantly industrial, and accelerate the pace of industrial development in the region.

### 1.4 SCOPE OF THE STUDY

Scope of this study covers all the points given in the Terms of References (ToR) prescribed by MoEF&CC, vide letter no J-11015/259/2012-IA-II (M) dated 08<sup>th</sup> September, 2021 as given in page no. 1-14 of this report.

The data generated from various studies for EIA/EMP are presented and discussed in following chapters of this report prepared as per Appendix-III of the EIA Notification, 2006.

Chapter	Description
Chapter-1	Introduction



Chapter	Description
Chapter-2	Project Description
Chapter-3	Description of the Environment
Chapter-4	Anticipated Environmental Impacts and Mitigation Measures
Chapter-5	Analysis of Alternatives (Technology & Site)
Chapter-6	Environmental Monitoring Plan
Chapter-7	Additional Studies
Chapter-8	Project Benefits
Chapter-9	Environment Cost Benefit Analysis
Chapter-10	Environment Management Plan
Chapter-11	Summary & Conclusion
Chapter-12	Disclosure of Consultants Engaged





## CHAPTER-2

### PROJECT DESCRIPTION

#### 2.1 TYPE OF THE PROJECT

M/s. Hindustan Zinc Limited has proposed Expansion of Zawar Group of Underground Lead-Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total excavation of 7.78 Million TPA including Waste Rock 1.28 MTPA and Beneficiation from 4.8 MTPA to 7.3 MTPA (M.L. Area- 3620 ha; ML No.03/89) at Villages- Zawar, Kodiya Khet, Nayakheda, Rawa, Tidi, Udiyakheda, Barothi Bhaldia, Bara, Chanawada, Dhavadi Talai, Kanpur, Newa Talai, Padla, Parsad, Krishnapura, Singhatwara, Tehsil: Girwa & Sarada, District: Udaipur, Rajasthan.

As per EIA Notification dated 14th September, 2006 and subsequent amendments, the project falls under Category “A”, Project or Activity 1(a) – 3 mining of minerals and Project or Activity 2 (b) - 3 for “Mineral Beneficiation.”

#### 2.2 NEED FOR THE PROJECT

Global zinc & lead consumption is expected to grow steadily by 4-5 % per annum in coming years which needs to be met by higher mine & smelter output. As India is one of the fastest growing economies in the world, adequate support from metal sector is essential to support & sustain infrastructure development & growth. Galvanized iron products play key role in infrastructure development and therefore the requirement of zinc metal is essential.

Zinc is a very versatile non-ferrous metal. Zinc’s different applications rank it as the 4th most common metal in use after iron, aluminum and copper. Zinc consumption is forecast to grow at a compound average annual rate of ~2% p.a. globally in FY2021-2030. Global zinc consumption is projected to grow to 20 Mt in 2035 representing average annual increase of 0.28 Mt.

##### Demand Supply Gap

In the aftermath of the financial crisis of 2008-2009, the Indian economy lost momentum. Growth in industrial production slowed from an average of 7.9% during 2000-2008 to 3.9% over the period 2010-2015. The domestic refined zinc supply & demand is given in Table - 2.1.

**Table - 2.1**  
**DOMESTIC REFINED ZINC SUPPLY & DEMAND (KT ZN)**

Year	2016	2017	2018	2019	2020	2025
Demand (kt)	699	844	833	828	824	827
Supply (kt)	643	838	811	849	837	837

Source: Wood Mackenzie Long Term Outlook

##### Import Vs Indigenous Production

The present production capacities of zinc in India are sufficient to meet the domestic requirements. However, the demand for zinc in India is expected to grow at a 7.1% which makes it viable for the



expansion of the zinc production capacities. Further, the deficit in international market during the upcoming years provides opportunity for export.

### Export Possibility

Indian exports majorly catered to south east asian and african nations. In India, since Hindustan Zinc is the largest producer of primary zinc, export of zinc is highly feasible and shall bring value addition.

### Domestic/Export Market

Zinc having found primary application in galvanization, a range of galvanized products are produced to meet various Industrial and consumer demands. Galvanized sheets (corrugated and plain), galvanized pipes, galvanized structure, galvanized sheet, galvanized wires are used for various applications.

Galvanizing segment accounts for 68% share of the overall zinc demand in India while non-galvanizing accounts for 32 % share. Among the major customer segments, galvanized sheets accounts for major share of the zinc consumption followed by structure and alloys.

The following chart (Figure-1.1) explains the demand for zinc in India and its segment wise break-up India has the potential for exporting zinc profitably as global zinc demand continues to be high & driven mainly by galvanizing sector in the emerging of Asia and Africa. The reported increase in Chinese manufacturing activities and US automotive sales along with emerging signs of stability in Europe's manufacturing and services sector are expected to support zinc demand.

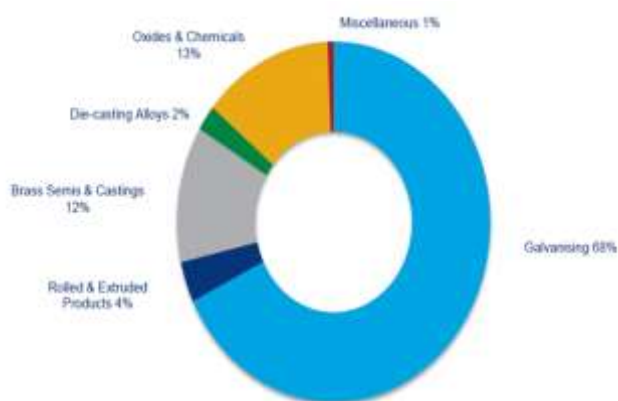


Figure 2.1 Demand for Zinc in India and its segment wise break-up India

## 2.3 LOCATION OF THE PROJECT

The mine site is located at Villages Zawar, Kodiya Khet, Nayakheda, Rawa, Tidi, Udiyakheda, Barothi Bhaldia, Bara, Chanawada, Dhavadi Talai, Kanpur, Newa Talai, Padla, Parsad, Krishnapura, Singhatwara, Tehsil – Girwa & Sarada, District- Udaipur (Rajasthan).

The maps showing general location, specific location (Mine Lease boundary) along with geographical coordinates, and geology & geomorphology of the mine site is given on the following pages.

### 2.3.1 LOCATION MAP (GENERAL AND SPECIFIC)

The map showing general as well as specific location of the mine site is as given below-



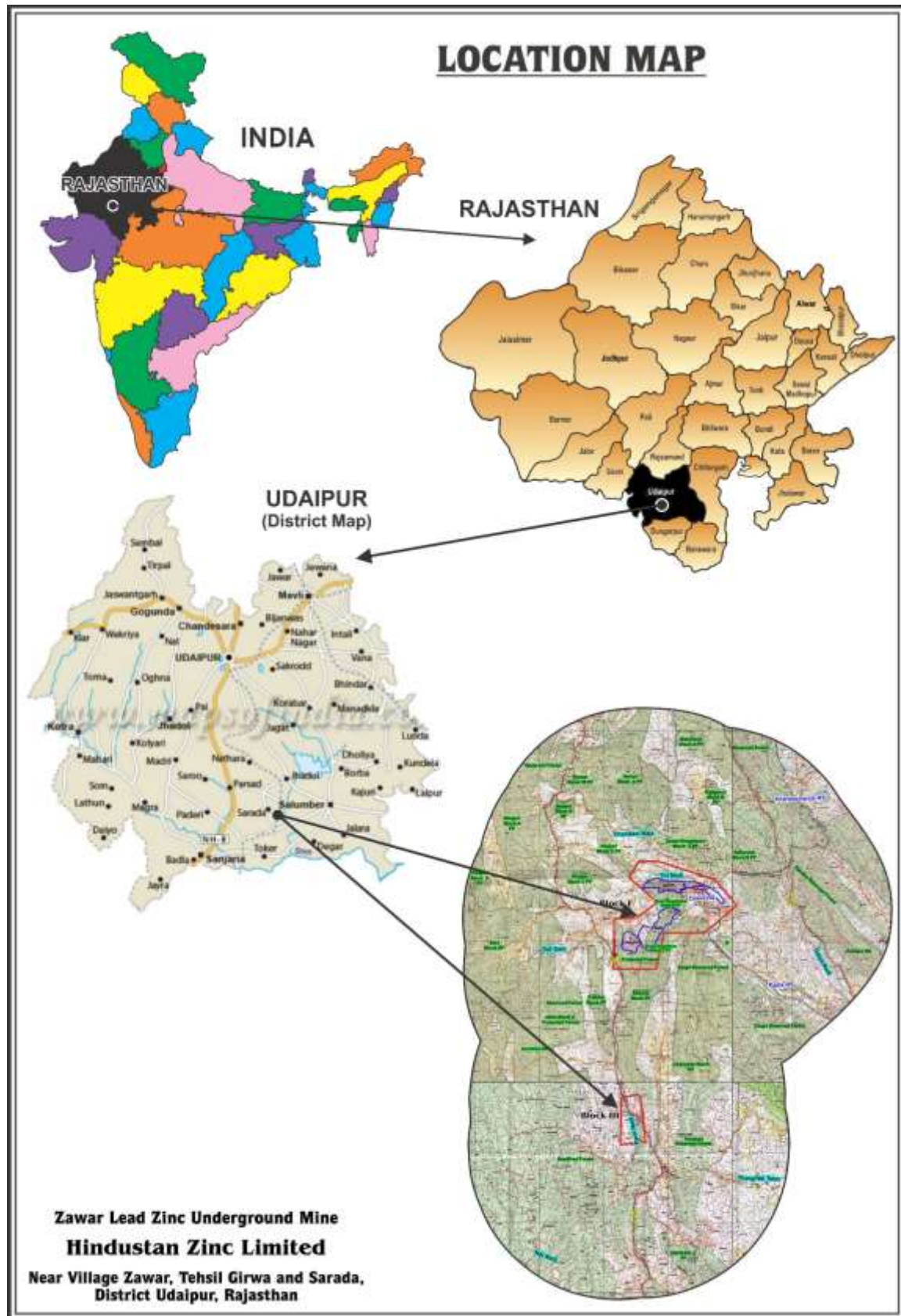


Figure 2.2: Location map (Showing general as well as specific location of the ML area)

2.3.2

SHOWING GEOLOGY AND GEOMORPHOLOGY OF THE MINE SITE WITH COORDINATES

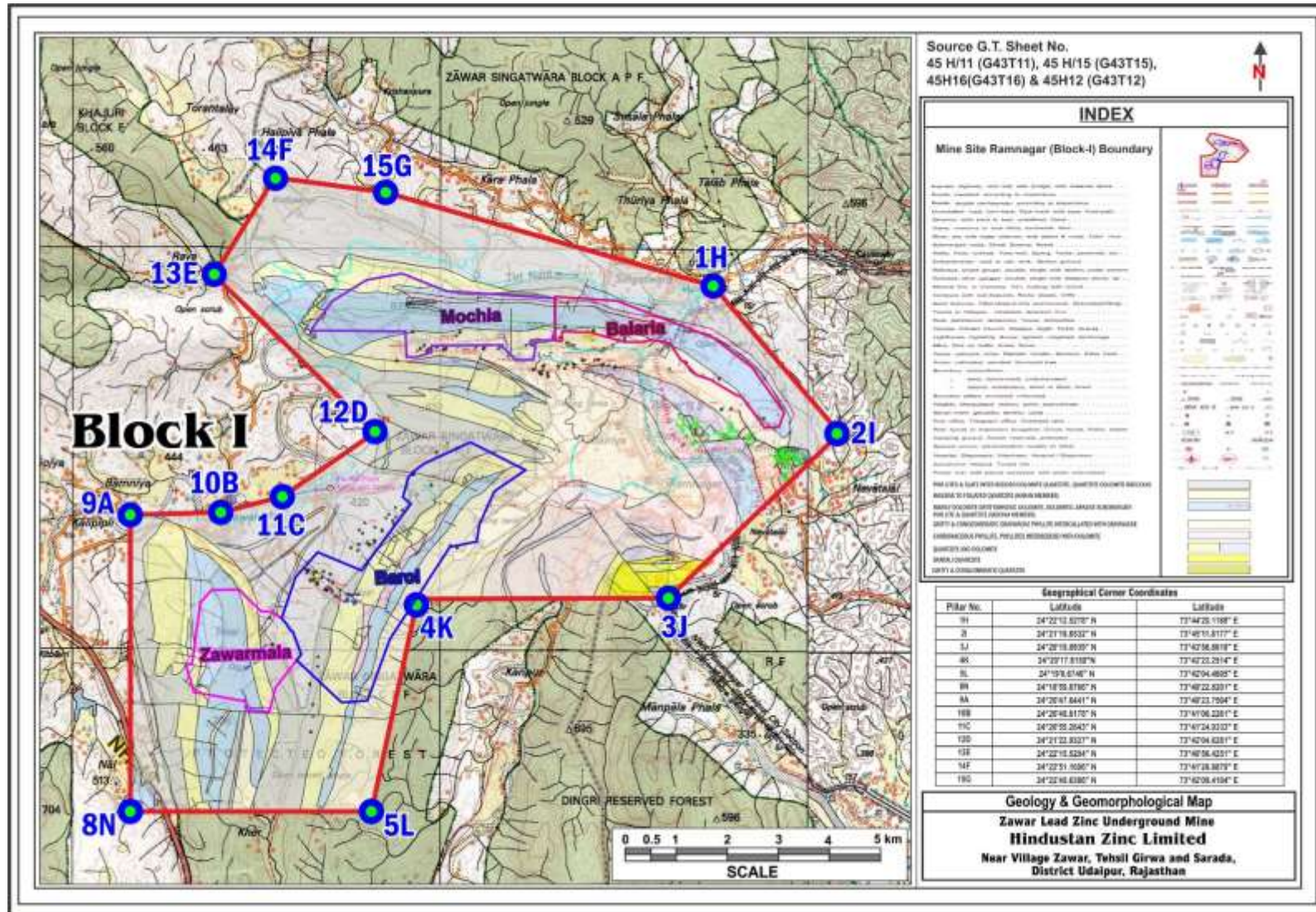


Figure 2.3 (a): Map showing Geology and Geomorphology of the Mine Site (Block-I) with Geographical Extents



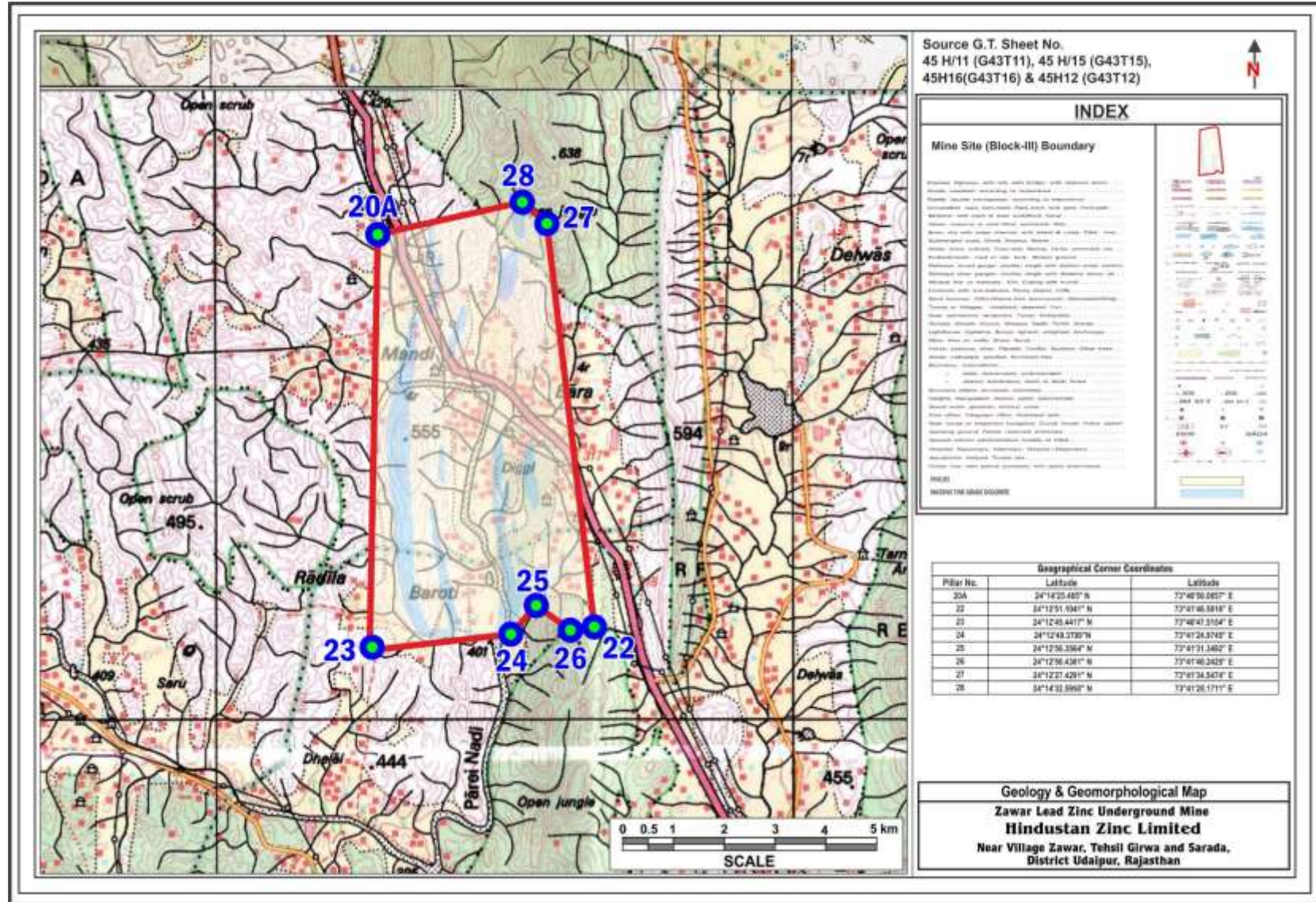


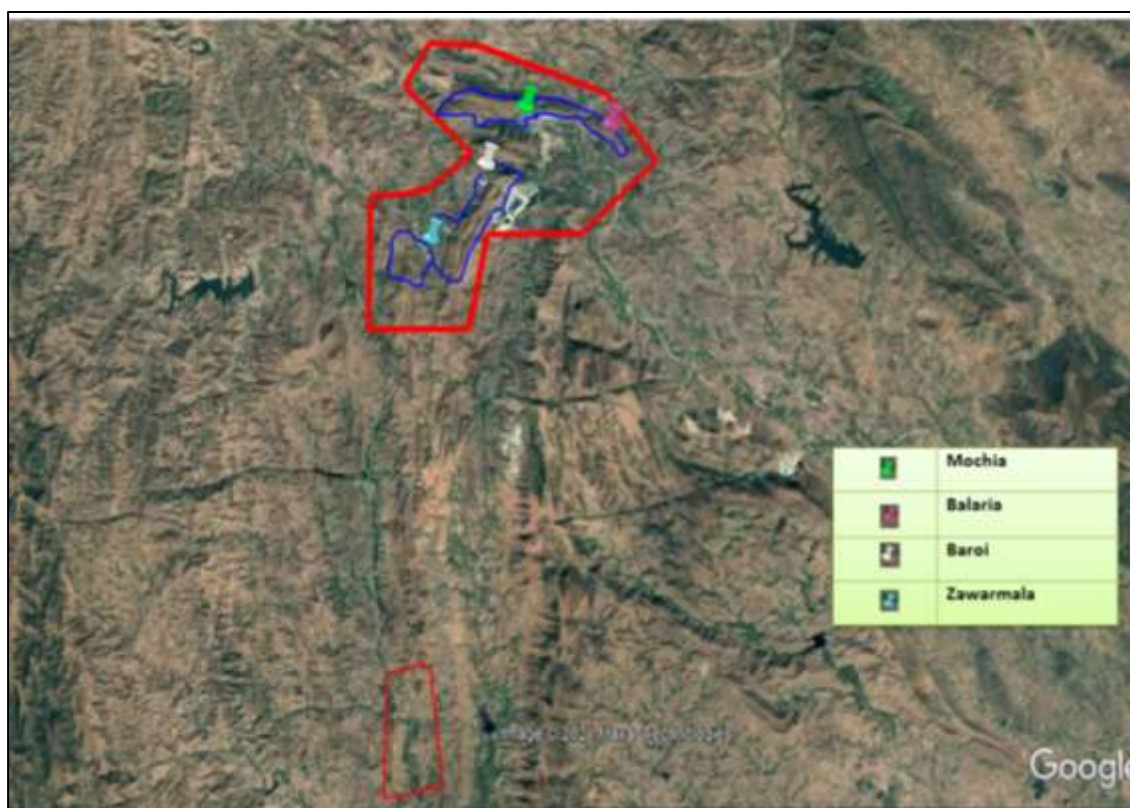
Figure 2.3 (b): Map showing Geology and Geomorphology of the Mine Site (Block-III) with Geographical Extents

### 2.3.3 PROJECT SITE LAYOUT

#### A. LAND DETAILS

The mining activities are being and will be carried out within the mining lease area of 3620 ha. Out of 3620 ha, 2082.09 Ha is non-forest land and 1537.91 ha is forest land. Khasra Map along with Khasra Details is enclosed as **Annexure 1**.

Block	Mines	Forest (Ha)	Non-Forest Land (Ha)	Total (Ha)
Block-I	Mochia, Balaria, Zawarmala & Baroi	1537.91	1634.09	3172
Block-III	Bara	-	448	448
<b>Total</b>		<b>1537.91</b>	<b>2082.09</b>	<b>3620</b>



**Figure 2.4: KML showing the 4 operating Mines in Block-I**

Clearance for diversification of forest land was granted by MoEF for the Forest area of 1537.91 Ha including 114.94 Ha for surface use F.No. 8-1/97-FC Dated 15/16.06.1998. Renewal of the forest diversion was granted. F.No. 8 1/1997-FC Dated 23.01.2015. (**Annexure 5a**). Land use of 114.94 ha area is given below:

S. No	Area (ha)	Land Use*
1.	8.55	Mochia Mine central Block surface Infrastructure
2.	12.50	West Mochia Mine, Surface Facilities
3.	64.86	Tailing Dam
4.	4.27	North Baroi Mine Surface facilities





5.	5.824	Baroi Mine Surface facilities
6.	18.94	Zawarmala Mine Surface facilities, Rani Khan & Pratap Khan
<b>Total</b>	<b>114.94</b>	

Application for forest diversion for additional surface rights for 68.95 ha of forest land for various purposes was submitted vide Proposal No FP/RJ/MIN/25404/2017 dated: 16.05.2017 as per below but due to non-availability of forest clearance for the said area, the entity of Proposed Ore Beneficiation Plant and New Tailing Storage Facility is proposed in Govt Barren land in place of forest land. Comparison of proposed infrastructure during ToR and as proposed now is given below:

S. No.	Proposed Infrastructure	Proposal during ToR [Forest Area (Ha)]	Proposal at present [Govt Barren Land (Ha)]
1.	Proposed Ore Beneficiation Plant	14.36	9.90
2.	New Tailing Storage Facility	29.87	25.10
3.	Proposed Mine Surface Infrastructure	5.94	0.00
4.	Expansion of Existing Tailing Storage Facility	18.78	0.00
<b>Total Area</b>		<b>68.95</b>	<b>35.00</b>

As per final Notification of Jaisamand Wildlife sanctuary published on 06.08.2020, ESZ is about 3.180 km and Sanctuary is about 10.80 km from the mine site. Certificate for the same has been obtained from Deputy Conservator of Forest (Wildlife) vide letter No F 9(10 km-469) survey/DCF/WL/2023-24/6405 dated 14.08.2023. Copy of the same is enclosed as **Annexure 10 (a)** with this Final EIA/EMP Report.

This is an operating mine and expansion in Ore production capacity is proposed within existing mining lease area. Therefore, no additional land will be required other than surface right for forest land as mentioned above.

#### Existing features of the lease area:

S. No	Particulars	Location	Details
1.	Habitations	Within Mining Lease area	Habitation of Villages: Zawar, Ram Nagar, Prem Nagar, Balaria Residential Colony for Housing 1828 families by Zawar group of Mines.
2.	Railway Station	Station: 24°21'29.75"N to 73°43'53.43"E  Rail line runs from: 24°22'7.94"N to 73°44'23.63"E  Rail line runs till: 24°20'46.41"N to 73°44'31.15"E	Zawar Railway Station and part of its railway track (~ 3.5 m) lies in the NE direction of core zone.
3.	River/Nallah/ Pond	Entry: 24°20'40.47"N to 73°40'25.78"E  Exit: 24°20'40.82"N to 73°44'24.05"E	Tiri Nadi enters the lease area from West direction and exist the lease area in East direction. Pond present within ML Area



S. No	Particulars	Location	Details
4.	Road/NH-48	NH-48 runs from: 24°19'22.82"N to 73°40'23.27"E	Many Public Road and Haul roads are present within ML Area. A part of NH- 48 (~0.7 Km) passes the Block-I in the SW direction of ML Area and it also passes through Block-III (~2.5 Km).
		NH-48 runs till: 24°19'1.92"N to 73°40'35.06"E	
5.	Electric Line	-	HTL & LTL present within ML Area
6.	Schools	Primary School: 24°20'56.25"N to 73°44'7.93"E	Primary school by Zawar Group of mines and other schools Swami Vivekanand high school and Govt Girls School are present within Mine area in the eastern area of ML.
		Govt. Girls School: 24°20'52.78"N to 73°44'12.76"E	
		Swami Vivekanand high school: 24°21'3.00"N to 73°44'37.62"E	
7.	Hospital	24°21'16.13"N to 73°43'44.28"E	A hospital by Zawar Mines present within Lease Area.
8.	Temples	Zawarmata: 24°20'41.79"N to 73°41'0.97"E	Zawarmata and Ramnath Temple present in the SSE part of the ML Area.
		Shiv Temple: 24°20'38.57"N to 73°41'3.51"E	
		Ghatrod Ji Temple: 24°20'41.91"N to 73°41'17.81"E	
		Ganesh Temple: 24°21'43.53"N to 73°42'6.45"E	

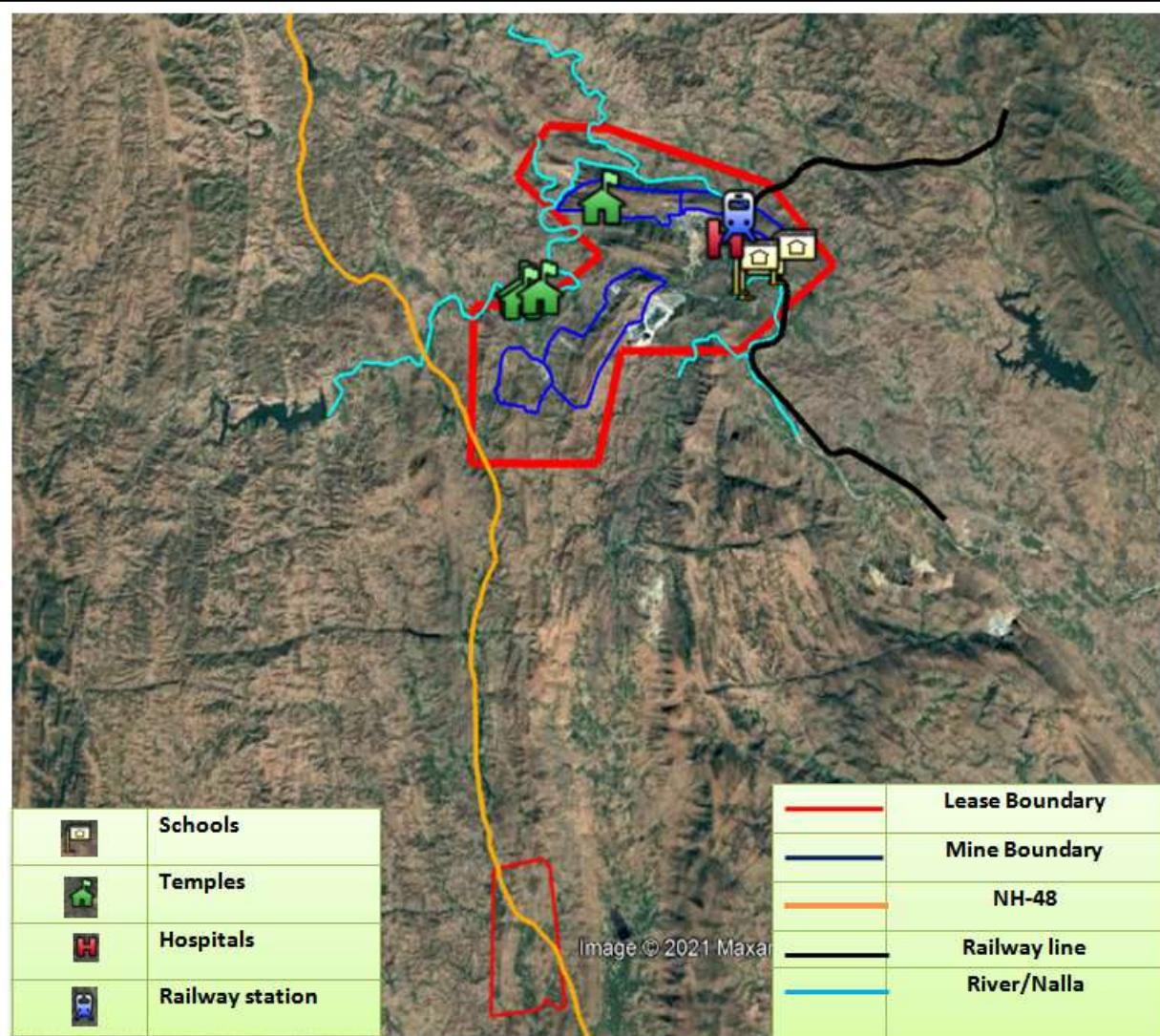


Figure 2.5: KML showing the existing site features within the lease area

Existing Industrial infrastructure of Zawar Mines			
1.	Captive Power plant	24°21'3.42"N 73°44'50.29"E	Captive Power Plant (CPP) of 90MW is present at Eastern side of ML Area.
2.	Dry Tailing Plant	24°20'52.53"N 73°42'40.70"E	Dry Tailing Plant (DTP) is present in the centre of ML Area near TSF 2
3.	Tailing Storage Facility	TSF-1: 24°21'26.82"N 73°43'24.61"E	2 TSF are present within ML Area. "out of which TSF-1 present in Northern direction is the old one that has been rehabilitated.
		TSF2: 24°20'38.44"N 73°42'44.66"E	



4.	MILL	Mill-1: 24°21'47.00"N 73°43'9.09"E	Mill-1 & 2 are present near the Mochia Mine.
		Mill-2: 24°21'48.82"N 73°43'27.57"E	
5.	Hydro-fill plant & Paste fill plant	Hydro-fill Plant: 24°21'49.71"N 73°42'29.58"E	Hydro fill & Paste fill plant are present within ML Area for backfilling of voids and are major part of Subsidence Management. Hydrofill is present at Mochia Mine. Pastefill Plant is present at Zawarmala Mine.
		Paste-fill plant: 24°20'0.05"N 73°41'20.91"E	

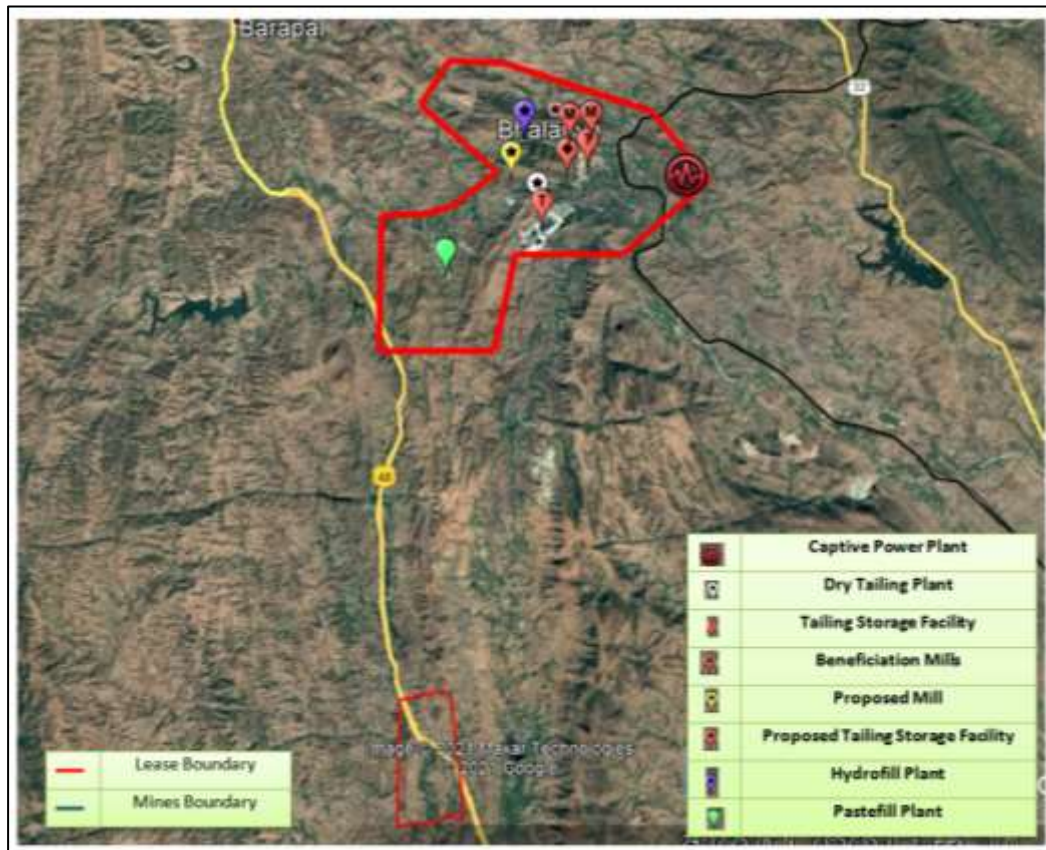


Figure 2.6: KML showing the industrial infrastructure within the lease area

## 2.4 PROJECT SITE PHOTOGRAPHS

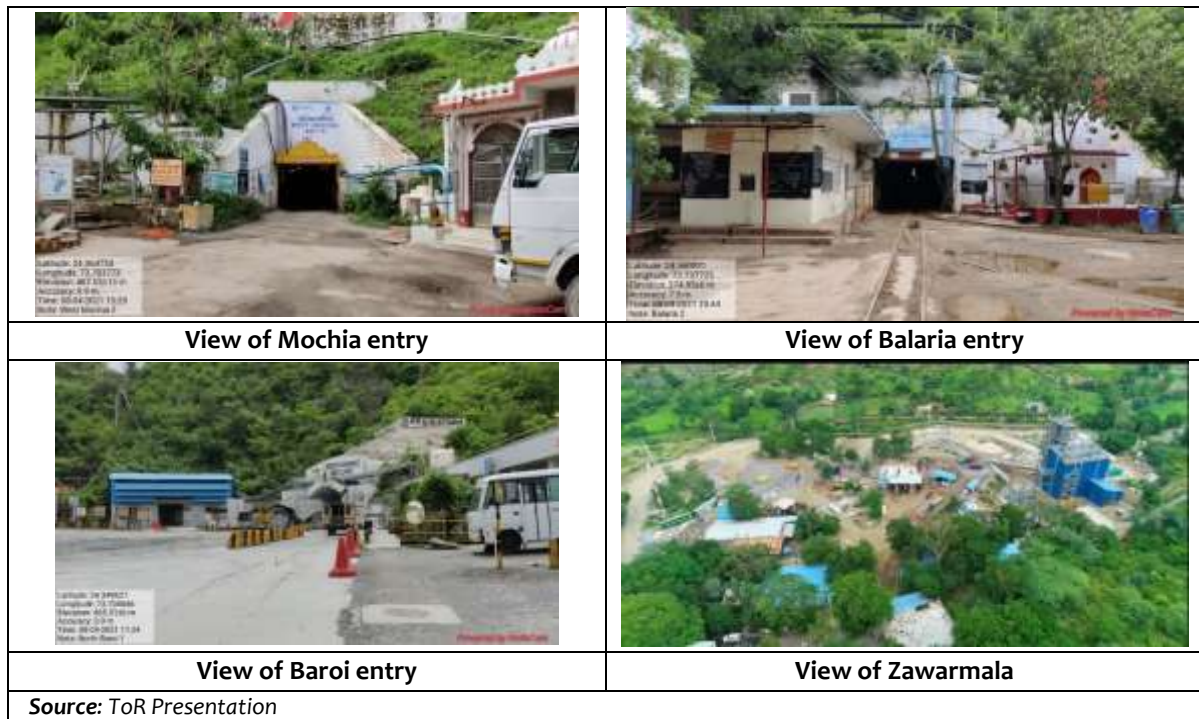


Figure 2.7: Photographs of Mine Site

## 2.5 SIZE OR MAGNITUDE OF OPERATION

S. No.	Project Activity		Existing	Additional	Total
1.	Production Capacity (MTPA)	Ore Production	4.8	1.7	6.5
		Waste Rock	1.2	0.08	1.28
		Total Excavation	-	-	7.78
2.	Capacity of Beneficiation Plant (Mill)	Mill	Existing	Additional	Total
		Mill-1	2.8 MTPA	-	2.8 MTPA
		Mill 2	2.0 MTPA	0.5 MTPA (Debottlenecking)	2.5 MTPA
		Mill-3 (Proposed)	-	2.0 MTPA	2.0 MTPA
		Total	4.8 MTPA	2.5 MTPA	7.3 MTPA



## 2.5.1 ASSOCIATED ACTIVITIES/ FACILITIES

The following site services are being/will be provided: -

S. No	Particulars	Details
1.	<b>POWER</b>	<ul style="list-style-type: none"> <li>➤ The power is supplied by coal based 90MW Captive power plant through AVVNL grid and distributed to mines &amp; beneficiation plant via various sub-stations at Zawar Mines.</li> <li>➤ In case of any supply power failure, additional stand by 6MW DG set or AVVNL grid shall provide power.</li> <li>➤ The present power requirement is around 33 MW and will be increased to around 45MW.</li> </ul>
2.	<b>SUBSTATIONS</b>	<ul style="list-style-type: none"> <li>➤ Substations are constructed in all mines at surface and underground in various levels for operating electrical equipment and appliances.</li> <li>➤ The main distribution sub-station has been upgraded to 132 KV (from 33KV) along with transmission lines.</li> <li>➤ Various surface &amp; underground substations have been constructed and few others are ordered &amp; work is in progress.</li> </ul>
3.	<b>WATER</b>	<ul style="list-style-type: none"> <li>➤ Water supply is being made from Tidi Dam (MoU with State Govt.) through pipe line.</li> <li>➤ Tidi dam is Gravity Masonry Dam constructed in 1976 at Amarpura village situated approximately 15 kms from Zawar Complex.</li> <li>➤ It has 300 mcft capacity and surplus capacity of water at Tidi dam available for the proposed Mine Plan.</li> </ul>
4.	<b>COMPRESSOR</b>	Compressor are installed at surface for supplying compress air for operating pneumatic equipment at all mines. However, requirement started reducing with use of electro-hydraulic equipments.
5.	<b>FIRST AID STATION</b>	<ul style="list-style-type: none"> <li>➤ First Aid Station is being maintained at VTC of Zawar mines is common for all mines location. Trained Rescue team is available for dealing with any emergency requirement.</li> <li>➤ Mines are also equipped with first aid room having critical facility at surface and underground.</li> </ul>
6.	<b>WORKSHOP</b>	Equipment maintenance facility is constructed for maintaining the equipment on Surface and underground.
7.	<b>REST ROOM</b>	Mines are having rest rooms at each mine site.
8.	<b>STORE</b>	Central store at common location and site store at each mine site maintained for facilitating the required material & supply.
9.	<b>COMMUNICATION</b>	➤ Well-connected from Udaipur district by rail & road network and 70km from nearest Dabok airport.





		➤ Rail line up gradation work is in progress from meter gauge to broad gauge. SAP/LAN connectivity is through lease line & VSAT. Post office & Banking facility are available at Zawar Mines.
10.	<b>EDUCATION</b>	Sr. Secondary / Secondary – One DAV School & two state owned Schools up to XII Std. Upper Primary / Primary – 3 State owned & 3 private schools from nursery to VIII Standard.
11.	<b>RESIDENTIAL</b>	Well-developed colonies having 1600 quarters 28 bed hospital with outdoor & indoor facility.
12.	<b>MEDICAL</b>	
13.	<b>ZINC FOOTBALL ACADEMY</b>	Nation level residential football academy with latest technology equipments & facility for developing the young talents.

Source: Approved Modified Mining Plan with PMCP (Pg.167)

## 2.6 PROPOSED SCHEDULE FOR APPROVAL AND IMPLEMENTATION

The mining project with expansion in Ore Production capacity will be implemented after obtaining all the statutory clearances and consents from the respective authorities. Proposed schedule for approval for the expansion in mining project is given as under:

### 2.6.1 APPROVAL

Table-2.2  
Proposed schedule for approval

S. No.	Activity description	Duration*(Months)
1.	Mining plan preparation & approval by IBM	Completed
2.	Environment Clearance from MoEF&CC	
	Application submission to MoEF&CC	Completed
	Grant of ToR	Completed
	Baseline Study Conduction (March to May, 2021 & March to May,2024)	Completed
	Submission of PH documents to SPCB	Completed
	Conducting Public hearing	Completed
	Appraisal by MoEF&CC	60 days
	Grant of EC	60 days
3.	CTE from SPCB for the expanded capacity	-
4.	CTO from SPCB	30 days from the date of EC

\*Duration has been taken from EIA Notification, 2006 for Environment Clearance.

### 2.6.2 IMPLEMENTATION

Implementation of the proposed expansion of mining project will be in accordance with the existing Acts and Rules applicable on mining operations as well as in accordance with any act/rule/guidelines issued by Central or State government time to time. The Implementation of the mining project will



be as per Modified Mining Plan and Progressive Mine Closure Plan.

## 2.7 TECHNOLOGY AND PROCESS DESCRIPTION

### 2.7.1 PROJECT REQUIREMENTS

The project requirements such as water, power, man-power, machinery with source of supply are described in the sections below.

#### 2.7.1.1 WATER REQUIREMENT

Existing water requirement for the project is 14000 KLD. There will be no Additional water requirement for the proposed expansion project; therefore the total water requirement after expansion will remain the same as 14000 KLD.

Water will be sourced from the Tidi Dam and mine seepage. Permission for the same was obtained from the Water Source Department, Government of Rajasthan on 17.09.1976. Copy of same is enclosed as **Annexure 11**. Ground water intersected during mining activities shall be dewatered and recycled for process use etc. and NOC regarding the same has been obtained from CGWA for Mochia, Balaria, Baroi and Zawarmala on 18.07.2024, 18.07.2024, 11.03.2024 and 17.07.2023 respectively. All the NOCs are valid up to 10.12.2024. Copy of all the NOCs are enclosed as **Annexure 9**.

The break-up of water requirement with water balance diagram is given below:

**Table: 2.3**  
**Water Requirements**

S. No	Particulars	Total (KLD)
1.	Mining	2400
2.	Beneficiation Plant	8600
3.	Domestic Demand	3000
<b>Total</b>		<b>14000 KLD</b>

**Source:** Hindustan Zinc Limited & Modified Mining Plan with PMCP

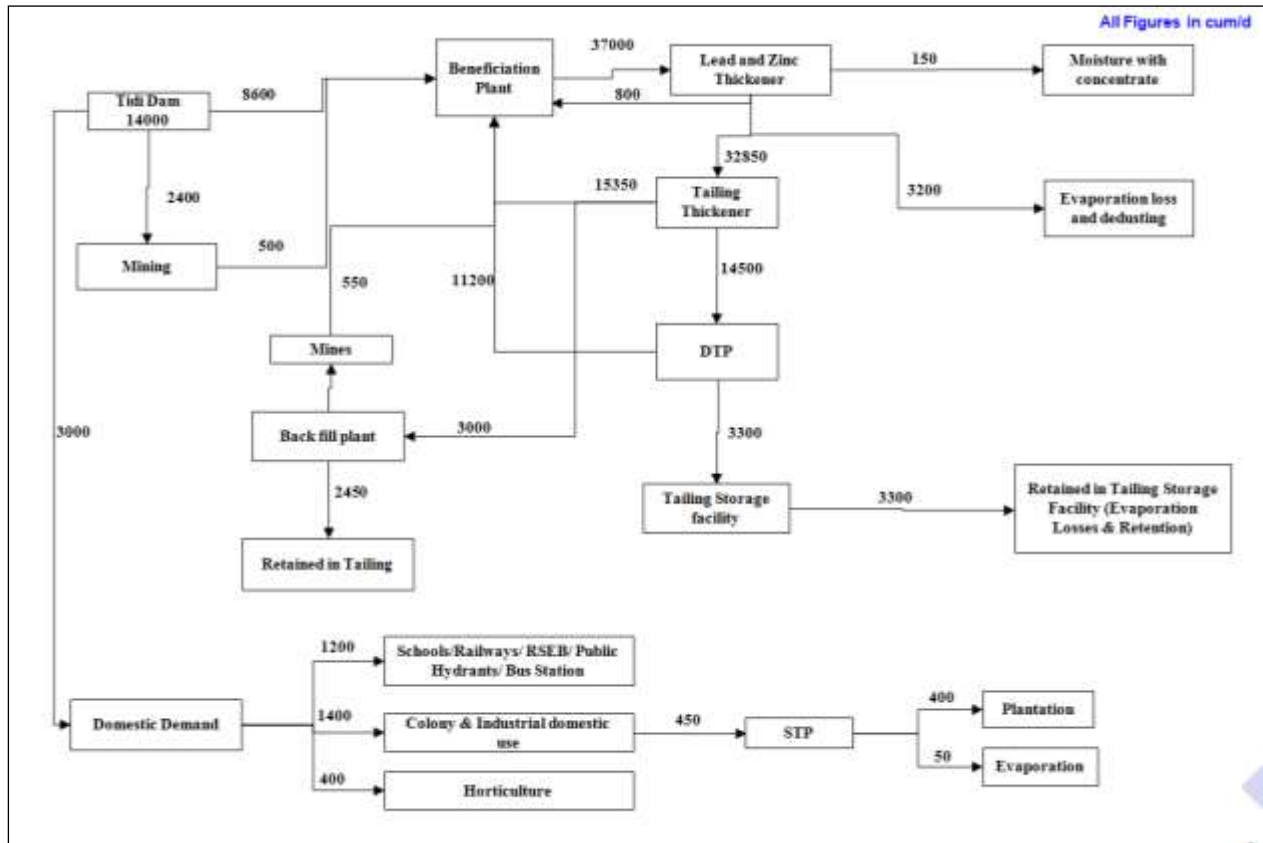


Figure 2.8: Water Balance Diagram

### 2.7.1.2 POWER REQUIREMENT

The existing power requirement for the project is 33 MW. Additional power requirement for proposed expansion will be 12 MW. Therefore, Total power requirement after proposed expansion will be 45 MW. The source of power is being/will be Captive Power Plant & AVVNL (Ajmer Vidyut Vitran Nigam Ltd).

In case of Emergency, DG set will be used. The existing DG Set requirement is 6.774 MVA. Additional 6 MVA DG set are proposed. Total DG set of 12.774 MVA are there for emergency.

Table: 2.4

#### Fuel Requirement

S. No	Fuel	Quantity	Source	Mode of transport	Distance of source from project site (In km)
1.	HSD	60 KLD	IOCL Ahmedabad/Udaipur/ Chittorgarh	Road	~250 Km

#### Steps to be taken for reduction of diesel consumption:

- Focusing exploration on lower horizon ore so as to minimize hauling distance
- Idle time monitoring of HEMM through real time Instrumentation and digitalization
- Improving Fill factor from 88% to 95% by minimizing carry backs/ Improving loading points design and illumination



- Improving productivities by enabling Business Partners with owner ship model
- Minimizing lead distance of loaders between mucking & loading point
- Migration of BEV (Battery Electric Vehicles) to maximum possible extent with technological advancements
- Enhancing hoisting system (shaft) capacities so as to maximize tonnage based on electrical energy

### 2.7.1.3 MAN POWER REQUIREMENT

Existing manpower for the project is 3400 persons which will be increased to 4150 after expansion. The details of additional Manpower (750) are given below:

Table: 2.5

Manpower Requirement

S. No.	Particulars	Existing	After Expansion
1.	Mine manager	4	4
2.	Mining Engineer	164	200
3.	Geologist	21	30
4.	Skilled Labour	2733	3358
5.	Unskilled Labour	478	558
<b>Grand Total</b>		<b>3400</b>	<b>4150</b>

Source: Hindustan Zinc Limited

Table: 2.6

Manpower Requirement for EMP

S. No	Designation	No of persons	Responsibility
1.	Mines Manager	4	Responsible for discharging duties as Mines Manager as per Mines Act 1952, MMR 1961, Mines Rules 1955, MCDR 2017 and various circulars issued by regulatory authorities from time to time.
2.	Environmental Manager	1	Ensure that all the applicable environmental parameters are regularly monitored and measured as per defined interval and reports submitted to the concerned regulatory authorities.
3.	Environmental Engineer	3	Checking of emission/ noise levels of mining equipment for mid-course correction.
4.	Water Champion	1	Ensures that targets are taken for reducing specific water consumption at site and required water saving projects are identified and implemented
5.	Energy and Carbon Champion	1	Ensures that targets are taken for reducing specific energy consumption at site and required energy



S. No	Designation	No of persons	Responsibility
			saving projects are identified and implemented
6.	Horticulture and Plantation Team	12	Maintenance of plantation and carrying out regular plantation activities and horticulture work
7.	STP operators	6	For operating sewerage treatment plant
8.	Waste management and housekeeping team	20	Dedicated team for carrying out general housekeeping of the area
<b>Total</b>		<b>48</b>	

**Source:** Hindustan Zinc Limited

#### 2.7.1.4 EXTENT OF MECHANIZATION

The following machinery & equipment is being/will be required for mining operation:

**Table: 2.7 (a)**

#### **Machinery & Equipment for Mining for Mochia Mine**

MOCHIA				
Equipment	Numbers			Size /Capacity
	Existing	Proposed	Total	
LPDT 60T	6	4	10	60T
LPDT 30T	4	-	4	30T
LPDT 20T	4	-	4	20T
LHD 20/21 tonne	3	1	4	17T
LHD 17 tonne	1	-	1	17T
LHD 10 tonne	2	6	8	10T
LHD 6-7 tonne	8	(-6)	2	7T
Drill Jumbo	11	3	14	45mm
Electro Hydraulic Drill	4	2	6	64/70/102mm
Grader	1	-	1	-
Personnel Carrier	4	-	4	32 Persons
Seissor Lifter	5	-	5	-
Charmec	1	2	3	-
Diesel Bowser	1	-	1	-
Scaler	1	-	1	-
Water Sprinkler	1	-	1	-
Mine Light vehicles (RBO)	2	1	3	5-Seater
Explosive Carrier	-	1	1	3-4t
Mine pumps	6	4	10	30 - 400 Head
Compressor	5	-	5	2500/1000 /500 CFM
Ventilation fan	3	3	6	30/60/150 m <sup>3</sup> /sec



**Table: 2.7(b)**  
**Machinery & Equipment for Mining for Balaria Mine**

<b>BALARIA</b>				
Equipment	Numbers			Size /Capacity
	Existing	Proposed	Total	
LPDT 60T		5	5	60T
LPDT 30T				30T
LPDT 20T	13	(-2)	11	20T
LHD 20/21 tonne		3	3	17T
LHD 17 tonne				17T
LHD 10 tonne	2	3	5	10T
LHD 6-7 tonne	9	(-4)	5	7T
Drill Jumbo	10	2	12	38/45mm
Electro Hydraulic Drill	4	1	5	64/70/102mm
Grader		1	1	
Personnel Carrier	2	1	3	32 Persons
Seissor Lifter	3		3	
Charmec		2	2	
Diesel Bowser	1		1	
Scaler	1		1	
Mine Light vehicles (RBO)	2	1	3	8
Explosive Carrier	1		1	3-4t
Mine pumps	12	3	15	100 - 450 Head
Compressor	4		4	30-70 m3/min &1250LPM,500CFM
Ventilation fan	3	1	4	135/150 m3/sec

**Table: 2.7 (c)**  
**Machinery & Equipment for Mining for Baroi Mine**

<b>BAROI</b>				
Equipment	Numbers			Size /Capacity
	Existing	Proposed	Total	
LPDT 60 T	4	3	7	60T
LPDT 30T	2	-	2	30T
LPDT 20T	8	-	8	20T
LHD 20/21 T	2	1	3	17T
LHD 17 T	2	-	2	17T
LHD 10T	3	1	4	10T
LHD 6-7 T	8	(-2)	6	7T

Expansion of Zawar Group of Underground Lead- Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total Excavation: 7.78 Million TPA including Waste rock 1.28 MTPA and Beneficiation from 4.8 Million TPA to 7.3 Million TPA within ML Area of 3620 ha (ML No. 03/89) at Villages- Zawar, Kodiya Khet, Nayakheda, Rawa, Tidi, Udiyakheda, Barothi Bhaldia, Bara, Chanawada, Dhavadi Talai, Kanpur, Newa Talai, Padla, Parsad, Krishnapura, Singhatwara, Tehsil: Girwa and Sarada, District- Udaipur, Rajasthan by M/s Hindustan Zinc Ltd.



Chapter 2 of Final EIA/EMP Report

BAROI				
Jumbo	15	-	15	45mm
Production Drill Rig	5	1	6	64/70/102 mm
Grader	1	-	1	-
Personnel carrier	1	-	1	16-Seater
Personnel carrier	3	-	3	32-Seater
Siessor Lifter	4	-	4	-
Charmec	3	-	3	-
Diesel Browser	2	-	2	2 KL
Scaler	1	-	1	-
Water Sprinkler	1	-	1	-
Mine Light Vehicles (RBO)	3	-	3	5-Seater
Explosive Carrier	1	1	2	-
Mine pumps	10	5	15	100-200 m Head
Compressor	6	-	6	1000 cfm
Ventilation Fan	4	1	5	210/420m <sup>3</sup> /sec

Table: 2.7 (d)

**Machinery & Equipment for Mining for Zawarmala Mine**

ZAWARMALA				
Equipment	Numbers			Size /Capacity
	Existing	Proposed	Total	
LPDT 20/30t	8	-	8	20T
LHD 6/7t	4	0	4	6/7T
LPDT 42/60T	0	2	2	42/60T
LHD 10/14T	1	2	3	10/14T
Drill Jumbo	2	15	3	45mm
Electro Hydraulic Drill	1	1	2	64/70/102mm
Explosive Carrier	-	2	2	3-4T
Personal carrier	2	-	2	26-Seater
Road grader	-	1	1	-
Seissor Lifter	1	1	2	-
Mine Light vehicles (RBO)	1	1	2	8-Seater
Mine pumps	2	2	4	200m Head
Compressor	3	-	3	1000 cfm
Ventilation fan	2	-	2	150cum/Sec & 70cum/sec
Exploratory Drilling Rig UCD 40	1	-	1	400m
Exploratory Drilling Rig UCD 60	1	-	1	600m



## 2.7.2 TECHNOLOGY DESCRIPTION

### 2.7.2.1 GEOLOGY OF THE AREA

#### Regional Geology

##### General:

Zawar lease area is situated in NW-SE trending hills of Rajasthan and is a type area of Paleo-Proterozoic age (1700-1800 Million Years). The lithological sequence comprises of meta-sedimentary rocks overlying a basement (Sarara inlier) contemporary to BGC (Banded Gneissic Complex) of Rajasthan.

The Central & Western part of the Udaipur district is occupied by the younger formation of Aravalli supergroup & Delhi supergroup of Proterozoic age. Quaternary and recent alluvium overlies most of the formations in isolated patches, along river courses and in the shallow depressions. The stratigraphic succession of the district is as follows:

Age	Supergroup	Group	Lithology
Proterozoic	Delhi Supergroup	Gogunda Group	Calc-schists, gneisses, mica-
			schists, garnetiferous biotite-
			schists, quartzites & migmatites
	Rikhabdeo Ultramafic suite		Serpentinite, talc-chlorite-schist, actinolite-tremoliteschist & asbestos
	Aravalli Supergroup	Jharol group	Chlorite-mica schist, calc schist & quartzite
		Bari lake group	Meta volcanics, chlorite schists, amphibolite, quartzite& conglomerate
		Udaipur group	Phyllite, mica schists, meta siltstone, quartzite, dolomite, gneisses & migmatites`
		Debari group	Meta arkose, quartzite, phyllite, dolomitic marble &dolomite
-----unconformity-----			
Archean	Bhilwara Supergroup	Mangalwar complex	Migmatites, gneisses, quartzite, felspathic garnet ferrous mica schists & para Amphibolites

#### Local Geology

**Block 1** is a conglomeration of four deposits Mochia, Balaria, Zawarmala & Baroi situated in a complexly folded geological structure. All the deposits are hosted in meta-sedimentary sequence for base metal mineralization. Host dolomite is flanked by Greywacke, Phyllite on south and Phyllite & Quartzite on the north. Stratigraphically, the rocks of the mine area form part of Mandli, Baroi Magra and Zawar formations of Tiri Series in the regional stratigraphical sequence. Generalized succession of the deposit is given below:



Expansion of Zawar Group of Underground Lead- Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total Excavation: 7.78 Million TPA including Waste rock 1.28 MTPA and Beneficiation from 4.8 Million TPA to 7.3 Million TPA within ML Area of 3620 ha (ML No. 03/89) at Villages- Zawar, Kodiya Khet, Nayakheda, Rawa, Tidi, Udiyakheda, Barothi Bhaldia, Bara, Chanawada, Dhavadi Talai, Kanpur, Newa Talai, Padla, Parsad, Krishnapura, Singhatwara, Tehsil: Girwa and Sarada, District- Udaipur, Rajasthan by M/s Hindustan Zinc Ltd.



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Series	Formation	Member	Litho Unit
			Quartz and quartz-felspar veins, metadolerite dykes
-----unconformity-----			
Tiri Series	Zawar Formation	Haran Member	Upper Phyllite, Quartzite
	Baroi Magra Formation	Mochia Member	Dolomitic quartzite, pure dolomite, siliceous dolomite (Host rock), sub-greywacke (?), argillaceous quartzite and interbedded phyllites
	Mandli Formation		
			Greywackes

**Table - 2.8 Salient geological feature of Zawar deposit (Block -1)**

S. No	Particulars	Mochia	Balaria	Zawarmala	Baroi
1	Strike Extension	2850 m	2850 m	550 m	2500 m
2	Rock Type	Greywacke, Phyllites, Dolomites, Quartzite, Dolerite Dyke	Greywacke, Lower Phyllites, Dolomites, Carb. Phyllite, Dolerite Dyke	Interbedded Quartzite, Dolomites, Carb. Phyllite	Greywacke, Dolomites, Quartzite, Phyllites, Dolerite Dyke
3	Attitude of Litho Units	E-W/80N	N40-70W / 80NE / E-W 80N	N10W/70E N30E/45W	N40E/50-80NW N20E/50-80NW
4	Host Rock	Dolomite (Sill. & Pure)	Dolomite (Sill. & Pure)	Dolomite (Sill. & Pure)	Dolomite (Sill. & Pure)
5	No. of Ore Lenses	40	36	4	21
6	Type of Ore Lenses	Overlapping veins & veinlets / disseminations	Overlapping lenses with enechelon pattern	Fracture filling, veins and dissemination along fissility planes and fractures	Parallel and overlapping veins and disseminations
7	Attitude of Lenses A. Strike / Dip  B. Plunge	WNW/70-80S  50-60NW	N10W/70SW- N65W/70SW 50-60NW	Varies from NW-SE to NE-SW 50-60NW	N15-50E/60NW  50-60NW
8	Strike Length of Lenses	60 - 200 m	60 - 200 m	60 - 150 m	60 - 250 m
9	Width Range of Lenses	2 - 45 m	2 - 40 m	2 - 40 m	2 - 20 m
10	Major Minerals	Sphalerite, Galena	Sphalerite, Galena, Pyrite	Sphalerite, Galena, Pyrite	Sphalerite, Galena



S. No	Particulars	Mochia	Balaria	Zawarmala	Baroi
11	Major Joint Sets	i. N70W/86S ii. S45E/57NE iii. N-S/88W	i. N15W-S15E /70E-90 ii. N15W-S15E /32-45W iii. E-W/80N90 iv. Subhoriz-Horiz	i. N30W-S30E/85SW ii. N10E-S10W/80SE iii. N30E-S30W /50NW iv. E-W/66N	i. N69W-S69E /70SW ii. N44W-S44E /42NE iii. N69W-S69E /26SW

**Table: 2.9 Salient geological feature of Bara Prospect (Block -3)**

S. No	Particulars	Details
1	Total Leasehold Area	448 Ha
2	Main Hills	i. Chittora Magra ii. Bhanwara Magra iii. Umreda Magra
3	Highest Level	640 mRL
4	Valley Level	430 mRL
5	Total Strike Length of Carbonat Horizon in Mapped Area	1.5 kms
6	Trends of S-Planes (Bedding / Foliation)	N-S / 80° W
7	Trends of Major Joint Sets	1. E-W / 80° N 2. N50° E / 80° SE
8	Plunge of main lineation	40° / N

**Source:** Modified Mining Plan with PMCP (Pg.30-33)

### 2.7.3 DETAILS OF MINING

#### 2.7.3.1 EXPLORATION CARRIED OUT IN THE AREA

In the past, Surface exploratory drilling was done by GSI (11544 m), MCI (5108 m) & HZL (334498 m) and Underground Exploratory drilling by MCI (5381 m) & HZL (687888 m).

Presently, HZL is carrying out surface and underground exploratory drilling which includes definition drilling as well. The bore hole details from 2005-06 to 2021-22 is as below –

**Table: 2.10**

#### Surface & Underground Exploratory drilling (2005-06 to 2020-21)

Particular	No. of Bore hole	Type (Core/RC/DTH)	Diameter	Spacing	Depth	Total Metrage
UG	10438	Core	AX, BX, BQ	12.5m - 30m	744973. m	1170978m
Surface	572	Core	NX, NQ	100m	426005m	

Expansion of Zawar Group of Underground Lead- Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total Excavation: 7.78 Million TPA including Waste rock 1.28 MTPA and Beneficiation from 4.8 Million TPA to 7.3 Million TPA within ML Area of 3620 ha (ML No. 03/89) at Villages- Zawar, Kodiya Khet, Nayakheda, Rawa, Tidi, Udiyakheda, Barothi Bhaldia, Bara, Chanawada, Dhavadi Talai, Kanpur, Newa Talai, Padla, Parsad, Krishnapura, Singhatwara, Tehsil: Girwa and Sarada, District- Udaipur, Rajasthan by M/s Hindustan Zinc Ltd.



Chapter 2 of Final EIA/EMP Report

Year	Surface Exploration		Underground Exploration	
	No. of Bore holes	Drilling (m)	No. of Bore holes	Drilling (m)
2005-06	0	0	196	6018
2006-07	0	0	302	11561
2007-08	1	1510	578	19901
2008-09	26	15425	352	15606
2009-10	22	16021	397	18329
2010-11	14	11778	45	1730
2011-12	36	20358	89	2417
2012-13	38	18967	315	9782
2013-14	58	31744	736	39142
2014-15	49	34851	972	41795
2015-16	38	40662	768	39253
2016-17	35	39156	740	51377
2017-18	41	39616	1348	83611
2018-19	55	58887	1239	99437
2019-20	106	61821	1239	165576
2020-21	53	35209	1122	139438
<b>Total</b>	<b>572</b>	<b>426005</b>	<b>10438</b>	<b>744973</b>

Source: Modified Review of Mining Plan with PMCP (Pg.36)

#### 2.7.3.2 EXPLORATION TO BE CARRIED OUT IN THE AREA

Mine	UoM	2021-22	2022-23	2023-24	2024-25
Mochia	m	36000	40000	43000	45000
Balaria	m	45000	47000	50000	50000
Zawarmala	m	13000	13000	13000	13000
Baroi	m	40000	44000	48000	51000
<b>Total Zawar UG</b>	<b>m</b>	<b>134000</b>	<b>144000</b>	<b>154000</b>	<b>159000</b>
Mochia	m	21000	21000	21000	21000
Balaria	m	14000	14000	14000	14000
Zawarmala	m	5000	5000	5000	5000
Baroi	m	17000	17000	17000	17000
Others	m	9000	9000	9000	9000
<b>Total Surface</b>	<b>m</b>	<b>66000</b>	<b>66000</b>	<b>66000</b>	<b>66000</b>
<b>Total Zawar</b>	<b>m</b>	<b>200000</b>	<b>210000</b>	<b>220000</b>	<b>225000</b>

Source: Modified Mining Plan with PMCP (Pg.39)

#### 2.7.3.3 ESTIMATION OF RESERVES

The summary of reserves/ resources as per UNFC is given below:



**Table -2.11**  
**Ore Reserves as per UNFC (As on 01.04.2021)**

Classification	Code	Quantity (million tonnes)	Grade			
			%Pb	%Zn	Ag ppm	%TMC
A. Mineral Reserves						
Proved Mineral Reserves	111	19.390	1.65	2.99	21	4.64
Probable Mineral Reserves	121	0.000	0.00	0.00	0	0.00
	122	15.102	1.70	3.05	28	4.75
Total Reserves		34.492	1.67	3.02	24	4.69
B. Total Remaining Resources						
Feasibility Mineral resources	211	-	-	-	-	-
Pre-Feasibility Mineral resources	221	21.071	1.97	4.02	27	5.99
	222	11.867	1.70	3.96	27	5.66
Measured Mineral Resources	331	-	-	-	-	-
Indicated Mineral Resources	332	-	-	-	-	-
Inferred Mineral resources	333	75.321	2.53	4.15	40	6.68
Reconnaissance Mineral Resources	334	-	-	-	-	-
Total Resource		108.260	2.33	4.10	36	6.43
Total Reserves + Resources		142.752	2.17	3.84	33	6.01

**Source:** Modified Mining Plan with PMCP (Pg.49)

### 2.7.3.3.1 MINEABLE RESERVES AND ANTICIPATED LIFE OF MINE

The life of the mine will be calculated as follows:

(In Million Tonnes)

S. No	Particulars	Mochia	Balaria	Zawarmala	Baroi	Zawar Mines
1.	Maximum Production Capacity	2.3	1.5	0.7	2	6.5
2.	Total Reserves & Resources as on 01.04.2021	54.46	41.95	8.96	35.70	141.07
3.	Resources	44.09	29.76	5.95	26.78	106.58
4.	Mineable reserves as on 01.04.2021	10.37	12.19	3.01	8.92	34.49
5.	Production during Present Proposal (4 Years)	7.4	4.9	1.70	7.5	21.50
6.	Balance Remaining Reserves	2.97	7.294	1.3094	1.42	12.99
7.	Balance Remaining Life of Mine based on remaining reserves	1.29	4.86	1.87	0.71	2.00
8.	Life of Mine based on Mineable Reserves	5.3	8.9	5.9	4.7	6.0
9.	Life of Mine (Based on Total Reserves & Resources)	24.5	28.7	14.4	18.1	22.4

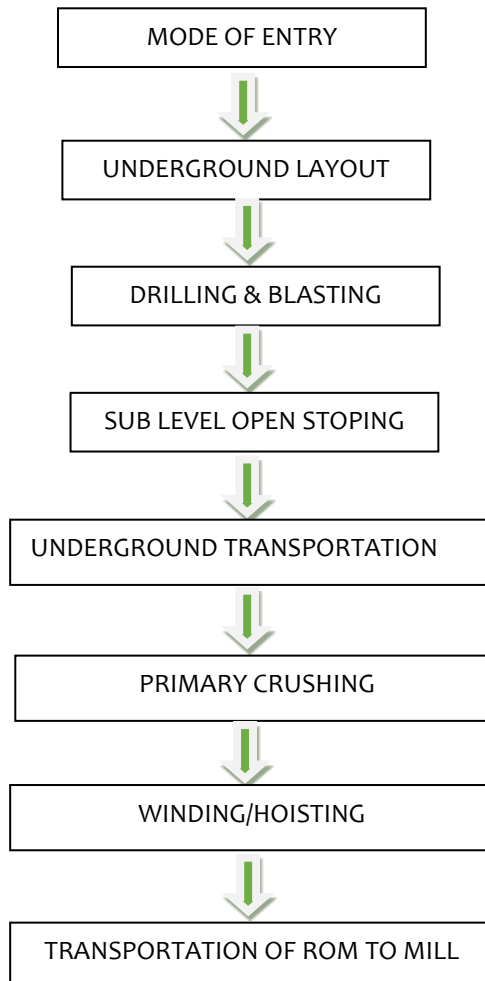
Note: Changes in the reserve figures will be there with further exploration and exploitation, by which the life of mine shall also be increased.

**Source:** Modified Mining Plan with PMCP



## 2.7.4 PROCESS DESCRIPTION

### 2.7.4.1 METHOD OF MINING



Expansion of Zawar Group of Underground Lead- Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total Excavation: 7.78 Million TPA including Waste rock 1.28 MTPA and Beneficiation from 4.8 Million TPA to 7.3 Million TPA within ML Area of 3620 ha (ML No. 03/89) at Villages- Zawar, Kodia Khet, Nayakheda, Rawa, Tidi, Udiyakheda, Barothi Bhaldia, Bara, Chanawada, Dhavadi Talai, Kanpur, Newa Talai, Padla, Parsad, Krishnapura, Singhatwara, Tehsil: Girwa and Sarada, District- Udaipur, Rajasthan by M/s Hindustan Zinc Ltd.



Chapter 2 of Final EIA/EMP Report

## UNDERGROUND MODE OF ENTRY

### PORTAL



### SHAFT



## MINE DEVELOPMENT

### METHOD OF MINE DEVELOPMENT



### MECHANIZED MINE DEVELOPMENT USING JUMBO DRILLS



## DRILLING

### METHOD OF PRODUCTION DRILLING



### MECHANIZED DRILLING USING EHY DRILL MACHINES

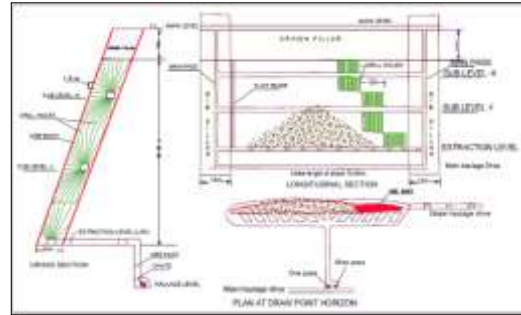
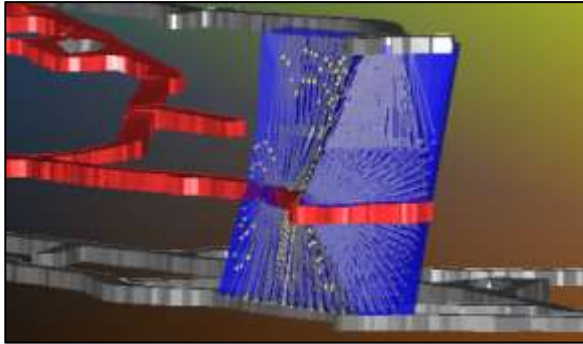


## Hole Charing using ANFO Explosive and Emulsion cartridge



## SUB LEVEL OPEN STOPING





### UNDERGROUND TRANSPORTATION

#### MECHANIZED LOADING USING 21/17/10 TON LOADER



### PRIMARY CRUSHING (UNDERGROUND)



Crushing

### SKIP HOISTING



Skip Hoisting

### ORE HAULING FROM UNDERGROUND TO SURFACE THROUGH LPDT (20/30/65 TON)



Figure 2.9: Photographs of Mining Activities

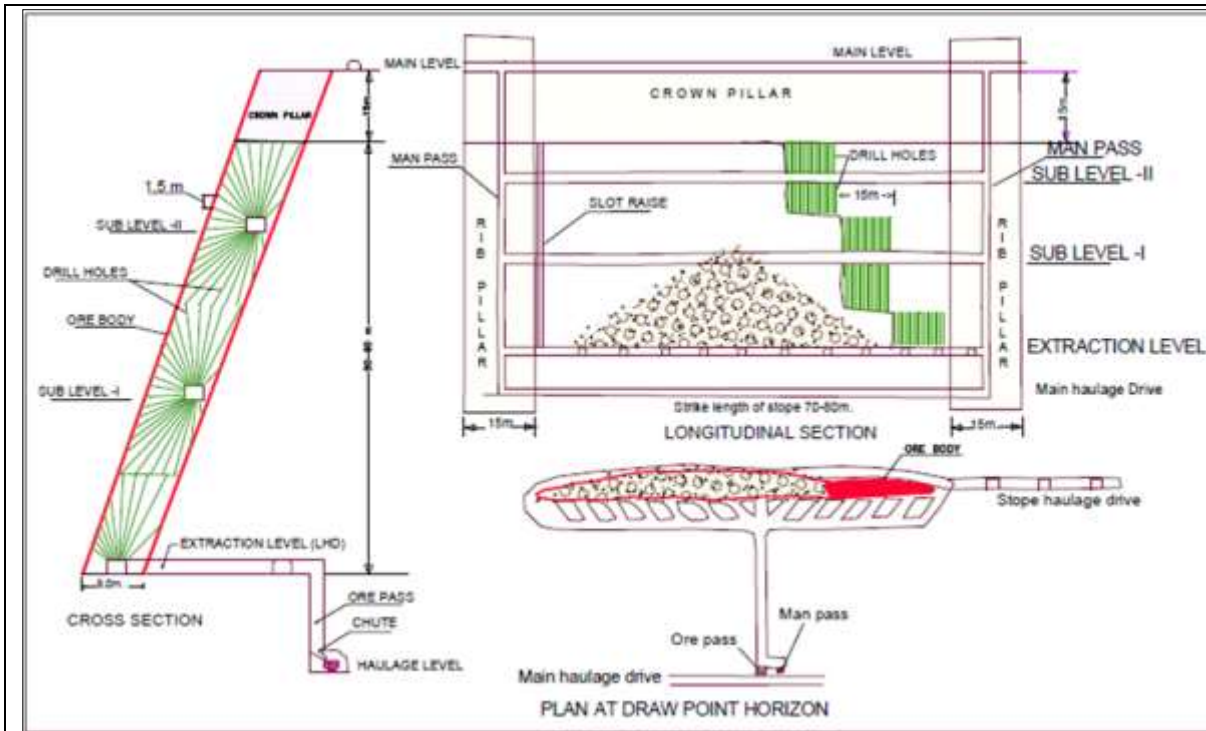
#### Mining Method: Sub-Level Open Stoping

It is planned to adopt sub-level open stoping mining method with backfill at Zawar mines for improving Global stability and for enhancement in ore recovery. The sequence of stoping involves:

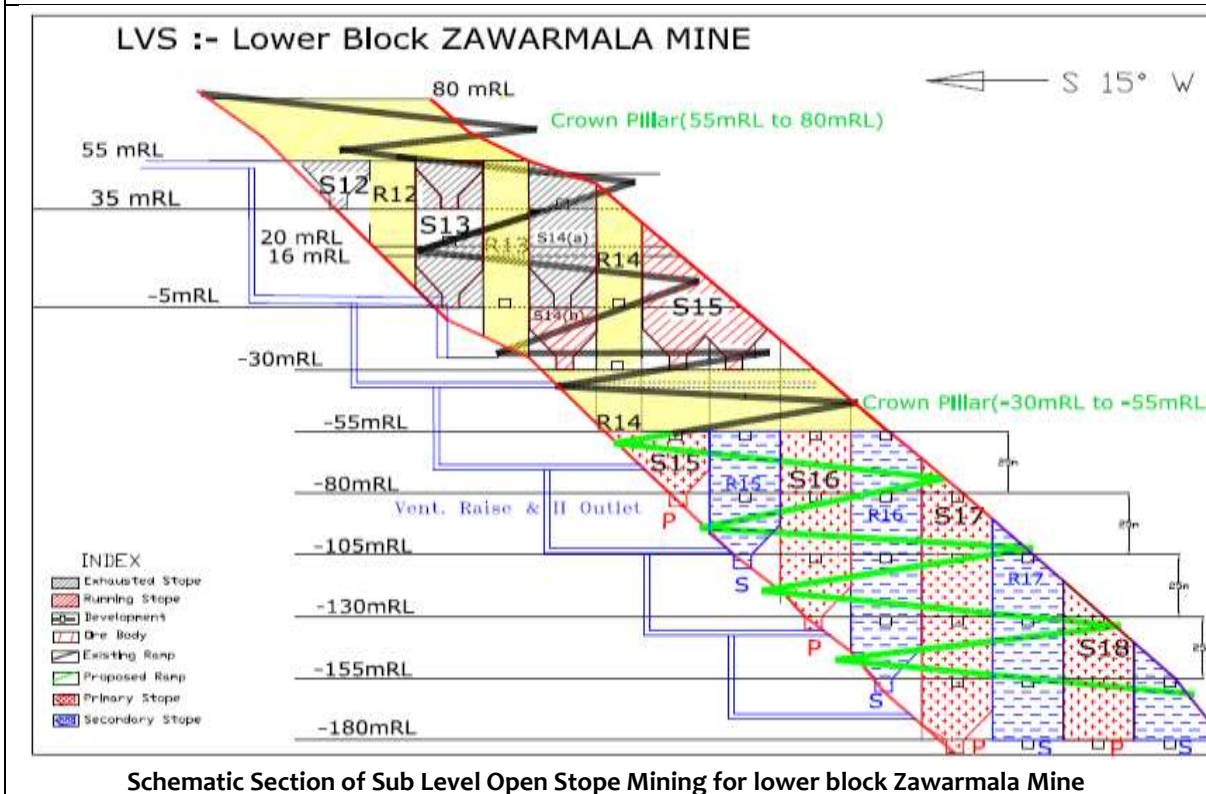
- Creation of wide stopes leaving wide pillars in between two stope panels. Sublevel stoping with regular interval is selected appropriately to match the ore-body geometry.
- The stoping parameters for each stope are determined by looking into the stability aspects at the local as well as the global level by empirical and numerical tools. Initially, the stope strike/height is determined by empirical methods (Mathew's Stability method in particular). Then the stability of same geometry is checked by numerical modeling with Flac 3D as numerical solver.
- The stopes are planned to be extracted in primary-secondary sequences.
- Each sublevel is extracted by blast holes drilled in trough fashion from the bottom. After the primary stope extraction, they will be backfilled with cemented paste backfill. The secondary stopes will be extracted after the extraction and back filling of adjacent primary stopes.
- A trough level is created at the bottom of the stope for extraction of ore. The lower main level acts extraction level with haulage level. In a typical stope layout, the intermediate sublevels are connected by ramp / raises for access, man & material handling & ventilation.
- The muck is then withdrawn at extraction level through LHDs and then directly loaded in to mine trucks for hauling through ramps from underground to crusher level.



- On backfilling of stoped out voids and stabilization of rock mass, pillar extraction shall be started from the left-out pillars.



Schematic outlay of Open Stopes (Longitudinal & Transverse)-SIMBA Holes



Schematic Section of Sub Level Open Stope Mining for lower block Zawarmala Mine

Fig: 2.10 Diagrammatic Representation of Sub-Level Open Stopping Methodology for Underground Mining



**Table - 2.12(a)**  
**Detailed Process Description of Mochia and Balaria Mines**

Particulars	Mochia Mine	Balaria Mine		
<b>Mode of Entry Purpose:</b> <ul style="list-style-type: none"><li>• For hoisting of Man, material and ore)</li><li>• Ventilation Intake at greater Depth</li></ul>	<b>Central Mochia</b> – Shaft 395 to (-)58mRL Level Entries- 307, 240, 173, 106, 39, 3& -29 mRL <b>West Mochia</b> - Adit at 452mRL & UG shaft (452 to 25mRL) Level Entries- 413, 370, 312, 252, 192,132, 57, 44 27, (-)2, & (-)23mRL <b>Mochia Portal</b> - Mochia-Balaria portal (6.5 m *5.5 m _407 m RL) Decline [5.5 m *5m _407 to 57 mRL]	<b>Central Balariya</b> -Adit 4 at 378mRL & UG Shaft [378 to (-) 50mRL] Level Entries- 314, 250, 190, 120, 105, 45, () 25, (-)40 mRL <b>Western Balaria</b> - Production Incline (387 to 56mRL),1 in 3.5 Grade Level Entries-250, 105 & 45 mRL <b>Western Balaria</b> – Decline from Surface (407 mRL) at 1 in 7 Grade (Decline Entry 407 m RL)		
<b>Underground Layout</b>	The Main Decline in West Mochia connected at 312mRL, 192mRL, 132 mRL 57mRL & 23 mRL and started below bottom most level. The Central Mochia & West Mochia connection also completed at 52/57 mRL for decline direct access extension upto Central Mochia workings, which further connects to Balaria mine.	Balaria mine extends from 9000 to 6500 Dep and the mine is intersected by Railway &Tidi river stream. Western side of Railway / River pillar is called West Balaria and Eastern side is called Central Balaria area. Mine is having underground access through shaft.		
<b>Avg Height of Stope</b>	60-75 m	40-70 m		
<b>Interconnection</b>	Mochia Main Decline has connected to West Mochia 57 m RL, which in turn connects to Balaria Mine 45 m RL through Central Mochia 52 m RL.			
<b>System of Drilling &amp; Blasting</b>	<b>Particulars</b>	<b>Parameters</b>	<b>Particulars</b>	<b>Parameters</b>
	Driling Pattern in Ore	Burn cut/wedge cut	Driling Pattern in Ore	Burn cut/wedge cut
	Driling Pattern in Rock	Burn cut/wedge cut	Driling Pattern in Rock	Burn cut/wedge cut
	Driling Pattern in Stopes	Ring / Parallel hole drilling	Driling Pattern in Stopes	Ring / Parallel hole drilling
	Max no of holes blasted in a round	50 Holes	Max no of holes blasted in a round	70 Holes
	Charge per round	3000 Kg	Charge per round	1500 Kg
	Charge per hole	420 Kg	Charge per hole	50 Kg
	Type of Explosive	ANFO, Slurry Explosive	Type of Explosive	ANFO, Slurry Explosive



Particulars	Mochia Mine		Balaria Mine	
Method and Sequence of Stoping	Particulars	Parameters	Particulars	Parameters
	Number of Working stopes	5	Number of Working stopes	3
	Size of the panel	60 - 80 (L) x 40 - 75 m (H) x 3 - 40 (W)	Size of the panel	60 - 80 (L) x 40 - 60 m (H) x 3 - 18 (W)
	Level Interval	50 - 75m	Level Interval	50 - 70m
	Thickness of Crown/Sill/Rib pillar	10-30 m	Thickness of Crown/Sill/Rib pillar	10-25 m
	Size and interval of stope pillar	10 - 27 m crown/sill pillar at 40 - 60 m interval	Size and interval of stope pillar	10 - 25 m crown/sill pillar at 40 - 60 m interval
	Size / shape of man way	1.8m(H) x 1.2m(D) x 0.75m(W)	Size / shape of man way	1.8m(H) x 1.2m(D) x 0.75m(W)
	Size / shape of ore pass	2 x 2m – 3m x 3m	Size / shape of ore pass	2 x 2m – 3m x 3m
	Method of stowing / backfilling	Backfilling development waste/Cemented rock fill/ Hydrofill	Method of stowing / backfilling	At present Backfilling development waste and CRF/high density hydro-fill system will be in operation from FY'21
	Method of drainage of stowed stope	NA	Method of drainage of stowed stope	NA
System of Underground Transportation	From face to loading Point	LHD	From face to pit bottom or loading Point	LHD
	From loading point to surface	LPDT Hauling to COB & Skip hoisting LPDT through Decline	From loading point to surface	LPDT & Production incline Belt conveyor system Planned with LPDT through Decline
	From surface to end Use Plant-	Belt Conveyor and Truck transport	From surface to end Use Plant-	Belt Conveyor



Particulars	Mochia Mine		Balaria Mine	
<b>Primary Crushing</b>	Centra Mochia: Primary Crsuhing at 9 <sup>th</sup> A level, 3 mRL) West Mochia: primary Crushing at Surface		Ore bw 105-45 mRL or below shall be hauled to Mochia coarse bin at 39/45/60 mRL. At 120 m RL, the ore is dumped in coars bin (1200 t capacity) for primary crushing in underground. Primary Crusher underground at 75 mRL.	
<b>Winding/ Hoisting</b>	Ore hoisting system.		Ore hoisting system.	
	<b>System</b>	<b>Capacity</b>	<b>System</b>	<b>Capacity</b>
	Mochia OHS (central mochia)	0.54 Mtpa (Cap. 1800 tpd)	Balaria Incline (Current)	0.8 Mtpa
	Mochia Decline using 20T/30T/60T LPDT (West Mochia)	+2.0 Mtpa	Balaria Decline (Planned)	+1.0 Mtpa
<b>Mine Ventilation</b>	<b>Particulars</b>	<b>UoM</b>	<b>Ventilation Requirement</b>	<b>Ventilation Plan Capacity</b>
	Mochia & Balaria mine are connecting mines and share their ventilation circuit (Mochia & Balaria Complex)			
	Mochia Mine	Cu.m/Sec	644	660
	Balaria Mine	Cu.m/Sec	497	510

Table no.2.1(b)

**Detailed Process Description of Zawarmala and Baroi Mines**

Particulars	Zawarmala Mine	Baroi Mine
<b>Mode of Entry Purpose:</b> <ul style="list-style-type: none"> <li>For hoisting of Man, material and ore)</li> <li>Ventilation Intake at greater Depth</li> </ul>	UG shaft (466 to 165mRL) Level Entries- 433, 355, 300, 250, 225, 200 & 173 mRL Ramp [430 to (-)55mRL] Level Entries- 355, 300, 250, 200, 173, 80, 35, (-)5& (-)30 mRL and various sub-levels.	<b>Central Baroi-</b> Adit 1 & Ramp at 430 mRL Level Entry- Level entries at 390, 360, 346, 311, 276, 190, 128 & 110mRL and various sub-level <b>North Baroi-</b> Ramp at 422mRL & main decline at 423mRL Level Entry- Level entries at 390, 302, 288, &190 mRL and various sub-level
<b>Underground Layout</b>	Zawarmala mine extends from 2400 to 2900 Dep and Adit as main entry followed by Shaft & Ramp (446-165mRL) is connected with different levels i.e.	Main entry to Central Baroi part of mine is through Central Baroi Ramp extending from 430 to 190 mRL. Main entry to North Baroi part of mine is through Main extending from 422 to 85 mRL



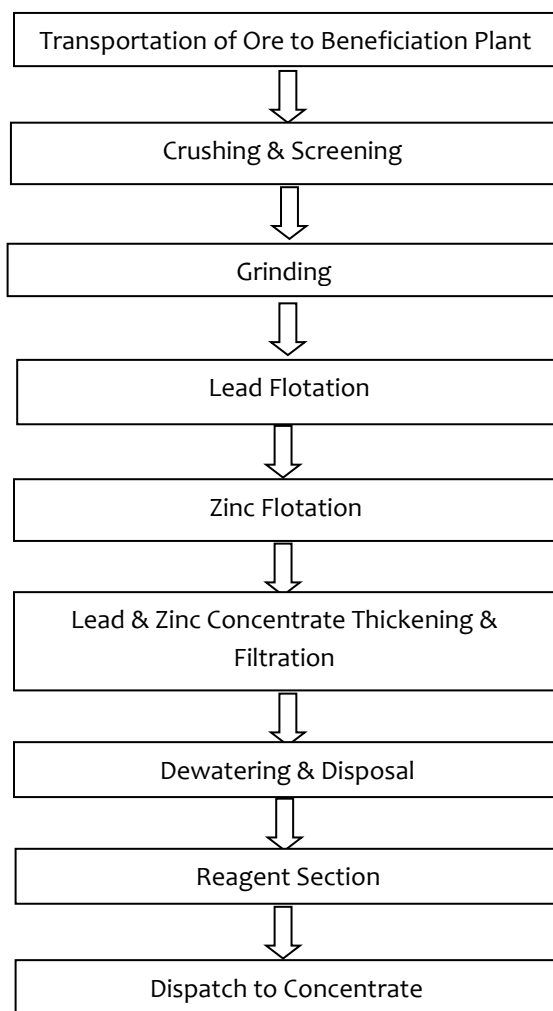
Particulars	Zawarmala Mine		Baroi Mine	
	355mRL, 300 mRL , 250mRL, 225mRL, 200mRL, 173mRL. Access through ramp presently extends from 430 to (-)134mRL		towards Central Baroi & 300 mRL towards North Baroi	
Avg Height of Stope	60-80 m		60-70 m	
Interconnection	Baroi – Zawarmala decline connection is proposed with bigger size decline, in order to use higher capacity equipments for production from lower blocks below -55mRL of Zawarmala Mine			
System of Drilling & Blasting	Particulars	Parameters	Particulars	Parameters
	Drilling Pattern in Ore	Burn cut/wedge cut	Driling Pattern in Ore	Burn cut/wedge cut
	Drilling Pattern in Rock	Burn cut/wedge cut	Driling Pattern in Rock	Burn cut/wedge cut
	Driling Pattern in Stopes	Ring / Parallel hole drilling	Driling Pattern in Stopes	Ring / Parallel hole drilling
	Max no of holes blasted in a round	250 Holes	Max no of holes blasted in a round	225 Holes
	Charge per round	2500 Kg	Charge per round	9500 Kg
	Charge per hole	100 Kg	Charge per hole	60 Kg
	Type of Explosive	ANFO, Slurry Explosive	Type of Explosive	ANFO, Slurry Explosive
	Method and Sequence of Stopping	Particulars	Parameters	Particulars
Number of Working stopes		1	Number of Working stopes	4
Size of the panel		80 - 100 (L) x 60 - 80 m (H) x 24 - 25 (W)	Size of the panel	60 - 80 (L) x 30 - 60 m (H) x 3 - 40 (W)
Level Interval		25 - 40m	Level Interval	70 - 80m
Size and interval of stope pillar		13 - 25 m crown/sill pillar at 65 - 90 m interval upto -55mRL and below -55mRL at interval of 200m	Size and interval of stope pillar	10 - 25 m crown/sill pillar at 60 - 70 m interval
Size / shape of man way		1.8m(H) x 1.2m(D) x 0.75m(W)	Size / shape of man way	1.8m(H) x 1.2m(D) x 0.75m(W)
			Size / shape of ore pass	2 x 2m – 3m x 3m



Particulars	Zawarmala Mine		Baroi Mine	
	Size / shape of ore pass	2 x 2m – 3m x 3m	Method of stowing / backfilling	Backfilling development waste/ Paste fill/ CRF
	Method of stowing / backfilling	Backfilling development waste/ Paste fill/ CRF	Method of drainage of stowed stope	NA
	Method of drainage of stowed stope	NA		
System of Underground Transportation	From face to loading Point	LHD	From face to loading Point	LHD
	From loading point to surface	LPDT, Belt conveyor, Skip hoisting & Diesel Locomotive	From loading point to surface	LPDT
	From surface to end Use Plant-	20-60 T road trucks	From surface to end Use Plant-	Belt Conveyor and Surface Trucks
Primary Crushing	COB (Coarse Ore bin – 800 t capacity) at 250 mRL for primary crushing. The primary crusher is located at 225 mRL i.e. at the bottom of COB with crushing capacity of 200tph.		Central Baroi: primary crusher installed at surface North Baroi: primary crusher installed at surface	
Winding/ Hoisting	Ore hoisting system.		Ore hoisting system.	
	System	Capacity	System	Capacity
	Zawarmala OHS	0.6 Mtpa	Central Baroi Ramp using 20 – 35 MT surface trucks	0.6 Mtpa
	Zawarmala Decline	+0.7 Mtpa	North Baroi- Main Decline using 20 – 35 MT surface trucks	+1.8 Mtpa
Mine Ventilation	Particulars	UoM	Ventilation Requirement	Ventilation Plan Capacity
	Zawarmala Mine	Cu.m/Sec	148	220
	Baroi Mine	Cu.m/Sec	544	510



#### 2.7.4.2 METHOD OF BENEFICIATION



##### 1) Transportation of Ore to Beneficiation Plant

The primary crushed ROM (-150mm size) from mine is being brought to the Mill and is being stacked at coarse ore stockpile. Mochia and Balaria ROM is being transported through Belt conveyor system from Central Mochia shaft, Balaria Production Incline and Mochia-Balaria Portal primary crusher.

Mochia Portal, Baroi and Zawarmala mines ore are being transported through surface trucks (14T–35T capacity) by road for a distance of 3km, 8km and 7km respectively.

Hence, Ore from all the four mines is transported to centralized beneficiation plants, where it is temporarily stacked in designated stockpiles namely Mochia, Balaria & mill2 stockpiles.



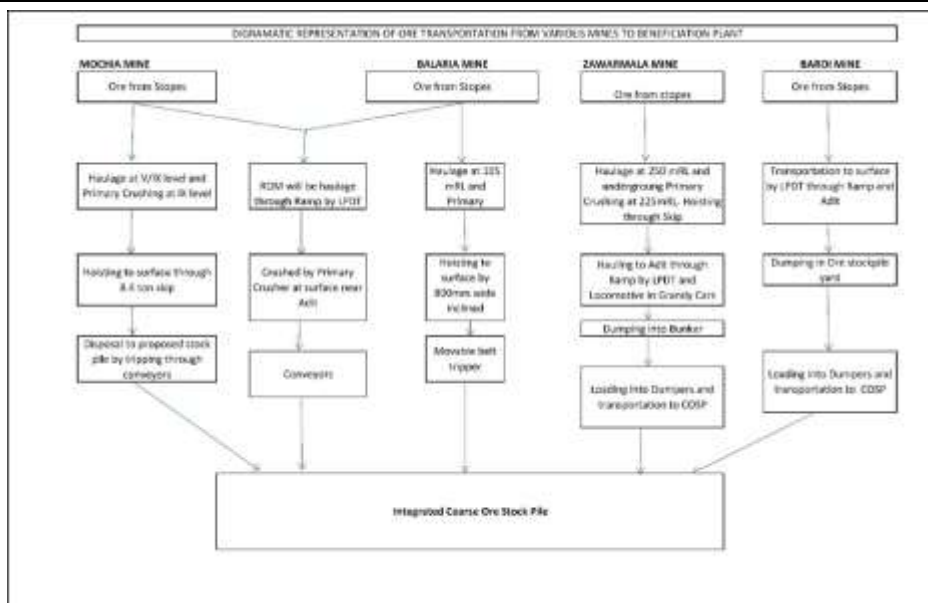


Figure 2.11: Diagrammatic Representation of Ore Transportation from various mines to Beneficiation Plant

## 2) Crushing & Screening

Primary crushers are installed in underground mine locations except Baroi & Mochia-Balaria Portal where it is installed on surface giving output of –150mm. The throughput capacity of these primary crusher is given below –

Primary Crushers		Capacity
Central Mochia	UG	250 TPH
Balaria	UG	250 TPH
Zawarmala	UG	250 TPH
Mochia-Balaria Portal	Surface	421 TPH
North Baroi	Surface	350 TPH
Central Baroi	Surface	200 TPH



Further capacity enhancement of final product through crusher (P80, 12mm) shall be proposed for DBN of 2 MTPA to 2.5 MTPA. Also, we have planned to install 2 MTPA crusher plant near North Baroi.

The installed secondary & tertiary crusher capacity is as below:

	Mill 1 –Mochia Crusher	Mill 1 –Balaria Crusher	Mill 2 – New Mill crusher
Overall Secondary Crushing Capacity	1.2 MTPA	1.6 MTPA	2.0 MTPA
Secondary Crusher	205 TPH x 1	317 TPH x 1	421 TPH x 1





Tertiary Crusher	100 TPH x 2	150 TPH x 2	208 TPH x 2
Fine Ore Bin capacity	6500 MT		7500

### 3) Grinding

The -12 mm ore is fed to the Ball mill with the help of disc & belt feeders, for wet grinding, by using High chrome grinding media of size 80 mm. These ball mills run in close circuit with hydro cyclones.

Grinding Section	Mill 1 – 2.7 MTPA	Mill 2 – 2 MTPA
Ball Mill	5500 TPD x 1 No. (233 TPH)	6500 x 1
Capacity	1000 TPD x 2 Nos. (45 TPH)	(281 TPH)
	500 TPD x 3 Nos. (22 TPH)	



### 4) Lead flotation

The Mill 1 Lead flotation section consists of two streams named Mochia & Balaria having same mode of operation. The lead flotation stream shall comprise of roughing, scavenging and 2-stages of cleaning processes.

	Mill 1 – Mochia flotation circuit	Mill 1 – Balaria flotation circuit	Mill 2 – New Mill flotation circuit
Flotaion Capacity	1.2 MTPA	1.6 MTPA	2.0 MTPA
Rougher cells	16 Cu.m x 3	38 Cu.m x 4	65 Cu.m x 3
Scavanger cells	16 Cu.m x 4	38 Cu.m x 3	65 Cu.m x 2
Cleaner cells	8 Cu.m x 2 16 Cu.m x 1	8 Cu.m x 3 3 Cu.m x 4	17 Cu.m x 3 8.5 Cu.m x 3



### 5) Zinc flotation

In Mill 1 - Zinc flotation section consists of two streams named Mochia & Balaria having same mode of operation. The Zinc flotation section treats the lead scavenger tails and circuit shall comprise of roughing, scavenging and 3 stages of cleaning. The lead scavenger tails are fed to Zinc rougher cells. The zinc rougher cells concentrate (float) is fed to 3 stage cleaning process and tails is fed to scavenger cells. The scavenger cell float is again fed to rougher cell and tails is proceeded for tailing disposal.





	Mill 1 – Mochia flotation circuit	Mill 1 – Balaria flotation circuit	Mill 2 – New Mill flotation circuit
Flotation Capacity	1.1 MTPA	1.7 MTPA	2.0 MTPA
Rougher cells	16 Cu.m x 3	38 Cu.m x 4	65 Cu.m x 3
Scavenger cells	16 Cu.m x 5	38 Cu.m x 4	65 Cu.m x 3
Cleaner cells	8 Cu.m x 8	16 Cu.m x 2 8 Cu.m x 5	17 Cu.m x 3 8.5 Cu.m x 5

#### 6) Lead and Zinc concentrate thickening and filtration section

Lead and Zinc concentrates is being sent to their respective HRT thickeners installed for lead concentrate and zinc concentrate. Overflow from lead thickener shall be collected in suitable tank having suitable drain arrangement with drain valve for recirculation and the deposited lead shall be collected and fed to the lead filtration unit and recover water further goes to process water tank.

Grinding Section	Mill 1 – 2.7 MTPA	Mill 2 – 2 MTPA
Zinc thickner	540 Cu.m (15m dia)	577 Cu.m (15m dia)
Lead thickner	384.5 Cu.m (12 m dia)	577 Cu.m (15m dia)
Tailing Thickner	4826 Cu.m (38m dia)	4826 Cu.m (38m dia)



#### 7) Tailing dewatering and disposal

The Mill 1 & Mill 2 tailings from the Zinc scavenger are sent to 2 separate tailing thicker (Volume 4826 Cu.m each). About 10000 Cu.m of water recovered from overflow of tailing thickener is send to proper sump and utilized for plant operation. The tailings from underflow of tailing thickener is being sent to the DTP-Dry tailing plant, further 85% (15% moisture) of dry material will stacked over tailing dam.

Recovered water from the Dry Tailing plant is reused in the mill operations. There are three tailing disposal lines for mill1 & two tailing disposal lines for mill2 each capable of handling the tailing



generated from plant, out of which, one tailing line is in operation and the other are in standby mode.



#### 8) Reagent section

Reagents  $ZnSO_4$ , SIPX, NaCN,  $CuSO_4$ , SMBS and MIBC are used in the main process plant. The reagent system comprises of preparation tank and distribution tank. There are agitators in preparation tanks.

All reagents are added at required points with required dosages in the flotation circuits by use of flow meter and control valve in closed loop. There are suitable metering types dosing pumps for control of MIBC & SIPX flow.

#### 9) Dispatching the Concentrates in proposed circuit.

There are separate stockpiles, one for Zinc concentrate and one for Lead concentrate production. The Zinc and Lead concentrates are dropped directly from conveyor belts on the respective stockpiles.

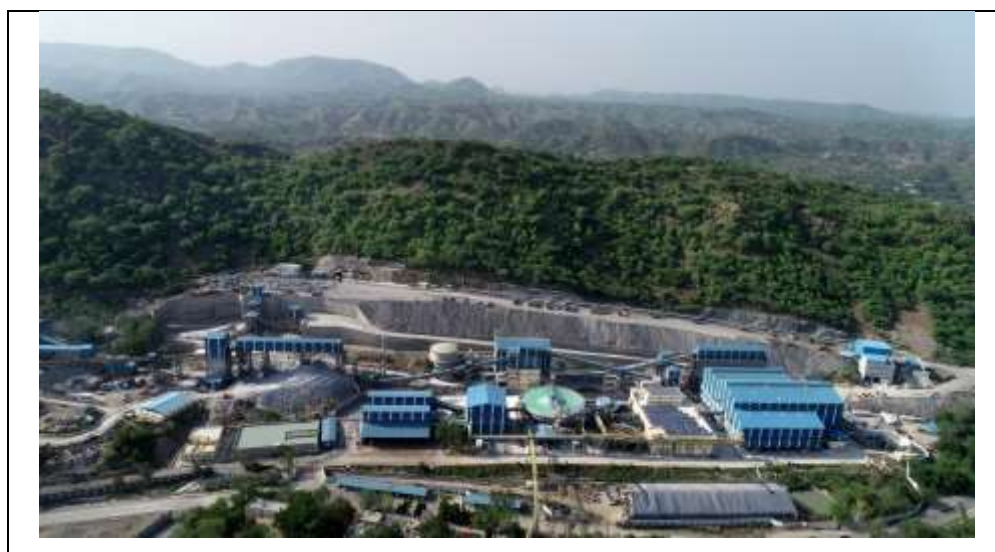
Lead and Zinc concentrates are sent to Dariba / Chanderiya Lead and Zinc Smelters for smelting. The concentrates so produced are sent to respective smelters through road transport.





**Table-2.13**  
**Details of Crusher**

	Location	Existing		Additional		Total	
		Nos	Capacity	Nos	Capacity	Nos	Capacity
1	Mochia (UG Shaft)	1	250			1	250
2	Balaria (UG Conveyor)	1	250			1	250
3	Mochia-Balaria Portal	1	421			1	421
4	Purvanchal	0		1	200	1	200
5	Zawarmala (Shaft)	1	250			1	250
6	Zawarmala (Surface)	0		1	200	1	200
7	Baroi-North	1	350			1	350
8	Baroi-Central	1	200	1	150	2	350
9	Mill-1 (Secondary Crusher)-Mochia	1	250			1	250
10	Mill-1 (Secondary Crusher)-Balaria	1	317			1	317
11	Mill-1 (Tertiary Crusher)-Mochia	2	100			2	100
12	Mill-1 (Tertiary Crusher)-Balaria	2	150			2	150
13	Mill-2 (Secondary Crusher)	1	421			1	421
14	Mill-2(Tertiary Crusher)	2	208			2	208
15	Mill-3 (Secondary Crusher)	0		1	421	1	421
16	Mill-3(Tertiary Crusher)	0		2	208	2	208
	<b>Total</b>	<b>15</b>		<b>6</b>		<b>20</b>	



**Figure 2.12: Site view of Beneficiation Plant**





**Table - 2.14**  
**Mining Details**

S. No.	Particulars	MOCHIA	BALARIA	ZAWARMALA	BAROI	Zawar Mines (Total)
1	<b>Mining Method</b>	Sub – level stoping (Longitudinal & Transverse)	Sub – level stoping (Longitudinal & Transverse)	Sub – level stoping (Longitudinal & Transverse)	Sub – level stoping (Longitudinal & Transverse)	Sub – level stoping (Longitudinal & Transverse)
2	<b>Production Capacity (MTPA)</b>	2.3	1.5	0.7	2	6.5
3	<b>Total Geological Resources (Million Tonne)</b>	44.09	41.95	8.96	35.7	130.7
4	<b>Mineable reserves (Million Tonnes)</b>	10.37	12.194	3.01	8.92	34.494
5	<b>Life of Mine</b>	+6 years	+9years	+6Years	+5 years	9 years
8	<b>Ultimate working depth</b>	-600 mRL	-400 mRL	-300mRL	-100 mRL	-600mRL
9	<b>Elevation Range</b>	345-695 mRL	345-695 mRL	345-695 mRL	345-695 mRL	345-695 mRL
10	<b>Water Table Level</b>	517-510 mRL	517-510 mRL	517-510 mRL	517-510 mRL	517-510 mRL
11	<b>Number of Working days</b>	365	365	365	365	365
12	<b>Number of Working Shifts</b>	3	3	3	3	3

**Source:** Modified Mining Plan with PMCP

## 2.8 YEAR WISE PRODUCTION& EXCAVATION DETAILS

### 2.8.1 Existing Production

Past Production details (For 1974-2016) have been authenticated by DMG, Udaipur dated 23.04.2005. Past Production details (For 2016-2020) have been authenticated by DMG, Udaipur vide letter no. Kha/Udai/S.No/ ML 3/1989/07 dated 30.0.2020. Past Production details for the year FY 2020-21 have been authenticated by Mining Engineer, Department of Mining and Geology on dated 14.06.2021 and 28.08.2024. Same is enclosed as **Annexure 12** with this Final EIA/EMP Report



**Table - 2.15**  
**Existing Production Figures**

Year	Ore production (MT)	Ore Beneficiation (MT)
1974-75	591865	628590
1975-76	714470	715064
1976-77	834580	808509
1977-78	940526	916924
1978-79	1090332	1145089
1979-80	986126	899580
1980-81	848936	811505
1981-82	946272	903205
1982-83	847658	837379
1983-84	1094661	1104287
1984-85	954445	965471
1985-86	989334	1014614
1986-87	1012261	1012076
1987-88	935000	935005
1988-89	1030431	1042717
1989-90	986732	970467
1990-91	1045084	1029705
1991-92	954987	967493
1992-93	1016898	1022848
1993-94	860138	850836
1994-95	734102	725900
1995-96	755870	770030
1996-97	810000	780595
1997-98	903850	922763
1998-99	853550	873412
1999-00	864150	855517
2000-01	778100	802551
2001-02	696800	701251
2002-03	747740	746601
2003-04	851100	839000
2004-05	931800	951300
2005-06	807500	799220

Expansion of Zawar Group of Underground Lead- Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total Excavation: 7.78 Million TPA including Waste rock 1.28 MTPA and Beneficiation from 4.8 Million TPA to 7.3 Million TPA within ML Area of 3620 ha (ML No. 03/89) at Villages- Zawar, Kodiya Khet, Nayakheda, Rawa, Tidi, Udiyakheda, Barothi Bhaldia, Bara, Chanawada, Dhavadi Talai, Kanpur, Newa Talai, Padla, Parsad, Krishnapura, Singhatwara, Tehsil: Girwa and Sarada, District- Udaipur, Rajasthan by M/s Hindustan Zinc Ltd.



Chapter 2 of Final EIA/EMP Report

Year	Ore production (MT)	Ore Beneficiation (MT)
2006-07	812000	812600
2007-08	901635	900345
2008-09	944300	943177
2009-10	1020250	1013580
2010-11	240550	233872
2011-12	204150	230722
2012-13	304680	277129
2013-14	1003600	996889
2014-15	10,56,000	10,77,142
2015-16	13,49,850	13,27,514
2016-17	177000	1457179
2017-18	2176111	2016815
2018-19	2832003	2895431
2019-20	3283832	3274146
2020-21	395128	3945313
2021-22	4410639	4416711
2022-23	4302812	4289517
2023-24	4032141	4008592

## 2.8.2 IN-SITU PROPOSED TENTATIVE EXCAVATION

Year-wise production is given in below table

**TABLE: 2.16**  
**Year-wise Proposed Excavation Details (Tonnes)**

Year	Ore Production (Tonnes)					Waste Generation (Tonnes)					Total Excavation (Tonnes)
	Mochia	Balaria	Zawar mala	Baroi	Zawar Mines	Mochia	Balaria	Zawar mala	Baroi	Zawar Mines	Zawar Mines
2021-22	1600000	1150000	550000	1800000	5100000	409000	292000	82000	414000	1197000	6297000
2022-23	1800000	1150000	550000	1900000	5400000	395000	292000	86000	429000	1202000	6602000
2023-24	1900000	1300000	600000	1900000	5700000	421000	292000	88000	457000	1258000	6958000
2024-25	2100000	1300000	600000	1900000	5900000	446000	292000	91000	457000	1286000	7186000
2025-26	2300000	1500000	700000	2000000	6500000	446000	279000	86000	379000	1190000	7690000
2026-27	2300000	1500000	700000	2000000	6500000	446000	279000	86000	379000	1190000	7690000





Year	Ore Production (Tonnes)					Waste Generation (Tonnes)					Total Excavation (Tonnes)
	Mochia	Balaria	Zawar mala	Baroi	Zawar Mines	Mochia	Balaria	Zawar mala	Baroi	Zawar Mines	Zawar Mines
2027-28	2300000	1500000	700000	2000000	6500000	446000	279000	86000	379000	1190000	7690000
2028-29	2300000	1500000	700000	2000000	6500000	446000	279000	86000	379000	1190000	7690000
2029-30	2300000	1500000	700000	2000000	6500000	446000	279000	86000	379000	1190000	7690000

Tailing bulk density – 1.7 MT/Cu.m (Wet disposal)

Tailing bulk density – 2.0 MT/Cu.m (Dry stacking)

Waste rock bulk density – 1.8 MT/Cu.m

**Source:** Modified Mining Plan with PMCP

### 2.8.3 WASTE MANAGEMENT

#### A) SOLID ROCK WASTE

**Nature:** During the process of mine development for access and stope preparation, waste rock is generated which consist of Barren Dolomite, Phyllites, Greywacke etc.)

#### A. ROCK WASTE TO BE GENERATED AND ITS MANAGEMENT

❖ During Modification of Mining Plan Period:

- **Generation:** Total 4.94 Million Tonne of Rock Waste will be generated.
- **Management:** All the mines have facilities for handling of waste for dumping into exhausted stope voids. Required part of waste hoisting being done to surface for temporary storage and further tailing dam construction. Some of the waste shall be used for leveling and creating base for new infrastructure site development, which shall be compacted and green belt shall be developed.

Out of the total Rock Waste generated during the proposal period i.e, 4.94 million tonne, 4.7 million tonne of waste will be disposed to Underground Voids, 0.22 million tonne of waste will be used for tailing dam construction and remaining 0.0022 million tonne waste will be used for surface leveling for infrastructure. Details are given below:

Year	Mill Tailings (Tonnes)			Rock Waste (Tonnes)			
	Generation	Disposal		Generation	Disposal		
		Backfilling	TSF		Backfilling of Voids	TSF Construction	Surface Levelling
2021-22	4488000	673200	3814800	1197000	1137000	55000	5000
2022-23	4752000	950400	3801600	1202000	1142000	55000	5000
2023-24	5016000	1254000	3762000	1258000	1198000	55000	5000

Expansion of Zawar Group of Underground Lead- Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total Excavation: 7.78 Million TPA including Waste rock 1.28 MTPA and Beneficiation from 4.8 Million TPA to 7.3 Million TPA within ML Area of 3620 ha (ML No. 03/89) at Villages- Zawar, Kodiya Khet, Nayakheda, Rawa, Tidi, Udiyakheda, Barothi Bhaldia, Bara, Chanawada, Dhavadi Talai, Kanpur, Newa Talai, Padla, Parsad, Krishnapura, Singhatwara, Tehsil: Girwa and Sarada, District- Udaipur, Rajasthan by M/s Hindustan Zinc Ltd.



Chapter 2 of Final EIA/EMP Report

Year	Mill Tailings (Tonnes)			Rock Waste (Tonnes)			
	Generation	Disposal		Generation	Disposal		
		Backfilling	TSF		Backfilling of Voids	TSF Construction	Surface Levelling
2024-25	5192000	1557600	3634400	1286000	1226000	55000	5000
2025-26	5720000	1716000	4004000	1190000	1061000	55000	5000
2026-27	5720000	1716000	4004000	1190000	1061000	55000	5000
2027-28	5720000	1716000	4004000	1190000	1061000	55000	5000
2028-29	5720000	1716000	4004000	1190000	1061000	55000	5000
2029-30	5720000	1716000	4004000	1190000	1061000	55000	5000
<b>Total</b>	<b>48048000</b>	<b>13015200</b>	<b>35032800</b>	<b>1190000</b>	<b>1137000</b>	<b>55000</b>	<b>5000</b>

Table: 2.17

Details of Waste Generation & Management

Particulars	Mine	UoM	21-22	22-23	23-24	24-25	Total
Mine Development - Waste Generation	Mochia	MT	409000	395000	421000	446000	1671000
	Balaria	MT	292000	292000	292000	292000	1168000
	Zmala	MT	82000	86000	88000	91000	347000
	Baroi	MT	414000	429000	457000	457000	1757000
	<b>Total - Zawar</b>	MT	<b>1197000</b>	<b>1202000</b>	<b>1258000</b>	<b>1286000</b>	<b>4943000</b>
Waste disposal to UG voids	Mochia	MT	399000	385000	411000	436000	1631000
	Balaria	MT	282000	282000	282000	282000	1128000
	Zmala	MT	79000	83000	85000	88000	335000
	Baroi	MT	377000	392000	420000	420000	1609000
	<b>Total - Zawar</b>	MT	<b>1137000</b>	<b>1142000</b>	<b>1198000</b>	<b>1226000</b>	<b>4703000</b>
Waste to tailing dam construction	Mochia	MT	5000	5000	5000	5000	20000
	Balaria	MT	10000	10000	10000	10000	40000
	Zmala	MT	3000	3000	3000	3000	12000
	Baroi	MT	37000	37000	37000	37000	148000
	<b>Total - Zawar</b>	MT	<b>55000</b>	<b>55000</b>	<b>55000</b>	<b>55000</b>	<b>220000</b>
Waste to use for surface leveling for infrastructure	Mochia	MT	5000	5000	5000	5000	2000
	Balaria	MT	-	-	-	-	0
	Zmala	MT	-	-	-	-	0
	Baroi	MT	-	-	-	-	0
	<b>Total - Zawar</b>	MT	<b>5000</b>	<b>5000</b>	<b>5000</b>	<b>5000</b>	<b>2000</b>



#### 2.8.4 MILL TAILINGS

##### Nature:

During the beneficiation process, after separation of concentrates, the mineral reject tailing (72% of -74 microns) is pumped in slurry form to the tailing storage facility.

Details of tailing storage facilities are given below:

**TABLE: 2.18**

**Details of Tailing Storage Facilities**

S. No	TSF- Tailing Storage Facility	Existing	Additional Provision	Total (TSF)
		2 TSF (Tailing Storage Facility)	1 TSF	3 TSF
i.	Area of each storage facility (Ha)	TSF-2: 82 ha TSF-1: 38 ha	TSF-3: 25.1 ha (new)	TSF-1: 38 ha TSF-2: 82 ha TSF-3: 25.1 ha
ii.	Quantity of tails filled (Million Cum)	TSF-2: 28.19 TSF-1: 6.96 (Tailings)	-	-
iii.	Available capacity (Million Cum)	TSF-1: 2 TSF-2: 5.3	TSF-2: 8 TSF-3: 20	TSF-1: 2 TSF-2: 5.3+8 TSF-3: 20
iv.	Location (Coordinate)	TSF-1: 73°43'24.61"E, 24°21'26.82"N TSF2: 73°42'44.66"E, 24°20'38.44"N	TSF-3: 24°21'2.89"N 73°43'28.18"E	

**Source:** Modified Mining Plan with PMCP



**Figure 2.13: Tailing Storage Facility Site View**



## A. TAILINGS TO BE GENERATED AND ITS MANAGEMENT

### ❖ During Modified Mining Plan Period:

- **Generation:** Total 19.89 million tonne of Tailing will be generated. Year wise details are given below:

Table - 2.19  
Tailing Generation (in tonne)

S. No	Year	Tail Generation	Tails to Backfilling	Tails to TSF
1.	2021-22	4590000	459000	4131000
2.	2022-23	4860000	777600	4082400
3.	2023-24	5130000	820800	4309200
4.	2024-25	5310000	849600	4460400
5.	2025-26	5850000	2340000	3510000
6.	2026-27	5850000	2340000	3510000
7.	2027-28	5850000	2340000	3510000
8.	2028-29	5850000	2340000	3510000
9.	2029-30	5850000	2340000	3510000
<b>Total</b>		49140000	14607000	34533000

- **Management:**

Tailing is a major waste material generated from beneficiation plant. Tailing is transported to Dry tailing plant where water is separated from tailings and dry tailing cake and is disposed in Tailing storage facility.

Tailings generated from Mill are used for backfilling mine voids and the remaining tailings are stored at tailing storage facility which is dewatered and dried for dry stacking at dry tailing plant. As per requirement at Zawarmala for paste filling, surface transportation of dry tailing is done to Zawarmala Paste filling plant.

Out of the total tailing generated (~49 million tonne) upto 2030, 14.6 million tonne will be backfilled and remaining 34.5 million tonne of tailing will be stored at the TSF.

Tailing will be used for backfilled will be in the following mines: Use of Tailings for backfilling at Mochia, Balaria, Zawarmala & Baroi Mine.



**HYDROFILL PLANT**



**PASTEFILL PLANT**



**STOPE FILLING FROM HYDROFILL/PASTEFILL**

**Figure 2.14: Tailing Generation and Management**

During mining plan period, the tailing disposal is planned over existing tailing storage facility in lease area, which shall be rehabilitated later after completion of life.

For gainful utilization of tailing, prefeasibility study has been conducted by CSIR-CRRI (Central Road Research Institute) w.r.t utilization of tailing in road construction. The studies have indicated its suitability for various options for road construction. Efforts will be made for its utilization in road construction activities.

## 2.9

### CONCEPTUAL PLAN

- At present 170.85 ha has been covered under plantation .
- During plan period 14.15 ha will be covered under plantation.
- At conceptual period, total land for Industrial/Mining area will be 242.57 ha, will be diverted for plantation on forest and non-forest land.
- 114.93 ha of Forest land will be restored.
- Total 356.63 ha area of non-forest land will be covered under plantation at the end of life of mine.
- An area of 1579.05 ha area will remain undisturbed.



Post mining land use of core zone (ha) is given in table below:

**Table-2.20**  
**Post mining land use of core zone (ha)**

S. No.	Land use	Pre-Operational	Operational (Ha)		Post – Operational (Ha.)	Remarks
			Existing	Post Expansion		
1	Agricultural land	284.29	284.29	284.29	284.29	Undisturbed
2	Grazing Land	59.84	59.84	59.84	59.84	Undisturbed
3	Settlement	99.75	146.41	146.41	146.41	Community
4	Barren land (Govt.)	1529.09	1160.8	1125.8 (-35)	1125.8	Undisturbed
5	Barren Land (HZL)	0	58.15	44 (-14.15)	0	Divert for plantation
6	Industrial/ Mining Use	0	207.57	242.57 (+35)	0	Divert for plantation
7	Plantation	0	170.85	185 (+14.15)	356.63 (+185.78)	Plantation
8	Forest Land	1537.91	1422.97	1422.97	1537.91 (+114.93)	Forest land (114.94 ha of Surface rights handover to forest)
9	River and Water Bodies	109.12	109.12	109.12	109.12	Undisturbed
<b>Total</b>		<b>3620</b>	<b>3620</b>	<b>3620</b>	<b>3620</b>	

Source: Hindustan Zinc Limited

## 2.10 DESCRIPTION OF MITIGATION MEASURES

The mitigation measures given in this section are for management of the emissions (particulate or gaseous), waste water& surface run-off and Noise pollution generated from the mining operations to meet the environmental standards and environmental operating conditions.

**Table: 2.21**

### Details of emissions/ Pollution from the mining operations and their management

Emissions	Mitigation measures incorporated
SO <sub>2</sub> & NO <sub>2</sub>	<ul style="list-style-type: none"> <li>➤ The mine site has provided mechanical ventilator for air circulation</li> <li>➤ Wet drilling is being used to suppress the dust generation</li> <li>➤ The trucks are being covered with tarpaulin sheets</li> </ul>





Emissions	Mitigation measures incorporated
	<ul style="list-style-type: none"> <li>➤ Dust generation during working will be minimized by adoption of dust suppression systems at working faces</li> <li>➤ Water spraying on haul road</li> <li>➤ During transportation and unloading points, water sprinkling is being/ will be done to suppress the fugitive emissions.</li> <li>➤ The crusher and Screens houses are provided with dust extraction system with outlets</li> <li>➤ Development of green belt within lease area &amp; plantation within ML Area is being done.</li> <li>➤ Regular monitoring of air quality</li> <li>➤ On surface, blacktop paved/ concrete roads</li> <li>➤ Deployment of mechanized vacuum road sweeper on surface roads</li> </ul>
Waste Water	<ul style="list-style-type: none"> <li>➤ No wastewater is being/will be discharged outside the ML Area</li> <li>➤ Water reclaimed from tailing storage facility (TSF) is pumped back for use in process. Garland drains around TSF and sumps have been constructed to channelize the rainwater. Similar arrangement shall be provided for new TSF.</li> <li>➤ Mine water constituted by seepage of rainwater and percolating ground water into the mines is being collected in underground sumps from where it is being pumped to surface storage tanks for reuse in mining operations like drilling, dust suppression and reuse in beneficiation plant.</li> <li>➤ The wastewater generated from domestic operations is channelized to existing Sewage Treatment Plant (450KLD) and reused in plantation after appropriate treatment.</li> <li>➤ Oil trap system at vehicle maintenance workshops and vehicle washing facilities.</li> <li>➤ Rainwater harvesting structure in mining lease area</li> <li>➤ Regular monitoring of surface and ground water</li> </ul>
Noise Generation	<ul style="list-style-type: none"> <li>➤ Majority of mining activities are restricted to underground only.</li> <li>➤ Compressors are installed in isolated building with acoustic enclosures.</li> <li>➤ Ventilation fans are provided with silencers</li> <li>➤ DG set are having acoustic enclosure.</li> <li>➤ All vehicles and machineries used have noise emissions within permissible limits through regular maintenance.</li> <li>➤ Improved design of chutes and mill liners.</li> <li>➤ Good grindability due to soft ore.</li> <li>➤ Regular monitoring of noise level of mining &amp; milling equipment.</li> <li>➤ UG HEMM are procured with latest emission standard engines.</li> <li>➤ UG HEMMs are equipped with airconditioned cabins thereby attenuating noise level while operating the equipment</li> <li>➤ Green belt is developed to attenuate the noise levels</li> </ul>



Expansion of Zawar Group of Underground Lead- Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total Excavation: 7.78 Million TPA including Waste rock 1.28 MTPA and Beneficiation from 4.8 Million TPA to 7.3 Million TPA within ML Area of 3620 ha (ML No. 03/89) at Villages- Zawar, Kodiya Khet, Nayakheda, Rawa, Tidi, Udiyakheda, Barothi Bhaldia, Bara, Chanawada, Dhavadi Talai, Kanpur, Newa Talai, Padla, Parsad, Krishnapura, Singhatwara, Tehsil: Girwa and Sarada, District- Udaipur, Rajasthan by M/s Hindustan Zinc Ltd.



Chapter 2 of Final EIA/EMP Report

Emissions	Mitigation measures incorporated
	<ul style="list-style-type: none"> <li>➤ Reducing the exposure time of workers to the higher levels of noise</li> <li>Provision of personnel protective equipment like ear plugs, earmuffs etc</li> </ul>

## 2.11 ASSESSMENT OF NEW AND TESTED TECHNOLOGY FOR THE RISK OF TECHNOLOGICAL FAILURE

From the nature and extent of the deposit, the reserves and the quality have been proved with adequate degree of reliability. Therefore, Sub level Open Stopping Method is the most feasible method for mining for the proposed expansion of Underground Mining project. Since the mining machineries are rapidly upgrading, project proponent would act fast to adopt more advance equipment and automation for safer, environment friendly mining technology.





## CHAPTER - 3

### DESCRIPTION OF THE ENVIRONMENT

#### 3.1 INTRODUCTION

The knowledge of present environment of the core and buffer zone of the existing mining area is important to assess the impact of various project activities on environment. The knowledge of present day environment is also helpful in planning management of environment and planning of mitigation measures. To assess the composite baseline of mine and CPP w.r.t. environmental quality of the area, field assessment has been conducted considering following components of the environment, viz. land, meteorology, air, noise, water, soil, biological and socio-economic.

The relevant information and data (both primary and secondary) were collected in core as well as buffer zone (10 km distance from the Mine Lease boundary) during Summer Season (March To May, 2021 and March to May, 2024) in accordance with the guidelines of MoEF&CC for undertaking EIA Studies and preparation of EIA/EMP report.

#### 3.2 STUDY AREA AT A GLANCE

**Study Area:** The study area is an area of 10 km radius (aerial distance) from the project site. The area of project site (within ML boundary) is considered as core zone and rest of the study area around core zone is known as buffer zone.

The mine site falls in Tehsil: Girwa and Sarada, District- Udaipur, Rajasthan

- **Core Area :** 3620 ha (The Zawar group of Mines is divided in 2 Blocks: Block 1 and 3 for systematic and scientific development of Deposit. )

S.No	Blocks	Area (in Ha)
1.	Block-1	3172
2.	Block-3	448
	Total Area (Zawar Mine)	3620

- **Buffer Area:** 83195.09 ha (10 Km radius area around core area).

The major environmental settings of the study area are as given in the table below-

**Table - 3.1**  
**Environmental Settings of the Area**

S.No	Particulars	Details		
		Name	Distance and Direction (From Block-I)	Distance and Direction (From Block-III)
1.	Nearest State/National Highway	SH-32	~3.5 km in ENE	~16.25 km in NE
		NH- 48	passing though Block-I	passing though BlockIII



S.No	Particulars	Details		
		Name	Distance and Direction (From Block-I)	Distance and Direction (From Block-III)
2.	Nearest Railway Station	Zawar Railway station	within block-I	~14 Km in NNE
		Kharwachanda Railway station	~7.5 Km in NE	~ 27 Km in NNE
		Padla Railway station	~7.5 Km in ESE	~12 Km in NE
3.	Airport	Maharana Pratap Airport	~32 Km in NNE	~46.5 Km in NNE
4.	Nearest Town / City	Udaipur city	~20 km in North	~38 km in North
5.	Ecological Sensitive Areas (Wild Life Sanctuaries, National parks, biosphere reserves) within 10km radius study area	As per final Notification of Jaisamand Wildlife sanctuary published on 06.08.2020, ESZ is about 3.180 km and Sanctuary is about 10.80 km from the mine site. Certificate for the same has been obtained from Deputy Conservator of Forest (Wildlife) vide letter No F 9(10 km-469) survey/DCF/WL/2023-24/6405 dated 14.08.2023.		
6.	Reserved / Protected Forest within 10 km radius study area	Name	Distance and Direction (From Block-I)	Distance and Direction (From Block-III)
		Zawar singatwara Block B PF	Within the block – I	~12.5 km in NNE
		Zawar singatwara Block C PF	Within the block –I	~10 km in North
		Zawar singatwara Block A PF	Adjacent in NNE	~15 km in NNE
		Khajuri Block E PF	Adjancent in NW	~15 km in North
		Khajuri Block C PF	~1.0 Km in WNW	~14.5 km in NNW
		Paduna Block PF	~1.0 km in South	~6.0 km in North
		Paduna Block PF	~1.5 km in SW	~6.0 km in NNW
		Babarmal Block B PF	~1.5 Km in NE	~16.5 km in NNE
		Dingri RF	~1.5 km in ESE	~9.0 km in NE
		Samar Block A PF	~2 km in North	~18 km in North
		Reserved Forest	~2.5 km in SW	~8.0 km in NNE
		Jabla Block A PF	~3.0 km in SW	~6.5 km in NW
		Samar Block B PF	~3 Km in NW	~18 km in NNW
		Babarmal Block B PF	~4.0 Km in NNE	~19 km in NNE
		Polodra RF	~4.0 Km in ENE	~17.25 KM NE
		Khajuri Block B PF	~5 Km in WNW	~19.5 km in NNW
		Khajuri Block A PF	~5.5 Km in WNW	~19.5 km in NW
		Dingri RF	~6.0 km in SE	~8.5 km in NE



S.No	Particulars	Details		
		Name	Distance and Direction (From Block-I)	Distance and Direction (From Block-III)
		Sera Block PF	~7.0 km in WSW	~13.5 km in NW
		Polodra RF	~7.0 Km in East	~15.75 km in ENE
		Reserve forest	~7.0 Km in NW	~22 km in NNW
		Chanavda Block RF	~7.0 km in SSE	~2.5 km in NE
		Babarmal Block A PF	~7.5 Km in NNE	~24 km in NNE
		Reserve forest	~8.0 Km in NNE	~24 km in NNE
		Khajuri Block D PF	~9.0 Km in WNW	~17.5 km in NW
		Parshad RF	~11.5 km in SSE	~2.0 km in ESE
		Reserve forest	~13 km in SSW	~2.0 km in SW
		Rikhabdev C PF	~18.5 km in S	~8.0 km in SE
7.	Water bodies within 10 km radius study area	<b>Name</b>	<b>Distance and Direction (From Block-I)</b>	<b>Distance and Direction (From Block-III)</b>
		Tiri Nadi	Within the block-I	~14.5 km in NNE
		Chandani Nala	~2.5 Km in NNW	~17.5 km in North
		Tidi Dam	~3.0 km in WSW	~10.0 k in NNW
		Daiya Nadi	~6.5 Km in East	~15 km in NE
		Pareri Nadi	~11 km in South	Passing through Block-III
		Thorghati Talav	~16 km in SSE	7.5 km in ESE
		Nal Nadi	~19 km in SSW	~8.5 Km in SW
8.	Seismic Zone	Zone – II as per IS: 1893 (Part-I) : 2002		

**Source:** Site Visit & Pre-feasibility Report

The map showing environmental settings within 10 km from the mine site is given on the following page.





### 3-3 BASELINE DATA COLLECTION

Composite Baseline environment data of Mine and CPP on various components of the environment in the study area were collected during Summer Season (March To May, 2021) and March to May, 2024 to assess the present scenario of the area. Details are given in the table given below:

**Table-3.2**  
**Composite Baseline data collection of Mine site and CPP**  
**Summer Season (March to May, 2021) and (March to May, 2024)**

S. No.	Environmental component	Primary data				Secondary data
		Parameters	Frequency	Monitoring locations	Methodology	
1.	Land	Land use and land cover	Once in a season	Study area	Field survey	Satellite imagery from NRSC, Hyderabad
		Soil	Once in a season		As per IS 2720/USDA	
2.	Meteorology	Temperature, Relative Humidity, Wind Speed, Wind Direction, Rainfall	Hourly	1	--	IMD book (Climatological normals 1981-2010), Rainfall data for Udaipur (Dabok)
3.	Air	PM <sub>10</sub> , PM <sub>2.5</sub> , CO, SO <sub>2</sub> and NO <sub>2</sub>	(24 hourly), twice a week	15	CPCB Guidelines /NAAQS/IS 5182	--
		O <sub>3</sub> , Pb, NH <sub>3</sub> , C <sub>6</sub> H <sub>6</sub> , BaP, As, Ni	Once in a season			
4.	Noise	Equivalent noise levels in LeqdB (A)	Once in a season (day & night time)	15	CPCB Guidelines /IS 9989	--
5.	Surface Water	Parameters as per IS 10500-2012	Once in a season	7	IS 10500 -2012	--
6.	Ground Water/Drinking water		Once in a season	15		Udaipur District Ground Water Brochure, 2013, CGWB





S. No.	Environmental component	Primary data				Secondary data
		Parameters	Frequency	Monitoring locations	Methodology	
7.	Biological Environment	Flora and Fauna	Once in a season	Study area	Quadrat method/random sampling	-
8.	Socio-Economic Environment	Socio-Economic status	Once in a season	Study area	Field survey through questionnaire, group discussion and random sampling	• Census data, 2011

### 3.3.1 INSTRUMENTS USED FOR ENVIRONMENTAL BASELINE DATA COLLECTION

The following instruments were used at the site for composite environmental baseline data collection work.

1. Respirable Dust Sampler with attachment for gaseous Pollutants, Envirotech APM 460.
2. Fine Particulate Matter (FPM) Sampler APM 550
3. Sound Level Meter Model Envirotech SLM - 100
4. Digital D.O. Meter Model - 831 E (CPCB Kit)
5. Weather Monitoring Station Model Enviro WM 271
6. Water Level Indicator and
7. Global Positioning System (GPS).

A part from collecting samples of air, water, noise and soil from representative sampling points given in proceeding sections, the data on land use, vegetation and agricultural crops were also collected by the field team through interaction with a large number of local inhabitants of the study area and different Government departments / agencies. This provided an excellent opportunity to the members of the field team for obtaining clear scenario of the existing environment of the study area.

### 3.4 LAND USE / LAND COVER STUDY

Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given. To fulfill the requirement of the above said ToR point the following process has been adopted:-

- Development of land use & land cover map using land coordinates of the project area.
- Identification and marking of important basic features according to primary and secondary data.





- Evaluation of the impact on existing land use of the project area.
- Suggestive measures for conservation and sustainable use of land.

### 3.4.1 DATA USED

Current vintage data of Indian Remote Sensing Satellite RESOURCESAT-2 (L4FMX) digital FCC (False Color Composite) has been used for preparation of Land use/ Land cover thematic map of study area.

Satellite image has been procured from National Remote Sensing Centre, Hyderabad. Survey of India toposheet as a reference map on 1:50,000 scale has been used for preparation of base layer data like road, rail network; village and mine site and for geo-referencing of satellite image.

**Table-3.3**  
**Details of Data collection**

S. No.	Particulars	Details
1.	Satellite Image	RESOURCESAT 2A (LISS-IV)
2.	Vintage Date	14th February 2021
3.	Satellite Data Source	NRSC, Hyderabad
4.	SOI Toposheets No	45 H/11, 45 H/12, 45 H/15 & 45 H/16
5.	Software Used	Earth Resources Data Analysis System (ERDAS) Imagine 9.2



### Figure 3.2: Satellite Imagery of Study Area

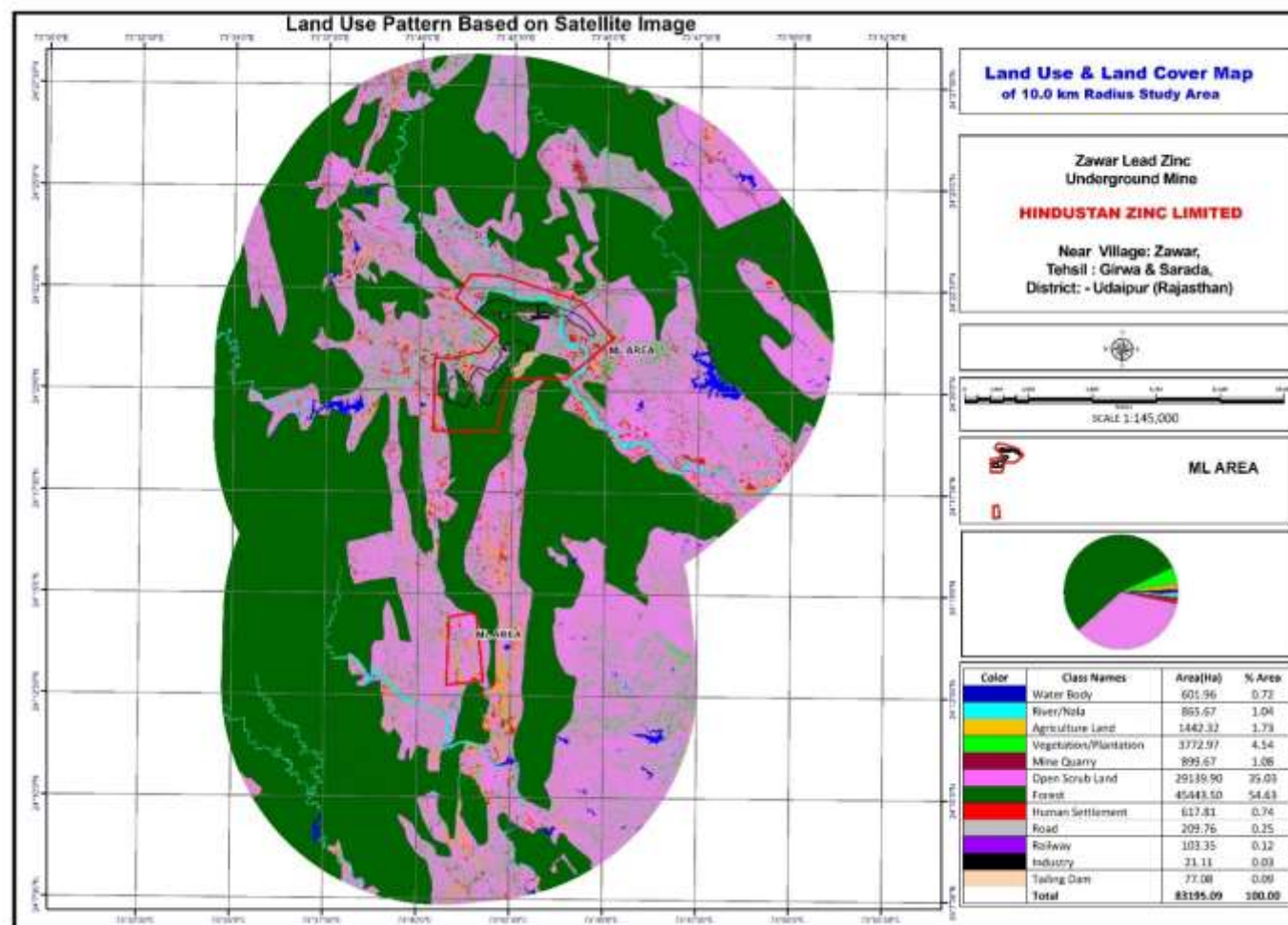


### 3.4.2 METHODOLOGY

- Preliminary / primary data collection of the study area
  - Satellite data procurement from NRSC Hyderabad
- Secondary data collection from authorized bodies
  - Survey of India Toposheet (SOI)
  - Cadastral / Khasra map
  - GPS Coordinates of Mine Lease Boundary
  - Mining Maps approved by IBM, Bangalore
- Processing of satellite data using ERDAS Imagine 9.2 and to prepare the Land use and Land cover maps (e.g. Forest, agriculture, settlements, wasteland, water bodies etc.) by digital image processing (DIP) technique.
  - Geo-Referencing of the Survey of India Toposheet
  - Geo-Referencing of satellite Imagery with the help of Geo-Referenced Toposheets
  - Geo-Referenced Khasra Maps
  - Enhancement of the Satellite Imagery
  - Base Map layer creation (Roads, Railway, Village Names and others Secondary data etc.)
  - Data analysis and Classification using Digital interpretation techniques.
  - Ground truth studies or field Verification.
  - Error fixing / Reclassification
  - Final Map Generation



### 3.4.2.1 LAND USE / LAND COVER DETAILS OF STUDY AREA



Source: Satellite Imagey

Figure 3.3: Land Use / Land Cover Map of the Study Area



The land use and land cover details of the Study area are given in Table - 3.4

**TABLE - 3.4**  
**Land Use / Land Cover Details of Study Area**

S. No.	Legend	Area (in ha)	Area (in %)
1.	River/Water Body	601.66	0.72
2.	Nala	865.67	1.04
3.	Agriculture land	1442.32	1.73
4.	Vegetation/Plantation	3772.97	4.54
5.	Mine Quarry	899.67	1.08
6.	Open Scrub Land	29139.90	35.03
7.	Forest	45443.50	54.63
8.	Human Settlement	617.81	0.74
9.	Road	209.76	0.25
10.	Railway	103.35	0.12
11.	Industry	21.11	0.03
12.	Tailing Storage Facility	77.08	0.09
	<b>Total</b>	<b>83195.09</b>	<b>100.00</b>

Source: LU/LC classification map for study area

### 3.4.3 INTERPRETATION OF THE LULC DATA

The study area mainly comprises of Forest Land (54.63%) and Open Scrub Land (35.03%). Vegetation and Plantation spreads over 4.54 % and Agriculture land (1.73 %) of total study area.

Built up area is represented by human settlements (0.74 %). Due to the upcoming project, increased human settlements will be concentrated near the mine lease area as employment will be generated. There is a possibility of increase in transportation and population in the nearby villages that will result in change in the present land use and land cover. Water bodies in the study area comprise of Tidi Dam etc. (0.72 %) and River/Nala (1.04 %). Mining areas comprise of active quarries and mined out area (1.08%) and Tailing Storage Facility (0.09%).

### 3.5 SEISMICITY AND FLOOD HAZARD ZONATION OF THE AREA

Bureau of Indian Standards [IS - 1893 (Part-1): 2002], has grouped the country into four seismic zones viz. Zone - II, III, IV and V. Of these, Zone - V is the most seismically active region, while Zone - II is the least. The Modified Mercalli Intensity (MMI) scale, which measures the impact of the earthquakes on the surface of the earth, broadly associated with various zones is given in table 3.5.

**Table - 3.5**  
**Seismic Zones in India**

S. No.	Seismic Zone	Risk	Intensity of Earthquake (on Mercalli Intensity Scale)
1.	Zone - II	Low Risk Zone	VI & below
2.	Zone - III	Moderate Risk Zone	VII



S. No.	Seismic Zone	Risk	Intensity of Earthquake (on Mercalli Intensity Scale)
3.	Zone - IV	High Risk Zone	VIII
4.	Zone - V	Very High-Risk Zone	IX & above

**Source:** [www.ndma.gov.in/images/guidelines/earthquakes.pdf](http://www.ndma.gov.in/images/guidelines/earthquakes.pdf)

The Rajasthan State falls in a region of low Seismic hazard zone with the exception being moderate hazard in areas along west state border. It mainly lies in Zones II and III. Several faults have been identified in this region out of which many show evidence of movement during the Holocene epoch. The Cambay Graben terminates in the south-western part of the state. The Konoil Fault near Jaisalmer trends in a north-south direction and was associated with the 1991 Jaisalmer earthquake. Several active faults criss-cross the Aravalli range and lie parallel to each other. The most prominent of them is the north-south trending Sardar Shahar Fault and the Great Boundary Fault which runs along the Chambal River and then continues in the same direction into Uttar Pradesh. However, it must be stated that proximity to faults does not necessarily translate into a higher hazard as compared to areas located further away, as damage from earthquakes depends on numerous factors such as subsurface geology as well as adherence to the building codes.

The Mine site as well as 10 km study area lies in Zone-II Moderate Risk Zone of Seismic Zoning Map of India, updated by “Vulnerability Atlas – 3<sup>rd</sup> Edition (updated on 2<sup>nd</sup> March, 2019); Peer Group, Ministry of Health (MoH) and UPA; based on digitized data of SOI, GOI; Seismic Zones of India Map, IS 1893 – 2002, BIS, GOI, Seismic tectonic Atlas of India and its environs, GIS, GOI”ss.



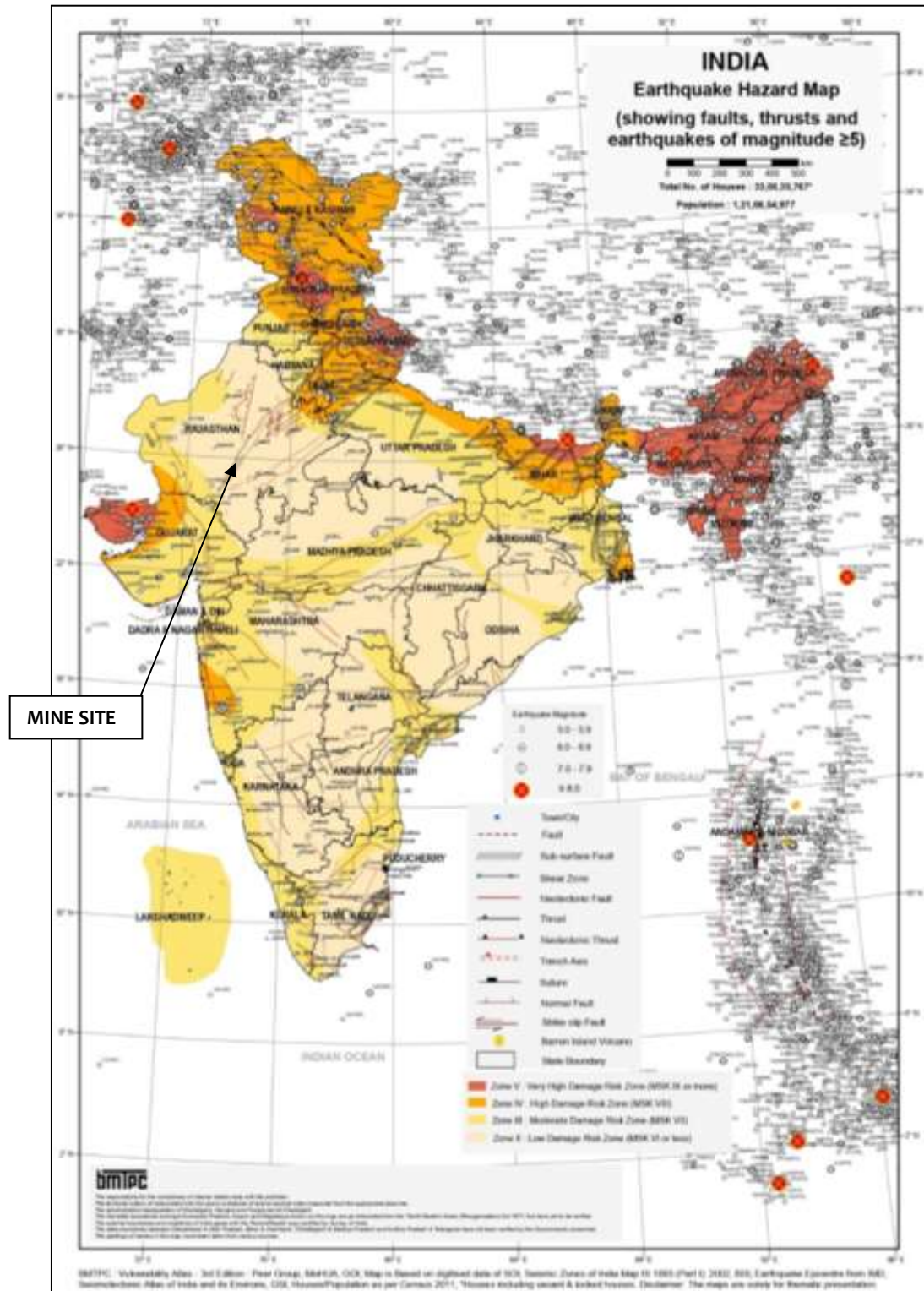


Figure 3.4 Seismic Zone Map (Mine site falls in Seismic zone II)

## Conclusion

The mine site as well as 10 km study area lies in zone-II which is low damage risk zone.





### 3.6 FLOOD HAZARD ZONATION OF THE AREA

As per -the “BMTPC: Vulnerability Atlas – 3<sup>rd</sup> Edition (updated on 2<sup>nd</sup> March, 2019); Peer Group, Ministry of Housing (MoH) and UPA (Urban Poverty Alleviation); based on digitized data of SOI, GOI; Census of India 2011; Flood Atlas (1987), Task Force Report (2004), C.W.C., GOI” the mine site does not fall under “area liable to flood”. Flood Hazard Zonation Map of India showing the mine site is given in Figure - 3.5.

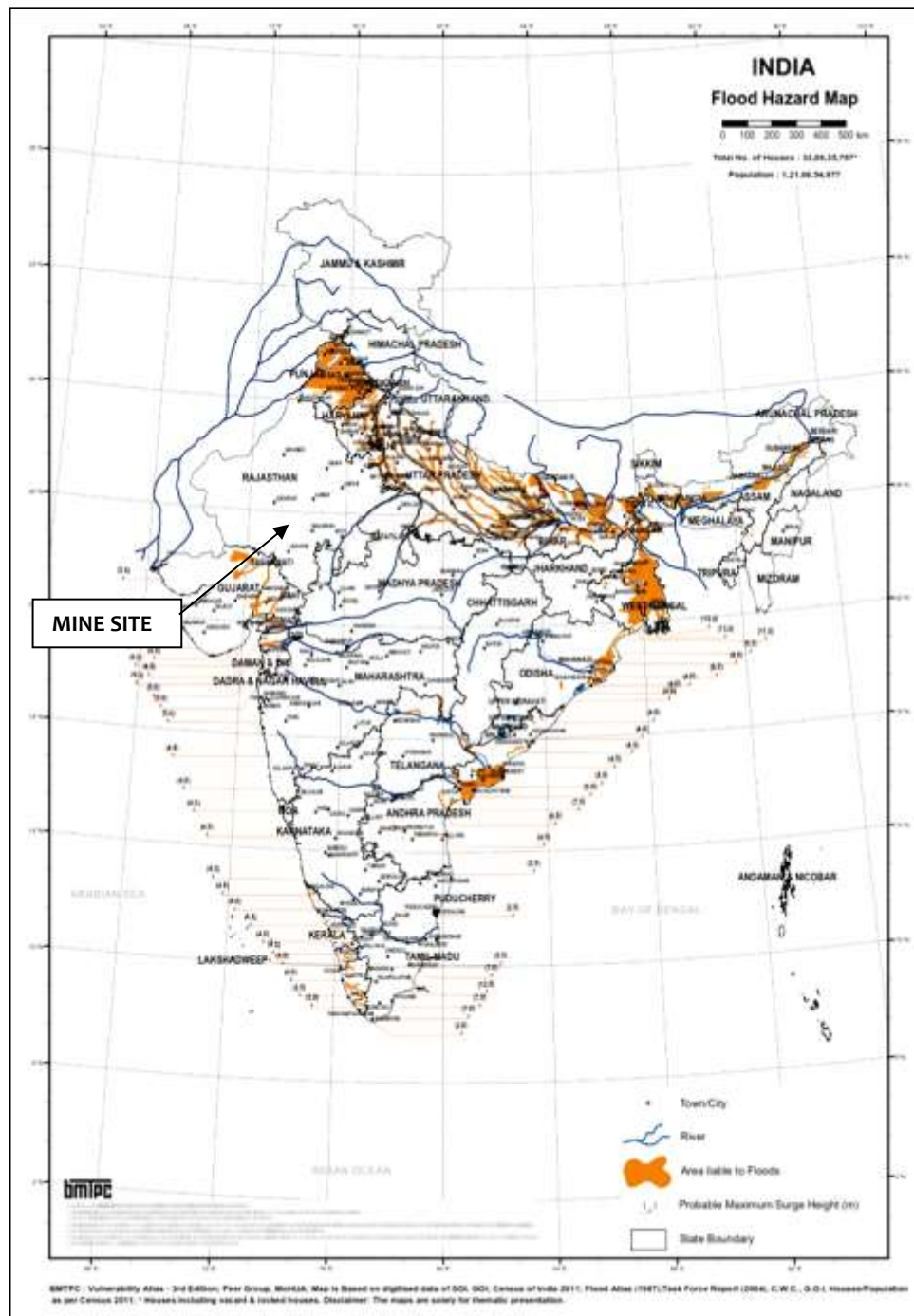


Figure 3.5 Flood Hazard Zonation Map showing project location



### 3-7

## TOPOGRAPHY & DRAINAGE PATTERN

### Topography

The lease area falls on Survey of India GT sheet no. 45 H/11 & 15 and southern side of Udaipur district. The Zawar group of mines lease area consisting hilly terrain of variable heights ranging from 350mRL to 600mRL and marked by rugged and hilly terrain, dominated by steeply dipping outcrops and small valleys carved by the networks of ephemeral streamlets and streams. The drainage pattern is sub-dendretic to dendretic. The general slope of the area is from west to east and north-west to south-west. In the northern and western part of the area, there are some high peaks of the hills. The south-eastern part has comparatively lower elevation having lowest elevation, i.e. at Khakhadara. The major part of these hilly area is under forest cover. The total leasehold area (3620 Ha) is divided in two blocks – Block 1 & Block 3. The details of general RL is given below -

ML	Lease area	Minimum RL	Maximum RL
Block 1	3172 Ha	345mRL	695mRL
Block 3	448 Ha	410mRL	540mRL

### Drainage Pattern

The Tidi river forms major river system in Core and peripheral area. It is a ephemeral river and has two catchment zones in the north and west of the area. The northern catchment commences from the high peaks of mountains towards north-west and north-east of Kaya village. The stream from these area almost takes a south and south-easterly course and joins Tidi river at the base of a hill north-west of mine area.

The western catchment commences from high hilly peaks around Sera village. The Tidi river near Tidi and Zawar villages takes a meandering north-east course. After flowing almost west-east course, North- Northwest of mining area it changes its course towards south-east, where it is joined by Daya River. The Daya river emerges from hill area around Keora Khurd village. After flowing through hilly terrain as a narrow stream upto Rela village the downstream course of River broadens with thin deposits of coarse alluvium.

The Tidi river further south of the area, joins Gomti river which is tributary of Som river. The Som river joins Mahi river near Deola Village in Dungarpur District and after draining a part of eastern Gujarat ultimately joins Gulf of Cambey of Arabian Sea.

Highest Flood Level (HFL) recorded as 351.60 mRL recorded on 20.08.1994. All the mine entries Mochia (395.06 mRL), Balaria (378 mRL), Zawarmala (430.58 mRL) and Baroi (430.05 mRL) are above HFL.

### 3-8

## CLIMATOLOGICAL DETAILS

### Climate

The climate of the district is generally dry and healthy and the seasons are on the pattern of those generally in the Deccan. The summer season starts during the middle of February and -continues up to the first week of June. Summer is followed by south-west monsoon which last till the end of



September. October and November are the post-monsoon months. December is the coldest month with mean daily maximum and minimum temperatures being 24 deg.C and 10 deg.C respectively. During peak summer, temperature shoots up to 44.6 degC. Relative humidity varies from 25% in summer to 82% in winter (Census 2011).

Udaipur district lies on the south slope of the Aravalli Range of Rajasthan and has semi-arid type of climate. Dry climate prevails for most part of the year. Meteorological data of Udaipur (Daboka) at a distance of approx 45 km.

#### **Temperature and rainfall**

The mean daily maximum temperature is 39°C during May and mean daily minimum temperature is 10.8°C during December. The annual mean temperature is 24.1°C.

A review of rainfall pattern during last 10 years (2010-2020) of District Udaipur reveals that the rainfall in the area is highly erratic. The annual average rainfall in the region is around 805.15 mm (average of last eleven years rainfall data from 2010-2020) varying from minimum 594.07 mm in 2018 to maximum 1077.79 mm in 2019.

Rainfall pattern during last 16 years for Udaipur district is presented in Table 3.6.

**Table - 3.6**  
**Rainfall Data for last 10 Years**

S.No	Year	Rainfall
1.	2010	775.24
2.	2011	855.97
3.	2012	880.71
4.	2013	880.73
5.	2014	701.32
6.	2015	652.31
7.	2016	976.71
8.	2017	823.99
9.	2018	594.07
10.	2019	1077.79
11.	2020	717.91
<b>Average</b>		<b>805.15</b>

(Source: India Meteorological Department)

### **3.9 METEOROLOGY**

Meteorology plays a vital role in determining the transport and diffusion pattern of air pollutants released into atmosphere. The principal variables include horizontal convective transport (average wind speed and direction), vertical convective transport (atmospheric stability) and topography of the area.

Meteorological characteristics of an area are very much important in assessing possible environmental impacts and in preparing environmental management plan.



Since meteorological factors show wide fluctuations with time, meaningful interpretation can be drawn only from long-term reliable data. Such source of data is India Meteorological Department (IMD), which maintains a network of meteorological stations at several important locations.

The nearest IMD stations to the mine site is located in Udaipur (Dabok). Based on the previous IMD data [Climatological Normals (1981-2010)], the pre-dominant wind direction (seasonal as well as annual) was considered. As per the data, pre-dominant wind direction through out study period was observed from West, according to which, the locations for ambient air quality monitoring were selected. Windrose prepared for the study period is given in Figure 3.6.

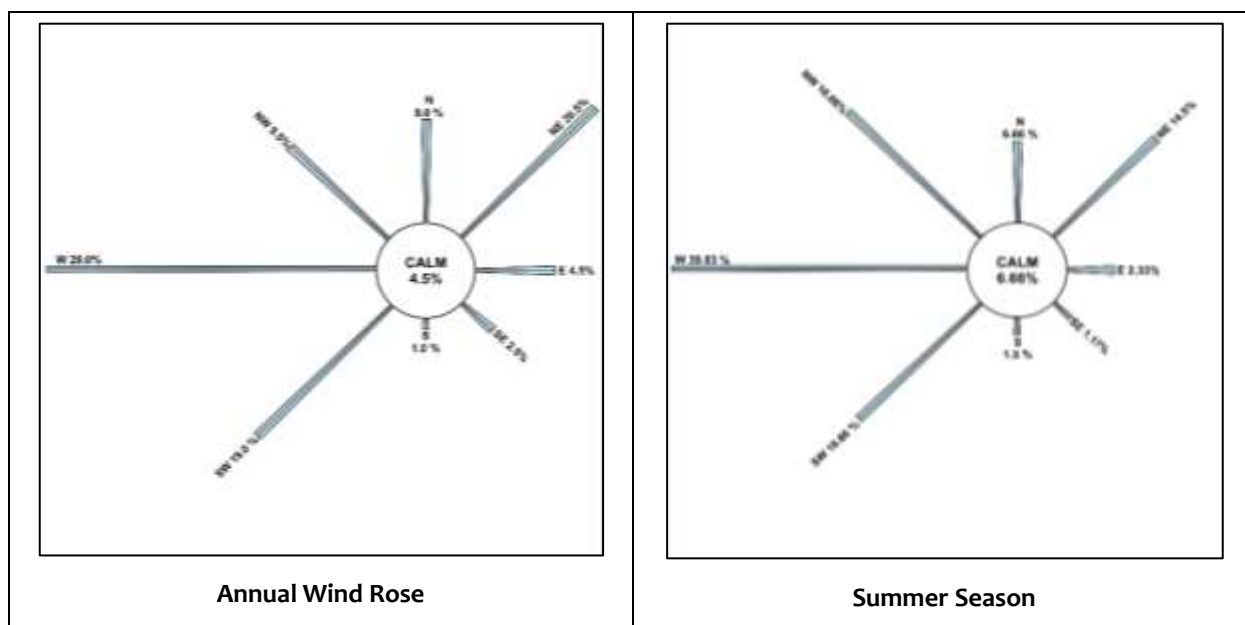


Figure no. 3.6: Windrose based on secondary Meteorological data of Udaipur (Dabok)  
(seasonal as well as annual)



### 3.9.1 MICRO-METEOROLOGY AT SITE

Meteorological station was set-up at site to record surface meteorological parameter during Summer Season (March to May, 2021) and (March to May, 2024)

Wind Rose Diagram showing the wind pattern that during the study period the dominant wind direction was from the West (W) accounting 29.4% no. of days. The second dominant wind direction was observed to be from South-West and 20.06% of the days winds are observed to be calm winds.

**TABLE - 3.7 (a)**

#### Micro-Meteorology at Site

Study Period: Summer Season (March to May, 2021)

Month	Temperature (°C)		Relative Humidity (%)		Wind Speed (m / sec)	
	Min.	Max.	Min.	Max.	Min.	Max.
March, 2021	9.8	38.3	21	44.0	0.1	5.2
April, 2021	14.7	41.8	19	39.0	0.1	6.1
May, 2021	20.3	44.5	24	41	0.1	5.7

Source: Meteorological Station at Site

**TABLE - 3.7 (b)**

#### Micro-Meteorology at Site

Study Period: Summer Season (March to May, 2024)

Month	Temperature (°C)		Relative Humidity (%)		Wind Speed (m / sec)	
	Min.	Max.	Min.	Max.	Min.	Max.
March, 2024	6.1	39.7	6.3	78.5	0.06	5.48
April, 2024	20.3	40.3	6.9	65.6	0.1	5.42
May, 2024	19.1	45.8	4.5	78.2	0.1	5.50

Source: Meteorological Station at Site

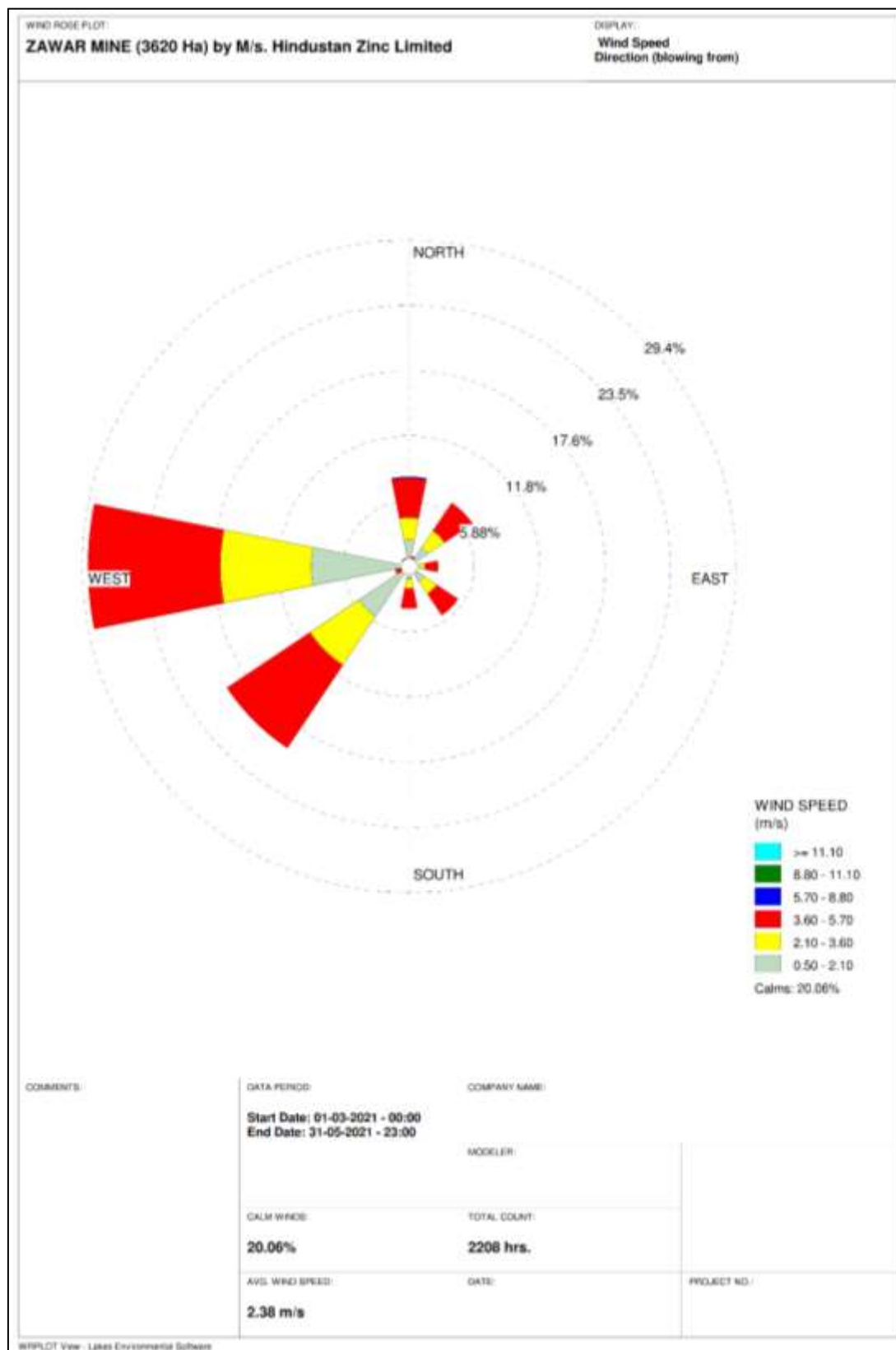


Figure 3.7 (a): Windrose diagram showing wind pattern (March to May, 2021)

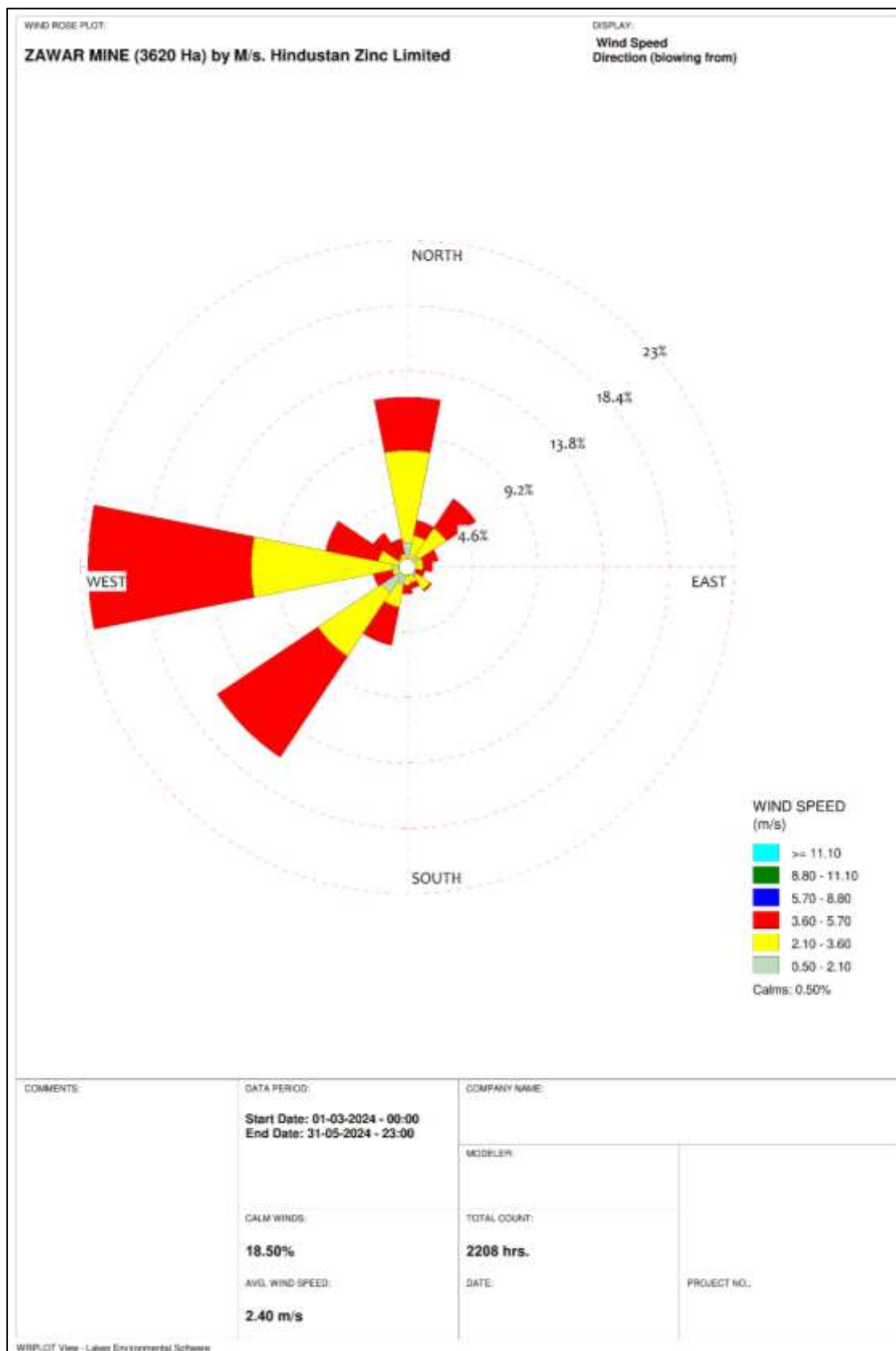


Figure 3.7 (b): Windrose diagram showing wind pattern (March to May, 2024)





### 3.10 AMBIENT AIR ENVIRONMENT

Ambient air quality monitoring has been carried out within the study area to determine the baseline concentration of various air pollutants in the ambient air. The ambient air quality depends upon the emission sources, meteorological conditions and the background concentration of specific pollutants. and the It helps in providing a data base for predicting impact on the surrounding area due to a project activity. It will also be useful in ascertaining the quality of air environment in conformity to standards of the ambient air quality during operation phase of project.

#### Monitoring schedule

Air quality monitoring has been carried out at 15 locations for 24 hours (twice a week) for three months (26 observations for one location).

Parameters monitored are:

- Sulphur Dioxide (SO<sub>2</sub>)
- Nitrogen dioxide (NO<sub>2</sub>)
- Particulate Matter (PM<sub>10</sub> and PM<sub>2.5</sub>)
- Carbon Monoxide (CO) were monitored once in the study period.

TABLE - 3.8

Details of Test Procedures

S.No.	Parameters	Test Method Specification against which tests are performed	Range of testing	Limit of detection	Equipment used for monitoring	
					Equipment required for Sampling	Equipment required for Analysis
1.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182, (P-2), 2001 Reaffirmed 2017	5 µg/m <sup>3</sup> to 1050 µg/m <sup>3</sup>	5 µg/m <sup>3</sup>	Respirable dust sampler/Low flow Pump	UV spectrophotometer
2.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182, (P-6), 2006 Reaffirmed 2017	5 µg/m <sup>3</sup> to 750 µg/m <sup>3</sup>	5 µg/m <sup>3</sup>	Respirable dust sampler/Low flow Pump	UV spectrophotometer
3.	Particulate Matter (PM <sub>10</sub> )	IS: 5182, (P-23), 2006 Reaffirmed 2017	10 µg/m <sup>3</sup> to 1000 µg/m <sup>3</sup>	10 µg/m <sup>3</sup>	Respirable dust sampler,	Desiccator, high accuracy weighing balance
4.	Particulate Matter (PM <sub>2.5</sub> )	JMELPL/STOP/03 (Issue Date – 09.11.2017)	10 µg/m <sup>3</sup> to 500 µg/m <sup>3</sup>	10 µg/m <sup>3</sup>	Fine Particulate sampler	Desiccator, high accuracy weighing balance



S.No.	Parameters	Test Method Specification against which tests are performed	Range of testing	Limit of detection	Equipment used for monitoring	
					Equipment required for Sampling	Equipment required for Analysis
5.	Carbon Monoxide (CO)	IS: 5182, (P-10), 1999 Reaffirmed 2014	0.5 mg/m <sup>3</sup> to 50 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>	Sampling in Tedlar Bag with low flow pump	Gas chromatography with detector (FID)
6.	*Benzene	IS:5182, (P-11):2006 Reaffirmed 2017	1 µg/m <sup>3</sup> to 100 µg/m <sup>3</sup>	1 µg/m <sup>3</sup>	Sampling in Charcoal tube with low flow pump,	Gas chromatography with detector (FID)
7.	*Benzo (a) pyrene (BaP) particulate Phase Only	IS:5182, (P-12):2004 Reaffirmed 2014	0.5 ng/m <sup>3</sup> to 2000 ng/m <sup>3</sup>	0.5 ng/m <sup>3</sup>	Sampling in Charcoal tube with low flow pump,	Gas chromatography with detector (FID)
8.	Arsenic	IS:5182 (Part-22) 2004 Reaffirmed 2014/CPCB Guidelines	0.5 ng/m <sup>3</sup> to 100 ng/m <sup>3</sup>	0.5 ng/m <sup>3</sup>	Respirable dust sampler with EPM filter paper	Atomic absorption spectroscopy
9.	Nickel	IS:5182 (Part-22) 1979/2004 Reaffirmed 2014/CPCB Guidelines	1 ng/m <sup>3</sup> to 100 ng/m <sup>3</sup>	1 ng/m <sup>3</sup>	Respirable dust sampler with EPM filter paper	Atomic absorption spectroscopy
10.	Lead	IS:5182 (Part-22) 2004 Reaffirmed 2014	0.02 µg/m <sup>3</sup> to 50 µg/m <sup>3</sup>	0.02 µg/m <sup>3</sup>	Respirable dust sampler with EPM filter paper	Atomic absorption spectroscopy
11.	Ozone	IS:5182 (Part-9) 1974 Reaffirmed 2014	1.0 µg/m <sup>3</sup> to 200 µg/m <sup>3</sup>	1.0 µg/m <sup>3</sup>	Respirable dust sampler/Low flow Pump	UV spectrophotometer
12.	Ammonia	Method of Air Sampling & Analysis (3 <sup>rd</sup> Edition – 1988)	1 µg/m <sup>3</sup> to 400 µg/m <sup>3</sup>	1 µg/m <sup>3</sup>	Respirable dust sampler/Low flow Pump	UV - spectrophotometer



**Note: \*- Parameter not covered in our NABL scope.**

**Protocol Used:** CPCB Guidelines/IS-5182

**RDS:** Respirable Dust Sampler

**FPS:** Fine Particulate Sampler

The sources of air pollution in the region are dust emission from unpaved roads, domestic fuel burning, vehicular traffic, agricultural activities, industries and mining activities etc.

#### **Sampling Locations**

Sampling locations were selected for AAQ Monitoring keeping in view the pre-dominant wind direction prevailing in the area based on the previous IMD source. Monitoring stations selected for Ambient Air Quality Monitoring during the study period are given in Table - 3.9.

**Table - 3.9**

**Locations of Ambient Air Quality & Noise Level Monitoring Stations**

Station Code	Sampling Location	Tentative distance (from Block-I)	Tentative distance (from Block-III)	Tentative distance (from CPP)	Latitudes & Longitudes	Selection Criteria Block-I	Selection Criteria CPP
SAN 1	Village Premnagar (Block-I)	Core Zone	~ 13.5 Km in NNE direction	~ 0.9 Km in WNW direction	24° 21' 17.1" N 73° 44' 17.3" E	Core Zone Residential Colony within Lease area Downwind direction	Nearest Habitation in buffer zone
SAN 2	Mochia Mine (Block-I)	Core Zone	~ 14.0 Km in North direction	~ 3.2 Km in WNW direction	24° 21' 46.93" N 73° 42' 58.95" E	<ul style="list-style-type: none"> <li>Core Zone</li> <li>Underground Mining</li> <li>Mill 1 &amp; Mill 2 in SE</li> <li>Hydrofill plant is in the area of mochia mine and ~0.6 km (West) away from the opening of Mochia Mine</li> </ul>	Existing Lead-Zinc Underground Mine
SAN 3	Balaria Mine (Block-I)	Core Zone	~ 14.0 Km in North direction	~ 1.1 Km in NW direction	24° 21' 33.21" N 73° 44' 21.66" E	<ul style="list-style-type: none"> <li>Core Zone</li> <li>Underground Mining</li> </ul>	Existing Lead-Zinc Underground Mine



Station Code	Sampling Location	Tentative distance (from Block-I)	Tentative distance (from Block-III)	Tentative distance (from CPP)	Latitudes & Longitudes	Selection Criteria Block-I	Selection Criteria CPP
SAN 4	Baroi Mine (Block-I)	Core Zone	~ 12.0 Km in North direction	~ 4.0 Km in West direction	24°21'0.32"N 73°42'17.46"E	<ul style="list-style-type: none"> <li>Core Zone</li> <li>Underground Mining</li> <li>DTP within Baroi Mine (~500 m away from Baroi opening)</li> </ul>	Existing Lead-Zinc Underground Mine
SAN 5	ZawarMala Mine (Block-I)	- Core Zone	~ 10.0 Km in North direction	~ 5.9 Km in WSW direction	24°20'4.00"N 73°41'19.49"E	<ul style="list-style-type: none"> <li>Core Zone</li> <li>Underground Mining</li> </ul>	<ul style="list-style-type: none"> <li>Existing Lead-Zinc Underground Mine</li> </ul>
SAN 6	Village Jawar	Core Zone	~ 10.5 Km in North direction	~ 5.26 Km in West direction	24°20'51.74"N 73°41'34.51"E	<ul style="list-style-type: none"> <li>Habitation within lease area</li> </ul>	Habitation in Upwind of Pre dominant direction
SAN 7	CPP	Core Zone	~ 13.5 Km in North direction	-	24°21'2.81"N 73°44'49.48"E	<ul style="list-style-type: none"> <li>Core Zone</li> </ul>	<ul style="list-style-type: none"> <li>Core Zone</li> </ul>
SAN 8	Mine Site Bara (Block III)	~ 8 Km in South direction	Core Zone	~ 13.5 Km in SW direction	24 14 19.2 N 73 41 09.9 E	<ul style="list-style-type: none"> <li>Habitation in Core Zone</li> <li>Near NH-48</li> </ul>	-
SAN 9	Singatwara	Adjacent in North direction	~ 16 Km in NNE	~ 2.5 Km in NNW direction	24°22'20.0"N 73°44'08.8"E	<ul style="list-style-type: none"> <li>Habitation within zone</li> <li>Near babarmal block B PF</li> <li>Near Zawar Singatwara Block A PF</li> </ul>	<ul style="list-style-type: none"> <li>Near ZawarSingatwara Block APF</li> <li>Habitation in Buffer zone</li> </ul>
SAN 10	kalipipli	~1.0 km in west direction	~ 11 Km in NW	~ 7.0 Km in West direction	24°20'56.0"N 73°40'26.8"E	<ul style="list-style-type: none"> <li>Near NH-48</li> </ul>	<ul style="list-style-type: none"> <li>Near NH-48</li> </ul>



Station Code	Sampling Location	Tentative distance (from Block-I)	Tentative distance (from Block-III)	Tentative distance (from CPP)	Latitudes & Longitudes	Selection Criteria Block-I	Selection Criteria CPP
						<ul style="list-style-type: none"> <li>• Nearest habitation in buffer zone</li> <li>• Upwind of the pre-dominant direction</li> </ul>	<ul style="list-style-type: none"> <li>• Upwind of the pre-dominant direction</li> </ul>
SAN 11	Kanpur	~ 1.0 km in SE direction	~ 9.5 Km in NNE	~ 3.80 Km in SW direction	24°19'31.1"N 73°43'02.5"E	<ul style="list-style-type: none"> <li>• Near Singatwara block C PF</li> <li>• Habitation in downwind of pre-dominant direction formZawarmala block</li> </ul>	<ul style="list-style-type: none"> <li>• Near Singatwara block C PF</li> <li>• Habitation in buffer Zone.</li> </ul>
SAN 12	Kevra Khurd	~ 6.0 km in NE direction	~ 20Km in NE	~ 7.4 Km in NNE direction	24°24'57.0"N 73°46'11.0"E	<ul style="list-style-type: none"> <li>• Near SH-32</li> <li>• Habitation in downwind of 2<sup>nd</sup> dominant direction</li> <li>• NearRF</li> </ul>	<ul style="list-style-type: none"> <li>• Near SH-32</li> <li>• Habitation in buffer Zone.</li> <li>• Near Babarmal Block B PF</li> </ul>
SAN 13	Nangela	~2.0 km in SW direction	~ 2 Km in NW	~ 9.0 Km in SW direction	24°18'34.0"N 73°39'31.4"E	<ul style="list-style-type: none"> <li>• Near paduna block PF</li> </ul>	<ul style="list-style-type: none"> <li>• Near paduna block PF</li> </ul>
SAN 14	NewaTalai	~0.45 km in East direction	~ 13.5 Km in NNE	~ 0.4 Km in East direction	24°20'58.58"N 73°45'09.74"E	<ul style="list-style-type: none"> <li>• Near Palodra RF</li> <li>• Near Sh-32</li> </ul>	Downwind of Pre dominant direction
SAN 15	Moridungri	~ 5.5 km in West direction	~12.5 Km in South West	~ 18.6 Km in SW direction	24°13'22.0"N 73°37'24.0"E	<ul style="list-style-type: none"> <li>• Near RF</li> <li>• Habitation in buffer zone near Block (III)</li> </ul>	-



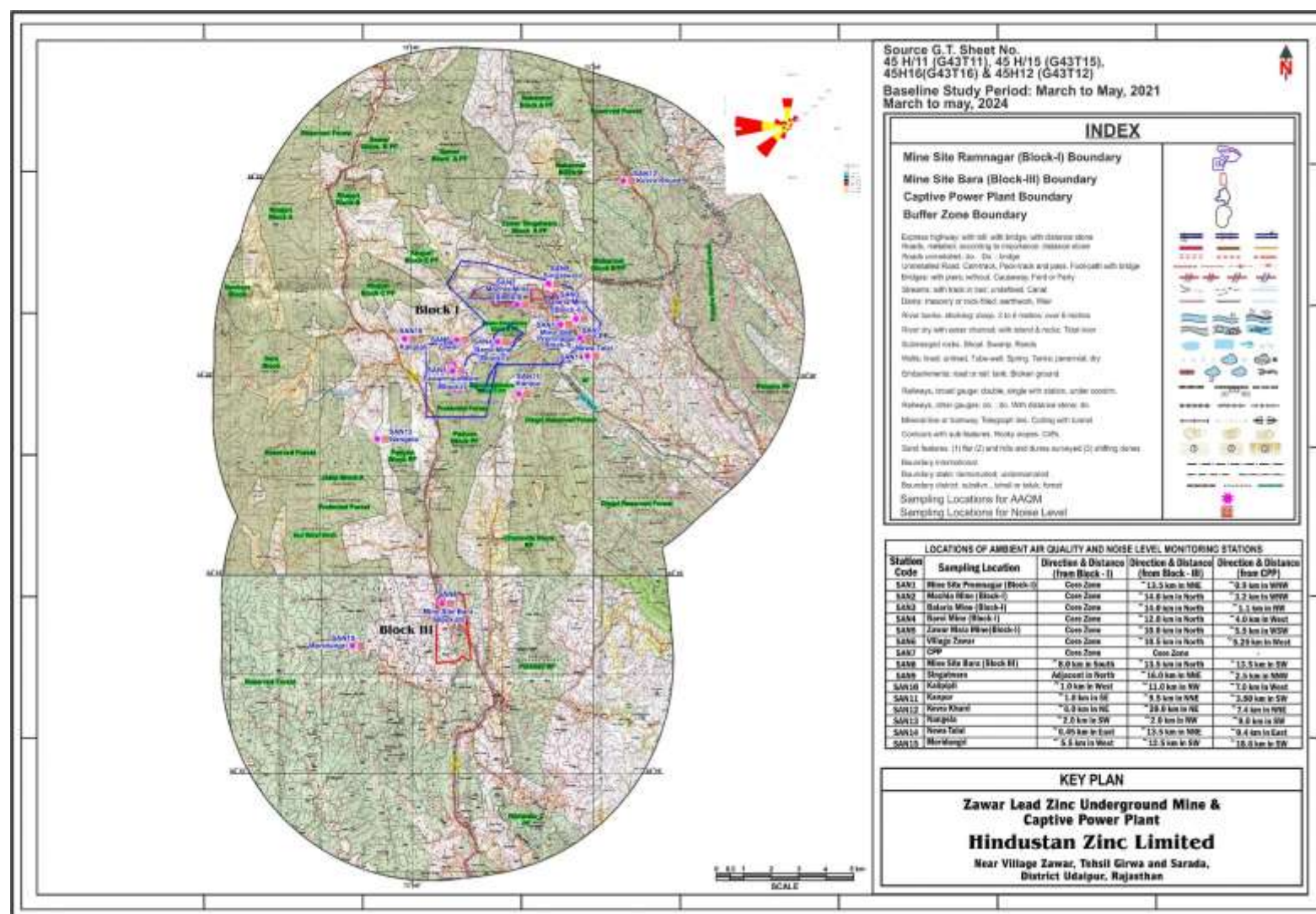


Figure 3.8 Key Plan showing Ambient Air quality and Noise Level monitoring Locations (March to May, 2021) and (March to May, 2024)



### Ambient Air Quality Monitoring

Table – 3.10 shows the maximum and minimum concentration of the air pollutants monitored at different locations (as mentioned in Table - 3.9) during the study period. All observations of pollutants for each location are detailed in Ambient Air Quality Monitoring Tables enclosed as **Annexure - 13 (a & b)** along with this report.

**TABLE - 3.10 (a)**  
**Ambient Air Quality Monitoring Results**  
**Summer Season (March to May, 2021)**

Station Code	Sampling Location	PM <sub>2.5</sub> (µg/m <sup>3</sup> )		PM <sub>10</sub> (µg/m <sup>3</sup> )		NO <sub>2</sub> (µg/m <sup>3</sup> )		SO <sub>2</sub> (µg/m <sup>3</sup> )		CO (mg/m <sup>3</sup> )	
		Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
SAN 1	Village Premnagar (Block-I)	39.8	29.6	75.2	62.3	24.9	16.5	12.9	6.4	BDL (DL 0.50)	
SAN 2	Mochia Mine(Block-I)	44.3	32.9	82.3	68.2	25.7	14.5	14.3	6.8	0.86	0.58
SAN 3	Balaria Mine(Block-I)	40.1	30.3	74.6	62.1	27.1	15.2	13.8	6.6	0.79	0.63
SAN 4	Baroi Mine(Block-I)	42.5	33.8	78.9	66.3	26.3	14.9	14.5	7.3	0.76	BDL (DL 0.50)
SAN 5	ZawarMala Mine(Block-I)	42.9	35	81.8	67.1	27.9	16.0	15.6	7.1	0.98	0.66
SAN 6	Village Jawar	40.4	30	74.1	62.7	26.0	16.3	12.4	5.8	BDL (DL 0.50)	
SAN 7	CPP	44.5	36.4	85.1	71.3	30.2	19.8	17.7	8.9	1.03	0.70
SAN 8	Mine Site Bara (Block III)	39.7	31.8	78.9	68.5	24.6	15.2	13.8	6.5	BDL (DL 0.50)	
SAN 9	Singatwara	38.8	29.4	76.7	62.4	21.4	13.7	11.2	6.3	BDL (DL 0.50)	
SAN 10	kalipipli	41.5	32.2	82.1	65.8	28.7	17.6	15.3	6.8	0.93	BDL (DL 0.50)
SAN 11	Kanpur	35.4	27.6	74.7	63.8	22.3	14.1	11.6	6.1	BDL (DL 0.50)	
SAN 12	Kevra Khurd	40.2	31.5	78.9	65	23.8	14.9	12.7	6.6	0.82	BDL (DL 0.50)
SAN 13	Nangela	34.3	26.2	67.3	54.9	20.3	13.6	10.3	5.5	BDL (DL 0.5)	
SAN 14	Newa Talai	38.6	29	76	63.1	23.3	13.0	11.9	6.0	BDL (DL 0.5)	
SAN 15	Moridungri	37.5	31.7	79.4	67.5	22.3	14.8	11.8	6.4	BDL (DL 0.50)	
<b>NAAQS*</b>		<b>60</b>		<b>100</b>		<b>80</b>		<b>80</b>		<b>4</b>	

**Remark** - Detection limit for CO - 0.5 mg/ m<sup>3</sup>

**Source:** Ambient Air Quality Monitoring Results from JM EnviroLab Pvt. Ltd.

\*NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009

As per the ToR issued by MoEFCC, New Delhi vide their letter no J-11015/259/2012-IA-II (M) dated 08th September, 2021 remaining 8 parameters (viz. O<sub>3</sub>, Pb, CO, NH<sub>3</sub>, C<sub>6</sub>H<sub>6</sub>, BaP, As, Ni) of Ambient air, as per NAAQS, 2009 were also monitored once and were found below the prescribed standards. Monitoring results are given as under:





**TABLE - 3.10 (b)**  
**Ambient Air Quality Monitoring Results**  
**Summer Season (March to May, 2021)**

Station Code	Sampling location	Ozone (O <sub>3</sub> ) (µg/m <sup>3</sup> )	Lead (Pb) (µg/m <sup>3</sup> )	(NH <sub>3</sub> ) (µg/m <sup>3</sup> )	Benzene (C <sub>6</sub> H <sub>6</sub> ) (µg/m <sup>3</sup> )	Arsenic (As) (ng/m <sup>3</sup> )	Nickel (Ni) (ng/m <sup>3</sup> )	Benzo(a)pyrene (BaP)- Particulate phase only (ng/m <sup>3</sup> )
SAN 1	Village Premnagar (Block-I)	12.3	BDL (DL-0.02)	5.5	BDL (DL-1.0)	BDL (DL-0.50)	BDL (DL-1.0)	BDL (DL-0.50)
SAN 2	Mochia Mine(Block-I)	18.6	0.08	4.8	BDL (DL-1.0)	BDL (DL-0.50)	4.4	BDL (DL-0.50)
SAN 3	Balaria Mine(Block-I)	12.3	BDL (DL-0.02)	6.9	BDL (DL-1.0)	BDL (DL-0.50)	2.2	BDL (DL-0.50)
SAN 4	Baroi Mine(Block-I)	21.3	0.09	11.3	BDL (DL-1.0)	BDL (DL-0.50)	6.9	BDL (DL-0.50)
SAN 5	ZawarMala Mine(Block-I)	20.5	BDL (DL-0.02)	12.8	BDL (DL-1.0)	BDL (DL-0.50)	5.6	BDL (DL-0.50)
SAN 6	Village Jawar	16.3	BDL (DL-0.02)	4.9	BDL (DL-1.0)	BDL (DL-0.50)	BDL (DL-1.0)	BDL (DL-0.50)
SAN 7	CPP	23.6	0.16	11.4	BDL (DL-1.0)	BDL (DL-0.50)	7.6	BDL (DL-0.50)
SAN 8	Mine Site Bara (Block III)	12.3	BDL (DL-0.02)	3.6	BDL (DL-1.0)	BDL (DL-0.50)	BDL (DL-1.0)	BDL (DL-0.50)
SAN 9	Singatwara	10.2	BDL (DL-0.02)	BDL (DL-1.0)	BDL (DL-1.0)	BDL (DL-0.50)	BDL (DL-1.0)	BDL (DL-0.50)
SAN 10	kalipipli	13.6	0.06	15.9	BDL (DL-1.0)	BDL (DL-0.50)	3.2	BDL (DL-0.50)
SAN 11	Kanpur	8.9	BDL (DL-0.02)	6.3	BDL (DL-1.0)	BDL (DL-0.50)	BDL (DL-1.0)	BDL (DL-0.50)
SAN 12	Kevra Khurd	13.7	BDL (DL-0.02)	5.4	BDL (DL-1.0)	BDL (DL-0.50)	BDL (DL-1.0)	BDL (DL-0.50)
SAN 13	Nangela	10.3	BDL (DL-0.02)	9.2	BDL (DL-1.0)	BDL (DL-0.50)	BDL (DL-1.0)	BDL (DL-0.50)
SAN 14	Newa Talai	8.9	BDL (DL-0.02)	BDL (DL-1.0)	BDL (DL-1.0)	BDL (DL-0.50)	BDL (DL-1.0)	BDL (DL-0.50)
SAN 15	Moridungri	14.8	BDL (DL-0.02)	8.6	BDL (DL-1.0)	BDL (DL-0.50)	BDL (DL-1.0)	BDL (DL-0.50)
<b>NAAQs</b>		<b>180</b>	<b>1</b>	<b>400</b>	<b>5</b>	<b>6</b>	<b>20</b>	<b>1</b>



**Table - 3.10 (c)**  
**Ambient Air Quality Monitoring Results**  
**Summer Season (March to May, 2024)**

Station Code	Sampling Location	PM <sub>2.5</sub> (µg/m <sup>3</sup> )		PM <sub>10</sub> (µg/m <sup>3</sup> )		NO <sub>2</sub> (µg/m <sup>3</sup> )		SO <sub>2</sub> (µg/m <sup>3</sup> )		CO (mg/m <sup>3</sup> )	
		Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
SAN 1	Village Premnagar (Block-I)	34.1	29.3	65.2	55.4	23.4	18.2	13.3	8.6	0.65	0.56
SAN 2	Mochia Mine(Block-I)	45.7	35.7	76.4	58.4	26.2	19.3	14.7	9.0	0.83	0.65
SAN 3	Balaria Mine(Block-I)	37.4	32.1	61.5	53.2	19.6	15.9	10.2	6.8	0.61	0.55
SAN 4	Baroi Mine(Block-I)	43.9	36.6	72.0	60.4	24.8	19.6	13.9	9.5	0.68	0.61
SAN 5	ZawarMala Mine(Block-I)	42.3	34.9	70.9	63.2	25.5	17.7	15.1	10.3	0.75	0.67
SAN 6	Village Jawar	38.7	33.8	66.0	56.8	22.5	16.0	12.8	8.0	0.63	0.54
SAN 7	CPP	45.9	38.3	76.3	68.5	30.8	21.5	18.2	12.2	0.92	0.75
SAN 8	Mine Site Bara (Block III)	38.0	33.6	68.0	57.7	23.1	17.9	11.2	7.7	0.65	0.58
SAN 9	Singatwara	35.0	27.1	62.7	49.5	18.8	13.5	9.5	5.5	BDL	BDL
SAN 10	kalipipli	33.8	26.0	57.2	46.9	17.3	12.3	9.1	5.0	BDL	BDL
SAN 11	Kanpur	31.5	25.3	55.6	44.9	16.7	11.9	8.9	4.9	BDL	BDL
SAN 12	Kevra Khurd	38.5	31.3	69.0	60.1	21.3	14.6	11.1	6.8	0.63	0.55
SAN 13	Nangela	31.4	26.9	57.0	47.8	15.7	10.4	8.6	5.2	BDL	BDL
SAN 14	Newa Talai	32.8	22.7	53.0	40.2	14.8	10.8	9.3	6.2	BDL	BDL
SAN 15	Moridungri	35.7	30.5	66.5	57.6	20.7	14.5	10.2	6.8	BDL	BDL
<b>NAAQS*</b>		<b>60</b>		<b>100</b>		<b>80</b>		<b>80</b>		<b>4</b>	

**Table - 3.10 (d)**

**AMBIENT AIR QUALITY MONITORING RESULTS SUMMER SEASON (MARCH TO MAY, 2024)**

Station Code	Sampling location	Benzo(a) pyrene (ng/m <sup>3</sup> )	Ozone (µg/m <sup>3</sup> )	Lead (µg/m <sup>3</sup> )	Ammonia (µg/m <sup>3</sup> )	Benzene (µg/m <sup>3</sup> )	Arsenic (ng/m <sup>3</sup> )	Nickel (ng/m <sup>3</sup> )
SAN 1	Village Premnagar (Block-I)	BDL	18.3	BDL	25.1	BDL	BDL	BDL
SAN 2	Mochia Mine(Block-I)	BDL	23.5	BDL	31.3	BDL	BDL	5.3
SAN 3	Balaria Mine(Block-I)	BDL	18.0	BDL	24.2	BDL	BDL	BDL
SAN 4	Baroi Mine(Block-I)	BDL	27.0	BDL	35.0	BDL	BDL	6.4
SAN 5	ZawarMala Mine(Block-I)	BDL	24.7	BDL	15.6	BDL	BDL	BDL
SAN 6	Village Jawar	BDL	10.1	BDL	11.2	BDL	BDL	BDL
SAN 7	CPP	BDL	8.4	BDL	14.3	BDL	BDL	8.1



Station Code	Sampling location	Benzo(a) pyrene (ng/m <sup>3</sup> )	Ozone (µg/m <sup>3</sup> )	Lead (µg/m <sup>3</sup> )	Ammonia (µg/m <sup>3</sup> )	Benzene (µg/m <sup>3</sup> )	Arsenic (ng/m <sup>3</sup> )	Nickel (ng/m <sup>3</sup> )
SAN 8	Mine Site Bara (Block III)	BDL	13.7	BDL	18.8	BDL	BDL	BDL
SAN 9	Singatwara	BDL	12.5	BDL	16.0	BDL	BDL	BDL
SAN 10	kalipipli	BDL	15.3	BDL	24.8	BDL	BDL	2.8
SAN 11	Kanpur	BDL	11.0	BDL	17.2	BDL	BDL	BDL
SAN 12	Kevra Khurd	BDL	16.6	BDL	26.1	BDL	BDL	BDL
SAN 13	Nangela	BDL	9.5	BDL	14.4	BDL	BDL	BDL
SAN 14	Newa Talai	BDL	10.6	BDL	17.9	BDL	BDL	BDL
SAN 15	Moridungri	BDL	18.9	BDL	29.6	BDL	BDL	BDL
<b>NAAQS</b>		<b>180</b>	<b>1</b>	<b>400</b>	<b>5</b>	<b>6</b>	<b>20</b>	<b>1</b>

NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009

**Remark** - Detection limit for Benzene - 0.5 µg/ m<sup>3</sup>, B(a)P – 0.1 ng/m<sup>3</sup>, As - 0.5 ng/m<sup>3</sup>, Ni – 1 ng/m<sup>3</sup>, Pb – 0.02 µg/ m<sup>3</sup>, O<sub>3</sub> – 20 µg/ m<sup>3</sup> and Ammonia – 5 µg/ m<sup>3</sup>.

\*8 hourly monitored values

\*\*1 hourly monitored values

**Source:** Ambient Air Quality Monitoring Results from JM EnviroLab Pvt. Ltd.

### 3.10.1 NATIONAL AMBIENT AIR QUALITY STANDARDS

Table - 3.11 shows the NAAQS prescribed by CPCB.

**TABLE - 3.11**  
**National Ambient Air Quality Standards**

S. No.	Pollutant	Time Weighted Average	Concentration in Ambient Air		Method of Measurement
			Industrial Area, Residential Rural and Other Areas	Ecologically Sensitive Area (Notified by Central Govt.)	
(1)	(2)	(3)	(4)	(5)	(6)
1	Sulphur Dioxide (SO <sub>2</sub> ), µg/m <sup>3</sup>	Annual Average * 24 hours **	50 80	20 80	1. Improved West and Gaeke Method. 2. Ultraviolet fluorescence.
2	Oxides of Nitrogen as NO <sub>2</sub> , µg/m <sup>3</sup>	Annual Average * 24 hours **	40 80	30 80	1. Modified Jacob and Hochheiser (Na-Arsenite) Method. 2. Chemiluminescence (Gas phase).
3	Particulate Matter (size less than 10 µm) or PM <sub>10</sub> , µg/m <sup>3</sup>	Annual Average * 24 Hours **	60 100	60 100	1. Gravimetric, 2. TOEM, 3. Beta attenuation.
4	Particulate Matter (size less than 2.5 µm) or PM <sub>2.5</sub> , µg/m <sup>3</sup>	Annual Average* 24 Hours **	40 60	40 60	1. Gravimetric, 2. TOEM, 3. Beta attenuation.



S. No.	Pollutant	Time Weighted Average	Concentration in Ambient Air		Method of Measurement
			Industrial Area, Residential Rural and Other Areas	Ecologically Sensitive Area (Notified by Central Govt.)	
5	Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>	8 Hours ** 1 Hours *	100 180	100 180	1. UV Photometric, 2. Chemiluminescence, 3. Chemical Method.
6	Lead (Pb), µg/m <sup>3</sup>	Annual Average * 24 Hours **	0.50 1.0	0.50 1.0	1. AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper. 2. ED-XRF using Teflon filter.
7	Carbon Monoxide (CO), mg/m <sup>3</sup>	8 Hours** 1 Hours	02 04	02 04	Non Depressive Infrared (NDIR) Spectroscopy.
8	Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>	Annual Average* 24 hours **	100 400	100 400	1. Chemiluminescence (Gas phase). 2. Indophenol blue method.
9	Benzene (C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>	Annual Average*	05	05	1. Gas Chromatography based continuous analyzer, 2. Adsorption and Desorption followed by GC analysis.
10	Benzo (α) Pyrene (BaP)- Particulate Phase only, ng/m <sup>3</sup>	Annual Average*	01	01	Solvent extraction followed by HPLC/GC analysis.
11	Arsenic (As), ng/m <sup>3</sup>	Annual Average*	06	06	AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper.
12	Nickel (Ni), ng/m <sup>3</sup>	Annual Average*	20	20	AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper.

\* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

\*\* 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

**Note:** Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and investigation.

### 3.10.2 INTERPRETATION OF AAQM RESULTS

#### (a) Baseline Season: Summer Season (March to May, 2021)

Ambient Air Quality Monitoring reveals that the concentrations of PM<sub>2.5</sub> and PM<sub>10</sub> for all the 15 AAQM stations were found between 26.2 to 44.5 µg/m<sup>3</sup> and 54.9 to 85.1 µg/m<sup>3</sup> respectively.

The concentration of PM<sub>2.5</sub> and PM<sub>10</sub> is maximum at Captive Power Plant and at location Captive Power Plant in East direction.



As far as the gaseous pollutants NO<sub>2</sub> and SO<sub>2</sub> are concerned, the prescribed CPCB limit of 80 µg/m<sup>3</sup> has not been surpassed at any station. The concentrations of NO<sub>2</sub> and SO<sub>2</sub> were found to be in range of 13 to 30.2 µg/m<sup>3</sup> and 5.5 to 17.7 µg/m<sup>3</sup> respectively.

The concentration of CO was found to be BDL to 1.03 mg/m<sup>3</sup>. Minimum value was found at Baroi Mine (Block-I) and maximum at CPP. It was observed that CO is within the NAAQS standard i.e. 0.2 mg/m<sup>3</sup>. Whereas CO concentrations were below detection limit at Village Jawar.

The concentration of Ammonia was found to be in the range of 3.6 to 15.9 µg/m<sup>3</sup> which is well below the standards i.e. 400 µg/m<sup>3</sup>.

AAQ parameters in the study area have been found well within prescribed limits norms due to absence of any major source of air pollution from any major industrial establishment, average population density etc. Lowest values of AAQ parameters were observed at Village Nangela as there is no major source of pollution. AAQ parameters at the mining site are also within the prescribed limits of CPCB norms as there is not any major source of pollution existing in the lease area whereas higher values were found at CPP.

#### (b) Baseline Season: Summer Season (March to May 2024)

Ambient Air Quality Monitoring reveals that the concentrations of PM<sub>2.5</sub> and PM<sub>10</sub> for all the 15 AAQM stations were found between 22.7 to 45.9 µg/m<sup>3</sup> and 40.2 to 76.4 µg/m<sup>3</sup> respectively.

As far as the gaseous pollutants NO<sub>2</sub> and SO<sub>2</sub> are concerned, the prescribed CPCB limit of 80 µg/m<sup>3</sup> has not been surpassed at any station. The concentrations of NO<sub>2</sub> and SO<sub>2</sub> were found to be in range of 10.4 to 30.8 µg/m<sup>3</sup> and 4.9 to 18.2 µg/m<sup>3</sup> respectively.

The concentration of CO was found to be BDL to 0.92 mg/m<sup>3</sup>. Minimum detected value was found at Village Jawar and maximum at CPP.

The concentration of Ammonia was found to be in the range of 11.2 to 35 µg/m<sup>3</sup> which is well below the standards i.e. 400 µg/m<sup>3</sup>.

AAQ parameters in the study area have been found well within prescribed limits norms due to absence of any major source of air pollution from any major industrial establishment, average population density etc. Lowest values of AAQ parameters were observed at Newa Talai as there is no major source of pollution. AAQ parameters at the mining site are also within the prescribed limits of CPCB norms as there is not any major source of pollution existing in the lease area whereas higher values were found at CPP.

Impact assessment and mitigation measures suggested for the same have been detailed in Chapter 4 of this Final EIA/EMP Report.

### 3.10.3 CHEMICAL COMPOSITION FOR RSPM

RSPM is “defined as the component of inhaled Respirable dust small enough to reach the pulmonary or alveolar region of the lung”. Mineralogical composition of PM<sub>10</sub>, particularly for free silica is given below. Test results enclosed as **Annexure 14** with this Final EIA/EMP Report.



**Table- 3.12 (a)**  
**Classification of RSPM**

Classification	Type of particles	Size of the particles
PM <sub>10</sub>	Inhalable particles	≤10μm
PM <sub>2.5</sub>	Fine particles	≤2.5μm

**Table - 3.12 (b)**  
**Chemical Characterization of RSPM**

S. NO.	IONS	QUANTITY (μg/m <sup>3</sup> )
1.	Calcium (Ca)	13.2
2.	Magnesium (Mg)	10.5
3.	Iron (Fe)	2.1
4.	Aluminum (Al)	1.9
5.	Sodium (Na)	2.3
6.	Potassium (K)	2.0
7.	Manganese (Mn)	4.1
8.	Chromium (Cr)	0.12
9.	Nickel (Ni)	2.3
10.	Zinc (Zn)	1.4
11.	Copper (Cu)	0.96
12.	Cobalt (Co)	0.45
13.	Lead (Pb)	0.53
14.	Mercury (Hg)	BDL
15.	Cadmium (Cd)	BDL
16.	Free Silica (SiO <sub>2</sub> )	1.03 (%)

### 3.11 NOISE ENVIRONMENT

Noise is often defined as unwanted sound, interferes with speech communication, causes annoyance, distracts from work, and disturbs sleep, thus deteriorating quality of human environment.

#### **Source of Noise**

There are several sources of noise in the 10 km radius of study area, which contributes to the local noise level of the area. Ambient noise sources in the vicinity of the project include the noise from traffic on road, human activities in villages and agricultural fields.

#### **Sampling Schedule**

Noise level monitoring was carried out at 15 locations during the day and night time once in the study period.

#### **Sampling Locations**

Locations / stations selected for noise level monitoring are given in Table - 3.13



**TABLE - 3.13 (a)**  
**Ambient Noise Level Monitoring Results**  
**Study Period: Summer Season (March to May, 2021)**

Station Code	Locations	Noise Level Leq. dB (A)			
		Day Time (6:00 am to 10:00 pm)		Night Time (10:00 pm to 6:00 am)	
		Result	Prescribed limit	Result	Prescribed limit
SAN 1	Village Premnagar (Block-I)	54	55	43.8	45
SAN 2	Mochia Mine(Block-I)	66.8	75	55.6	70
SAN 3	Balaria Mine(Block-I)	64.5	75	57.7	70
SAN 4	Baroi Mine(Block-I)	66.7	75	59.2	70
SAN 5	ZawarMala Mine(Block-I)	65.1	75	55.3	70
SAN 6	Village Jawar	53.9	55	43.7	45
SAN 7	CPP	70.2	75	63.5	70
SAN 8	Mine Site Bara (Block III)	63.2	75	50.9	70
SAN 9	Singatwara	53.4	55	43.8	45
SAN 10	kalipipli	51.9	55	42.3	45
SAN 11	Kanpur	53.2	55	43.6	45
SAN 12	Kevra Khurd	53.7	55	43.4	45
SAN 13	Nangela	52.4	55	43.5	45
SAN 14	Newa Talai	52.3	55	43.1	45
SAN 15	Moridungri	53.6	55	43.8	45

Source: Ambient Noise Level Monitoring

**TABLE - 3.13 (b)**  
**Ambient Noise Level Monitoring Results**  
**Study Period: Summer Season (March to May, 2024)**

Station Code	Locations	Noise Level Leq. dB (A)			
		Day Time (6:00 am to 10:00 pm)		Night Time (10:00 pm to 6:00 am)	
		Result	Prescribed limit	Result	Prescribed limit
SAN 1	Village Premnagar (Block-I)	56.2	55	44.3	45
SAN 2	Mochia Mine(Block-I)	65.5	75	56.8	70
SAN 3	Balaria Mine(Block-I)	58.4	75	50.7	70
SAN 4	Baroi Mine(Block-I)	64.7	75	57.8	70
SAN 5	ZawarMala Mine(Block-I)	66.4	75	54.5	70
SAN 6	Village Jawar	54.6	55	44.3	45
SAN 7	CPP	69.7	75	64.6	70
SAN 8	Mine Site Bara (Block III)	59.6	75	49.7	70
SAN 9	Singatwara	53.4	55	42.9	45
SAN 10	kalipipli	52.7	55	42.8	45
SAN 11	Kanpur	52.2	55	42.4	45





Station Code	Locations	Noise Level Leq. dB (A)			
		Day Time (6:00 am to 10:00 pm)		Night Time (10:00 pm to 6:00 am)	
		Result	Prescribed limit	Result	Prescribed limit
SAN 12	Kevra Khurd	53.9	55	41.9	45
SAN 13	Nangela	52.1	55	42.4	45
SAN 14	Newa Talai	51.2	55	41.3	45
SAN 15	Moridungri	52.5	55	42.6	45

Source: Ambient Noise Level Monitoring

CPCB Noise Standards are given in Table - 3.14

**TABLE - 3.14**  
**CPCB Noise Standards**

Area Code	Category of Area	Limits in Leq. dB (A)	
		Day Time (06.00 am–10.00 pm)	Night Time (10.00 pm–6.00 am)
(A)	Industrial Area	75	70
(B)	Commercial Area	65	55
(C)	Residential Area	55	45
(D)	Silence Zone	50	40

1. Day Time is from 6.00 AM to 10.00 PM.

2. Night Time is reckoned between 10.00 PM to 6.00 AM.

3. Silence Zone is defined as an area up to 100m around premises of Hospitals, Educational Institutions and Courts. Use of vehicle horn, loudspeaker and bursting of crackers is banned in these zones.

Note: Mixed categories of areas be declared as one of the four above mentioned categories by the competent Authority and the corresponding standards shall apply

Source: Central Pollution Control Board Norms

### 3.11.1 INTERPRETATION OF NOISE RESULTS

#### a. Baseline Season: Summer Season (March to May, 2021)

Ambient noise levels were measured at 15 locations in and around the mine site. Noise level varies from 51.9 to 70.2 Leq dB (A) during day time and from 42.3 to 63.5 Leq dB (A) during night time.

The highest value of noise level monitoring at day time was observed at CPP and lowest value at Village Kalipipli. At night time, the highest value was observed in CPP and lowest value at Village Kalipipli. Also, there is no other major source of noise pollution.

#### b. Baseline Season: Summer Season (March to May, 2024)

Ambient noise levels were measured at 15 locations in and around the mine site. Noise level varies from 51.2 to 69.7 Leq dB (A) during day time and from 41.3 to 64.6 Leq dB (A) during night time.

The highest value of noise level monitoring at day time was observed at CPP and lowest value at Newa Talai. At night time, the highest value was observed in CPP and lowest value at Village Newa Talai. Also, there is no other major source of noise pollution.



During construction activities, a minor increase in noise levels near to the mine site will be seen which will be temporary.

From the above study and discussions, it can be concluded that noise levels in the study area are well within the prescribed limits as prescribed by the Noise Pollution (Regulation and Control) Rules, 2000 but it is predicted from the project, it can increase the noise level concentration in the nearby areas when compared to the current composite baseline results of Mine and CPP. In order to mitigate the anticipated impacts, adequate mitigation measure will be adopted to reduce the noise impacts.

In order to mitigate the anticipated impacts, adequate mitigation measure will be adopted to reduce the noise impacts. Impact assessment and mitigation measures suggested for the same have been detailed in Chapter 4 of this report.

### 3.12 WATER ENVIRONMENT

#### A. Type of sampling

Grab sampling has been done as single sample collected at a specific spot and at a site over a short period of time, grab samples are taken at a single selected location, depth and time.

#### B. Sampling method

Sample were collected manually from various type of sampling location by method described below. Drinking Water / Ground water: samples have been collected from tanks water as well as borewell water in the study area.

#### 3.12.1 SURFACE WATER

Table - 3.15  
Surface Water Sampling Stations  
Study Period - Summer Season (March to May, 2021) & (March to May, 2024)

Sampling Code	Sampling Stations	Tentative distance (from Block-I) & direction (from centre point)	Tentative distance (from Block-III) & direction (from centre point)	Tentative distance (from CPP) & direction (from centre point)
SW1	TiriNadi (Upstream & Downstream)	~passing through project site (Block I)	~14.5 km in NNE	~ 6.48 Km in West direction
SW2	Pareli Nadi (Upstream & Downstream)	~11 km in South	~passing through project site (Block III)	-
SW3	Thorghati Talav	~16 km in SSE	7.5 km in ESE	-
SW4	NalNadi	~8.0 km SW direction	~8.5 Km in SW	-
SW5	Tidi Dam	~3.2 km in west direction	~10.0 k in NNW	~ 10.7 Km in WSW direction
SW6	DaiyaNadi	~6.5 km in SE direction	~15 km in NE	~ 4.2 Km in East direction
SW7	Chandani Village (Nala Passing Near By)	~2.5 km in NNW direction	~17.5 km in North	-

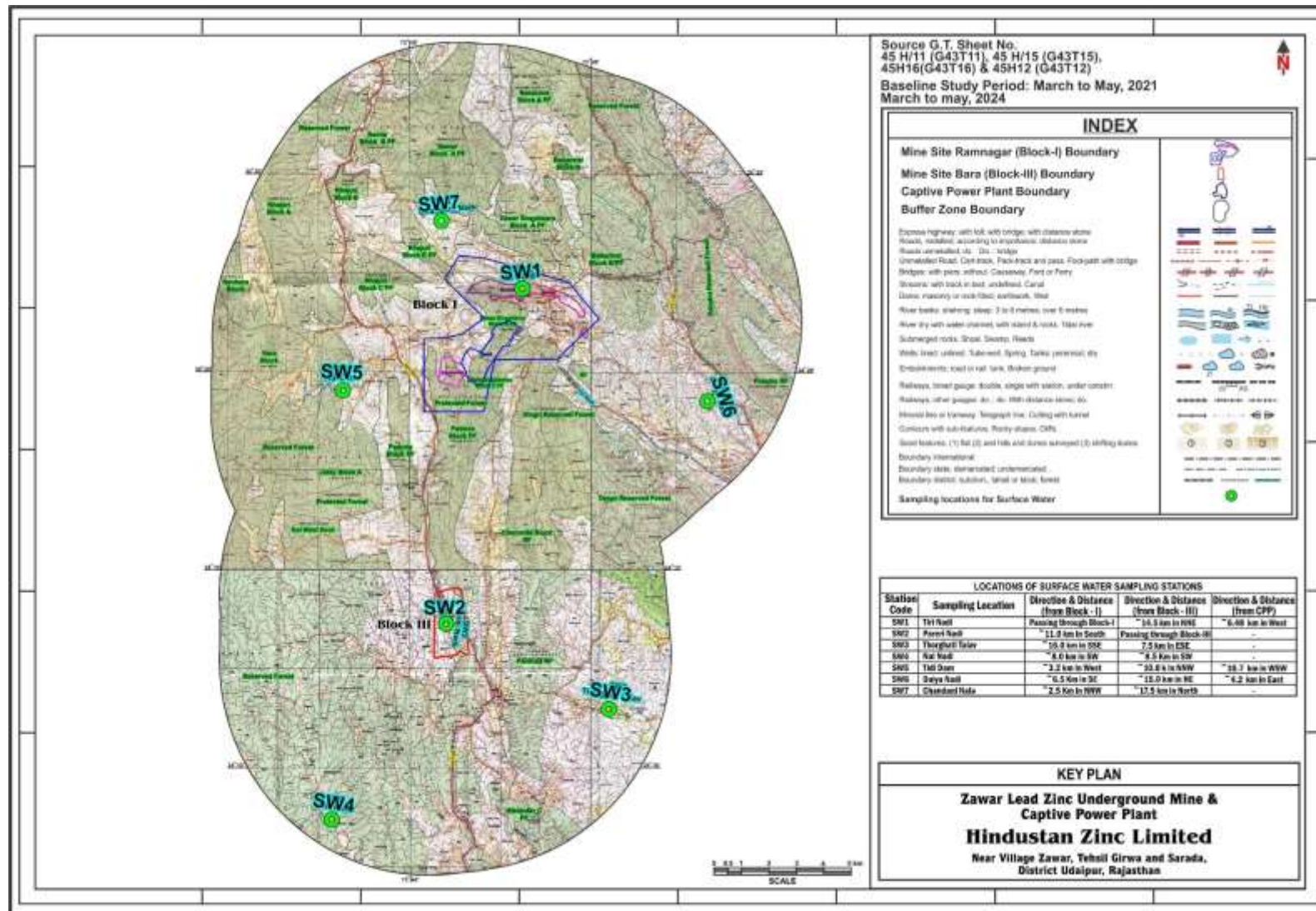


Figure 3.9: Key Plan Showing Surface Water Sampling Monitoring Locations



**Table - 3.16 (a)**  
**Surface Water analysis**  
**Study Period – Summer Season (March to May, 2021)**

S. No.	Parameters	Unit	Tiri Nadi (up-stream)	Tiri Nadi (down stream)	Tidi Dam	Daiya Nadi	Chandani Village Nala	Nal Nadi	Thorghati Talav	Pareli Nadi (up)	Pareli Nadi (down)
1.	pH (at 25°C)	--	7.64	7.61	7.52	7.84	7.58	7.75	7.9	7.82	7.89
2.	Colour	Hazen Unit	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)
3.	Turbidity	NTU	8	8	5	10	13	11	16	9	10
4.	Odour	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5.	Total Hardness as CaCO <sub>3</sub>	mg/l	242.15	246.15	122.46	212.54	196.82	207.16	193.87	223.65	226.85
6.	Calcium as Ca	mg/l	47.01	52.31	26.57	38.97	30.66	45.41	34.75	65.61	69.82
7.	Alkalinity as CaCO <sub>3</sub>	mg/l	213.19	216.54	109.52	135.75	176.65	194.15	184.56	205.65	203.15
8.	Chloride as Cl	mg/l	119.98	123.98	97.43	134.94	84.52	101.25	132.15	89.31	86.54
9.	Residual free Chlorine	mg/l	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)
10.	Cyanide as CN	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)
11.	Magnesium as Mg	mg/l	30.34	28.1	13.65	28.02	29.24	22.81	26.04	14.57	12.79
12.	Total Dissolved Solids	mg/l	498	512	366	431	409	484	502	469	482
13.	Sulphate as SO <sub>4</sub>	mg/l	56.85	60.32	45.62	38.62	60.15	66.45	62.89	68.14	70.13
14.	Fluoride as F	mg/l	0.65	0.63	0.69	0.61	0.79	0.67	0.59	0.42	0.4
15.	Nitrate as NO <sub>3</sub>	mg/l	6.98	7.15	10.24	9.07	11.54	11.28	12.87	13.06	12.63
16.	Iron as Fe	mg/l	0.28	0.26	0.33	0.34	0.14	0.34	0.22	0.29	0.33



S. No.	Parameters	Unit	Tiri Nadi (up-stream)	Tiri Nadi (down stream)	Tidi Dam	Daiya Nadi	Chandani Village Nala	Nal Nadi	Thorghati Talav	Pareli Nadi (up)	Pareli Nadi (down)
17.	Aluminum as Al	mg/l	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)
18.	Boron	mg/l	0.55	0.53	0.29	0.87	0.45	0.69	0.29	0.34	0.34
19.	Phenolic Compounds	mg/l	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)
20.	Anionic Detergents as MBAS	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)
21.	Hexa Chromium as Cr+6	mg/l	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)
22.	Zinc as Zn	mg/l	0.22	0.21	0.29	0.14	0.56	0.14	0.29	0.23	0.23
23.	Copper as Cu	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)
24.	Manganese as Mn	mg/l	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)
25.	Cadmium as Cd	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)
26.	Lead as Pb	mg/l	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)
27.	Selenium as Se	mg/l	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)
28.	Arsenic as As	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)
29.	Mercury as Hg	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL



S. No.	Parameters	Unit	Tiri Nadi (up-stream)	Tiri Nadi (down stream)	Tidi Dam	Daiya Nadi	Chandani Village Nala	Nal Nadi	Thorghati Talav	Pareli Nadi (up)	Pareli Nadi (down)
			(DL 0.001)	(DL 0.001)	(DL 0.001)	(DL 0.001)	(DL 0.001)	(DL 0.001)	(DL 0.001)	(DL 0.001)	(DL 0.001)
30.	Phosphate as Po <sub>4</sub>	mg/l	0.11	0.12	0.05	0.08	0.13	0.16	0.06	0.11	0.1
31.	Total Suspended Solid	mg/l	2.3	2.1	1.8	3.3	5.7	2.6	3.3	2.8	2.7
32.	Biochemical oxygen demand	mg/l	3.7	3.7	4.2	4.8	7.3	4	5.2	4.6	4.6
33.	Chemical oxygen demand	mg/l	10.6	9.6	13.6	14.7	27.5	14.2	17.8	13.9	13
34.	Sodium as Na	mg/l	72.1	70.8	67.8	58.9	59.3	78.6	93.1	61.4	63.2
35.	Potassium as K	mg/l	1.4	1.2	1.7	5.5	1.5	1.9	2.8	1.8	2.3
36.	Conductivity	µS/cm	744	763	591	673	649	741	771	711	732
37.	Nickel	mg/l	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)
38.	Dissolve Oxygen	mg/l	7.5	7.4	7.1	6.9	6.6	7.3	7.1	7.2	7.3

BDL – Below Detection Limit, DL- Detection Limit

Table - 3.16 (b)

Surface Water analysis

Study Period – Summer Season (March to May, 2024)

S. No.	Parameters	Unit	Tiri Nadi (up-stream)	Tiri Nadi (down stream)	Tidi Dam	Daiya Nadi	Chandani Village Nala	Nal Nadi	Thorghati Talav	Pareli Nadi (up)	Pareli Nadi (down)
1.	pH (at 25°C)	–	7.51	7.48	7.39	7.88	7.62	7.79	7.78	7.92	8.03





S. No.	Parameters	Unit	Tiri Nadi (up-stream)	Tiri Nadi (down stream)	Tidi Dam	Daiya Nadi	Chandani Village Nala	Nal Nadi	Thorghathi Talav	Pareli Nadi (up)	Pareli Nadi (down)
2.	Colour	Hazen Unit	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)
3.	Turbidity	NTU	10	10	5	10	15	15	10	10	10
4.	Odour	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5.	Total Hardness as CaCO <sub>3</sub>	mg/l	263.14	267.49	133.08	230.97	213.88	225.12	210.68	243.04	246.52
6.	Calcium as Ca	mg/l	51.09	56.85	28.87	42.35	33.32	49.35	37.76	71.30	75.87
7.	Alkalinity as CaCO <sub>3</sub>	mg/l	206.62	210.64	115.80	146.80	180.30	204.15	175.62	185.65	192.06
8.	Chloride as Cl	mg/l	130.38	134.73	105.88	146.64	91.85	110.03	143.61	97.05	104.04
9.	Residual free Chlorine	mg/l	BDL (DL 0.2)	BDL (DL 0.2)	BDL (DL 0.20)	BDL (DL 0.2)	BDL (DL 0.2)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)
10.	Cyanide as CN	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)
11.	Magnesium as Mg	mg/l	32.94	30.50	14.82	30.42	31.75	24.76	28.28	15.79	13.86
12.	Total Dissolved Solids	mg/l	516	524	378	486	450	516	560	488	482
13.	Sulphate as SO <sub>4</sub>	mg/l	62.28	66.09	49.98	42.31	65.90	72.80	73.60	74.65	76.83
14.	Fluoride as F	mg/l	0.71	0.69	0.76	0.67	0.87	0.73	0.65	0.46	0.44
15.	Nitrate as NO <sub>3</sub>	mg/l	7.65	7.83	11.22	9.94	12.64	12.36	14.10	14.31	13.84
16.	Iron as Fe	mg/l	0.31	0.28	0.36	0.37	0.15	0.37	0.24	0.32	0.36
17.	Aluminum as Al	mg/l	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)
18.	Boron	mg/l	0.60	0.58	0.32	0.95	0.49	0.76	0.32	0.37	0.37





S. No.	Parameters	Unit	Tiri Nadi (up-stream)	Tiri Nadi (down stream)	Tidi Dam	Daiya Nadi	Chandani Village Nala	Nal Nadi	Thorghathi Talav	Pareli Nadi (up)	Pareli Nadi (down)
19.	Phenolic Compounds	mg/l	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)
20.	Anionic Detergents as MBAS	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)
21.	Hexa Chromium as Cr+6	mg/l	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)
22.	Zinc as Zn	mg/l	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)
23.	Copper as Cu	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)
24.	Manganese as Mn	mg/l	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)
25.	Cadmium as Cd	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)
26.	Lead as Pb	mg/l	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)
27.	Selenium as Se	mg/l	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)
28.	Arsenic as As	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)
29.	Mercury as Hg	mg/l	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)



S. No.	Parameters	Unit	Tiri Nadi (up-stream)	Tiri Nadi (down stream)	Tidi Dam	Daiya Nadi	Chandani Village Nala	Nal Nadi	Thorghati Talav	Pareli Nadi (up)	Pareli Nadi (down)
30.	Phosphate as $PO_4$	mg/l	0.14	0.15	0.06	0.10	0.17	0.21	0.08	0.14	0.13
31.	Total Suspended Solid	mg/l	3.0	2.7	2.3	4.2	7.3	3.3	4.2	3.6	3.5
32.	Biochemical oxygen demand	mg/l	4.8	4.8	5.4	6.2	9.4	5.1	6.7	5.9	6.8
33.	Chemical oxygen demand	mg/l	15.0	13.0	18.0	20.0	36.0	19.0	23.0	19.0	25.0
34.	Sodium as Na	mg/l	93.0	91.0	87.0	76.0	77.0	101.0	120.0	79.0	81.0
35.	Potassium as K	mg/l	2.0	3.0	3.0	8.0	3.0	3.0	5.0	3.0	6.0
36.	Conductivity	$\mu S/cm$	770.0	785.0	565.0	725.0	672.0	770.0	836.0	728.0	719.0
37.	Nickel	mg/l	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)
38.	Dissolve Oxygen	mg/l	7.2	7.3	7.1	6.9	6.5	6.9	6.8	7.1	6.4

BDL – Below Detection Limit, DL- Detection Limit



### 3.12.2 INTERPRETATION OF SURFACE WATER QUALITY RESULTS

#### a. Baseline Season: Summer Season (March to May, 2021)

The above mentioned chemical analysis of surface water samples reveals that there is a variation in a chemical composition of water samples from the nearby water bodies. The pH of the water bodies ranges from 7.52 to 7.9 indicating slightly alkaline in nature. The water bodies are rich in Calcium, silica, potassium, magnesium and bicarbonates. The colour and turbidity were of permissible range and odour was found agreeable at all the locations. Less turbidity in the above mentioned water bodies indicates that it is good for the growth of aquatic life.

Total hardness (122.46 to 256.15 mg/l), Total dissolved solids (366 to 512 mg/l), Alkalinity (109.52 to 216.54 mg/l) and conductivity (591 to 771  $\mu$ S/cm) were found to be within standards in water samples. The COD (9.6 to 27.5 mg/l) and BOD (3.7 to 7.3 mg/l) indicates that Nala near the Chandni Village is slightly polluted as compared to the other surface water sampling locations. The nutrients were also found low viz. sulphate (38.62 to 70.13 mg/l), nitrate (6.98 to 13.06 mg/l), calcium (26.57 to 69.82 mg/l), magnesium (12.79 to 30.34 mg/l) indicated clean nalla as well as river water. The Dissolved oxygen (6.6 to 7.5 mg/l) indicated that the water bodies are safe for aquatic biodiversity.

#### b. Baseline Season: Summer Season (March to May, 2024)

The pH of the water bodies ranges from 7.39 to 8.03 indicating slightly alkaline in nature. The water bodies are rich in Calcium, silica, potassium, magnesium and bicarbonates. The colour and turbidity were of permissible range and odour was found agreeable at all the locations. Less turbidity in the above mentioned water bodies indicates that it is good for the growth of aquatic life.

Total hardness (133.08 to 267.49 mg/l), Total dissolved solids (378 to 560 mg/l), Alkalinity (115.8 to 210.64 mg/l) and conductivity (565 to 836  $\mu$ S/cm) were found to be within standards in water samples. The COD (13.0 to 36.0 mg/l) and BOD (4.8 to 9.4 mg/l). The nutrients were also found low viz. sulphate (42.31 to 76.83 mg/l), nitrate (7.65 to 14.31 mg/l), calcium (28.87 to 75.87 mg/l), magnesium (13.86 to 32.94 mg/l) indicated clean nalla as well as river water. The Dissolved oxygen (6.4 to 7.3 mg/l) indicated that the water bodies are safe for aquatic biodiversity.

Thus, It can be inferred from the above data that water quality of all the monitoring stations seems to be clean. Also, the physical quality and chemical quality is good and safe for aquatic biodiversity.

### 3.12.3 GROUND WATER QUALITY

Ground water samples were collected from the available water resources around the mine site. The samples were collected and tested from different sites.

The quality of ground water was studied by collecting samples from 14 locations. Details of ground water sampling locations and their distance and directions are given in Table - 3.17. Ground water analysis results are given in Table - 3.17



**TABLE - 3.17**  
**Locations of Ground Water and Soil Sampling Stations**  
**Study Period – Summer Season (March to May, 2021) & (March to May, 2024)**

Station Code	Sampling Station	Tentative distance (from Block-I) & direction (from centre point)	Tentative distance (from Block-III) & direction (from centre point)	Tentative distance (from CPP) & direction (from centre point)	Latitudes & Longitudes
SGWS 1	Village Premnagar (Block-I)	Core Zone	~ 13.5 Km in NNE direction	~ 0.80 Km in WNW direction	24°21'17.1"N 73°44'18.7"E
SGWS 2	Mochia Mine	Core Zone	~ 14.0 Km in North direction	~ 3.23 Km in NW direction	24°21'46.93"N 73°42'58.95"E
SGWS 3	Naka Bazar Well (within area of Balaria Mine)	Core Zone	~ 14.5 Km in NNE direction	~ 2.0 Km in NW direction	24°21'56.06"N 73°43'56.90"E
SGWS 4	Zawar mata well	Core Zone	~ 12.0 Km in North direction	~ 6.0 Km in West direction	24°20'42.63"N 73°41'1.78"E
SGWS 5	Near TSF 2	Core Zone	~ 12.5 Km in NNE direction	~ 2.9 Km in West direction	24°21'0.72"N 73°43'0.32"E
SGWS 6	Village Jawar	Core Zone	~ 10.5 Km in North direction	~ 5.3 Km in West direction	24°20'51.74"N 73°41'34.51"E
SGWS 7	Mine Site Bara (Block III)	~ 8 Km in South direction	Core Zone	~ 13.7 Km in SSW direction	24°14'16.7"N 73°41'08.2"E
SGWS 8	Singatwara	Adjacent in North direction	~ 16 Km in NNE	~ 2.60 Km in NNW direction	24°22'21.6"N 73°44'09.2"E
SGWS 9	kalipipli	~1.0 km in west direction	~ 11 Km in NW	~ 7.0 Km in West direction	24°20'55.4"N 73°40'27.6"E
SGWS 10	Kanpur	~ 1.0 km in SE direction	~ 9.5 Km in NNE	~ 3.30 Km in NW direction	24°19'47.6"N 73°42'58.1"E
SGWS 11	Kevra Khurd	~ 6.0 km in NE direction	~ 20Km in NE	~ 7.40 Km in NNE direction	24°24'57.2"N 73°46'10.6"E
SGWS 12	Nangela	~2.0 km in SW direction	~ 2 Km in NW	~ 9.7 Km in SW direction	24°18'33.7"N 73°39'34.4"E
SGWS 13	Dewala	~4.0 km in East direction	~ 16 Km in NE	~ 4.30 Km in East direction	24°21'09.6"N 73°47'30.3"E
SGWS 14	Moridungri	~ 5.5 km in West direction	~12.5 Km in South West	~ 19 Km in SW direction	24°13'19.6"N 73°37'11.9"E

Source: SOI Toposheet & field Survey

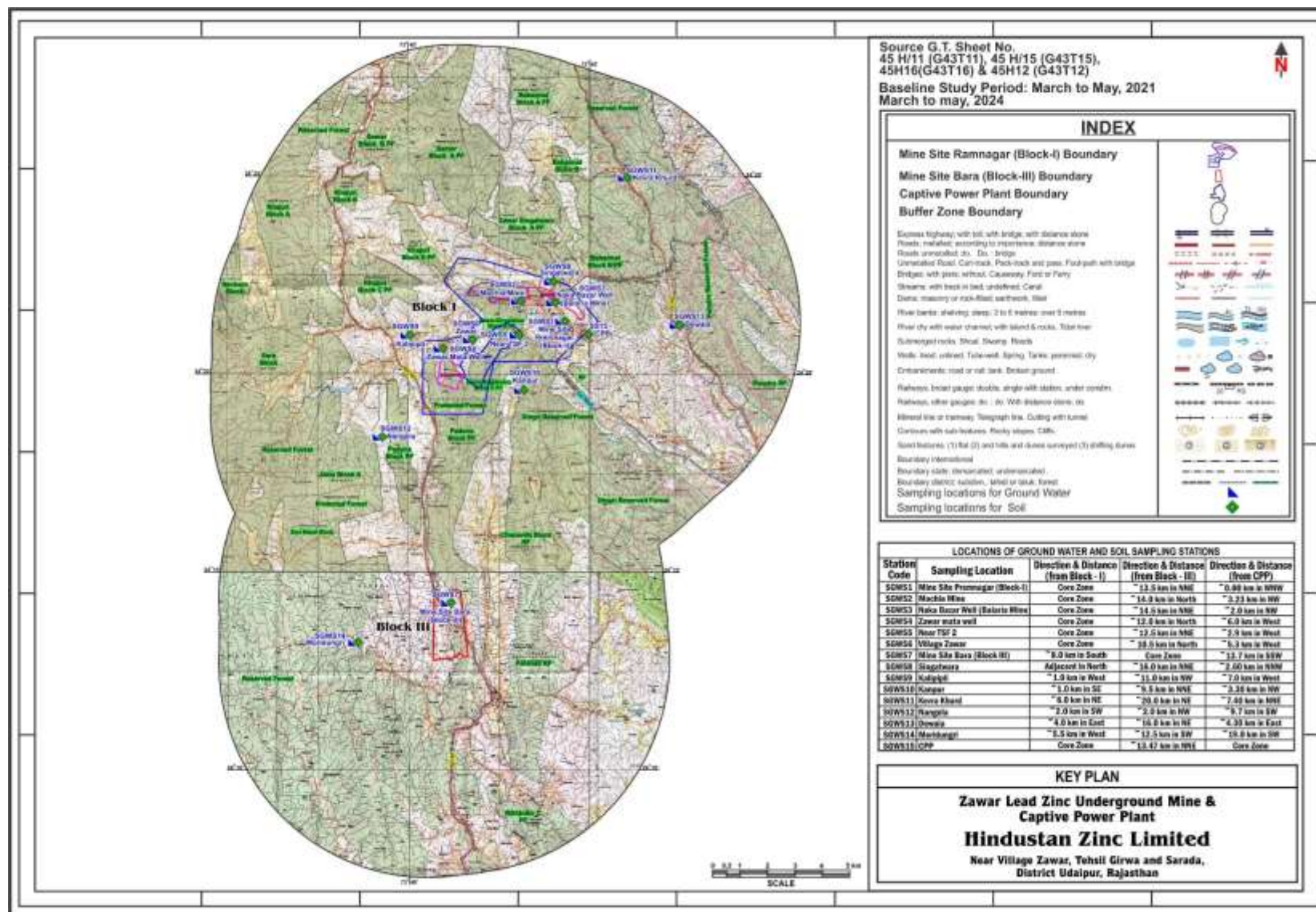


Figure 3.10: Key plan showing Groundwater and Soil Sampling Locations



**TABLE - 3.18 (a)**  
**Ground Water Analysis**  
**Study Period: Summer Season (March to May, 2021)**

S. No.	Parameters	Unit	Village Premnagar (Block-I)	Mochia Mine	Naka Bazar Well	Near TSF 2	Mine Site Bara (Block- III)	Singatwara	Kalipipli	Specification as per IS 10500-2012	
										Requirement (Acceptable Limit)	Permissible Limit (Max.)
1.	pH		7.82	7.98	7.65	7.83	7.85	7.91	7.89	6.5-8.5	No Relaxation
2.	Colour	Hazen Unit	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	5	15
3.	Turbidity	NTU	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	1	5
4.	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5.	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	mg/l	343.38	323.62	402.19	346.95	318.54	423.65	463.87	200	600
7.	Calcium as Ca	mg/l	67.26	65.48	78.65	62.13	61.32	96.25	114.74	75	200
8.	Alkalinity as CaCO <sub>3</sub>	mg/l	290.23	302.21	287.65	306.23	276.89	305.13	372.18	200	600
9.	Chloride as Cl	mg/l	122.42	113.25	132.53	106.32	104.96	182.45	201.68	250	1000
10.	Cyanide as CN	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	0.05	No Relaxation
11.	Magnesium as Mg	mg/l	34.00	38.94	50.05	46.64	40.23	44.59	43.16	30	100
12.	Total Dissolved Solids	mg/l	649.0	609.0	642.0	599.0	587.0	796.0	964.0	500	2000
13.	Sulphate as SO <sub>4</sub>	mg/l	104.32	113.25	132.53	106.32	87.54	128.65	143.87	200	400





S. No.	Parameters	Unit	Village Premnagar (Block-I)	Mochia Mine	Naka Bazar Well	Near TSF 2	Mine Site Bara (Block- III)	Singatwara	Kalipipli	Specification as per IS 10500-2012	
										Requirement (Acceptable Limit)	Permissible Limit (Max.)
14.	Fluoride as F	mg/l	1.06	89.67	89.78	80.39	1.25	1.29	1.12	1.0	1.5
15.	Nitrate as NO <sub>3</sub> -N	mg/l	9.08	1.23	1.29	1.09	10.23	11.14	12.45	45	No Relaxation
16.	Iron as Fe	mg/l	0.41	8.65	12.03	8.65	0.29	0.38	0.31	0.3	No Relaxation
17.	Aluminum as Al	mg/l	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	0.03	0.2
18.	Boron	mg/l	BDL (DL 0.20)	0.44	0.45	0.66	BDL (DL 0.20)	0.68	0.75	0.50	2.4
19.	Phenolic Compounds	mg/l	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	0.001	0.002
20.	Anionic Detergents as MBAS	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	0.2	1
21.	Hexa Chromium as Cr <sup>+6</sup>	mg/l	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	--	--
22.	Chromium as Cr	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.03)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	0.05	No Relaxation
23.	Zinc as Zn	mg/l	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	5	15
24.	Copper as Cu	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	0.05	1.5
25.	Manganese as Mn	mg/l	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	0.1	0.3
26.	Cadmium as Cd	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	0.003	No Relaxation
27.	Lead as Pb	mg/l	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	0.01	No Relaxation
28.	Arsenic as as	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	0.01	No Relaxation
29.	Mercury as Hg	mg/l	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	0.001	No Relaxation





S. No.	Parameters	Unit	Village Premnagar (Block-I)	Mochia Mine	Naka Bazar Well	Near TSF 2	Mine Site Bara (Block- III)	Singatwara	Kalipipli	Specification as per IS 10500-2012	
										Requirement (Acceptable Limit)	Permissible Limit (Max.)
30.	Sodium as Na	mg/l	78.9	74.5	59.8	75.3	66.4	93.4	112.6	--	--
31.	Potassium as K	mg/l	4.2	4.2	2.6	3.6	3.3	3.2	1.5	--	--
32.	Phosphate as PO <sub>4</sub>	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)		
33.	Nickel	mg/l	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	--	--
34.	Conductivity	µS/cm	998.00	922.00	958.00	934.00	917.00	1188.00	1403.00	--	--
35.	Total Suspended Solid	mg/l	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)		

TABLE - 3.18 (b)

Ground Water Analysis

Study Period: Summer Season (March to May, 2021)

S. No.	Parameters	Unit	Kanpur	Kevra Khurd	Nangela	Dewala	Mori dungri	Village Jawar	Zawarmata Well	Specification as per IS 10500-2012	
										Requirement (Acceptable Limit)	Permissible Limit (Max.)
1.	pH (at 25°C)		7.66	7.93	7.84	7.82	7.38	8.06	7.88	6.5-8.5	No Relaxation
2.	Colour	Hazen Unit	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	5	15
3.	Turbidity	NTU	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	1	5
4.	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable



S. No.	Parameters	Unit	Kanpur	Kevra Khurd	Nangela	Dewala	Mori dungri	Village Jawar	Zawarmata Well	Specification as per IS 10500-2012	
										Requirement (Acceptable Limit)	Permissible Limit (Max.)
5.	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	mg/l	359.56	359.53	368.47	465.87	260.68	378.98	312.36	200	600
7.	Calcium as Ca	mg/l	61.45	81.9	55.36	83.13	34.88	88.03	59.87	75	200
8.	Alkalinity as CaCO <sub>3</sub>	mg/l	279.59	377.32	293.29	330.32	206.56	342.15	302.45	200	600
9.	Chloride as Cl	mg/l	159.91	194.96	164.92	147.49	144.95	154.97	102.54	250	1000
10.	Cyanide as CN	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	0.05	No Relaxation
11.	Magnesium as Mg	mg/l	50.12	37.71	55.97	62.81	42.20	38.72	39.61	30	100
12.	Total Dissolved Solids	mg/l	665.0	842.0	656.0	703.0	556.0	729.0	609.00	500	2000
13.	Sulphate as SO <sub>4</sub>	mg/l	81.23	87.64	65.87	87.12	42.87	95.93	82.32	200	400
14.	Fluoride as F	mg/l	1.01	1.09	1.05	1.14	0.98	1.06	1.16	1.0	1.5
15.	Nitrate as NO <sub>3</sub> -N	mg/l	11.17	12.47	9.09	11.21	9.19	12.24	10.24	45	No Relaxation
16.	Iron as Fe	mg/l	0.26	0.27	0.34	0.32	0.34	0.35	0.36	0.3	No Relaxation
17.	Aluminum as Al	mg/l	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	0.03	0.2
18.	Boron	mg/l	BDL (DL 0.20)	0.52	BDL (DL 0.20)	0.47	BDL (DL 0.20)	0.89	0.75	0.50	2.4
19.	Phenolic Compounds	mg/l	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	0.001	0.002



S. No.	Parameters	Unit	Kanpur	Kevra Khurd	Nangela	Dewala	Mori dungri	Village Jawar	Zawarmata Well	Specification as per IS 10500-2012	
										Requirement (Acceptable Limit)	Permissible Limit (Max.)
20.	Anionic Detergents as MBAS	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	0.2	1
21.	Hexa Chromium as Cr <sup>+6</sup>	mg/l	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	--	--
22.	Chromium as Cr	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.03)	0.05	No Relaxation
23.	Zinc as Zn	mg/l	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	5	15
24.	Copper as Cu	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	0.05	1.5
25.	Manganese as Mn	mg/l	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	0.1	0.3
26.	Cadmium as Cd	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	0.003	No Relaxation
27.	Lead as Pb	mg/l	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	0.01	No Relaxation
28.	Arsenic as as	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	0.01	No Relaxation
29.	Mercury as Hg	mg/l	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	0.001	No Relaxation
30.	Sodium as Na	mg/l	79.3	123.9	69.8	54.6	82.5	89.7	84.2	--	--
31.	Potassium as K	mg/l	2.1	5.7	1.2	1.9	1.4	1.9	3.6	--	--
32.	Phosphate as PO <sub>4</sub>	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)		
33.	Nickel	mg/l	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	--	--
34.	Conductivity	µS/cm	1023.00	1259.00	998.00	1023.00	859.00	1104.00	919.00	--	--
35.	Total Suspended Solid	mg/l	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)		



**TABLE - 3.19 (a)**  
**Ground Water Analysis**  
**Study Period: Summer Season (March to May, 2024)**

S. No.	Parameters	Unit	Village Premnagar (Block-I)	Mochia Mine	Naka Bazar Well	Near TSF 2	Mine Site Bara (Block- III)	Singatwara	Kalipipli	Specification as per IS 10500-2012	
										Requirement (Acceptable Limit)	Permissible Limit (Max.)
1.	pH		7.71	7.87	7.54	7.60	7.71	7.77	7.64	6.5-8.5	No Relaxation
2.	Colour	Hazen Unit	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 1.0)	5	15
3.	Turbidity	NTU	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	1	5
4.	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5.	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	mg/l	369.75	384.26	433.08	496.11	325.84	329.82	387.32	200	600
7.	Calcium as Ca	mg/l	72.43	74.62	84.69	118.02	73.87	80.87	93.57	75	200
8.	Alkalinity as CaCO <sub>3</sub>	mg/l	254.36	268.36	224.36	333.55	242.66	215.14	256.82	200	600
9.	Chloride as Cl	mg/l	131.82	121.95	142.71	163.01	99.16	181.87	149.99	250	1000
10.	Cyanide as CN	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	0.05	No Relaxation
11.	Magnesium as Mg	mg/l	45.90	48.07	53.84	48.94	34.35	31.07	37.34	30	100
12.	Total Dissolved Solids	mg/l	688.0	708.0	744.0	792.0	618.0	696.0	687.0	500	2000
13.	Sulphate as SO <sub>4</sub>	mg/l	111.40	120.94	141.53	88.67	61.72	53.07	68.72	200	400



S. No.	Parameters	Unit	Village Premnagar (Block-I)	Mochia Mine	Naka Bazar Well	Near TSF 2	Mine Site Bara (Block- III)	Singatwara	Kalipipli	Specification as per IS 10500-2012	
										Requirement (Acceptable Limit)	Permissible Limit (Max.)
14.	Fluoride as F	mg/l	0.98	1.14	1.19	0.18	0.24	0.16	0.18	1.0	1.5
15.	Nitrate as NO <sub>3</sub> -N	mg/l	11.51	10.97	15.25	15.98	19.40	17.37	25.61	45	No Relaxation
16.	Iron as Fe	mg/l	0.52	0.32	0.23	0.11	0.23	0.13	0.24	0.3	No Relaxation
17.	Aluminum as Al	mg/l	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	0.03	0.2
18.	Boron	mg/l	0.26	0.36	0.52	0.23	0.29	BDL (DL 0.20)	BDL (DL 0.20)	0.50	2.4
19.	Phenolic Compounds	mg/l	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	0.001	0.002
20.	Anionic Detergents as MBAS	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	0.2	1
21.	Hexa Chromium as Cr <sup>+6</sup>	mg/l	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	--	--
22.	Chromium as Cr	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	0.05	No Relaxation
23.	Zinc as Zn	mg/l	0.45	0.32	0.38	0.39	0.18	0.37	0.19	5	15
24.	Copper as Cu	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	0.05	1.5
25.	Manganese as Mn	mg/l	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.10)	BDL (DL 0.01)	0.1	0.3
26.	Cadmium as Cd	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	0.003	No Relaxation
27.	Lead as Pb	mg/l	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	0.01	No Relaxation
28.	Arsenic as as	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	0.01	No Relaxation
29.	Mercury as Hg	mg/l	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	0.001	No Relaxation



S. No.	Parameters	Unit	Village Premnagar (Block-I)	Mochia Mine	Naka Bazar Well	Near TSF 2	Mine Site Bara (Block- III)	Singatwara	Kalipipli	Specification as per IS 10500-2012	
										Requirement (Acceptable Limit)	Permissible Limit (Max.)
30.	Sodium as Na	mg/l	85.0	81.0	65.0	82.0	58.0	95.0	78.0	--	--
31.	Potassium as K	mg/l	6.0	5.0	3.0	6.0	5.0	7.0	9.0	--	--
32.	Phosphate as PO <sub>4</sub>	mg/l	BDL(DL 0.02)	BDL(DL 0.02)	BDL(DL 0.02)	BDL(DL 0.02)	BDL(DL 0.02)	BDL(DL 0.02)	BDL(DL 0.02)		
33.	Nickel	mg/l	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL(DL 0.005)	BDL(DL 0.005)	BDL(DL 0.005)	BDL(DL 0.005)	--	--
34.	Conductivity	µS/cm	1028.0	1058.0	1110.0	1182.0	922.0	1040.0	1026.0	--	--
35.	Total Suspended Solid	mg/l	BDL(DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL(DL 1.0)		

TABLE - 3.19 (b)

Ground Water Analysis

Study Period: Summer Season (March to May, 2024)

S. No.	Parameters	Unit	Kanpur	Kevra Khurd	Nangela	Dewala	Mori dungri	Village Jawar	Zawarmata Well	Specification as per IS 10500-2012	
										Requirement (Acceptable Limit)	Permissible Limit (Max.)
1.	pH (at 25°C)		7.53	7.82	7.73	7.71	7.28	7.95	7.77	6.5-8.5	No Relaxation
2.	Colour	Hazen Unit	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	5	15
3.	Turbidity	NTU	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	1	5
4.	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable



S. No.	Parameters	Unit	Kanpur	Kevra Khurd	Nangela	Dewala	Mori dungri	Village Jawar	Zawarmata Well	Specification as per IS 10500-2012	
										Requirement (Acceptable Limit)	Permissible Limit (Max.)
5.	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
6.	Total Hardness as CaCO <sub>3</sub>	mg/l	394.62	412.65	426.77	501.65	280.70	408.09	376.35	200	600
7.	Calcium as Ca	mg/l	66.17	88.19	81.52	89.51	37.56	94.79	72.47	75	200
8.	Alkalinity as CaCO <sub>3</sub>	mg/l	262.26	323.82	275.11	309.84	193.75	278.94	283.70	200	600
9.	Chloride as Cl	mg/l	172.19	209.93	177.59	158.82	156.08	166.87	166.88	250	1000
10.	Cyanide as CN	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	0.05	No Relaxation
11.	Magnesium as Mg	mg/l	55.73	46.75	54.23	67.57	45.41	41.64	47.45	30	100
12.	Total Dissolved Solids	mg/l	748.0	892.0	715.0	743.0	658.0	798.0	710.0	500	2000
13.	Sulphate as SO <sub>4</sub>	mg/l	86.75	93.59	70.34	93.04	45.78	102.44	87.91	200	400
14.	Fluoride as F	mg/l	0.93	1.01	0.97	1.05	0.90	0.98	1.07	1.0	1.5
15.	Nitrate as NO <sub>3</sub> -N	mg/l	14.16	15.81	11.53	14.21	11.65	15.52	12.98	45	No Relaxation
16.	Iron as Fe	mg/l	0.33	0.34	0.43	0.41	0.43	0.44	0.46	0.3	No Relaxation
17.	Aluminum as Al	mg/l	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	0.03	0.2
18.	Boron	mg/l	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	0.41	0.00	0.75	0.64	0.50	2.4
19.	Phenolic Compounds	mg/l	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	0.001	0.002





S. No.	Parameters	Unit	Kanpur	Kevra Khurd	Nangela	Dewala	Mori dungri	Village Jawar	Zawarmata Well	Specification as per IS 10500-2012	
										Requirement (Acceptable Limit)	Permissible Limit (Max.)
20.	Anionic Detergents as MBAS	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	0.2	1
21.	Hexa Chromium as Cr <sup>+6</sup>	mg/l	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	--	--
22.	Chromium as Cr	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	0.05	No Relaxation
23.	Zinc as Zn	mg/l	0.21	0.31	0.11	0.32	0.25	0.09	0.14	5	15
24.	Copper as Cu	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	0.05	1.5
25.	Manganese as Mn	mg/l	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	0.1	0.3
26.	Cadmium as Cd	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	0.003	No Relaxation
27.	Lead as Pb	mg/l	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	0.01	No Relaxation
28.	Arsenic as as	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	0.01	No Relaxation
29.	Mercury as Hg	mg/l	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	0.001	No Relaxation
30.	Sodium as Na	mg/l	89.0	140.0	86.0	62.0	91.0	97.0	109.0	--	--
31.	Potassium as K	mg/l	4.0	9.0	4.0	2.0	2.0	3.0	9.0	--	--
32.	Phosphate as PO <sub>4</sub>	mg/l	BDL(DL 0.02)	BDL(DL 0.02)	BDL(DL 0.02)	BDL(DL 0.02)	BDL(DL 0.02)	BDL(DL 0.02)	BDL(DL 0.02)		
33.	Nickel	mg/l	BDL(DL 0.005)	BDL(DL 0.005)	BDL(DL 0.005)	BDL(DL 0.005)	BDL(DL 0.005)	BDL(DL 0.005)	BDL(DL 0.005)	--	--
34.	Conductivity	µS/cm	1120.0	1332.0	1070.0	1110.0	982.0	1185.0	1072.0	--	--
35.	Total Suspended Solid	mg/l	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)		



### 3.12.4

## INTERPRETATION OF GROUND WATER QUALITY RESULTS

### a. Baseline Season: Summer Season (March to May, 2021)

The physico-chemical quality of groundwater was compared with drinking water standard (IS:10500- 2012). All the groundwater samples showed good Ground water quality; The pH of the water samples ranged from 7.38 to 8.06 indicating slightly alkaline in nature; and maximum pH was recorded at Village Zawar. The colour and turbidity were found to be BDL, and odour and taste were agreeable at all sampling locations. The observed values of parameter varies from: total hardness (260.68 to 465.87 mg/l), alkalinity (206.56 to 377.32 mg/l), total dissolved solids (556 to 964 mg/l) however, maximum hardness and dissolved solids were found in the samples of village Dewala and Kalipipli village respectively. The presence of calcium and magnesium ions in the water indicates the high values of above mentioned parameters.

The concentration of chloride was found to be (102.54 to 201.68 mg/l) and sulphate was (42.87 to 143.87 mg/l). The concentrations of other micro and macro nutrients were also at low level i.e. calcium (34.88 to 114.74 mg/l), magnesium (34 to 68.1 mg/l), and iron (0.26 to 12.03 mg/l).

Thus, it can be concluded from the composite baseline sampling results of Mine and CPP, for groundwater that all the samples were observed to be within the permissible limits and complies to the drinking water standard (IS: 10500-2012).

### b. Baseline Season: Summer Season (March to May, 2024)

The physico-chemical quality of groundwater was compared with drinking water standard (IS:10500- 2012). All the groundwater samples showed good Ground water quality; The pH of the water samples ranged from 7.53 to 7.87 indicating slightly alkaline in nature; and maximum pH was recorded at Mochia Mine. The colour and turbidity were found to be BDL, and odour and taste were agreeable at all sampling locations. The observed values of parameter varies from: Total Hardness (325.84 to 496.11 mg/l), Alkalinity (215.14 to 333.55 mg/l), Total Dissolved Solids (618 to 892 mg/l).

The concentration of chloride was found to be (99.16 to 209.93 mg/l) and sulphate was (53.07 to 141.53 mg/l). The concentrations of other micro and macro nutrients were also at low level i.e. calcium (66.17 to 118.02 mg/l), magnesium (31.07 to 55.73 mg/l), and iron (0.11 to 0.52 mg/l).

Thus, it can be concluded from the composite baseline sampling results of Mine and CPP, for groundwater that all the samples were observed to be within the permissible limits and complies to the drinking water standard (IS: 10500-2012).

However, considering the scarcity of potable water in the area, HZL will assist for improving the drinking water facilities in the area under EMP/ CSR program. Details of the same are given in Chapter 7 of this Final EIA/EMP Report.

### 3.13

## SOIL ENVIRONMENT

The information on soil quality has been arrived by collection and analysis of soil samples from representative locations. In order to assess the base line characteristics of soil profile of themine lease area representing project and nearby areas, the samples were analyzed for key and chemical parameters. The sampling locations were finalized with the following considerations:

- To enable information on baseline characteristics and,



- To determine the impact of mining activities on soil characteristics.
- To determine the type of plantation

Representative soil samples were collected from 15 different specified locations within the study area of the mine site. Standard operating procedures were followed for the sampling and analysis of physico-chemical parameters.

Soil analysis results are given in Table - 3.20 (a & b) and Standard Soil Classification is given in Table - 3.21.



**TABLE - 3.20 (a)**  
**Soil Quality Analysis Results**  
**Study Period – Summer Season (March to May, 2021)**

S. No	Parameters	Unit	Village Premnagar (Block-I)	Mine Site Bara (Block III)	Singatwara	Kalipipli	Kanpur	Kevra Khurd	Nangela	Dewala	Moridungri	Mochia Mine	Balaria Mine (Block-I)	BaroiMine (Block-I)	Zawar Mala Mine (Block-I)	Village Jawar	CPP
1.	pH (at 25°C) (1:2.5 soil water sus.)	-	7.44	7.67	7.99	7.86	8.02	7.32	7.17	8.03	7.27	7.36	7.55	7.69	7.78	7.84	7.96
2.	Conductivity (1:2 soil water sus)	mS/cm	0.65	0.55	0.67	0.46	0.54	0.52	0.41	0.49	0.52	0.63	0.60	0.67	0.70	0.53	0.60
3.	Soil Texture	-	Sandy Loam	Sandy Loam	Sandy Clay Loam	Sandy Loam	Sandy Clay Loam	Sandy Clay Loam	Sandy Loam	Sandy Clay Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Clay Loam
4.	Colour	-	Blackish Brown	Blackish Brown	Brownish black	Blackish Brown	Blackish Brown	Blackish Brown	Brownish	Blackish Brown	Brownish	Blackish Brown	Brownish	Brownish	Blackish Brown	Blackish Brown	Blackish Brown
5.	Water holding capacity	%	43.54	46.60	36.34	38.12	36.90	39.26	44.57	35.99	33.06	44.65	42.98	43.12	45.87	40.23	37.95
6.	Bulk density	gm/cc	1.40	1.37	1.44	1.39	1.42	1.46	1.39	1.45	1.47	1.38	1.42	1.43	1.37	1.37	1.40
7.	Chloride	mg/kg	234.32	214.37	230.83	203.72	153.22	262.88	225.04	169.52	174.07	213.65	205.78	198.65	223.54	216.65	189.65
8.	Calcium	mg/kg	1766.07	1736.81	1050.77	1119.31	1226.50	1123.72	2070.56	1021.81	1839.19	1568.24	1498.57	1726.59	1657.89	1235.54	1365.45
9.	Sodium	mg/kg	93.47	89.76	103.47	139.29	112.79	94.24	101.48	105.66	100.98	102.65	89.98	96.78	113.54	145.62	119.65
10.	Potassium	kg/hectare	278.67	269.92	179.35	161.81	195.24	162.85	154.52	109.07	104.06	256.65	245.89	215.98	233.04	203.65	189.65
11.	Organic Matter	%	1.05	1.18	1.15	0.92	1.29	1.08	0.98	0.93	0.89	0.98	0.86	1.06	1.08	0.88	1.03



S. No	Parameters	Unit	Village Premnagar (Block-I)	Mine Site Bara (Block III)	Singatwara	Kalipipli	Kanpur	Kevra Khurd	Nangela	Dewala	Moridungri	Mochia Mine	Balaria Mine (Block-I)	BaroiMine (Block-I)	Zawar Mala Mine (Block-I)	Village Jawar	CPP
12.	Magnesium as Mg	mg/kg	227.34	209.75	235.76	239.11	311.53	327.90	276.00	364.05	276.16	236.54	245.87	289.65	247.58	244.62	305.62
13.	Available Nitrogen as N	kg/hectare	218.07	182.65	151.62	153.11	249.42	213.18	229.38	226.25	164.46	205.64	198.54	213.87	187.54	189.65	213.87
14.	Available Phosphorus	kg/hectare	43.75	54.60	46.79	37.61	43.63	38.34	39.74	42.20	31.73	46.65	41.15	38.87	36.78	45.21	46.98
15.	Zinc as Zn	mg/kg	84.28	88.82	57.33	52.83	49.84	59.87	54.87	38.96	49.00	85.15	76.54	90.18	86.87	59.98	42.32
16.	Manganese as Mn	mg/kg	481.76	406.88	346.84	344.33	285.17	346.83	348.33	279.82	287.56	302.45	415.65	336.87	406.58	306.85	298.87
17.	Chromium as Cr	mg/kg	8.49	7.36	8.43	10.25	12.37	13.48	8.48	6.48	5.27	9.56	10.14	8.74	7.65	12.32	14.25
18.	Lead as Pb	mg/kg	42.96	54.46	31.36	53.51	37.09	38.98	37.48	9.99	36.69	56.24	50.14	47.68	43.25	50.12	36.87
19.	Cadmium as Cd	mg/kg	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)
20.	Copper as Cu	mg/kg	27.49	44.15	15.93	21.60	33.03	38.98	32.98	41.96	28.26	23.54	29.65	32.14	30.14	18.65	30.65
21.	Organic Carbon	%	0.61	0.68	0.67	0.53	0.75	0.63	0.57	0.54	0.52	0.57	0.50	0.61	0.63	0.51	0.60
22.	SAR Value	-	0.56	0.54	0.75	0.99	0.74	0.64	0.56	0.72	0.58	0.64	0.57	0.57	0.69	0.99	0.76

Source: Soil Quality Analysis results from JMEPL



**TABLE - 3.20 (b)**  
**Soil Quality Analysis Results**  
**Study Period – Summer Season (March to May, 2024)**

S. No	Parameters	Unit	Village Premnagar (Block-I)	Mine Site Bara (Block III)	Singatwara	Kalipipli	Kanpur	Kevra Khurd	Nangela	Dewala	Moridungri	Mochia Mine	Balaria Mine (Block-I)	BaroiMine (Block-I)	Zawar Mala Mine (Block-I)	Village Jawar	CPP
1.	pH (at 25°C) (1:2.5 soil water sus.)	-	7.44	7.67	7.99	7.86	8.02	7.32	7.17	8.03	7.27	7.36	7.55	7.69	7.78	7.84	7.96
2.	Conductivity (1:2 soil water sus)	mS/cm	0.65	0.55	0.67	0.46	0.54	0.52	0.41	0.49	0.52	0.63	0.60	0.67	0.70	0.53	0.60
3.	Soil Texture	-	Sandy Loam	Sandy Loam	Sandy Clay Loam	Sandy Loam	Sandy Clay Loam	Sandy Clay Loam	Sandy Loam	Sandy Clay Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Clay Loam
a.	Sand	%	55	52	64	60	63	60	58	64	62	56	58	52	52	59	63
b.	Silt	%	33	34	15	28	14	13	30	12	27	31	30	33	35	30	15
c.	Clay	%	12	14	21	12	23	27	12	24	11	13	12	15	13	11	22
4.	Colour	-	Blackish Brown	Blackish Brown	Brownish black	Blackish Brown	Blackish Brown	Blackish Brown	Brownish	Blackish Brown	Brownish	Blackish Brown	Brownish	Brownish	Blackish Brown	Blackish Brown	Blackish Brown
5.	Water holding capacity	%	38.54	36.60	46.34	38.12	46.90	44.26	39.57	45.90	33.06	34.65	38.98	33.12	39.87	40.23	47.95
6.	Bulk density	gm/cc	1.40	1.37	1.44	1.39	1.42	1.46	1.39	1.45	1.47	1.38	1.42	1.43	1.37	1.40	1.38
7.	Chloride	mg/kg	234.32	214.37	230.83	234.32	153.22	262.88	225.04	169.52	174.07	213.65	205.78	198.65	223.54	216.65	189.65
8.	Calcium	mg/kg	1766.07	1736.81	1050.77	1766.07	1226.50	1123.72	2070.56	1021.81	1839.19	1568.24	1498.57	1726.59	1657.89	1235.54	1365.45



S. No	Parameters	Unit	Village Premnagar (Block-I)	Mine Site Bara (Block III)	Singatwara	Kalipipli	Kanpur	Kevra Khurd	Nangela	Dewala	Moridungri	Mochia Mine	Balaria Mine (Block-I)	BaroiMine (Block-I)	Zawar Mala Mine (Block-I)	Village Jawar	CPP
9.	Sodium	mg/kg	93.47	89.76	103.47	93.47	112.79	94.24	101.48	105.66	100.98	102.65	89.98	96.78	113.54	145.62	119.65
10.	Potassium	kg/hectare	278.67	269.92	179.35	278.67	195.24	162.85	154.52	109.07	104.06	256.65	245.89	215.98	233.04	203.65	189.65
11.	Organic Matter	%	1.05	1.18	1.15	1.05	1.29	1.08	0.98	0.93	0.89	0.98	0.86	1.06	1.08	0.88	1.03
12.	Magnesium as Mg	mg/kg	227.34	209.75	235.76	227.34	311.53	327.90	276.00	364.05	276.16	236.54	245.87	289.65	247.58	244.62	305.62
13.	Available Nitrogen as N	kg/hectare	184.24	218.07	211.62	168.07	249.42	213.18	229.38	226.25	164.46	205.64	198.54	213.87	187.54	189.65	213.87
14.	Available Phosphorus	kg/hectare	43.75	54.60	46.79	43.75	43.63	38.34	39.74	42.20	31.73	46.65	41.15	38.87	36.78	45.21	46.98
15.	Zinc as Zn	mg/kg	84.28	88.82	57.33	84.28	49.84	59.87	54.87	38.96	49.00	85.15	76.54	90.18	86.87	59.98	42.32
16.	Manganese as Mn	mg/kg	481.76	406.88	346.84	481.76	285.17	346.83	348.33	279.82	287.56	302.45	415.65	336.87	406.58	306.85	298.87
17.	Chromium as Cr	mg/kg	8.49	7.36	8.43	8.49	12.37	13.48	8.48	6.48	5.27	9.56	10.14	8.74	7.65	12.32	14.25
18.	Lead as Pb	mg/kg	42.96	54.46	31.36	42.96	37.09	38.98	37.48	9.99	36.69	56.24	50.14	47.68	43.25	50.12	36.87
19.	Cadmium as Cd	mg/kg	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)
20.	Copper as Cu	mg/kg	27.49	44.15	15.93	21.60	33.03	38.98	32.98	41.96	28.26	23.54	29.65	32.14	30.14	18.65	30.65





S. No	Parameters	Unit	Village Premnagar (Block-I)	Mine Site Bara (Block III)	Singatwara	Kalipipli	Kanpur	Kevra Khurd	Nangela	Dewala	Moridungri	Mochia Mine	Balaria Mine (Block-I)	BaroiMine (Block-I)	Zawar Mala Mine (Block-I)	Village Jawar	CPP
21.	Organic Carbon	%	0.61	0.68	0.67	0.53	0.75	0.63	0.57	0.54	0.52	0.57	0.50	0.61	0.63	0.51	0.60
22.	SAR Value	-	0.56	0.54	0.75	0.99	0.74	0.64	0.56	0.72	0.58	0.64	0.57	0.57	0.69	0.99	0.76

Source: Soil Quality Analysis results from JMEPL



**Table - 3.21**  
**Standard Soil Classification**

S. No.	Parameters	Classification
1.	pH	<p>&lt;4.5 extremely acidic</p> <p>4.51 – 5.0 very strong acidic</p> <p>5.01 – 5.5 strongly acidic</p> <p>5.51-6.0 moderately acidic</p> <p>6.1 – 6.5 slightly acidic</p> <p>6.51-7.30 Neutral</p> <p>7.31-7.8 slightly alkaline</p> <p>7.81-8.5 moderately alkaline</p> <p>8.51 – 9.0 strongly alkaline</p> <p>&gt;9.0 Very strongly alkaline</p>
2.	Salinity Electrical Conductivity (mho/cm)	<p>Up to 1.0 average</p> <p>1-2 harmful to germination</p> <p>2-3 harmful to crops</p>
3.	Nitrogen (kg/ha)	<p>Up to 50 very less</p> <p>51-100 less</p> <p>110-150 good</p> <p>151-300 better</p> <p>&gt;300 sufficient</p>
4.	Phosphorus (kg/ha)	<p>Up to 15 very less</p> <p>15 – 30 less</p> <p>31-50 medium</p> <p>51-65 on average sufficient</p> <p>66-80 sufficient</p> <p>&gt;80 more than sufficient</p>
5.	Potassium (kg/ha)	<p>0-120 very less</p> <p>120-180 less</p> <p>180-240 medium</p> <p>241-300 average</p> <p>301-360 better</p> <p>&gt;360 more than sufficient</p>

**Source:** Indian Agricultural Research Institute Handbook.

### 3.13.1 INTERPRETATION OF SOIL QUALITY RESULTS

#### a. Baseline Season: Summer Season (March to May, 2021)

The soil samples majorly exhibit blackish brown and brownish colour at all the sampled villages. The organic matter present in the soil observed to be appropriate (0.86% to 1.29 %) for the plant growth. The textures of the soil samples were Sandy Loam and Sandy clay loam at. All soil samples were



neutral in nature except for the soil in Village Dewala which is slightly alkaline in nature. The pH range from 7.17 to 8.03, which is an optimal range for most of the plants to thrive and grow Six essential nutrients required for an ideal plant growth are Nitrogen, Phosphorus, Potassium, Magnesium, Sulfur and calcium.

All the essential nutrients were observed to be present in a higher amount than the other micro nutrient and macro nutrient such as Nitrogen (151.62 to 249.42 kg/ha), Phosphorous (31.73 to 54.6 kg/ha), Potassium (104.06 to 278.67 kg/ha), Magnesium (209.75 to 364.05 mg/kg), Calcium (1021.81 to 2070.56 mg/kg). Higher calcium values in the soil sample is due to the presence of alkaline soil in nature within the area, thus would positively affect the plant growth. These results indicates that the soils quality within the study area is of a good quality and contains sufficient macronutrients which is vital for healthy plant growth.

#### **b. Baseline Season: Summer Season (March to May, 2024)**

The soil samples majorly exhibit blackish brown and brownish colour at all the sampled villages. The organic matter present in the soil observed to be appropriate (0.86% to 1.29 %) for the plant growth. The textures of the soil samples were Sandy Loam and Sandy clay loam at. All soil samples were neutral in nature except for the soil in Village Dewala which is slightly alkaline in nature. The pH range from 7.17 to 8.03, which is an optimal range for most of the plants to thrive and grow Six essential nutrients required for an ideal plant growth are Nitrogen, Phosphorus, Potassium, Magnesium, Sulfur and calcium.

All the essential nutrients were observed to be present in a higher amount than the other micro nutrient and macro nutrient such as Nitrogen (164.46 to 249.42 kg/ha), Phosphorous (31.73 to 54.6 kg/ha), Potassium (104.06 to 278.67 kg/ha), Magnesium (209.75 to 364.05 mg/kg), Calcium (1021.81 to 2070.56 mg/kg). Higher calcium values in the soil sample is due to the presence of alkaline soil in nature within the area, thus would positively affect the plant growth. These results indicates that the soils quality within the study area is of a good quality and contains sufficient macronutrients which is vital for healthy plant growth.

### **3.14 BIOLOGICAL ENVIRONMENT**

#### **3.14.1 INTRODUCTION**

Biological environment includes the Habitat (Place where the organism lives) and natural surroundings of all species (living organism species) of the particular area.

The biological study was undertaken as a part of the EIA study to understand the present status of ecosystem prevailing in the study area and to study the floristic and faunal diversity of the terrestrial and aquatic environment of the study area within the 10 km radius of the mine site. Studies on various aspects of ecosystem play an important role in identifying sensitive issues for under taking appropriate action to mitigate the impact, if required.



Some of the information was gathered from the local habitants. All the collected data were classified to interpret the impact of pollution on the flora and fauna of that region. Survey of the wild plants as well as cultivated crop plants was made and all the available information was recorded. Night survey was also conducted with the help of spotlight to record nocturnal animals, birds and reptiles.

Secondary data on flora and fauna, cropping patterns etc. were also collected from available literatures, internet, forest department and revenue department.

No existence of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Tiger / Elephant reserves (existing as well as proposed) within 10 km radius from Zawar Lead Zinc Underground Mine has been obtained from Deputy Conservator of Forest (Wildlife) Udaipur vide letter no. F.9(10) (10 km - 469) Survey/DCF/WL/2023-24/6405 dated 14.08.2023 and the same has been enclosed as **Annexure - 10 (a)** along with this Final EIA/EMP Report.

Seven Schedule - I species were found during the field survey. Wildlife conservation has been approved by CWLW vide letter no. F 11 (300)/CWLW/ 2022-23/174 dated 21.03.2023. The copy of the same along with Approved Wildlife Conservation Plan is enclosed as **Annexure 10 (b)** along with this Final EIA/EMP Report.

List of flora and Fauna observed in the study area 10 km radius from the boundary of the mine including the core zone is mentioned in the list below:

**Table - 3.22(a)**  
**Inventory of floral diversity in Core & Buffer zone of Mine site**  
**Based on Actual Sighting, based on inputs from locals and Perused from Secondary Data**  
**Habit: Tree (T), Shrub (S), Herb (H), Grass (G) and Climber (C)**

S. No	Scientific name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 8th Sep, 2021
<b>Tree Species</b>							
1.	<i>Acacia auriculiformis</i>	Australian Acacia	Leguminosae	T	-	+	LC
2.	<i>Acacia ferruginea</i>	Rusty Acacia	Leguminosae	T	+	+	VU
3.	<i>Acacia leucophloea</i>	White-bark Acacia	Leguminosae	T	+	+	LC
4.	<i>Acacia nilotica</i>	Babool	Leguminosae	T	+	+	LC
5.	<i>Aegle marmelos</i>	Wood Apple	Rutaceae	T	+	+	NT
6.	<i>Ailanthus excelsa</i>	Indian Tree of Heaven	Simaroubaceae	T	+	+	NA
7.	<i>Alangium salviifolium</i>	Sage-leaved Alangium	Alangiaceae	T	-	+	LC
8.	<i>Albizia lebbek*</i>	Siris Tree	Leguminosae	T	+	+	LC
9.	<i>Albizia odoratissima</i>	Ceylon Rosewood	Leguminosae	T	+	+	LC
10.	<i>Anogeissus latifolia</i>	Axle Wood Tree	Combretaceae	T	-	+	NA
11.	<i>Azadirachta indica*</i>	Neem	Meliaceae	T	+	+	LC
12.	<i>Bauhinia variegata*</i>	Orchid Tree	Leguminosae	T	-	+	LC



S. No	Scientific name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 8th Sep, 2021
13.	<i>Bombax ceiba</i> *	Red Silk Cotton	Malvaceae	T	+	+	LC
14.	<i>Boswellia serrata</i>	Indian Frankincense	Burseraceae	T	+	+	NA
15.	<i>Butea monosperma</i>	Flame of Forest	Leguminosae	T	+	+	LC
16.	<i>Cassia fistula</i>	Golden Shower	Leguminosae	T	+	+	LC
17.	<i>Cordia dichotoma</i>	Indian Cherry	Boraginaceae	T	+	+	LC
18.	<i>Cordia myxa</i>	Clammy Cherry	Boraginaceae	T	-	+	LC
19.	<i>Dalbergia lanceolaria</i> subsp. <i>paniculata</i>	Passi	Leguminosae	T	+	-	NA
20.	<i>Dalbergia sissoo</i> *	Indian Rosewood	Leguminosae	T	-	+	LC
21.	<i>Delonix regia</i>	Flame Tree	Leguminosae	T	-	+	LC
22.	<i>Dichrostachys cinerea</i>	Sickle Bush	Leguminosae	T	-	+	LC
23.	<i>Eucalyptus globules</i> *	Eucalyptus	Myrtaceae	T	+	+	LC
24.	<i>Euphorbia nivulia</i>	Leafy Milk Hedge	Euphorbiaceae	T	+	+	NA
25.	<i>Feronia elephantum</i>	Wood Apple	Rutaceae	T	+	+	NA
26.	<i>Ficus bengalensis</i>	Banyan Tree	Moraceae	T	+	+	NA
27.	<i>Ficus racemosa</i>	Cluster Fig	Moraceae	T	+	+	LC
28.	<i>Ficus religiosa</i>	Peepal Tree	Moraceae	T	+	+	NA
29.	<i>Garguga pinnata</i>	Grey Downy Balsam	Burseraceae	T	+	-	NA
30.	<i>Gmelina arborea</i> *	Gamhar	Verbenaceae	T	+	+	LC
31.	<i>Holarrhena pubescens</i>	Indrajao	Apocynaceae	T	+	+	LC
32.	<i>Holoptelea integrifolia</i>	Indian Elm	Ulmaceae	T	+	+	NA
33.	<i>Ixora parviflora</i> *	Small-flowered Ixora	Rubiaceae	T	-	+	NA
34.	<i>Jacaranda mimosifolia</i> *	Jacaranda	Leguminosae	T	-	+	VU
35.	<i>Kigelia pinnata</i>	Sausage Tree	Bignoniaceae	T	-	+	NA
36.	<i>Lannea coromandelica</i>	Indian Ash Tree	Anacardiaceae	T	+	+	LC
37.	<i>Leucaena leucocephala</i> *	White Babool	Leguminosae	T	+	+	CD
38.	<i>Madhuca longifolia</i> *	Indian Butter Tree	Sapotaceae	T	-	+	NA
39.	<i>Milusa tomentosa</i>	Hoom	Annonaceae	T	+	-	NA
40.	<i>Millingtonia hortensis</i>	Indian Cork Tree	Bignoniaceae	T	+	+	NA
41.	<i>Mitragyna parvifolia</i>	True Kadamba	Rubiaceae	T	+	+	NA
42.	<i>Moringa concanensis</i>	Konkan Moringa	Moringaceae	T	+	-	NA
43.	<i>Peltophorum pterocarpum</i>	Copperpod	Leguminosae	T	+	-	NA
44.	<i>Plumeria alba</i>	Pagoda Tree	Apocynaceae	T	+	-	NA



S. No	Scientific name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 8th Sep, 2021
45.	<i>Pongamia glabra</i>	Pongam Tree	Leguminosae	T	+	+	LC
46.	<i>Prosopis juliflora</i>	Mesquite	Leguminosae	T	+	+	NA
47.	<i>Ricinus communis</i>	Castor	Euphorbiaceae	T	+	+	NA
48.	<i>Saraca indica*</i>	Seeta Ashok	Leguminosae	T	+	-	LC
49.	<i>Schrebera swietenoides</i>	Weaver's Beam Tree	Oleaceae	T	-	+	NA
50.	<i>Senna siamea</i>	Siamese Cassia	Leguminosae	T	+	+	LC
51.	<i>Syzygium cumini*</i>	Java Plum	Myrtaceae	T	+	+	LC
52.	<i>Tectona grandis*</i>	Teak	Verbenaceae	T	-	+	NA
53.	<i>Terminalia bellirica</i>	Belliric Myrobalan	Combretaceae	T	-	+	LC
54.	<i>Thevetia neriifolia</i>	Mexican oleander	Apocynaceae	T	+	+	NA
55.	<i>Toona ciliata*</i>	Toon Tree	Meliaceae	T	-	+	LC
56.	<i>Vitex negundo</i>	Chaste Tree	Verbenaceae	T	+	+	LC
57.	<i>Wrightia tinctoria</i>	Sweet Indrajao	Apocynaceae	T	+	+	NA
<b>Shrub Species</b>							
1.	<i>Abutilon indicum</i>	Indian Mallow	Malvaceae	S	+	+	NA
2.	<i>Acanthocereus tetragonus</i>	Fairy Castle Cactus	Cactaceae	S	+	+	LC
3.	<i>Atalantia monophylla</i>	Climbing Atalantia	Rutaceae	S	-	+	NA
4.	<i>Bougainvillea spectabilis*</i>	Bougainvillea	Nyctaginaceae	S	+	+	NA
5.	<i>Breynia retusa</i>	Cup-Saucer Plant	Phyllanthaceae	S	-	+	LC
6.	<i>Caesalpinia bonduc</i>	Fever Nut	Leguminosae	S	-	+	LC
7.	<i>Caesalpinia pulcherrima</i>	Peacock Flower	Leguminosae	S	-	+	LC
8.	<i>Calotropis gigantea</i>	Crown Flower	Apocynaceae	S	+	+	NA
9.	<i>Capparis decidua</i>	Bare Caper	Capparidaceae	S	+	+	LC
10.	<i>Carissa spinarum</i>	Wild Karanda	Apocynaceae	S	+	-	LC
11.	<i>Cissus quadrangularis</i>	Devil's Backbone	Vitaceae	S	-	+	NA
12.	<i>Cocculus hirsutus</i>	Broom Creeper	Menispermaceae	S	-	+	NA
13.	<i>Crotalaria pusilla</i>	Small Rattlepod	Leguminosae	S	+	-	NA
14.	<i>Datura metel</i>	Downy Thorn Apple	Solanaceae	S	+	+	NA
15.	<i>Dioscorea bulbifera</i>	Air Yam	Dioscoreaceae	S	+	+	NA
16.	<i>Dodonaea viscosa</i>	Hop Bush	Celastraceae	S	-	+	LC
17.	<i>Euphorbia neriifolia</i>	Indian Spurge Tree	Euphorbiaceae	S	+	+	LC
18.	<i>Flueggea leucopyrus</i>	Indian Snowberry	Phyllanthaceae	S	+	+	LC



S. No	Scientific name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 8th Sep, 2021
19.	<i>Grewia abutifolia</i>	Mallow-leaved Crossberry	Malvaceae	S	+	+	NA
20.	<i>Grewia hirsuta</i>	Huktapata	Malvaceae	S	-	+	NA
21.	<i>Helicteres isora</i>	Screw Tree	Malvaceae	S	-	+	NA
22.	<i>Hemidesmus indicus</i>	Indian Sarsaparilla	Apocynaceae	S	+	-	NA
23.	<i>Hibiscus micranthus*</i>	Tiny Flower Hibiscus	Malvaceae	S	-	+	NA
24.	<i>Indigofera tinctoria</i>	True Indigo	Leguminosae	S	-	+	NA
25.	<i>Ipomoea aquatica</i>	Water Morning Glory	Convolvulaceae	S	-	+	LC
26.	<i>Ipomoea carnea</i>	Bush Morning Glory	Convolvulaceae	S	+	+	NA
27.	<i>Ipomoea violacea</i>	Sea Moonflower	Convolvulaceae	S	+	+	NA
28.	<i>Jatropha gossypifolia</i>	Bellyache Bush	Euphorbiaceae	S	+	+	LC
29.	<i>Justicia adhatoda</i>	Malabar Nut	Acanthaceae	S	+	+	LC
30.	<i>Lablab purpureus</i>	Egyptian Bean	Leguminosae	S	+	+	NA
31.	<i>Lantana camara</i>	Lantana	Verbenaceae	S	+	+	NA
32.	<i>Mimosa hamata</i>	Sickle Bush	Leguminosae	S	-	+	NA
33.	<i>Nerium oleander*</i>	Oleander	Apocynaceae	S	+	+	LC
34.	<i>Opuntia elatior</i>	Prickly Pear	Cactaceae	S	+	-	LC
35.	<i>Passiflora foetida*</i>	Stinking Passionflower	Passifloraceae	S	+	-	NA
36.	<i>Pergularia daemia</i>	Hair Knot Plant	Apocynaceae	S	+	-	LC
37.	<i>Senna auriculata</i>	Tanner's Cassia	Leguminosae	S	+	+	NA
38.	<i>Tecoma stans*</i>	Yellow Bell	Bignoniaceae	S	+	-	LC
39.	<i>Trichosanthes cucumerina</i>	Snake Gourd	Cucurbitaceae	S	+	-	NA
<b>Herb Species</b>							
1.	<i>Abrus pricatorius</i>	Coral Bead Vine	Fabaceae	S	-	+	NA
2.	<i>Acalypha lanceolata</i>	Toothed-bract Indian Copperleaf	Euphorbiaceae	H	-	+	NA
3.	<i>Acanthospermum hispidum</i>	Bristly Starbur	Asteraceae	H	+	+	NA
4.	<i>Adiantum aleuticum</i>	Western Maidenhair Fern	Pteridaceae	H	-	+	NA
5.	<i>Aerva lanata</i>	Mountain Knot Grass	Amaranthaceae	H	-	+	NA
6.	<i>Ageratum conyzoides</i>	Goatweed	Asteraceae	H	+	+	LC
7.	<i>Allium sativum</i>	Garlic	Alliaceae	H	+	+	
8.	<i>Alternanthera sessilis</i>	Sessile Joyweed	Amaranthaceae	H	-	+	LC





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9.	<i>Alysicarpus hamosus</i>	Round-leaf Alyce Clover	Leguminosae	H	-	+	NA
10.	<i>Amaranthus albus</i>	Common Tumbleweed	Amaranthaceae	H	+	+	NA
11.	<i>Amaranthus spinosus</i>	Prickly Amaranth	Amaranthaceae	H	-	+	NA
12.	<i>Amaranthus viridis</i>	Green Amaranth	Amaranthaceae	H	+	+	NA
13.	<i>Amaranthus wrightii</i>	Wright's Amaranth	Amaranthaceae	H	+	-	NA
14.	<i>Andrographis paniculata</i>	Creast	Acanthaceae	H	+	+	NA
15.	<i>Asparagus racemosus</i>	Asparagus	Asparagaceae	S	+	+	NA
16.	<i>Barleria acanthoides</i>	Philippine Violet	Poaceae	H	+	+	NA
17.	<i>Barleria cristata</i>	Porcupine Flower	Acanthaceae	H	-	+	NA
18.	<i>Bidens biternata</i>	Yellow-flowered Blackjack	Asteraceae	H	-	+	NA
19.	<i>Bidens pilosa</i>	Spanish Needle	Asteraceae	H	+	+	NA
20.	<i>Blepharis maderaspatensis</i>	Madras Blepharis	Acanthaceae	H	-	+	NA
21.	<i>Blumea lacera</i>	Lettuce-leaf Blumea	Asteraceae	H	+	-	DD
22.	<i>Boerhavia diffusa</i>	Red Spiderling	Nyctaginaceae	H	+	+	NA
23.	<i>Borreria articularis</i>	Jointed Buttonweed	Rubiaceae	H	+	+	NA
24.	<i>Catharanthus pusillus</i>	Tiny Periwinkle	Apocynaceae	H	+	+	NA
25.	<i>Celosia argentea</i>	Cock's Comb	Amaranthaceae	H	+	+	LC
26.	<i>Cleome gynandra</i>	Wild Spiderflower	Cleomaceae	H	+	+	NA
27.	<i>Commelina benghalensis</i>	Benghal Dayflower	Commelinaceae	H	+	+	LC
28.	<i>Commelina diffusa</i>	Creeping Dayflower	Commelinaceae	H	-	+	LC
29.	<i>Commelina maculate</i>	Spotted Dayflower	Commelinaceae	H	+	+	NA
30.	<i>Cosmos sulphureus*</i>	Yellow Cosmos	Asteraceae	H	+	+	NA
31.	<i>Crotalaria medicaginea</i>	Medick Rattlepod	Leguminosae	H	+	+	NA
32.	<i>Crotalaria scabrella</i>	Cherukonna	Leguminosae	H	-	+	LC
33.	<i>Croton bonplandianus*</i>	Bonpland's croton	Euphorbiaceae	H	-	+	NA
34.	<i>Cynarospermum asperum</i>	Hill Blepharis	Acanthaceae	H	-	+	NA
35.	<i>Cyperus dubius</i>	Soft Sedge	Cyperaceae	H	-	+	LC
36.	<i>Cyperus esculentus</i>	Common Nut Sedge	Cyperaceae	H	+	+	LC
37.	<i>Cyperus squarrosus</i>	Bearded Flatsedge	Cyperaceae	H	+	+	LC



S. No	Scientific name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 8th Sep, 2021
38.	<i>Desmodium triflorum</i>	Creeping Tick Trefoil	Leguminosae	H	+	-	LC
39.	<i>Digera muricata</i>	False Amaranth	Amaranthaceae	H	-	+	NA
40.	<i>Echinops echinatus</i>	Indian Globe Thistle	Asteraceae	H	+	+	NA
41.	<i>Eclipta prostrata</i>	False Daisy	Asteraceae	H	-	+	LC
42.	<i>Euphorbia heterophylla</i>	Wild Poinsettia	Euphorbiaceae	H	-	+	NA
43.	<i>Euphorbia hirta</i>	Asthma Weed	Euphorbiaceae	H	+	+	NA
44.	<i>Evolvulus alsinoides</i>	Dwarf Morning Glory	Convolvulaceae	H	+	+	NA
45.	<i>Fagonia cretica</i>	Virgin's Mantle	Zygophyllaceae	H	+	+	NA
46.	<i>Glossocardia bosvallea</i>	Patthar Suva	Asteraceae	H	-	+	NA
47.	<i>Gomphrena celosioides</i>	Cockscomb Gomphrena	Amaranthaceae	H	-	+	NA
48.	<i>Gomphrena globosa</i>	Globe Amaranth	Amaranthaceae	H	+	-	NA
49.	<i>Hyptis suaveolens</i>	American Mint	Lamiaceae	H	+	+	NA
50.	<i>Impatiens balsamina</i>	Balsam	Balsaminaceae	H	+	-	NA
51.	<i>Indigofera cordifolia</i>	Heart-leaf Indigo	Leguminosae	H	+	-	NA
52.	<i>Ipomoea rubriflora</i>	Redstar	Convolvulaceae	H	-	+	NA
53.	<i>Justicia diffusa</i>	Spreading Justicia	Acanthaceae	H	+	+	NA
54.	<i>Justicia glauca</i>	Glaucus Justicia	Acanthaceae	H	+	+	NA
55.	<i>Justicia japonica</i>	Common small Justicia	Acanthaceae	H	+	+	NA
56.	<i>Lepidagathis cristata</i>	Crested Lepidagathis	Acanthaceae	H	-	+	NA
57.	<i>Leucas aspera</i>	Common Leucas	Lamiaceae	H	+	+	NA
58.	<i>Leucas lamiifolia</i>	Mint-leaved Leucas	Lamiaceae	H	-	+	NA
59.	<i>Malvastrum coromandelianum</i>	False Mallow	Malvaceae	H	-	+	NA
60.	<i>Mimosa pudica</i>	Touch-me-not	Leguminosae	H	-	+	LC
61.	<i>Ocimum americanum*</i>	Hoary Basil	Lamiaceae	H		+	NA
62.	<i>Ocimum gratissimum*</i>	Wild Basil	Lamiaceae	H	+	+	NA
63.	<i>Ocimum tenuiflorum*</i>	Holy Basil	Lamiaceae	H	+	+	NA
64.	<i>Oldenlandia corymbosa</i>	Diamond Flower	Rubiaceae	H	+	+	LC
65.	<i>Oldenlandia umbellata</i>	Chay Root	Rubiaceae	H	-	+	NA
66.	<i>Oxalis corniculata</i>	Creeping Wood Sorrel	Oxalidaceae	H	+	-	NA
67.	<i>Parthenium hysterophorus</i>	Congress Grass	Asteraceae	H	+	+	NA



S. No	Scientific name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 8th Sep, 2021
68.	<i>Pavonia zeylanica</i>	Ceylon Swamp Mallow	Malvaceae	H	-	+	NA
69.	<i>Pedaliium murex</i>	Crow Thorn	Pedaliaceae	H	+	+	NA
70.	<i>Phyllanthus niruri</i>	Gulf Leaf Flower	Phyllanthaceae	H	+	+	NA
71.	<i>Physalis minimaculata</i>	Ground Cherry	Solanaceae	H	+	+	VU
72.	<i>Senna alata</i>	Candle Bush	Leguminosae	H	-	+	LC
73.	<i>Senna insularis</i>	-	Leguminosae	H	+	+	NA
74.	<i>Senna occidentalis</i>	Coffee Senna	Leguminosae	H	+	-	LC
75.	<i>Senna tora</i>	Stinking Senna	Leguminosae	H	+	+	NA
76.	<i>Sida acuta</i>	Common Wireweed	Malvaceae	H	+	+	NA
77.	<i>Sida cordifolia</i>	Heart-leaf Sida	Malvaceae	H	-	+	NA
78.	<i>Sida rhombifolia</i>	Jellyleaf	Malvaceae	H	+	+	NA
79.	<i>Solanum nigrum</i>	Black Nightshade	Solanaceae	H	-	+	NA
80.	<i>Solanum xanthocarpum</i>	Thorny Nightshade	Solanaceae	H	-	+	NA
81.	<i>Spermacoce neohispida</i>	Shaggy Button Weed	Rubiaceae	H	+	+	NA
82.	<i>Spermacoce verticillata</i>	Shrubby False Buttonweed	Rubiaceae	H	+	+	NA
83.	<i>Sphaeranthus indicus</i>	Globe Thistle	Asteraceae	H	+	+	LC
84.	<i>Tephrosia purpurea</i>	Wild Indigo	Leguminosae	H	+	+	EN
85.	<i>Tribulus terrestris</i>	Puncture Vine	Zygophyllaceae	H	+	+	LC
86.	<i>Trichodesma indicum</i>	Indian Borage	Boraginaceae	H	+	-	NA
87.	<i>Tridax procumbens</i>	Mexican Daisy	Asteraceae	H	+	+	NA
88.	<i>Trigonella corniculata</i>	Wild Trefoil	Leguminosae	H	+	+	NA
89.	<i>Triumfetta cordifolia</i>	Burbark	Malvaceae	H	+	+	NA
90.	<i>Triumfetta rhomboidea</i>	Burr Bush	Malvaceae	H	+	+	NA
91.	<i>Withania somnifera</i>	Winter Cherry	Solanaceae	H	-	+	DD
<b>Climber Species</b>							
1.	NIL	NIL	NIL	NIL	NIL	NIL	
<b>Grass Species</b>							
1.	<i>Aristida adscensionis</i>	Common Needle Grass	Poaceae	H	+	+	NA
2.	<i>Axonopus compressus</i>	Summer Grass	Poaceae	H	-	+	NA
3.	<i>Bothriochloa bladhii</i>	Australian Bluestem	Poaceae	H	+	-	NA
4.	<i>Brachiaria reptans</i>	Running Grass	Poaceae	H	+	+	LC
5.	<i>Cenchrus ciliaris</i>	Buffel Grass	Poaceae	H	+	+	LC



S. No	Scientific name	Local name / English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 8th Sep, 2021
6.	<i>Cymbopogon martini</i>	Palmarosa Grass	Poaceae	H	-	+	NA
7.	<i>Cynodon dactylon</i>	Bermuda Grass	Poaceae	H	+	+	NA
8.	<i>Dactyloctenium aegyptium</i>	Crowfoot Grass	Poaceae	H	+	+	NA
9.	<i>Dichanthium annulatum</i>	Sheda Grass	Poaceae	H	-	+	NA
10.	<i>Digitaria stricta</i>	Hairy crabgrass	Poaceae	H	-	+	NA
11.	<i>Enteropogon dolichostachyus</i>	Long-spike Finger Grass	Poaceae	H	-	+	NA
12.	<i>Eragrostiella bifaria</i>	Double-row Lovegrass	Poaceae	H	+	+	NA
13.	<i>Eragrostis amabilis</i>	Chinese Lovegrass	Poaceae	H	+	+	NA
14.	<i>Eragrostis japonica</i>	Lovegrass	Poaceae	H		+	LC
15.	<i>Heteropogon contortus</i>	Black Speargrass	Poaceae	H	+	+	NA
16.	<i>Imperata cylindrica</i>	Cogon Grass	Poaceae	H	-	+	LC
17.	<i>Melinis repens</i>	Rose Natal Grass	Poaceae	H	-	+	NA
18.	<i>Paspalum distichum</i>	Knot Grass	Poaceae	H	+	+	LC
19.	<i>Themeda quadrivalvis</i>	Grader Grass	Poaceae	H	+	+	NA
20.	<i>Themeda triandra</i>	Kangaroo Grass	Poaceae	H	-	+	NA

(+) Shows: Presence of the species and (-) Shows: Absence of the species

#### Status of RET Species

During Field Survey, no endemic, rare, endangered and threatened species of flora are recorded under threatened status in the study area.

Table - 3.22 (b)

#### Inventory of Agro Biodiversity of the Core & Buffer zone of Mine site

Habit: Tree (T), Shrub (S), Herb (H), Grass (G) and Climber (C)

S. No.	Scientific name	Local name/ English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 8th Sep, 2021
1.	<i>Arachis hypogaea*</i>	Ground nut	Leguminosae	H	+	+	NA
2.	<i>Argemone Mexicana*</i>	Mexican Poppy	Papaveraceae	H	+	+	NA



S. No.	Scientific name	Local name/ English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 8th Sep, 2021
3.	<i>Bambusa arundinaceae</i> *	Bamboo	Poaceae	H	-	+	NA
4.	<i>Brassica oleraceae</i> *	Cabbage	Brassicaceae	H	+	+	NA
5.	<i>Carica papaya</i> *	Papaya	Caricaceae	T	+	+	DD
6.	<i>Citrus limon</i> *	Lemon	Rutaceae	S	-	+	LC
7.	<i>Citrus media</i> *	Citron	Rutaceae	S	-	+	NA
8.	<i>Clitoria ternatea</i> *	Cowpea	Leguminosae	S	+	+	NA
9.	<i>Colocasia esculenta</i> *	Taro	Arecaceae	H	+	+	NA
10.	<i>Corchorus capsularis</i> *	White Jute	Malvaceae	H	-	+	NA
11.	<i>Cucumis melo</i> *	Muskmelon	Cucurbitaceae	S	+	+	NA
12.	<i>Daucus carota</i> *	Carrot	Apiaceae	H	+	-	LC
13.	<i>Dendrocalamus strictus</i> *	Calcutta Bamboo	Poaceae	H	+	+	NA
14.	<i>Gossypium hirsutum</i> *	Mexican Cotton	Malvaceae	S	-	+	VU
15.	<i>Indigofera tinctoria</i> *	True Indigo	Leguminosae	S	-	+	NA
16.	<i>Luffa acutangula</i> *	Wild Ridge Gourd	Cucurbitaceae	S	-	+	NA
17.	<i>Lycopersicon esculentum</i> *	Tomato	Solanaceae	H	+	+	NA
18.	<i>Mangifera indica</i> *	Mango	Anacardiaceae	T	+	+	DD
19.	<i>Momordica charantia</i> *	Bittergourd	Cucurbitaceae	S	+	-	NA
20.	<i>Momordica dioica</i> *	Wild Buttergourd	Cucurbitaceae	S	+	+	NA
21.	<i>Musa x paradisiaca</i> *	Banana	Musaceae	H	+	-	LC
22.	<i>Oryza sativa</i> *	Rice	Poaceae	H	+	+	LC
23.	<i>Pennisetum glaucum</i> *	Bajra/Pearl Millet	Poaceae	H	+	+	LC
24.	<i>Phoenix sylvestris</i> *	Date Palm	Arecaceae	T	+	+	NA
25.	<i>Phyllanthus emblica</i> *	Indian Gooseberry	Euphorbiaceae	T	+	-	LC
26.	<i>Pithecellobium dulce</i> *	Sweet Tamarind	Leguminosae	T	+	+	LC
27.	<i>Psidium guajava</i> *	Guava	Myrtaceae	T	+	+	LC
28.	<i>Raphanus sativus</i> *	Radish	Brassicaceae	H	+	-	NA
29.	<i>Saccharum officinarum</i> *	Sugarcane	Poaceae	H	+	+	NA
30.	<i>Solanum melongena</i> *	Brinjal	Solanaceae	H	+	+	NA
31.	<i>Solanum tuberosum</i> *	Potato	Solanaceae	H	+	-	NA
32.	<i>Sorghum bicolor</i> *	Jowar	Poaceae	H	+	+	LC
33.	<i>Tamarindus indica</i> *	Tamarind	Leguminosae	T	+	+	LC
34.	<i>Trichosanthes cucumerina</i> *	Snake Gourd	Cucurbitaceae	S	+	-	NA



S. No.	Scientific name	Local name/ English Name	Family	Habit	Core Zone	Buffer Zone	IUCN conservation status as on 8th Sep, 2021
35.	<i>Trigonella foenumgraecum*</i>	Fenugreek	Leguminosae	H	+	+	NA
36.	<i>Triticum aestivum*</i>	Wheat	Poaceae	H	+	+	DD
37.	<i>Zea mays*</i>	Corn	Poaceae	H	+	+	LC

Source: Primary site survey and secondary data from previous EIA/EMP report of Zawar Mines

(+) Shows: Presence of the species and (-) Shows: Absence of the species

LC: Least Concern, NA: Not available, NT: Near Threatened, VU: Vulnerable, DD: Data Deficient

\* Planted Species

Table No. - 3.23

Inventory of faunal diversity in Core & Buffer zone of Mine site and CPP

Based on Actual Sighting, based on inputs from locals and Perused from Secondary Data

S. No.	Scientific name	Common name/ English Name	Conservation status according to IWPA- 1972	IUCN conservation status as on 8 <sup>th</sup> Sep, 2021
<b>Mammalian Diversity</b>				
1.	<i>Bandicota bengalensis</i>	Lesser bandicoot rat	V	LC
2.	<i>Boselaphus tragocamelus</i>	Nilgai	III	LC
3.	<i>Canis aureus</i>	Golden Jackal	II (Part II)	LC
4.	<i>Funambulus pennantii</i>	Five-striped Palm Squirrel	IV	LC
5.	<i>Herpestes edwardsii</i>	Indian Grey Mongoose	II (Part II)	LC
6.	<i>Hyaena hyaena</i>	Striped Hyaena	III	NT
7.	<i>Hystrix indica</i>	Indian Crested Porcupine	IV	LC
8.	<i>Lepus nigricollis</i>	Indian Hare	IV	LC
9.	<i>Manis crassicaudata</i>	Indian Pangolin	I (Part I)	EN
10.	<i>Panthera pardus</i>	Leopard	I (Part I)	CR
11.	<i>Paradoxurus hermaphroditus</i>	Common Palm Civet	II (Part II)	LC
12.	<i>Pteropus giganteus</i>	Indian Flying Fox	IV	LC
13.	<i>Rattus rattus</i>	House Rat	V	LC
14.	<i>Rusa unicolor</i>	Sambar Deer	III	VU
15.	<i>Semnopithecus entellus</i>	Gray Langur	II (Part I)	NT
16.	<i>Sus scrofa</i>	Wild Boar	III	LC
17.	<i>Tatera indica</i>	Indian Gerbil	Not listed	LC
18.	<i>Vulpes bengalensis</i>	Bengal Fox	II (Part II)	LC
<b>Reptilian Diversity</b>				
1.	<i>Boiga trigonata</i>	Common Cat Snake	Not listed	LC
2.	<i>Bungarus caeruleus</i>	Common Krait	Not listed	NA



S. No.	Scientific name	Common name/ English Name	Conservation status according to IWPA- 1972	IUCN conservation status as on 8 <sup>th</sup> Sep, 2021
3.	<i>Calotes versicolor</i>	Oriental garden lizard.	Not listed	NA
4.	<i>Chamaeleo zeylanicus</i>	Indian Chameleon	II (Part II)	LC
5.	<i>Echis carinatus</i>	Saw Scaled Viper	II (Part II)	NA
6.	<i>Lycodon aulicus</i>	Indian wolf Snake	Not listed	NA
7.	<i>Lycodon striatus</i>	Barred wolf Snake	Not listed	NA
8.	<i>Naja Naja</i>	Spectacled Cobra	II (Part II)	VU
9.	<i>Sitana spinaecephalus</i>	Fan Throated Lizard	Not listed	NA
10.	<i>Varanus bengalensis</i>	Bengal monitor Lizard	I (Part II)	NT
<b>Amphibian Diversity</b>				
1.	<i>Duttaphrynus melanostictus</i>	Common Indian toad	IV	LC
2.	<i>Duttaphrynus stomaticus</i>	Indian marbled toad	IV	LC
3.	<i>Euphlyctis cyanophlyctis</i>	Common Skittering frog	IV	LC
4.	<i>Hoplobatrachus tigerinus</i>	Indian Bullfrog	IV	LC
5.	<i>Microhyla ornata</i>	Ant Frog	IV	LC
6.	<i>Polypedates maculatus</i>	Chunam tree frog	IV	LC
7.	<i>Sphaerotheca breviceps</i>	Burrowing Frog	IV	LC
<b>Butterfly and Arthropod Diversity</b>				
1.	<i>Graphium agamemnon</i>	Tailed Jay	Not listed	NA
2.	<i>Hebomoia glaucippe</i>	Great Orange-tip	Not listed	NA
3.	<i>Junonia almana</i>	Peacock Pansy	Not listed	LC
4.	<i>Junonia atlites</i>	Grey Pansy	Not listed	NA
5.	<i>Neptis hylas</i>	Common Sailor	Not listed	NA
6.	<i>Pachliopta hector</i>	Crimson Rose	I (Part IV)	LC
7.	<i>Papilio demoleus</i>	Lime Swallowtail	Not listed	NA
8.	<i>Papilio polymnestor</i>	Blue Mormon	Not listed	NA
9.	<i>Parantica aglea</i>	Glassy Tiger	Not listed	NA
10.	<i>Phalanta phalantha</i>	Common Leopard	Not listed	LC

Source: Primary site survey and secondary data from previous EIA/EMP report of Zawar Mines

LC: Least Concern, NA: Not available, NT: Near Threatened, VU: Vulnerable, DD: Data Deficient

### Analysis of Fauna

- Seven schedule - I species (02 species of mammals, 01 species of butterflies, 01 species of reptiles and 03 avifaunal species) were recorded in the study area during field survey which comes in (IWPA) Indian Wildlife Protection Act, 1972.





Table No. - 3.24

**Inventory of Avifaunal (Birds) diversity in Core & Buffer zone of Mine site and CPP  
Based on Actual Sighting, based on inputs from locals and Perused from Secondary Data**

S. No.	Scientific Name	Common Name/ English Name	Conservation status according to IWPA- 1972	IUCN conservation status as on dated: 8th Sep, 2021
1.	<i>Accipiter badius</i>	Shikra	IV	LC
2.	<i>Acridotheres tristis</i>	Common Myna	IV	LC
3.	<i>Aegypius monachus</i>	Cinereous Vulture	IV	NT
4.	<i>Alcedo atthis</i>	Common Kingfisher	IV	LC
5.	<i>Anas crecca</i>	Common Teal	IV	LC
6.	<i>Anhinga melanogaster</i>	Oriental Darter	IV	NT
7.	<i>Apus nipalensis</i>	House Swift	IV	LC
8.	<i>Aquila rapax</i>	Tawny eagle	IV	VU
9.	<i>Ardea intermedia</i>	Little Egret	IV	LC
10.	<i>Ardeola grayii</i>	Indian Pond-heron	IV	LC
11.	<i>Argya caudata</i>	Common Babbler	IV	LC
12.	<i>Athene brama</i>	Spotted owlet	IV	LC
13.	<i>Bubo coromandus</i>	Dusky Eagle-owl	IV	LC
14.	<i>Bubulcus ibis</i>	Cattle Egret	IV	LC
15.	<i>Caprimulgus asiaticus</i>	Indian Nightjar	IV	LC
16.	<i>Caprimulgus indicus</i>	Jungle Nightjar	IV	LC
17.	<i>Centropus sinensis</i>	Greater Coucal	IV	LC
18.	<i>Ceryle rudis</i>	Pied Kingfisher	IV	LC
19.	<i>Cinnyris asiaticus</i>	Purple Sunbird	IV	LC
20.	<i>Columba livia</i>	Rock dove/pigeon	IV	LC
21.	<i>Copsychus saularis</i>	Oriental Magpie-robin	IV	LC
22.	<i>Coracias benghalensis</i>	Indian Roller	IV	LC
23.	<i>Corvus macrorhynchos</i>	Large-billed Crow	IV	LC
24.	<i>Corvus splendens</i>	House Crow	IV	LC
25.	<i>Cuculus micropterus</i>	Indian Cuckoo	IV	LC
26.	<i>Dendrocitta vagabunda</i>	Rufous treepie	IV	LC
27.	<i>Dicaeum agile</i>	Thick-billed Flowerpecker	IV	LC
28.	<i>Dicrurus macrocercus</i>	Black Drongo	IV	LC
29.	<i>Emberiza lathami</i>	Crested Bunting	IV	LC
30.	<i>Euodice malabarica</i>	Indian Silverbill	IV	LC
31.	<i>Francolinus pictus</i>	Painted Francolin	IV	LC
32.	<i>Francolinus pondicerianus</i>	Grey Francolin	IV	LC
33.	<i>Gallinula chloropus</i>	Common Moorhen	IV	LC



S. No.	Scientific Name	Common Name/ English Name	Conservation status according to IWPA- 1972	IUCN conservation status as on dated: 8th Sep, 2021
34.	<i>Glaucidium radiatum</i>	Jungle Owlet	IV	LC
35.	<i>Gracupica contra</i>	Asian pied starling	IV	LC
36.	<i>Gyps bengalensis</i>	White-rumped Vulture	I	CR
37.	<i>Halcyon smyrnensis</i>	White-throated kingfisher	IV	LC
38.	<i>Haliastur indus</i>	Brahminy Kite	IV	LC
39.	<i>Hierococcyx varius</i>	Common Hawk-cuckoo	IV	LC
40.	<i>Ketupa zeylonensis</i>	Brown Fish-owl	IV	LC
41.	<i>Lalage melanopectera</i>	Black-headed Cuckooshrike	IV	LC
42.	<i>Lanius excubitor</i>	Great Grey Shrike	IV	LC
43.	<i>Lanius meridionalis</i>	Southern grey Shrike	IV	VU
44.	<i>Leptocoma zeylonica</i>	Purple-rumped Sunbird	IV	LC
45.	<i>Lonchura punctulata</i>	Scaly-breasted Munia	IV	LC
46.	<i>Merops leschenaulti</i>	Chestnut-headed Bee-eater	IV	LC
47.	<i>Merops orientalis</i>	Green Bee-eater	IV	LC
48.	<i>Merops philippinus</i>	Blue-tailed Bee-eater	IV	LC
49.	<i>Ninox scutulata</i>	Brown hawk-owl	IV	LC
50.	<i>Ocyrceros birostris</i>	Indian Grey Hornbill	IV	LC
51.	<i>Oriolus kundoo</i>	Indian Golden Oriole	IV	LC
52.	<i>Orthotomus sutorius</i>	Common Tailorbird	IV	LC
53.	<i>Otus sunia</i>	Oriental Scops-owl	IV	LC
54.	<i>Pandion haliaetus</i>	Osprey	I	LC
55.	<i>Passer domesticus</i>	House Sparrow	IV	LC
56.	<i>Pavo cristatus</i>	Indian Peafowl	I	LC
57.	<i>Perdica asiatica</i>	Jungle Bush-quail	IV	LC
58.	<i>Pericrocotus cinnamomeus</i>	Small Minivet	IV	LC
59.	<i>Pernis ptilorhynchus</i>	Oriental Honey-buzzard	IV	LC
60.	<i>Plegadis falcinellus</i>	Glossy Ibis	IV	LC
61.	<i>Ploceus philippinus</i>	Baya Weaver	IV	LC
62.	<i>Psittacula eupatria</i>	Alexandrine Parakeet	IV	NT
63.	<i>Psittacula krameri</i>	Rose-ringed parakeet	IV	LC
64.	<i>Pycnonotus cafer</i>	Red-vented Bulbul	IV	LC
65.	<i>Rhipidura aureola</i>	White-browed Fantail	IV	LC
66.	<i>Saxicola caprata</i>	Pied Bushchat	IV	LC
67.	<i>Sterna aurantia</i>	River Tern	IV	VU
68.	<i>Stigmatopelia chinensis</i>	Spotted Dove	IV	LC
69.	<i>Streptopelia tranquebarica</i>	Red Turtle-dove	IV	LC



S. No.	Scientific Name	Common Name/ English Name	Conservation status according to IWPA- 1972	IUCN conservation status as on dated: 8th Sep, 2021
70.	<i>Strix ocellata</i>	Mottled Wood-owl	IV	LC
71.	<i>Sturnia pagodarum</i>	Brahminy Starling	IV	LC
72.	<i>Tachybaptus ruficollis</i>	Little Grebe	IV	LC
73.	<i>Tephrodornis pondicerianus</i>	Common Woodshrike	IV	LC
74.	<i>Terpsiphone paradisi</i>	Indian Paradise-flycatcher	IV	LC
75.	<i>Turdoides striata</i>	Jungle Babbler	IV	LC
76.	<i>Turnix suscitator</i>	Barred Buttonquail	IV	LC
77.	<i>Tyto alba</i>	Common Barn-owl	IV	LC
78.	<i>Vanellus indicus</i>	Red-wattled lapwing	IV	LC
79.	<i>Zosterops palpebrosus</i>	Oriental White-eye	IV	LC

#### Conservation Status of Avifauna (Birds)

- Three schedule - I species of avifauna were recorded in the study area during field survey which comes in (IWPA) Indian Wildlife Protection Act, 1972

Table - 3.25

#### Inventory of Aquatic faunal diversity in Core & Buffer zone of Mine site Based on Actual Sighting, based on inputs from locals and Perused from Secondary Data

S. No.	Scientific name	Common name/ English Name	Family	IUCN Conservation status as on 8 <sup>th</sup> Sep, 2021
<b>Ichthyo Fauna</b>				
1.	<i>Channa striatus</i>	Snakehead Murrel	Channidae	LC
2.	<i>Cirrhinus mrigala</i>	Mrigal Carp	Cyprinidae	LC
3.	<i>Clarias batrachus</i>	Walking Catfish	Clariidae	LC
4.	<i>Esomus danricus</i>	Indian Flying Barb	Cyprinidae	LC
5.	<i>Labeo catla</i>	South Asian Carp	Cyprinidae	NA
6.	<i>Labeo rohita</i>	Rohu	Cyprinidae	LC
7.	<i>Mystus vittatus</i>	Striped Dwarf Catfish	Bagridae	LC
8.	<i>Notopterus notopterus</i>	Bronze Featherback	Notopteridae	LC
<b>Amphibians</b>				
1.	<i>Euphlyctis cyanophlyctis</i>	Skittering Frog	Dicroglossidae	LC
<b>Insects</b>				
1.	<i>Dytiscus sp.</i>	Diving Beetle	Dytiscidae	NA
2.	<i>Nepa sp.</i>	Water Scorpion	Nepidae	NA



S. No.	Scientific name	Common name/ English Name	Family	IUCN Conservation status as on 8 <sup>th</sup> Sep, 2021
3.	<i>Ranatra sp.</i>	Water Scorpion	Nepidae	NA
<b>Birds</b>				
1.	<i>Alcedo atthis</i>	Common Kingfisher	Alcedinidae	LC
2.	<i>Ardea cinerea</i>	Grey Heron	Ardeidae	LC
3.	<i>Bubulcus ibis</i>	Cattle Egret	Ardeidae	LC
4.	<i>Dendrocygna javanica</i>	Lesser Whistling Duck	Anatidae	LC
5.	<i>Egretta garzetta</i>	Little Egret	Ardeidae	LC
6.	<i>Phalacrocorax carbo</i>	Great Cormorant	Phalacrocoracidae	LC

**Table - 3.26**  
**Inventory of Aquatic faunal (Phytoplankton & Zooplankton) diversity of Mine site and CPP**  
**Based on Actual Sighting, based on inputs from locals and Perused from Secondary Data**

S. No.	Phytoplankton	Zooplankton
1.	<i>Actonostrium sp</i>	<i>Bosmina sp</i>
2.	<i>Amphora sp</i>	<i>Brachionus sp</i>
3.	<i>Anabaena sp</i>	<i>Chaetospira sp</i>
4.	<i>Asterionella sp</i>	<i>Chilodonella sp</i>
5.	<i>Botrydiopsis sp</i>	<i>Coleps sp</i>
6.	<i>Bscillaria sp</i>	<i>Corixa sp</i>
7.	<i>Candelabrum sp</i>	<i>Cyclidium sp</i>
8.	<i>Chlamidomonas sp</i>	<i>Cyclopyris sp</i>
9.	<i>Chlorobotrys sp</i>	<i>Cyclops sp</i>
10.	<i>Cholrella sp</i>	<i>Cypris sp</i>
11.	<i>Cladophora sp</i>	<i>Dadya sp</i>
12.	<i>Closterium sp</i>	<i>Daphnia sp</i>
13.	<i>Coelastrum sp</i>	<i>Diaptomus sp</i>
14.	<i>Cyclotella sp</i>	<i>Dileptus sp</i>
15.	<i>Cymbellasp</i>	<i>Eucyclops sp</i>
16.	<i>Desmidium sp</i>	<i>Euglena sp</i>
17.	<i>Eudorina sp</i>	<i>Filinia sp</i>
18.	<i>Fragilaria sp</i>	<i>Gerridae sp</i>



S. No.	Phytoplankton	Zooplankton
19.	<i>Gomphonema sp</i>	<i>Hydrophilus sp</i>
20.	<i>Gomphospaeria sp</i>	<i>Keratella sp</i>
21.	<i>Lyngbya sp</i>	<i>Lecane sp</i>
22.	<i>Melosira sp</i>	<i>Macrothrise sp</i>
23.	<i>Merismopedia sp</i>	<i>Mesoveli sp</i>
24.	<i>Microcystic sp</i>	<i>Microveli sp</i>
25.	<i>Microspora sp</i>	<i>Notonecta sp</i>
26.	<i>Navicula sp</i>	<i>Paramecium sp</i>
27.	<i>Nephrocystium sp</i>	<i>Peranema sp</i>
28.	<i>Nitzschia sp</i>	<i>Stenocypris sp</i>
29.	<i>Nostoc sp</i>	<i>Stentor sp</i>
30.	<i>Oedogonium sp</i>	<i>Teratell sp</i>
31.	<i>Oocystis sp</i>	<i>Trichocerca sp</i>
32.	<i>Oscillatoria sp</i>	
33.	<i>Palmella sp</i>	
34.	<i>Penium sp</i>	
35.	<i>Phormidium sp</i>	
36.	<i>Pinnularia sp</i>	
37.	<i>Pleodorina sp</i>	
38.	<i>Pleodorina sp</i>	
39.	<i>Protoccus sp</i>	
40.	<i>Rivularia sp</i>	
41.	<i>Scenesdemus sp</i>	
42.	<i>Schizomeris sp</i>	
43.	<i>Spaerocystis sp</i>	
44.	<i>Spaerzosma sp</i>	
45.	<i>Spirogyra sp</i>	
46.	<i>Sprolaenia sp</i>	
47.	<i>Surirella sp</i>	
48.	<i>Synedra sp</i>	
49.	<i>Tetraspora sp</i>	
50.	<i>Ulothrix sp</i>	



S. No.	Phytoplankton	Zooplankton
51.	<i>Zygneama sp</i>	
52.	<i>Zygnemopsis sp</i>	

#### Conservation Status of Aquatic Biodiversity

- No schedule - I Aquatic species were recorded in the study area during field survey which comes in (IWPA) Indian Wildlife Protection Act, 1972

#### Interpretation & Conclusion

A primary field survey was carried out within 10 km radius impact zone in and around the project area (Plant and Mine) to study the floral and faunal diversity of the terrestrial and aquatic environment of the study area. Seven schedule - I species were recorded in the study area during field survey which comes in (IWPA) Indian Wildlife Protection Act, 1972. As per the survey, below mentioned species were observed within the studied area:

**Table: 3.27**  
**Schedule-I Fauna reported from the study area**

S. No.	Common Name/ English Name	Scientific name	Family	Conservation status according to IWPA-1972	IUCN Conservation status as on 8 <sup>th</sup> Sep, 2021
<b>Birds</b>					
1	Osprey	<i>Pandion haliaetus</i>	Pandionidae	I	LC
2	Indian Peafowl	<i>Pavo cristatus</i>	Phasianidae	I	LC
3	White-rumped Vulture	<i>Gyps bengalensis</i>	Accipitridae	I	CR
<b>Mammals</b>					
4	Indian Leopard	<i>Panthera pardus fusca</i>	Felidae	I	NA
5	Indian Pangolin	<i>Manis crassicaudata</i>	Manidae	I	EN
<b>Butterflies</b>					
6	Crimson rose	<i>Pachliopta hector</i>	Papilionidae	I	LC
<b>Reptiles</b>					
7	Bengal Monitor Lizard	<i>Varanus bengalensis</i>	Varanidae	I, Part II	NT

Source: Primary site survey and secondary data from previous EIA/EMP report of Zawar Mines

LC: Least Concern, NA: Not available, NT: Near Threatened, VU: Vulnerable, DD: Data Deficient

#### Floral Diversity -

As per the field survey and List of Flora; no endemic species of flora have been observed. Total of 57 trees, 39 shrubs, 91 herbs, 20 species of grass and no species of climbers have been recorded in the study area based on primary observation as well as based on information collected from the secondary data. Out of all the floral species found in the study area 37 are agricultural crops. As per



the field survey and List of Flora by ENVIS, MoEFCC; no endemic, endangered and rare species of flora have been observed under threatened status in the study area.

#### **Faunal Diversity-**

Among fauna, 18 species of mammals, 10 species of reptiles and 7 amphibians and 7 species of Butterfly and Arthropods were recorded from the study area. Among avifauna, 79 species were recorded in the study area. No National Park, Sanctuary, Biosphere Reserve, Migratory Corridor of wild animals exists within 10 km radius study area. Among aquatic fauna, 8 species of fishes, 1 amphibia, 3 species of insects and 6 birds were recorded in the study area. Along with this 52 different species of phytoplankton and zooplankton have been recorded.

Approved Wildlife Conservation Plan for Seven Schedule I species has been enclosed as **Annexure 10 (b)** with this Final EIA/EMP Report.

### **3.15 SOCIO-ECONOMIC STUDY**

An essential part of environmental study which includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication, transportation, prevailing diseases pattern as well as feature of aesthetic significance such as temples, historical monuments etc. at the baseline level. This composite baseline assessment of mine and CPP helps in visualizing and predicting the possible impact depending upon the nature and magnitude of the project.

Socio-economic study of an area provides a good opportunity to assess the socio-economic conditions of an area. This study may possibly facilitate a change in living and social standards of the area around the project. It can undoubtedly be said that this plant will provide some direct and indirect employment and facilitate in improving the infrastructural facilities and standards of living of the area.

#### **OBJECTIVES OF THE STUDY**

Following objectives are plan to access from this socio-economic study:

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





## METHODOLOGY

Following methodology is undertaken to conduct this socio-economic study:

### Collection of Data

Data for this project was collected from primary sources like Field survey, Interviews of locals and secondary sources like Government department, Maps, Literature research etc. during field survey. JMEPL conducted the socio-economic baseline survey using a survey team of Field Assistants and a Supervisor apprising them about the project area and relevant documents.

The Survey was conducted using Simple Random Sampling method with a well-structured questionnaire prepared enabling subjects to reply appropriately. The questionnaires were designed to suit the subjects considering their rural background enabling them to furnish correct information and data to the extent possible. Primary data has been collected at village level, household level by questionnaires and focused group discussions.

The study area for the field survey has been divided into three major segments namely Primary Zone (0 - 3 km), Secondary Zone (3 - 7 km) and Outer Zone (7 - 10 km).

### Presentation of Data & Analysis

Field observations along with social research were presented in tabular, graphical and diagrammatic form suiting collected inputs for comprehensive understanding. These datasets are further interpreted and analyzed with the help of ancillary data in order to highlight major concerns/issues being borne by individuals in these villages. Also, when collected inputs are correlated with the ongoing qualitative parameters, one can perceive them and then can derive an action plan to meet the current need and find its solution. These tabulated data were interpreted and analysed with the help of various qualitative techniques and ideographic approaches.

#### 3.15.1 STUDY AREA

Detailed socio-economic survey was conducted in the study area (buffer zone) within 10 km radius of the Mine site at village- Zawar, Tehsil- Girwa & Sarada, District- Udaipur (Rajasthan) in order to determine the impact of the proposed expansion on nature and inhabitant. To get an overview of the villagers and their perspectives about this expansion activity, different demographic parameters and social aspects such population density, sex ratio, literacy rate, worker ratio etc. has been identified, analyzed, studied together. These impacts may be beneficial or detrimental. If detrimental, anticipated suggestions/measures are advocated in order to have collective development.



Broadly the study area (buffer zone) was categorized on the basis of the distance of the villages from plant site into 3 zones. The Primary zone relates to 0 to 3 km radius area, secondary zone 3-7 km and outer zone 7-10 km radius area.



S. No.	Name	No. of HH	Total Pop	Total Male	Total Female	Sex Ratio	P_06	M_06	F_06	SC Pop.	ST Pop.	P_LIT	M_LIT	F_LIT	Literacy Rate	Male Lit Rate	Female Lit Rate	Working Pop	Non working Pop	Child Sex
o - 3km																				
1	Krishanpura	298	1637	807	830	1029	354	155	199	0	1637	662	441	221	51.60	67.64	32.74	455	1182	1284
2	Chandani	184	1017	528	489	926	231	123	108	3	1006	446	325	121	56.74	80.25	33.06	409	608	878
3	Toran Talab	73	403	203	200	985	84	46	38	0	403	139	105	34	43.57	66.88	22.08	237	166	826
4	Padla	455	2287	1177	1110	943	393	207	186	28	2136	1150	736	414	60.72	75.88	45.85	877	1410	899
5	Chanawada	718	3607	1831	1776	970	586	290	296	213	2975	1513	964	549	50.08	62.56	36.94	1810	1797	1021
6	Khakhadara	124	563	289	274	948	110	57	53	0	536	214	139	75	47.24	59.91	34.56	157	406	930
7	Gosiya	237	1024	511	513	1004	168	71	97	40	937	524	321	203	61.21	72.95	45.93	353	671	1366
8	Nagenla	103	540	284	256	901	111	58	53	8	522	157	114	43	36.60	50.44	21.72	219	321	914
9	Teeri	459	2402	1263	1139	902	397	204	193	78	1901	1278	822	456	63.74	77.62	48.77	1015	1387	946
10	Nagda	47	237	121	116	959	36	16	20	0	210	89	66	23	44.28	62.86	23.00	106	131	1250
11	Deopura	641	3065	1533	1532	999	517	257	260	173	1813	1435	907	528	56.32	71.08	41.41	1150	1915	1012
12	Intali Pal	327	1808	908	900	991	344	162	182	39	1761	886	535	351	60.52	71.72	47.56	912	896	1123
13	Bori Malan	113	607	322	285	885	144	75	69	1	590	272	188	84	58.75	76.11	40.00	274	333	920
14	Banadiya	254	1201	618	583	943	238	120	118	1	1191	502	371	131	52.13	74.50	28.29	595	606	983
15	Parsad	871	4271	2193	2078	948	688	376	312	185	2407	2480	1498	982	69.22	82.44	57.70	1900	2371	830
16	Kherki	161	857	441	416	943	171	87	84	0	857	298	193	105	43.44	54.52	31.91	186	671	966
17	Khori Mahuri	356	1795	920	875	951	297	145	152	1	1788	508	361	147	33.91	46.58	20.14	814	981	1048
18	Delwas	448	2332	1185	1147	968	478	240	238	3	2251	856	534	322	46.17	56.51	35.50	1106	1226	992
19	Udpuriya (Khalsa)	96	558	271	287	1059	105	45	60	0	489	275	171	104	60.71	75.66	42.98	269	289	1333
20	Mor Dungri	316	1767	927	840	906	470	253	217	9	1746	532	352	180	41.02	52.23	30.66	808	959	858
21	Barothi	163	898	462	436	944	200	100	100	34	859	369	262	107	52.87	72.38	31.85	384	514	1000
<b>Total</b>		<b>6444</b>	<b>32876</b>	<b>16794</b>	<b>16082</b>	<b>958</b>	<b>6122</b>	<b>3087</b>	<b>3035</b>	<b>816</b>	<b>28015</b>	<b>14585</b>	<b>9405</b>	<b>5180</b>	<b>54.52</b>	<b>68.61</b>	<b>39.86</b>	<b>14036</b>	<b>18840</b>	<b>983</b>



S. No.	Name	No. of HH	Total Pop	Total Male	Total Female	Sex Ratio	P_06	M_06	F_06	SC Pop.	ST Pop.	P_LIT	M_LIT	F_LIT	Literacy Rate	Male Lit Rate	Female Lit Rate	Working Pop	Non working Pop	Child Sex
3 - 7km																				
1	Peepaldara	121	634	321	313	975	107	52	55	0	630	275	186	89	52.18	69.14	34.10	365	269	1058
2	Babarmal	240	1297	673	624	927	229	118	111	37	1245	620	410	210	58.05	73.87	41.50	649	648	941
3	Sera	422	2144	1125	1019	906	466	248	218	14	2124	511	363	148	30.45	41.39	19.20	966	1178	879
4	Rathora	518	2370	1206	1164	965	398	219	179	134	1183	1277	767	510	64.76	77.71	53.97	1047	1323	817
5	Ratakhet	101	486	249	237	952	95	45	50	0	408	221	152	69	56.52	74.51	35.94	122	364	1111
6	Banal	145	822	421	401	952	163	87	76	0	816	360	235	125	54.63	70.36	39.81	419	403	874
7	Mandwa	244	1241	647	594	918	261	144	117	12	1225	503	319	184	51.33	63.42	40.89	390	851	813
8	Parai	267	1376	702	674	960	277	132	145	22	1330	832	504	328	75.71	88.42	60.52	615	761	1098
9	Kolar	115	587	318	269	846	121	68	53	0	586	313	219	94	67.17	87.60	46.77	190	397	779
10	Kharbar Chak (A)	403	2046	1033	1013	981	391	201	190	112	1928	905	575	330	54.68	69.11	40.64	960	1086	945
11	Kharbar Chak (B)	324	1700	851	849	998	346	168	178	0	1694	797	487	310	58.86	71.30	45.52	587	1113	1060
12	Keora Khurd	240	1165	603	562	932	219	110	109	14	1143	367	275	92	38.79	55.78	20.35	443	722	991
<b>Total</b>		<b>3140</b>	<b>15868</b>	<b>8149</b>	<b>7719</b>	<b>947</b>	<b>3073</b>	<b>1592</b>	<b>1481</b>	<b>345</b>	<b>14312</b>	<b>6981</b>	<b>4492</b>	<b>2489</b>	<b>54.56</b>	<b>68.51</b>	<b>40.62</b>	<b>6753</b>	<b>9115</b>	<b>930</b>
7-10km																				
1	Mahuwara	157	683	338	345	1021	79	36	43	180	222	394	238	156	65.23	78.81	51.66	246	437	1194
2	Dhawadiya	248	1062	539	523	970	147	73	74	48	297	640	393	247	69.95	84.33	55.01	365	697	1014
3	Katila	214	1197	625	572	915	237	133	104	24	1170	478	311	167	49.79	63.21	35.68	563	634	782
4	Khajoori	512	2589	1310	1279	976	531	267	264	9	2578	857	590	267	41.64	56.57	26.31	1328	1261	989
5	Chhani	138	712	340	372	1094	170	98	72	0	712	303	179	124	55.90	73.97	41.33	355	357	735
6	Deimata	78	377	199	178	894	65	31	34	0	264	113	72	41	36.22	42.86	28.47	119	258	1097
7	Amdari	81	451	226	225	996	92	37	55	0	451	136	103	33	37.88	54.50	19.41	151	300	1486
8	Kaya	480	2570	1294	1276	986	545	269	276	35	2120	893	613	280	44.10	59.80	28.00	718	1852	1026



S. No.	Name	No. of HH	Total Pop	Total Male	Total Female	Sex Ratio	P_06	M_06	F_06	SC Pop.	ST Pop.	P_LIT	M_LIT	F_LIT	Literacy Rate	Male Lit Rate	Female Lit Rate	Working Pop	Non working Pop	Child Sex
9	Kharpina	308	1664	823	841	1022	396	183	213	27	1635	593	415	178	46.77	64.84	28.34	482	1182	1164
10	Pareda	442	2507	1253	1254	1001	423	199	224	136	1835	1458	939	519	69.96	89.09	50.39	1083	1424	1126
11	Pareda Chak No. 1	60	347	173	174	1006	66	32	34	0	347	162	110	52	57.65	78.01	37.14	96	251	1063
12	Daben	77	406	202	204	1010	128	59	69	0	400	137	92	45	49.28	64.34	33.33	189	217	1169
13	Bhoodar	600	3184	1604	1580	985	581	292	289	87	2404	1755	1075	680	67.42	81.94	52.67	1265	1919	990
14	Paderi	200	1068	558	510	914	146	79	67	159	219	646	404	242	70.07	84.34	54.63	522	546	848
15	Peepli (A)	414	2367	1261	1106	877	411	216	195	23	2293	1309	867	442	66.92	82.97	48.52	1106	1261	903
16	Peepli (B)	370	2017	1029	988	960	345	159	186	110	1811	912	589	323	54.55	67.70	40.27	914	1103	1170
17	Keora Kalan	180	903	466	437	938	155	79	76	17	829	363	234	129	48.53	60.47	35.73	374	529	962
18	Ghoriyawar a	211	1244	633	611	965	224	117	107	0	1244	602	393	209	59.02	76.16	41.47	637	607	915
19	Kitoda	97	494	237	257	1084	98	43	55	0	80	174	139	35	43.94	71.65	17.33	206	288	1279
20	Kheruaa	83	384	179	205	1145	67	32	35	5	171	161	100	61	50.79	68.03	35.88	253	131	1094
<b>Total</b>		<b>4950</b>	<b>26226</b>	<b>13289</b>	<b>12937</b>	<b>974</b>	<b>4906</b>	<b>2434</b>	<b>2472</b>	<b>860</b>	<b>21082</b>	<b>12086</b>	<b>7856</b>	<b>4230</b>	<b>56.69</b>	<b>72.37</b>	<b>40.42</b>	<b>10972</b>	<b>15254</b>	<b>1016</b>
<b>Grand Total</b>		<b>14534</b>	<b>74970</b>	<b>38232</b>	<b>36738</b>	<b>961</b>	<b>14101</b>	<b>7113</b>	<b>6988</b>	<b>2021</b>	<b>63409</b>	<b>33652</b>	<b>21753</b>	<b>11899</b>	<b>55.29</b>	<b>69.90</b>	<b>40.00</b>	<b>31761</b>	<b>43209</b>	<b>982</b>



### 3.15.2 STUDY AREA DETAILS

The project site is located near Village Zawar, tehsil Girwa and Sarada, district Udaipur in the state of Rajasthan. Post 1991 census, seven tehsils of Udaipur district viz. Bhim, Deogarh, Amet, Kumbhalgarh, Rajsamand, Nathdwara and Railmagra were transferred to make a new district Rajsamand. Then after 2001 census, two new tehsils have been made in Udaipur district namely Rishabhdeo and Lasadia. The geographical area of the district is 11724 Km<sup>2</sup> and area wise it ranks 8th in Rajasthan state.

The study area (buffer zone) was categorized on the basis of the distance of the villages from project site into 3 zones. The Primary zone relates to 0 to 3 km radius area, secondary zone 3-7 km and outer zone 7-10 km radius area. The 10 km study area fall in Udaipur district.

#### Background of region

Prior to its formation, it was a part of erstwhile princely state of Mewar. With the formation of United States of Rajasthan in 1948, a part of the district of Girwa, Khamnor, Rajnagar, Bhim, Magra, Kherwara and Kumbhalgarh, together with the thikanas of Nathdwara, Kankroli, Salumbar (excluding Saira tehsil), Bhinder, Kanor, Bansi, Bari Sadri, Amet, Sardargarh, Deogarh and Gogunda were combined to constitute the district of Udaipur.

District Udaipur is situated at the southern tip of Rajasthan, adjoining Gujarat and is oval in shape with the very narrow strip stretching towards the north. It is bounded on the north by Rajsamand and Pali districts, on the south by Dungarpur, on the east by Pratapgarh and Chittaurgarh and on the west by Pali and Sirohi districts and Sabarkantha district (Gujarat). The district is encircled by the Aravalli Ranges from north to south. The northern and eastern part of the district consist of an elevated plateaus though there are long strips of waste and rocky sierras with hills rising here and there in the plains. The southern part is covered with rocks, hills and dense forests whereas the western portion known as the Hilly Tracks of Mewar is composed of Aravalli range. In south east corner a range extends from Bari Sadri to the Jakham river, and forming narrow confined valley parallel to each other. The river Banas and its tributaries flow through the eastern parts of the district. Other rivers in the district include Some, Jakham, wakar, Sei, Sabarmati and Berach. All these are non-perennial rivers which flow during rainy season only. Jaisamand (Dhebar lake) in the south east of Udaipur is the largest artificial lake in Asia. The climate of the district is marked by the large variation in temperature, extreme dryness and scanty rainfall. Clay loam soil is available in Gogunda, Kotra, Jhadol, Girwa, Bargaon, Mavli and Bhindar while the red loam soil in Kherwara, Sarada, Salumbar and Dhariawad.



### 3.15.3 SOCIO ECONOMIC PROFILE OF THE REGION

The study area comprise of 53 villages of Girwa, Sarada, Rishabhdeo and Jhadoltehsil that covers a total area of 831.95 square kilometers giving approximately 74970 people residence. Following table entails brief information about demography structure at state level, district level and study area.

Table: 3.28

#### SOCIO ECONOMIC PROFILE

S. No.	Particular	Rajasthan	Udaipur	Study Area
1.	Area (Sq. Km.)	324,439	11724.00	831.95
2.	No. Of Households	12,651,423	621,193	14534
3.	Total Population	68,548,437	3,068,420	74970
4.	Sex ratio	928	958	961
5.	Schedule caste	12,221,593	188,525	2021
6.	Schedule tribe	9,238,534	1,525,289	63409
7.	Literacy rate (%)	66.11	61.82	55.29
8.	Male literacy (%)	79.19	74.74	69.90
9.	Female literacy (%)	52.12	48.45	40.00
10.	Working population (%)	43.6	44.51	42.36
11.	Non-working population (%)	56.4	55.49	57.64

Source: Census, 2011

- Previous researches have suggested that area has a long history of people from diverse culture.
- Soil is one of the important factor affecting land in general and transportation on land in particular. All types of soils in the district are deep to moderately deep. Clay loam soil is available in Gogunda, Kotra, Jhadol, Girwa, Bargaon, Mavli and Bhindar while the red loam soil in Kherwara, Sarada, Salumbar and Dhariawad.
- The district is covered with rocks and hills, which are well stocked with forests and it covers about 4142.33 square km under forests. The forests, which constitute an invaluable source of income partly, sustain the economy of the district.
- The major and minor forest produce, inter-alia, include timber, coal, firewood, gum, bamboo, tendu, kattha, honey, wax, barks and grasses. The forests of the district fall under the northern tropical Dry Deciduous type of forests according to champion's classification.





- Though both rabi and kharif crops are grown in the district, however, kharif remains the main crops of the district, the third crop which Zayad is also raised when several types of vegetables are produced in river beds during the summers.
- Camel, Ox is mainly useful in cultivation which is being used for pulling and transportation of agricultural produce.
- Horses, Donkeys, Ponies and Mules are being used in urban areas for short distance transportation and as goods carrier.
- The cottage industries found in the district include manufacturing of agricultural implements, dyed ivory and wooden toys, cloth dyeing and printing, leather shoe making, tie and dye and handloom weaving. The traditional industries like goldsmith, pottery, bamboo works, stone carving etc. are mostly carried on the homes of the artisans and cater to the needs of local and neighbouring markets.
- Despite the fact that the district is rich in mineral resources, it remains, on the whole, industrially backward. However, there are a few big factories in the district.
- Since agriculture is a seasonal work and involves people for limited period; most of them are out of work after harvesting causing higher ratio of marginal workers in the region.
- Besides this, many households are self-employed as fabric shops, dairy and poultry business, confectionary shops, local eateries etc.
- Considering work participation in agriculture, men are mostly seen at farming fields which the role of women comes at later stages where they are needed for threshing, cleaning, and preparing sacks.
- Census data of 2011 of study area suggested that only 42.36 % people are involved at working in defined sector despite literacy rate of 55.29 %. Similarly, the ratio of non-working population in the region is 57.64 % posing question on why such a gap?

### 3.15.4 DEMOGRAPHY STRUCTURE

#### Zone wise population of study area

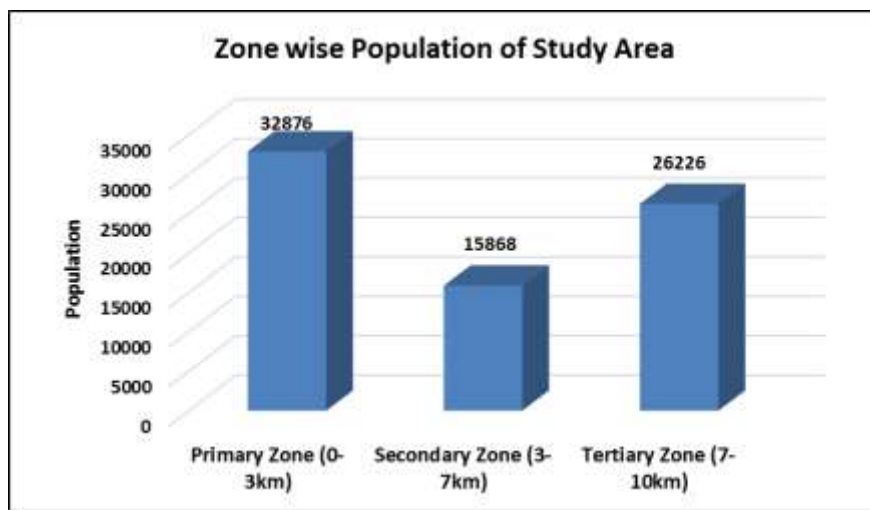
Census data suggests that the study area is composed of 51% of male population while 49% of female population. Following table entails information about basic demographic structure of villages/town lying in study area (buffer zone) as primary, secondary and outer zone.

Zone	No. of Villages/ward	Total Household	Total Population	Total Male Population	Total Female Population
Primary Zone (0 - 3 Km)	21	6444	32876	16794	16082
Secondary Zone (3 - 7 Km)	12	3140	15868	8149	7719
Outer Zone (7 - 10 km)	20	4950	26226	13289	12937

Source: Census of India, 2011



Above table highlights that 21 villages/ward comes under primary zone (0 – 3 km radius from plant site) with as much as 6444 houses resides with a total population of over 32876 people. Due to shorter distance from mine site, it gives people living in here fair opportunity to get enroll at project site and avail possible benefits (less transport cost/time saving) than to people living in other zones. Secondary and outer zone both comprise of 12 village and 20 villages holding a total population of 15868 and 26226 respectively. Since secondary and outer zone comprise mostly of flowing streams and clustered ponds, most of these settlements are inhabited in and along these natural features.



Source: Census of India, 2011

### 3.15.5 SEX RATIO

Sex ratio determine the Human Development Index (HDI) of an area thereby understanding the status of women in that region.

The sex ratio in the study area is 961 females per 1000 males (higher than state's average i.e. 928) with secondary zone having 947, following with primary zone as 958 and then outer zone as 974. This variation suggests that possible reason behind this variation is due to presence of service facility in each of these zones.

Below table gives brief insight about the sex ratio at different zones in study area suggesting that there is a lower proportion of females than male.

S. No.	Buffer Zone	Sex Ratio of Study area Female/ 1000 Male
1	Primary Zone (0-3 km)	958
2	Secondary zone (3-7 km)	947
3	Outer Zone (7-10 km)	974
4	Overall Study Area (0-10 km)	961



### Source: Census of India, 2011

On comparing the district sex ratio statistics with other peripheral areas, there has been notified improvements however despite that (awareness on social welfare schemes by the government), this variation has been referred to restricted sources of earning. Since families in most of these villages are involved at working in informal sector (as marginal labors) fertility rate is high causing higher proportion of men and women.

### Child Sex Ratio

In India, Child sex ratio is defined as number of females born per 1000 males in age group 0 – 6 years in a human population. Study area information suggests that on an average each household has 2 to 3 children of which proportion of boys are more than girls.

S. No.	Buffer Zone	Sex Ratio of Study area Female/ 1000 Male
1	Primary Zone (0-3 km)	983
2	Secondary zone (3-7 km)	930
3	Outer Zone (7-10 km)	1016
4	Overall Study Area (0-10 km)	982

Source: Census of India, 2011

When questions related to sex selective births and their mortality were asked to these villagers, it was suggested families often think that women are softer gender and that physical work requires men more than women, therefore boy in family is preferred more. Also, when considered about meeting the financial needs of family, it is very much expected of boy to take of household than a girl. Such notions cause sex selective births. Ancillary research studies also suggested that in many villages, female infanticide is prominent which can either be due to poor provision of good take care of new born infant or pre/post pregnant women's diet.

### 3.15.6

### FAMILY SIZE

Size of family also describes about family functioning, resource consumption, total income generated and their expenditure pattern. Census 2011 data suggests that most of these households have a family size of up to 5 members, knowing the size of family also give fair understanding of relating how much resource consumption is being incurred, annual income being generated and spent. Referring ancillary researcher, it is seen that the average annual income of a family varies from 1 lakh to 1.5 lakh where major expenses are borne on food, medical expenses and shelter.

### 3.15.7

### INFRASTRUCTURE BASE

A better network of physical infrastructure facilities (well-built roads, rail links, irrigation, power and telecommunication, information technology, market-network and social infrastructure



support, viz. health and Education, water and sanitation, veterinary services and co-operative) is essential for the development of the rural economy.

A review of infrastructural facilities available in the area has been done based on the information from base line survey & census data of the study area. Infrastructural facilities available in the area are described in the subsequent sections.

- Administrative offices are located in Girwa approx. 30 to 40km from mine site which is commutable.
- Functioning of Primary health centre and sub centre is fair in these villages. Community health centre is located in Udaipur, medical facilities are satisfactory in study area.
- Availability of Government primary schools in all these villages are present within <2 km while secondary schools are located 3 – 4 km. Government Senior Secondary schools and college institutes are present at Udaipur City area.
- Various technical and vocational degree colleges and institutes are present at Udaipur city which is within the reach of 30 to 40 km from each of villages.
- Water availability in the region is mostly household tap water with few depending upon tube wells. In summer season people depends on water tanker.
- LPG Gas cylinders are available in approx. 90% of these households against provision of 'UjwalaYojna' scheme, however villagers are unable to fill gas due to unavailability of finances.
- Most of these households are of one to two room dwellings made of brick walls and concrete roofs. It also has functioning toilets inside them.
- Electricity is also available for most of the hours in these households.
- Government Campaign on 'Sanitary and Hygiene' and availability of running welfare social protection schemes are still less. They are restricted to Gram Sabha meeting which usually occurs on 26th January (Republic Day), 1 May (Labour Day), 15 August (Independence Day) and 2nd October (Gandhi Jayanti).
- Settlements in the study area mostly developed alongside road. These settlements are connected with thin roads (metalled roads) that eventually merge with main road and highways.
- During field survey, it was found, villager have requested Gram Panchayat take necessary actions against rebuilding of road.

### 3.15.8

#### PROVISION TO BASIC AMENITIES

Primary survey conducted in these villages and census information suggests that availability of basic needs such as provision to food, clothes, shelter, employment opportunities, transport connectivity, education availability, health infrastructure, cooking fuel and natural resource availability is fairly well.



- Men and women in these villages are involved at small manufacturing industries such as bangle factory, textile industry, handlooms etc. Many of these men are also involved at marble cutting and marble finishing centers.
- In study area, Census 2011 reveals that out of total working population, ratio of non-workers is more than working population. In the study area, 42.36 % people work while remaining are non-workers (57.64 %). Those who work are mainly cultivators, agricultural labours, small scale manufacturing workers who are paid however, those performing household duties, dependents, infants / children and adults who are engaged for small period of time (informal and marginal workers) constitutes higher proportion.
- Surveyed information revealed that average annual income of a family is varying from 1 Lakh to 1.5 lakh where major expenses are borne on food, medical expenses and shelter.
- While surveying it was found, most of these houses are made up of brick walls and cemented roof tops. Villages located in outer region are built semi structured, with walls made of bricks.
- Facilities relating to sanitary & hygiene in the region is not very satisfactory it need various awareness program. Toilets in the most of these houses are built inside premises while some use community toilets.
- Many households use LPG gas as fuel for cooking with very few still dependent on wood and hay.
- Sources of water are primarily present in the form of tap water inside houses or open wells and tube wells located at distance varying from kilometer or two from each of these villages.
- Every household on an average has 1 mobile phone for communication and 1 bicycle for transport.
- People also have motor cycle for commuting otherwise they are dependent on public transport – bus and auto.

### Education

- Household survey on prevailing educational conditions in these villages' highlights that study area performs fairly well, especially at Primary and Secondary schools for both genders.
- Senior Secondary schools however have less participation of female students when compared to male.
- Colleges are present in Udaipur city.
- Most of these families have stated that major reason behind this is due to financial constraints. Families prefer their girl child to take care of household chores and look after other young siblings so that adults can work outside and earn.
- Also, because considering women a soft gender they are expected to settle down early than completing her education.
- Provision to free books, uniform and food (mid-day meal) as per Government welfare benefits for students are provided in these primary school however, ratio of teachers to student is



extremely low. It becomes little stressful on the teachers run all the five classes in school at this average.

- In these sampled villages, senior secondary schools are few in number. Thus, if one has to pursue further he/she has not to go out from village for senior secondary education.
- During survey it was found, high proportion of dropouts occurs between secondary and senior secondary standard, that too independent of gender.
- These dropouts are mainly due to financial crunch. Village communities are not in position to cater multiple needs – food, clothing, shelter, medical needs etc.
- Facilities provided by Government in kind - such as mid-day meal arrangements are already in practice however still face severe problems of mismanagement among the organizers.
- This area needs larger attention from policy making communities in order to improve prevailing social norms and cultural stigmas related to women.

### Occupational structure

- Occupational structure of surveyed households suggests that most of people are engaged in unorganized sector.
- They either work as cultivators or agricultural labors or work at small scale manufacturing units such as stone quarries, mines, bangle making, textile industries, and handloom manufacturing units while few perform self-employed business.
- Most of family members in a household are also involved as cultivators and agricultural labors where men and women work equally.
- Marble cutting and furnishing also gives many of them fair opportunity to work and earn.
- Proposed expansion of lead zinc mine project would aim to give most of these people employment opportunity to earn decent living.

### Health

- The gap that exists in basic amenities and education categories appear small when compared to health facilities available in these villages.
- Seeing the census information of knowing health Infrastructure facilities in the region, very few villages has PHC's located while CHC's are mainly located in statutory towns and city.
- PHC's located here generally has basic medicine for fever, cold, cough, dysentery, loose motions etc. however for major issues villagers have to visit CHC located in Udaipur.
- Availability of doctors, physicians and pharmacists are also few in numbers in PHC's located.
- During field visit, it was revealed that government drives for the implementation of vaccinations among children have been quite prevailing across communities and that has played effective role in giving awareness to locals.
- Since region has large scheduled tribe and scheduled caste population pertaining to poor educational abilities and general awareness, such informational health care service drives helps in getting them benefits from aimed schemes.



- Seeing ground scenarios, health centers are inadequate in handling cases such as child birth (pre mature deliveries) which was clearly reflected from survey suggesting high home deliveries in the region.
- Regarding vaccination of children under the age of 5, 95 % of all communities in these villages were covered, while those who did not participate mainly owes to lack of awareness.
- Ambulance is available in the region during emergency however it is time taking.

#### **Transport**

- Study area is served by road and rail network mostly.
- These villages are indirectly connected with major road and rail links via thin roads that merge into national and state highway in the region.
- National Highway 48 and, State Highway 32 located in the study area.
- Other major road (metalled road) also passes evenly through the study area connecting many of the study area villages.
- Very few of these villages are still not connected with major road because of which villagers have to walk or either take bus that takes minimum 30 minutes to reach Jaitaran town.
- Bus service and auto service are also available in study area.

### **3.15.9 SOCIAL AND CULTURAL ACTIVITIES OF THE REGION**

The region has received a rich cultural heritage from the bygone ages. The lakes, temples, huge forts and palaces boast about the rich legacy of this area. The area has kept a balance between preserving the rituals and traditions of the past while keeping up with the modern advancements and changes in lifestyle. Like any other place in the state of Rajasthan, folk dance and music have an important place in adding to the city's cultural richness. The dynamic and vibrant dances of Bhavai, Ghoomar, KachchhiGhodi, Kalbeliya and Terahtaali add a sparkle to the rich cultural heritage of Udaipur.

### **3.15.10 GOVERNMENT SCHEMES**

For providing social assistance to backward and vulnerable groups in the society, Central and State Government introduced various social protection schemes associating the welfare of men, women, children and old of all age group irrespective of sex, caste, creed, race and religion. These programs are meant to ensure minimum national standard social assistance to socially challenged groups. Following are some major schemes currently running in the region.

**Central Government Schemes:** presently, following major schemes are running –

- Indira Gandhi National Old Age Pension Scheme (IGNOAPS)
- Indira Gandhi National Widow Pension Scheme (IGNWPS)
- Indira Gandhi National Disability Pension Scheme (IGNDPS)





- National Family Benefit Scheme (NFBS)
- JananiSurakshaYojna (JSY)
- AamAdmiBimaYojna (AABY)
- Make in India Scheme

**State Government Schemes:** presently, following major schemes are running –

- National Food Security Mission in Rajasthan (NFSM)
- Pradhan MantriFasalBimaYojna in Rajasthan (PMFBY)
- KisanKalewaYojna (KKY)
- SarasSamuhikArogyaBima (SSAB)
- Rajasthan Investment Promotion Scheme 2019
- PanditDeenDayalUpadhyayaGrameenKaushalyaYojna(DDU-GKY)
- SamagraShikshaAbhiyan
- MukhyamantriNishulkDavaYojna (MNDY)
- AnupratiYojana
- Indira Mahila Shakti Fund & related Schemes (IMSFS)
- Mukhyamantrihunarvikasyojna
- PalanharYojna
- MukhyamantriChiranjeeviSwasthyaBimaYojna
- Rajasthan Ambedkar DBT Voucher Yojna.

#### OTHER ISSUES

- Poor focus on Menstrual Hygiene in all these villages
- Gender disparity - in terms of wage / remuneration, social treatment, decision making power, domestic violence etc.
- Lack of awareness among vulnerable groups for their welfare
- Quality doctors and nurses are required in health care institutions

#### 3.15.11

#### SUMMARY AND CONCLUSION OF SOCIO ECONOMIC SETTING

The Socio – economic study of the area where lead zinc mine is located in Udaipur district of Rajasthan gives a clear picture of how it a favorable place in brining development. It cites demographic patterns (viz. gender and sex ratio, child sex ratio, family size,), present infrastructures, provision to basic amenities, educational facilities, occupational structure, health and hygiene, transport facilities, various social protection schemes running by central and state governmental schemes for welfare of locals and vulnerable groups.

Broadly it suggests that region has normalized difference in the population between male and female. Considering child sex ratio, proportion of male as compared to female are more and that gender disparity is fairly visible among these households. Provision to basic sanitary need is also very



poor in the region it often leads to severe cases of women health. Since the area has large non-working population and decent proportion of people living in joint families, the pressure on using resources and to generate livelihood income becomes high. Other than performing agriculture and being cultivator, many men and women are involved at other marginal works such as fabric shops, hardware shops, brassware workshop, handloom garments, khadi gram udyog, etc. As far as literacy is concerned, study area has poor literacy rate in general with varied patterns among male and female. At primary and secondary schooling children participation (irrespective of gender) is highly there however at senior secondary schools and college level participation by girl child is highly low. On comparing the dropout rates, they are higher among both genders after completing secondary schooling. Major reason behind this cause is monetary constraint. Considering health facilities in the region, study area has limited presence of PHCs and dispensaries. For meeting the requirements of CHC's villagers have to visit to Udaipur city area. Ambulance facilities are available during emergency. Fair quality and quantity of water availability in the form of local distributaries, drains and ponds are present in the region. Other drinking facilities are available in the form of tap water, community tanks and tube wells. Villagers have to approx. a kilometer from their houses to fetch water. As far as sanitary and hygiene is concerned in study area, under Swachh Bharat Mission, toilets have been provided in each household. Almost 95 % of these households are even using it however those who aren't is possibly due to unavailability proper water connection. Women sanitary hygiene is a matter of concern here as during survey it was found; menstrual hygiene is ignored among many women. Therefore more focus is needed on giving timely awareness on sanitary hygiene and taking benefits of social protection schemes running in the region since many vulnerable groups are still unknown of most of these welfare schemes. And the problem of covid has also come as a big problem in our country. And at the time of survey it was found that there is lack of awareness among the people to save from covid-19, so it is needed to make people aware for covid appropriate behavior.

Thus, this whole study of socio – economic concludes that mine project is suitable for sound socio economic development and with time it will only keep on positively evolving the region and its inhabitants thereby meeting end needs.



## CHAPTER - 4

### ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

#### 4.1 INTRODUCTION

The environmental parameters likely to be affected by mining are related to many factors, viz. physical, social, and economic, agriculture and aesthetic. Underground mining involves drilling, blasting, excavation (sub level open stope), underground transportation, winding/hoisting, hauling, crushing, transportation to mill, unloading etc. At present, Transportation of material from mine to the crusher (Primary crushers are installed in underground mine locations except Baroi & Mochia-Balaria Portal where it is installed on surface) is being carried out by appropriate capacity of LPDT (Low profile Dump Truck). The material is transported from primary crushers to beneficiation mill (installed within the lease area) through conveyors from Mochia mine, moveable belt tipper from Balaria and Dumpers from Zawarmala and Baroi Mine.

The operations may disturb environment of the area in various ways such as change of landscape, flora and fauna of the area, surface drainage and change in air, water and soil quality. While for the purpose of development and economic upliftment of people there is need for establishment of mining industries because the area is rich in mineral resources, but these should be environment friendly. Therefore, it is essential to assess the impacts of mining on different environmental and Socio-economic parameters before starting the mining operations so that abatement measures could be planned in advance for minimizing the impacts wherever feasible.

The likely impacts on different environmental parameters due to the mine site location, possible accidents, mine design, development, operations & final closure of this mining project are discussed below.

#### 4.2 METHODOLOGY OF IMPACT ASSESSMENT

The impact assessment has been undertaken following a systematic process that identifies, predicts and evaluates the impacts the project could have on aspects of the physical, biological, social/ socio-economic and cultural environment, and identifies measures that the project will take to avoid, minimise/reduce, mitigate, offset or compensate for adverse impacts; and to enhance positive impacts where practicable. The stages of the impact assessment process comprise of the following:

- **Impact identification:** to identify the potential impact of the project on the various environmental parameters.
- **Impact prediction:** to determine what could potentially happen to resources/receptors as a consequence of the project and its associated activities.
- **Impact evaluation:** to evaluate the significance of the predicted impacts by considering their magnitude and likelihood of occurrence, and the sensitivity, value and/or importance of the affected resources/ receptors.



- **Impact mitigation:** to identify appropriate and justified measures to mitigate negative impacts and enhance positive impacts.

#### 4.3 BASIS OF IMPACT ASSESSMENT

The impact of the proposed expansion project would be assessed on the basis of their characteristics i.e. nature, type, extent, duration, intensity & frequency and its significance.

##### **Characteristics of Impacts**

The impact is described in terms of its characteristics such as nature, type etc. Impact characteristics are given in Table below.

**Table - 4.1**  
**Impact Characteristics**

Characteristic	Classification	Description
Nature	Positive impact	When impact is considered to represent improvement to baseline or introduce a new positive factor/change.
	Negative impact	When impact is considered to represent adverse change to the baseline or introduce a new undesirable factor/change.
	Neutral	When there is no impact to represent any change on the baseline and not introducing any new factor/change.
Type	Direct impact	Resulting from a direct interaction between a project activity and the receiving environment / receptors.
	Indirect impact	Resulting from other activities that happened as a consequence of the project.
	Cumulative impact	Impacts that act together with other impacts (including those from concurrent or planned future third-party activities) to affect the same resources and/or receptors as the Project.
Extent	Project Area	When impact due to the project related activities is restricted within the premises of project area i.e. core zone.
	Local	When impact due to the project related activities is restricted within the immediate surroundings i.e. upto 3 km radius.
	Zonal	When impact due to the project related activities is restricted within the study area i.e. up to 10 km radius.
	Regional	When an impact due to the project activity extends within as well as beyond 10 km radius.
Duration	Short - term	When the impact is usually temporary or last for a short time or will have an effect soon rather than in the distant future.
	Long- term	When impact would occur during the development of the project and either takes a long time or lasts a long time or cause a permanent change in the affected receptor/resource.
Intensity	Low	When resulting in slight changes of prevailing baseline conditions and quality of existing physical environment is good. Ecological environment



Characteristic	Classification	Description
		as well as human receptors is not likely to be affected due to the expansion project activity.
	Medium	When resulting in changes of prevailing baseline conditions which are within the benchmark norms and quality of existing physical environment shows some signs of stress. Ecological environment as well as human receptors could be sensitive to change in quality of prevailing baseline condition, but human receptors retain an ability to adapt to change.
	High	When resulting in changes of prevailing baseline conditions which are exceeding the benchmark norms and quality of existing physical environment is already under stress. Ecological environment as well as human receptors would be impacted to the larger extent and the ability of human receptors to adapt to changes would be undermined.
Frequency	Remote (R)	When resulting in remote or one-off chance of an event due to an activity on a receptor/ resource.
	Occasional (O)	When an impact due to an activity is occurring intermittently from time to time on a receptor/resource.
	Periodic (P)	When an impact due to an activity is resulting on periodic basis for a week or a month on a resource/receptor.
	Continuous (C)	When an impact due to an activity is continuously resulting on a resource/receptor.

### Significance of Impacts

Impacts are described in terms of 'significance'. Significance is a function of the magnitude & sensitivity / importance of the impact.

Classification of impact significance is given in Table below.

**Table - 4.2**  
**Significance of Impact**

Significance	Description
Insignificant	Negligible impact or where a resource or receptor (including people) will not be affected in any way by a particular activity, or the predicted effect is deemed to be 'negligible' or 'imperceptible' or is indistinguishable from natural background variations.
Minor	Where an effect will be experienced, but the impact is well within accepted standards/guidelines with or without mitigation.
Moderate	Where an effect will be experienced and the impact is within accepted standards/guidelines with mitigation.
Major	Impact where an accepted limit or standard may be exceeded or the impact occur to the highly valued/sensitive resource/receptors.



### Irreversible and Irretrievable commitments of environmental components

Determining the irreversible and irretrievable commitment of the resources is one of the major stages of impact evaluation, which gives an understanding about the potential impacts that are likely to affect future generations of the area and facilitates for adoption of proper mitigation measure regarding the same.

Table - 4.3

#### Irreversible and Irretrievable commitments of environmental components

Commitment of resources	Description
Irreversible	Irreversible commitment of resources refers to the impact or loss of the resources that cannot be recovered or reversed. Irreversible is a term that describes the loss of future options. It applies primarily to the impacts of use of nonrenewable resources or to those factors that are renewable only over long periods of time.
Irretrievable	Irretrievable is a term that applies to the loss of production, harvest, or use of natural resources. Irretrievable commitment of resources may be considered as the loss of resources as a result of change (both reversible & irreversible) due to any project activity that cannot be regained or recovered.

### 4.4 INTERACTION MATRIX

The interaction matrix enables a methodical identification of the potential interactions each project activity may have on the range of resources/receptors within the Area of Influence for the Project.

The interaction matrix for the project activities and likely impacted resources/receptors is presented in Table - 4.4 which covers potential interactions, regardless of probability of occurrence. The matrix consists of a list of resources/ receptors that could be affected against a list of project activities.

Entries in the matrix cells are tick marked to indicate whether:

- An interaction is not reasonably expected (blank);
- The interaction is reasonably possible and may lead to potential impact (tick marked).

**Table - 4.4**  
**Interaction Matrix**

[illegible]







S. No.	Project Activity  Likely Impacted Resources / Receptors	Land Acquisition				Mine development & Process				Reclamation and Greenbelt/plantation			Miscellaneous			
		Acquiring land	Displacement of households	Displacement of occupation	Rehabilitation & Resettlement of PAFs	Site Clearing within the project area and leveling of site (removal of vegetation, structures etc.)	Mining Operation (excavation with Drilling, blasting)	Loading and unloading of mined out material	Crushing of ROM in the crusher in the Mining lease	Transportation of crushed Ore through Conveyor belt	Tailing Storage Facility formation	Reclamation of TSF	Greenbelt Development and maintaining greenbelt of 7.5 m statutory barrier.	Workshop for HEMM maintenance in mine.	Meeting points of workers/ employees i.e. Rest shelter, canteen	Handling of high explosive in magazine & AN storage shed and fuel
7.	Infrastructure & Public Services					√										
8.	Public Health						√					√				
9.	Agriculture					√	√									
10.	Transport Infrastructure									√						
D.	Occupational Health															
1.	Injury					√	√	√								√
2.	Health							√								√
3.	Non - routine risk						√									√
	Legends	Show no interactions is reasonably									√	Show interactions reasonably possible with one of the outcomes may lead to potential impact				



According to the interactions identified between project activities and resource/receptors as described in the above table, it is evident that the following aspects are likely to have impact due to the mining project and therefore, to be considered for Impact Assessment:

**Table: 4.5**  
**Likely Impacted Resources / Receptors**

S. No.	Likely Impacted Resources / Receptors	
<b>A.</b>	<b>Physical:</b>	Air Quality
		Noise Level, ground vibrations
		Water environment (Surface & Ground water)
		Soil Environment
		Land Use
		Geology & Topography
<b>B.</b>	<b>Biological environment</b>	Flora
		Fauna
<b>C.</b>	<b>Socio economic environment</b>	Habitation & Demography
		Physical Displacement
		Land use (w.r.t. population influx)
		Economy & Livelihood
		Social & Cultural Structure
		Infrastructure & Public Services
		Public Health
		Agriculture
		Transport Infrastructure
<b>D.</b>	<b>Occupation Health &amp; Safety</b>	Injury
		Health
		Non-Routine Risk

#### 4.5 ENVIRONMENTAL IMPACT ASSESSMENT AND MITIGATION MEASURES

The mining activities are underground, so it may not disturb environment but the process of beneficiation and transportation that is being taken place on the surface may affect environment in various ways such as degradation of land, dust generation, deterioration of water and soil quality, affecting the biological and socio-economic environment of the area. The impacts of mining and beneficiation on various environmental parameters were assessed and are given below.

##### 4.5.1 IMPACT ON AIR QUALITY AND MITIGATION MEASURES

The underground mining project includes various mining operations involving drilling, blasting, primary crushing and beneficiation process that takes place on surface includes transportation of ore to beneficiation plant, crushing, tailings disposal and vehicular movement are the sources to



air pollution. These operations result in generation of dust and thereby pose health hazards. However, adequate control measures will be provided at every stage of operation.

The mining activities will be confined to underground and will have insignificant effect on air pollution on the surface.

#### 4.5.1.1 AIR POLLUTION DUE TO LEAD-ZINC MINING PROJECT

##### (i) Gaseous Pollution

Gaseous pollutants ( $\text{SO}_2$  and  $\text{NO}_x$ ) are anticipated from blasting operation, small D.G. Sets, crushing & screening, HEMMs like LPDT, LHD, trucks and other vehicles.

##### (ii) Particulate Matter

The generation of dust is anticipated from various mining activities like ore loading, unloading, crushing, transportation, crushing & grinding, tailing storage and other Mining and beneficiation related activities. The ambient air quality monitored during Summer Season (March – May, 2021) and March to May, 2024 shows that the PM concentration in the surrounding villages is within the prescribed limits, However, to maintain or to improve the quality, effective mitigative measures should be taken during each and every activity. Transportation and Crushing are the major sources to air pollution due to beneficiation.

#### 4.5.1.2 AMBIENT AIR QUALITY IMPACT PREDICTION MODELING

Impact Prediction is an important part of Environmental Impact Assessment Study. There are various techniques available to predict the impacts. Mathematical modelling is an established and accepted technique for the same. The ambient air quality depends upon emission sources, meteorological conditions and the topographical features of the study area. The impact of any future emission activities can be accessed through air quality modelling. Air quality modelling is a mathematical replication of how air pollutants disperse and transport to the receptor considering the effect of meteorology and site terrain. An air quality models reflects a mathematical description of hypothesis conveying the behaviour of some physical process or other and not exact replica but contain some of nature's essential elements. Air quality managers use models to identify source contributions to air quality problems and assist in the design of effective strategies to reduce harmful air pollutants.

The present study has evaluated the impact on surrounding air quality considering following activity:

**Table 4.6**  
**Normative and Peak Production Capacity**

S. No	Particulars	Production Million TPA	Normative Production Capacity (TPD) (365 Days)	Peak production Capacity (TPD) (350 days)
1.	Ore Production	6.5	17,808.2	18,571.4
2.	Waste Rock	1.28	3,506.9	3,657.2
3.	Total excavation	7.78	21,315.1	22,228.6



S. No	Particulars	Production Million TPA	Normative Production Capacity (TPD) (365 Days)	Peak production Capacity (TPD) (350 days)
4.	Beneficiation	7.3	20,000	20,857.2

This report gives the cumulative peak incremental concentration of Particulate Matter to a distance of 10 km, due to the mining & allied activity. The concentrations have been predicted in all directions covering study period. Spatial distributions of all the pollutants are also presented in the form of Isopleths.

#### 4.5.1.2.1 ACTIVITIES INVOLVED IN THE PROJECT:

The underground mining project includes various mining operations involving drilling, blasting, ore loading, waste dumping, primary crushing and beneficiation process that takes place on surface includes transportation of ore to beneficiation plant, crushing, tailings disposal and vehicular movement.

Various mining activities such as drilling, blasting, loading, transportation & crushing are being conducted in such a way to ensure maximum mineral conservation and minimum environmental degradation.

#### 4.5.1.2.2 EMISSION RATE AS PER MATERIAL HANDLED

The area and line source modelling were done by using AERMOD 9.9.0. Numerous researchers has derived various formulation based on the experimental data and generalized the emission calculation for various open cast mining activities irrespective of type of mining (CMFRI, 1998; Chakraborty et al. 2002). Emission rate and pollution load due to each activity has been calculated on the basis of Area Source, Point source and Line Source emission rates.



#### A. Point Source

Table - 4.7  
Stack Details of Proposed Mill

Stack attached to	Design Flow Rate (Am <sup>3</sup> /hr)	Efficiency (%)	Actual Max Flow (Am <sup>3</sup> /hr)	PM (max)	Emission rate (Kg/hr)	Emission rate (g/sec)	Temp (deg.C) (max)	Dia at top (m)	Area (m <sup>2</sup> )	Flow (m <sup>3</sup> /sec)	Exit Velocity
Mill-1 Mochia Crusher	105000	80	8400	100	8.40	2.33	Ambient	1.5	1.77	23.33	13.21
Mill-1 Balaria Crusher	105000	80	8400	100	8.40	2.33	Ambient	1.5	1.77	23.33	13.21
Mill-2 Crusher	105000	90	94500	100	9.45	2.63	Ambient	1.6	2.01	26.25	13.06
Mill-3 Crusher	105000	90	94500	100	9.45	2.63	Ambient	1.6	2.01	26.25	13.06

Source: Hindustan Zinc Limited



#### 4.5.1.2.3 MODELLING PROCEDURE

Prediction of incremental GLC's due to Lead & Zinc Underground Mine has been made by AERMOD version 9.9.0 as per CPCB guidelines. It is US-EPA approved model for prediction of the air quality. The model uses rural dispersion and regulatory default options as per guidelines on air quality models. For this study, uniform polar receptors on flat terrain have been assumed.

Meteorological inputs required are hourly wind speed and direction, ambient temperature, stability class.

#### 4.5.1.2.4 METEOROLOGICAL DATA

Data recorded at the weather monitoring station on wind speed, direction, and temperature at one-hour interval for the monitoring period has been used as meteorological input.

#### 4.5.1.2.5 AMBIENT AIR QUALITY STANDARDS

Ambient air quality standards promulgated by National Ambient Air Quality Standards for different areas are as follows:

**Table - 4.8**  
**Ambient air quality standards**

Area	Time Weighted Average	Concentration (µg/m <sup>3</sup> )		
		PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>2</sub>
Industrial Area, Residential Rural and Other Areas	Annual Average	60	50	40
	24 hours	100	80	80
Ecologically Sensitive Area (Notified by Central Govt.)	Annual Average	60	20	30
	24 hours	100	80	80

#### 4.5.1.2.6 PRESENTATION OF RESULTS

In the present case, model simulations have been carried out for proposed expansion in mining project to obtain an optimum description of variations in concentration over the site in 10 km radius covering 16 directions.

The incremental concentrations have been estimated based on mathematical emission data-based modelling. For each time scale, i.e. for 24 hrs, the model computes the maximum predicted values observed during the period over all the measurement points. Existing value has been covered in the Background Ambient Air Quality Monitoring.

The Ground level incremental predicted values are estimated for the monitoring period. For each time scale, i.e. for 24 hr the model computes the highest concentrations observed during the period over all the measurement points. Details are given as under:

##### **For Area Source:**

The maximum predicted incremental concentration due to the expansion in mining project for PM<sub>10</sub> is superimposed on the maximum baseline PM<sub>10</sub> of mining lease area, concentration recorded at the monitoring locations during the field monitoring period. The maximum incremental





predicted values/concentration due to mining activities PM<sub>10</sub> is 1.82 µg/m<sup>3</sup>, PM<sub>2.5</sub> is 0.728 µg/m<sup>3</sup>, SO<sub>2</sub> is 1.49 µg/m<sup>3</sup> & NO<sub>2</sub> is 1.95 µg/m<sup>3</sup>. Isopleths showing maximum predicted incremental concentration are given as **Figure no. 4.1 a-4.1d**.

Mainly fugitive emission will be generated from mining and beneficiation operation which will be restricted nearby the lease boundary by using proper dust suppression measures.

Fugitive emissions generated due to area source will be controlled by various measures viz wet drilling, maintenance of HEMMs, regular water sprinkling on haul road, & loading/unloading points, The trucks are being covered with tarpaulin sheets etc other than this, use of PPEs for workers working in high dust zone and development of green belt and plantation will be adopted.

**Table - 4.9**  
**Peak Incremental Concentration for Different Scenarios**

Particular	Baseline Results (µg/m <sup>3</sup> )	Incremental Predicted value (µg/m <sup>3</sup> )	Resultant (µg/m <sup>3</sup> )	CPCB NAAQS Standards (µg/m <sup>3</sup> )
PM 2.5	45.9	0.728	46.628	60
PM 10	76.4	1.82	78.22	100
SO <sub>2</sub>	18.2	1.49	19.69	80
NO <sub>2</sub>	30.8	1.95	32.75	80

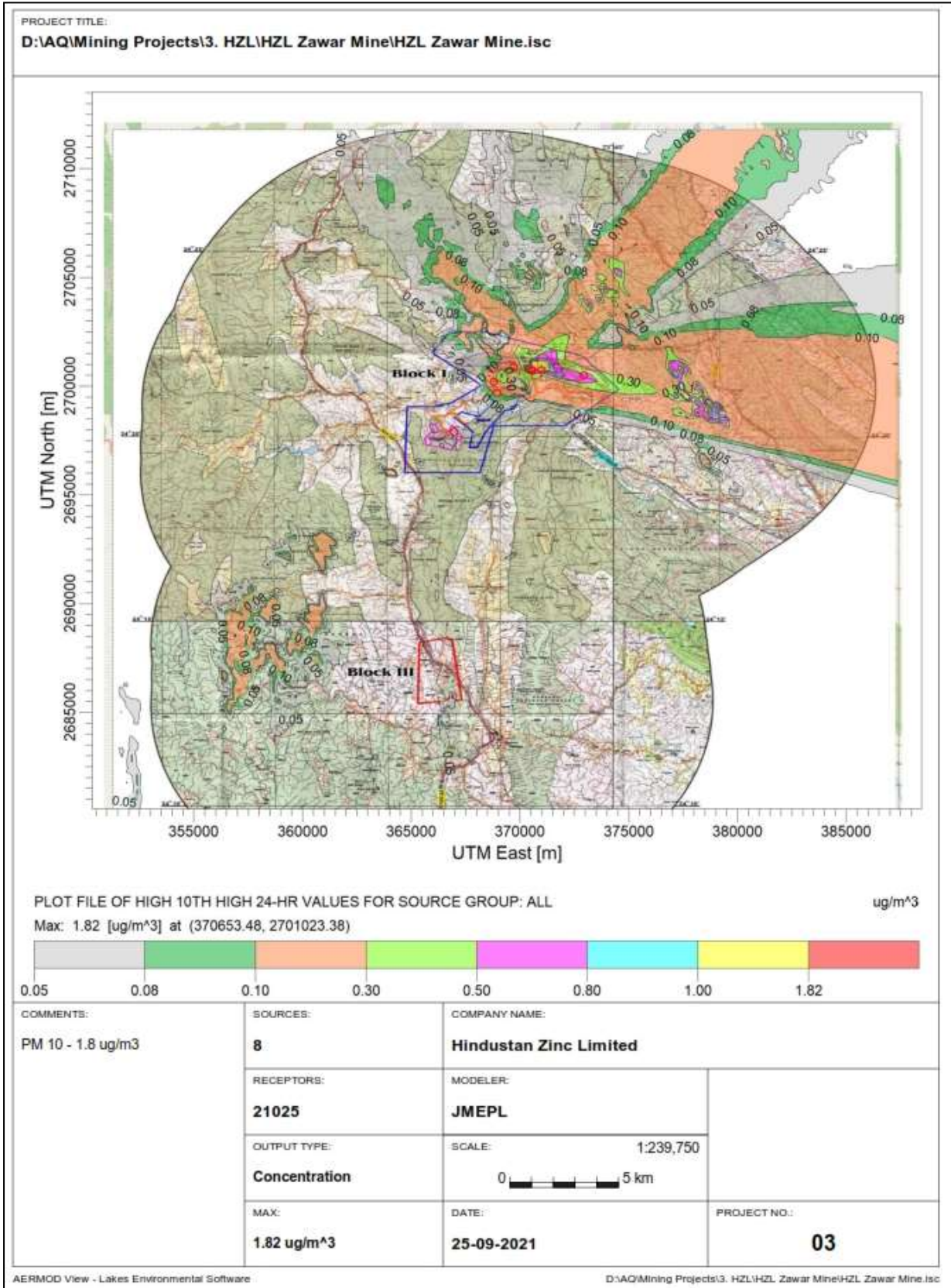


Fig 4.1 (a): Isopleth showing incremental GLCs of PM<sub>10</sub> for Zawar Mine (Max GLC – 1.82 µg/m<sup>3</sup>)

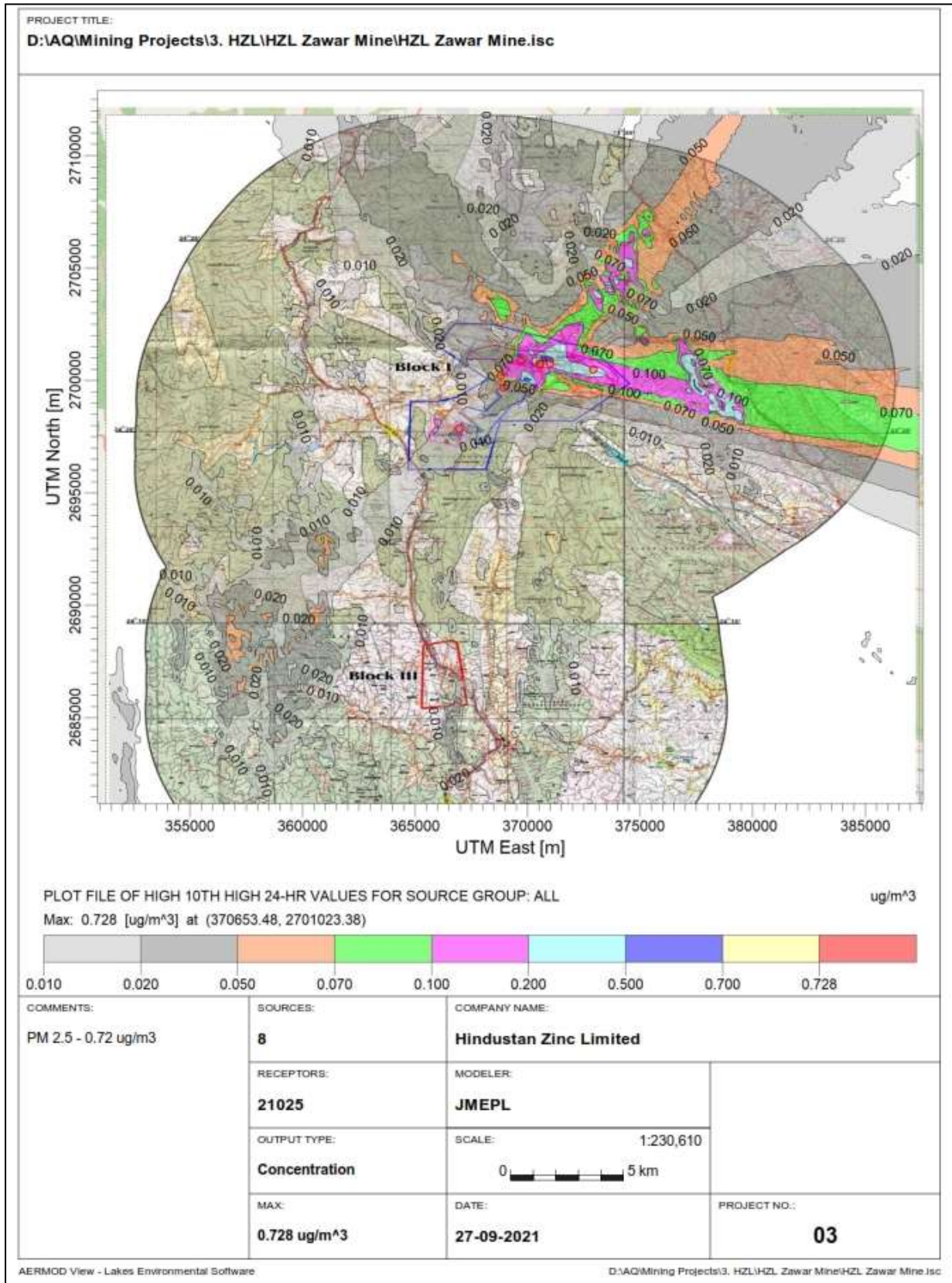


Fig 4.1 (b): Isopleth showing incremental GLCs of PM 2.5 for Zawar Mine (Max GLC – 0.728  $\mu\text{g}/\text{m}^3$ )



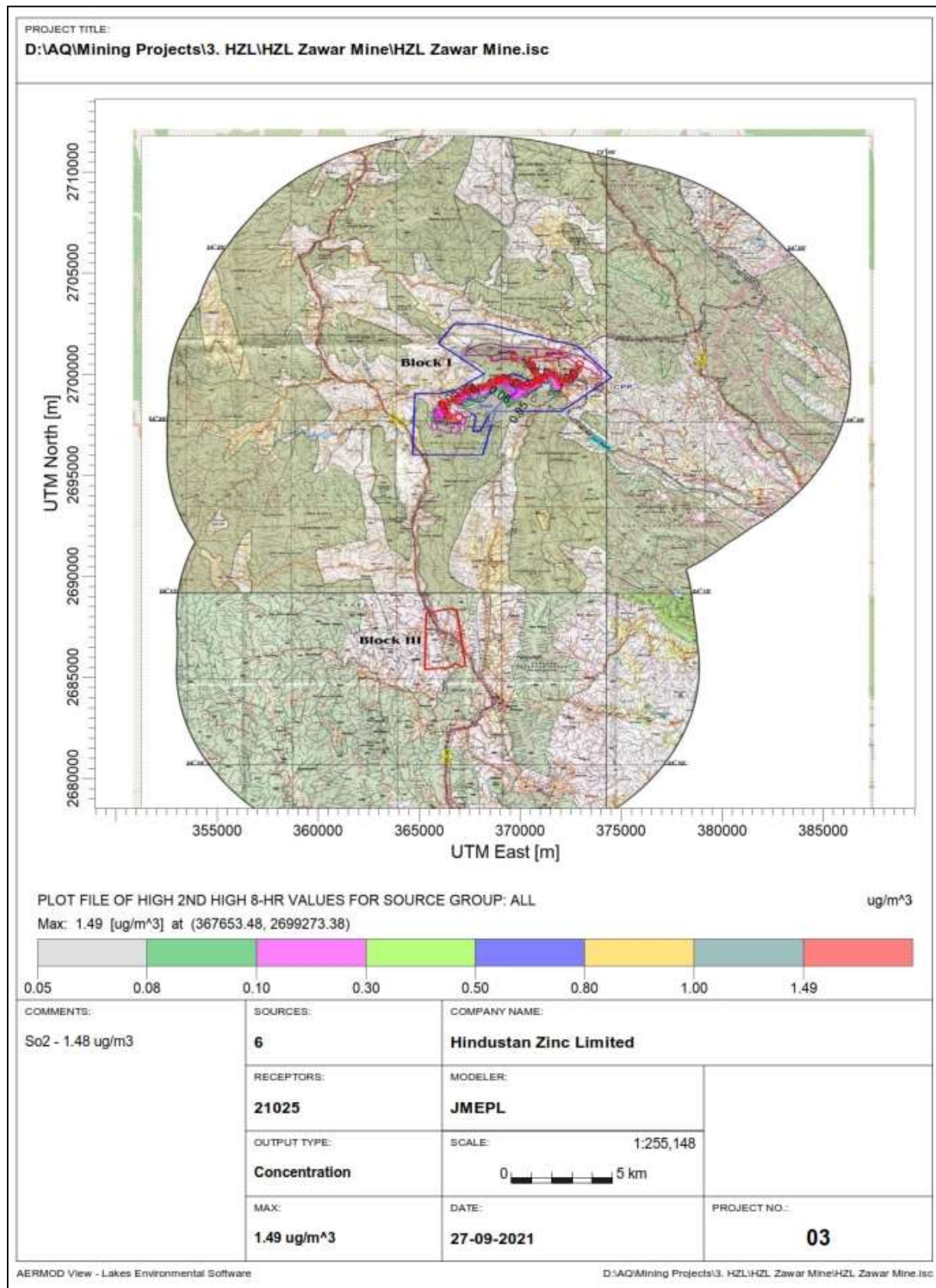


Fig 4.1 (c): Isopleth showing incremental GLCs of SO<sub>2</sub> for Zawar Mine (Max GLC – 1.49 µg/m<sup>3</sup>)

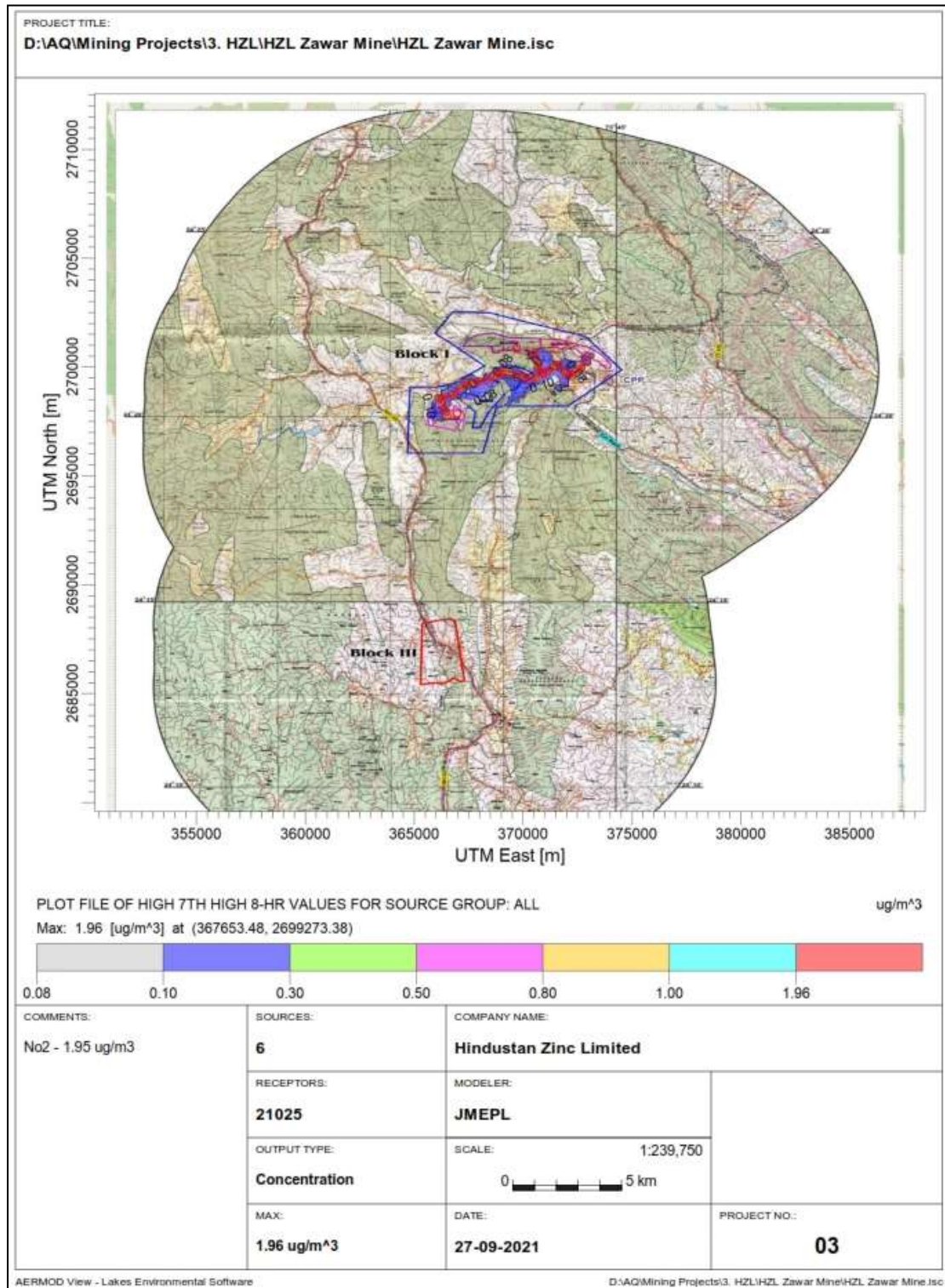






Fig4.1 (d): Isopleth showing incremental GLCs of NO<sub>2</sub> for Zawar Mine (Max GLC – 1.96 µg/m<sup>3</sup>)

#### 4.5.1.2.7 MITIGATION MEASURES




The following mitigation measures will be adopted to mitigate air pollution generated due to the mining and beneficiation activities is given in the following table:








S. No	Activity	Potential Impact	Mitigation Measures	PHOTOGRAPHS SUPPORTING MITIGATION MEASURES	
<b>MINING</b>					
1.	<b>Drilling</b>	Dust from drilling operations	<ul style="list-style-type: none"> <li>➤ Excavation of ore by drilling is carried out underground.</li> <li>Wet drilling is being used to suppress dust generation.</li> </ul>		
2.	<b>Blasting</b>	Dust from blasting operations	<ul style="list-style-type: none"> <li>➤ Excavation of ore by blasting is carried out underground.</li> <li>➤ Most of the dust produced during blasting is settled down underground, and get diluted by ventilating air before being exhausted.</li> <li>➤ The dust settled underground will be sufficiently wetted to prevent from getting air borne.</li> </ul>		
3.	<b>Ventilation</b>		<ul style="list-style-type: none"> <li>➤ Adequate ventilation is maintained as per DGMS guidelines.</li> <li>➤ Ensuring flow through ventilation in stoping &amp; forcing ventilation in development headings.</li> <li>➤ Assessment &amp; simulation of ventilation requirement through Ventsim.</li> </ul>		
4.	<b>Transportation from Underground To Surface</b>	Fugitive dust during loading & unloading and transport of ore	<ul style="list-style-type: none"> <li>➤ Water spraying is carried out to ensure sufficient moisture in the ore transported to the surface.</li> <li>➤ This minimizes any fugitive dust generation and hence impact on ambient air quality from the underground mining activity is not expected to be significant.</li> </ul>		
5.	<b>Transportation within ML Area</b>	<ul style="list-style-type: none"> <li>➤ Fugitive dust during loading &amp; unloading and transport of ore</li> <li>➤ Release of vehicular exhaust</li> </ul>	<ul style="list-style-type: none"> <li>➤ The trucks are being covered by tarpaulin due to transportation.</li> <li>➤ During transportation &amp; unloading points, spraying of water is done to control dust being air borne.</li> <li>➤ Closed conveyor system</li> </ul>		



S. No	Activity	Potential Impact	Mitigation Measures	PHOTOGRAPHS SUPPORTING MITIGATION MEASURES	
			<p>with dust suppression, for transportation of materials.</p> <ul style="list-style-type: none"><li>➤ Speed limit will be enforced to reduce airborne fugitive dust from vehicular traffic.</li><li>➤ Proper maintenance of vehicles will be done to limit gaseous emissions.</li><li>➤ Deployment of mechanized vacuum road sweeper on surface roads</li><li>➤ Development of plantation within ML Area.</li></ul>		
CRUSHING					
S.No	Activity	Potential Impact	Mitigation Measures		
1.	CRUSHING	Fugitive Emissions	<ul style="list-style-type: none"><li>➤ Use of proper protection measures i.e. use of Bag filters, Regular water spraying on Crusher hopper to arrest dust from becoming air-borne.</li><li>➤ In the secondary crushing operations at beneficiation plant, moist ore with 3-4% moisture is fed to control emission of dust.</li><li>➤ The crushers and screens houses are provided with dust extraction system with outlets connected to stacks which are regularly monitored.</li></ul>		
BENEFICIATION					
S. No	Activity	Potential Impact	Mitigation Measures		
1.	Beneficiation process		The beneficiation process practiced at Zawar is a wet process and also the equipment used are operated electrically, hence no significant particulate or gaseous emissions are observed.		





S. No	Activity	Potential Impact	Mitigation Measures	PHOTOGRAPHS SUPPORTING MITIGATION MEASURES
2.	Tailing disposal		The surface of the existing tailing dam is kept wet due to continuous discharge of tailings mixed with water. The old tailing has been stabilized with sufficient soil cover and vegetation with almost 1.55 lakhs plants of various species surviving as on date. The practice of stabilizing abandoned tailing dams with vegetative cover will continue in future.	
3.	Transportation Outside ML area	<ul style="list-style-type: none"> <li>➤ Fugitive dust during loading &amp; unloading and transport of concentrate</li> <li>➤ Release of vehicular exhaust</li> </ul>	<ul style="list-style-type: none"> <li>➤ About 8% moisture is retained in the final product. Hence, dust emissions are controlled during handling and transportation and there are no significant particulate emissions.</li> <li>➤ The trucks are being covered by tarpaulin due to transportation.</li> </ul>	
<b>MONITORING</b>				
<ul style="list-style-type: none"> <li>➤ CAAQMS have been installed at 3 locations as per wind direction with digital display of data in front of the main gate of the mine site. The pH meters and turbidity meters have also been provided.</li> <li>➤ Periodic air quality monitoring is being/will be carried out.</li> </ul>				 

#### 4.5.1.3 IMPACT ON AIR ENVIRONMENT DUE TO CRUSHING AND SAFEGUARD/MITIGATION MEASURES

The key emissions due to crushing in the mine are Particulate Matter. Proper safeguard measures will be taken to reduce the impact of crushing as given below:

##### SAFEGUARD/MITIGATION MEASURES

- Use of proper protection measures i.e. use of Bag filters, Regular water spraying on Crusher hopper to arrest dust from becoming air-borne.
- In the secondary crushing operations at beneficiation plant, moist ore with 3-4% moisture is fed to control emission of dust.
- The crushers and screens houses are provided with dust extraction system with outlets connected to stacks which are regularly monitored.



Fig 4.2: Dust Extraction System

#### 4.5.1.4 IMPACT EVALUATION

Ambient Air Quality monitoring results are given in **Table 3.10 & 3.11, Chapter 3** of this Final EIA/EMP report. From this it is evident that AAQ results are well within the prescribed norms. Impact evaluation is given in Table below.

Table: 4.10

Impact Evaluations for Ambient Air Quality

Impact Element	Evaluation	Change Of Air Quality Due to Proposed expansion in Underground Lead Zinc Mining Project		
Potential Effect/ Concern	Impact on health of humans and nearby biological/ecological receptors due to line and point sources of air emissions including fugitive dust emissions during mining activities from the proposed expansion in mining Project			
Characteristics of Impacts				
Nature	Positive		<b>Negative</b>	Neutral
			✓	
Type	<b>Direct</b>	Indirect	Cumulative	
	✓			
Extent	Project Area	Local	<b>Zonal</b>	Regional



		✓		
Duration	Short - term		Long- term	
			✓	
Intensity	Low		Medium	High
			✓	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	Continuous (C)
				✓
Significance of Impact				
Significance	Insignificant	Minor	Moderate	Major
			✓	

#### 4.5.2 IMPACT OF NOISE / VIBRATIONS AND MITIGATION MEASURES

##### 4.5.2.1 IMPACT OF NOISE ON WORKING ENVIRONMENT

With the increase in production levels there will be proportionate increase in mining operations, deployment of machinery, drilling and blasting for mine development, excavation and transportation of ore and men that are expected to generate noise.

##### Noise Generated due to Drilling, Excavation, Transportation and Crushing

Since almost all the mining activities will take place below ground, except the ore crushing and transportation on the surface. The noise levels due to drilling; blasting and operation of mining equipment will be confined to underground only and attenuated due to the depth of the operation.

**TABLE - 4.11**  
**Permissible Exposure in Case of Continuous Noise**

S. No.	Sound Level (dB A)	Continuous Duration (Hours)
1.	85	8
2.	88	4
3.	91	2
4.	94	1
5.	97	0.5
6.	100	0.25
7.	103	0.125
8.	106	0.067

Source: Factories Noise Regulations, 1997

The only noise generating sources situated above ground are the compressors / fans for feeding air / ventilation for the underground operations.

The main noise generating sources are compressors, crusher house, Ball mills and floatation cells. The noise levels at the source for these units will be in the range of 80-90 dB(A).



In summary, it can be stated that the impact on the present noise levels due to mining operations are/will be restricted to the work zone areas only. Hence, the noise levels impact due to expansion in mining operations on community is/will be insignificant.

#### **Methodology & interpretation:**

Noise Impact Prediction has been carried out using iNoise Software V2020.0 by DGMR Software (A division of DGMR Consulting Engineers, Netherlands). This software works on the principal method of calculation of ISO 9613.

This model has been used for the prediction of noise level due to the area source for Underground Lead Zinc Mine (ML Area-3620 ha) with Expansion OF Zawar Group of Underground Lead-Zinc Mines(Ore) Production Capacity from 4.8Million TPA to 6.5 Million TPA with (Total excavation of 7.78 Million TPA including Waste Rock generation 1.28 MTPA) and Beneficiation from 4.8 MTPA to 7.3 MTPA (M.L. Area- 3620 ha; ML No.03/89) at Village: Zawar, Tehsil: Girwa & Sarada, District: Udaipur, Rajasthan.



#### **Interpretation:**

- The model reflects noise levels due to Compressors fans for feeding air / ventilation for the underground operations, crusher house, Ball mills and floatation cells and operation of HEMMs viz. Drills, Dumpers, Tippers, and other medium sized vehicles within lease area.
- Blasting has not been considered as it occurs for a very short duration and is temporary in nature. Therefore, the prediction has been carried out based on the operation of above HEMMs. Blasting Report of Mochia, Balaria, Baroi and Zawarmala is enclosed as **Annexure 18 (a), (b), (c) & (d) respectively**.
- The predicted levels of generated noise will be within the mining lease area and are well within the prescribed standards for industrial area.

#### **4.5.2.2 MITIGATION MEASURES TO REDUCE NOISE LEVEL**

The following mitigation measures will be adopted to mitigate noise pollution generated due to the mining and beneficiation activities is given in the following table:



S. No	Activity	Potential Impact	Mitigation Measures	PHOTOGRAPHS SUPPORTING MITIGATION MEASURES
1.	Drilling & Blasting	Rise in ambient noise level may result in noise induced hearing loss, annoyance & irritation, sleep deprivedness.	<ul style="list-style-type: none"><li>➤ Majority of mining activities are restricted to underground only.</li><li>The workers employed are provided with protective equipment, earmuffs and earplugs as a protective measure from the high noise level generated at the mine site and wherever required.</li></ul>	
3.	Ventilation fans		<ul style="list-style-type: none"><li>➤ Installation of ventilation fans is designed in such a manner to control the noise levels and also they are placed at isolated locations in the mine area to avoid noise pollution in the surrounding.</li><li>Ventilation fans are provided with silencers</li></ul>	
4.	Compressors & DG Set		<ul style="list-style-type: none"><li>➤ Compressors and DG Sets are installed with acoustic enclosures.</li><li>➤ Surrounding / Concealment of noise generating machinery with artificial, non-permanent arrangement like noise isolative structure and acoustic barriers.</li><li>➤ The prime movers/diesel engines are of proper design and are properly maintained.</li></ul>	
5.	TRANSPORTATION		All vehicles and machineries used have noise emissions within permissible limits through regular maintenance.	
6.	CRUSHING		<ul style="list-style-type: none"><li>➤ Provision of sound insulated chambers for the workers deployed on machines producing higher levels of noise</li><li>Reducing the exposure time of workers to the higher noise levels</li></ul>	
7.	BENEFICIATION		<ul style="list-style-type: none"><li>➤ Improved design of chutes and mill liners.</li><li>Good grindability due to soft ore.</li></ul>	
MONITORING				
Regular monitoring of noise level of mining & milling equipment				



#### 4.5.2.3 IMPACT EVALUATION OF NOISE

Ambient Noise Level monitoring results are given in Table 3.14 of Chapter 3 of this Final EIA/EMP report. From this it is evident that results are well within the prescribed norms. Impact evaluation is given in Table below.

**Table: 4.12**  
**Impact Evaluation for Noise**

Impact Element	Evaluation	Change Of Air Quality Due to Proposed expansion in Underground Lead Zinc Mining Project		
Potential Effect/ Concern	Impact on health of humans and biological factors/receptors due to noise generated due to mining activities during day and night time and also on occupational health of the workers exposed to noise.			
Characteristics of Impacts				
Nature	Positive		<b>Negative</b>	Neutral
			√	
Type	<b>Direct</b>	Indirect	Cumulative	
	√			
Extent	<b>Project Area</b>	Local	Zonal	Regional
	√			
Duration	Short - term		Long- term	
	√			
Intensity	Low		<b>Medium</b>	High
			√	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	<b>Continuous (C)</b>
			√	
Significance of Impact				
Significance	Insignificant	Minor	<b>Moderate</b>	Major
			√	

#### 4.5.2.4 IMPACT OF VIBRATION DUE TO BLASTING

Ground vibration, fly rock, noise, dust and fumes are the deleterious effects of blasting operation on environment. The explosive energy sets up a seismic wave in the ground, which can cause significant damage to structures and disturbance to human occupants.

When an explosive charge is fired inside the blast hole, it is converted into hot gases, which exert intense pressure on the blast hole walls. High intensity shock waves propagate radially in all directions and cause the rock particles to oscillate. This oscillation is felt as ground vibration. Blasting, in addition to easing the hard strata, generates ground vibrations and instantaneous noise. Ground vibration from mine blasting is expressed by amplitude, frequency and duration of blast. The variables, which influence ground vibrations, are controllable and non-controllable. The

non-controllable variables include general surface terrain, type and depth of overburden. Similarly, the controllable variables include type of explosives, charge per delay, delay interval, direction of blast progression, burden, spacing, specific charge and coupling ratio.



The oscillation of rock particles is called Particle Velocity and its value is called Peak Particle velocity (PPV), which is measured in millimeters per second. The standards for safe limit of PPV are established by Director General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997. The safe level criteria PPV as mentioned in Circular No. 7 of DGMS is presented below:

**Table - 4.13**  
**Permissible Peak Particle Velocity (mm/s)**

S. No.	Type of Structure	Dominant Excitation Frequency (Hz)		
		< 8 Hz	8 - 25 Hz	> 25 Hz
A)	Buildings/structures not belonging to the owner			
1.	Domestic houses/structures (Kuchcha brick and cement)	5	10	15
2.	Industrial Buildings (RCC and framed structures)	10	20	25
3.	Objects of historical importance and sensitive structure	2	5	10
B)	Buildings belonging to the owner with limited life span			
1.	Domestic houses/structures (Kuchcha brick and cement)	10	15	25
2.	Industrial buildings (RCC and framed structures)	15	25	50

Source: DGMS Circular No. 7 dated 29.8.1997

As the distance increases the PPV value is likely to reduce. As the distance increases the PPV value is likely to reduce. A ground vibration study due to blasting had been done and based on recommendations of study protection measures are taken to control vibrations. The noise levels and vibration induced by blasting will be attenuated due to depth of the mine below ground. With the proposed expansion, the mine development will occur faster into deeper levels that shall further reduce the noise and vibration impact on the surface. Blasting is carried as per the recommendations of the CIMFR, Dhanbad and blasting is monitored for vibration as per the DGMS rules and is found well within the permissible limits. Copy of report is enclosed as **Annexure 18 (a), (b), (c) & (d) respectively**.

	
View of NONEL delay detonators connection for delay detonator scattering test	Analysis of actual firing time from video data

Following mitigation measures are being adopted to combat the ground vibrations due to blasting:





- Ground vibrations will not affect the structures in the vicinity of ML area as blasting is being done within the standards prescribed by DGMS for controlled blasting and vibration induced by blasting will be attenuated due to depth of the mine below ground.
- The recommendations of CIMFR followed by approvals from DGMS regarding charge per hole & delay/blasting sequences are/will be implemented.
- Regular vibration monitoring at surface on appropriate locations by Seismographs.
- NONEL and bottom hole initiation system with optimal charge per delay is being used to reduce the noise level, vibrations and fly rocks.
- Total charge and Maximum Charge per delay (MCPD) for individual block is decided based on its location derived from predictor equation.

#### 4.5.2.5 IMPACT SIGNIFICANCE OF GROUND VIBRATIONS

Table: 4.14

Impact Evaluation for Ground Vibrations

Impact Evaluation Element	Change Of Air Quality Due to Proposed expansion in Underground Lead Zinc Mining Project			
Potential Effect/ Concern	Impact on buildings and other structures and on the workers involved in the blasting process.			
Characteristics of Impacts				
Nature	Positive		Negative	Neutral
			✓	
Type	Direct	Indirect	Cumulative	
	✓			
Extent	Project Area	Local	Zonal	Regional
	✓			
Duration	Short – term		Long- term	
	✓			
Intensity	Low		Medium	High
			✓	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	Continuous (C)
			✓	
Significance of Impact				
Significance	Insignificant	Minor	Moderate	Major
		✓		

#### 4.5.3 IMPACT OF SUBSIDENCE AND MITIGATION MEASURES

##### 4.5.3.1 IMPACT OF SUBSIDENCE

The underground mining operations are subjected to occurrence of subsidence when large portions of materials are excavated resulting in surface subsiding over the mining area. The



vertical displacements resulting in central area of subsidence i.e. subjected to gradual lowering, and horizontal differential displacements which cause strain on the surface. Large horizontal strains of tensile nature manifest in cracks on the surface. Mostly damages to the surface structures are caused due to horizontal strains.

#### 4.5.3.2 SUBSIDENCE MONITORING

Although the litho units of Zawar area are good rock and require normal support, however Zawar mines is practicing systematic support rules based on recommendation of sixth conference on safety in mines as approved under regulation no. 112 (2a)-MMR1961.

In addition, GCMP (Ground Control Management Plan) has been formed by HZL for all the mines and implemented.

Subsidence monitoring, which is an integral part of ground control and will be done in two ways:

##### i. **Surface Monitoring:**

- By monitoring the surface subsidence pillars on quarterly basis.
- The subsidence pillars will also be constructed on surface with increase in lateral extent of the stoping operations in each mine

##### ii. **Ground Monitoring:** Monitoring of Crown and Rib pillars through geotechnical instrumentation in underground

Geotechnical instruments such as MPBX (multiple point borehole extensometers) are placed at crown pillars to monitor the ground movement in each stope. In addition to these, VWSM (vibrating wire stress meters) are placed at strategic locations to measure stress buildup during and after the stoping operations. The frequency of underground instrumentation will be at least once a week.

For the proposed mining Plan, each stope crown pillar will be monitored by installing at least one multiple point borehole extensometers and few strategically located vibrating wire stress meters. If instrument record changes more than expected, then the stoping operation will be stopped and reason for such abnormal change will be investigated. The stoping operation will resume only when the changes have subsided / stabilized. The maximum allowable peak stress and displacement limit for Zawar mines has been suggested by National Institute of Rock Mechanics by Numerical Study.

Table 4.15:

Location	Maximum changes in Stress (MPa)	Vertical Stress Limits (MPa)	Modelled Peak Displacement (mm)	Vertical Displacement Limits (mm)
324 mRL	6.62	4.64	3.68	2.57
252 mRL	8.20	5.74	4.18	2.92
132 mRL	10.0	7.00	8.39	5.87
25 Mrl	14.5	10.15	8.53	5.97

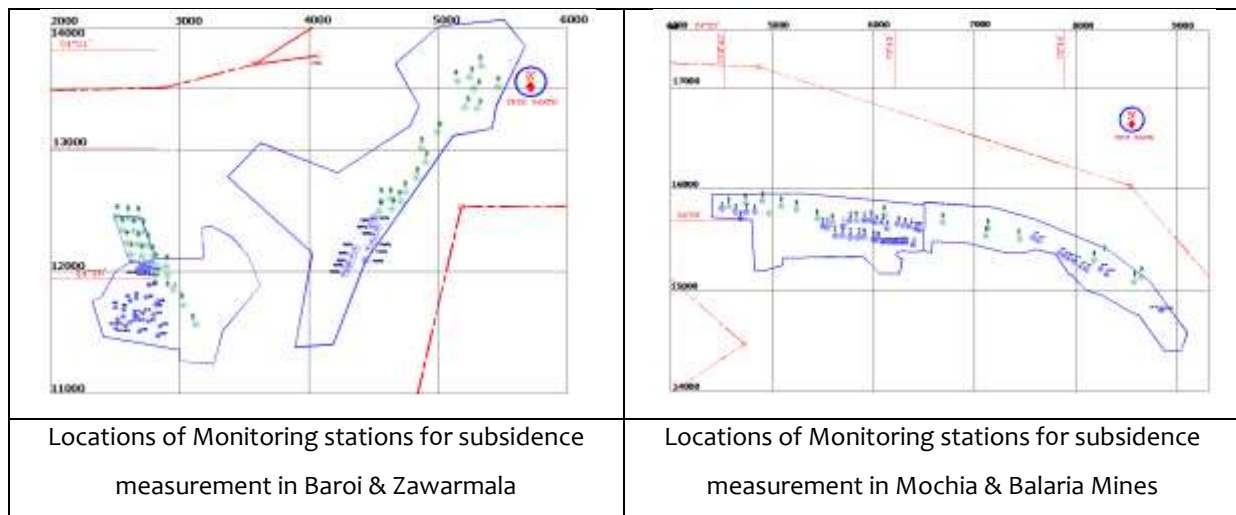


-50 mRL	16.9	11.83	9.10	6.37
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#### **Subsidence Monitoring Locations**

Regular subsidence measurement and monitoring of cap rock. The monitoring locations details of all four mines have been shown below:

S. No.	Mines	No. of Monitoring locations
1.	Mochia	34
2.	Balaria	14
3.	Baroi	12
4.	Zawarmala	15



**Fig 4.3: Locations of Subsidence Monitoring Stations**

#### **4.5.3.3 SUBSIDENCE MODELLING & PREDICTION**

Non-linear Numerical modeling (FLAC - 3D software) was used to find all possible weakness planes such as shear zone and fault planes running across at various positions in the crown pillar. The plasticity zones are analyzed to check the ultimate yield zone of stopes and its effect on stope back.

The in-situ stress value used for the numerical modelling study is based on earlier measurement conducted at 173mRL, Zawarmala.

#### **4.5.3.4 RESULTS AND FINDINGS**

3-Dimensional numerical modelling of the complete mining block incorporated all possible weakness planes such as shear zone and fault planes running across at various positions in the crown pillar.



Numerical Modelling apprehends <2mm subsidence i.e negligible. As on date there is no significant change in the measurement. Slight changes may be attributed to surface curvature and refraction. Subsidence Report is enclosed as **Annexure 19**.

#### 4.5.3.5 SUBSIDENCE MANAGEMENT

Surface subsidence, old workings, voids created due to mining activity during past years and voids likely to be created during next years. To guard against surface subsidence adequate thickness of pillars has been left on the basis of advanced techniques of geo-mechanics.

The pillar dimension varies from place to place and mine to mine. Further, the competent litho environment and ore body geometry characterized by shifting due to dip & plunge also rules out possibility of any future subsidence. Following actions have been taken for subsidence prevention and surveillance:

##### **Safe Designing:**

- ✎ Extraction of ore is planned by leaving a minimum 30 m of solid cap rock
- ✎ Ensuring global stability of the mines by Characterization of rock mass – RMR & Q-system
- ✎ Determination of geo-technical and physico-mechanical properties of rocks
- ✎ Determination of stope & pillar dimensions:
- ✎ Using Empirical - Mathew's Stability graph method
- ✎ Authentication using Numerical modeling (FLAC - 3D software) both in-house expert & external agencies.

#### 4.5.3.6 MITIGATION MEASURES

The following Mitigation Measures are adopted:

- Regular Subsidence measurement and monitoring of cap rock has been taken up on quarterly basis.
- Ground Control Management Plan (GCMP) implemented. Same is reviewed annually.
- Ground Awareness training given to 100% workforce.
- Stope planning, designing and sequencing is done based on empirical and numerical modelling basis.
- Geotechnical mapping is carried out at all faces of the mine for support design.
- Jumbo are being used for mechanized supporting and Scaler will be used for mechanized scaling.
- Supporting upto 0.5m from face. Resin capsules are being used as a standard practice.
- QA-QC of supporting materials & support testing forms the integral part of GCMP.
- Subsidence monitoring above stoping area at designated locations.
- During the proposed mining plan period, the strike length of Baroi and Zawarmala mine will be 0.85 km and 1.2 km respectively. To monitor the surface, the subsidence pillars will be constructed all along the strike length in the proposed period.

- The strike length of Mochia will be 2 km and for Balaria, it will be 1.95 km. The surface subsidence at Mochia and Balaria during the proposed mining scheme will also be monitored by constructing surface pillars all along the strike length.
- The surfaces subsidence pillars shall be monitored on quarterly basis. The frequency of underground instrumentation will be at least once a week.
- To ensure additional safety all the level developments including that in the waste and ore are systematically supported with rock bolts/ cable bolts as per Systematic Support Rule (SSR).
- Systematic support system in the form of rock bolts, wire mesh is installed in the excavation drives and cross cuts to ensure long term stability of the strata and roof of development viz., drives and cross-cuts, ramp, incline etc.
- If poor ground or any geological discontinuity plane is encountered like faults & shear zones etc, some additional support elements are used in the form of Dowels/steel sets and concreting anything else as per scenario.
- To avoid hanging wall failure leading to in stope dilution, cable bolts are being installed extending into the hanging wall to arrest excessive wall rock failure, especially in areas where the wall rocks are having low RMR or low angle dripping of ore lenses.

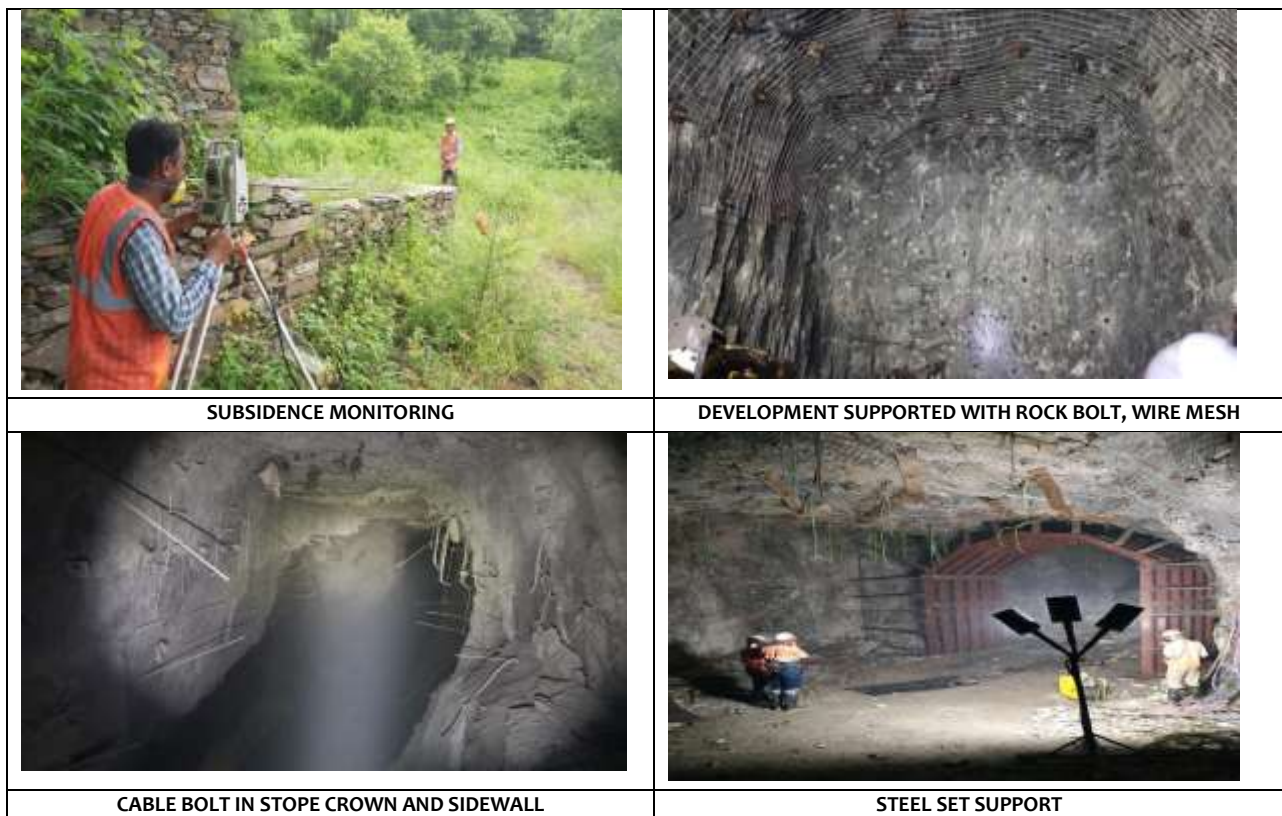


Fig 4.4: Photographs showing Subsidence Monitoring



#### 4.5.4 IMPACT ON WATER ENVIRONMENT AND MITIGATION MEASURES




##### 4.5.4.1 IMPACT ON SURFACE WATER AND MITIGATION MEASURES

The Zawar group of mines is located within southern Rajasthan Mountain ranges. The Tidi river forms major river system in Core and peripheral area. It is an ephemeral river and has two catchment zones in the north and west of the area. Tidi river is the only surface water body crossing the lease hold area. The river is seasonal in nature and water flows only in monsoon season only. Other source of water at Zawar mines is Naka well, which is situated within the lease area of Zawar Mines and the quality of water in Naka well is potable and is good for domestic use.

The maintenance workshop is also a source of surface water contamination due to leaks and spills of oil and grease.

The following mitigation measures will be adopted to mitigate surface water pollution generated due to the mining and beneficiation activities is given in the following table:



S.No	Activity	Potential Impact	Mitigation Measures	PHOTOGRAPHS SUPPORTING MITIGATION MEASURES
1.	Generation of Domestic Effluents	It can degrade the quality of TiriNadi.	The sewage generated shall be treated in sewage treatment plant and reused in Mining Operations/plantation.	
2.	Ore Storage and Tailing Storage Facility	The rainwater runoff from ore storage and tailing dam are likely source of suspended solids, if allowed to escape to the natural drainage without any treatment, may affect the quality of water bodies.	<ul style="list-style-type: none"> <li>➤ Storm water drain provided in the plant area to collect surface run off</li> <li>➤ Garland drain around TSF (tailing storage facility provided) along with collection reservoir with pumping arrangement for recycling</li> <li>➤ Installation of Dry tailing plant for disposal of tailing in dry cake form with 15-18% moisture</li> <li>➤ Zero discharge is maintained to prevent water pollution from tailing etc.</li> </ul>	 
3.	Workshop Activities		<ul style="list-style-type: none"> <li>➤ The entire maintenance workshop is under covered shed and concrete floor to avoid surface water contamination due to leaks and spills of oil and grease.</li> </ul>	





			<ul style="list-style-type: none"> <li>➤ All garage effluent will be treated for oil and sediments before reused in vehicle maintenance, mining operation and dust suppression.</li> <li>➤ Used lubricant and oil is being disposed off through authorized vendors.</li> </ul>
4.	TRANSPORTATION		<ul style="list-style-type: none"> <li>➤ The vehicle maintenance area is provided with water containment area and oil trap.</li> <li>➤ 8-10% moisture is maintained in Ore and concentrate while transportation</li> <li>➤ Covered transportation to avoid any fugitive dust generation</li> <li>➤ Regular vehicle maintenance is done</li> </ul>
<b>MONITORING</b>			
Regular monitoring of surface water.			



#### 4.5.4.2 IMPACT ON GROUND WATER AND MITIGATION MEASURES

Ground water pollution can take place only if the mining rejects contain toxic substances, which get leached by the precipitation of water and percolate to the ground water table thus polluting it. Any nearby wells or other sources of water can be rendered unfit for drinking and even for industrial use. The ore and associated rocks do not contain any toxic substance. Therefore, there is no significant impact of mining activities on any source of water and its quality.

Total water requirement for the project will be 14000 KLD which is being sourced from Tidi Reservoir.

General ground level in the area noted as 520 m AMSL. Water table level varies from Water table level varies from 517-510 mRL.

**Table 4.16**  
**Ultimate Working Depth of Zawar Mines**

Mine	Ultimate Working Depth
Mochia	-600 mRL
Balaria	-400 mRL
Zawarmala	-300mRL
Baroi	-100 mRL

Therefore, ground water will be intersected due to mining activities.

The groundwater movement in the area follows topography and general slope of the area. The general movement of groundwater is towards southeast following drainage pattern of the area. The groundwater in the area occurs under unconfined or water table conditions as such it is in direct response to the recharge through rainfall.

The depth to water in buffer zone ranges from 5 to 10 m below the land surface near the river courses, surface water reservoirs and ponds during post monsoon period while it is deeper in the area from 10 to 20 m below the land surface. The water levels during post monsoon period are shallow along the Tidi River within the lease area, less than 3 m below the land surface as there is very limited ground water abstraction by one well located on the bank of Tidi river.

The hydrogeology and hydrology study revealed that there are adequate surface and ground water resources which are being utilized for irrigation from irrigation dams and open dug wells. There is intensive ground water development in the buffer zone for irrigation by 4855 open dug wells. The ground water development is within safe limits in core zone and will remain within safe limits even at the conceptual stage. The ground water inflow in the mines and its withdrawal will not influence any nearby private or public wells. As the proposed expansion mining method is underground, there will not be any impact on surface water resources.

With the underground mining of lead and zinc at Zawar mines, the water regime is not likely to be affected, disturbed or polluted. The surface and ground water resources of the area, which are being utilized for drinking and irrigation purposes will be continued to be exploited despite

underground mining operations and the present hydrological, hydrogeological and hydro geochemical setting of the core and buffer zone will not be affected. Mine wise hydrogeological & pumping of subsurface make of water is dealt in the chapter of Mine Drainage in section 3.0 of the Mining Plan.

Detailed Hydro-Geological Study has been prepared and same is enclosed as **Annexure 17** with this Final EIA/EMP Report.

#### 4.5.4.3 WASTE WATER MANAGEMENT

Adequate control measures are being/will be adopted to check not only the wash-offs from domestic effluent, workshop but also from the tailing dam. The measures adopted are:

- The wastewater generated from domestic operations is channelized to existing Sewage Treatment Plant (450KLD) and reused in plantation after appropriate treatment.
- Oil trap system at vehicle maintenance workshops and vehicle washing facilities
- Periodical monitoring of Surface water & Ground water quality is being carried out regularly.
- Further, high-rate clarifier with reverse osmosis plant is proposed which will enhance recycling of process water thereby no additional fresh water will be required for proposed expansion.
- 680 TPH Dry Tailing disposal System- Presently, the slurry contains about 50-65% water. The excess water is extracted (recirculation for mill operation) from tailings by introducing filtration plants to transform soil fractions into cake containing about 16% moisture.
- Garland drains around TSF and sumps have been constructed to channelize the rainwater



**Fig 4.5: Waste water Management System**

#### 4.5.4.4 WATER CONSERVATION MEASURES

##### A. Rain Water Harvesting

- 39 check dams have been operational for the purpose of ground water recharge of 92812 m<sup>3</sup>/year against mandatory requirement of 88293 m<sup>3</sup>/year
- Garland drains and Anicuts are constructed at various locations (including around TSF) in lease area for ground water recharge and arresting solid wash off.

- Rain Water harvesting techniques are being implemented for conservation of water. This technique will recharge the ground water table level of the area.
- Detailed Rain water harvesting plan is given in Hydrogeology Report of this Final EIA/EMP Report.



Fig 4.6: Rainwater Harvesting Structures

## B. Water Recycling

- Mine water constituted by seepage of rainwater and percolating ground water into the mines is being collected in underground sumps from where it is being pumped to surface storage tanks for reuse in mining operations like drilling, dust suppression and reuse in beneficiation plant.
- The decanted water from tailing dam is recycled back to beneficiation plant for reuse. For recycling of water pumping arrangement are in place. The recycled water is directly usable in the beneficiation plant.
- Dry tailing plant (DTP) has been installed which recover the water from tailing before disposal.

### DRY TAILING PLANT

- DTP is a proactive step for reclaiming major portion of water that reduces environment risk and possibility of dam failure.
- Reduction of risk of ground water contamination through seepage due to Dry Tailing disposal system (680TPH).
- Presently, the slurry contains about 50-65% water. The excess water is extracted (recirculation for mill operation) from tailings by introducing filtration plants to transform soil fractions into cake containing about 16% moisture.

#### Advantages of DTP:

- Recirculation of >90% of process water.
- Elimination of the risks of catastrophic tailings flow when a slurry dam (TSF Fails)
- Safe stacking of tailing cakes even in areas of high seismicity.
- Reduction of risk of groundwater contamination through seepage.
- Reduction of Storage Foot Print by 50% and enabling the rehabilitation when approaching mine closure.



**Fig 4.7: Dry Tailing Plant**

#### 4.5.4.5 IMPACT EVALUATION

Impact evaluation is given in table below:

**Table: 4.17**

#### Impact Evaluations for Water Environment

Impact Evaluation Element	Change in the water environment (quantity as well as quality of Surface and Ground water) due to expansion of mining project		
Potential Effect/ Concern	Increase in water availability in the area due to development of water reservoir and catch drains in the lease area.		
Characteristics of Impacts			
Nature	Positive	Negative	Neutral
	✓		

#### 4.5.5 ACID MINE DRAINAGE

At the mines of Zawar Mines, presence of sulphone's Sulphur in overburden material is reported relatively less to cause Acid Mine Drainage and the presence of alkaline material was found relatively higher enough to neutralize any acidity effects to be caused by Sulphur compounds.

#### 4.5.6 IMPACT ON SOIL / LAND USE PATTERN AND MITIGATION MEASURES

##### 4.5.6.1 IMPACT ON SOIL ENVIRONMENT

The top soil mainly observed is clay loam and red clay.



Predictions of the environmental impact of the mining activities on surface soil are based on the nature of activities; extent of the area covered and associated aspects of environmental concern.

As the Mining activities at Zawar group of Mines are confined in underground, so no topsoil is being disturbed except for minor amount of the topsoil in areas of infrastructure development, which will be re-used immediately for plantation purpose, so no arrangement for stacking is proposed.

During surface exploration activity or during tailing dam expansion, temporary soil erosion can take place.

By adopting efficient dust suppression measures, the contamination of dust with soil will be avoided. Following measures will be taken to reduce the impact of mining on adjacent land with reference to run off, soil erosion and loss of top soil:

#### **Run Off**

- Garland drain will be provided around Tailing storage facility to channell the rain water percolating from tailing dumps.

#### **Soil Erosion**

Sustainable land use can help preventing soil degradation and erosion such as:

- During surface exploration activity or during tailing dam expansion top soil temporary preservation & utilization will be done for plantation.
- The tailing pond area will remain the same and shall be provided with adequate slope to prevent erosion and will be vegetated to avoid fugitive dust generation due to wind.
- Any potential area of soil contamination will be checked and decontaminated by excavating the contaminated portion and replacing with fresh soil.
- Adequate care shall be taken to ensure prevention of erosion, wash off and leaching etc. in the disturbed area.
- The increased green cover will substantially prevent soil erosion. Total 321.63 ha area will be covered under plantation. Till date, 170.85 ha has been covered under plantation in including rehabilitated areas, around beneficiation plant, on matured tailing dam, roads and social a forestry.
- The tailing pond area will remain the same and shall be provided with adequate slope to prevent erosion and will be vegetated to avoid fugitive dust generation due to wind.
- The greenbelt development in the mine lease area will act as effective barrier for control of dust.

Moreover, Fugitive dust of mining area will mainly be confined within ML area and will not impact soil of buffer zone. Further, dust in mining area is of neutral nature and does not contain toxic elements which may impact soil.





#### 4.5.6.2 LANDSCAPE AND LAND USE PATTERN

Land use pattern of the mining lease area during present operational and post-plan period have been given in Table below:

**Table-4.18**  
**Post mining land use of core zone (ha)**

S. No.	Land use	Pre-Operational	Operational (Ha)		Post – Operational (Ha.)	Remarks
			Existing	Post Expansion		
1	Agricultural land	284.29	284.29	284.29	284.29	Undisturbed
2	Grazing Land	59.84	59.84	59.84	59.84	Undisturbed
3	Settlement	99.75	146.41	146.41	146.41	Community
4	Barren land (Govt.)	1529.09	1160.8	1125.8 (-35)	1125.8	Undisturbed
5	Barren Land (HZL)	0	58.15	44 (-14.15)	0	Divert for plantation
6	Industrial/ Mining Use	0	207.57	242.57 (+35)	0	Divert for plantation
7	Plantation	0	170.85	185 (+14.15)	356.63 (+185.78)	Plantation
8	Forest Land	1537.91	1422.97	1422.97	1537.91 (+114.93)	Forest land (114.94 ha of Surface rights handover to forest)
9	River and Water Bodies	109.12	109.12	109.12	109.12	Undisturbed
<b>Total</b>		<b>3620</b>	<b>3620</b>	<b>3620</b>	<b>3620</b>	

#### 4.5.6.3 IMPACTS ON LAND USE PATTERN

##### a) Core Zone:

- Total Mining lease area is 3620 ha. Out of 3620 ha, 2082.09 Ha is non forest land and 1537.91 ha is forest land.
- No land degradation would take place on account of underground mining operations. The waste coming out of mines will be utilized for tailing dam construction, stabilization of tailing dam & some quantity will be used for levelling work at all the mine just outside the new entries whereas the balance quantity will dump in stope voids.
- Most of the built-up structures like the garage, workshop, office building, rest rooms, electrical substations and training centres shall be dismantled during the mine closure. As such the impact of mining on the land use pattern of the project area on a long-term perspective shall have no major adverse impact.





- At present 170.85 ha has been covered under greenbelt/plantation.
- During plan period 14.15 ha will be covered under greenbelt/plantation.
- At conceptual period, total land for Industrial/Mining area will be 242.57 ha, will be diverted for plantation on forest and non-forest land.
- 114.93 ha of Forest land will be restored.
- Total 356.63 ha area of non-forest land will be covered under plantation at the end of life of mine.
- An area of 1579.05 ha area will remain undisturbed

**Following site features are present:** Habitations, Railway Station, River/Nallah/Pond, Road/NH-48, Electric Line, Schools, Hospital, Temples

**Impact on Site features in Core Zone:** Mining being underground, there is no such impact.

**Mitigation Measure:** Also, nearby villages and other features are far away from the surface infrastructures in the core zone.

#### b) Buffer Zone

- There will not be any significant change in land use of buffer zone due to proposed expansion of mining activity.
- A river named as TiriNadi passing within lease area and adjacently to the western boundary of the lease area. The possible impacts along its mitigation are given in Chapter 4 (4.5.3.1) of this Final EIA/EMP Report.
- Habitation of Zawar, Premnagar, Ramnagar, Balaria Village and Residential Colony for Housing 1828 families by Zawar group of Mines falling within the lease area. The possible impacts along its mitigation are given in Chapter 4 (4.5.5.4) of this Final EIA/EMP Report.
- Mining activity are confined to the mineralized zone and proper pollution control measures are being adopted to restrict the pollution load within the active zone in order to prevent any negative impact on nearby areas.

#### Recommendations

- Plantation is being developed, so that dust emission impacts can be minimized on surrounding forest land.
- Rainwater harvesting practices is being encouraged which leads to ground water recharge and ultimately increased productivity in the study area.

#### 4.5.6.4 IMPACT SIGNIFICANCE

Impact significance is given in table below.



Table: 4.19

**Impact Evaluation to determine the Significance (Land use – during operation phase)**

Impact Evaluation Element	change in the land use due to infrastructure development for beneficiation& operation			
Potential Effect/ Concern	Change in the land use of core zone from residential, forest land to mining activities (during operation) due to infrastructure development for beneficiation & operation activities			
Characteristics of Impacts				
Nature	Positive		<b>Negative</b>	Neutral
	√			
Type	<b>Direct</b>	Indirect	Cumulative	
	√			
Extent	<b>Project Area</b>	<b>Local</b>	Zonal	Regional
		√		
Duration	Short – term		Long- term	
			√	
Intensity	Low		<b>Medium</b>	High
			√	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	Continuous (C)
				√
Significance of Impact				
Significance	Insignificant	Minor	<b>Moderate</b>	Major
			√	

**4.5-7 SOCIO-ECONOMIC ENVIRONMENT**

The potential impact on socio-economic environment due to this mining project is given in following heads.

**4.5-7.1 POSITIVE IMPACTS**

The activities of the mine will produce some improvements in the socio - economic levels of the study area. The anticipated impact of this project on various aspects is described in the following sections.

**Employment:**

Direct and indirect employment opportunities will be generated during mining operation and other allied activities. Contractual workers will increase in coming years with enhancement of mine development & other activities at Zawar Mines. The project in its present shape has been a major avenue to the local population around 10 kms periphery. Around 50% of the regular employees of the company are from local population whereas in case of contractual employees the figure stands at 85% of the total.



During the proposed Mining Plan proposal, Manpower engagement will be required to be enhanced by 50% and would prove to be additional employment generation.

Unskilled personnel would get direct or indirect employment in the operations and maintenance of the project.

Further, there would be many services that are essential to a mining industry including transportation, catering, courier, office staffing, afforestation, sanitation, taxi conveyance, vehicle maintenance etc. that generates self-employment and entrepreneurial opportunity for local people generating immense economic benefits.

#### **Community Skills Development:**

The local community will be benefitted from the training programmes that will be instituted by HZL to enable the community labor force to work for their livelihood/Self-growth.

- HZL is already, through the CSR initiatives, providing various skills development opportunity through vocational training that would enable people become self-employed or entrepreneurs. Self-help group activities are also implemented to empower rural women and make them self-sufficient.
- Assistance being provided to the village population for access to banking facility has helped further increase the access to cheaper funds and financial facilities.
- Various health camps are being organized with distribution of essential medicines to improve the basic health of the village population in the vicinity of the project site.
- Educational material, uniform and scholarship incentives are being distributed to the village school children to motivate them.
- Zinc Football Academy: Nation level residential football academy with latest technology equipment& facility for developing the young talents.

#### **Impact on Public Utilities:**

The existing socio-economic profile shows that the villages in the Zawar Mines region have better public utility status than villages situated further away. Improvement in facilities is a result of overall economic development of the area. Some of the villages in core area also receive piped water supply from HZL. Some of the recreational facilities provided by HZL in the campus are also enjoyed by the adjacent villagers. The current trend will continue during future also.

#### **Improved Standard of Living:**

Employment opportunities created by the project and skill development activities carried out under CSR, will increase income of local community and therefore improve the overall standard of living in the area.

#### **Economic Exposure and Development:**

The proposed expansion would immensely influence the economic aspect of the society around the project and also the state and the nation through increased revenues. This will expose and



introduce the local population to factors of economic development including the banking system, financial services and credit and investment schemes.

#### **Impact on Civic Amenities**

There are ten schools (including one DAV School) in the Zawar campus. These schools also cater to a significant number of children from surrounding villages, thus providing improved educational facilities for the region. The current status will continue during future mining operations.

Under CSR initiatives, HZL had sent 21 rural SC/ST community drop out girls for higher education in degree courses at Vedanta Post Graduate Ringus College at Ringus. Similarly, HZL also organized the Shiksha Sambal Project in 10 Govt. Schools for the weaker students of area the better education to the rural students benefitting more than 750 students every year. Educational material, uniform and scholarship incentives are being distributed to the village school children to motivate them.

#### **Population Growth**

Preference will be given to suitable local people in employment. Hence the project does not aim to contribute significantly in the population influx & only marginal population influx is designated for the proposed expansion project.

### **4.5.7.2 ADVERSE SOCIAL IMPACTS**

#### **Health Impacts:**

The project may trigger negative health impacts through increased dust & gases which might introduce respiratory illness for the workers involved in the underground mining operations. Inadequate ventilation can cause suffocation and dust related issues in the workers operation in the underground mines. Inadequate illumination in the underground mines may have adverse effect on the eye sight of the workers.

#### **Noise and Vibration:**

The process of mining will entail drilling, blasting, excavation, and transportation. These activities generate noise and vibration. The impact of noise and vibration due to drilling and blasting will be limited to the underground mines hence adverse effects on the population living around these areas is not anticipated. For the workers, can feel impacts from mining operations such as Noise induced Hearing loss, annoyance, fatigue & hypertension. The excessive vibration could lead to collapse of the structures.

#### **Safety, Potential Risks**

Potential Injuries occurs due to underground traffic where risk of collision persists due to limited movement space available. Other major risk of injuries such as due to failure of machineries, traffic related accidents, underground fire, fuel and hazardous chemical storage etc.

#### **Livelihood Change**



Due to the labor intensity of the mining sector, the project will attract the more able-bodied persons from the community which in turn will lead to low labour availability in other sectors of the economy including agricultural, labour-intensive jobs etc.

#### **Population Growth**

This project will not have any substantial impact on the population growth. The proposed expansion in the mining project will generate employment opportunities for the people of nearby villages rendering positive impact on the area on the whole.

### **4.5.7.3 MITIGATION MEASURES**

#### **Mitigating Health Impacts:**

As mentioned in 4.2.1, the incremental predicted value for various air pollutants will be restricted within the mining lease area and the impacts will be negligible on the nearby villages after implementation of all mitigation measures. Nevertheless, awareness programmes on health hazards have been conducted on a regular basis to create awareness amongst the employees as well as the local population. These activities will be continued in the future also.

#### **Health Care Facilities**

Zawar Mines has a fully equipped 28 bed hospital with modern therapeutic equipment, owned and maintained by HZL. The medical facilities are also available to outside patients on token charges basis. In addition, from time to time, HZL also organizes mass mobile medical camps, family planning camps, eye camps, surgical camps etc. in and around the mines area to enable villagers to avail medical facilities. This will be continued in the future also.

#### **Managing Loss of Livelihood and Income:**

In the mining activities, preference to the suitable land oustees & local people would be given for employment opportunities etc., in various sectors based on their capabilities.

The Company will organize vocational training, entrepreneur development programmes including women members and will provide advice for starting suitable small-scale industry. HZL will encourage entrepreneurship by awarding services, contracts for activities such as canteens, vehicle hiring, maintenance of gardens, office services and cleanliness, courier services, and material supplies

To cushion the local population against impacts of mine closure, adequate advance intimation will be given to employees and contractors to allow them to seek alternative opportunities. Skills development programmes will also be undertaken by HZL to ensure sustainable livelihood for people of the nearby areas.

No loss of livelihood and income is envisaged as the mining operations do not require any additional land for enhancing to proposed production capacity to 6.5 Million TPA.

### **4.5.7.4 IMPACT ON HUMAN SETTLEMENT**

- The total mining lease area is 3620 ha, Out of total mining lease area, 2082.09 ha is Non-Forest land and 1537.91 ha is Protected forest Land.



- No additional land will be required for creating infrastructure for enhancing to proposed production capacity to 6.5 Million TPA.
- As no additional land will be required to be acquired from human settlements, there would be no issue of resettlement or rehabilitation.
- There will not be any major change in the human settlement pattern at the Zawar Mines Township or surrounding villages due to influx of migrant population Impact on School and its mitigation.

#### **Protection Plan for Nearby Habitation**

Mining being underground, there is no such impact. Also, nearby villages and other features are far away from the surface infrastructures in the core zone.

To protect the habitations near to the lease area from blasting and dust pollution, following measures will be taken into consideration during mining:

- Controlled blasting will be adopted and optimum use of explosive energy will be made by optimizing explosive charge per hole and per delay.
- NONEL and bottom hole initiation system will be used to control ground vibrations, noise & fly rocks.
- Blasting will be carried out during day time only.
- Regular vibration monitoring studies shall be carried out near habitation/ Buildings to evaluate the zone of influence and impact of blasting and to plan remedial measures.
- Regular Ground Vibration will be monitored near habitation when mining activity takes place near the habituated areas.
- Mining will be carried out as per the provisions outlined in mining plan approved by Indian Bureau of Mines (IBM) as well as by abiding to the guidelines of DGMS.
- All measures will be adopted to control fugitive dust emission during mining operation and to ensure no impact on nearby habitats.

#### **Mitigative measures for the nearby habitation in compliance of Ministry's O.M. No. Z-11013/57/2014- IA. II (M) dated 29.10.2014:**

- Best Mining Practices shall be adopted for the given mining conditions.
- Adequate number of check dams, retaining walls /structures. Garland drains and settling ponds will be provided in the mining area to arrest the wash-off with rain water in catchment area.
- The natural water bodies and /or streams which are flowing in and around the village will not be disturbed.
- In case of any water scarcity in the area, the Company will provide water to the villagers for their use under its CSR activity.
- A provision for regular monitoring of water table in open dug wells located in village and by establishing Piezometer has been incorporated to ascertain the impact of mining over ground water table and to plan mitigative measures.



- We will ensure that the biological clock of the villagers is not disturbed by orienting the flood lights/ masks away from the village and keeping the noise levels within the prescribed limits for day and night hours so that it does not affect the health in villages located close to mining operations. Regular health surveillance will be undertaken.
- For conducting blasting for mining operations, proper vibration studies shall be carried out well before approaching such habitats or other buildings to evaluate the zone of influence and impact of blasting on the neighbourhood. Within 500 meters of such sites vulnerable to blasting vibrations, avoidance of use of explosives and adoptions of alternative means for mineral extraction shall be practiced wherever practicable. Blasting will be done within the permissible distance from habitation as permitted by DGMS.
- No mining operations will be carried out within 50 meters of public works such as public roads and buildings or inhabited sites
- Main haulage road in the mine will be provided with permanent water sprinklers and other roads will be regularly wetted with water tankers fitted with sprinklers. Crusher and material transfer points will invariably be provided with Bag filters and or dry fogging system. Belt conveyors will be fully covered to avoid air borne dust.
- It will be ensured that the productivity of agricultural crops is not affected due to mining operations. A study will be undertaken to assess the productivity of agricultural crops in 5 km radius from the ML boundary. An alliance with other Cement Plant will be constituted in the form of an Association and this will jointly take responsibility for securing such Crop Liability Policy in study area.
- No road movement will be undertaken in existing village road network without appropriately increasing the carrying capacity of such roads.
- Alteration or re-routing of foot paths, pagadandis, cart roads and village infrastructure /public utilities or roads will be avoided to the extent possible and in case such acquisition is inevitable, alternative arrangements shall be made first and then only the area acquired.
- Socio economic development of the neighbourhood habitats has been planned based on the need-based survey and will be executed as per the recommendation of the plan.

#### 4.5.7.5 PUBLIC HEALTH IMPLICATION

- It was observed that the predominant over all wind patterns for the study period was from West (W) direction that mean downwind direction is East.
- Air quality modelling has been carried out & incremental value for PM<sub>10</sub> is 1.82 µg/m<sup>3</sup>, PM<sub>2.5</sub> is 0.728 µg/m<sup>3</sup> SO<sub>2</sub> is 1.49 µg/m<sup>3</sup> and for NO<sub>2</sub> is 1.96 µg/m<sup>3</sup> due to mining operations and beneficiation activities within the lease area.
- CAAQMS have been installed at 3 locations as per wind direction with digital display of data in front of the main gate of the mine site
- Water quality and level monitoring at mine site and villages
- The Peak particle velocity monitoring will be done in mine site and for nearest habitation





- Plantations will be developed on 14.15 ha of land during the present proposal period (2021-2025) with @ 11000 saplings/year.
- Efforts had been made to improve the hygiene, sanitation, education and infrastructure of the nearby villagers.
- Various health camps are being organized with distribution of essential medicines to improve the basic health of the village population in the vicinity of the project site.
- Telemedicine services have been planned for the next quarter of plan period.
- All the employees when inducted will be medically examined. Further, they will also be medically examined at periodical interval.

#### 4.5.7.6 IMPACT EVALUATION

Impact significance is given in table below:

**Table: 4.20**

##### Impact Evaluation to determine the Significance (Socio economic Environment)

Impact Element	Evaluation	Impact on socio economics due to the proposed expansion mining project			
Potential Concern	Effect/	Improvements in socio economic conditions of the settlement falling within lease			
Characteristics of Impacts					
Nature	Positive		Negative	Neutral	
	✓				
Type	Direct	Indirect	Cumulative		
	✓	✓			
Extent	Project Area	Local	Zonal	Regional	
		✓	✓	✓	
Duration	Short – term		Long- term		
			✓		
Intensity	Low		Medium	High	
			✓		
Frequency	Remote (R)	Occasional (O)	Periodic (P)	Continuous (C)	
				✓	
Significance of Impact					
Significance	Insignificant	Minor	Moderate	Major	
				✓	

#### 4.5.8 IMPACT ON LOCAL TRANSPORT INFRASTRUCTURE

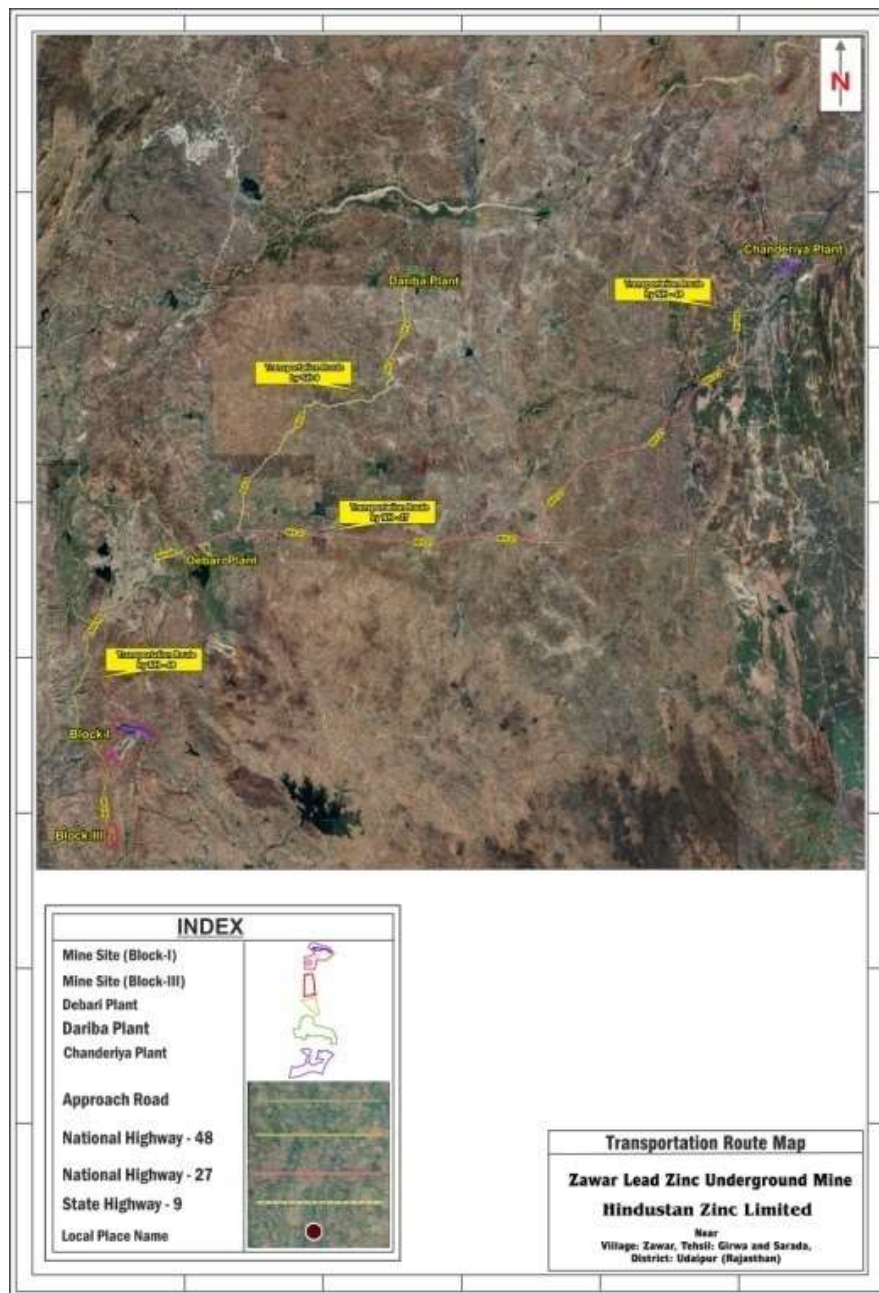
About 21,667 TPD of Ore after excavation will be transported to Crusher (installed underground and at surface) and then to beneficiation mill (Located within mine lease area) and then to end users (Smelters) through road by 35 Tonne capacity trucks.

Traffic survey has been done for mine at the survey point marked on Transportation route map given below as figure 4.5. Details of the roads being used for transportation of Lead & Zinc Concentrates are given in the Table below:

**Table - 4.21**  
**Details of Traffic Survey point**

Survey point no.	Stretches	Coordinates
1	Approach Road (Zawar Mine to NH-48)	24°20'57.9"N 73°41'44.3"E

**Source:** Field Survey



**Fig 4.8: Transportation Route Map**



Traffic survey has been done for mine. Details are given in the Table below:

**Table 4.22**  
**No of Vehicles per day**

S. No.	Vehicle Type	No. of Vehicle/day	Passenger Car Unit (PCU) factor	TOTAL NUMBER OF VEHICLE (PCU)/Day
1.	Cycle/ Motor Cycle /Scooter	288	0.5	144
2.	Passenger Car/Van/ Auto Rickshaw	960	1.0	960
3.	Tractors	840	1.5	1260
4.	Trucks/ Buses	2454	3.0	7362
Total		4542	-	9780
				9726/24= 405.5PCU/Hr

Average existing vehicle per hour is 190 which will be maximum 407.5 PCU/hr

**Table 4.23**  
**Existing Traffic Scenario & LOS for traffic survey point**

S. No	ROAD	V (VOLUME IN PCU/HR)	RECOMMENDED SERVICE VOLUME (CAPACITY IN PCU/HR)	Percentage of Utilization of Road	LOS
1	NH-48	405.5	1400	0.28	B

\*Recommended service volume for two-lane road as per IRC guidelines for the capacity of roads in rural areas (IRC: 64-1990)

The existing Level of NH-48 road Service is "B" i.e. Very Good.

Capacity as per IRC: 106-1990, Page No: 11, Table-2 for Arterial Road/ Highways.

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

#### 4.5.8.1 PROPOSED TRAFFIC DENSITY

**Table 4.24**  
**Traffic density**

S. No	Particulars	Existing	Additional	Proposed
1.	Capacity of mine <b>Ore</b> (Million TPA)	4.8	1.7	6.5
2.	Capacity of Mine <b>Concentrates (Pb &amp; Zn)</b> (Million TPA)	0.38	0.14	0.52



S. No	Particulars	Existing	Additional	Proposed
3.	No. of working days	350	350	3502
4.	Capacity of dumpers for Transportation of Concentrates (Tonnes)	35	35	35
5.	Transportation of Concentrates (Tonnes per day)	1085.7	400	1485.7
6.	Working hours (for transportation) per day	24	24	24
7.	No. of trips (filled)	31	11	42
8.	No. of trips / day (to & from)	62	22	84
9.	Frequency of dumpers/trucks deployed/hour	3	1	4
10.	Increase in PCU's per hour	9	3	12

Table 4.25

ROAD	Increases PCU's	V (VOLUME IN PCU/HR)	RECOMMENDED SERVICE VOLUME (PCU/HR)	Percentage of Utilization	LOS
NH-48	405.5+12	417.5	1400	0.3	B

\*DSV in PCU per day/total no. of hours.

#### 4.5.8.2 CONCLUSION

The LOS value for the traffic survey conducted for Public Road is for the present traffic scenario & it indicates that comfort & convenience is fair but declines noticeably after this point of LOS. For future scenario, following points have been considered for calculations:

About 17,809 TPD of Ore after excavation will be transported to Crusher (installed underground and at surface) and then to beneficiation mill (Located within mine lease area). The concentrates (1,424.6 TPD) are transported to end users (Smelters) through road by 35 Tonne capacity trucks.

The ratio of Lead-Zinc supply to these units will vary based on the requirement but not exceeding the 6.5 million TPA. However, to consider the worst-case scenario, impact on existing roads has been calculated for peak production capacity. It is seen that percentage of utilization of road will increase from 28 % to 30%. From the findings, it is observed that the existing road network will be adequate to accommodate the additional traffic load and complied with IRC guidelines. Company will maintain the transportation route.

#### 4.5.8.3 MITIGATION MEASURES FOR TRANSPORTATION

Necessary mitigation measures will be adopted. The same are given as under:

- Prevention of spillage of material by engaging covered tippers.
- Vehicle with valid PUC will be used for transportation.
- Overloading of the material will be avoided.
- Vehicular emission will be kept under control.
- Regular maintenance of HEMMs & transportation vehicles will be carried out.
- Regular monitoring of the emission levels.



- Regular water spraying on the haul roads to suppress the fugitive dust emissions.
- Personal protective equipment provided to all workers.
- Training will be given to all drivers about safe and environment friendly driving.

#### 4.5.8.4 IMPACT EVALUATION

Table: 4.26

##### Impact Evaluations for Transportation Infrastructure

Impact Element	Evaluation	Impact on transportation infrastructure due to the expansion of the mining project		
Potential Effect/ Concern				
Characteristics of Impacts				
Nature	Positive		Negative	Neutral
				√
Type	Direct	Indirect	Cumulative	
			√	
Extent	Project Area	Local	Zonal	Regional
	√	√	√	√
Duration	Short – term		Long- term	
Intensity	Low		Medium	High
	√			
Frequency	Remote (R)	Occasional (O)	Periodic (P)	Continuous (C)
				√
Significance of Impact				
Significance	Insignificant	Minor	Moderate	Major
	√			

#### 4.5.9 IMPACT ON BIOLOGICAL ENVIRONMENT

Habitat loss, degradation, and fragmentation are important causes of known species-population extinctions. The main cause of degradation and depletion of forests and wildlife are the human activity (anthropogenic pressure). Population explosion, over exploitation of forest resources, urbanization, unscientific management, encroachment of forest land, illicit felling, lack of regeneration of forests and outdated laws are major factors responsible for the degradation and depletion of forests. Details are given in the follow up points.

As per final Notification of Jaisamand Wildlife sanctuary published on 06.08.2020, ESZ is about 3.180 km and Sanctuary is about 10.80 km from the mine site. Certificate for the same has been obtained from Deputy Conservator of Forest (Wildlife) vide letter No F 9(10 km-469) survey/DCF/WL/2023-24/6405 dated 14.08.2023. Copy of the same is enclosed as **Annexure 10 (a)** with this Final EIA/EMP Report.



#### 4.5.9.1 IMPACT ON FLORA

No adverse impact is envisaged on the existing flora, as there will be no deforestation by mining operation. There are herbs and shrubs and few scattered trees within ML area. Greenbelt/plantation area shall be developed in 7.5 m safety barrier all around the ML and within mine lease area. The greenbelt and plantation development will eventually attract micro fauna, birds etc. in the area which will also have positive impact. Support will be taken from local forest and agricultural departments in selection of species of plants so that green coverage could improve fast.

#### 4.5.9.2 IMPACT ON FAUNA

As per final Notification of Jaisamand Wildlife sanctuary published on 06.08.2020, ESZ is about 3.180 km and Sanctuary is about 10.80 km from the mine site. Certificate for the same has been obtained from Deputy Conservator of Forest (Wildlife) vide letter No F 9(10 km-469) survey/DCF/WL/2023-24/6405 dated 14.08.2023. Copy of the same is enclosed as **Annexure 10 (a)** with this Final EIA/EMP Report.

No existence of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Tiger / Elephant reserves (existing as well as proposed) within 10 km radius from Zawar Lead Zinc Underground Mine has been obtained from Deputy Conservator of Forest (Wildlife) Udaipur vide letter no. F.9(10) (10 km - 469) Survey/DCF/WL/2023-24/6405 dated 14.08.2023 and the same has been enclosed as **Annexure - 10 (a)** along with this Final EIA/EMP Report.

Seven Schedule - I species were found during the field survey. Wildlife conservation has been approved by CWLW vide letter no. F 11 (300)/CWLW/ 2022-23/174 dated 21.03.2023. The copy of the same along with Approved Wildlife Conservation Plan is enclosed as **Annexure 10 (b)** along with this Final EIA/EMP Report.

Out of 3620 ha, 2082.09 Ha is non forest land and 1537.91 ha is forest land. Clearance for diversification of forest land was granted by MoEF for the Forest area of 1537.91 Ha including 114.94 Ha for surface use has been taken from MoEFCC, GOI vide letter no. F.No. 8-1/97-FC Dated 15/16.06.1998. Renewal for the forest diversion was granted vide F. No. 8 1/1997-FC Dated 23.01.2015. Copy of same is enclosed as **Annexure 5 (a) & (b)** respectively with this Final EIA/EMP Report.

Proper Environment mitigation measures are being/will be adopted; As underground mining takes place, mining is/will not cause any adverse impact on existing wildlife.

However, adequate measures for keeping noise level well within permissible limit will be taken to prevent disturbance to wild life. Mine lease area will be fenced for preventing the entry of wildlife into the mine area.

#### Measures for Minimizing Impact on Fauna

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



- Measures will be taken and environment management plan will be implemented to curb pollution of air, water, land and noise environment.
- Plantation helps in creating habitats for local faunal species and to create better environment for various fauna.
- Creating and developing awareness for nature and wildlife in the nearby villages.

#### 4.5.9.3 QUANTIFICATION OF IMPACT ON BIOLOGICAL ENVIRONMENT VS. MITIGATION MATRIX

S. No.	Parameters	Impact	Mitigation
1.	<b>Direct Impact</b>	<ul style="list-style-type: none"> <li>• Loss of woodlands, low-lying grasslands/fallow fields and agricultural lands;</li> <li>• Damage to various habitats including fishponds and marshes;</li> <li>• Fragmentation of habitats.</li> <li>• Landscape connectivity disruption due to site fencing prevents movement of larger &amp; middle-sized mammals</li> <li>• Dust deposition on vegetation; noise and other disturbance to birds and other wild animals.</li> </ul>	<ul style="list-style-type: none"> <li>• This is the existing mining lease area</li> <li>• No loss of habitat, No habitat was observed in study area.</li> <li>• The 10 km radius study area (buffer area) has 14 PF and 9 RF.</li> <li>• However, the Buffer area is thickly populated.</li> </ul>
2.	<b>Indirect Impact</b>	<ul style="list-style-type: none"> <li>• Occurs as a result of the activity, i.e. all the potential impacts that do not manifest immediately with the activity or which occur at a different place as a result of the activity,</li> <li>• Example: Invasion of alien weed species.</li> <li>• Vegetation damage due to industrial pollutants may have secondary effects on associated fauna like insects &amp; birds.</li> </ul>	<ul style="list-style-type: none"> <li>• Native plants species as per CPCB guidelines, APTI and as per Bio-geographic zones of India has been/will be selected in greenbelt and plantation programme.</li> <li>• No exotic species will be used.</li> <li>• Fugitive emission, noise generation will be minimized at maximum level for the control of adverse impact on insects &amp; birds, which are better pollinators in our Ecosystem. No effluent waste water being generated during mining activity.</li> </ul>
3.	<b>Cumulative Impact</b>	<p>Result from the incremental impact of the activity when added to the impacts of other activities</p> <ul style="list-style-type: none"> <li>• It may occur from the collective</li> </ul>	<p>After implementation of project, we will control the fugitive emission at dust prone area at maximum level by water</p>





		<p>impacts of individual minor activities over a period of time and may include both direct &amp; indirect impacts.</p> <p>Example: Impact of SO<sub>2</sub>, NO<sub>x</sub> &amp; Ozone (secondary pollutant) will be generated from Diesel Operated Vehicle HEMM's like excavator, dumper, loader &amp; other vehicles in combination on agricultural productivity / vegetation near Mine site.</p>	<p>sprinkling, greenbelt on 7.5 m periphery and gaseous emission from transportation activity will be controlled by regular maintenance of HEMM with silencers, PUC certificates etc., so that pollutant cannot disperse on nearby agricultural field/ nearby vegetation.</p>
4.	<b>Development and Operation Stage Impact</b>	<p>Activities like excavation, site formation; dumping/transportation, spoil, construction of riprap protected embankments, trampling, etc.</p> <ul style="list-style-type: none"> <li>• Permanent Loss of Habitat: Fragmentation: Habitats isolated in patches due to project location.</li> <li>• Increased Fragmentation: Habitats isolated in patches due to project location.</li> <li>• Habitat damage: Habitats damaged due to loss and disturbance of plant communities and listed plant species &amp; invasion of alien species.</li> <li>• Industrial Pollutants: Dust, Particulate Matter (PM<sub>10</sub> &amp; PM<sub>2</sub>) &amp; gases generated during construction may affect human beings, plants, animals &amp; habitats nearby.</li> <li>• Disturbance to Wildlife: Noise / blasting operations during construction and disturbance by construction workers may impact sensitive animal species.</li> </ul> <p>The severity of disturbance depends on: Intensity, duration &amp; frequency, distance from the source; the sensitivity of affected species; and Availability of alternative habitats nearby.</p> <ul style="list-style-type: none"> <li>• Soil Erosion: Soil disturbance &amp; loss</li> </ul>	<ul style="list-style-type: none"> <li>• No habitat will be fragmented from the project activity.</li> <li>• No loss of plant communities and no planting of exotic species, only indigenous plants species will be planted.</li> <li>• Properly maintained HEMM and vehicles having Pollution under Control (PUC) certificate will be deployed during the project to restrict the exhaust emission. Fugitive dust emission will be prevented by water sprinkling on roads and mining site.</li> <li>• rock breaker will be used.</li> <li>• Greenbelt will be developed around the mine boundary for effective green barrier.</li> <li>• No water body parameter will be disturbed due to mining activity</li> </ul>



		<p>of vegetation cover, through surface runoff &amp; wind, causing siltation of drainage channels &amp; loss of wetland habitats/low-lying grass/fallow lands. Silt deposition in water bodies &amp; associated wetlands leading to Increased turbidity (reduced light penetration) &amp; eutrophication leading to loss of Aquatic / wetland macrophytes.</p> <ul style="list-style-type: none"> <li>• Oxygen depletion &amp; impoverishment of fish and other aquatic animals.</li> </ul>	
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#### 4.5.9.4 MEASURES FOR IMPROVING BIOLOGICAL ENVIRONMENT & FOREST

Greenbelt development programme has been designed for preventing the soil erosion, improving the greenery and aesthetic beauty of the area. Plantation is being/will be done in consultation with DFO. While selection of species, care will be taken so as the developed greenbelt/plantation will remain useful for habitations. Greenbelt development and plantation is necessary:

- Groundcovers reduce runoff velocity and filter out suspended soil particles during storms
- Shrub and tree roots provide a restraining web that increases soil cohesion and stabilizes soil,
- Landscaping and providing shelter,
- Improvement in aesthetic environment of site,

#### 4.5.9.5 GREENBELT DEVELOPMENT AND PLANTATION PROGRAMME

Greenbelt development programme has been designed for preventing the soil erosion, improving the greenery and aesthetic beauty of the area. Plantation will be done in consultation of DFO. While selection of species, care will be taken so as the developed greenbelt/plantation will remain useful for habitations. Greenbelt development and plantation is necessary:

- Groundcovers reduce runoff velocity and filter out suspended soil particles during storms
- Shrub and tree roots provide a restraining web that increases soil cohesion and stabilizes soil,
- Provide stabilization to slopes of the tailing dumps,
- Landscaping and providing shelter,
- Improvement in aesthetic environment of site,
- Air purification by generation of oxygen
- Allowing PM to settle on the leaves and to attenuate noise generated by movement of vehicles and other machinery.
- Live plant foliage reduces the impact of rainfall and increase the absorptive capacity of the soil

#### 4.5.9.6 GENERAL GUIDELINES FOR GREEN BELT DEVELOPMENT



- i. Native plant species will be planted in consultation with DFO the Forest department.
- ii. Trees growing up to 5 m or more in height with large canopy cover & leaf area will be planted around the installation mine.
- iii. Plantation of trees will be done along in the safety barriers along Nala and mine lease.
- iv. Since tree trunks are normally devoid of foliage (up to 3 m), it is appropriate to have shrubbery in form of such trees to give coverage to trunk portion of these trees.
- v. Fast growing trees with thick perennial foliage will be grown, as it takes many years for trees to grow to their full height.
- vi. In order to facilitate the proper growth of vegetation, limited measures involving preparation of seedbed with suitable amount of fertilizers and treatment with mulches will be taken. The topsoil will be used for green belt development / plantation.

Vegetation covers in and around the mine workings generally helps in:

- Control of dust.
- Reducing noise.
- Stabilizing erodible slopes to minimize pollution.
- Ground water re-charging
- Enhancement of aesthetic value.

For re-vegetation, the plants and saplings suitable for the existing soils and site conditions will be considered. It is recommended to plant fast growing local species, which can adapt to the local climate. HZL will raise plantation all along the lease periphery, rehabilitated tailing area and within lease area etc.

The following characteristics have been taken into consideration while selecting plant species for green belt development and tree plantation.

- I. Local, indigenous and drought resistant species.
  - II. Fast growing and tall trees.
  - III. Perennial and evergreen.
  - IV. Thick canopy cover.
  - V. Stratified layers of Plantation to prevent lateral pollution dispersion.
  - VI. The trees will be selected so as to maintain regional ecological balance and to conform to soil and hydrological conditions.
  - VII. Plantation will be done as per guidelines.
- During the conceptual period, 276.52ha of land utilized through mining/industrial use. All the disturbed area will be diverted for plantation.
  - Replacement of sapling (replanting) required whenever mortality occurs or any damage occurs due to any natural or cattle activity in the plantation during growth stage.

#### 4.5.9.7 GREENBELT DEVELOPMENT AND PLANTATION PLAN

Till date, 170.85 ha has been covered under plantation in including rehabilitated areas, around beneficiation plant, on matured tailing dam, roads and social a forestry.

TABLE: 4.27



#### PLANTATION/GREENBELT TILL DATE

S. No.	Particulars	Existing	Proposed	Total
1	Acquired Area (ha)	483.23	68.95	552.18
2	Area under plantation (ha)	170.85	14.15	185
3	% Area	> 33%		

Plantation will be carried out progressively in the area as below:

Year	Nos of Plantation	Area
1 <sup>st</sup> Year	11,000	2.15 ha + gap filling
2 <sup>nd</sup> Year	11,000	3 ha + gap filling
3 <sup>rd</sup> Year	11,000	3 ha + gap filling
4 <sup>th</sup> Year	11,000	3 ha + gap filling
5 <sup>th</sup> Year	11,000	3 ha + gap filling

Fruits bearing and native plants will be planted including Jamun, Mango, Sitafal, Guava, Goonda, Imli, Neem, Kachnar, Shisham, Palash, Amaltas, Gulmohar, Peltorum, Pipal etc

Over last 6 years, carried out plantation in 100 ha under RDF-1 and 200 ha under RDF-2 with the support of forest department in nearby area in mine lease.

	
<b>Balaria Mines</b>	<b>Zawarmala Mines</b>
	
<b>Mochia Mines</b>	<b>Rock Garden</b>



Plantation Done this year around TSF

Figure 4.9: Existing Plantation in the mining lease area

- A total of 14.15 ha land has been taken up for plantation purpose for the proposal period (2021-2025)
- At post operational Stage, Total 356.63 ha area will be covered under greenbelt and plantation.
- The trees will be planted @ 11000 saplings/year.

#### 4.5.9.8 SPECIES SELECTION FOR PLANTATION/GREEN BELT DEVELOPMENT

The plants and saplings suitable for the existing soil and site conditions will be considered. Preference will be given for fast growing local plant species, which can adapt to the local climate. Indigenous & fruit bearing species is being/will be planted by HZL in consultation with local forest department. Fruit Trees: Ber (*Ziziphus mauritiana*), Jamun (*Syzygiumcumini*), Mango (*Magnifera indica*), Sitafal (*Annona squamosa*), Amrood (*Psidium guajava*), Drumstick (*Moringa oleifera*), Pomegranate (*Punicagranatum*)

Native Species: Neem (*Azadirachta Indica*), Kachnar (*Bauhinia varigata*), Shisham (*Dalbergia sisso*), Palash (*Butea monosperma*), Amaltas (*Cassia fistula*) etc.

#### 4.5.9.9 BUDGET FOR GREENBELT AND PLANTATION

About Rs.5.0 Crore, along with recurring cost of Rs. 0.14 Crore, are proposed as cost for development of plantation/greenbelt over 14.15 Ha including cost for sapling, fertilizers, tree guard, tool stackers and maintenance etc. The area designated for each year shall be planted with trees and shrubs @ 11000 Plants.

#### 4.5.9.10 IMPACT EVALUATION

Table: 4.28

Impact Evaluation for Biological Resources

Impact Element	Evaluation	change in the biological resources of the area due to infrastructure development &Beneficiation activities and generation of emissions.
Potential Concern	Effect/	Loss of habitat, Impact on health of biological receptors due to area and line sources of air emissions including fugitive dust emissions during mine operation activities
Characteristics of Impacts		



Nature	Positive		Negative	Neutral
			✓	
Type	Direct	Indirect	Cumulative	
		✓		
Extent	Project Area	Local	Zonal	Regional
	✓			
Duration	Short – term		Long- term	
			✓	
Intensity	Low		Medium	High
	✓			
Frequency	Remote (R)	Occasional (O)	Periodic (P)	Continuous (C)
				✓
Significance of Impact				
Significance	Insignificant	Minor	Moderate	Major
	✓			

#### 4.5.9.11 MEASURES/TECHNOLOGY FOR PREVENTION OF ILLEGAL MINING AND PILFERAGE OF MINERAL

- Till date no illegal mining has been done in our mine lease area and the same is also not anticipated. However, below mitigation measures are adopted for prevention of illegal mining and pilferage of mineral which are as follows:
- Mining will be done as per the proposal in mining plan approved by Indian Bureau of Mines.
- Mining operation will commence only after getting all requisite statutory clearances.
- Mine boundary will be fenced by barbed fence/ earthen berms; wherever required.
- Deployment of adequate number of Security guards at all the prominent / critical locations to monitor any illegal activity in mining area.
- Frequent and regular patrolling will be conducted by Security Supervisors deployed by the company.
- Sealing of likely illegal mining spots, if any.
- CCTV camera will be installed at strategic locations for strict surveillance purpose.
- Training of existing security personnel, refresher training and basic training to new recruits in security discipline will be arranged for strengthening the security set up.
- Horizontal movement of executives with aptitude for security work and inducting qualified security personnel at junior, middle and senior levels.
- Entry/exit points will be manned by establishing proper check posts and barrier where all vehicles are physically checked.
- Surprise checks/raids will be conducted by flying squads of security department of company.
- Regular monitoring of land use as per MoEF&CC guidelines.

#### 4.5.9.12 TARGET FOR ACTIVITIES AWARENESS CAMPAIGN FOR ENVIRONMENTAL ISSUES



Awareness program on various environment topics are/ will be conducted:

- Celebration of various environment days including World Environment Day, Earth Day, Biodiversity Day etc
- Training programs on various environment themes including waste management training to waste handlers and workers, environmental rules and regulations to employees
- Basic awareness training for all persons on water conservation, energy conservation, and climate change awareness

#### 4.5.10 OCCUPATIONAL HEALTH AND SAFETY

Occupational health and safety (OHS) is a multidisciplinary field concerned with the safety, health and welfare of people at work. The goal of occupational safety and health programs includes fostering a safe and healthy work environment. OHS may also protect co-workers, family members, employers, customers, and many others who might be affected by the workplace environment.

Occupational Health & Safety is based on the following three aspects: -

- Hazard identification
- Risk assessment
- Determination of applicable controls

A Hazard Identification and Risk Assessment (HIRA) is a systematic way to identify and analyze hazards to determine their scope, impact and the vulnerability of the built environment to such hazards and its purpose is to ensure that there is a formal process for hazard identification, risk assessment and control to effectively manage hazards that may occur within the workplaces. Details regarding occupational health hazards as well as mitigation measures have been discussed as under.

#### 4.5.10.1 OCCUPATIONAL HEALTH AND RELATED DISEASE

##### 4.5.10.1.1 IMPLEMENTATION OF OCCUPATIONAL HEALTH AND SAFETY MEASURES

Occupational Health and Safety measures result in improving the conditions under which workers are employed. It improves not only their physical efficiency but also provides protection to their life. HZL will adopt the following safety measures.

**Table: 4.29**

**Hazard Identification and its Mitigation Measures**

Possible Hazards	Likely Impacts	Mitigation Measures
Dust Emission	Respiratory illness	<ul style="list-style-type: none"> <li>➤ Wet drilling for effective dust suppression.</li> <li>➤ Adequate ventilation in all areas.</li> <li>➤ Regular water sprinkling on haul roads</li> <li>➤ Water spraying arrangement during mucking at drawl cross-cuts.</li> </ul>





		<ul style="list-style-type: none"> <li>➤ Prohibiting entry of persons till dust &amp; blasting fumes gets cleared/ suppressed</li> <li>➤ Use of suitable PPE by Mine workers</li> <li>➤ Separate u/g crusher circuit from mine air circuit</li> </ul>
Noise	Noise Induced Hearing Loss (NIHL), annoyance, fatigue & hypertension	<ul style="list-style-type: none"> <li>➤ State-of-art mining &amp; beneficiation equipments.</li> <li>➤ Maintenance as per OEM schedule &amp; standards</li> <li>➤ Air condition, sound-proof cabins</li> <li>➤ Regular monitoring of noise emissions.</li> <li>➤ Use of suitable PPE by all persons</li> </ul>
Inadequate ventilation	Dust related issues, Suffocation, Fatigue, Respiratory illnesses	<ul style="list-style-type: none"> <li>➤ Adequate ventilation is maintained as per DGMS guidelines.</li> <li>➤ Ensuring flow through ventilation in stoping&amp; forcing ventilation in development headings.</li> <li>➤ Assessment &amp; simulation of ventilation requirement through Ventsim.</li> <li>➤ Monitoring of exhaust emissions of diesel equipment.</li> </ul>
Inadequate Illumination	Eye strains and adverse effect on eye sight;	<ul style="list-style-type: none"> <li>➤ Ensuring ventilation to prevent dusty environment</li> <li>➤ Ensuring &amp; monitoring adequate lighting in all working areas as per standards</li> <li>➤ LED/ Xenon lights on all underground equipments.</li> </ul>
Underground traffic	Risk of collision,	<ul style="list-style-type: none"> <li>➤ Proximity sensors installed to avoid man-machine interaction</li> <li>➤ Rear view cameras to prevent collision.</li> <li>➤ Only authorised persons operate the equipment.</li> <li>➤ Underground workings are maintained in good condition.</li> </ul>
Surface traffic	Injuries	<ul style="list-style-type: none"> <li>➤ Road worthiness of all transport vehicles is tested and certified periodically.</li> <li>➤ Experienced and licensed drivers are employed at site.</li> <li>➤ Proper signage &amp; speed barriers as per requirement.</li> <li>➤ Appropriate illumination &amp; convex mirror on blind turns</li> <li>➤ Adherence to traffic routes &amp; traffic rules.</li> </ul>
Safety risk associated with failure of machineries/ equipment	Injuries	<ul style="list-style-type: none"> <li>➤ Only DGMS approved vehicles are used.</li> <li>➤ All equipment are maintained as per OEM schedule &amp; standards</li> <li>➤ Moving parts are suitably guarded</li> <li>➤ PPEs &amp; proper tools are provided to all employees</li> </ul>



		<ul style="list-style-type: none"> <li>➤ Reporting of all incidents and learnings are propagated to all employees</li> </ul>
Underground fire	Suffocation, Burn Injuries	<ul style="list-style-type: none"> <li>➤ All mobile equipment is equipped with auto fire suppression &amp; manual fire extinguishers.</li> <li>➤ All the workings are connected with two outlets, fresh air base/ refuge chamber and escape route marked.</li> <li>➤ Mandatory use of self-rescuer.</li> <li>➤ Emergency response plan is in place.</li> <li>➤ Mock drills are carried out to check the effectiveness.</li> <li>➤ Stationery equipment, substations, pump stations are provided with sufficient number of fire extinguishers.</li> <li>➤ Rescue Trained Persons form the integral part of the operations team.</li> <li>➤ Availability of fire tender</li> </ul>
Safety risks pertaining to fuel & hazardous chemical storage	Injuries, skin diseases, fire & poisoning	<ul style="list-style-type: none"> <li>➤ Storage &amp; handling of HSD is done as per the provisions of PESO</li> <li>➤ Fire hydrant system installed in Mill and surface structures</li> <li>➤ Material Safety Data Sheet (MSDS) for hazardous chemicals are being maintained and followed</li> <li>➤ Strict prohibition of smoking &amp; mobile phones usage in fuel &amp; hazardous chemical storage area</li> <li>➤ Only authorized entry in hazardous chemical storage area</li> <li>➤ Eye wash and emergency shower are provided.</li> <li>➤ Signage in hazardous and risky areas</li> </ul>

#### 4.5.10.2 PRE-PLACEMENT& PERIODICAL MEDICAL EXAMINATION SCHEDULE

Ideally, the pre-employment medical examination (also referred to as a pre-placement examination) strives to place and maintain employees in an occupational environment adapted to their physiological and psychological capacities. The goal of the pre-employment examination is to determine whether an individual is fit to perform his or her job without risk to himself or others and also to record medical history of the person in case employed. This is also conceptualized within the practice of occupational medicine – it is assumed that the examiner is required to have detailed knowledge of both working and health conditions.

**Parameters to be monitored:**



New employees will be thoroughly medically examined under initial medical examination and thereafter during continuation of employment; the periodic medical examination will be done suggested by DGMS. The medical examination includes the following parameters -

- Height, weight, body mass index (BMI)
- Cardiovascular examination (heart check, blood pressure, pulse)
- Full musculoskeletal examination including comprehensive range of movement
- Central nervous system examination
- Examination for hernia and other abdominal abnormalities
- Urine examination for diabetes or kidney / bladder disorders
- Respiratory examination
- Vision assessment including color blindness
- Medical fitness to work in mines
- Medical examination of drivers
- Drug and alcohol testing
- Spirometry - (Lung Function Test)
- Audiometry (Hearing Test)
- Urine testing
- Vision tests, color vision
- ECG
- CXR (Chest Radiograph)
- Blood glucose
- Blood lead level
- Strength and mobility screening

Further, Regular Awareness campaign amongst staff/ working about AIDS/ Dengue/Malaria will be done, Ambulance and First Aid facility is being provided on a regular basis.

The medical records of the employees will be maintained. Under initial induction, the workers will be given training related to all safety and health aspects pertaining to their vocation and thereafter, special training courses/ awareness programme for Malaria eradication, STDs and health effects on exposure to mineral dust will be organized regularly for employed persons as well as for nearby villagers. Refresher training will also be arranged as per statutes.

#### **Recommendations & Remedial Measures**

- Hazard Identification and Risk Assessment at work place.
- Ergonomic aspects taken care during equipment procurement.
- Imparting health awareness through camps/ campaigns/ trainings & medical checkups.
- Maintaining Environmental & Industrial Hygiene Standards.
- Focused programs to educate society for healthy living
- Infrastructure facilities for sanitation & safe drinking water supply.
- Health Camps for people & live-stock



### Frequency of Medical Examination

- Pre-Placement Medical examination: Prior to joining
- Periodical Medical examination:

Schedule of Public Health Check	
Activity	Frequency
Regular Health Camp for community includes <ul style="list-style-type: none"> <li>Awareness on Health habits &amp; sanitation</li> <li>Nutritional knowledge</li> <li>Education on protection &amp; prevention of Public Health Risks &amp; Wide Spread Diseases</li> </ul>	Quarterly
Organizing HIV & AIDS awareness	Half Yearly
Mega Health camp	Yearly

Budget for implementation of Occupational Health & safety measures & medical examination has been given in the following table:

**Table: 4.30**  
**Budget for Occupational Health & Safety measures**

Particulars	UoM	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
IME Budget @ 1100 per person	Rs. (in lakh)	1.1	5.5	3.85	1.1	1.1	1.1	1.1	1.1	1.1
New Joinees	Nos.	100	500	350	100	100	100	100	100	100
PME Budget @ 1100 per person	Rs. (in lakh)	7.7	9.13	9.13	9.13	9.13	9.13	9.13	9.13	9.13
PME Checkups	Nos.	700	830	830	830	830	830	830	830	830
PPEs @ Rs.6000 per person	Rs. (in lakh)	204	234	249	249	249	249	249	249	249
Working Population	Nos.	3400	3900	4150	4150	4150	4150	4150	4150	4150
Occupational Hygiene (Covid-19, Sanitation and Housekeeping)	Rs. (in lakh)	20	20	20	20	20	20	20	20	20
Training, awareness and visual display	Rs. (in lakh)	25	25	25	25	25	25	25	25	25
Ambulances, Fire extinguisher and rescue	Rs. (in lakh)	20	20	20	20	20	20	20	20	20



management										
<b>Total</b>	Rs. (in lakh)	<b>277.8</b>	<b>313.63</b>	<b>326.98</b>	<b>324.23</b>	<b>324.23</b>	<b>324.23</b>	<b>324.23</b>	<b>324.23</b>	<b>324.23</b>

#### 4.5.11 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF ENVIRONMENTAL COMPONENTS

Irreversible commitment of environmental components for the proposed expansion in mining project will include Land use, topography, geology, soil. There will be no irretrievable commitment of environmental components for the said project.

#### 4.5.12 CONCLUSION

As discussed above, it is safe to say that the project will not cause any significant impact on the environment of the area, as adequate preventive measures will be adopted to contain various pollutants generated due to the proposed expansion project within permissible limits. Development of Greenbelt/Plantation around the mining lease will minimize the environment pollution and improve the overall aesthetic beauty.





## CHAPTER - 5

### ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

#### 5.1 GENERAL

Analysis of alternative site helps in selection of best possible site for the project. On one hand it helps to closeness to the existing infrastructure and on other hand it also helps to minimize the impact of project on environment.

Site for Mining lease is selected on the basis of occurrence of mineral for suitable end use. Occurrence of mineral is site specific in nature and it is proved after necessary survey, prospecting and detailed exploration and after duly obtaining statutory prospecting license and clearances and therefore alternative site analysis after grant of mining lease is not applicable for such projects

Comparison of alternatives of technology helps to determine the best method of achieving the project objectives with minimum environmental impacts or indicates the most environment friendly and cost-effective options. Every mine needs to be planned in a way that the mineral is extracted to the maximum extent without causing severe irreversible environmental damages.

#### 5.2 ANALYSIS OF SITE

M/s. Hindustan Zinc has Proposed Expansion of Zawar Group of Underground Lead- Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total Excavation: 7.78 Million TPA including Waste rock 1.28 MTPA and Beneficiation from 4.8 Million TPA to 7.3 Million TPA within ML Area of 3620 ha at Villages- Zawar, Tehsil: Girwa and Sarada, District- Udaipur, Rajasthan.

Dept. of Mines & Geology, Govt. of Rajasthan extended the lease validity till 31.03.2030 as per Section 8A (5) of MMRD (Amendment) Ordinance 2015 vide letter no. Kh/Udai/CC-3/Pr/Sarada/323/08/3856 dated 26.02.2015.

From the nature & extent of the deposit and exploration done in the deposit, adequate reserves of required quality have been proved with adequate degree of reliability. Therefore, the expansion project will continue in the existing site.

#### 5.3 ANALYSIS OF TECHNOLOGY

Mining operation is being/will be carried out in the Underground Mine with sub level open stoping method, utilizing machines in conjunction with drilling & blasting, crushing and winding/hoisting. Loading is being done by LHD/LPDT.

The sequence of stoping involves creation of wide stopes leaving wide pillars in between two stope panels. The stopes are planned to be extracted in primary-secondary sequences. Each sublevel is extracted by blast holes drilled in trough fashion from the bottom. After the primary stope extraction, they will be backfilled with cemented paste backfill. The secondary stopes will be extracted after the extraction and back filling of adjacent primary stopes.

Presently, Primary crushers are installed in underground mine locations except Baroi & Mochia-Balaria Portal where it is installed on surface. Ore from all the four mines is transported to centralized beneficiation plants, either through belt conveyor system or by road through surface



trucks (15T-35T capacity), where it is temporarily stacked in designated stockpiles namely Mochia, Balaria & mill 2 stockpiles.

The ore is fed up in the secondary crusher installed in the beneficiation plant and crushed ore is the sent to the Ball mill with the help of disc & belt feeders, for wet grinding, by using High chrome grinding media of size 80 mm. These ball mills run in close circuit with hydro cyclones. Lead- Zinc concentrate is obtained after processing through flotation, thickening and filtration section of the beneficiation plant. The concentrates so produced are sent to respective smelters through road transport.

#### 5.4 CONCLUSION

The expansion will be carried out in the existing mining lease area. The mineral mined at this mine will be used for the manufacture of lead and zinc at the Smelter plant. No change in use of mineral or mining process is envisaged. Sub level open stoping (Longitudinal & Transverse) method of underground mining, Beneficiation process and transportation by conveyor belt/trucks is adopted. No Change in site and technology is envisaged.







## CHAPTER - 6

### ENVIRONMENTAL MONITORING PROGRAMME

#### 6.1 INTRODUCTION

Post Project Monitoring is an essential part to check the impact of project related activity. Hence monitoring of various environmental parameters will be carried out on a regular basis to ascertain the following:

- Status of Pollution within the mine site and in its vicinity.
- Generate data for predictive or corrective purpose in respect of pollution.
- Examine the efficiency of pollution control system adopted at the site.
- To assess environmental impacts.

Monitoring is being /will be carried out at the site as per the norms of CPCB.

Environmental Monitoring Programme will be conducted for various environmental components as per conditions stipulated in Environmental Clearance Letter issued by MoEFCC & Consent to Operate issued by SPCB.

Six monthly compliance reports will be submitted every year to Regional Office by 1<sup>st</sup> of June & 1<sup>st</sup> of December. Quarterly compliance Report for conditions stipulated in Consent to Operate will be submitted to SPCB on regular basis.

#### 6.2 FORMATION OF ENVIRONMENTAL MANAGEMENT CELL (EMC)

In order to maintain the environmental quality within the standards, regular monitoring of various environmental components is necessary. M/s. Hindustan Zinc Ltd. (HZL) has an Environmental Management Cell (EMC) for environmental monitoring and control. The EMC team takes care of pollution monitoring aspects and implementation of control measures.

A group of qualified and efficient engineers with technicians are deputed for maintenance, up keeping and monitoring the pollution control equipment, to keep them in working at the best of their efficiencies. The Organizational structure of EMC is given in Chapter – 10 of this Final EIA/EMP Report.

##### 6.2.1 RESPONSIBILITIES OF EMC

The responsibilities of the EMC include the following:

- Obtaining Consents and authorizations from the respective SPCBs.
- Regular environmental monitoring.
- Analysis of environment data, reports preparation and submission of reports to statutory authorities, corporate office etc.
- Compliance with guidelines and statutory requirements.
- Coordination with statutory bodies, functional groups of the unit, Corporate Project/Environment & Engineering department etc.



- Interaction with engineering & operation team for implementation of any modification programmes intended to improve the availability / efficiency of pollution control devices / systems.
- Regular environmental review and performance appraisal (Internal) and organizing Environmental Audits by independent agencies/ 3rd parties
- Coordination with the vendors dealing in waste supplies and disposal
- Ensuring that the waste handling and disposal is carried out as per prescribed conditions
- Installation of pollution control systems and other recommended measures to reduce or minimize all kinds of environmental pollution shall be done by the project management team after consultation with the site Environment Cell.
- The operation and maintenance of the pollution control systems shall be supervised by the Environment Cell in association with Plant Maintenance team.
- The Corporate Environment Cell shall regularly coordinate all activities related to pollution control and environmental management with the respective units and Head of the Plant.

### 6.3 MEASUREMENT METHODOLOGIES

#### 6.3.1 INSTRUMENTS TO BE USED

The following instruments are being/ will be used for the environmental monitoring:

1. Respirable Dust Sampler (RDS)
2. Fine Particulate Sampler (FPS)
3. Sound Level Meter
4. Micro Meteorological Station (common for plant and mine)
5. Stack Monitoring Kit
6. Water level indicator/Piezometer digital water level recorder
7. Global Positioning System (GPS)
8. Blastmate / minimate for blast monitoring operation

#### 6.3.2 MONITORING PROGRAMME

The post project monitoring includes details of any major/ minor impact in the core zone and area within buffer zone for the following parameters: -

1. Meteorological data
2. Ambient Air Quality Monitoring
3. Fugitive Dust Emission Monitoring
4. Noise Level Monitoring
5. Vibration Monitoring
6. Water quality and level monitoring
7. Medical check-up of the employees.
8. Socio-economic condition of villager



### 6.3.2.1 MONITORING SCHEDULE

Details of the Environmental Monitoring schedule, which are undertaken for various environmental components, are detailed below:

**TABLE - 6.1**  
**Post Project Monitoring**

S. No.	Description	Frequency Of Monitoring
1.	Meteorological data	Hourly
2.	Ambient Air Quality Monitoring	Twice a Week
3.	Water Quality & Level Monitoring	Monthly
4.	Noise Level Monitoring	Monthly
5.	Vibration Monitoring	Of every blast
6.	Soil Quality Monitoring	Bi-annually
7.	Stack Monitoring	Regular
8.	Medical check-up of the employees	Yearly as per DGMS Rules

### 6.3.3 METHODOLOGY ADOPTED

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

The following table is showing details of Post Project Monitoring programme:

**TABLE - 6.2**  
**POST PROJECT MONITORING PROGRAMME**

S. No.	Environmental Component	Parameters	Frequency of Monitoring	Measurement Method	Location
1.	Meteorological	Wind Speed; Wind Direction; Max. Temperature; Min. Temperature; Dry bulb temperature; Wet Bulb temperature; Relative Humidity; Rainfall; Cloud cover.	24 hourly continuous	IS 5182 Part 1-20 Automatic Weather Monitoring station.	Mine Site
2.	Ambient Air	PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> CO, and Lead in PM or as prescribed by CPCB/ SPCB/ MoEF&CC	24 hourly Once in a month	As per Revised National Ambient Air Quality	6 static and 2 dynamic locations within ML Area (third



S. No.	Environmental Component		Parameters	Frequency of Monitoring	Measurement Method	Location
					Standards (NAAQS) vide MoEF circular, dated 16.11.2009	party monitoring)
			PM, NO <sub>x</sub> , CO or as prescribed by CPCB/ SPCB/ MoEF&CC	Continuous monitoring using on-line monitoring system		03 locations in Mine Site
3.	Air Emissions	DG Stack	PM, CO, NO <sub>x</sub> , HC, NMHC	Six monthly		D.G. Sets, crusher and Mill area
		>1000 kVA				
		<1000 kVA	PM, CO, NO <sub>x</sub> , HC			
		Crusher	Particulate Matter or as prescribed by CPCB/ SPCB/ MoEF&CC	Once in a month		
		Work Zone	Free silica in PM or as prescribed by CPCB/ SPCB/ MoEF&CC/ OHSAS	Once in a quarter		Mine site
4.	Noise & Vibration	Ambient	Spot Noise level recording Leq (day), Leq (night), Leq (dn)	Once in a quarter	IS: 4954-1968 as adopted by CPCB.	06 locations in ML Area
		Work Zone				D.G. Set, mine, Mill area
		Peak particle velocity	-	Once in a year	PPV Meter	150-200 mtr from the blasting site.
5.	Water Quality	Ground water	Quality: As per IS: 10500, 2012 or as prescribed by CPCB/ SPCB/ MoEF&CC	Once in a quarter	IS: 2488 (Part 15) Standards methods for examination of water and waste water analysis	4 locations in and around M.L Area
			Level (m bgl): continuous through DWLR	Once in a month		Piezometric wells in & around ML Area



S. No.	Environmental Component	Parameters	Frequency of Monitoring	Measurement Method	Location
	Surface Water	Parameters specified under IS:2296 (Class C) or as prescribed by CPCB/ SPCB/ MoEF&CC	Once in a quarter	published by American Public Health association.	Two locations inside ML Area. (upstream and downstream)
	Treated Water (STP)	pH, BOD, COD, TSS, Total Kjeldahl nitrogen, Ammonical nitrogen, chlorides, sulphates or as prescribed by CPCB/ SPCB/ MoEF&CC	Once in a month		Inlet & Outlet of STP
		Turbidity, pH, or as prescribed by CPCB/ SPCB/ MoEF&CC	Continuous monitoring using online monitoring system		
	Mine water & Tailing dam reclaimed water	pH, TSS, TDS, Heavy metals, BOD COD or as prescribed by CPCB/ SPCB/ MoEF&CC		Effluents Standards as per IS:2490	
6.	Soil Environment	Composite sample from the site for Physio-chemical parameters	Once in a quarter	Collected and analyzed as per soil analysis reference book, M.I. Jackson and soil analysis reference book by C.A. Black	10 locations in and around M.L Area
8.	Health	Occupational Health	<ul style="list-style-type: none"> <li>Initial Medical Examination (IME)</li> </ul>	--	All employees



S. No.	Environmental Component	Parameters	Frequency of Monitoring	Measurement Method	Location
			<ul style="list-style-type: none"> <li>Periodic Medical Examination (PME)                             <ul style="list-style-type: none"> <li>Once in 3 years for age &gt; 45 years</li> <li>Once in 5 year for age ≤ 45 years</li> </ul> </li> </ul>		

#### 6.4 LOCATIONS OF MONITORING STATIONS

The location of the monitoring stations is selected on the basis of prevailing micro meteorological conditions of the area like; Wind Direction & Wind Speed, Relative Humidity, Temperature. 6 nos. static and 2 nos. dynamic AAQM stations are selected to assess the ambient air quality of the area. While 3 nos. of Continuous on-line air quality monitoring system have been installed in the Mine site. Noise level monitoring are carried out on lease boundary & in high noise generating area within the M L area. Water monitoring locations are decided on the basis of general slope of the area & drainage pattern. Locations for the post project monitoring are as under.



**Table - 6.3**  
**Locations of Monitoring Stations**

S. No	Attribute	Parameters to be monitored	No. of Locations	Latitude	Longitude	Project Phase in Which Monitoring is Required	Monitoring Agency
1.	Ambient Air Quality	PM10, PM2.5, SO2, NO2	Mill Office	24°21'44.53"	73°43'9.68"	Operation Phase	Third Party
			Mochia Mine	24°21'47.28"	73°43'59.03"	Operation Phase	Third Party
			Balaria Mine	24°21'50.42"	73°42'29.51"	Operation Phase	Third Party
			Admin Block	24°21'45.52"	73°43'19.74"	Operation Phase	Third Party
			Zawarmala Mine	24°20'7.49"	73°41'15.38"	Operation Phase	Third Party
			Baroi Mine	24°20'19.76"	73°41'43.30"	Operation Phase	Third Party
			Dry Tailing Plant	24°20'52.85"	73°42'40.84"	Operation Phase	Third Party
			Hydrofill	24°21'50.42"	73°42'29.51"	Operation Phase	Third Party
2.	Ambient Noise Quality	Leq noise levels in dB (A)	Mill Office	24°21'44.53"	73°43'9.68"	Operation Phase	Third Party
			Mochia Mine	24°21'47.28"	73°43'59.03"	Operation Phase	Third Party
			Balaria Mine	24°21'50.42"	73°42'29.51"	Operation Phase	Third Party
			Admin Block	24°21'45.52"	73°43'19.74"	Operation Phase	Third Party
			Zawarmala Mine	24°20'7.49"	73°41'15.38"	Operation Phase	Third Party
			Baroi Mine	24°20'19.76"	73°41'43.30"	Operation Phase	Third Party
			Dry Tailing Plant	24°20'52.85"	73°42'40.84"	Operation Phase	Third Party
			Hydrofill	24°21'50.42"	73°42'29.51"	Operation Phase	Third Party
			Hospital	24°21'14.7384"	73°43'49.0152"	Operation Phase	Third Party
			Ramnagar Colony	24°20'54.056"	73°44'26.030"	Operation Phase	Third Party
			West Mochia	24°21'51.93"	73°42'11.33"	Operation Phase	Third Party
			Central Baroi Mine	24°20'19.76"	73°41'43.30"	Operation Phase	Third Party
			DAV School	24°21'33.83"	73°43'59.71"	Operation Phase	Third Party
3.			Mahadev ki nal	24°20'37.086"	73°44'4.855"	Operation Phase	Third Party





S. No	Attribute	Parameters to be monitored	No. of Locations	Latitude	Longitude	Project Phase in Which Monitoring is Required	Monitoring Agency
	Ground Water Quality	Parameters as per IS 10500-2012 (pH, Alkalinity, Hardness, TDS, TSS, COD, BOD, DO, Sulphate etc.)	Tiger well	24°20'57.96"	73°41'44.99"	Operation Phase	Third Party
			Openwell Naka bazar	24°21'54.94"	73°44'0.97"	Operation Phase	Third Party
			Open well Zawarmata village	24°20'46.59"	73°40'47.40"	Operation Phase	Third Party
			Handpump Zawarmata	24°20'48.30"	73°40'54.90"	Operation Phase	Third Party
			Govt Handpump, Kanpur	24°20'20.45"	73°43'32.26"	Operation Phase	Third Party
4.	Soil Quality	Parameters As per IS 2720/USDA (pH, Conductivity, Soil Texture, Colour, Water Holding Capacity etc.)	Around 4 mines, Tidi River upstream sediment, Tidi River downstream stream sediment	Kanpur Village- 24°20'12.50"	73°43'20.41"	Operation Phase	Third Party
				Newa Talai- 24°20'52.59"	73°44'58.47"		
				Balariya Mines- 24°21'41.53"	73°44'1.06"		
				Upstream- 24°20'44.80"	73°40'51.83"		
				Downstream- 24°21'27.22"	73°43'47.02"		
5.	Fugitive Emission Monitoring	Suspended Particulate Matter	Mill Office, Mochia Mine, Balaria Mine, Zawarmala mine, Baroi Mine, Dry Tailing Plant, Hydrofill, Admin Block	Same provided as above	Same provided as above	Operation Phase	Third Party
6.	Stack Emission Monitoring	PM	Mochia Crusher, Balaria Crusher, New mill crusher	-24°21'50.29" -24°21'49.92" -24°21'49.16"	-73°43'6.57" -73°43'9.732" 73°43'20.1684"	Operation Phase	Third Party



## 6.5 DATA ANALYSIS

Monitoring data analysis will be done by MoEFCC approved laboratory as per CPCB guidelines & timely submitted to concerned authority (specified in Environment Clearance Letter issued by MoEFCC, New Delhi and Consent issued by CPCB) on regular basis.

## 6.6 DETAILED BUDGET

The budget proposed for this Expansion in Ore Production capacity is as follows:

- Capital Cost of the Project: Rs. 1250 Crores /-
- Capital Cost for EMP: Rs. 120 Crores /-
- Recurring Cost for EMP: Rs. 400 Lacs/annum/-





## CHAPTER-7

### ADDITIONAL STUDIES

#### 7.1 INTRODUCTION

As per EIA Notification dated September 14, 2006 as amended on time to time, MoEF&CC, New Delhi has suggested Terms of References (ToRs) for the preparation of the Environmental Impact Assessment (EIA) Report and Environmental Management Plan (EMP) vide their letter no. J-11015/259/2012-IA-II (M) dated 08th September, 2021.

The following Additional Studies were carried out in reference to the additional Terms of References:

1. Public Consultation
2. Hydro-geological Study and Rainwater Harvesting Plan
3. Resettlement & Rehabilitation
4. Risk Assessment & Disaster Management Plan

#### 7.2 PUBLIC CONSULTATION

Public hearing for the said project was conducted on 22.12.2021 at Gram Panchayat Bhawan Bhaladia, Tehsil Sarada, District Udaipur. Details of the Public hearing proceedings are appended herewith.

**Table - 7.1**  
**Public Hearing Details in Brief**

S. No.	Particular	Description
1.	Name of newspapers & Date of Advertisement	<ul style="list-style-type: none"> <li>➤ The Times of India dated 21.12.2021</li> <li>➤ Rajasthan Patrika dated 21.12.2021</li> </ul>
2.	Date/ Time of Public Hearing	22.12.2021 at 11:00 AM
3.	Venue	Gram Panchayat Bhawan Bhaladia, Tehsil Sarada, District Udaipur
4.	Members	<ul style="list-style-type: none"> <li>➤ Mr. O.P. Bunkar, Additional District Collector and Additional District Magistrate (Administration) sir, Udaipur.</li> <li>➤ Shri Vinay Katta, Regional Officer, Rajasthan State Pollution Control Board, Udaipur.</li> </ul>

Public Hearing Proceedings have been forwarded from Regional Office to MoEFCC vide letter no. RPCB/RO U/UDR/1395 dated 12.01.2022. Same has been enclosed as **Annexure 22** with this Final EIA/EMP Report.





Expansion of Zawar Group of Underground Lead- Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total Excavation: 7.78 Million TPA including Waste rock 1.28 MTPA and Beneficiation from 4.8 Million TPA to 7.3 Million TPA within ML Area of 3620 ha (ML No.03/89) at Villages- Zawar, Kodiya Khet, Nayakheda, Rawwa, Tidi, Udiyakheda, Barothi Bhaldia, Bara, Chanawada, Dhavadi Talai, Kanpur, Newa Talai, Padla, Parsad, Krishnapura, Singhatwara, Tehsil: Girwa and Sarada, District- Udaipur, Rajasthan by M/s Hindustan Zinc Ltd.



Chapter 7 of Final EIA/EMP Report

## 7.2.2 PHOTOGRAPHS OF PUBLIC HEARING





7.2.3

PUBLIC HEARING ACTION PLAN

Table - 7.2

Public Hearing Action Plan of Verbal Comments/ Issues Received During Public Hearing

Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
1	<b>Smt. Manju Meena, Village Newatalai :</b>  Smt. Manju Meena, Village Newatalai told that she is associated with the Sakhi project being run by Hindustan Zinc Ltd. for the last 5-6 years. She was given a fund of Rs. 36 Lakh by the company, which she has increased by 4 times. Good repair work has also been done by the company in Swami Vivekananda Vidyalaya. <u>I want the company to continue to do such good work in future also and wants people to get good employment opportunities.</u>	Hindustan Zinc Ltd undertates various initiatives each year in education sector in building capacities & supporting the local government schools to enhance the quality of education in Zawar region, this includes construction of classrooms, toilets, complete repair & renovation of School buildings. Additionally, many continuous programs like - <b>A. Education Projects active in Zawar region through CSR:</b> <b>Shiksha Sambal</b> - Supporting Sr. Sec Schools for Xth & XII th Board Exams through competent teachers in Science, English & Maths Subjects in 10 Senior Secondary Schools of Nevatalai, Padla, Oda, Singhatwada, Chanavda, Zawar, Tidi Boys, Tidi Girls, Kanpur - <b>52 Lakhs per year</b>  <b>Reengus:</b> Each year 30 meritorious Girls are selected & supported with residential Graduation Program in Science, Commerce & Arts stream for three years - <b>10 Lakhs per year</b>  <b>Unchi Udaan:</b> Every year, students are selected for JEE	1.Continuous Implementation of Projects mentioned in the Category A above viz. Shiksha Sambal, Reengus, Unchi Udaan  2. Undertaking Education Infra Projects basis need - 65 Lakhs approx. each year.  3. Ongoing Education Infra Sites: i) Govt. Kanpur Sr. Sec School- 16 Lakhs ii) Govt. Tidi Girls Sr. Sec School,19 Lakhs



Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
		<p>Coaching, supported with residential education program from VIIIth to XIIth &amp; coaching for JEE program</p> <p><b><u>Total Investment in Education Projects: 62 Lakhs per year</u></b></p> <p><b>B. Education Infra Projects undertaken by the company over past 3 Years-</b></p> <p>i) Repair &amp; Renovation of Primary School, Limbadara, Nevatalai 22 Lakhs</p> <p>ii) Repair &amp; Renovation of Govt. Primary School, Talab Fala, Singhatwada- 12 Lakhs</p> <p>iii) Repair &amp; Renovation of Govt. Primary School, Amarpura - 12.63 Lakh</p> <p>iv) Library setup at Newatalai - 9 Lakhs Repair and renovation at Govt. Zawar School - 23.60 Lakhs</p> <p>v) Repair and renovation at Govt.Tidi Boys School - 41.71 Lakhs</p> <p>vi) Repair and renovation at Govt. upper Primary School Nala, Chanavda- 29.7 Lakhs</p> <p>vii) Repair &amp; Renovation at Govt. Primary School, Bedadhara - 14.91 Lakhs</p> <p>viii) Repair &amp; Renovation Govt. Girls Senior Secondary School, Ramnagar - 22.11 Lakhs</p> <p>ix) Construction of 2 Classrooms at Govt. Senior Secondary School, Mahadev Ki Naal- 20.35 Lakhs</p>	





Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
		<b>Total Education Infra Development Spend: 208.01 Lakhs</b>	
<b>2</b>	<b><u>Shri Ashok Patwa, New Market, Village Zawar Mines:</u></b>		
	Shri Ashok Patwa, resident of Zawar Mines welcomed the MLA, all the officials, public representatives and the people of the area present in today's public hearing. After that he said that today we have got an opportunity to move forward a step further in the development of our region. Hindustan Zinc wants to increase its production capacity, which will provide employment to the local people and will get an opportunity to move forward. For this it is necessary to provide training to the local unemployed. <u>I would like to say to the management here that skill development training centres should be opened here so that quality production can be done here by working of trained people.</u> We want to carry forward the pace of development of the country.	Hindustan Zinc Ltd. has been taking continuous initiatives in Skilling & employment through its various long-term programs, some of which include, 1. Skill center at Rural Resource center in June, 2022 with 25 youth being trained for Hospitality Management- 5 Lakhs 2. In collaboration with Anushka Academy coaching for Govt. Exams were provided to 70 youth in FY'24. Total Budget of the project was around ₹5 lakh <b><u>Completed Programs: 10 Lakhs</u></b>	Future initiatives under pipeline for FY 2024-25 include- 1. Zinc Kaushal Kendra would be opened for youth in 2 trades (hospitality management & security) with 60 students in each batch - 30 Lakhs 2. Anushka Academy coaching to be continued for the coming years with 2 batches in a FY. Total budget would be ₹ 12 lakhs per year 3. Commencing Computer Training Centre for 50 youth in one batch, and 4 batches in one FY. Total budget shall be 5 lakhs per year 4. Restarting of the textile unit at Zawar where it would provide skill training as well as employment to around 25 women in the operational villages. Total annual budget shall be ₹ 25 lakhs <b>Programs Planned: 72 Lakhs</b>
<b>3</b>	<b><u>Smt. Raj Shree Jain Teacher, Swami Vivekananda Vidyalaya Zawar Mines.</u></b>		
	Smt. Raj Shree Jain, teacher, Swami Vivekananda Vidyalaya said that our school was in a dilapidated condition, whose renovation and repair work has been done by Hindustan Zinc Ltd. in the year 2021-22. Earlier,	Thanks for the support	



Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
	our students studying here were afraid that the stones of the building might fall on their heads. Now with the renovation of the school building, the problems of our children have gone away and they are sitting and studying well. Along with this, stadium work has been done by Hindustan Zinc Ltd., Children have been assisted in learning dance, and arrangements for refreshments have been made from time to time. <b><u>Apart from this, whenever any support is needed by the school, all kinds of work are done by Zinc people by giving full cooperation.</u></b> For all this, on behalf of the school family, I express my gratitude and thanks to the Zinc Administration.		
4	<b>Shri Shivsingh Sisodia, Ex-employee H.J.L.Z.M.</b>		
	Shri Shivsingh Sisodia, The ex-employee said that I joined the HZL in 1975 and retired from Hindustan Zinc Limited in 2014. Hindustan Zinc Limited has a huge contribution in our region. As much development has taken place in this area, so much development has not happened in any other area. For all these types of work, I thank the local MLAs, public representatives, Hindustan Zinc Administration, trade union officials etc. The factory should come to our area, Modi ji took the factory from Calcutta to Gujarat. The people of the area will get employment by setting up a factory here too,	Hindustan Zinc Ltd. has been taking continuous initiatives in Skilling & employment through its various long-term programs, some of which include, 1. Skill centre at Rural Resouce centre in June, 2022 with 25 youth being trained for Hospitality Management- 5 Lakhs 2. In collaboration with Anushka Academy coaching for Govt. Exams were provided to 70 youth in FY'24. Total Budget of the project was around ₹ 5 lakh <b><u>Completed Programs: 10 Lakhs</u></b>	Future initiatives under pipeline for FY 2024-25 include- 1. Zinc Kaushal Kendra would be opened for youth in 2 trades (hospitality management & security) with 60 students in each batch - 30 Lakhs 2. Anushka Academy coaching to be continued for the cominh years with 2 batches in a FY. Total budget would be ₹ 12 lakhs per year 3. Commencing Computer Training Centre for 50 youth in one batch, and 4 batches in one FY. Total



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	for this they should be supported. Hindustan Zinc Administration is also doing good work in the field of education, health and other social welfare, work is also being done through NGO, under which 500 farmers of the area have been added in the first phase and more Farmers will also be added in the coming time. Trees and plants are also being planted by them in the area. Each farmer is being given works worth Rs 2 lakh each, in which only 25 percent of the amount is deposited by the farmer, the rest is being given by the Zinc Administration. <u>I request the Additional District Collector that a factory should come to the area, but along with this, arrangements should be made to provide training to the local unemployed. Earlier also we had requested the trade union officials to open a technical college in this area so that the local students can get good training and get employment.</u> For this, camps are also organized from time to time by Hindustan Zinc Administration and efforts are also made from time to time for how to prevent environmental pollution of the area, due to which if any team from outside comes for inspection. If so, he does not see pollution. Overall, there has been all kinds of awareness in our area, but still, the development that should have been done has not happened. A lot of social welfare		budget shall be 5 lakhs per year 4. Restarting of the textile unit at Zawar where it would provide skill training as well as employment to around 25 women in the operational villages. Total annual budget shall be ₹ 25 lakhs <b>Programs Planned: 72 Lakhs</b>
		Hindustan Zinc Ltd. has been taking continuous initiatives in Skilling & employment through its various long-term programs, some of which include, 1. Skill centre at Rural Resouce centre in June, 2022 with 25 youth being trained for Hospitality Management- 5 Lakhs 2. In collaboration with Anushka Academy coaching for Govt. Exams were provided to 70 youth in FY'24. Total Budget of the project was around ₹ 5 lakh <b>Completed Programs: 10 Lakhs</b>	Future initiatives under pipeline for FY 2024-25 include- 1. Zinc Kaushal Kendra would be opened for youth in 2 trades (hospitality management & security) with 60 students in each batch - 30 Lakhs 2. Anushka Academy coaching to be continued for the cominh years with 2 batches in a FY. Total budget would be ₹ 12 lakhs per year 3. Commencing Computer Training Centre for 50 youth in one batch, and 4 batches in one FY. Total budget shall be 5 lakhs per year 4. Restarting of the textile unit at Zawar where it would provide skill training as well as employment to around 25 women in the operational villages. Total annual budget shall be



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	work is also being done under CSR. In the last few days, out of the CSR fund of Rs 13 crore that came, very little money was spent here, <b><u>so this fund should be increased further and an ITI should be opened in our area.</u></b>		₹ 25 lakhs <b>Programs Planned: 72 Lakhs</b>
5	<b>Mr. Deepak Kamar Meena (Resident of Tidi)</b>		
	Mr. Deepak Kumar Meena said that he has done farming till the year 2020, but for the first time strawberry cultivation has been done by him with the new technology through Hindustan Zinc, which has good yield. By doing farming with new technology, 80-90 quintals of tomatoes have grown in my field and I have got to learn a new way of farming. Under the Samadhan project also, good work is being done by the Zinc Administration. <b><u>For this, I express my gratitude to our Sarpanch, Shri Lalu ji that he did a good job in providing employment to the local people</u></b> , but in the future also, more and more employment should be given to the local people so that no one remain unemployed. If the factory is set up in the future, then the people of the area will also get employment. <b><u>For this ITI should also be opened in this field.</u></b>	Hindustan Zinc Ltd. has been taking continuous initiatives in Skilling & employment through its various long-term programs, some of which include, 1. Skill centre at Rural Resouce centre in June, 2022 with 25 youth being trained for Hospitality Management- 5 Lakhs 2. In collaboration with Anushka Academy coaching for Govt. Exams were provided to 70 youth in FY'24. Total Budget of the project was around ₹ 5 lakh <b><u>Completed Programs: 10 Lakhs</u></b>	Future initiatives under pipeline for FY 2024-25 include- 1. Zinc Kaushal Kendra would be opened for youth in 2 trades (hospitality management & security) with 60 students in each batch - 30 Lakhs 2. Anushka Academy coaching to be continued for the cominh years with 2 batches in a FY. Total budget would be ₹ 12 lakhs per year 3. Commencing Computer Training Centre for 50 youth in one batch, and 4 batches in one FY. Total budget shall be 5 lakhs per year 4. Restarting of the textile unit at Zawar where it would provide skill training as well as employment to around 25 women in the operational villages. Total annual budget shall be ₹ 25 lakhs <b>Programs Planned: 72 Lakhs</b>
6	<b>Smt. Yashoda Chaudhary, resident of village Zawar Mata:</b>		



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	Mrs. Yashoda Chaudhary resident of village Zawar Mata said that I am associated with Khushi project that is being run by Hindustan Zinc since 2006. Under this, pre-school education being given to children and children are being taught through sports. <u>I request the Hindustan Zinc Administration that they continue to work for the development of children by opening new centres.</u>	<p>As a part of one of the initiatives of Hindustan Zinc Ltd. In Early Childhood Care, HZL operates Child Care Centers under Khushi Program supporting overall child development through health interventions &amp; pre-school learnings. Like Zawar Mata Nandghar, <b>160 Aanganwadis of Sarada &amp; Girwa Block are being renovated under the Nandghar Program</b> as a part of Company's initiative for early child hood care, nutrition &amp; development</p> <p>Hindustan Zinc Ltd. has been taking continuous initiatives in Skilling &amp; employment through its various long-term programs, some of which include,</p> <ol style="list-style-type: none"> <li>1. Skill centre at Rural Resouce centre in June, 2022 with 25 youth being trained for Hospitality Management- 5 Lakhs</li> <li>2. In collaboration with Anushka Academy coaching for Govt. Exams were provided to 70 youth in FY'24. Total Budget of the project was around ₹ 5 lakh</li> </ol> <p><b>Completed Programs: 10 Lakhs</b></p>	<p>Shall continue supporting the Govt. in running Anganwadis efficiently and budget would be ₹50 lakhs</p> <p>Future initiatives under pipeline for FY 2024-25 include-</p> <ol style="list-style-type: none"> <li>1. Zinc Kaushal Kendra would be opened for youth in 2 trades (hospitality management &amp; security) with 60 students in each batch - 30 Lakhs</li> <li>2. Anushka Academy coaching to be continued for the coming years with 2 batches in a FY. Total budget would be ₹ 12 lakhs per year</li> <li>3. Commencing Computer Training Centre for 50 youth in one batch, and 4 batches in one FY. Total budget shall be 5 lakhs per year</li> <li>4. Restarting of the textile unit at Zawar where it would provide skill training as well as employment to around 25 women in the operational villages. Total annual budget shall be ₹ 25 lakhs</li> </ol>



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			<b>Programs Planned: 72 lakhs</b>
7	<b><u>Smt. Seema Meena, Village Zawar, Anganwadi Worker:</u></b>		
	Smt. Seema Meena, Anganwadi worker first of all welcomed the officers and people of the area present in today's public hearing. After that she said that I want to give some information about the Khushi project being run by Hindustan Zinc Ltd. Under this, women are involved from pregnancy till their child's childhood. During this, all kinds of facilities are made available to women and children. Like toys for children, rags patti, dress, many types of kits etc. Many children are coming to our center because of these facilities. During the lockdown also, pre-school education kits were distributed door-to-door to the children by the Zinc Administration. We are also given help for kitchen and gardens by Zinc Administration. Even in future, we wish that the members of Khushi should remain connected with us.	As a part of one of the initiatives of Hindustan Zinc Ltd. In Early Childhood Care, HZL operates Child Care Centers under Khushi Program supporting overall child development through health interventions & pre-school learnings. Like Zawar Mata Nandghar, 160 Aanganwadis of Sarada & Girwa Block are being renovated under the Nandghar Program as a part of Company's initiative for early child hood care , nutrition & development	Shall continue supporting the Govt. in running Anganwadis efficiently and budget would be ₹50 lakhs
8	<b><u>Mrs. Rukmani, Village Nalagaon</u></b>		
	Mrs. Rukmani said that she is associated with the Sakhi project run by Hindustan Zinc, under which 58 groups are given gender training by giving information about how women can get government facilities. Under this, about 5000 women have joined us. Due to this project,	As a part of Sakhi Initiative in Zawar, Village level groups have been formed & an apex body of Federation has been registered and established, owned & managed by Hindustan Zinc Ltd under its CSR. <b>Women own this Federation &amp; undertake the functioning of it , sanctioning loans up to 5-7 Lakhs per month , 60 Lakhs</b>	The flagship projects Sakhi and Microenterprises (Namkeen Unit) shall be continued for the upcoming years and the <b>tentative budget for the same shall be ₹ 100 lakhs</b>



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	many women are self-employed as they have been trained in sewing, flour mill, dairy etc.	<b>annually using the Fund contributed by HZL under CSR.</b> Various trainings & awareness programs are also conducted with the Sakhi women members on Gender based social issues & awareness about rights & legislations for women protection in India are given each year under Sakhi 'Uthori' initiative by HZL, through the Sakhi initiative, <b>5000 members and 15000+ Benefeciaries</b> are benefitted under the program till date. <b>A Production unit has been established as a part of Sakhi Initiative employing 8 women from Paduna, Zawar with the capacity of producing Namkeen 400Kgs per day.</b> The women are trained to make the products and also do local selling, establised in 2023, the unit has an <b>annual expenditure of INR 60 Lakhs per year</b> <b>Total Budget: 147 Lakhs per year</b>	
9	<u><b>Mr. Dharmendra Singh Rajoria Village Zawar</b></u>		
	<u><b>Mr. Dharmendra Singh Rajoria said that for the crores of rupees being submitted by mining companies under DMFT fund, it is requested to the officials of Zinc Administration, District Administration and Worker Union to spend majority of money of fund for development of locals.</b></u>	Each year Hindustan Zinc Ltd, Zawar Mines contributes more than <b>100 Crs towards District Mineral Foundation Trust (DMFT)</b> , a fund set up& managed by District Authorities for Development of mining affected regions. In 2023-24, INR 10 Crs approx. was appoved under DMFT, sending out a complete list of Development works to be undertaken in 13 Panchayats of Zawar Mines as per the recommendations of local PRI's, the sanction order was received in May'23, post which the financial sanction was	Efforts will be continued for utilization of DMFT fund with support of local village representatives.





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		given to 3 of the works in March'24 by District DMFT Committee, work under which is not started yet, HZL has always made continuous efforts for the DMFT funds be utilised for village development in Zawar Mines region.	
10	<b>Shri Banshilal, Sarpanch of Gram Panchayat Tidi:</b>		
	<b>Shri Banshilal, Sarpanch Gram Panchayat Tidi said that as the speakers have said before me that Hindustan Zinc has been doing good work in our area but still the physical facilities are very less in our area.</b> There are many of our issues which are not on the ground even today. When the people of Hindustan Zinc had to get environmental clearance before this, then many such promises were made by them, which they have not been able to fulfill even today. <b>I request that Hindustan Zinc Administration should open ITI in this field and provide training in such subject so that the local people can get maximum employment.</b>	As a part of Health initiatives in the region, HZL through a Mobile Health Van, provides primary health care facility without any cost in 28 villages across 13 Panchayats of Zawar. The project has been in function from FY 2019 up to FY 2023 reaching out to 2 villages per day as per a fixed monthly timetable with services of General Health checkup & medicines, reaching out to about 30,000 beneficiaries from Zawar region per year, Budget - <b>35 Lakhs per year</b> Total investments made, status: <b>Completed: 70 Lakhs</b>	Few of the major health initiatives in plan for FY 25 include – 1. Support to Primary Healthcare Center, right now under construction in Sarada Block with equipment & such other support basis the recommendations from Block Medical Department: <b>70-80 Lakhs approx.</b> 2. Mobile Health Van, provides primary health care facility without any cost in 28 villages across 13 Panchayats of Zawar.- <b>35 Lakhs per year</b> <b>Total Budgeted: 115 Lakhs</b>
	<b>The money of DMFT fund should be spent in various development works in the Gram Panchayats affected by mining.</b>		
	<b>The money of DMFT fund should be spent in various development works in the Gram Panchayats affected by mining.</b>		



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	<b><u>The water of wells, tube wells and ponds of our area has dried up, so arrangements should be made for farming and drinking water in the areas.</u></b> The category of our workers who work in the mining sector should be increased, because if the category of a worker increases, then his salary will also increase, due to which he will get economic benefits.	Hindustan Zinc , under its Community Asset Creation supports many Rural & Education Infra Deveelopment works in the villages of Zawar region (Education infra details highlighted above), below are few of the other Rural Infra works undertaken since FY 2021- i) Construction of Retaining wall near Zawar Mata Temple & Cremation Shed - <b>27.67 Lakhs</b> ii) Bhaladiya Cremation shed (Behind Community Center)- <b>18.5 Lakhs</b> iii) RCC construction at Zawar Pump House - <b>30.60 Lakhs</b> iv) RCC construction at Dhawaditalai & Deraphala, Zawar <b>23 Lakhs</b> v) Cremation shed at Singatwada (Near Naka Bazar) - <b>32 Lakhs</b> <b>Total Rural Infra works in past 3 years: 132 Lakhs</b>	In the rural infrastructure, we shall be taking up: i) CC road in the interior part of Kanpur Village - ₹ 70 lakhs ii) Cremation shed at Newatalai Village - ₹ 35 lakhs iii) Repair and renovation of Kanpur School - ₹ 15 lakhs iv) Repair and renovation of Tidi Girls school - ₹ 20 lakhs v) Repair and renovation of Padla school - ₹ 10 lakhs
	<b><u>Rain water should be stopped by making anicuts in 7-8 panchayats of mining affected area.</u></b>	Hindustan Zinc Ltd undertates various initiatives each year in education sector in building capacities & supporting the local government schools to enhance the quality of education in Zawar region, this includes construction of classrooms, toilets, complete repair & renovation of School buildings. Additionally, many continuous programs like - <b>A. Education Projects active in Zawar region through CSR:</b> <b>Shiksha Sambal</b> - Supporting Sr. Sec Schools for Xth & Xii	1.Continuous Implementation of Projects mentioned in the Category A above viz. Shiksha Sambal, Reengus, Unchi Udaan  2. Undertaking Education Infra Projects basis need - 65 Lakhs approx. each year.  3. Ongoing Education Infra Sites:



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		<p>th Board Exams through competent teachers in Science, English &amp; Maths Subjects in 10 Senior Secondary Schools of Nevatalai, Padla, Oda, Singhatwada, Chanavda, Zawar, Tidi Boys, Tidi Girls, Kanpur - <b>52 Lakhs per year</b></p> <p><b>Reengus:</b> Each year 30 meritorious Girls are selected &amp; supported with residential Graduation Program in Science, Commerce &amp; Arts stream for three years - <b>10 Lakhs per year</b></p> <p><b>Unchi Udaan:</b> Every year, students are selected for JEE Coaching, supported with residential education program from VIIIth to XIIth &amp; coaching for JEE program  <b>Total Investment in Education Projects: 62 Lakhs per year</b></p> <p><b>B. Education Infra Projects undertaken by the company over past 3 Years</b></p> <p>i) Repair &amp; Renovation of Primary School, Limbadara, Nevatalai 22 Lakhs</p> <p>ii) Repair &amp; Renovation of Govt. Primary School, Talab Fala, Singhatwada- 12 Lakhs</p> <p>iii) Repair &amp; Renovation of Govt. Primary School, Amarpura - 12.63 Lakhs</p>	<p>i) Govt. Kanpur Sr. Sec School- 16 Lakhs</p> <p>ii) Govt. Tidi Girls Sr. Sec School, 19 Lakhs</p>



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		iv) Library setup at Newatalai - 9 Lakhs v) Repair and renovation at Govt. Zawar School - 23.60 Lakhs vi) Repair and renovation at Govt. Tidi Boys School - 41.71 Lakhs vii) Repair and renovation at Govt. upper Primary School Nala, Chanavda- 29.7 Lakhs viii) Repair & Renovation at Govt. Primary School, Bedadhara - 14.91 Lakhs ix) Repair & Renovation Govt. Girls Senior Secondary School, Ramnagar - 22.11 Lakhs x) Construction of 2 Classrooms at Govt. Senior Secondary School, Mahadev Ki Naal- 20.35 Lakhs <b>Total Education Infra Development Spend: 208.01 Lakhs</b>	
	<b><u>In the field of medical and health also, Hindustan Zinc Administration should provide free treatment for the nearby people by setting up a good doctor in the hospital of village Zawar Mines.</u></b>		
	People get deprived of treatment as they are not aware of the ambulances deployed by them to reach the villages. Good work should also be done in the field of education. We want that not only one but ten factories should be opened in our area, but <b><u>employment should be provided to the local people on priority.</u></b>	Each year Hindustan Zinc Ltd, Zawar Mines contributes more than <b>100 Crs towards District Mineral Foundation Trust (DMFT)</b> , a fund set up& managed by District Authorities for Development of mining affected regions. In 2023-24, INR 10 Crs approx. was appoved under DMFT, sending out a complete list of Development works to be undertaken in 13 Panchayats of Zawar Mines as per the	Efforts will be continued for utilization of DMFT fund with support of local village representatives.



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		<p>recommendations of local PRI's, the sanction order was received in May'23, post which the financial sanction was given to 3 of the works in March'24 by District DMFT Committee, work under which is not started yet, HZL has always made continuous efforts for the DMFT funds be utilised for village development in Zawar Mines region, however in the absence of local &amp; company's representation, works have not been adequately addressed.</p> <p>As a part of Health initiatives in the region, HZL through a Mobile Health Van , provides primary health care facility without any cost in 28 villages across 13 Panchayats of Zawar. The project has been in function from FY 2019 up to FY 2023 reaching out to 2 villages per day as per a fixed monthly timetable with services of General Health checkup &amp; medicines, reaching out to about 30,000 beneficiaries from Zawar region per year, Budget - <b>35 Lakhs per year</b> Total investments made, status: <b>Completed: 70 Lakhs</b></p>	<p>Few of the major health initiatives in plan for FY 25 include</p> <ol style="list-style-type: none"> <li>1. Support to Primary Healthcare Center, right now under construction in Sarada Block with equipments &amp; such other support basis the recommendations from Block Medical Department - <b>70-80 Lakhs approx.</b></li> <li>2. Mobile Health Van, provides primary health care facility without any cost in 28 villages across 13 Panchayats of Zawar- <b>35 Lakhs per year</b> <b>Total Budgeted: 115 Lakhs</b></li> </ol>
11	<b><u>Mr. Mohammad Arif, Advocate</u></b>		
	Mr. Mohammad Arif, Advocate said that as our Sarpanch Sahab said that people should get employment. <b><u>I also want that at least 50 percent of the local people should be given employment.</u></b>	As of year 2023-24, company employs 80% of its contract workers from the districts of Udaipur & Salumber under Girwa & Sarada Blocks of Zawar Mines region. Additionally, HZL continuously works towards upskilling	<p>Future initiatives under pipeline for FY 2024-25 include-</p> <ol style="list-style-type: none"> <li>1. Zinc Kaushal Kendra would be opened for youth in 2 trades (hospitality management &amp;</li> </ol>



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	<p><b><u>The last time when the environment clearance was taken over by the Zinc Administration, it was promised by them that a biogas plant would be set up.</u></b> But even in 4-5 years this plant is not there but it must be set up in the future. As replied to me by Zinc Administration that they have applied for ToR in July, 2021, whereas the truth is that they have started work from March, which should be answered.</p>	<p>&amp; providing quality education to the children &amp; youths in the community through its Education Initiatives under CSR--</p> <p><b><u>A. Education Projects active in Zawar region through CSR:</u></b></p> <p><b>Shiksha Sambal</b> - Supporting Sr. Sec Schools for Xth &amp; XII th Board Exams through competent teachers in Science, English &amp; Maths Subjects in 10 Senior Secondary Schools of Nevatalai, Padla, Oda, Singhatwada, Chanavda, Zawar, Tidi Boys, Tidi Girls, Kanpur - 52 Lakhs per year</p> <p><b>Reengus:</b> Each year 30 meritorious Girls are selected &amp; supported with residential Graduation Program in Science, Commerce &amp; Arts stream for three years - 10 Lakhs per year</p> <p><b>Unchi Udaan:</b> Every year, students are selected for JEE Coaching, supported with residential education program from VIIIth to XIIth &amp; coaching for JEE program</p> <p><b><u>Total Investment in Education Projects: 62 Lakhs per year</u></b></p>	<p>security) with 60 students in each batch - 30 Lakhs</p> <p>2. Anushka Academy coaching to be continued for the coming years with 2 batches in a FY. Total budget would be ₹ 12 lakhs per year</p> <p>3. Commencing Computer Training Centre for 50 youth in one batch, and 4 batches in one FY. Total budget shall be 5 lakhs per year</p> <p>4. Restarting of the textile unit at Zawar where it would provide skill training as well as employment to around 25 women in the operational villages. Total annual budget shall be ₹ 25 lakhs</p> <p><b><u>Programs Planned: 72 lakhs</u></b></p>
12	<b><u>Ms. Reshma Meena, Village Zawar</u></b>		
	Ms. Reshma Meena said that she has been a part of UnchiUdan project run by Hindustan Zinc Ltd. Under this, she has been given IIT coaching by Zinc	Thanks for the support	-



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	Administration, due to which today she is got admission in NIT in Jamshedpur. I request that the administration for Hindustan Zinc should continue to cooperate with the children in need for higher education.		
13	<b>Mr. Shambhulal, Resident of Zawar</b>		
	<b>Mr. Shambhulal resident of Zawar said that due to the blasting work being done by Hindustan Zinc, cracks are coming in many houses in the area.</b> My house is also getting cracks. <b>The water level of the wells in this area are decreasing.</b> Two people are mad in my house, what is the reason? Noise pollution, air pollution or water pollution. The people of Hindustan Zinc have always cheated us, how much amount is earned from here, but in return no work is done here. When it was under Government of India, then our vehicles used to run in it but in today's time Vedanta people have paralyzed us. As long as there is a lack of education here, there will be no imagination of employment and development here. People who do not have any certificate, such people are also working here from outside which can be checked. Later the zinc administration says that the local people protest, which is wrong. We are the natives here, we should have economic development, which is not happening, now it will not work. <b>If we look at the</b>	As a part of Sakhi Initiative in Zawar, Village level groups have been formed & an apex body of Federation has been registered and established, owned & managed by Hindustan Zinc Ltd under its CSR. Women own this Federation & undertake the functioning of it, sanctioning loans up to 5-7 Lakhs per month, 60 Lakhs annually using the Fund contributed by HZL under CSR. Various trainings & awareness programs are also conducted with the Sakhi women members on Gender based social issues & awareness about rights & legislations for women protection in India are given each year under Sakhi 'Uthori' initiative by HZL, through the Sakhi initiative, 5000 members and 15000+ Beneficiaries are benefitted under the program till date. A Production unit has been established as a part of Sakhi Initiative employing 8 women from Paduna, Zawar with the capacity of producing Namkeen 400Kgs per day. The women are trained to make the products and also do local selling, established in 2023, the unit has an annual expenditure of	The same measures shall be continued.





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	<p><b><u>explosive material used for blasting here, it seems that nothing has been done by the Zinc Administration in the field of preventing environmental pollution.</u></b></p> <p>People are becoming deaf because of the smoke produce from here, local people are not getting proper employment while the people of mining affected area should be given adequate employment. Apart from this there are many other things but due to hesitating because of our Netaji, Adhikariji and other bhai sahab sitting here I don't want to say more.</p>	<p>INR 60 Lakhs per year</p> <p>Total Budget: 147 Lakhs per year</p> <p>Supply of portable Water is done through Tankers in the community during Summers &amp; on a regular basis in Kanpur village, Zawar Panchayat - settlement with a population of 1000 villagers near to tailing dam, the water is supply twice a day on regular basis &amp; more frequently during community festivals &amp; summers as required &amp; suggested by PRI's, <b>Budget for Water supply: 10 Lakhs per year</b></p>	<p>Water supply through tankers shall be continued and efforts shall be made to converge with the ongoing Jal Jeevan Mission initiatives.</p> <p><b>Tentative budget for the same shall be ₹ 12 lakhs per annum</b></p>
14	<b><u>Shri Mangilal Meena, Resident of Zawar Mala</u></b>		
	Mr. Mangilal Meena resident of Zawar Mala said that as my former speakers said that we are going crazy because of the sound of the fan running here, then this thing is completely wrong. Because I have my own house just in front of the fan, we have not suffered any damage from it. It is a matter of the family of the people who say this, which should be settled by sitting with their own family.	Ventilation fan provided is regularly maintained and noise monitoring is done and found within prescribed limit.	The same shall be continued.
15	<b><u>Smt. Aruna Kanwar, Resident of Singhatwada</u></b>		
	Mrs. Aruna Kanwar resident of Singhatwada said that on our request, a toilet was built in the school, there was no playground in the school which was built, water tank was made by Hindustan Zinc Administration. A loan of one lakh rupees to each was given to the women of the	As a part of Sakhi Initiative in Zawar, Village level groups have been formed & an apex body of Federation has been registered and established, owned & managed by Hindustan Zinc Ltd under its CSR. <b>Women own this Federation &amp; undertake the functioning of it,</b>	The flagship projects Sakhi and Microenterprises (Namkeen Unit) shall be continued for the upcoming years and the <b>tentative budget for the same shall be ₹ 100 lakhs</b>



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	village through the Sakhi project, due to which today women are taking care of their household expenses by working in the field of sewing, flour mill, dairy etc.	<b>sanctioning loans up to 5-7 Lakhs per month, 60 Lakhs annually using the Fund contributed by HZL under CSR.</b> Various trainings & awareness programs are also conducted with the Sakhi women members on Gender based social issues & awareness about rights & legislations for women protection in India are given each year under Sakhi 'Uthori' initiative by HZL, through the Sakhi initiative, <b>5000 members and 15000+ Beneficiaries</b> are benefitted under the program till date. <b>A Production unit has been established as a part of Sakhi Initiative employing 8 women from Paduna, Zawar with the capacity of producing Namkeen 400Kgs per day.</b> The women are trained to make the products and also do local selling, established in 2023, the unit has an <b>annual expenditure of INR 60 Lakhs per year</b> <b>Total Budget: 147 Lakhs per year</b>	
16	<b>Mr. Amit Kharadi, Resident of Zawar</b>		
	Mr. Amit Kharadi, resident of Zawar said that programs like Sakhi Project and UnchiUdan are also being run by the state government. In other districts of the state also, the work of such benefits is being done by the government. But here zinc administration is also doing kind of work for which we will have to give our land? We are not going to give our land in return for such small works. <b>A tremor like an earthquake is felt at the time of</b>	Hindustan Zinc Ltd undertates various initiatives each year in education sector in building capacities & supporting the local government schools to enhance the quality of education in Zawar region, this includes construction of classrooms, toilets, complete repair & renovation of School buildings. Additionally, many continuous programs like –	All the projects mentioned in part A shall be continued in the future years, with total budget of ₹ 60 lakhs



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	<p><b><u>blasting by zinc people at night. Will it have to bear the tremors of earthquake for such small facilities?</u></b> Our request is, not to mislead the public for small works and profit. Our demand is that Vedanta should be run again as a Government of India. Here 80 seats should be reserved for tribal children in the Sports Academy (Football) which has been opened by the Zinc Administration. There is no benefit in opening a college or ITI here. Due to this, the frog of the well will remain in the well. <b><u>We want that the students of this place should be encouraged for higher education by giving scholarships so that they can get good employment in future without relying on zinc people.</u></b> In the year 2017 also, we had apprised the CSR team of Zinc Administration about tailing dam, drinking water, education and health etc. but till date no hearing has been done. No work has also been done regarding the recruitment of unemployed. Many people here are sitting unemployed. <b><u>It is the demand of all that the local people should get maximum employment.</u></b> When the power plant was being built here, an assurance was given by the zinc administration that free electricity would be provided to the local people, do you all remember or forgot this thing. In year 2012, an assurance was given by Vedanta Group to fulfill the local</p>	<p><b>A. Education Projects active in Zawar region through CSR:</b></p> <p><b>Shiksha Sambal</b> - Supporting Sr. Sec Schools for Xth &amp; XII th Board Exams through competent teachers in Science, English &amp; Maths Subjects in 10 Senior Secondary Schools of Nevatalai, Padla, Oda, Singhatwada, Chanavda, Zawar, Tidi Boys, Tidi Girls, Kanpur - 52 Lakhs per year</p> <p><b>Reengus:</b> Each year 30 meritorious Girls are selected &amp; supported with residential Graduation Program in Science, Commerce &amp; Arts stream for three years - 10 Lakhs per year</p> <p><b>Unchi Udaan:</b> Every year, students are selected for JEE Coaching, supported with residential education program from VIIIth to XIIth &amp; coaching for JEE program</p> <p><b>Total Investment in Education Projects: 62 Lakhs per year</b></p>	



Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
	demands, copy of which I will provide to you. None of these demands have been met by the Zinc Administration.		
17	<b>Mr. Amritlal Meena, MLA Sir Salumbar:</b>		
	Mr. Amrutlal Meena, MLA Sir Salumbar first of all welcomed the Additional District Collector, other officers and the people of the area present in today's public hearing. After that, he said that there is a demand of everyone that factories should be opened in this area, but along with this, <b><u>it is also true that the people here should be provided employment on priority.</u></b> Today a public hearing has been held for environmental clearance. The same was organized in the year 2018 as well, but the factory from here went to Agucha, due to which the people here had to bear the loss. Zinc administration is also requested to establish coordination with the Sarpanch and other public representatives of all the Gram Panchayats of the area by making a list of the works to be done in the field of education, health, environment and getting them done from time to time. <b><u>The District Collector President of the DMFT fund, the Mining Engineer is the Member Secretary and all the MLAs of the district are the members.</u></b>	Each year Hindustan Zinc Ltd, Zawar Mines contributes more than <b>100 Crs towards District Mineral Foundation Trust (DMFT)</b> , a fund set up& managed by District Authorities for Development of mining affected regions. In 2023-24, INR 10 Crs approx. was appoved under DMFT, sending out a complete list of Development works to be undertaken in 13 Panchayats of Zawar Mines as per the recommendations of local PRI's, the sanction order was received in May'23, post which the financial sanction was given to 3 of the works in March'24 by District DMFT Committee, work under which is not started yet, HZL has always made continuous efforts for the DMFT funds be utilised for village development in Zawar Mines region, however in the absence of local & company's representation, works have not been adequately addressed.	Efforts will be continued for utilization of DMFT fund with support of local village representatives.



Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
	All the Gram Panchayats of zawar Mines area do come under my Vidhan Sabha area. Right now we have got a fund of Rs 7 crore under DMFT fund. <b><u>I want that approval should be issued from this fund for Zawar to Oda Road.</u></b> I request that like iron mines, soap stone mines should also be added to this. <b><u>As far as opening of ITI is concerned, I will meet the honorable Chief Minister along with 5-7 people here and get the approval issued hand-in-hand. I urged to the Zinc Administration about the limits set by management to ensure that the local people's representatives should be taken along with them to solve the problems of the area.</u></b>		
		Hindustan Zinc , under its Community Asset Creation supports many Rural & Education Infra Deveelopment works in the villages of Zawar region (Education infra details highlighted above), below are few of the other Rural Infra works undertaken since FY 2021- i) Construction of Retaining wall near Zawar Mata Temple & Cremation Shed - <b>27.67 Lakhs</b> ii) Bhaladiya Cremation shed (Behind Community Center)- <b>18.5 Lakhs</b> iii) RCC construction at Zawar Pump House - <b>30.60 Lakhs</b> iv)RCC construction at Dhawaditalai & Deraphala, Zawar - <b>23 Lakhs</b>	In the rural infrastructure, we shall be taking up: i) CC road in the interior part of Kanpur Village - ₹ 70 lakhs ii) Cremation shed at Newatalai Village - ₹ 35 lakhs iii) Repair and renovation of Kanpur School - ₹ 15 lakhs iv) Repair and renovation of Tidi Girls school - ₹ 20 lakhs v) Repair and renovation of Padla school - ₹ 10 lakhs



Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
		v) Cremation shed at Singatwada (Near Naka Bazar) - <b>32 Lakhs</b> <b>Total Rural Infra works in past 3 years: 132 Lakhs</b>	
18	<b><u>Shri Mohanlal Kharadi, Former Pradhan Panchayat Samiti Sarada.</u></b>		
	Shri Mohanlal Kharadi, former Pradhan Panchayat Samiti Sarada first of all welcomed the officers and people of the area present in today's public hearing. After that he said that first of all I would like to thank our MLA sir for giving the approval of the factory. after that our sad regarding the DMFT fund that crores of rupees go into the fund from our area, yet the village panchayats of the area (Kevada, Oda, Singatwada, Nevatalai ,Bhaladiya, Devpura etc.) have not even received a single rupee. <b><u>After this it is requested to MLA sir that they should take care of Oda road.</u></b> If they want this road will be built this year. The development of this area which should be done under DMFT fund is in the hands of MP and MLA. Because wherever you want, the money will be spent from this fund. If half of the money that goes from here to this fund is spent in the development of the gram panchayats of this area, then these panchayats will become rich. So before the next meeting, Acceptance should be issued under equitable distribution system by taking proposal from the	Each year Hindustan Zinc Ltd, Zawar Mines contributes more than <b>100 Crs towards District Mineral Foundation Trust (DMFT)</b> , a fund set up& managed by District Authorities for Development of mining affected regions. <b>In 2023-24, INR 10 Crs approx. was appoved under DMFT</b> , sending out a complete list of Development works to be undertaken in 13 Panchayats of Zawar Mines as per the recommendations of local PRI's, the sanction order was received in May'23, post which the financial sanction was given to 3 of the works in March'24 by District DMFT Committee, work under which is not started yet, HZL has always made continuous efforts for the DMFT funds be utilised for village development in Zawar Mines region, however in the absence of local & company's representation, works have not been adequately addressed.	Efforts will be continued for utilization of DMFT fund with support of local village representatives.



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	government so that we do not have any complaints / complaints from any government or Hindustan Zinc Administration to our sarpanch sir. Women of the area have been inspired by the social concern program (Sakhi Saheli Programme) being run by Hindustan Zinc Ltd. and women who did not come out of their homes before”, She has learned to speak on stage by going out today. Many thanks to the Zinc Administration for this. When Hindustan Zinc Administration has helped so much, I urge women that now they should try to walk and move forward on their own because if they do not work, then their development will not be possible.		
19	<b>Smt. Shankari Devi, resident of Chanavada.</b>		
	Shri Shankari Devi, Resident of Chanavada said that we women did not know how to come out of our house but we were made aware by Hindustan Zinc Administration through Manjari Foundation. Due to Manjari Foundation, if we are standing on our feet today, then we will also learn to walk ahead. The opportunity that we got today to express our views is all due to the Hindustan Zinc Administration. Earlier, the girls of our village were not educated, but today, inspired by the plans of the Zinc Administration, the girls are moving ahead by reading and writing. I was told by the zinc administration that your daughter has got good marks,	As a part of Sakhi Initiative in Zawar, Village level groups have been formed & an apex body of Federation has been registered and established, owned & managed by Hindustan Zinc Ltd under its CSR. <b>Women own this Federation &amp; undertake the functioning of it, sanctioning loans up to 5-7 Lakhs per month, 60 Lakhs annually using the Fund contributed by HZL under CSR.</b> Various trainings & awareness programs are also conducted with the Sakhi women members on Gender based social issues & awareness about rights & legislations for women protection in India are given each year under Sakhi 'Uthori' initiative by HZL, through the	The flagship projects Sakhi and Microenterprises (Namkeen Unit) shall be continued for the upcoming years and the <b>tentative budget for the same shall be ₹ 100 lakhs</b>





Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
	so she got admission in Ringus College through us for further studies. On this matter we admitted our daughter there and today she is studying in second year BA. Therefore, I request all the mothers that they should also get their daughters educated and get admission in Ringus College and Zinc Administration should also continue to do such work in future and provide employment to our unemployed people of the area.	Sakhi initiative, <b>5000 members and 15000+ Benefeciaries</b> are benefitted under the program till date. <b>A Production unit has been established as a part of Sakhi Initiative employing 8 women from Paduna, Zawar with the capacity of producing Namkeen 400Kgs per day.</b> The women are trained to make the products and also do local selling, established in 2023, the unit has an <b>annual expenditure of INR 60 Lakhs per year</b> <b>Total Budget: 147 Lakhs per year</b>	
20	<b>Smt. Falak Naaz, Resident of Bhaladia:</b>		
	Mrs. Falak Naaz resident Bhaladia welcomed the officers and the people of the area in today's public hearing. After that she said that she is associated with the education project run by Hindustan Zinc limited. With this program of zinc administration, the level of education of children of our area has increased, today they are studying IIT and engineering. This project is running in 10 schools of the area. Due to this, children have got good benefit in English, Maths and Science subjects and we are also getting good employment from last 4 years. Children who never knew how to speak in front of anyone, are today talking well with their teacher. This project was going on even during the Corona epidemic, so that we kept the children connected with studies. This project is going on since the year 2016, due to which the board's exam results	Thanks for the support	



Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
	have also improved a lot and helping them to move forward. For all the above-mentioned benefits, we are thankful to Hindustan Zinc Administration.		
21	<b>Smt. Pyari Kumari Meena, Resident of Krishnapura Zawar Mines:</b>		
	Smt. Pyari Kumari Meena, Zawar Mines told that she is associated with Unchi Udaan, a program run by Hindustan Zinc. Under this, coaching for IIT and engineering is given by Zinc Administration for two years after class 11 and 12. Through this program, today I am studying B.Tech engineer in civil subject from Jodhpur College. I request all the mothers that they should also educate their daughters further and zinc administration should also fully support them. <b><u>I also request the zinc administration to help the girls in their higher education as well as they are helping them in coaching, because our poor parents are unable to bear the cost of higher education. Along with coaching, zinc administration should also help in college fees.</u></b>	As of year 2023-24, company employs 80% of its contract workers from the districts of Udaipur & Salumber under Girwa & Sarada Blocks of Zawar Mines region. Additionally, HZL continuously works towards upskilling & providing quality education to the children & youths in the community through its Education Initiatives under CSR-- <b><u>A. Education Projects active in Zawar region through CSR:</u></b> <b>Shiksha Sambal</b> - Supporting Sr. Sec Schools for Xth & XII th Board Exams through competent teachers in Science , English & Maths Subjects in 10 Senior Secondary Schools of Nevatalai, Padla, Oda, Singhatwada, Chanavda, Zawar, Tidi Boys, Tidi Girls, Kanpur - 52 Lakhs per year <b>Reengus:</b> Each year 30 meritorious Girls are selected & supported with residential Graduation Program in Science, Commerce & Arts stream for three years - 10 Lakhs per year <b>Unchi Udaan:</b> Every year, students are selected for JEE Coaching, supported with residential education program from VIIIth to XIIth & coaching for JEE program	Future initiatives under pipeline for FY 2024-25 include- 1. Zinc Kaushal Kendra would be opened for youth in 2 trades (hospitality management & security) with 60 students in each batch - 30 Lakhs 2. Anushka Academy coaching to be continued for the coming years with 2 batches in a FY. Total budget would be ₹ 12 lakhs per year 3. Commencing Computer Training Centre for 50 youth in one batch, and 4 batches in one FY. Total budget shall be 5 lakhs per year 4. Restarting of the textile unit at Zawar where it would provide skill training as well as employment to around 25 women in the operational villages. Total annual budget shall be ₹ 25 lakhs <b>Programs Planned: 72 lakhs</b>



Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
		<b>Total Investment in Education Projects: 62 Lakhs per year</b>	
22	<b>Mr. Gautam Lal Meena resident Tidi:</b>		
	<p>Shri Gautam Lal Meena resident of Tidi welcomed the officers and people of the area present in today's public hearing. After that he said that mining is going on for the last many years at Zawar village. Along with mining, a sufficient amount of plantation has also been done by the Zinc Administration, due to which today only greenery is visible all around. In the future, we want that along with mining, the environment of the area should also remain good. I want to ask the Regional Officer, Rajasthan State Pollution Control Board whether the expansion of mining area will provide more employment opportunities to our people. Good work has also been done in the area under the Sakhi and Samadhan project. Along with this, poultry farming scheme is also going on in the area. The farmers of the area have a lot of land but they are not able to cultivate on it, so I request them to dig a big pit in their land and start fisheries there and do fish farming with fish seeds. The fish will take a good shape within the span of the month itself. Through this, a farmer can take good profit in a small amount of land. <b>I request that zinc</b></p>	<p>Hindustan Zinc Limited has been supporting the farmers in its operational villages in multiple <b>agricultural and livestock related activities through its Samadhan Program</b>. Under which farmers are supported with seeds, inputs, equipment, pest control, hi-tech farming equipment, installation and other technical services. For the livestock, there are health camps, vaccination drives and awareness campaigns conducted along with Artificial Insemination. They also provide the option of choosing sorted semens to improve the chances of having female calves.</p> <p>In June, 2022 an Input shop by Farmer Producer Organisation was opened with 1200+ shareholders.</p> <p><b>Overall budget that goes into these initiatives is more than ₹ 60 lakhs annually.</b></p>	<p>These activities shall continue to operate in the coming years with the scope on increasing the farmer reach. <b>Budget to be used for the same shall be ₹ 55 lakhs</b></p>



Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
	<b>administration should also link this business with the solution project.</b>		
<b>23</b>	<b>Shri Gautam Lal Meena, Former Sarpanch of Gram Panchayat Singhatwada:</b>		
	Shri Gautam Lal Meena, former Sarpanch of Gram Panchayat Singhatwada welcomed the officers and people of the area present in the public hearing. After that he said that once in the year 2008, when Hindustan zinc limited has been closed, the people around it had suffered a little. At that time, I myself was the Sarpanch here and this factory was under the Central Government. At that time this factory was closed for 4 years and we Sarpanch people of nearby gram panchayats had made a lot of efforts to make this factory run again. At that time, the people of Hindustan Zinc had conducted a public hearing to get NOC for 5158 hectares of land. When Hindustan Zinc was closed, it had 1578 hectares of land. At that time all the sarpanches around this area had said that we will not give 5158 hectares of land. Then from where did this 3620-hectare land come to Zinc, about which public hearing is being held today. The people of this area say that we will get this factory closed, whereas we had got the factory started again by giving 1578 hectares of land. The agreement/promises made by the Zinc Administration to run the factory at that time, has not	HZL carries out blasting activity as prescribed in statutory permission laid out in Stoping Permissions vide Reg 107(3) of MMR 1961. This is guided by scientific study done by CSIR CIMFR. All mines have grown deeper and the response of blast vibration has reduced significantly in surface. Pertaining to the quality of explosives, it is checked by scientific agency CSIR CIMFR and is within prescribed limit.	
		80% of the contract workforce are from the nearby communities and the same shall be maintained in future	



Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
	<p>been fulfilled by the Zinc Administration. none of this agreement has been considered. <b><u>Only 5 percent of the workers in this factory are local residents. All the people from outside are working.</u></b> Today we have to take approval even to meet the General Manager of Zinc. Whereas earlier we could meet without any hindrance. The doors of the factory have been closed for us today. is not found with us. For this we ourselves will fight and we will raise the coming generation ahead of us. Today, a public hearing is being organized by the Zinc Administration for 3620 hectares of land, while the truth is that our area is not being developed by them in any way. We want that we should take one step and the company should also take one step, there should be no role of any broker in the middle. The people of this area, who have done brokerage, are sitting in the company's lap today and people like us are being insulted. Not a single penny is being spent in development by the company in this area, but the company is spending the money received from state government and place the board of its name on that money and work, which is wrong. So far, how many local people have been given employment by the company, we should be informed after extracting the data. Out of about 7500 workers employed here, only 2000/2500 workers can be local,</p>		



Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
	rest all are outsiders and our people have to wander for employment outside Udaipur or elsewhere. The security guards of Zinc Company also keep a complete watch on us, have we committed any crime, for what we are being treated like this. We are not able to sleep at the night due to the blasting done by the company during night time. Therefore, zinc administration should listen with open ears that we want to know from where 3620-hectare land is coming, first of all, we should be given information about the boundaries, we have given 1580 hectares of land in the past, Will not give any more land.		
24	<b>Shri Prakash Chand Meena, Sarpanch, Gram Panchayat Zawar:</b>		
	Shri Prakash Chand Meena, Sarpanch, Village Zawar welcomed all the officers and people of the area present in today's public hearing. After that, today a public hearing is being held in our village for the expansion of work for Hindustan Zinc. As told by Mr. Gautam ji, the company is talking about taking 3620 hectares of land. When the company wants to increase its production, then land will also be needed for it. A lot of money is being deposited by the company in DMFT. Nominal money is being spent in the development of nearby gram panchayats from this fund (cumin in the mouth of a camel equal). Not even one percent of the money of here is being spent here. Our MLA is also	80% of the contract workforce are from the nearby communities and the same shall be maintained in future	



Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
	requested that the DMFT fund money should be spent in the development of the panchayats around us. If mining will expand, then surely the development of the surrounding villages will also happen. <b><u>Today our people who have done diploma or technical training have to go for interview in Udaipur office of Hindustan Zinc and in that too only 2-3 percent people are selected, which is wrong.</u></b>		
25	<b>Shri Laxmi Chand Meena, Sarpanch, Gram Panchayat Newatalai:</b>		
	Shri Laxmi Meena, Sarpanch, Gram Panchayat Newatalai welcomed the officers and people of the area present in today's public hearing. After that, he said that it is a matter of great pride that the Zinc Administration has organized a public hearing today for the expansion of its mining operations. It is a matter of sorrow that our land is being taken from us and our people do not get jobs in return, the participation of local people should be ensured for the jobs. Today, people coming from outside are moving around in cars by contracting and have made village pucca house, we want 10 more factories to be set up here, but in return, development of local people and village should also take place, people should get facilities. Zinc administration should also do good work in the field of education and health and parents should also take full care whether their children	<p>Hindustan Zinc Ltd undertakes various initiatives each year in education sector in building capacities &amp; supporting the local government schools to enhance the quality of education in Zawar region, this includes construction of classrooms, toilets, complete repair &amp; renovation of School buildings. Additionally, many continuous programs like –</p> <p><b><u>A. Education Projects active in Zawar region through CSR:</u></b></p> <p><b>Shiksha Sambal</b></p> <p>- Supporting Sr. Sec Schools for Xth &amp; XII th Board Exams through competent teachers in Science, English &amp; Maths Subjects in 10 Senior Secondary Schools of Nevatalai, Padla, Oda, Singhatwada, Chanavda, Zawar, Tidi Boys, Tidi Girls, Kanpur</p>	<p>1.Continuous Implementation of Projects mentioned in the Category A above viz. Shiksha Sambal, Reengus, Unchi Udaan</p> <p>2. Undertaking Education Infra Projects basis need - 65 Lakhs approx. each year.</p> <p>3. Ongoing Education Infra Sites:</p> <p>i) Govt. Kanpur Sr. Sec School- 16 Lakhs</p> <p>ii) Govt. Tidi Girls Sr. Sec School, 19 Lakhs</p>





Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
	are going to school or not. Since more land has been allotted to the people of Newatalai in this company, the people of Newatalai should also get maximum employment on priority in this company. At the same time, government servants should also do their duty honestly. The people of the company should take the local people along so that the company and the area can develop.	<p><b>Reengus</b> : Each year 30 meritorious Girls are selected &amp; supported with residential Graduation Program in Science, Commerce &amp; Arts tream for three years.</p> <p><b>Unchi Udaan:</b> Every year, students are selected for JEE Coaching, supported with residential education program from VIIIth to XIIth &amp; coaching for JEE program</p> <p><b><u>B. Education Infra Projects undertaken by the company over past 3 Years-</u></b></p> <p>i) Repair &amp; Renovation of Primary School, Limbadara, Nevatalai 22 Lakhs</p> <p>ii) Repair &amp; Renovation of Govt. Primary School, Talab Fala, Singhatwada- 12 Lakhs</p> <p>iii) Repair &amp; Renovation of Govt. Primary School, Amarpura - 12.63 Lakhs</p> <p>iv) Library setup at Newatalai - 9 Lakhs</p> <p>v) Repair and renovation at Govt. Zawar School - 23.60 Lakhs</p> <p>vi) Repair and renovation at Govt.Tidi Boys School - 41.71 Lakhs</p> <p>vii) Repair and renovation at Govt. upper Primary School Nala, Chanavda- 29.7 Lakhs</p>	



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		<p>viii) Repair &amp; Renovation at Govt. Primary School, Bedadhara - 14.91 Lakhs</p> <p>ix) Repair &amp; Renovation Govt. Girls Senior Secondary School, Ramnagar - 22.11 Lakhs</p> <p>x) Construction of 2 Classrooms at Govt. Senior Secondary School, Mahadev Ki Naal- 20.35 Lakhs</p> <p>Total Education Infra Development Spend: 208.01 Lakhs</p>	
		<p>Hindustan Zinc Ltd undertakes various initiatives to ensure the proper supply of water to villages that are water deficit:</p> <ol style="list-style-type: none"> <li>1. A structure was developed with 7 overhead water tanks, D G Set and water pump with pipelines spread across 5 km. The overall expense for the same was ₹ 45 lakhs. But due to improper use of the system it couldn't last long.</li> <li>2. As a solution to the above-mentioned problem, we started water tankers for all villages that are water deficit. In some villages the requirement for water came only in Summers.</li> </ol>	<p>Water supply through tankers shall continue in all the required villages which costs around ₹ 12 lakhs per annum. Also we shall be converging with PHED for utilise the available resources in ensuring that water reaches everywhere</p>
		<p>As a part of Health initiatives in the region, HZL through a <b>Mobile Health Van</b>, provides primary health care facility without any cost in <b>28 villages across 13 Panchayats of Zawar</b>. The project has been in function from FY 2019 up to FY 2023 reaching out to 2 villages per day as per a fixed monthly timetable with services of General Health</p>	<p>Few of the major health initiatives in plan for FY 25 include –</p> <ol style="list-style-type: none"> <li>1. Support to Primary Healthcare Center, right now under construction in Sarada Block with equipment &amp; such other support basis the recommendations from Block Medical</li> </ol>



Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
		checkup & medicines, reaching out to about 30,000 beneficiaries from Zawar region per year, <b>Budget - 35 Lakhs per year</b> <b>Total investments made, status: Completed: 70 Lakhs</b>	Department - 70-80 Lakhs approx. 2. Mobile Health Van, provides primary health care facility without any cost in 28 villages across 13 Panchayats of Zawar.- 35 Lakhs per year  <b>Total Budgeted: 115 Lakhs</b>
26	<b>Shri Anil Kumar Meena, Shiksha Sambal Village Zawar:</b>		
	Shri Anil Kumar Meena welcomed the officers and people of the area present in today's public hearing. After that he said that Hindustan Zinc gave education in class 9 and 10, we were given coaching by taking extra classes and winter camps were set up for which I am grateful to the entire team of the company.	Thanks for the support	
27	<b>Shri Magan Meena, Former Sarpanch Gram Panchayat Tidi:</b>		
	Shri Magan Meena, former Sarpanch Gram Panchayat Tidi welcomed the officers and people of the area present at the public hearing today. After that, He said, in the public hearing of today, people of nearby gram panchayats have gathered for the subject of employment, social and economic development, security and basic amenities. But the way the Hindustan Zinc Administration wants to expand the land to	a) 1. Skill centre was opened at Rural Resouce centre in June, 2022 with 25 youth being trained for Hospitality Management. 2. In collaboration with Anushka Academy coaching for Govt. Exams were provided to 70 youth in FY'24. <b>Total Budget of the project was around ₹ 5 lakhs</b>  b) As a part of Health initiatives in the region, HZL through	a) 1. Zinc Kaushal Kendra would be opened for youth in 2 trades (hospitality management & security) with 60 students in each batch 2. Anushka Academy coaching to be continued for the cominh years with 2 batches in a FY. Total budget would be ₹ 12 lakhs per year 3. Commencing Computer Training Centre for 50 youth in one batch, and 4 batches in one FY. Total



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	<p>increase its production, as informed by our former sarpanch Mr. Gautam ji Meena, it is a matter of fact that in the year 2014, all of us worked together in this area to get the mining work started again, got the NOC issued. Expansion of mining should be done in our area, but in return we should also be provided with basic facilities, we have given 1580 hectares of land to the company, now 3620 hectares of land is needed, which makes about 20000 bighas. In return, we need complete protection from the company. We first need employment for the local people, which is also the right of the people here. We do not want that the company should not get land but instead our area should also be developed, we want security and development. There is no demand of the people except the daily meal for their livelihood. If we villagers sacrifice our land for industries then we should also get its full reward. In 2014, when it was started, the imputation was made on me that I have taken 2 crores from company which is wrong. Use 3620 hectares of land for the expansion of its industry with Hindustan Zinc, but its demarcation should be clear.</p> <p>• In the year 2014, while getting this mine started again, let me read to you some things about the bond agreement that has been signed.</p>	<p>a Mobile Health Van, provides primary health care facility without any cost in 28 villages across 13 Panchayats of Zawar. The project has been in function from FY 2019 up to FY 2023 reaching out to 2 villages per day as per a fixed monthly timetable with services of General Health checkup &amp; medicines, reaching out to about 30,000 beneficiaries from Zawar region per year, Budget - 35 Lakhs per year</p> <p>Total investments made, status: Completed: 70 Lakhs</p> <p>c) Supply of portable Water is done through Tankers in the community during Summers &amp; on a regular basis in Kanpur village, Zawar Panchayat - settlement with a population of 1000 villagers near to tailing dam, the water is supply twice a day on regular basis &amp; more frequently during community festivals &amp; summers as required &amp; suggested by PRI's, Budget for Water supply: 10 Lakhs per year</p> <p>d) Hindustan Zinc Ltd undertakes various initiatives each year in education sector in building capacities &amp; supporting the local government schools to enhance the quality of education in Zawar region, this includes</p>	<p>budget shall be 5 lakhs per year</p> <p>4. Restarting of the textile unit at Zawar where it would provide skill training as well as employment to around 25 women in the operational villages. <b>Total annual budget shall be ₹ 25 lakhs</b></p> <p>b) Few of the major health initiatives in plan for FY 25 include</p> <p>1. Support to Primary Healthcare Center, right now under construction in Sarada Block with equipments &amp; such other support basis the recommendations from Block Medical Department - 70-80 Lakhs approx.</p> <p>2. Mobile Health Van, provides primary health care facility without any cost in 28 villages across 13 Panchayats of Zawar 35 Lakhs per year</p> <p><b>Total Budgeted: 115 Lakhs</b></p> <p>c) Water supply shall be continued with a cost of ₹ 12 lakhs</p>



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	<ul style="list-style-type: none"> <li>It was decided in the Gram Sabha dated 11.2.2014 that whenever land is required by Vedanta Group in future, full compensation will be given to the villagers, and Hindustan zinc Administration will be fully responsible for it.</li> <li>If there are cracks in the houses due to blasting, then a team will be constituted for that, by which necessary action will be taken by the management if it is proved in the investigation.</li> <li>Work will be done by Hindustan Zinc to set up ITI for training the unemployed people of the area and after training, arrangements will be made to provide employment on priority. The work of skill development which should have been done in this area is not being done. The 10th and 12th pass children's here should be given apprenticeship by training them in different trades.</li> <li>If the wells, tube wells, ponds etc. dry up in the area, alternative arrangements will be made by Hindustan Zinc for drinking water and agriculture water.</li> <li>If there is any loss of public and money due to mining work, it will be compensated as per rules. Prior to this bond, in case of an accident, the victims used to get a compensation of Rs 1-2 lakh, which has now started getting up to Rs 20 lakh.</li> </ul>	<p>construction of classrooms, toilets, complete repair &amp; renovation of School buildings. Additionally, many continuous programs like -</p> <p>A. Education Projects active in Zawar region through CSR: Shiksha Sambal - Supporting Sr. Sec Schools for Xth &amp; XII th Board Exams through competent teachers in Science, English &amp; Maths Subjects in 10 Senior Secondary Schools of Nevatalai, Padla, Oda, Singhatwada, Chanavda, Zawar, Tidi Boys, Tidi Girls, Kanpur - 52 Lakhs per year</p> <p>Reengus: Each year 30 meritorious Girls are selected &amp; supported with residential Graduation Program in Science, Commerce &amp; Arts stream for three years - 10 Lakhs per year</p> <p>Unchi Udaan: Every year, students are selected for JEE Coaching, supported with residential education program from VIIIth to XIIth &amp; coaching for JEE program</p> <p>Total Investment in Education Projects: 62 Lakhs per year</p> <p>B. Education Infra Projects undertaken by the company over past 3 Years</p> <p>i) Repair &amp; Renovation of Primary School, Limbadara, Nevatalai 22 Lakhs</p> <p>ii) Repair &amp; Renovation of Govt. Primary School, Talab Fala, Singhatwada- 12 Lakhs</p>	<p>d) Continuous Implementation of Projects mentioned in the Category A above viz. Shiksha Sambal, Reengus, Unchi Udaan</p> <p>2. Undertaking Education Infra Projects basis need - 65 Lakhs approx. each year.</p> <p>3. Ongoing Education Infra Sites:</p> <p>i) Govt. Kanpur Sr. Sec School- 16 Lakhs</p> <p>ii) Govt. Tidi Girls Sr. Sec School, 19 Lakhs</p>



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	<ul style="list-style-type: none"> <li>Medical and health facilities in the area will be expanded/improved.</li> <li>In the field of labor welfare, work will be done as per the rules of the government.</li> <li>Good work will be done under CSR from social concern fund.</li> <li>For the recruitment of contractor workers, employment will be provided to them on priority by taking a list of local unemployed people from the Gram Panchayat.</li> </ul> <p>We request that the physical verification of the people of this area should be done and given to them on priority. If the company has to take further 3620 hectares of land, then the promises made by it in the past should be fulfilled. All of us want that if the points of the earlier bond are followed, then only we will give consent to give 3620 hectares of land.</p>	<p>iii) Repair &amp; Renovation of Govt. Primary School, Amarpura - 12.63 Lakhs</p> <p>iv) Library setup at Newatalai - 9 Lakhs</p> <p>v) Repair and renovation at Govt. Zawar School - 23.60 Lakhs</p> <p>vi) Repair and renovation at Govt.Tidi Boys School - 41.71 Lakhs</p> <p>vii) Repair and renovation at Govt. upper Primary School Nala, Chanavda- 29.7 Lakhs</p> <p>viii) Repair &amp; Renovation at Govt. Primary School, Bedadhara - 14.91 Lakhs</p> <p>ix) Repair &amp; Renovation Govt. Girls Senior Secondary School, Ramnagar - 22.11 Lakhs</p> <p>x) Construction of 2 Classrooms at Govt. Senior Secondary School, Mahadev Ki Naal- 20.35 Lakhs</p> <p>Total Education Infra Development Spend: 208.01 Lakhs</p>	
28	<b>Smt. Manju resident Tidi:</b>		
	<p>Smt. Manju resident village Tidi welcomed the officers and people of the area present in today's public hearing. After that she said that she is associated with Manjari Foundation run by Hindustan Zinc. Hindustan Zinc Dhara Good work was done in the area even during the corona epidemic, under which distribution of ration material, masks and sanitizers have been done in the villages of</p>	<p>As a part of Sakhi Initiative in Zawar, Village level groups have been formed &amp; an apex body of Federation has been registered and established, owned &amp; managed by Hindustan Zinc Ltd under its CSR. Women own this Federation &amp; undertake the functioning of it , sanctioning loans up to 5-7 Lakhs per month , 60 Lakhs annually using the Fund contributed by HZL under CSR. Various trainings</p>	<p>The flagship projects Sakhi and Microenterprises (Namkeen Unit) shall be continued for the upcoming years and the <b>tentative budget for the same shall be ₹ 100 lakhs</b></p>



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	the area and earlier there was no road to our village, which has been built.	& awareness programs are also conducted with the Sakhi women members on Gender based social issues & awareness about rights & legislations for women protection in India are given each year under Sakhi 'Uthori' initiative by HZL, through the Sakhi initiative, 5000 members and 15000+ Beneficiaries are benefitted under the program till date. Total Budget: 87 Lakhs per year	
29	<b>Shri Devi Lal Village Kanpur</b>		
	Shri Gehri Lal said that the water of the dam built by Hindustan Zinc is coming to our homes, due to which we are facing problems. We need its solution. <b><u>We ask to get this water monitored but neither investigation of water has been done nor has it been resolved. Even today, we walk 2 km away to bring drinking water. Therefore, arrangement of drinking water should be made in our place.</u></b>	Hindustan Zinc Ltd undertakes various initiatives to ensure the proper supply of water to villages that are water deficit: 1. A structure was developed with 7 overhead water tanks, D G Set and water pump with pipelines spread across 5 km. The overall expense for the same was ₹ 45 lakhs. But due to improper use of the system it couldn't last long. 2. As a solution to the above-mentioned problem, we started water tankers for all villages that are water deficit. In some villages the requirement for water came only in Summers.	Water supply through tankers shall continue in all the required villages which costs around ₹ 12 lakhs per annum. Also we shall be converging with PHED for utilise the available resources in ensuring that water reaches everywhere
30	<b>Shri Vishnu Meena, Village Zawar Data Entry Operator:</b>		





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	Shri Vishnu Meena, Data Entry Operator welcomed the officers and people of the area present in today's public hearing. After that he said that I work on an ambulance van operated by Hindustan Zinc. This van goes to 28 villages of the area to treat people and give them medicines. People of this area wait for arrival of our vans and good facilities are being provided.	Thanks for the support	
31	<b><u>Smt. Sunita Village Singhatwada:</u></b>		
	Smt. Sunita said that she is associated with Sakhi project run by Hindustan Zinc for last 3 years. Good work is being done by them for all the women of our area, now we have started coming out of the house. Well done group power. Poultry farming is also being done. We are very grateful to Hindustan Zinc for the help given to us, but the local people should get employment.	As a part of <b>Sakhi Initiative in Zawar</b> , Village level groups have been formed & an apex body of Federation has been registered and established, owned & managed by Hindustan Zinc Ltd under its CSR. <b>Women own this Federation &amp; undertake the functioning of it, sanctioning loans up to 5-7 Lakhs per month, 60 Lakhs annually using the Fund contributed by HZL under CSR.</b> Various trainings & awareness programs are also conducted with the Sakhi women members on Gender based social issues & awareness about rights & legislations for women protection in India are given each year under Sakhi 'Uthori' initiative by HZL, through the Sakhi initiative, 5000 members and 15000+ Beneficiaries are benefitted under the program till date. <b>Total Budget: 87 Lakhs per year</b>	The flagship projects Sakhi and Microenterprises (Namkeen Unit) shall be continued for the upcoming years and the <b>tentative budget for the same shall be ₹ 100 lakhs</b>
32	<b><u>Smt. Kusum Meena Village Amarpura:</u></b>		



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	Smt. Kusum Meena told that she is associated with the Shiksha Sambal project run by Hindustan Zinc. Many thanks to Hindustan Zinc Administration for the support we got, but the local children should also benefit further.	<p>Hindustan Zinc Ltd undertates various initiatives each year in education sector in building capacities &amp; supporting the local government schools to enhance the quality of education in Zawar region, this includes construction of classrooms, toilets, complete repair &amp; renovation of School buildings. Additionally, many continuous programs like</p> <p>A. Education Projects active in Zawar region through CSR:</p> <p>Shiksha Sambal</p> <p>- Supporting Sr. Sec Schools for Xth &amp; Xii th Board Exams through competent teachers in Science, English &amp; Maths Subjects in 10 Senior Secondary Schools of Nevatalai, Padla, Oda, Singhatwada, Chanavda, Zawar, Tidi Boys, Tidi Girls, Kanpur</p> <p>Reengus</p> <p>: Each year 30 meritorious Girls are selected &amp; supported with residential Graduation Program in Science, Commerce &amp; Arts stream for three years.</p> <p>Unchi Udaan:</p> <p>Every year, students are selected for JEE Coaching, supported with residential education program from VIIIth to XIIth &amp; coaching for JEE program</p> <p>B. Education Infra Projects undertaken by the company over past 3 Years-</p>	<p>1.Continuous Implementation of Projects mentioned in the Category A above viz. Shiksha Sambal, Reengus, Unchi Udaan</p> <p>2. Undertaking Education Infra Projects basis need - 65 Lakhs approx. each year.</p> <p>3. Ongoing Education Infra Sites:</p> <p>i)Govt. Kanpur Sr. Sec School- 16 Lakhs</p> <p>ii) Govt. Tidi Girls Sr. Sec School,19 Lakhs</p>



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		i) Repair & Renovation of Primary School, Limbadara, Nevatalai 22 Lakhs ii) Repair & Renovation of Govt. Primary School, Talab Fala, Singhatwada- 12 Lakhs iii) Repair & Renovation of Govt. Primary School, Amarpura - 12.63 Lakhs iv) Library setup at Newatalai - 9 Lakhs v) Repair and renovation at Govt. Zawar School - 23.60 Lakhs vi) Repair and renovation at Govt. Tidi Boys School - 41.71 Lakhs vii) Repair and renovation at Govt. upper Primary School Nala, Chanavda- 29.7 Lakhs viii) Repair & Renovation at Govt. Primary School, Bedadhara - 14.91 Lakhs ix) Repair & Renovation Govt. Girls Senior Secondary School, Ramnagar - 22.11 Lakhs x) Construction of 2 Classrooms at Govt. Senior Secondary School, Mahadev Ki Naal- 20.35 Lakhs Total Education Infra Development Spend: 208.01 Lakhs	
		1. Skill center was opened at Rural Resource center in June, 2022 with 25 youth being trained for Hospitality Management. 2. In collaboration with Anushka Academy coaching for	1. Zinc Kaushal Kendra would be opened for youth in 2 trades (hospitality management & security) with 60 students in each batch 2. Anushka Academy coaching to be continued for the coming years with 2 batches in a FY. Total



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		Govt. Exams were provided to 70 youth in FY'24. Total Budget of the project was around ₹ 5 lakhs	budget would be ₹ 12 lakhs per year 3. Commencing Computer Training Centre for 50 youth in one batch, and 4 batches in one FY. Total budget shall be 5 lakhs per year 4. Restarting of the textile unit at Zawar where it would provide skill training as well as employment to around 25 women in the operational villages. Total annual budget shall be ₹ 25 lakhs
33	<b>Shri Laxman Meena (Father of Sarpanch) Village Amarpura.</b>		
	The father of village Amarpura Sarpanch first of all welcomed the officers and the people of the area present in today's public hearing. He said after the independence of the country, today we have become the Sarpanch for the first time. Our village has now become a huge town. The water of the village pond is used by us, we request the labor union official to give employment opportunity to the people of our panchayat.	80% of the contract workforce are from the nearby communities and the same shall be maintained in future	
34	<b>Shri Rahul Meena , Resident of Newatalai:</b>		
	Shri Rahul Meena Resident Newatalai first of all welcomed the officers and people of the area present in today's public hearing. After that he said that I am grateful to the Hindustan Zinc Administration for the cooperation being given under the Shiksha Sambal	Thanks for the support	



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	Yojana. Because I was also very weak in a way, but the team here gave good support, explained to us with love, we did not want to study, even then built our interest in reading. We are being given a good environment to study. Summer camps have also been organized by them in Vidya Bhavan so that the children going there understand the importance of education and they can be inspired towards it. Along with this, all the family members should also support their children.		
35	<b>Smt. Sadhna Meena, Resident of Zawar:</b>		
	Mrs. Sadhna Meena, Resident of Zawar first of all welcomed the officers and people of the area present in today's public hearing. After that he said something is also being hidden in the message being given by Hindustan Zinc today. As soon as Vedanta arrived in 2007, it started working in its own way due to which people are facing a lot of problems. I have to tell the district administration and zinc administration that the sarpanches of the area have given NOC for mining, but out of the 13 conditions written in it, what will you do for the development of this area, it should be disclosed. If these conditions are not followed then the death of all of you is very near. The beatings done by the police and forest department in Vedanta area against the people of	<p>1. Skill centre was opened at Rural Resource center in June, 2022 with 25 youth being trained for Hospitality Management.</p> <p>2. In collaboration with Anushka Academy coaching for Govt. Exams were provided to 70 youth in FY'24. Total Budget of the project was around ₹ 5 lakhs</p>	<p>1. Zinc Kaushal Kendra would be opened for youth in 2 trades (hospitality management &amp; security) with 60 students in each batch</p> <p>2. Anushka Academy coaching to be continued for the coming years with 2 batches in a FY. Total budget would be ₹ 12 lakhs per year</p> <p>3. Commencing Computer Training Centre for 50 youth in one batch, and 4 batches in one FY. Total budget shall be 5 lakhs per year</p> <p>4. Restarting of the textile unit at Zawar where it would provide skill training as well as employment to around 25 women in the operational villages. Total annual budget shall be ₹ 25 lakhs</p>



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	the area should be stopped. Also, the farmers whose land is being taken by Zinc, the same land should be given to those farmers elsewhere so that they can earn their living by cultivating there. Also, the people whose land is going for mining should be told by the Zinc Administration that for what reason their land is being taken, land cannot be taken by suing anyone.	<p>The school which was functional as Kendriya Vidyalaya later got adopted by DAV and is still functional from Pre-Primary to Senior Secondary classes with total strength of 550 students, out of which 275 were students of localities and from families with no HZL Employees or Business Partners. We are also supporting them with 50% overall fees for each student. Annually we spent around ₹ 80 lakhs for supporting the education of localities. Hindustan Zinc Ltd undertakes various initiatives each year in education sector in building capacities &amp; supporting the local government schools to enhance the quality of education in Zawar region, this includes construction of classrooms, toilets, complete repair &amp; renovation of School buildings. Additionally, many continuous programs like -</p> <p><b>A. Education Projects active in Zawar region through CSR:</b></p> <p><b>Shiksha Sambal</b> - Supporting Sr. Sec Schools for Xth &amp; XII th Board Exams through competent teachers in Science, English &amp; Maths Subjects in 10 Senior Secondary Schools of Nevatalai, Padla, Oda, Singhatwada, Chanavda, Zawar, Tidi Boys, Tidi Girls, Kanpur</p> <p><b>Reengus:</b> Each year 30 meritorious Girls are selected &amp; supported with residential Graduation Program in Science, Commerce &amp; Arts stream for three years.</p>	<p>1. Continuous Implementation of Projects mentioned in the Category A above viz. Shiksha Sambal, Reengus, Unchi Udaan</p> <p>2. Undertaking Education Infra Projects basis need - 65 Lakhs approx. each year.</p> <p>3. Ongoing Education Infra Sites:</p> <p>i) Govt. Kanpur Sr. Sec School- 16 Lakhs</p> <p>ii) Govt. Tidi Girls Sr. Sec School, 19 Lakhs</p>



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		<p><b>Unchi Udaan:</b> Every year, students are selected for JEE Coaching, supported with residential education program from VIIIth to XIIth &amp; coaching for JEE program</p> <p><b>B. Education Infra Projects undertaken by the company over past 3 Years</b></p> <p>i) Repair &amp; Renovation of Primary School, Limbadara, Nevatalai 22 Lakhs</p> <p>ii) Repair &amp; Renovation of Govt. Primary School, Talab Fala, Singhatwada- 12 Lakhs</p> <p>iii) Repair &amp; Renovation of Govt. Primary School, Amarpura - 12.63 Lakhs</p> <p>iv) Library setup at Newatalai - 9 Lakhs</p> <p>v) Repair and renovation at Govt. Zawar School - 23.60 Lakhs</p> <p>vi) Repair and renovation at Govt. Tidi Boys School - 41.71 Lakhs</p> <p>vii) Repair and renovation at Govt. upper Primary School Nala, Chanavda- 29.7 Lakhs</p> <p>viii) Repair &amp; Renovation at Govt. Primary School, Bedadhara - 14.91 Lakhs</p> <p>ix) Repair &amp; Renovation Govt. Girls Senior Secondary School, Ramnagar - 22.11 Lakhs</p> <p>x) Construction of 2 Classrooms at Govt. Senior Secondary School, Mahadev Ki Naal- 20.35 Lakhs</p> <p><b>Total Education Infra Development Spend: 208.01 Lakhs</b></p>	





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		<p>Hindustan Zinc Ltd undertates various initiatives to ensure the proper supply of water to villages that are water deficit:</p> <ol style="list-style-type: none"> <li>1. A structure was developed with 7 overhead water tanks, D G Set and water pump with pipelines spread across 5 km. The overall expense for the same was ₹ 45 lakhs. But due to improper use of the system it couldn't last long.</li> <li>2. As a solution to the above-mentioned problem, we started water tankers for all villages that are water deficit. In some villages the requirement for water came only in Summers.</li> </ol>	<p>Water supply through tankers shall continue in all the required villages which costs around ₹ 12 lakhs per annum. Also we shall be converging with PHED for utilise the available resources in ensuring that water reaches everywhere</p>
36	<b>Smt. Geeta Devi, Resident Sarada-Kherfala:</b>		
	<p><b><u>Smt. Geeta Devi resident Sarada-Kherfala said that there is no Anganwadi and road in our village, due to which children face difficulty in going to school. Anganwadi center is also far away from our village, whereas in our village there are 100/150 houses where new Anganwadi should be opened.</u></b> In addition, other facilities should be provided in our village so that people can get benefitted.</p>	<p>Hindustan Zinc Ltd undertates various initiatives each year in rural sector in building capacities &amp; supporting the local government to enhance the quality of life in Zawar region, this includes road construction, ground levelling and repair of cremation sheds etc. Some of the rural infra work taken up in the past few years are:</p> <ol style="list-style-type: none"> <li>1. Tidi retaining wall and CC road</li> <li>2. Retaining wall at Zawar Mata Temple</li> <li>3. Cremation shed at Bhaladiya</li> <li>4. Cremation shed at Singatwada</li> </ol>	<p>For the upcoming years, we are planning to improve the living conditions of villagers in operational area through further activities under Rural Infrastructure such as :</p> <ol style="list-style-type: none"> <li>1. 5 cc roads in the interior hamlets of operational villages</li> <li>2. Upgrading the medical infrastructure</li> <li>3. Renovation of some of the dilapidated cremation sheds</li> <li>4. Development of community centres basis the</li> </ol>



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		<p>5. RCC roads at Zawar Pump House, Deraphala and Datawaladeri</p> <p><b>Overall expenditure in Rural Infrastructure is ₹ 152 lakhs</b></p> <p>Hindustan Zinc Limited under its Flagship initiative Nand Ghar is aimed at promoting the holistic development of children between the age group of 0 - 6 yrs through Anganwadis. Government run anganwadis are converted into Nand Ghars by providing infrastructure support, electricity, drinking water, kitchen garden, learning materials and nutritious meals. There are regular health check-ups to ensure that children does not fall into malnourished category and mothers are regularly trained in keeping the ward healthy. There are more than 40 Nand Ghars in the operational area of Zawar Mines with more than 1000 children.</p>	<p>requirement</p> <p><b>Overall budget expected for the above activities would be ₹ 220 lakhs</b></p> <p>Shall continue supporting the Govt. in running Anganwadis efficiently and budget would be ₹50 lakhs</p>
37	<b><u>Smt. Chanda Devi / Rajkumar Meena, Sarpanch.</u></b>		
	Smt. Chanda Devi / Rajkumar Meena, Sarpanch first of all welcomed the Additional District Collector, Tehsildar and other officers present and the people of the area present in today's public hearing. After that he said that we are happy that mining expansion will provide new employment opportunities in our area. But we request that most of the local people should be given employment. If we don't get it then we will have objection.	<p>80% of the contract workforce are from the nearby communities and the same shall be maintained in future</p>	



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38	<b>Smt. Dharmidevi, Resident of Bhaladiya:</b>		
	<b>Smt. Dharmidevi, Resident of Bhaladiya said that we have been residing here since birth but our land is not in our name. Everyone says that the land will be in our name but it is not happening. Our land should be in our name.</b>		
39	<b>Shri Shankarlal Meena, Resident of Amarpura:</b>		
	Shri Shankarlal Meena resident of Amarpura said that every year there is a rain, and every year the dam overflows, due to which we find it difficult to get our cattle, so your facility should be provided.		
40	<b>Shri Lakshmi Meena, Resident of Falsya:</b>		
	Shri Lakshmi Meena resident of Falsya said that the people of our village are very sad. All the people go to Udaipur for work, but they do not get equal work and there is rent for commuting, so we should get work here. We poor people are very sad, we should be given facilities. Smt. Lakshmi resident Falasya said that it is not that Vedanta is not giving anything to anyone, here people are saying that it is not giving anything, which is wrong. Everything is being given by the company, seeds and fertilizers, helmet money has also been given by Vedanta. We request that further employment should be provided for the poor.	80% of the contract workforce are from the nearby communities and the same shall be maintained in future	
41	<b>Mr. Govind resident Falasya Sarada:</b>		



Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
	Mr. Govind resident Falasya Sarada said that all the villages that are coming in the area of Zawar Mines, go to their place and ask what work is being done. We should not be treated in an unfair manner. Take full care of all the villages with the company otherwise anything can happen. People from our villages go to Udaipur for work, which should be taken care of and employment should be given here, otherwise we will get the NOC rejected. When we have made Modi ji bowed down, what then? If you do not pay attention to the village, then the matter is crooked. Children whose parents have died; their children should also be given help by paying attention to them. <b><u>We are warning that if any injury is done to us, then we farmers are also sitting ready. The school which has been adopted by Vedanta should be paved. All the roads around our village are completely bad which should be rectified but Vedanta is not doing anything for it.</u></b>	Hindustan Zinc Ltd undertates various initiatives each year in rural sector in building capacities & supporting the local government to enhance the quality of life in Zawar region, this includes road construction, ground levelling and repair of cremation sheds etc. Some of the rural infra work taken up in the past few years are: 1. Tidi retaining wall and CC road 2. Retaining wall at Zawar Mata Temple 3. Cremation shed at Bhaladiya 4. Cremation shed at Singatwada 5. RCC roads at Zawar Pump House, Deraphala and Datawaladeri <b>Overall expenditure in Rural Infrastructure is ₹ 152 lakhs</b>  The school which was functional as Kendriya Vidyalaya later got adopted by DAV and is still functional from Pre-Primary to Senior Secondary classes with total strength of 550 students, out of which 275 were students of localites and from families with no HZL Employees or Business Partners. We are also supporting them with 50% overall fees for each student. Annually we spent around ₹ 80 lakhs for supporting the education of localites.	For the upcoming years, we are planning to improve the living conditions of villagers in operational area through further activities under Rural Infrastructure such as : 1. 5 cc roads in the interior hamlets of operational villages 2. Upgrading the medical infrastructure 3. Renovation of some of the dilapidated cremation sheds 4. Development of community centres basis the requirement <b>Overall budget expected for the above activities would be ₹ 220 lakhs</b>  We would continue the support to Company run school for in taking more students from our villages along with the subsidy we are already providing.
42	<b>Smt. Manju Devi resident Sarada:</b>		
	<b><u>Smt. Manju Devi resident Sarada said that there is no road in our village for 8-10 years. When children get</u></b>	Hindustan Zinc Ltd undertates various initiatives each year in rural sector in building capacities & supporting the	For the upcoming years, we are planning to improve the living conditions of villagers in



Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
	<u>sick, people wrap the children in clothes and take them to Tidi. We should have road and anganwadicenter in our village.</u>	<p>local government to enhance the quality of life in Zawar region, this includes road construction, ground levelling and repair of cremation sheds etc. Some of the rural infra work taken up in the past few years are:</p> <ol style="list-style-type: none"> <li>1. Tidi retaining wall and CC road</li> <li>2. Retaining wall at Zawar Mata Temple</li> <li>3. Cremation shed at Bhaladiya</li> <li>4. Cremation shed at Singatwada</li> <li>5. RCC roads at Zawar Pump House, Deraphala and Datawaladeri</li> </ol> <p><b>Overall expenditure in Rural Infrastructure is ₹ 152 lakhs</b></p>	<p>operational area through further activities under Rural Infrastructure such as:</p> <ol style="list-style-type: none"> <li>1. 5 cc roads in the interior hamlets of operational villages</li> <li>2. Upgrading the medical infrastructure</li> <li>3. Renovation of some of the dilapidated cremation sheds</li> <li>4. Development of community centres basis the requirement</li> </ol> <p><b>Overall budget expected for the above activities would be ₹ 220 lakhs</b></p>
43	<b>Shri Ganesh Raj Ahari, Resident Zawar:</b>		
	Shri Ganesh Raj Ahari, Resident of Zawar first of all welcomed the officers and the people of the area present today. After that he said that we are very fortunate that today we have got such an opportunity. There are many industries running in our 10-15 km area but no one got to see or hear our pain. In the year 2014, Mr. Dave Sahab was the GM of Vedanta. We had placed a demand in front of them which has been suppressed. The husbands of women who are involved in Sakhi Project and Manjari Foundation are not working anywhere. <b>In this area, only farmers do farming. So the farmers should be benefited. 30 percent of the profit</b>	<p>We already have 80% of the contract workforce from the nearby communities and the same shall be maintained in future</p>	



Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
	<p>earned by the company from here should be spent on the development of nearby villages. Ward wise committee should be formed for the development of every village and priority should be given to the poor. In 2014, the company had given an assurance that 60 percent recruitment would be given to local people, which is not being done. Women should also have permanent jobs so that they do not need to spread their hands in front of their husbands. Farmers should get drinking water for their fields and drinking, because even after 500 feet of boring, water does not come in this area. Here also a water system like Jaisalmer should be made so that the problem of water can be overcome.</p>		
44	<p><b>Shri Narendra Kumar Meena, Resident of Newatalai:</b></p> <p>Shri Rahul Meena Residents Newatalai first of all welcomed all the officers and people of the area present in today's public hearing. After that he said that if anyone asks me about Hindustan Zinc, then I do Hindustan Zinc is our pride, our identity, our status, because this mine has a different identity in Udaipur division. Whenever we give full consent to Hindustan Zinc for expansion of its mining at Environmental Public Hearing. But we urge you Hindustan Zinc should not go against the promises. There is one thing left in what the former Sarpanch Shri Maganji has said. It is wrong to say</p>	<p>The school which was functional as <b>Kendriya Vidyalaya</b> later got adopted by DAV and is still functional from <b>Pre-Primary to Senior Secondary classes with total strength of 550 students, out of which 275 were students of localites</b> and from families with no HZL Employees or Business Partners. <b>We are also supporting them with 50% overall fees for each student. Annually we spent around ₹ 80 lakhs for supporting the education of localites.</b> Hindustan Zinc Ltd undertakes various initiatives each year in education sector in building capacities &amp; supporting the local government schools to enhance the</p>	<p>1.Continuous Implementation of Projects mentioned in the Category A above viz. Shiksha Sambal, Reengus, Unchi Udaan</p> <p>2. Undertaking Education Infra Projects basis need - 65 Lakhs approx. each year.</p> <p>3. Ongoing Education Infra Sites: i)Govt. Kanpur Sr. Sec School- 16 Lakhs ii) Govt. Tidi Girls Sr. Sec School,19 Lakhs</p>



Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
	<p>that people say that Hindustan Zinc has not done anything. Hindustan Zinc has definitely done something in every field, we cannot even speak against them, but we urge them that out of the profit you earn from here, a certain amount should be spent on its development. Because we are the real owners of this profit, so we should be treated like a master. Don't make us happy by just giving gram, peanuts or solar lights. There was also a point in the agreement of 2014 that the Kendriya Vidyalaya which used to run here should be run back. For this we also wrote 3-4 letters. <u>At the time of agreement, we had put a condition that this school should not be closed and the zinc administration had assured not to close it but later the school was closed. Now want assurance from this company to run this school again. Now we want assurance from the company to run this school again so that we will not be cheated by the people.</u> A football academy is brought by this company, but less than 50 percent of the children are from the locals, the rest are from the outskirts. <u>Children of our area should be recruited in this. Under the company's tailing dam, there is a village called Kanpur, under which farmers' land and wells are located, but because of this, the quality of the water is being deteriorated.</u> The far-reaching consequences of</p>	<p>quality of education in Zawar region, this includes construction of classrooms, toilets, complete repair &amp; renovation of School buildings. Additionally, many continuous programs like -</p> <p><b>A. Education Projects active in Zawar region through CSR:</b></p> <p><b>Shiksha Sambal</b> - Supporting Sr. Sec Schools for Xth &amp; XII th Board Exams through competent teachers in Science, English &amp; Maths Subjects in 10 Senior Secondary Schools of Nevatalai, Padla, Oda, Singhatwada, Chanavda, Zawar, Tidi Boys, Tidi Girls, Kanpur</p> <p><b>Reengus:</b> Each year 30 meritorious Girls are selected &amp; supported with residential Graduation Program in Science, Commerce &amp; Arts stream for three years.</p> <p><b>Unchi Udaan:</b> Every year, students are selected for JEE Coaching, supported with residential education program from VIIIth to XIIth &amp; coaching for JEE program</p> <p><b>B. Education Infra Projects undertaken by the company over past 3 Years-</b></p> <p>i) Repair &amp; Renovation of Primary School, Limbadara, Nevatalai 22 Lakhs</p> <p>ii) Repair &amp; Renovation of Govt. Primary School, Talab Fala, Singhatwada- 12 Lakhs</p> <p>iii) Repair &amp; Renovation of Govt. Primary School, Amarpura - 12.63 Lakhs</p>	





Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
	this mining will be revealed after 50 years of today, which the company should think about from now on. Consent should be given to increase Hindustan Zinc, but it should also be monitored that proprietary treatment should be done with us.	iv) Library setup at Newatalai - 9 Lakhs v) Repair and renovation at Govt. Zawar School - 23.60 Lakhs vi) Repair and renovation at Govt.Tidi Boys School - 41.71 Lakhs vii) Repair and renovation at Govt. upper Primary School Nala, Chanavda- 29.7 Lakhs viii) Repair & Renovation at Govt. Primary School, Bedadhara - 14.91 Lakhs ix) Repair & Renovation Govt. Girls Senior Secondary School, Ramnagar - 22.11 Lakhs x) Construction of 2 Classrooms at Govt. Senior Secondary School, Mahadev Ki Naal- 20.35 Lakhs <b>Total Education Infra Development Spend: 208.01 Lakhs</b>	
		Hindustan Zinc Ltd undertates various initiatives to ensure the proper supply of water to villages that are water deficit: 1. <b>A structure was developed with 7 overhead water tanks, D G Set</b> and water pump with pipelines spread across 5 km. <b>The overall expense for the same was ₹ 45 lakhs.</b> But due to improper use of the system it couldn't last long. 2. As a solution to the above-mentioned problem, we started water tankers for all villages that are water	Water supply through tankers shall continue in all the required villages which costs around ₹ 12 lakhs per annum. Also, we shall be converging with PHED for utilise the available resources in ensuring that water reaches everywhere



Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
		deficit. In some villages the requirement for water came only in Summers.	
45	<b>Shri. Kishan Meena, Sarpanch of Gram Panchayat Newatalai</b>		
	<p>Shri Kishan Meena, Sarpanch of Gram Panchayat Newatalai first of all welcomed the officers and people of the area present in today's public hearing. After that he said that today in this public hearing, all of us are here. They have gathered that no permission has been given or not to carry forward the factory running here. It is true that if the factory runs, the local people will also get employment. In the year 2014, when this industry was run through a compromise, then all the points of the agreement were put in cold storage and no work was done. My former speakers informed about the 14 points of agreement, to comply with which we had given a memorandum to the District Collector in the year 2018 also and we had told the administration that if our demand is not fulfilled then we will outline further what would be our next step. The company gave assurance on this but till date nothing has been done. Free van has been arranged by Hindustan Zinc from DMFT fund, <b>consent has also been given for ITI but till when ITI will be operational, there is no information.</b> Factory should be established but along with that we should also get adequate facilities. All the points of the</p>	<p>1. Skill centre was opened at Rural Resouce centre in June, 2022 with 25 youth being trained for Hospitality Management.</p> <p>2. In collaboration with <b>Anushka Academy</b> coaching for Govt. Exams were provided to 70 youth in FY'24. <b>Total Budget of the project was around ₹ 5 lakhs</b></p>	<p>1. Zinc Kaushal Kendra would be opened for youth in <b>2 trades (hospitality management &amp; security) with 60 students in each batch- 30 Lakhs</b></p> <p>2. <b>Anushka Academy coaching</b> to be continued for the coming years with 2 batches in a FY. Total budget would be <b>₹ 12 lakhs per year</b></p> <p>3. <b>Commencing Computer Training Centre for 50 youth</b> in one batch, and 4 batches in one FY. <b>Total budget shall be 5 lakhs per year</b></p> <p>4. Restarting of the textile unit at Zawar where it would provide skill training as well as employment to around 25 women in the operational villages. Total annual budget shall be <b>₹ 25 lakhs</b></p> <p><b>Total Budget planned: 49 Lakhs per year</b></p>



Sr. No.	Comments/suggestions and objections/issues	Reply by PP	PH action Plan with budget allocation
	agreement made in 2014 should be implemented on the ground. The company should prepare a list of the works to be done under CSR in the area after meeting with the sarpanch and public representatives of each gram panchayat and get them done on priority.		

Physical target based on issues raised during public hearing has been prepared and same is given below:

Table 7.3

Proposed Physical targets for addressing issues of during public hearing as per MoEF&CC, OM dated 30.09.2020 & 20.10.2020

S. No.	Physical Targets	Budget (in Rs. Lakhs)			
		I Year 2022 - 2023	II Year 2023 - 2024	III Year 2024 - 2025	Total
<b>A</b>	<b>Skill Development and livelihood enhancement</b>				
1	Skill center at Rural Resource center in June, 2022 with 25 youth being trained for Hospitality Management	5	-	-	5
2	In collaboration with Anushka Academy coaching for Govt. Exams were provided to 70 youth in FY'24.	-	5	-	5
3	Zinc Kaushal Kendra would be opened for youth in 2 trades (hospitality management & security) with 60 students in each batch	-	-	30	30
4	Anushka Academy coaching to be continued for the coming years with 2 batches in a FY.	-	-	12	12
5	Commencing Computer Training Centre for 50 youth in one batch, and 4 batches in one FY.	-	-	5	5
6	Restarting of the textile unit at Zawar where it would provide skill training as well as employment to around 25 women in the operational villages.	-	-	25	25
	<b>Sub Total</b>	<b>5</b>	<b>5</b>	<b>62</b>	<b>72</b>
<b>B</b>	<b>Education Projects &amp; Infra Works</b>				
1	➤ Repair & Renovation of Primary School, Limbadara, Nevatalai ➤ Library setup at Newatalai	177	138	150	465



S. No.	Physical Targets	Budget (in Rs. Lakhs)			
		I Year 2022 - 2023	II Year 2023 - 2024	III Year 2024 - 2025	Total
2	Repair & Renovation of Govt. Primary School, Talab Fala, Singhatwada				
3	Repair & Renovation of Govt. Primary School, Amarpura				
4	Repair and renovation at Govt. Zawar School				
5	Repair and renovation at Govt.Tidi Boys School				
6	Repair and renovation at Govt. upper Primary School Nala, Chanavda				
7	Repair & Renovation at Govt. Primary School, Bedadhara				
8	Repair & Renovation Govt. Girls Senior Secondary School, Ramnagar				
9	Construction of 2 Classrooms at Govt. Senior Secondary School, Mahadev Ki Naal				
10	Repair & Renovation at Govt. Kanpur Sr. Sec School				
12	Repair & Renovation at Govt. Tidi Girls Sr. Sec School,				
Sub Total		177	138	150	465
<b>C</b>	<b>Women Empowerment</b>				
1	The flagship projects Sakhi and Microenterprises (Namkeen Unit). A Production unit has been established as a part of Sakhi Initiative employing 8 women from Paduna, Zawar with the capacity of producing Namkeen 400Kgs per day	105	87	90	282
Sub Total		105	87	90	282
<b>D</b>	<b>Health care facility</b>				
1	Development of 160 Aanganwadis of Sarada & Girwa Block and renovation under the Nandghar Program as a part of Company's initiative for early child hood care, nutrition & development		25	25	50
Sub Total		-	25	25	50
<b>E</b>	<b>Health care</b>				
1	Support to Primary Healthcare Center, right now under construction in Sarada Block with equipment & such other support basis the recommendations from Block Medical Department	-		40	40



S. No.	Physical Targets	Budget (in Rs. Lakhs)			
		I Year 2022 - 2023	II Year 2023 - 2024	III Year 2024 - 2025	Total
2	Mobile Health Van, provides primary health care facility without any cost in 28 villages across 13 Panchayats of Zawar & Health Camps	49	35	35	119
	<b>Sub Total</b>	<b>49</b>	<b>35</b>	<b>75</b>	<b>159</b>
<b>F</b>	<b>Water Facility</b>				
1.	Supply of portable Water is done through Tankers in the community during Summers & on a regular basis in Kanpur village, Zawar Panchayat - settlement with a population of 1000 villagers near to tailing dam, the water is supplying twice a day on regular basis & more frequently during community festivals & summers as required & suggested by PRI's	12	12	12	36
	<b>Sub Total</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>36</b>
<b>G.</b>	<b>Rural Infrastructure Development:</b>				
1.	<ul style="list-style-type: none"> <li>➤ Rural Infra Works completed in past 3 Years:</li> <li>➤ Renovation and Painting of Zawar MKM Stadium</li> <li>➤ Tidi Retaining wall &amp; CC Road in ZWM</li> <li>➤ Retaining Wall at Zawar Mata Temple</li> <li>➤ Cremation shed at Singatwada</li> <li>➤ RCC construction at Zawar Pump House</li> <li>➤ RCC construction at Dawaditalai and Deraphala</li> <li>➤ Bhaladiya Cremation shed</li> </ul>	69	42	100	211
	<b>Sub Total</b>	<b>69</b>	<b>42</b>	<b>100</b>	<b>211</b>
<b>H.</b>	<b>Agricultural and livestock related activities</b>				
1.	Support to farmers is supported with seeds, inputs, equipment, pest control, hi-tech farming equipment, installation and other technical services. For the livestock, there are health camps, vaccination drives and	45	95	90	230



S. No.	Physical Targets	Budget (in Rs. Lakhs)			
		I Year 2022 - 2023	II Year 2023 - 2024	III Year 2024 - 2025	Total
	awareness campaigns conducted along with Artificial Insemination. They also provide the option of choosing sorted semen to improve the chances of having female calves.				
	<b>Sub Total</b>	<b>45</b>	<b>95</b>	<b>90</b>	<b>230</b>
	<b>Grand Total</b>	<b>462</b>	<b>439</b>	<b>604</b>	<b>1505</b>



### 7.3 HYDRO-GEOLOGICAL STUDY & RAINWATER HARVESTING PLAN

General ground level in the area noted as 520 m AMSL. Water table level varies from Water table level varies from 517-510 mRL.

**Table 7.4**  
**Ultimate depth of working**

Mine	Ultimate Working Depth
Mochia	-600 mRL
Balaria	-400 mRL
Zawarmala	-300mRL
Baroi	-100 mRL

Ground water intersected during mining activities shall be dewatered and recycled for process use etc. and NOC regarding the same has been obtained from CGWA for Mochia, Balaria, Baroi and Zawarmala on 18.07.2024, 18.07.2024, 11.03.2024 and 17.07.2023 respectively. All the NOCs are valid up to 10.12.2024. Copy of all the NOCs are enclosed as **Annexure 9**.

Detailed Hydro geological study has been carried for the mining project. Report of the same with Rain water harvesting plan has been prepared and annexed as **Annexure 17** with this Final EIA/EMP Report.

### 7.4 RESETTLEMENT & REHABILITATION

The Ore mining activities will be carried out within the mining lease area of 3620 ha. Mining lease area falls in Villages Zawar, Tehsil: Girwa & Sarada, District: Udaipur, Rajasthan. Out of 3620 ha, 2082.09 Ha is non forest land and 1537.91 ha is forest land.

The infrastructure for carrying out mining operations at the present capacity of 4.8 MTPA is in place and no additional land will be required for enhanced production capacity of 6.5 MTPA, as the proposed infrastructure development will be done on the existing forest land of 68.95 Ha for which, application of forest diversion for additional surface rights ha has been submitted.

### 7.5 RISK ASSESSMENT AND DISASTER MANAGEMENT PLAN

#### 7.5.1 DEFINITION

A major emergency in a work is one which has the potential to cause serious injury or loss of life. It may cause extensive damage to property and serious disruption both inside and outside the work. It would normally require the assistance of emergency services to handle it effectively.

Emergency may be caused by a number of different factors; it will normally manifest itself in two basic forms viz fire, explosion or toxic release.

#### 7.5.2 SCOPE

An important element of mitigation is emergency planning i.e. recognizing that accidents are possible, assessing the consequences of such accidents and deciding on the emergency procedures, both on site and off site that needs to be implemented in the event of an emergency.

Emergency planning is just one aspect of safety and cannot be considered in isolation.





### 7-5-3 OBJECTIVE-RISK ANALYSIS

Risk assessment is a systematic method of identifying and analyzing the hazards associated with an activity and establishing a level of risk for each hazard. The hazards cannot be completely eliminated, and thus there is a need to define and estimate an accident risk level possible to be presented either in quantitative or qualitative way. Because of the existing hazards of mining as an activity and the complexity of mining machinery and equipment and the associated systems, procedures and methods, it is not possible to be naturally safe.

Regardless of how well the machinery or methods are designed, there will always be potential for serious accidents. It is not possible for an external agency to ensure the safety of an organization such as a mining company nor of the machinery or methods it uses. The principal responsibility for the safety of any particular mine and the manner in which it is operated rest with the management of that mine. Hazard identification and risk analysis involves identification of undesirable events that to a hazard, the analysis of hazard mechanism by which this undesirable event could occur and usually the estimation of extent, magnitude and likelihood of harmful effects.

### 7-5-4 NEED FOR RISK ASSESSMENT

Risk assessments will help the mine operators to identify high, medium and low risk levels. Risk assessments will help to priorities risks and provide information on the probability of harm arising and severity of harm by understanding the hazard, combine assessments of probability and severity to produce an assessment of risk and it is used in the assessment of risk as an aid to decision making. In this way, mine owners and operators will be able to implement safety improvements. Different types of approaches for the safety in mines various tools and appropriate steps have to be taken to make mining workplace better and safer. A Hazard Identification and Risk (HIRA) analysis is a systematic way to identify and analyse hazards to determine their scope, impact and the vulnerability of the built environment to such hazards and its purpose is to ensure that there is a formal process for hazard identification, risk assessment and control to effectively manage hazards that may occur within the workplaces

Mining requires stringent safety measures to avoid incidences involving risk of life and damage to machineries. Such situations need positioning of emergency response plans which can be executed without the loss of time. Time factor is the essence in dealing emergencies to minimize the loss of human life and disruption of work.

Any accident may develop into a major emergency even with the best safety measures and programmes in mining. Hence, an emergency preparedness plan will be planned properly and documented for ease of implementation at the time of need without losing time and avoiding delays.

### 7-5-5 HAZARD IDENTIFICATION

Identification of Hazards in a mining unit is of primary significance in the analysis, quantification and effective control of accidents. A hazard is characteristic of a system/process that presents potential for an accident. All the components of a system/process need to be thoroughly examined to assess



their potential for initiating an accident. Safety is relative and implies freedom from danger or injury. It calls for identification of hazards, risk and further suggestion on hazard mitigation measures.

In the Metalliferous Mines Regulations (1961), possibility of occurrence of hazards and the mitigation measures are spelt out in detail. Accident or hazardous situation may arise due to occurrence of any one of the following causes

1. Ventilation failure
2. Outbreak of fire;
1. An influx of noxious gases;
2. An eruption of water or inundation;
3. Premature collapse of any part of workings;
4. An accident due to the explosives;
5. A fracture or breakage of any essential part of winding system;
6. Bursting of any equipment at high pressure;
7. Air blast; and
8. Subsidence.

#### 7.5.6 METHODOLOGIES FOR RISK ANALYSIS

The objective of risk analysis is to produce outputs that can be used to evaluate the nature and distribution of risk and to develop appropriate strategies to manage risk. Events or issues with more significant consequences and likelihood are identified as higher risk and are selected for higher priority mitigation actions to lower the likelihood of the event happening and reduce the consequences if the event were to occur. Qualitative methods use descriptive terms to identify and record consequences and likelihoods of the events and resultant risk. Quantitative methods identify likelihoods as frequencies or probabilities. They identify consequences in terms of relative scale (orders of magnitude) or in terms of specific values (for example estimate of cost, number of fatalities or number of individuals lost from a rare species). For both qualitative and quantitative methods, it is important to invest time in developing appropriate rating scales for likelihood, consequence and resultant risk. The full range of risk situations likely to be encountered within the scope of the exercise should be considered when developing rating scales.

#### 7.5.7 SEMI QUANTITATIVE METHODS

Semi-quantitative approaches to risk assessment are currently widely used to overcome some of the shortcomings associated with qualitative approaches. Semi-quantitative risk assessments provide a more detailed prioritized ranking of risks than the outcomes of qualitative risk assessments. Semi-quantitative risk assessment takes the qualitative approach a step further by attributing values or multipliers to the likelihood and consequence groupings. Semi-quantitative risk assessment methods may involve multiplication of frequency levels with a numerical ranking of consequence. Several combinations of scale are possible.



SEVERITY		LIKELIHOOD				
		1	2	3	4	5
		Rare	Unlikely	Possible	Likely	Almost Certain
Catastrophic	5	5	10	15	20	25
Serious	4	4	8	12	16	20
Moderate	3	3	6	9	12	15
Minor	2	2	4	6	8	10
Negligible	1	1	2	4	4	5

**Risk Factor 20 to 25 - Very High** – A risk factor in this range would indicate an "unacceptable" level of risk. It would be appropriate to prohibit the activity until suitable improvements have been implemented to reduce the level of risk to an acceptable level;

**Risk Factor 10 to 16 - High** – Hazards within this range should be proactively managed to reduce the risk to a level as low as reasonably practicable;

**Risk Factor 5 to 9 - Medium** – Risk factors within this range may be regarded as "tolerable" and identified hazards within this range should be actively managed; and

**Risk Factor 1 to 4 - Low** - Risk factors within this range would indicate that the level of risk is "acceptable" and therefore no further action would be necessary. However, it would still be important to ensure that any existing controls are maintained.

From the above Risk Assessment Matrix, risks are assigned a risk ranking that is used to determine their priority for management. The risk rankings areas below:

**Table 7.5: Risk and Hazard analysis for different phases of Project**

S.No.	Risk and Hazard	Control Measures	HSE		
			S	L	R
1	Interaction with vehicles, machinery and equipment (Physical).	Safety drills, training to operators, emergency preparedness.	5	3	
2	Interaction with onsite and offsite traffic	Implementation of traffic management plan	5	3	
3	Fugitive Dust Emissions	Sprinkler system, plantation, regular cleaning and upkeep of road condition	1	2	
4	Fatigue	Work rosters that include rest between shifts; training and awareness; and Health and well-being improvement program.	4	2	
5	Physical injuries from manual handling.	Documented standard operating procedure; education and training; education and awareness program; Job Hazard Analysis covering manual handling; and Effective pre-employment fitness for work screening and health and well-being improvement program.	2	4	



S.No.	Risk and Hazard	Control Measures	HSE		
			S	L	R
6	Leaks of oil, fuel or chemicals from vehicles during transport and/or at designated fueling stations	Follow SOP of fueling procedures; Provision of impervious containment and bunding of stationary / fixed tanks; overfill protection; prompt reporting and clean-up; major equipment maintenance to be conducted in dedicated facilities; clean up equipment; and storage and handling	2	3	
7	Ventilation failure	The underground mining area will be provided with good ventilation as per the DGMS guidelines; Provision of backup ventilation provision, in case of failure of ventilation equipments; Provision CO, NOx, O <sub>2</sub> and Methane level detectors;	4	3	
8	Chemical release – liquid from leaks, ruptures, overflows, spillage or pooling.	Storm water is directed away from potentially contaminated areas; site drainage system designed to allow retention of spills on site; Hazard and Operability (HAZOP) reviews conducted during detailed design; Personnel trained in use, appropriate storage, handling and incident response; Material Safety Data Sheets (MSDS) available on site; appropriate personal protective equipment and adequate supply of spill materials; Chemical incidents included in Emergency Management Plan; and effective preventative maintenance.	2	2	
9	Natural Flooding and ground water interception and associated flooding	dewatering will be done at regular interval;	5	1	
10	Noise and vibrations	explosive materials handled only by competent authorized personnel; induction and training of all staff on safety procedures during blasting; strict control of ignition sources; advise surrounding neighbors, where appropriate; personal protective equipment (PPE) provided; and storage of explosives and accessories in accordance with the Explosives Act	2	4	



S.No.	Risk and Hazard	Control Measures	HSE		
			S	L	R
11	Failure of tailing storage facility	Regular ground control monitoring, third party assessment	5	1	
12	Hazards due to poor illuminations	The work area will be kept well lighted. Lightening in different areas will be provided as per DGMS guidelines; Energy efficient light sources with minimum heat emission will be used in underground mining activities and mine office;	2	2	
13	Hazard due to Blasting associated activities	<ul style="list-style-type: none"> <li>Protective devices will be provided to workers during handling explosives;</li> <li>Blasting will be carefully planned and executed under supervision of a responsible officer to avoid any accident;</li> <li>Explosives will be handled as per guidelines of DGMS;</li> <li>Strict prohibition of smoking in fuel and hazardous chemical storage area;</li> <li>Signage in hazardous and risky areas;</li> <li>Blasting sites will be checked post blast by qualified personnel for malfunctions and any unexploded blasting material prior to resumption of work in the area;</li> <li>Provision of storage of magazine at separate area at safe distance from ML area with necessary security arrangements;</li> <li>Provisions of fire fighting in the mine area and beneficiation plant with sufficient number of fire extinguishers at fuel storage area, mine office, electrical substation and other strategic locations to take care of any eventuality;</li> <li>Following Emergency Response Plan in case of any accident at site.</li> </ul>	5	2	
14	Storage of fuel and hazardous chemicals	<ul style="list-style-type: none"> <li>Specific warning siren will be blown before each blasting activity to alert all the workers and local people residing in the surrounding areas;</li> <li>Material Safety Data Sheet (MSDS) for hazardous chemicals will be maintained and followed to ensure safety of workers;</li> </ul>	4	2	



S.No.	Risk and Hazard	Control Measures	HSE		
			S	L	R
		<ul style="list-style-type: none"> <li>Eye wash and emergency shower system will be provided in hazardous chemical storage area;</li> <li>Signage in hazardous and risky areas;</li> </ul>			

Note: S= Severity, L = Likelihood and R = Risk

## 7.5.8 PRECAUTIONARY MEASURES FOR HAZARDS

### Outbreak of fire

- Some precautions and remedial measures recommended to be adopted to prevent fires are:
- No inflammable material shall be stored in underground workings except in fireproof containers;
- To avoid surface fire, all structure with 10 m of shaft, ramp and incline to be constructed of incombustible material;
- Surface workshop, diesel filling station, compressor house and electric sub-station shall be provided with firefighting equipments and to be maintained regularly;
- Dry vegetation shall not be allowed within a distance of 15 m from any entrance to the mine;
- Regular inspection will be done to remove accumulation of greasy material cotton waste, old conveyor pieces, waste hose pipes, wooden scrap, wood cuttings etc. and shall be removed regularly;
- A proper communication system installed to warn underground worker about outbreak of fire;
- Electric apparatus, electric cables etc. shall be checked regularly;
- Adequate number of persons will be trained in firefighting; and
- Mock drills will be conducted on regular basis.

On the appearance of signs indicating that a fire has broken out, all persons other than those whose presence in the mine is deemed necessary for dealing with the fire shall be immediately withdrawn from the mine.

Fire fight operations would be carried out under the supervision of competent persons along with trained firefighting personnel.

Sufficient supply of sand or incombustible dust or sufficient portable fire extinguishers shall be provided at entrance to a mine, landing and the bottom of every shaft or winze in use, engine room and at other place where timber, canvas, grease, oil or other inflammable material is stored. Water hydrants will be provided at all necessary locations. Suitable types of fire extinguishers will be provided at different locations to deal with different types of fire.

### Influx of Noxious Gases

The following precautionary measures will be adopted.

- Noxious and Inflammable gas presence shall be checked by-gas detector.
- When any person detects the presence of inflammable gas, he shall immediately withdraw from the place and shall inform his superior official about the same;



- When inflammable or noxious gas is detected, all persons shall be withdrawn from the place, and the place shall be immediately fenced off so as to prevent persons inadvertently entering the same;
- No person shall be re-admitted in to the place where the gas was detected until a competent person has examined the place and has reported that the place is free from gas;
- Persons will be trained in the use of gas detector usage. The competent person will take steps to remove the gases by improving ventilation.

#### **Eruption of Water/inundation**

A water danger plan showing the following features will be maintained as required by regulations.

- The position of the workings below ground;
- Every borehole and shaft (with depth) drive, crosscut, winzes, raise, excavation and air passage connected therewith;
- The position of every dyke fault and other geological disturbance, with the amount and direction of throw;
- Levels taken in workings below ground at easily identifiable points sufficient in number to allow the construction of sections along all drives main headings and haulage roadways;
- Every source of water such as river, stream, water course, reservoir, water-logged workings on the surface, and also the outline of all water logged workings below ground lying within 60 meters of any part of the workings measured in any direction;
- Every reservoir, dam or other structure, either above or below ground, constructed to withstand a pressure of water or to control an inrush of water, along with reference to its design and other details of construction;
- Surface contour lines drawn at vertical intervals shall not exceed five meters; and
- The highest flood level of the area.

#### **Premature collapse of any part of workings**

Based on the rock quality assessment and the chosen method of mining, no premature collapse of any part of working is anticipated. However, following precautionary measures are being/will be observed: -

- To prevent premature collapse of any workings, effective supports will be erected based upon the geotechnical mapping. All workings will be systematically supported to eliminate any possibility of premature collapse;
- Numerical modeling techniques will be used to determine the stable spans; and
- The hang wall and crown pillar will be instrumented with multi point boreholes extensometer and stress meter for ground monitoring on regular basis.

#### **Accident due to the Explosives**

Detailed guidelines have been provided in the regulations and various circulars. The measures proposed are:

- Explosives will be issued only to the authorized persons;
- Explosives and detonators will be transported in separate boxes under lock and key;





- The person holding the statutory certificates will carry out the blasting operations;
- Large diameter blasting would be carried out after withdrawing all persons from below ground;
- A register will be maintained at the gate checker office, where all section foremen will countersign indicating the removal of persons from their sections before carrying out large hole diameter blasting; and
- The blaster will ensure that all persons have taken proper shelter before blasting the charge.

#### **Bursting of any Equipment at High Pressure**

- All apparatus used as or forming part of the equipment of mine, which contains or produced air at a pressure greater than atmosphere pressure shall be so constructed, installed and maintained as to obviate any risk of fire, bursting explosion or collapse or the production of noxious gases;
- Every air receiver forming part of a compressing plant shall be fitted with a safety valve and an air gauge, which shows pressure in excess of the atmospheric pressure;
- Before an air receiver commissioned, the engineer or other competent person shall subject it to a hydraulic test at pressure at least one and a half times the maximum permissible working pressure; and
- A similar test shall be made after every three years. Proper records will be maintained.
- The supply of air for air compressors shall be drawn from a source free from dust and fumes.

#### **Precautions against Air Blast**

No such danger is anticipated. However, the following precautionary measures will be observed in case of eventuality:

- Any large scale collapse of wall rocks into voids may displace the air in violent manner and cause accidents;
- Persons will be trained to deal with situations arising out of Air blasts;
- Air blast shelter would be established at suitable locations; and
- The drawal points in the stopes would not be totally emptied.

#### **Storage and Use of Explosives**

- While storing of explosives, statutory regulations viz. 154, 155, 156, 157 & 158 of MMR 1961 will be followed strictly.
- Explosive are being/will be stored in magazines duly approved by the licensing authority under the Explosive Act and permitted by DGMS.
- The magazine is/will be in charge of a competent person who will be responsible for the proper receipt, storage and issue of explosives.
- No explosive will be issued from the magazine or taken into the mine except in a permitted container and carrier.
- Safe practices are being/will be adopted while using explosives.
- Production drilling is being done by Electro-Hydraulic, ITHs and pneumatic drills.
- Stope blasting is being carried by using ANFO / emulsion explosives with Nonels/ Electronic detonators for higher degree of safety & ground control.



- Transportation of explosive to the site will be made by duly licensed explosive van.
- All precautions will be taken before blasting like removal of persons, equipments from the place of blasting to the safe distance.
- Proper record of receipt, storage and use of explosives/ fuel will be kept and maintained by properly authorized persons.
- Explosives will be used as per the requirement. No overcharging/ undercharging of holes will be allowed.
- All entries to the blasting area will be blocked and guarded to prevent inadvertent entry of persons.
- The Rules as per the Indian Explosive Act will be followed for handling of explosive, which includes transportation, storage & use of explosive.
- Scalar and Rock bolter will be used for reducing the cycle time and ground management.

#### General Precautions

- Persons will be authorized for various skilled works;
- Every exposed part of any machinery used as, or forming part of, the equipment of a mine shall be adequately fenced by suitable guards to prevent danger;
- Only authorized and trained persons will be permitted to operate and maintain equipments; and
- Danger signs will be displayed at appropriate locations.

#### 7.5.9 TYPE AND QUANTITY OF CHEMICALS TO BE USED AND STORED

Following chemical are being/will be used & stored at site in beneficiation plant complex in covered earmarked area, as per guidelines.

Table 7.6

Type and Quantity of Chemicals to be Used and Stored

S. No	Type of Chemical	Use	Consumption (gpt)	Storage Capacity (MT)
1	Zinc Sulphate	Depressant for Sphalerite ore	165	60
2	Sodium Cyanide	Depress pyrite to improve concentrate grade	10	15
3	Copper Sulphate	An activator to activate Sphalerite in flotation	150	100
4	MIBC	Frothier: to make stability of froth	31	35
5	Sodium Isopropyl	Xanthates: Collector to collect metal in the form of froth	26	30
6	Flocculent	Fine settling in thickeners	4	15
7	Lime	Maintain pH of different lead and zinc floatation circuits	-	-

#### 7.5.9.1 USE OF SODIUM CYANIDE IN BENEFICIATION PLANT



During beneficiation of lead and zinc ore, cyanide salts are used for suppressing impurities present in the ore with a view to improve the separation of lead-zinc metals from the gangue materials. The material safety data of sodium cyanide is presented in **Table-7.4**.

**Table 7.7: Properties of Sodium Cyanide**

S. No	Data	Details
1	Boling point	1496°C (2724 F) at 760 MMHG
2	Melting point	564°C (1047 F) at 760 MMHG
3	Vapour pressure (MMHG)	1 (817°C)
4	Vapour density	AIR (1): 1.7
5	Specific gravity	1.6
6	Evaporation rate	N/A
7	Solubility (H <sub>2</sub> O)	37%
8	Volatiles by volume	0 (21°C)
9	pH	11.7 (25% solution)
10	Physical state	Solid

Sodium cyanide solution contains 53.1% available cyanide. Due to the solidiphic nature of cyanide ions, most of them (about 85%) form complexes with Fe and Zn and are discharged along with tailings. About 10% of the free cyanides go along with tailing solution to tailing dam and balance about 5% of cyanide goes along with concentrates. The present consumption of sodium cyanide in beneficiation process is about 10 g/tonnes of ore treatment. Depending on the quantum of ore processed by Zawar mine, the monthly consumption of NaCN is 3.3tonnes/month.

Sodium cyanide salts are transported through rail in mild steel containers with HDPE liners. After the use, the empty containers and containers liners of cyanide salts are discarded as hazardous waste transported to treatment storage and disposal facility (TSDF) located at Udaipur. A comprehensive study and on HCN emissions in Zawar mines was carried out by National Environmental Engineering Research Institute (NEERI).

#### 7.5.9.2 TAILING DISPOSAL

The final tailings from beneficiation process are pumped through pipe lines to tailing dam, which is situated at about 3.5 km away from the beneficiation plant. In the tailing dam, the water gets separated from the tailings and is recycled back to the process.

**Cyanide Containers and liners:** The sodium cyanide used by Zawar Mine is received in MS containers which are lined with HDPE liners. Once the entire quantity of cyanide is exhausted from the containers, the empty containers and HDPE liners which are contaminated with residue/traces of sodium cyanide are discarded as wastes. Present rate of generation of empty sodium cyanide containers and liners is about 50-60 containers/Month.

#### **Management of Cyanide Containers and Liners:**

The present practice of management of cyanide drums (with accessories) and liners involve three major steps. These include



- i) Water rinsing: The wash-water from this operation is recycled to process for utilization of cyanide content. The washed containers and the accessories are taken out from the tank and kept by the side of concrete tank for next step of treatment.
- ii) Alkaline chlorination: After completion of decontamination process, entire hypochlorite solution is drained out and pumped back to thickener from where it is pumped to mil overhead tank for recycling in process. Before disposal, containers and accessories are again rinsed with water and the rinse water is recycled to the process for reuse.
- iii) Deformation and disposal: the decontaminated containers and liners are perforated at bottoms and sides and distorted in a safe enclosure so as to prevent reuse of containers and liners. The perforated and distorted containers, components and liners are finally disposed off to hazardous wastes treatment storage and disposal facility (TSDF), Udaipur.

Necessary HW authorization under Hazardous and other waste (management and transboundary movement) Rules is in place for handling.

#### 7.5.10 DISASTER MANAGEMENT PLAN

A situation is potentially a Disaster if it entails any one or more of the following factors:

- 1) Risk of loss of human lives- ten or more in single situation;
- 2) Loss of property as a consequence of the incident is covered millions and / or bears a potential to above;
- 3) A situation which goes beyond the control of the available resources of the mine/plant; and
- 4) A situation which apparently may not have caused much loss but whose long term severity could cause of life, production and property.

The 'emergency management plan' is designed to deal with the emergency situations in a mine in such a way that immediate action is to be taken by workmen, supervisors and officials working at the mine.

##### Objectives:

The objectives of DMP is to describe the company's emergency preparedness, organization, resource availability and response actions applicable to deal with various types of situations that can occur at mines in shortest possible time.

Thus, the overall objectives of the emergency plan are summarized as:-

- Rapid control and containment of Hazardous situation;
- Minimizing the risk and impact of event/ accident;
- Effective prevention of damage to property.

In order to achieve effectively the objectives of emergency planning, the critical elements that form the backbone of Disaster Management Plan (DMP) are:-

- Reliable and early detection of an emergency and immediate careful planning.
- The command, co-ordination and response organization structure along with availability of efficient trained personnel.
- The availability of resources for handling emergencies.

- Appropriate emergency response action.
- Rescue operation and provision of adequate medical facilities to the injured
- Effective notification and communication facilities.
- Regular review and updating DMP.
- Training of the concerned personnel.

Steps to be taken for minimizing the effects may include rescue operations, first aid, evacuation, rehabilitation and communicating promptly to people living nearby and concerned authorities.

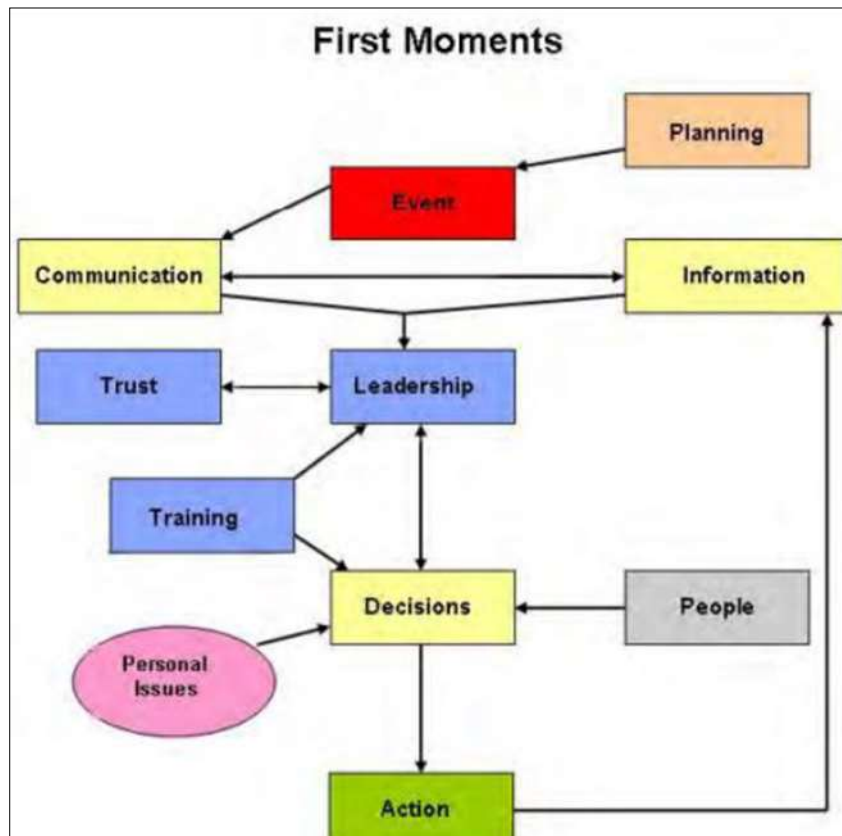


Fig. 7.1: Framework of first moments in mine emergency escape

A fully operational rescue room equipped with all necessary equipment is being maintained at Zawar for catering to the emergency needs of all the mines. Sufficient number of rescue trained persons is available for dealing with any emergency including fire. A fire tender is also maintained at Zawar.

#### a) Mine Emergency Response Planning

All miners should be trained to understand and follow the mine emergency plan where they work. A response plan is only one piece of the continual, dynamic process of emergency response planning. Identifying threats and their associated risks will help establish planning process priorities. As a first critical step in emergency response planning, a thorough hazard analysis and risk assessment should be conducted. This will help in keeping emergency response plans simple and easy to use.

The Mine Safety Technology & Training Commission report (2006) recommends developing a comprehensive emergency response plan that is risk based and mine specific. A risk-based plan is targeted for the most likely threats and assumes that preparing for them also prepares for unrecognized hazards.



Fire Tender



Work at height rescue kit 2



BG 4 SCBA – 15nos



Care vent



Confined space rescue kit 1



#### Competencies required for successful escape include:

- Technical knowledge: understanding and proficiency in the use of emergency breathing apparatus (self-contained self-rescuers), lifelines, refuge chambers, etc.
- Mine specific knowledge: knowledge of the mine maps, the escapeways, the ventilation system, the mine emergency response plan, and familiarity with escape capsules.
- Escape conceptual knowledge: ability to think and adapt to changing conditions, to be resilient, to be able to problem solve and make decisions, and to understand the dynamic of human behavior in escape, including leadership and other psycho-social issues.



**b) Communication**

Information about the situation affects the initial response and defines the first moments of an incident. Research has suggested that effective communication will reduce confusion, increase confidence in decisions, stop rumors and incorrect information, and improve the likelihood of success.

**c) Training**

Training is considered to be one of the most essential elements in the emergency response planning process. Training, in the form of drills, mock disasters, and even tabletop simulations, affords the opportunity for planners to identify and resolve problems, examine and evaluate the utility of developed procedures, refine plans, and train individuals who will be responding to emergency events.

**d) Decision-making**

Decision-making directly relates to communications issues. In an emergency, decision-making relies on:

- The quality of the information received by everyone immediately following the incident
  - The technical communication system in place in the mine.
  - The process is iterative, meaning that one choice leads to another until the incident is resolved.
- Decision-making is also affected by the experience level of the people involved.

**e) Personal protective equipment for first aid and rescue**





People entering the mine as part of first aid and rescue procedures should have the appropriate personal protective equipment (PPE). Considerations for ensuring capacity to provide PPE include:

- Potential or actual atmospheric contaminants
- Potential or actual inundation or inrush
- availability of the appropriate equipment
- availability of persons trained in the equipment
- specific protocols for use of the equipment
- Procedures for any specialist emergency response team who may enter the mine.

#### 7.5.11 EMERGENCY RESPONSE ORGANIZATION

The purpose of the Emergency Response teams at Zawar mines is to provide a group of trained individuals for emergency response. This section outlines the description of each organization, their selection, training, and overall managing processes to ensure ER effectiveness. The basic function of the Emergency organization is to save lives and this should be the main concern of one and all. The emergency organization chart is presented in **Figure-7.3**.

##### **Rescue Recovery Committee (RRC):**

This committee will be responsible for the overall direction of all the operations connected with the rescue / recovery work and will function in close contact with EMC. All the activities connected with the rescue & recovery operation will be done as per the direction of RRC. The Mine Manager will instruct all his officials and supervisors to report to RRC Room in the back shifts for smooth operation of rescue & recovery work. All necessary instructions and guidelines will be displayed on the notice board/black board.

This committee will be responsible for the overall direction of all the operations connected with the rescue / recovery work and will function in close contact with DMC. The RRC will consist of:

- HoD (OD)/In-charge, Mine - Chief Coordinator
- Asst. Manager/ Safety Officer
- Dy. Director (MS) for Zawar Mine.
- Engineering I/C (Maint.) Central Services
- In-charge, Electrical

Henceforth, all the activities connected with the rescue and recovery operations will be done as per the direction of the RRC. The Mine Manager will instruct all his officials and supervisors to report to RRC for further orders/instructions. The RRC will make arrangements for manning the RRC Room in the back shifts for smooth operations of rescue and recovery work. All necessary instructions and guide lines will be displayed on the notice board/ black board. As soon as the RRC is set up, all persons who are required for rescue/ recovery work must first obtain authorization from the RRC. A record of such persons shall be maintained in the RRC Room.

##### **Rescue-recovery Committee Room:**

The Rescue, Recovery Committee Room will be set up at Rescue Room. It will be equipped with one external and two internal phones, a large table for the display of plans & sections, a black board for technical guidelines, almirah to hold plans, emergency tokens, telephones call lists, logbooks registers etc.

Depending upon the location of the accident a Rescue Recovery Committee Room will be set up on the surface. It will be equipped with one external and two internal telephones, a large table for display of plans and sections, a black board for technical guidelines, almirah to hold plans, Emergency tokens, and telephones call lists, log books registers etc. In addition, another room should be made available for accommodation of this rescue team

#### **Rescue Room and Rescue Team**

The Rescue Room will be setup at the surface inside the mine premises. The Rescue Room will have all the facilities for Storage of required Equipment and material, Washing and ablution facilities, Oxygen filling and Equipment maintenance Room. In addition, another room should be made available for accommodation of the Rescue team.

The Rescue team will be formed with personnel working in the Mine and consist of Engineers, Maintenance persons and Contractual Manpower. The total no. of persons in the team shall be 12. The Rescue team will report to Rescue Room In charge at the Rescue Room.

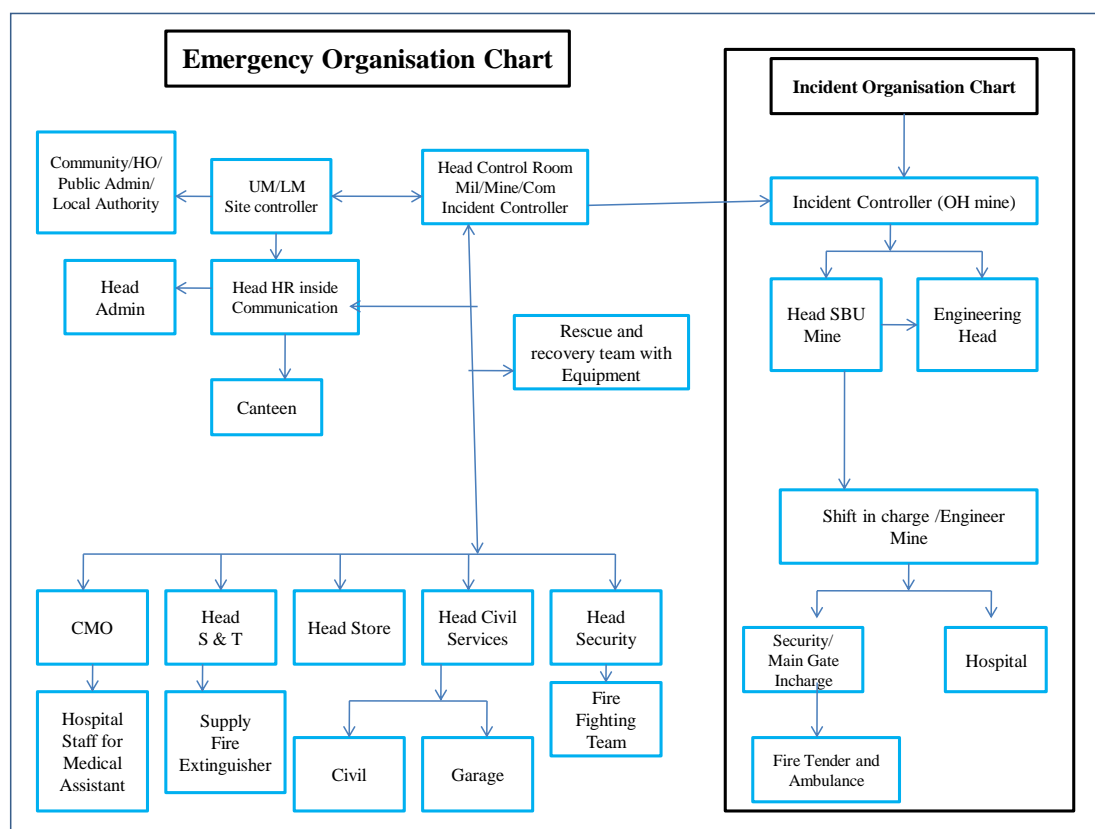


**Figure 7.2: Photograph showing Rescue Room**

#### **Checking of Persons**

As soon as the RRC Room is set up, all persons who are required to go underground must first obtain authorization from the RRC. A record of such persons shall be maintained in the RRC Room. Each person authorized will be given an two ID cards. The list of person receiving the ID cards will be recorded. One ID card must be handed over to the Gate Checker before entering the Cage/Mine. Another ID card must be worn suspended from the neck whilst in underground. On returning to the surface, all persons must collect their tokens from the Gate Checker and hand over the same to the RRC.

Fig 7.3: Organizational Chart for Emergency Response at Zawar Mine



### Establishing a Chain of Command

A great number of people will be doing many different jobs during a rescue and recovery operation. Therefore, it is important to establish a clear chain-of-command so that rescue and recovery work can be well coordinated.

Located at the top of the chain-of-command is the Mines Manager or a designated responsible person who delegates duties to other people. These people must know exactly what their duties and responsibilities are, who to report to, and who reports to them. State officials will arrive at the mine site to advise and observe. Govt. mining officials can take charge of an operation if they deem it necessary, but normally their role is to consult with and advise the company personnel on how the rescue and recovery work might best be carried out safely.

The team is under the direct supervision of the team captain. The captain also works and communicates with the designated official(s) who are responsible for coordinating the work carried out by mine rescue teams.

Mine rescue teams must receive accurate, concise, and reliable briefing information from the Rescue room to perform rescue/recovery duties in a safe, timely, and efficient manner. The teams will also need up-to-date mine maps for exploration duties. It is extremely important to develop a standardized method of reporting gas readings and other critical information to the Command Centre and the Fresh Air Base (FAB).

#### 7.5.11.1 Mine Gases and Air monitoring

The mine rescue team members will identify the physical properties and characteristics of gases they may encounter during rescue and recovery work. They will identify where the gases are normally found, how to test them, and the meanings of their findings.

- a) **Self-rescuer** – Ensuring that every person going underground carries self-rescuer.
- b) **Gas monitoring** – Supervisors in every shifts equipped with gas monitors to ascertain safe working environment for CO and H<sub>2</sub>S



Self-rescuer



Gas monitoring (CO & NO<sub>x</sub> Meter)

Fig. 7.4: Photographs showing Measures for Mine Gas and Air Monitoring

#### c) Mine Ventilation

The purpose of mine ventilation is to provide a volume of air sufficient to disperse and remove harmful gases, dust, smoke, and fumes, and to provide adequate oxygen. When a mine is ventilated through mechanical ventilation, air from the surface enters the mine at the main intake or intakes and is directed or “coursed” through the mine by a system of ventilation controls. These controls force the air to move in certain directions and at certain velocities so that it reaches all levels or sections of the mine. All the return air from the levels or sections is then channeled to the main exhaust and eventually exits the mine.

#### d) Ventilation Maps

As mine rescue team members, should know how to read a mine map that shows ventilation. This is basic knowledge for any team member, especially the map person. The team’s map person is responsible for marking down information on the map as the team explores and assesses ventilation.

#### 7.5.11.2 Emergency/ Crisis Management Control Room

An emergency /Crisis Management Control Room shall be set up in the mine office complex earmarked for the purpose and shall be manned round the clock during the emergency by Mine manager, or any other persons decided by the Chairperson.

Emergency Control Room will be equipped with at least two internal phones and one external phone for liaison work. All public relation work connected with the Crisis such as answering inquiries and giving information to the Head Office, Liaison with Press, Public etc., shall be done by Mgr. (HR)/ AM (HR) from



Control Room so as to avoid any misinformation and unnecessary crowding at actual place of rescue /recovery operation.

The EMC shall consist of the following:

- Location Head - As Chairperson -Phone: 3400/3401
- H.R. Head –Phone: 3440/3501
- HOD / In-charge Mine: Phone: 3385/ 3407
- HOD / In-charge Mill: Phone: 3210
- In-charge, VTC. Phone: 3380
- Engg. Head (Maint.)/ In-charge, Central Services Phone: 3408
- Dy. Director (Mine Safety) for Zawar Mine Phone: 2417962
- Chief Medical Officer/ I/C, Hospital. Ph : 3330/3569
- Sr. Vice President/ Sr. Secretary, Zawar mines Mazdoor Sangh. Phone: 3360

The EMC members will ensure to meet once in every three months in order to keep liaison with one another and one to check the **Emergency Management Preparedness** of the mine/surface departments. Such meetings shall be convened and organized by Sr. Manager in consultation with the Chairperson.

During an Emergency, the DMC shall meet regularly in order to assess the progress of rescue/ recovery operations and decide further strategy and guidance to be given to Rescue Recovery Committee (RRC). The RRC will give instructions to Rescue team the situation of Crisis Place, likely to have the atmospheric condition on the spot. Rescue team will equip with suitable apparatus/ appliances to deal the situation.

#### 7.5.12 Roles and function of Emergency Team

##### a) Functions of the incident controller

- To assess the scale of the incident against predetermined criteria and decide whether emergency exists or is likely; if so, to immediately activate Emergency Plan.
- To assumes duties of Crisis Controller pending his arrival, in particular to:
  - Ensure emergency services called.
  - Direct shutting down and evacuation of other Zawar Mines areas likely to be affected.
  - Ensure key personnel summoned.
- To direct all operations at the scene of the incident e.g.
  - Rescue and firefighting operations
  - Search for casualties
  - Evacuation of non-essential workers to assembly areas.
- To set up communication point with radio, telephone/mobile/email or messenger contact with DCR.
- To give advice and information to emergency services.
- To brief the Emergency Controller and keep him informed of developments.



**b) Duties of persons in emergency:**

**i. HoD (Mine)**

- As soon as the mine manager gets the information of any serious nature, he will immediately inform the Agent and Location head (Phone No. 3400/ 3401) and send an urgent call for mine officials to attend essential works prior to the set-up of RRC and subsequently ask them to report to RRC for further instructions and line of action
- He will make all necessary arrangements for the functioning of RRC and office accommodations with all necessary facilities to take the charge of rescue work.
- He will ensure that all affected persons are withdrawn in the best possible ways and only those persons shall be allowed to proceed to the affected area who will be needed for rescue and recovery work.
- He will take necessary steps so as to get deployed all other work force in other areas, except those needed by RRC for rescue work.
- In addition to the above, Chief Manager (OD)/ In-charge Mine shall take necessary actions independently warrant for situation without loss of time.

**ii. Asst. Manager/ other Mine officials:**

- Depending upon the nature and severity of the accident, the RRC, will make a duty distribution chart and the same shall be immediately displayed on the notice board. All officials/ supervisors will be briefed by RRC about their duty timings, place of work and nature of job assigned to them.
- All officials will keep close liaison with the RRC.
- The persons shall be relieved at the site.
- All necessary steps should be taken to make a telephone arrangement and First aid station as near to the affected area as possible.
- All critical activities shall be done as per the guidelines of RRC. Findings and actions taken shall be recorded in abounded paged book kept in the RRC room and duty signed by them with date and time
- They will keep all necessary liaison for quick shifting of the affected persons to surface and if felt necessary, send the information for sending rescue/ medical team which will be in ready state at the mine office.
- They will ensure that all persons engaged for rescue work are safely withdrawn at the end of the shift and record in the register kept for the purpose in RRC room
- C.M. /OH (Mine) should be ensuring that the restore functioning of critical equipment at earliest, if conditions warrant. In consultation with C.M. /OH (Mine)/In-charge, Mine
- In-charge of Mine Electrical department shall take necessary action for restoration of power if tripped during Emergency, taking consideration of all safety measures and the matter may be consulted with OH/ C.M. (Mine)/ In-charge, Mine



### iii. Rescue Room In-charge:

For the purpose of coordinating fire-fighting activities and to enforce all regulations for prevention of fire: and

- To extricate persons from debris.
- To hand over dead bodies and injured persons to first aid parties.
- To take immediate steps as may be necessary for the temporary supports or demolition of buildings and structures, the collapse of which is likely to endanger life or obstruct traffic,
- To cut off supplies to damaged structures etc.,
- To keep his rescue / firefighting teams in ready state in the place assigned by RRC.
- To divide his team in such a fashion so that the rescue teams is readily available round the clock.
- To ensure to make all necessary arrangements for timely refilling of oxygen cylinders of breathing apparatus

### iv. Safety Head: Zawar Group VTC

He will keep a close watch over the rescue/ recovery activities and will report the development to RRC. If required the services of surveyor may be called for preparing drawings of the affected areas.

### v. CMO I/C Hospital: (Ph. No. 3333/3569)

- He will summon all the Doctors. And medical staff and will give the necessary instructions to deal with the affected persons and keep the mortuary ready for post-mortem and identification.
- He will keep the ambulance and first-aid equipment ready with the necessary staff at the Mine office or at the place proposed by RRC
- He will arrange for sufficient beds and other facilities for the treatment of injured persons.
- He will ensure to maintain at all times minimum stock of oxygen and other medicines to meet out any Emergency. However, he shall make all arrangements for additional requirements during Crisis/ accident depending upon the gravity of the situation.
- He will inform nearby hospitals and will ensure that in case of Emergency, the injured persons can be immediately shifted and given necessary treatment;
- He will arrange for recording casualties by putting the label on each patient seen, treated and transported which would bear the particulars about the name, date of accident, details of injury conditions of the patient and treatment. The following 3 types of labels are to be used for different type of casualties.

### vi. Ventilation officer

- He shall keep a close watch over the running of Main Ventilating Fan;
- Any unusual variation shall be immediately reported to RRC and recorded in a Register; and





- In case of fire, he shall ensure the stoppage and reversal of main ventilating fan as per the instruction of Mine Manager/RRC. In addition, he shall take necessary actions for the re-coursing of air current as per the requirement in consultation with Mine Manager.

**vii. Survey Officer**

He shall prepare all relevant plans & sections of the affected areas that shall be readily available in sufficient quantities.

**viii. Gate Checker**

- He shall keep record of the persons going below ground and coming out from the underground .immediately after the withdraw of work persons, he shall make a head –count and report the Mine Manager;
- He shall permit only those persons to proceed for below ground, who have been authorized by Mine Manager/RRC for rescue work; and
- In case of any relevant information received from underground, he shall immediately inform the RRC.

**ix. Bellman**

- He shall allow only those persons to proceed below ground who have got clearance from the gate Checker. Once RRC is in action, persons going below ground required to wear copper token on the neck and the same be checked by the Bellman before allowing him into the cage; and
- He shall ensure that the cage is not held up at any landing unnecessary.

**x. HR Head:**

- On receiving information from the Location head, he will arrange immediately for Emergency signal.
- He will keep proper record of all injured persons and casualties. He will also deal with the relatives of the injured, state administration officials and other agencies.
- In addition, he shall make all arrangements for lodging and boarding of outside agencies in the Guest House and transport facility if required.

**xi. Manager (Stores) I/C Central Stores:**

He will make all necessary arrangements to keep the stores open round- the- clock for drawl of material and make available sufficient stock of materials needed during the course of rescue and recovery operations. He will be in close contact with the RRC for any material requirement.

**xii. Canteen In-charge/ Welfare Officer**

He will make all necessary arrangements and organisation for the additional food supplies to meet out the Emergency.

**xiii. In-charge of Garage**

- He will make the arrangements for availability of transport facility round the clock.
- The Central workshop facility shall be available as per the requirement.



#### xiv. Stocking of tools and materials:

All tools and materials and safety items needed for the rescue/ recovery operations will be stored in a safe place near the RRC room so that the work is not affected for want of any such material. A store Officer/ Mine Engineer will be made in-charge to look into the arrangements of the materials and to keep the RRC informed. To deal with such exigency, certain materials as listed below shall be kept at VTC and the materials shall be shifted expeditiously to the required place as per requirement.

#### xv. Security InCharge

The chief of the Security is the Commanding Officer of the security staff. On the instruction of HR Head (HR) the Commanding Officer shall arrange to record the entry of outside personnel at the main gate to avoid any hindrance during the course of rescue / recovery operations. The Chief of Security shall keep close liaison with local police and district authorities to:

- Control the vehicular/ personnel traffic in and around the mine/ surface installations.
- Help local police in controlling the area of the mine/ surface installations, if necessary.
- Assist in Transporting injured persons.
- Control traffic. The security personnel on duty shall ensure that all roads at the scene of fire/ emergencies are kept clear from obstruction. Persons arriving by motor transport at the scene of fire/ Emergency are not permitted to park their vehicles within 100 meters of fire, near fire hydrants, at road junction and access roads. The ignition key should be left in the vehicles.
- Assist local police in patrolling in township and workout adequate arrangements for protection of property.
- Ensure separate entries of different materials received from external agencies for coping up emergencies operations.

#### 7.5.13 Incident / Emergency Scenarios

1. Equipment Fire in Underground : Major underground diesel equipment are provided with auto fire suppression system, other diesel equipment are provided with two portable fire extinguishers
2. Diesel Pump station fire: 50 Kg capacity fire extinguishers are kept ready at site along with sand bucket.
3. Magazine area fire: Water sprinkler system is established surrounding the area. A fire hydrant is provided and fire tender filling point is provided for continuous water supply for tender to operate for long duration.
4. Winding operation failure due to electric fault: Winder can be operated by gravity to reach the nearest level. The effects of emergency scenario details are presented in the below **Table-7.5.**



Table-7.8: Effects of Emergency Scenario

Factors	Emergency Scenario	Locations	Level-1 Incident	Level-2 Emergency	Level-3 Crisis
Internal	Fire	in HEMM	Hydraulic hose leakage, puncture and spill over hot pipe, exhaust	Equipment burn/fumes	Affecting surroundings with smoke, suffocation to the persons
		in diesel pump station/oil storage tank	Small fire within control of the fire extinguisher& sand.	Large fire uncontrolled by fire extinguishers and affecting the large area and smoke	Uncontrolled by fire tender and other means of fire extinguisher affecting large area and nearby locality with fume smoke and chances of explosion
		Of combustible material/sub station	Asphyxia due to minor fire	Major fire affecting persons in return section	Major fire at/near mine intake affecting all persons in u/g
		in magazine	Small fire by dry grass vegetation, miss handling of explosives	External threat by nuisance attack/lightening	Lightening/thunderstorms
	Environment	Ore/waste transportation from mine to mill/tailing dam	Falling of material from moving vehicle on road/farms		
		Mine waste dump slope failure	Small failure within control	Big failure within unit affecting the work persons	Muck spill over the boundary wall and affecting the locality
		Oil spillage	Small leakage	Large leakage	Affecting locality
	Food poisoning	Canteen	First aid case like vomiting ,stomach ache and outdoor treatment	Severity in life threatening of several person and hospitalization	
	Confined space entry	Sump	Fall of person in sump		
		Shaft bottom	Fall of object from upper level	Suffocation due to deficiency of O <sub>2</sub> at shaft bottom	Sudden inrush of water submerging persons working at shaft bottom
	Electrocution	Power cables in shaft	Minor shock due to damaged cable	Live cable coming in contact with cage	Live cable coming in contact with cage during man winding



Factors	Emergency Scenario	Locations	Level-1 Incident	Level-2 Emergency	Level-3 Crisis
		Haulage (trolley wire locomotive)	Shock due to earth leakage current	Falling of live trolley wire	
	Height working	Sheet works, overhead pipe lines, shaft maintenance, long hole blasting at sub levels, raising	Fall of person	Cage stuck between levels	Cage submerging at shaft bottom
	Collapse of major structures	Shaft head gear, crusher/bunkers, chutes, overhead crane structure, Rupture of pipelines in shaft, etc.	Property damage	Persons entrapped in mine	Catastrophic
	Air blast	Underground	Flying rocks hitting persons in its pathway	Air blast affecting several number of people in nearby vicinity	Air blast causing major fall of material in shaft during man winding
	Entrapment or falling of person in running equipment's/conveyors or FOB	Surface & U/G	Person / body part getting trapped in running conveyor	Breakage of loaded conveyors in running condition	
	Equipment run over / collision	Surface as well as underground	Collision of two vehicle and serious injury to person, roll over of person		
External	Bomb threat		No chances- peace full area away from border except in war		
Natural	Floods		Flooding of mine due to sudden inrush of water		
	Lightning strikes		Direct exposure of person to lightning	Surface Magazine explosion	Fire due to explosion involving community in surroundings
	earthquake		No chance- non seismic Zone-II		



Factors	Emergency Scenario	Locations	Level-1 Incident	Level-2 Emergency	Level-3 Crisis
	storms		Flying of sheets may cause injury	Electric pole or big tree falling over passenger vehicles	

Whenever an Emergency/ accident occur, no time is left for any discussion to deal with the situation and a state of confusion arises. To deal with such Crisis/ accidents, it is proposed to form an "**Emergency Management Committee**" (EMC) For Zawar Pb-Zn Mine. In case of Emergency and if felt appropriate by the In-charge (OD), the EMC shall immediately swing into action so that the rescue/ recovery work can be taken up in a most systematic and efficient way without any delay, confusion and panic.

**Table-7.9: Emergency Management Committee**

S. No	Name	Function	Extension
1	Mr. Kishore S	Location Head	3401/3400
2	Mr. Aman Vohra	VTC	3380
3	Mr. JP Gupta	Mill	3508
4	Dr.C S Mishra	Medical Services	3330
5	Mr. Deepak Garkhreja	HR	3440
7	Mr. Vinay Kumar	Security	3340
8	Mr.Lalu Ram Meena	ZMMS	3360

#### 7.5.14 Proposed Action to be taken in Different Cases

##### 7.5.14.1 In Case Of Fire

- Any person notices fire at any place will report to the shift in-charge to gate checker (in case of mine) shift in-charge DG Set (in case of surface), in turn will inform to security gate/ Main gate and to the mine manager (designated)/ incident controller.
- The concerned Mine Manager (Designated)/incident Controller will get the report from the Shift in-charge/ Gate Checker (in case of Mine), Shift in-charge DG Set (in case of surface)/ security gate in-charge and will act accordingly to the situation.
- Incident Controller and security gate personnel will inform to all facilities to the firefighting crew, Hospital, Emergency vehicle may be used for informing the members.
- The crew member/facility team will report immediately and take charge of the situation.
- For case the Name & Addresses of the crew members & facility team may be including Internal Telephone Directory to be displayed at all notice boards/departments.
- A system shall have to be made to ensure that a minimum number of crew members always remain in Zawar Mines for this a register may be maintained at the main gate to mark the absence of the crew members who has left Zawar Mines.
- The leave application of these persons may be granted by a regulatory body i.e. DC or IC.



- In the absence of AGM (Safety & Training) one official of Administration may be designated or alternatively the matter should be intimated to AC (Security), who will take the charge of firefighting.

#### 7.5.14.2 In Case of Flood

- In case of problem in the mine the intimation shall be given to the main gate and IC/DC.
- DG Set in charge shall look into it that power supply shall be ensured till the substation is not flooded.
- All designated Mines Manager shall ensure compliance of Mine Rules & Regulation, e.g. every point in the mine is connected with the ladders.
- One inflatable boat/Raft may be kept at VTC.

#### 7.5.14.3 In Case of Air Blast

Each person shall follow the instruction given in the action plan already in force in the mine.

#### 7.5.14.4 In Case Of Accident

- In case of accident, Hospital should intimate.
- DGMS & Union may be informed depending upon severity of the accident.
- A list may be prepared of the materials to be kept in VTC. One copy of the list shall be given to the DC.
- The VTC in charge may be high ranking official and VTC should be the noble agency for such situation.

#### 7.5.14.5 Subsidence Management Plan

In the pursuit to attain highest standards of safety and economic realization of ore at HZL, world class practices are being incorporated to study the impact of each new stope vis a vis the overlying open stopes and ultimately the cap rock. The methodology includes the following:

- Stability of a stope (under the given geo-mechanic conditions) is determined empirically (POTVIN's Method).
- To assess its impact on the other stope pillars, the stope geometry is then modeled on FLAC 3d. Though, the rock mass contains the geological discontinuities, but on a large scale, it does behave as a continua and hence, analysis on Flac3d gives very good results.

##### 7.5.14.5.1 About FLAC 3D

- FLAC 3d (Fast Lagrangian Analysis of Continua in 3 dimensions) is an explicit finite difference code which simulates the behavior of structures built of soil, rock or other materials which may undergo plastic flow when their yield is reached.
- Materials are represented by zones, or elements, which form a grid that is adjusted by the user to fit the shape of the object to be modeled.
- Each element follows a prescribed linear or non-linear stress/strain law in response to the applied forces and boundary restraints.



- If stresses are high enough to cause the material to yield and flow, the grid actually deforms and moves with the material it represents. This calculation scheme is called “Langrangian” and is well suited to modeling large distortions.
- The program has ten built-in material models: the "null" model, three elasticity models (isotropic, transversely isotropic and orthotropic elasticity), and six plasticity models (Drucker-Prager, Mohr-Coulomb, strain-hardening/softening, ubiquitous-joint, bilinear strain-hardening/softening ubiquitous-joint, and modified Cam-clay).
- Each zone in a FLAC3D grid may have a different material model or property, and a continuous gradient or statistical distribution of any property may be specified. For Zawar Group of rocks (Failure through the development of shear bands) – Mohr-Coulomb Strain Softening model is best suited and is used for the analyses.
- The FLAC3D strain-hardening/softening model is a particular form of the Mohr-Coulomb model in which some or all of the zone yielding parameters, cohesion, friction, dilation and tensile strength, can be modified after the onset of plasticity, according to piecewise linear laws specified beforehand in terms of pre-defined hardening parameters.
- The total plastic shear and tensile strains are measured by incrementing the hardening parameters at each time step. The model properties are then adjusted to conform to the user-defined functions.
- The yield and potential functions, plastic flow rules and stress corrections are identical to those of the Mohr-Coulomb model
- The impact of the geological discontinuities on the stability of the mine is modeled indirectly through variation in the properties.

### Input Parameters for Modelling

To begin with, the rock mass is mapped and classified using the ‘Q’ classification. Based on the values of Q, the input parameters are determined (Depth Dependent Rock Mass Properties)

In situ stress regimes: These are an important part of Geotechnical investigations/analyses. The in situ stress regimes were determined by CIMFR (Formerly CMRI, Dhanbad) using hydraulic fracturing technique.

They are:

$$SH = 4.4 + 0.048 * H \quad \text{MPa} \quad (\text{N-S})$$

$$Sh = 2.2 + 0.024 * H \quad \text{MPa} \quad (\text{E-W})$$

$$Sv = 0.0297 * H \quad \text{MPa} \quad (\text{Depth})$$

Flac3d models (Mohr-Coulomb Strain Softening) are calibrated to the ground condition and the instrumentation trends.

Calibration minimizes the chances of error in predicting the ground response.

Rock mass failure analysis is assessed in three forms:

- The compressive stresses are more than the rock mass compressive strength – Failure under compression.



- The tensile stresses are more than the tensile strength of the rock mass – Failure under Tension.
- The shear stresses are more than the shear strength of the rock mass – Failure under shear.

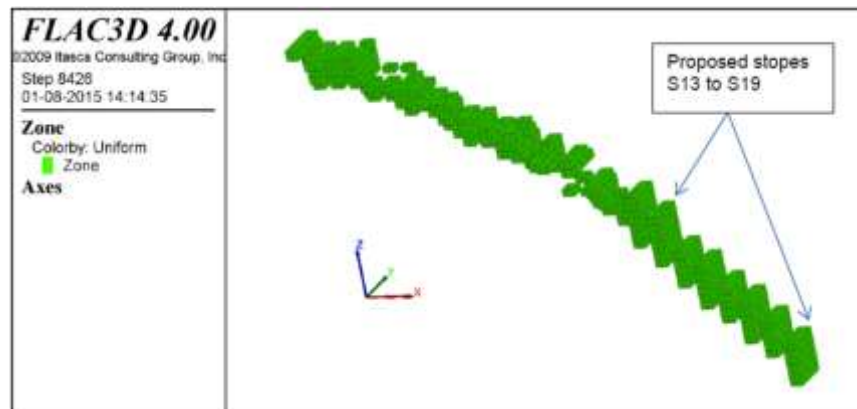


Fig. 7.5: Three-dimensional view of the extracted stopes

### Subsidence monitoring

It is done in two ways:

- Monitoring of surface through regular surveys and,
- Monitoring the health of the pillars in underground.

Monitoring of surface through survey shows no unwarranted change. Similarly, the stress and strain monitoring of underground pillars also shows no changes so as to initiate the failure.

At Zawar Mines, analyzing the rock mass behavior for the present as well as future stoping geometries, the chances of the failure are negligible. The pillars at present do not suffer from any stability problems and as a result, the chances of any instability at the upper horizons leading to cap rock Subsidence are negligible.

#### 7.5.14.5.2 Subsidence: Surveillance & Monitoring

##### Safe Designing

- Extraction of ore is planned by leaving a minimum 30 m of solid cap rock
- Ensuring global stability of the mines by :
  - Characterization of rock mass – RMR & Q-system
  - Determination of geo-technical and physico-mechanical properties of rocks
  - Determination of stope & pillar dimensions :
    - Using Empirical - Mathew's Stability graph method
    - Authentication using Numerical modeling (FLAC - 3D software)

##### Monitoring & Validation

- Quarterly survey for monitoring subsidence.
- Subsidence Monitoring Stations- Mochia- 34, Balaria- 14, Zawarmala- 15, Baroi- 12
- Use of stress-meters and extensometers to monitor the condition of underground pillars

- In-house rock mechanics expertise for designing and monitoring
- Validation by Central Institute of Mining and Fuel Research (CIMFR) & National Institute of Rock Mechanics (NIRM).

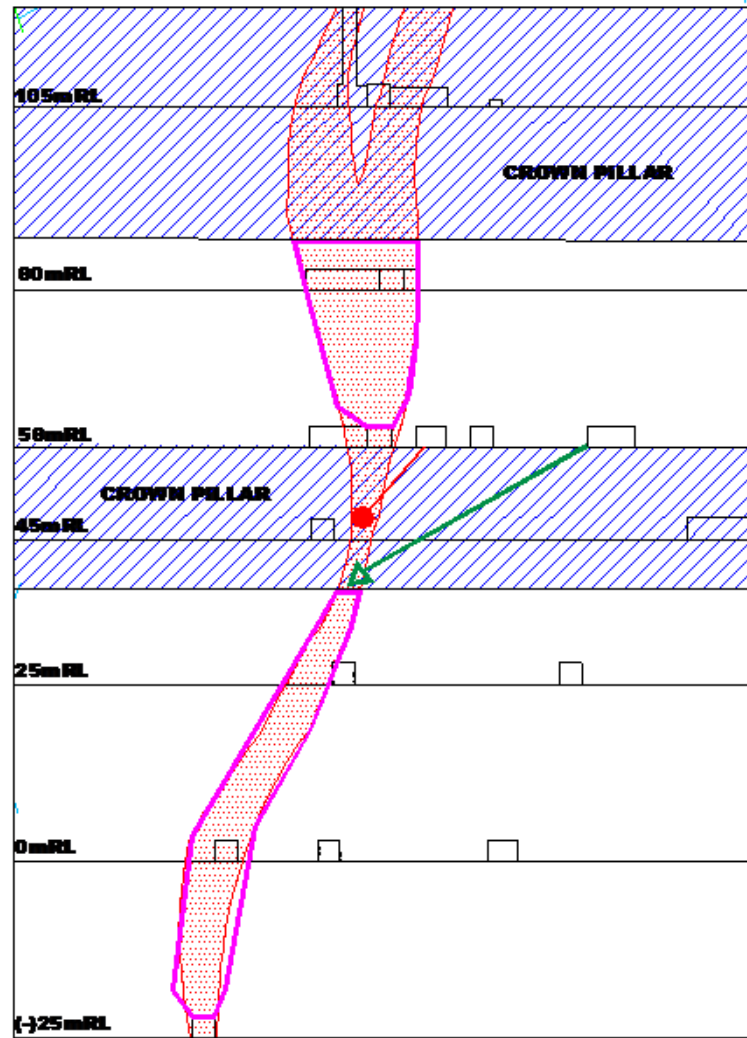


Fig. 7.6: Typical Instrumentation Plan in Stope

#### Subsidence: Remedial Measures

- Fencing-off the area at the surface
- Isolation of stoped out area by stopping walls etc.
- Filling of the stoped out voids with tailings / waste rock.
- To strengthen the crown/rib pillars, cable bolting and rock bolting is done.

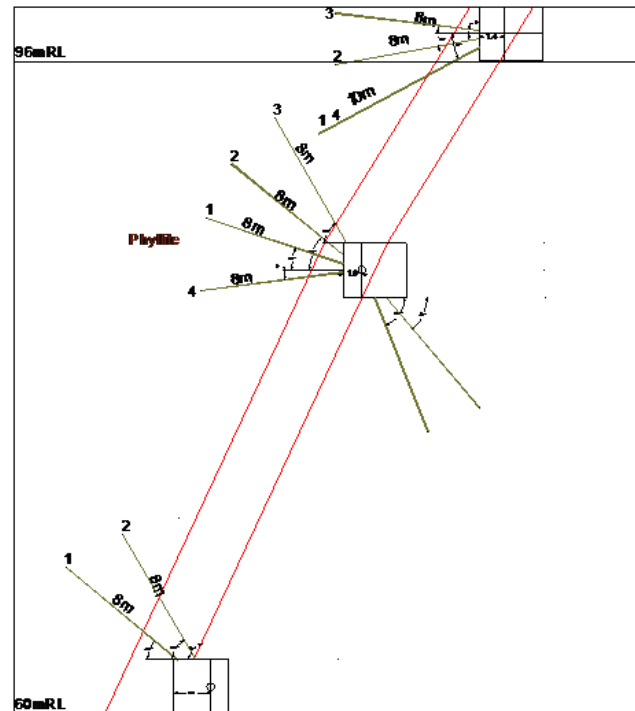


Fig. 7.7: Cable Bolting For Wall Rock Pinning

Surface cap is monitored periodically for subsidence and surface subsidence monitoring pillars are shown in Figure-7.8

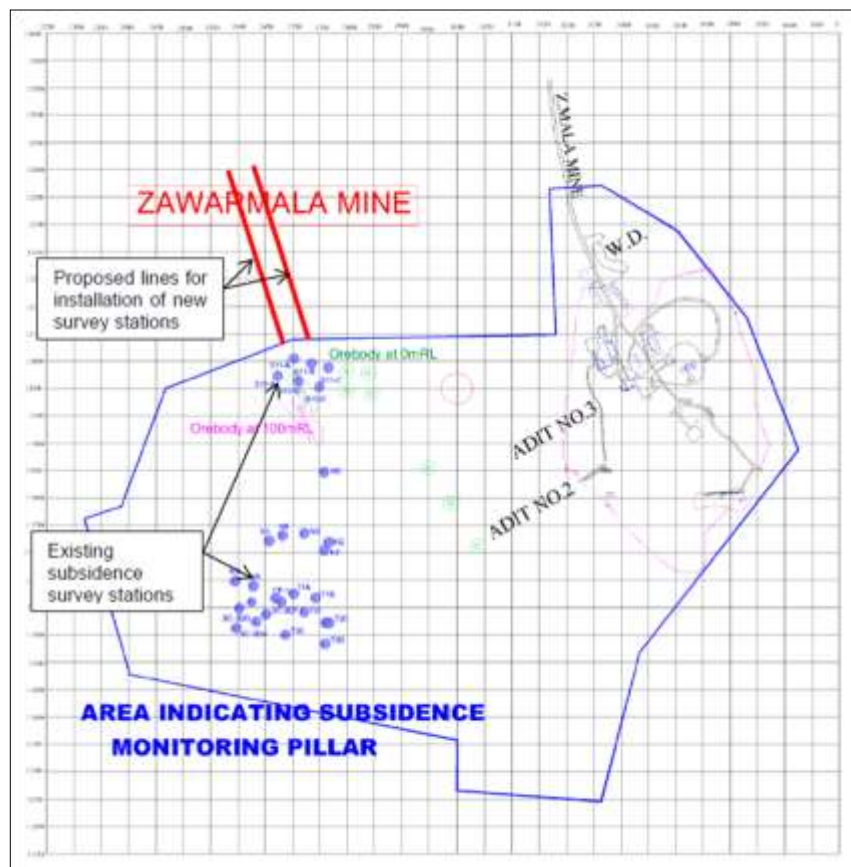


Fig. 7.8: Subsidence survey points over the earlier extracted stopes and proposed stopes of Zawarmala mine

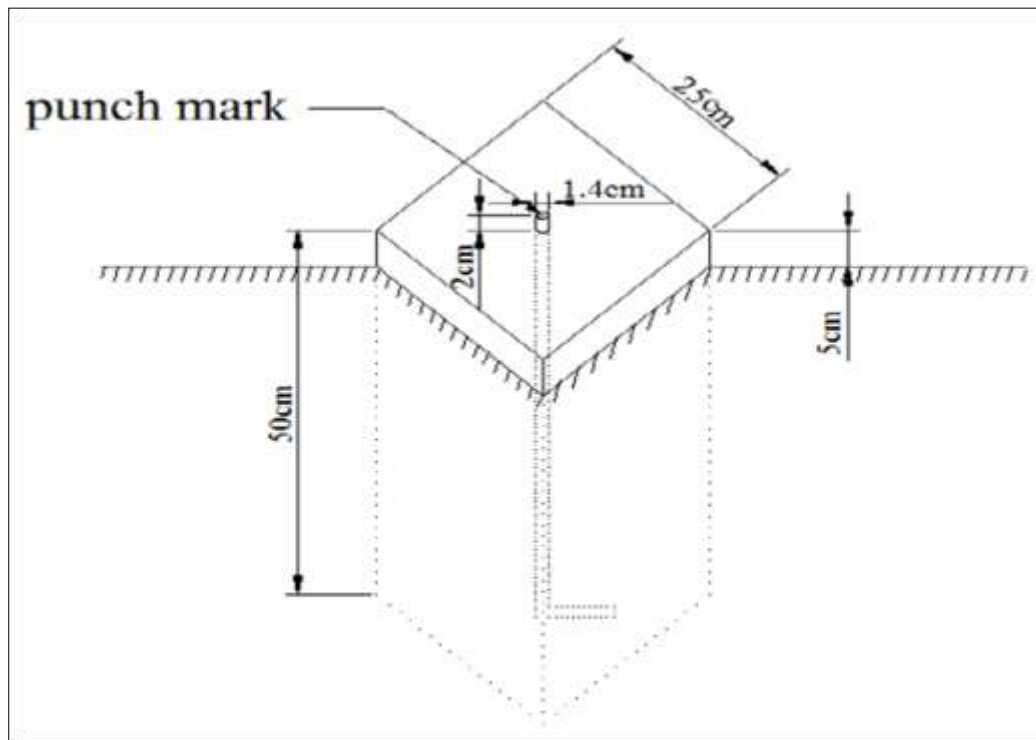


Fig. 7.9: Design of subsidence survey pillar

#### Summary of Subsidence monitoring & prediction report:

- Subsidence prediction incorporated open stoping in all the previously extracted stopes and also the proposed stopes S13 to S19, down to a depth of about 800m from the surface.
- The subsidence predictions revealed negligible subsidence (maximum ~2mm), less than the threshold value of 10~20mm to be considered as minimum noticeable subsidence.
- The anticipated subsidence is so low that the calculated strain and slope values rounds off to zero. Hence it can be said that the proposed stoping will not have any significant surface impact to the existing surface features.
- However, it is recommended to monitor the surface displacements over the proposed stoping region at Zawarmala mine at regular intervals.

#### Conclusion

- Geotechnical studies carried out by CSIR-CIMFR, Dhanbad, M/s Mining One (Australia) and inhouse, have concluded that no subsidence is expected.
- All the mines are scientifically designed, considering Geological & geotechnical parameters.
- The rock mass (RMR =65-75) is very competent and is characterized as having high bulk and shear modulus, suitable for open stoping.
- Host and wall rocks are dolomites and its variants. Average Compressive Strength is 120 MPa.
- In Situ stress regimes are as follows

- $\sigma_1 - \sigma_H = 0.048 \cdot H + 4.4$  MPa, acting N-S, (across Strike)
- $\sigma_2 - \sigma_H = 0.024 \cdot H + 2.2$  MPa, acting E-W, (parallel to Strike).
- Designed sill/ crown pillars are stable with equivalent Factor of Safety of +1.4, according to the Pakalnis method of pillar stability evaluation.

#### 7.5.14.6 Ground Vibration Management – Current Practices

- Ground Control Management Plan (GCMP) implemented. Same is reviewed annually.
- Ground Awareness training given to 100% workforce.
- Stope planning, designing and sequencing is done on the basis of empirical and numerical modelling basis.
- Geotechnical mapping is carried out at all faces of the mine for support design.
- Jumbo are being used for mechanized supporting and Scaler will be used for mechanized scaling.
- Supporting upto 0.5m from face. Resin capsules are being used as a standard practice.
- QA-QC of supporting materials & support testing forms the integral part of GCMP.



Development supported with  
Rock Bolt, Wire Mesh & Cable Bolt



Development supported  
with Rock Bolt

Fig. 7.10: Photographs showing Ground Vibration Control & Management at HZL-Zawar Mines

#### 7.5.15 EMERGENCY COMMUNICATION

- Whoever notices an accident, disaster or emergency situation etc. would inform immediate superior and emergency control center led by the Mines Manager.
- When any accident resulting in serious bodily injury to any person or in loss of life occurs in a mine, the manager shall inspect the site or accident as soon as possible and have an enquiry made into the cause of and circumstances attending the accident.
- The result of such enquiry with plan of the site of the accident showing details shall be recorded in a bound paged book kept for the purpose. The Manager shall perform such other duties as have been prescribed in that behalf under the Mines Act 1952 and under MMR and orders made there under.



- Notice of accident will be communicated as per Section 23 of Mines Act 1952 and in Form IV-A to the District Administration and DGMS authorities as per regulation 9 of MMR 1961. When it becomes essential, the Mines Manager will communicate to the District authority, Police, fire services etc. regarding help required or development of the situation into an off-site emergency.

### Emergency Event Public Relations

The Officer –in-charge of Public Relation Services acts as the Commanding Officer. His main function is to consult with Emergency Controller before communication, if required, with outside agencies.

The Chief Public Relation Officer is to be authorized as official spokesman for the mining unit. He shall arrange for photographs and filming of the whole Crisis (this is of immense value for the purpose of investigation, training and education).

## 7.6 OCCUPATIONAL HEALTH AND SAFETY

The main areas of concern for ensuring adequate occupational health and safety are:-

- All working places to have safe means of access, safe working platform and exit. Persons working in hazardous dust prone area will be provided with dust mask.
- Ensuring use of Personal protective equipments like respirators, ear plug, noise muff, helmet etc. provided to the workers.
- Proper unit design and engineering controls in order to protect workers, including by control of process and fugitive emissions.
- Adequate arrangement of drinking water & medical facilities.
- Education & training to the workforce about facilities, protective equipment, risk associated, potential health effects, etc.
- Display board showing the hazards associated and recommended precautionary measures.

### 7.6.1 MEDICAL SURVEILLANCE

The Unit hospital, Zawar Mines, is presently looking after the Medical health, Family welfare & Occupational Health Services of the employees and their dependants. Unit hospital is also providing services to the contractors, workers and residents of nearby villages.

To further reduce the occupational health impacts, regular training is provided to the workers in a structured way.

Initial medical check-up of the employees, contractors and workers will be conducted prior to the recruitment

Zawar Mines-HZL has a Captive 28 bed hospital providing free medical services to employees. Schedule of Initial & Periodical Medical Examination (IME & PME) being followed at project site are shown as under:

- IME at the time of recruitment and PME every 3 years for age > 45 years and Once in 5 year for age ≤ 45 years
- Detailed Physical checkup in IME & PME of a person includes:
  - Pulmonary function;



- Chest X-Ray;
  - Blood & urine tests;
  - Audiometric test;
  - Spirometry;
  - Blood lead for selected persons; and
  - Other physical check-up.
- Form 27A Fitness Certificate obtained every year from certified surgeon.
  - Form 17 Health Register of each employee obtained every year from certified surgeon.
  - Individual medical records are maintained

Further Periodical Medical Examination (PME) is carried out as per guidelines of DGMS.

The detail of health check up and periodical medical examination schedule is given below in Table 7.7.

**Table 7.10: Medical Examination Schedule**

S. No.	Activities	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year	5 <sup>th</sup> Year
<b>1.</b>	<b>Initial Medical Examination (Mine Workers)</b>					
a.	Physical Check – up (Inclusive of Silicosis Symptoms)		--	--	--	--
b.	Psychological Test		--	--	--	--
c.	Audiometric Test		--	--	--	--
d.	Respiratory Test					
<b>2.</b>	<b>Periodical Medical Examination (Mine Workers)</b>					
a.	Physical Check - up	--				
b.	Audiometric Test	--				
c.	Eye Check - up	--				
d.	Respiratory Test	--				
<b>3.</b>	<b>Medical Camp (Mine Workers &amp; Nearby Villagers)</b>	--				
<b>4.</b>	<b>Training (Mine Workers)</b>					

#### 7.6.2 Occupational Health Impacts & Preventive Measures

OCCUPATIONAL HEALTH RISK ASSESSMENT					
Potential Hazard	Risk	Hazard Rating	Preventive measure	Monitoring	Action to be taken
<b>Physical</b>					
Noise	Noise induced Hearing loss.	Chronic health effect: LOW	<ul style="list-style-type: none"> <li>• Deployment of low noise equipment</li> <li>• Isolation of High Noise areas</li> </ul>	<ul style="list-style-type: none"> <li>• Regular Noise surveys as per guidelines of DGMS.</li> </ul>	If found developing hearing loss, placement to less noisy area





### OCCUPATIONAL HEALTH RISK ASSESSMENT

Potential Hazard	Risk	Hazard Rating	Preventive measure	Monitoring	Action to be taken
			<ul style="list-style-type: none"> <li>• Strict use of appropriate PPEs.</li> </ul>	<ul style="list-style-type: none"> <li>• Conducting Regular Audiogram for the employees as per DGMS guidelines.</li> <li>• Baseline PPME / PME health education and counseling.</li> </ul>	
Hand arm vibration syndrome.	<ul style="list-style-type: none"> <li>• Hand transmitted Vibration / Whole-body Vibration.</li> <li>• Vibration-induced white finger</li> </ul>	Chronic health effect: LOW	<ul style="list-style-type: none"> <li>• All the drill machines are provided with remote operating Panel, so as not to be in contact with vibrating parts</li> <li>• Regular monitoring of machineries for ensuring minimum vibration levels.</li> </ul>	<ul style="list-style-type: none"> <li>• Vibration impact monitoring.</li> <li>• Regular monitoring during PME.</li> </ul>	If person develops Hand Arm Vibration Syndrome, he will be shifted to other functional area.
Musculoskeletal disorders /Ergonomic issues	Backache	Chronic health effect: LOW	<ul style="list-style-type: none"> <li>• Design of Equipment and Hand Tools for prevention</li> <li>• Most of the works are designed ergonomically to avoid job stress and mechanical injuries.</li> <li>• By adopting engineering, medical and personal protection method, the ergonomic</li> </ul>	Ergonomic issues monitoring. Regular monitoring as part of periodic medical examination.	Regular monitoring of seating arrangement for operators.



### OCCUPATIONAL HEALTH RISK ASSESSMENT

Potential Hazard	Risk	Hazard Rating	Preventive measure	Monitoring	Action to be taken
			hazard will be eliminated.		
<b>Radiation</b>					
Heat & Cold	Heat exhaustion / stroke	Low/ Medium	Ensuring adequate ventilation at all work places to ensure safe working environment.	Regular monitoring of mine environment as per DGMS guidelines.	Victim has to be taken to a fresh air base, cooling of the body by cold sponging done till the temperature becomes normal. Extend independent drinking water pipe line. The person should be given a lot of cold water with sugar to drink and to be shifted to hospital immediately on stabilization.
<b>Chemical Hazards</b>					
Dust	Respiratory problems, silicosis	Medium	<ul style="list-style-type: none"> <li>Controlling of dust generation at source by wet drilling and water spraying.</li> <li>Ensuring adequate ventilation to clear dust.</li> <li>Use of PPEs.</li> </ul>	<ul style="list-style-type: none"> <li>Regular X-Ray of chest, pulmonary function test.</li> <li>Base line PPME /PME as per D.G.M.S guidelines.</li> <li>Health education and counseling</li> </ul>	Shift to other functional area to prevent dust exposure.



### OCCUPATIONAL HEALTH RISK ASSESSMENT

Potential Hazard	Risk	Hazard Rating	Preventive measure	Monitoring	Action to be taken
Fumes	Breathlessness/ co-poisoning/ headache and vomiting	Medium	<ul style="list-style-type: none"> <li>• Deployment of low emission equipments.</li> <li>• Adequate ventilation.</li> <li>• Gas monitoring before deploying persons.</li> <li>• Use of Self Rescuers</li> <li>• Regular monitoring of equipment exhausts and mine environment.</li> <li>• Use of PPEs</li> </ul>	Regular monitoring of mine environment as per DGMS guidelines by gas monitors of approved type.	victim has to be taken to a fresh air base, and shifted to hospital immediately.
<b>Biological Hazards</b>					
Contact with domestic and wild animals and insects	Snake/ Insect bite	Low- Medium	Proper housekeeping and clearing of bushes and grass	Regular inspections	First aid and shifting to hospital
Contact with infected workers and other people in the workplace	Transmission of disease	Low	Good house keeping	Maintaining medical records and feedback from co workers	If found any worker is carrying infectious disease, he/she will be put into quarantined and provided treatment.
			Health education and counseling	-	-
Ingestion of Contaminated food and drinks	Danger of developing food poisoning	LOW	Will provide hygienic canteen facility	6 monthly stool examination of canteen worker / employee.	Good housekeeping at canteen
			Vaccinate all canteen employees against typhoid / hepatitis A etc.	Base line PPME /PME	Health education and counseling of canteen



### OCCUPATIONAL HEALTH RISK ASSESSMENT

Potential Hazard	Risk	Hazard Rating	Preventive measure	Monitoring	Action to be taken
					employees and workers
			Regular de-worming	Regular checks on canteen hygiene, water and food quality	-
Poor hygiene and waste disposal practices and facilities	Infections	Low	Waste handling & disposal as per rules.	Regular inspections and segregation and waste bin disposal	Good housekeeping practices.
					Health education and counseling
<b>Ergonomic Hazards</b>					
Job design (i.e. control, content, workload)	Not Applicable				
Job organization (i.e. Shift patterns, sleep deprivation, rotations)	Not Applicable				
Poor working postures and repetitive motion (e.g. within the mine and in offices and warehouses)	Back Ache	Low	Proper training regarding posture /wt. lifting / driving All equipments are ergonomically designed	Regular checking of equipments / offices	Regular check and training
Equipment design (e.g. cab and control design in mobile equipment)	Back Ache	Low	Ergonomically designed operators cabin	Regular checking of equipments	Regular check and training
<b>Psychological Hazards</b>					
Poor risk perception and risk-taking behavior	Exposure to Injury	Low-Medium	Basic & refreshing VTC training and tool box talks.	Regular supervision and counseling	Regular supervision and counseling
Leisure and recreation opportunities	Depression	Low	Creation of recreational facilities	Regular supervision and counseling	Creation of recreational facilities

#### 7.6.3 Personal Protective Equipment



The working personnel will be given the following appropriate personnel protective equipments.

- Industrial Safety Helmet;
- Crash Helmets;
- Face shield with replacement acrylic vision;
- Zero power plain goggles with cut type filters on both ends;
- Zero power goggles with cut type filters on both sides and blue color glasses;
- Welders equipment for eye and face protection;
- Cylindrical type earplug;
- Ear muffs;
- Dust mask;
- Self-contained breathing apparatus;
- Leather apron;
- Safety belt/ line man's safety belt;
- Leather hand gloves;
- Asbestos hand gloves;
- Acid/ Alkali proof rubberized hand gloves;
- Canvas cum leather hand gloves with leather palm;
- Lead hand glove;
- Electrically tested electrical resistance hand gloves; and
- Industrial safety shoes with steel toe.
- Lifebuoys

#### 7.6.4 Facilities, Health Awareness & Treatment Programs at HZL-Zawar Mines

##### Medical Facilities:

- 28 Bed Central Hospital with following facilities:
  - 3 Ambulances with 24-hour availability
  - Digital X-ray machine One 300 mA
  - 2 ECG Machines, 1 Spirometer, 1 Audiometer with audiometry room, 1 Semi-auto-analyzer
  - QBC Centrifugal Hematology System
  - 2 Nebulizing machines for management of Asthma cases
  - Fully equipped Physiotherapy unit
  - OPD block, emergency unit, minor operation theatre & separate sanitation block
  - Mortuary



- 4 medical officers and 25 para-medical staff

Zawar Mines has a fully equipped 28 bed hospital with modern equipment, owned and maintained by HZL. The medical facilities are also available to outside patients on nominal payment basis. In addition, from time to time, HZL also organizes mass mobile medical camps, family planning camps, eye camps, surgical camps etc. in and around the mines area to enable villagers to avail medical facilities. This will be continued in the future also.

**Table 7.11: Hospital staff details**

Doctors	4
Nursing Staff	7
Lab Technician	1
Physiotherapist cum Sanitary Inspector	1
X-ray Technician Audiologist & Occupational Health Record Keeper & ECG Technician	1
Dressor	4
Ministerial Staff	2 (1 M & 1 F)
Store Attendant/MPW	2(1+1)
Ward Ayas	4
Sweepers	4

#### **Disposal of Hospital waste:**

Hospital Bio Medical Waste disposed off as per guidelines of RSPCB at Common Disposal facility at Udaipur

#### **Various Health Awareness and Treatment Programs:**

- Health checkup of school children;
- Pre placement & refresher courses for workers regarding occupational disease awareness, first aid, health & hygiene, safety & training programs and examinations;
- First aid examinations;
- Audiometric test;
- Immunization and family planning facilities;
- Mini and mega medical camps

The Health safety and environment policy of HZL is given in **figure 7.11**.

## **7.7 HEALTH SAFETY & ENVIRONMENT POLICY OF HZL**

The Health safety and environment policy of HZL is given in figure 7.11.



Fig. 7.11: Health safety and environment policy of HZL







## CHAPTER - 8

### PROJECT BENEFITS

#### 8.1 INTRODUCTION

M/s. Hindustan Zinc Limited has been actively contributing to the social and economic development of the communities in which it operates. In doing so, it plays a key role in building a better, sustainable way of life for the weaker sections of society and raises the country's Human Development Index. The company defines its principle of working in a socially responsible, ethical and environmentally friendly manner.

M/s. Hindustan Zinc Limited has Proposed Expansion Zawar Group of Underground Lead-Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total excavation of 7.78 Million TPA including Waste generation 1.28 MTPA and Beneficiation from 4.8 Million TPA to 7.3 Million TPA within ML Area- 3620 ha; (ML No.03/89) at Villages- Zawar, Kodiya Khet, Nayakheda, Rawa, Tidi, Udiyakheda, Barothi Bhaldia, Bara, Chanawada, Dhavadi Talai, Kanpur, Newa Talai, Padla, Parsad, Krishnapura, Singhatwara, Tehsil: Girwa and Sarada, District- Udaipur, Rajasthan, to meet the ore requirement of the Smelter Plant.

HZL believes holistic socioeconomic development of the local community is the need of the hour. It truly believes that a company's prosperity is linked with that of its neighboring communities.

#### 8.2 PROJECT BENEFITS

Project benefits are attributed in various ways as under:

- 1) Environment
- 2) Employment
- 3) Social
- 4) Economic

The company is conscious of its obligations to society at large and will contribute in overall socio-economic development of the area in the coming years by increasing its efforts for overall development of the study area.

Benefits of the project clearly indicate environmental, social, economic, employment potential etc, are summarized below:

##### 8.2.1 ENVIRONMENTAL BENEFITS

- Till date, plantation has been carried out in an area of 170.85 Ha at various places in Zawar mines. Same practice will be continued in the future.
- Total 321.63 ha area of non-forest land will be covered under plantation at the end of life of mine.
- The species planted area Neem, Kaner, Gulmohar, Karanj, Sheesam and Casaea as these are capable of surviving in semi-arid climatic condition. The survival rate is around 70-80%.



## 8.2.2 EMPLOYMENT OPPORTUNITIES

Existing manpower for the project is 3400 persons which will be increased to 4150 after expansion. During operational phase, direct & indirect employment generation potential for proposed expansion will be 750 and 7500 respectively.

While during construction phase, direct & indirect employment generation potential for proposed expansion will be 1,000 and 10,000 respectively. Preference will be given to the locals as per their eligibility. Apart from direct employment, there will be many indirect employment opportunities after commissioning of the proposed mining project. In addition to this, the project is leading/ will lead to numerous indirect employment opportunities as well.

## 8.2.3 ECONOMIC BENEFITS

The project is also contributing/will contribute additional revenue to the State and Central Govt. in the form of royalty and other taxes etc. These benefits are given below:

**Table - 8.1**  
**Economic Benefits of the Project**

S. No.	Description	Revenue Generation/Annum (In Crores)
1.	Royalty@ Rs 80/- Per Ton (Present / prevailing Rate)	52
2.	District Mineral Foundation (@30% of Royalty)	15.6
3.	National Mineral Exploration Trust (@2% of Royalty)	1.04
<b>Total</b>		<b>68.64</b>

Revenue generation per year (@ 6.5 Million TPA) is Rs. 68.64 Cr/Annum

## 8.2.4 SOCIAL BENEFITS

Proposed expansion project will result in growth of the surrounding areas by increased direct and indirect employment opportunities in the region including ancillary development and supporting infrastructure. Besides this, Royalty and other levies like District Mineral Foundation, National Mineral Exploration Trust etc. are/ would be additional benefits and are being/ will be utilized by local administration for the development of socio-economic infrastructure and well-being of the local population.

Hindustan Zinc Limited (HZL) has a dedicated CSR department which is led by qualified and experienced professionals. CSR is a fundamental part of HZL's targeted practices, broad objectives, and overall culture. The company has undertaken/will continue to undertake various community development activities for the social upliftment of community as under:

1. Health and Hygiene;
2. Education;
3. Sustainable Livelihood;
4. Social Mobilization; and
5. Model Village Development.

## 8.2.5 CSR AT ZAWAR MINES

The CSR Projects have been identified based on the baseline study conducted and projects have been designed aligning to Sustainable development goal covering each segment and domain of the society which includes broadly the area of Education, Sustainable livelihoods, Women's empowerment, Health water and Sanitation, sports and culture, Environment and Safety and community development including community assets creation as below:



1. **NANDGHAR:** As part of a MOU between Vedanta and Ministry of Women & Child Development, Government of India, 13 Nandghars are constructed in Zawar. Nandghars re-imagine the Anganwadi space by providing provisions for e-learning, clean drinking water, sanitation and solar power, etc. They provide child friendly learning spaces and after the Anganwadi closes, become entrepreneurship training hubs for local women.
2. **KHUSHI:** A unique Public-Private-People initiative to strengthen effectiveness of the government's ICDS Program for improving health and well-being of children below 6 years of age. KHUSHI has reached 759 children spread over 599 Anganwadis in Girwa and Sarada block. KHUSHI is being implemented in Zawar by Seva Mandir.
3. **ZINC FOOTBALL PROJECT:** Zinc Football program has been set up with an objective to identify Football talent in districts across Rajasthan and enroll them in a Residential Football Academy at Zawar stadium, Udaipur to create future International Level Football prospects. In addition, mass community engagement is being driven in grassroots Football across Rajasthan by adopting 12 schools across 2 districts and starting Community Football Centres to nurture home grown talent. Currently more than 50 children have been engaged through 2 community football centres at Zawar and 40 students have been enrolled at Zinc Football Academy.
4. **SHIKSHA SAMBAL:** Science, English and Mathematics (SEM) are the 3 subjects that students in government schools most frequently fail in. Many schools often lack SEM teachers. Shiksha Sambal being implemented in partnership with Vidya Bhawan has placed SEM teachers in 10



- government schools to improve results of class 7-12 students through extra classes and summer & winter learning camps benefiting more than 1900 students.
5. **MINDSPARK:** To digitalize learning process in schools, Mindspark project has been introduced in 4 schools at ZM for students from class 1-8.
  6. **UNCHI UDAAN:** The program Unchi Udaan provides IIT coaching for meritorious students chosen through a rigorous selection process from schools covered under Shiksha Sambal. 2 girls from Zawar got through NIT Jamshedpur and MBM Jodhpur after completing coaching through this project.
  7. **GIRLS SCHOLARSHIP PROGRAM FOR HIGHER STUDIES:** Total 56 girls sponsored for higher education at Vedanta PG Girls college at Ringus, Sikar. These girls come from tribal areas and have earned scholarship on meritorious basis. They are currently pursuing education in various fields like arts, commerce and science.
  8. **SKILL PROJECT:** Under skilling project, youth are given training in various fields like microfinance, security guard and ITI training. They are also given training and certification for jumbo drill operator. Apart from that the local youth are also counselled on the various career opportunities available to them in different career fields.
  9. **SAMADHAN:** It addresses the backbone of the economy in most of our neighboring communities by trying to encourage sustainable livelihood opportunities through integrated farming systems and livestock development. In a partnership effort with well-known NGO BISLD, a diverse package of practices on agriculture and livestock development. Support under this project includes providing high quality seeds, formation of Farmer Interest Groups, orchard development, providing breeding bucks, artificial insemination of cattle, farmer training programs, etc. are being offered to community members. More than 1400 farmers and cattle rearers benefit from this project at ZM
  10. **Swasthya Seva:** It addresses the primary health issues in 28 neighboring villages by imparting preventive promotive and curative health care to villages through mobile health units in partnership with Deepak Foundation. This project was launched in October 2018 at Zawar and in FY 19-20 17,711 beneficiaries have been reached through mobile health camps.
  11. **SAKHI:** Women's empowerment is important for the overall development of a family or a community. Sakhi being implemented in partnership with Manjari Foundation promotes SHGs as sustainable grassroots women run institutions empowerment. Plans are afoot to expand the membership base of more than 5064 women in 394 SHGs in Zawar and to deepen economic, entrepreneurial and social engagement opportunities for women members. 256 women from Zawar have taken up entrepreneurship through Sakhi project.
  12. **STITCHING CENTRE:** Women's empowerment is important for the overall development of a family or a community. 26 women from Zawar Mines are being given stitching training on electrical machines, and once skilled, are given employment opportunity so that they can independently earn livelihood skills and become financially independent. Stitching centre is currently being run with the partnership of HZL and COS V.

13. **INFRASTRUCTURE PROJECTS:** Various Infrastructure development and strengthening programs like renovation and construction of roads, community toilets, check dams, water tanks, water harvesting structures, retaining walls, construction and renovation of various schools, buildings, etc. are taken up under CSR to support the local communities in enabling access to basic facilities.
14. **HEALTH, WATER AND SANITATION:** Permanent Drinking water storage structures built in Kanpur village benefiting 350 villagers per day. Health checkup camps organized for children from 0-6 years of age regularly. Toilets built as a part of Nandghars to inculcate habit of zero open defecation in children of community. More than 58600 community members quarterly provided medical facility through company hospital.



#### **ZM CSR SUPPORT IN COVID-19 SECOND WAVE**

It was important as a responsible business of HZL to step up and help the community to fight Covid-19. In our efforts to safeguard the community in this fight, we had provided below support in 7 nearby Panchayats:

1. 2000 medicine kits consisting to basic medication as prescribed by doctors to recover from Covid-19.
2. 200 Covid protection kits to ANMs, AASHA Workers and frontline health workers consisting of face-shield, soaps, masks, sanitizers etc, to prevent them from Covid-19.
3. 600 dry ration packets to the extremely needy and economically backward families of the community.



4. Regular rounds of hypo chlorite spray in Panchayat areas.

Glimpses of Covid initiatives undertaken are as follows:



#### **ONLINE EDUCATION PROGRAM THROUGH SHIKSHA SAMBAL:**

HZL's flagship program on education for 9<sup>th</sup> to 12<sup>th</sup> class students offers online education through mentors & field representatives from our partners Vidya Bhawan, Udaipur.

More than 1900 students are enrolled with 10 schools at Zawar and undergoing online education program by solving worksheets, question paper, video lectures etc.



Table 8.2

**CSR ACTIVITIES WITH EXPENDITURE (In Rs. Lakhs)-For Last 5 years**

S. No	Focus Area	Initiatives	Expenditure (In Lacs)					Total
			2016-17	2017-18	2018-19	2019-20	2020-21	
1	Sustainable Livelihood	<ul style="list-style-type: none"> <li>SAMADHAN Project                             <ul style="list-style-type: none"> <li>agriculture</li> <li>animal husbandry</li> </ul> </li> <li>Skill development for youth</li> </ul>	78.4	0	0	0.04	40.82	119.26



S. No	Focus Area	Initiatives	Expenditure (In Lacs)					Total
			2016-17	2017-18	2018-19	2019-20	2020-21	
2	Women Empowerment	<ul style="list-style-type: none"> <li>Sakhi SHG project</li> <li>Stitching centre</li> </ul>	34.6	9.3	3	1.99	68	116.89
3	Health, Water & Sanitation	<ul style="list-style-type: none"> <li>Smile on wheels</li> <li>Drinking water project</li> <li>Ad Hoc camps</li> </ul>	37	8.4	200	183	38	466.4
4	Education	<ul style="list-style-type: none"> <li>Khushi, Nandghar, Shiksha Sambal, Mindspark, Unchi Udaan, Sponsorship for education in Ringus college</li> </ul>	88.6	6.83	70	170	165	500.43
5	Community Assets Creation	<ul style="list-style-type: none"> <li>Roads -widening &amp; maintenance</li> <li>water harvesting structure,</li> <li>school infrastructure development, boundary walls, etc.</li> </ul>	61.1	228	79	56.6	45	469.7
6	Energy & Environment	Solar lights installation in nearby villages	4	0	14	7.85	10	35.85
7	Sports & Culture	Zinc Football project, International women's day celebration with local community etc.	3	1.71	3	0.22	106	113.93
8	Promotional & Administration		12	3.51	7	10.4	12.30	45.21
<b>Total</b>			<b>318.7</b>	<b>257.75</b>	<b>376</b>	<b>430.1</b>	<b>485.12</b>	<b>1867.67</b>

**8.2.6 PROPOSED CSR ACTIVITIES:** The ongoing CSR activities will be continued and Proposed CSR activities with expenditure for next 3 years is given in the table below:





Table 8.3

Proposed CSE Activities With Expenditure (In Rs. Lakhs) - For 3 years

S. No	Physical Targets	Budget & 3 Year Plan of Activity				Detailed description with cost
		I Year	II Year	III Year	Total	
1	Mobile Health Van for primary healthcare provision in 28 villages at Zawar	45.0	40.0	50.0	135.0	<ul style="list-style-type: none"> <li>I year –Provision of basic medicine &amp; referral services to hospitals of Udaipur through mobile health Van</li> <li>II + III year –Improvisation and implementation of health facilities through telemedicine and mobile health van services.</li> </ul>
2	Repair & Renovation of Swami Vivekanand School, Bhaladiya & Nevatalai Panchayat	50.0	0.0	0.0	50.0	<ul style="list-style-type: none"> <li>Complete renovation &amp; construction of 13 standing pillars of school</li> <li>Renovation of toilet blocks</li> <li>Complete water proofing of the building</li> <li>Renovation of 2000 sq. ft. Classrooms of the school</li> </ul>
3	Repair & Renovation of Government Primary School, Talab Fala, Singhatwada	10.73	0	0	10.73	<ul style="list-style-type: none"> <li>Paint &amp; repair of all 5 classrooms</li> <li>Renovation of toilet blocks</li> <li>Water proofing of building @1500 sq. ft.</li> </ul>
4	Repair & Renovation of Government Primary School, Limbadra, Nevatalai	18.50	0.0	0.0	18.50	<ul style="list-style-type: none"> <li>Paint &amp; repair of all 5 classrooms</li> <li>Renovation of toilet blocks</li> <li>Water proofing of building @1500 sq. ft.</li> </ul>
5	Repair & Renovation of Govt. Secondary School, Amarpura	10.02	0.0	0.0	10.02	<ul style="list-style-type: none"> <li>Paint &amp; repair of all 5 classrooms</li> <li>Renovation of toilet blocks</li> <li>Water proofing of building @1500 sq. ft.</li> </ul>
6	Retaining Wall development at Zawar near Zawar Mata Temple	20.0	3.50	0.0	23.50	One retaining wall development to prevent soil erosion of 100 m length
7	CC Road & Retaining wall development near cremation center Tidi	25.0	5.0	0.0	30.0	CC Road of 120 m near Tidi village
8	Prevention of Covid-19 through preventive initiatives & measures	10.0	-	-	10.0	<ul style="list-style-type: none"> <li>2000 medicinal kits</li> <li>200 PPE kits to frontline health workers</li> <li>Vaccination to community &amp; employees</li> <li>600 dry ration kits to needy</li> </ul>



S. No	Physical Targets	Budget & 3 Year Plan of Activity				Detailed description with cost
		I Year	II Year	III Year	Total	
						➤ Hypo-chlorite spray
9	Providing guidance to students of 9 <sup>th</sup> to 12 <sup>th</sup> class through mentoring & field representatives under Shiksha Sambal program	50.0	50.0	50.0	150.0	➤ Provision of 10-12 mentors to 10 schools in nearby villages for improving class results of schools
	<b>Total</b>	<b>239.25</b>	<b>98.50</b>	<b>100.0</b>	<b>437.75</b>	

### 8.3 PROPOSED PLAN FOR SOCIO ECONOMIC DEVELOPMENT

As per the OM F. No. 22-65/2017-IA.III dated 30.09.2020, it is directed that commitments made by the project proponent to address the concerns rose during the public consultation and prescribe specific condition(s) in physical terms while recommending the proposal, for grant of prior environment clearance instead of allocation of funds under Corporate Environment Responsibility (CER). Company has earmarked an amount of Rs 15.05 Crore to implement the issues raised during public hearing.

### 8.4 CONCLUSION

Due to the proposed expansion of underground mining project local economy will receive a boost due to employees spending and services generated by company. Overall effect will improve the buying power of employees and thus a higher standard of living viz. better education, improved health and sanitation facilities, housing and acquisition of consumer durables. Housing, transport, medical, educational and other civic amenities will get improved in the future. This is envisaged as a major positive benefit.





## CHAPTER - 9

### ENVIRONMENTAL COST BENEFIT ANALYSIS

#### 9.1 ENVIRONMENTAL COST BENEFIT ANALYSIS

As per EIA Notification dated 14<sup>th</sup> Sept., 2006, the Chapter on the 'Environmental Cost Benefit Analysis' is applicable, only if the same is recommended at the Scoping stage.

As per the ToR issued by MoEFCC, New Delhi Vide letter no J-11015/259/2012-IA-II (M) dated 08th September, 2021 for the mining project activity, the 'Environmental Cost Benefit Analysis' is not required.





## CHAPTER - 10

### ENVIRONMENTAL MANAGEMENT PLAN

#### 10.1 INTRODUCTION

The environmental management plan (EMP) is required to minimize adverse environmental impacts by implementing suggested mitigation measures with timelines and responsibilities during the project life cycle. An environmental management system (EMS) is a dynamic, continuous process initiated by management and involving communication between the client, its workers, and the local communities directly affected by the project. Drawing on the elements of the established business management process of “plan, implement, check and Act (Management review)” the system entails the thorough assessment of potential environmental, social impacts and risks from the projects. EMS provides order and consistency for mitigating and managing these on an ongoing basis.

#### 10.2 ELEMENTS OF EMP

EMP includes four major elements: -

1. **Planning:** This includes identification of environmental impacts, legal requirement, commitments and policies, setting environmental objectives and environment, health, safety and social compliance requirements;
2. **Implementation:** This comprises of resources available for the project, accountability of employees, contractors and documentation of measures to be taken;
3. **Checking:** Measurement & Evaluation: This includes regular inspection, audits, monitoring corrective actions and record keeping; and
4. **Management Review:** Actions are taken to continually improve the environment, health, safety, and social performance of the organization.

The following Policy & programs have been developed to ensure proper implementation of EMP for the proposed mining project:

- Formulating Corporate Environment Policy (CEP)
- Formation of Environment Management Cell (EMC)
- Greenbelt Development & Plantation programme
- Occupational Health and Safety
- Budgeting of Environmental mitigation measures

#### 10.3 CORPORATE ENVIRONMENT POLICY

Environment Policy has been formulated and adopted by the Board of Directors of Hindustan Zinc Ltd. to provide a framework to become an environmentally sustainable company.

Environment Policy represents company's general position on environmental issues, policies and practices for conducting business. Also conveys the company's commitment towards empowering the environment by adopting various measures.

(Copy of Environment Policy is enclosed as **Annexure 20**).

#### 10.4 FORMATION OF ENVIRONMENTAL MANAGEMENTAL CELL (EMC)

In order to maintain the environmental quality within the standards, regular inspections, audits & monitoring of various environmental components is necessary. M/s. Hindustan Zinc Ltd. (HZL) will have a full-fledged Environmental Management Cell (EMC) for environmental monitoring and control. The EMC team will be responsible for pollution monitoring aspects and implementation of control measures as discussed in Chapter 2 & 4 of this Final EIA/EMP Report.

A group of qualified and efficient engineers with technicians will be deputed for maintenance, up keeping and monitoring the pollution control equipment, to keep them in working mode at the best of their efficiencies. The organizational structure of environment management is presented in Figure-10.1.



**Figure 10.1 Organizational Structure**

The unit has established, implemented and maintained Environment Management System (ISO 140001) for ensuring that its requirements at all locations within the organization are met. The roles and responsibilities of various personnel, who manage, perform and verify the activities having effect on environment and / or OH & S have been fixed by the Top Management.

- Centralized Environment Management Cell headed by an experienced Associate General Manager (Environment).
- Associate General Manager (Environment) directly reports to Location Head and SBU Director regarding all environmental concerns.



- EMC directly report to Director SBU for ensuring implementation & monitoring of the mitigative measures.
- EMC & Location head also report to Corporate Head, who brings these concerns and development in the knowledge of Dy. CEO and CEO & Whole time Director.

#### 10.4.1 RESPONSIBILITY OF EMC

The responsibilities of the EMC include the following:

- Environmental Monitoring
- Procurement and commissioning of Pollution Control and Monitoring Equipment
- Specification and regulation of maintenance schedules for pollution control equipment.
- Ensuring that prescribed standards are maintained.
- Ensuring optimum water usage.
- Implementation of the mitigation measures suggested in EIA/EMP Report.
- Ensuring development of plantation & its maintenance.

#### 10.5 PERSONS RESPONSIBLE FOR IMPLEMENTATION OF EMP

Details of persons responsible for implementation of EMP along with their role/responsibilities are given in table below:

**Table: 10.1**  
**Persons responsible for implementation of EMP**

S. No.	Designation	Role/Responsibilities
1.	Mines Manager (4 nos)	<ul style="list-style-type: none"> <li>➤ Responsible for discharging duties as Mines Manager as per Mines Act 1952, MMR 1961, Mines Rules 1955, MCDDR 2017 and various circulars issued by regulatory authorities from time to time.</li> <li>➤ To Identify and comply with the applicable Statutory &amp; Regulatory requirements besides visioning with statutory/ regulatory amenities.</li> <li>➤ Create awareness on potential environmental aspects &amp; occupational hazards &amp; risk.</li> <li>➤ Ensure judicious use of all natural resources including energy, minerals, water etc.</li> <li>➤ Ensure environment friendly operations with a view to keep the emissions/effluents within the prescribed norms.</li> <li>➤ To plan for new equipment, minor modification etc. for betterment of plant (i.e. Quality improvement, reduction of environmental impact &amp; OHS Risk etc.) in consultation with Operations Head/Mine Agent.</li> <li>➤ To identify, control and reduce the EHS hazards and risks.</li> <li>➤ Training Need Assessment of Employees for effective implementation of the EMP.</li> <li>➤ Incident controller in case of any emergency.</li> <li>➤ To ensure effective &amp; continuous operation of pollution control &amp; Safety equipment.</li> </ul>



S. No.	Designation	Role/Responsibilities
		<ul style="list-style-type: none"> <li>➤ Responsible to ensure quality of stacker feed iron ore and bauxite as per process requirement.</li> <li>➤ Overall environmental performance of the Mines.</li> <li>➤ Liaison with statutory / regulatory bodies.</li> <li>➤ To ensure effective implementation &amp; adherence to QEHS Criterion at their sub-contracted activities.</li> <li>➤ Ensure the EMP is implemented and is effective. Assist the Environment Manager with regulatory authorities and/or community consultation (i.e. complaints).</li> </ul>
2.	Environmental Manager (1 No)	<ul style="list-style-type: none"> <li>➤ Implement EMP as stipulated</li> <li>➤ Ensure that all the applicable environmental parameters are regularly monitored and measured as per defined interval and reports submitted to the concerned regulatory authorities.</li> <li>➤ Ensure that the environmental objectives and targets are established and achieved.</li> <li>➤ Liaise with regulators and other agencies as required in unison with the Mines Manager for effective implementation of the EMP</li> <li>➤ Regular communication with nearby community through CSR Department and establish a feedback system</li> <li>➤ Implement appropriate management programs to achieve the management objectives and goals.</li> <li>➤ Assist operational staff with respect to clarifying or improving existing practices / procedures or adding more stringent requirements / controls)</li> <li>➤ Ensure that any change in any of the activities/ equipment/ processes is duly evaluated in order to ensure No increase in or introduction of new environmental risks or impacts.</li> <li>➤ Undertake HSE Manager Role in case of an emergency with a potential to degrade environment and/or human health and safety.</li> <li>➤ Ensure that the requirements of the EMP and related management programs have been addressed in all contractor environmental management documentation.</li> <li>➤ Undertake regular audits (or appoint an appropriately qualified external auditor) for evaluating the environmental performance of the mine.</li> </ul>
3.	Environmental Engineer (3 Nos)	<ul style="list-style-type: none"> <li>➤ Undertake routine environment monitoring as per schedule.</li> <li>➤ Daily inspection of the premises, preparing inspection reports.</li> <li>➤ Checking of emission/ noise levels of mining equipment for mid-course correction.</li> <li>➤ Ensure that regular water sprinkling is done on the haul roads and around waste dumps for effective control of fugitive emissions</li> <li>➤ Supervising the overall progress of environmental management programs put in</li> </ul>





S. No.	Designation	Role/Responsibilities
		<p>place and ensuring they adhere to all applicable regulations.</p> <ul style="list-style-type: none"> <li>➤ Engaging with recognized agencies for carrying out environment monitoring activities</li> <li>➤ Prepare and submit regular reports to concerned authorities</li> <li>➤ Assist horticulturist in developing greenbelt in mining premises in line with stipulated guidelines.</li> <li>➤ Assist mining engineers in implementing best waste management practices.</li> <li>➤ Coordinate with mining and other concerned engineers for effective implementation of the EMP.</li> </ul>
4.	Water Champion (1 nos)	<ul style="list-style-type: none"> <li>➤ Person designated shall drive water conservation measures at site</li> <li>➤ Ensures that targets are taken for reducing specific water consumption at site and required water saving projects are identified and implemented</li> <li>➤ Water inspections and audits are conducted</li> <li>➤ Ensure sensitising masses on importance of water and its conservation. Ensure that necessary awareness is through training, posters and skit</li> </ul>
5.	Energy and Carbon Champion (1 nos)	<ul style="list-style-type: none"> <li>➤ Person designated shall drive energy conservation measures at site and also design the site for reducing carbon emissions</li> <li>➤ Ensures that targets are taken for reducing specific energy consumption at site and required energy saving projects are identified and implemented</li> <li>➤ Ensures that carbon emissions are calculated as per international guidelines like GRI (Global reporting initiatives) and GHG protocol (Greenhouse gases)</li> <li>➤ Energy audits are conducted, and recommendations are implemented</li> <li>➤ Ensure sensitising masses on importance of energy conservation and climate change impacts through trainings and posters.</li> <li>➤ Ensures implementation of Energy Management Systems: ISO 50001</li> </ul>
6.	Horticulture and Plantation Team (12 nos)	<ul style="list-style-type: none"> <li>➤ Maintenance of plantation and carrying out regular plantation activities and horticulture work</li> <li>➤ Watering and maintenance of saplings</li> <li>➤ Gardening and horticultural activities</li> <li>➤ Assist environment engineer in carrying monitoring equipment at site</li> <li>➤ Water spray on haul roads through tankers</li> <li>➤ Daily inspection of mining machineries</li> <li>➤ Regular maintenance of equipment's as per OEM recommendations</li> <li>➤ Keeping maintenance logs</li> <li>➤ Regular monitoring of fuel consumption of vehicles and coordination with suppliers/ OEM if the fuel consumption exceeds the committed values.</li> <li>➤ Ensure that the mining machineries conform to the applicable environmental</li> </ul>



S. No.	Designation	Role/Responsibilities
		norms ➤ Ensure that the emission/noise levels from the mining machineries do not exceed the permissible levels
7.	STP operators (6 nos)	➤ For operating sewerage treatment plant
8.	Waste management and housekeeping team (20 nos)	➤ Dedicated team for carrying out general housekeeping of the area ➤ Regular disposal of office, municipal waste and other waste. ➤ Regular sweeping of roads where water sprinkling is not done ➤ Mechanized vacuum sweeper

#### 10.6 DETAILED BUDGET FOR EMP

The budget proposed for implementation of the pollution control & impact mitigation measures as suggested for this Lead & Zinc Underground Mining Project is given as under:

- Capital Cost of the Project: Rs. 1250 Crores /-
- Capital Cost for EMP: Rs. 120 Crores /-
- Recurring Cost for EMP: Rs. 400 Lacs/annum

**Table - 10.2**  
**EMP Cost Breakup (Rs. in Crores)**

S. No	Particulars	Capital Cost	Recurring Cost
1.	Dust control/ Sprinklers/ road grader	15.0	0.5
2.	Tailing storage facility management	46.0	1.8
3.	Raise boring for improving UG Environment & overall ventilation	30.0	1.0
4.	Plantation/Green belt development	5.0	0.14
5.	Schedule-I fauna conservation plan	18.5	0
6.	STP Upgradation and its network revamping and upgradation of oil grease trap system	4.0	0.40
7.	Others (RWH, Env monitoring system upgradation)	1.5	0.16
	<b>Grand Total</b>	<b>120.00</b>	<b>4.00</b>





## CHAPTER - 11

### SUMMARY & CONCLUSION

#### 11.1 INTRODUCTION

M/s. Hindustan Zinc Limited has proposed Expansion of Zawar Group of Underground Lead-Zinc Mines (Ore) Production Capacity from 4.8 Million TPA to 6.5 Million TPA with Total excavation of 7.78 Million TPA including Waste Rock 1.28 MTPA and Beneficiation from 4.8 MTPA to 7.3 MTPA (M.L. Area- 3620 ha; ML No.03/89) at Village: Zawar, Tehsil: Girwa & Sarada, District: Udaipur, Rajasthan.

As per EIA Notification dated 14.09.2006 and as amended thereof, the proposed expansion project falls under S. No. '1' (Mining of Minerals), Project or Activity '1(a) (3)', Category "A" and Project or Activity 2 (b) (3) for "Mineral Beneficiation".

#### 11.2 JUSTIFICATION FOR THE PROJECT

The present production capacities of zinc in India are sufficient to meet the domestic requirements. However, the demand for zinc in India is expected to grow at a 7.1% which makes it viable for the expansion of the zinc production capacities. Further, the deficit in international market during the upcoming years provides opportunity for export.

#### 11.3 PROJECT DETAILS

**Table - 11.1**  
**Project Details**

S. No.	Particulars	Details	
A.	Nature of project	Lead-Zinc Underground Mining	
B.	Size of project		
1.	ML area	3620 ha	
2.	Proposed Production Capacity	<ul style="list-style-type: none"> <li>➤ Ore Production Capacity :4.8Million TPA to 6.5 Million TPA</li> <li>➤ Waste Rock: 1.28 Million TPA</li> <li>➤ Total excavation of 7.78 Million TPA</li> <li>➤ Beneficiation from 4.8 MTPA to 7.3 MTPA</li> </ul>	
C	Project Location		
1.	Tehsil	Girwa	Sarada
2.	Village	Zawar	Bhalidia
		Kodiya Khet	Bara
		Nayakheda	Chanawada
		Rawa	DhavadiTalai
		Tidi	Kanpur
		Udiyakheda	NewaTalai
			Padla
			Parsad



S. No.	Particulars	Details		
			Krishnapura	
			Singhatwara	
3.	District	Udaipur		
4.	State	Rajasthan		
5.	Toposheet No.	45 H/11, 45 H/12, 45 H/15 & 45 H/16		
6.	Geographical coordinates	Block 1	Latitude	24°19’0.3” to 24°22’51.59” N
			Longitude	73° 40’23.24” to 73° 45’12.24” E
		Block 3	Latitude	24°14’43.66” to 24°16’30.81” N
			Longitude	73° 41’47.03” to 73° 43’6.58” E
D	Environmental Setting Details (with approx. aerial distance & direction from the mining lease boundary			
	Particulars	Details		
		Name	Distance and Direction (From Block-I)	Distance and Direction (From Block-III)
1.	Nearest State /National Highway	SH-32	~3.5 km in ENE	~16.25 km in NE
		NH- 48	passing though Block-I	passing though Block III
2.	Nearest Railway Station	Zawar Railway station	within block-I	~14 Km in NNE
		Kharwachanda Railway station	~7.5 Km in NE	~ 27 Km in NNE
		Padla Railway station	~7.5 Km in ESE	~12 Km in NE
3.	Airport	Maharana Pratap Airport	~32 Km in NNE direction	~46.5 km in NNE direction
4.	Nearest Town / City	Udaipur city	~20 km in North direction	~38 km in North direction
5.	Ecological Sensitive Areas (Wild Life Sanctuaries, National parks, biosphere reserves) within 10km radius study area	None		
6.	Reserved / Protected Forest within 10 km radius study area	Name	Distance and Direction (From Block-I)	Distance and Direction (From Block-III)
		Zawar singatwara Block B PF	Within the block – I	~12.5 km in NNE
		Zawar singatwara Block C PF	Within the block –I	~10 km in North



S. No.	Particulars	Details		
		Zawar singatwara Block A PF	Adjacent in NNE	~15 km in NNE
		Khajuri Block E PF	Adjacent in NW	~15 km in North
		Khajuri Block C PF	~1.0 Km in WNW	~14.5 km in NNW
		Paduna Block PF	~1.0 km in South	~6.0 km in North
		Paduna Block PF	~1.5 km in SW	~6.0 km in NNW
		Babarmal Block B PF	~1.5 Km in NE	~16.5 km in NNE
		Dingri RF	~1.5 km in ESE	~9.0 km in NE
		Samar Block A PF	~2 km in North	~18 km in North
		Reserved Forest	~2.5 km in SW	~8.0 km in NNE
		Jabla Block A PF	~3.0 km in SW	~6.5 km in NW
		Samar Block B PF	~3 Km in NW	~18 km in NNW
		Babarmal Block B PF	~4.0 Km in NNE	~19 km in NNE
		Polodra RF	~4.0 Km in ENE	~17.25 KM NE
		Khajuri Block B PF	~5 Km in WNW	~19.5 km in NNW
		Khajuri Block A PF	~5.5 Km in WNW	~19.5 km in NW
		Dingri RF	~6.0 km in SE	~8.5 km in NE
		Sera Block PF	~7.0 km in WSW	~13.5 km in NW
		Polodra RF	~7.0 Km in East	~15.75 km in ENE
		Reserve forest	~7.0 Km in NW	~22 km in NNW
		Chanavda Block RF	~7.0 km in SSE	~2.5 km in NE
		Babarmal Block A PF	~7.5 Km in NNE	~24 km in NNE
		Reserve forest	~8.0 Km in NNE	~24 km in NNE
		Khajuri Block D PF	~9.0 Km in WNW	~17.5 km in NW
		Parshad RF	~11.5 km in SSE	~2.0 km in ESE
		Reserve forest	~13 km in SSW	~2.0 km in SW
		Rikhabdev C PF	~18.5 km in S	~8.0 km in SE
7.	Nearest water bodies	Name	Distance and Direction (From Block-I)	Distance and Direction (From Block-III)
		Tiri Nadi	Within the block-I	~14.5 km in NNE
		Chandani Nala	~2.5 Km in NNW	~17.5 km in North
		Tidi Dam	~3.0 km in WSW	~10.0 k in NNW
		Daiya Nadi	~6.5 Km in East	~15 km in NE
		Pareri Nadi	~11 km in South	Passing through Block-III
		Thorghati Talav	~16 km in SSE	7.5 km in ESE
		Nal Nadi	~19 km in SSW	~8.5 Km in SW
8.	Seismic Zone	Zone – II as per IS: 1893 (Part-I): 2002		
E	Cost Details			
1.	Project Cost	Rs. 1250 Crores /-		



S. No.	Particulars	Details
2.	Cost of EMP	Capital Cost: Rs. 120 Crores /- Recurring Cost: Rs. 400 Lacs/annum

Source: Site Visit & Pre- Feasibility Report

#### 11.4 MINING DETAILS

Table - 11.2  
Mining Details

S. No.	Particulars	MOCHIA	BALARIA	ZAWARMALA	BAROI	Zawar Mines (Total)
1.	Mining Method	Sub – level stoping (Longitudinal & Transverse)				
2.	Production Capacity (MTPA)	2.3	1.5	0.7	2	6.5
3.	Total Geological Resources (Million Tonne)	44.09	41.95	8.96	35.7	130.7
4.	Mineable reserves (Million Tonnes)	10.37	12.194	3.01	8.92	34.494
5.	Life of Mine based on Reserves	5.3	8.9	5.9	4.7	6.0
6.	Life of Mine (Based on Total Reserves & Resources)	24.5	28.7	14.4	18.1	22.4
7.	Ultimate working depth	-600 mRL	-400 mRL	-300mRL	-100 mRL	-600mRL
8.	Elevation Range	345-695 mRL	345-695 mRL	345-695 mRL	345-695 mRL	345-695 mRL
9.	Water Table Level	517-510 mRL	517-510 mRL	517-510 mRL	517-510 mRL	517-510 mRL
10.	Number of Working days	365	365	365	365	365
11.	Number of Working Shifts	3	3	3	3	3

Source: Approved Modification of Mining Plan & Progressive Mine Closure Plan

#### 11.5 MITIGATION MEASURES

##### 11.5.1 AIR POLLUTION CONTROL MEASURES

##### I. FROM MINING OPERATIONS

##### Drilling

- Wet drilling is being used to suppress dust generation.
- Similarly, water spraying is carried out to ensure sufficient moisture in the ore transported to the surface. This minimizes any fugitive dust generation and hence impact on ambient air quality from the underground mining activity is not expected to be significant.

##### Blasting

- Most of the dust produced during blasting is settled down underground, and get diluted by ventilating air before being exhausted.
- The dust settled underground will be sufficiently wetted to prevent from getting air borne.
- Water spray on blasted muck pile before loading to control dust generation.



### **Loading & Transportation**

- While loading; overloading will be avoided.
- Closed conveyor system with dust suppression technology will be adopted for transportation of materials.
- The trucks are being covered by tarpaulin due to transportation.
- During transportation & unloading points, spraying of water is done to control dust being air borne.
- Vehicular movement speed will be controlled to avoid dust generation.
- Proper maintenance of vehicles will be done to limit gaseous emissions.
- PPEs like dust masks will be provided to mine workers.

### **Crushing**

- Use of proper protection measures i.e. use of Bag filters, Regular water spraying on Crusher hopper to arrest dust from becoming air-borne.
- In the secondary crushing operations at beneficiation plant, moist ore with 3-4% moisture is fed to control emission of dust.
- The crushers and screens houses are provided with dust extraction system with outlets connected to stacks which are regularly monitored.

### **I. FROM BENEFICIATION PLANT**

- The beneficiation process practiced at Zawar is a wet process and also the equipment used are operated electrically, hence no significant particulate or gaseous emissions are observed.
- About 8% moisture is retained in the final product. Hence, dust emissions are controlled during handling and transportation and there are no significant particulate emissions.
- The surface of the existing tailing storage facility is kept wet due to continuous discharge of tailings mixed with water.
- The old tailing has been stabilized with sufficient soil cover and vegetation with almost 1.55 lakhs plants of various species surviving as on date. The practice of stabilizing abandoned tailing storage facilities with vegetative cover will continue in future.

### **II. MONITORING**

- Ambient Air Quality will be monitored at mine site and maintained as per prescribed norms.
- Fugitive dust emission monitoring will be carried out and maintained as per prescribed norms.
- CAAQMS have been installed at 3 locations as per wind direction with digital display of data in front of the main gate of the mine site.
- Compliance of conditions laid by MoEF&CC and Rajasthan State Pollution Control Board (RSPCB) will be done.

### **11.5.2 NOISE LEVEL & GROUND VIBRATION MANAGEMENT**

- Majority of mining activities are restricted to underground only.
- Installation of ventilation fans is designed in such a manner to control the noise levels and also they are placed at isolated locations in the mine area to avoid noise pollution in the surrounding.
- Ventilation fans are provided with silencers.
- Compressors and DG Sets are installed with acoustic enclosures.





- Concealment of noise generating machinery with artificial, non-permanent arrangement like noise isolative structure and acoustic barriers.
- The prime movers/diesel engines are of proper design and are properly maintained.
- The workers employed are provided with protective equipment, earmuffs and earplugs as a protective measure from the high noise level generated at the mine site and wherever required.
- Provision of sound insulated chambers for the workers deployed on machines producing higher levels of noise.
- Reducing the exposure time of workers to the higher noise levels.
- A thick greenbelt is being developed in phased manner around the periphery of the mine and along the road side to attenuate noise
- Regular monitoring of noise level of mining & milling equipment

### 11.5.3 SURFACE WATER QUALITY MANAGEMENT

- To avoid & control any contamination, the nallah or tributaries falling in the vicinity of tailing storage facility has been sealed.
- The sewage generated shall be treated in sewage treatment plant and reused in Mining Operations/greenbelt development.
- The quality of water before it enters the leasehold and after it leaves is being regularly monitored.
- The mine will operate on zero discharge and is not envisaged to impact the surface water quality.
- The entire maintenance workshop is under covered shed and concrete floor to avoid surface water contamination due to leaks and spills of oil and grease.
- All garage effluent will be treated for oil and sediments before reused in vehicle maintenance, mining operation and dust suppression.
- The vehicle maintenance area is provided with water containment area and oil trap.
- Used lubricant and oil is being disposed off through authorized vendors.
- Regular monitoring of surface water will be done.

### 11.5.4 WASTEWATER MANAGEMENT

- The wastewater generated from domestic operations is channelized to existing Sewage Treatment Plant (450KLD) and reused in plantation after appropriate treatment.
- Oil trap system at vehicle maintenance workshops and vehicle washing facilities
- Further, high-rate clarifier with reverse osmosis plant is proposed which will enhance recycling of process water thereby no additional fresh water will be required for proposed expansion.
- **Dry Tailing Plant (680 TPH)** - Presently, the slurry from beneficiation plant contains about 50-65% water. The excess water is extracted (recirculation for mill operation) from tailings by introducing filtration plants to transform soil fractions into cake containing about 16% moisture.
- Recovered water from the Dry Tailing plant is reused in the mill operations.



#### 11.5.5 TAILING STORAGE FACILITY MANAGEMENT

- The pumped slurry at tailing storage facility is allowed to settle and the decanted water is totally collected in open well at the tailing storage facility from which it is pumped back to beneficiation plant for re-use in the process.
- Tailing storage facility design involves embankment constructed of mine waste which has provision of filtering the decanted water through the filters provided in the embankment.
- Zero discharge is maintained to prevent water pollution from tailing etc.
- 680 TPH Dry Tailing Disposal System has been installed which extract excess water and cut the amount of water stored within tailings, thus reducing possibility of storage facility failure

#### 11.5.6 SUBSIDENCE MANAGEMENT

- Geotechnical mapping is carried out at all faces of the mine for support design.
- QA-QC of supporting materials & support testing forms the integral part of GCMP Stope planning, designing and sequencing is done based on empirical and numerical modelling basis.
- Ground Control Management Plan (GCMP) implemented. Same is reviewed annually.
- Ground Awareness training given to 100% workforce
- Systematic support system in the form of rock bolts, wire mesh is installed in the excavation drives and cross cuts to ensure long term stability of the strata and roof of development viz., drives and cross-cuts, ramp, incline etc.
- If poor ground or any geological discontinuity plane is encountered like faults & shear zones etc, some additional support elements are used in the form of Dowels/steel sets and concreting anything else as per scenario.

##### MONITORING OF SUBSIDENCE

- Regular Subsidence measurement and monitoring of cap rock has been taken up on quarterly basis.
- Subsidence monitoring above stoping area at designated locations
- The surface subsidence at Mochia and Balaria during the proposed mining scheme will also be monitored by constructing surface pillars all along the strike length
- The surfaces subsidence pillars shall be monitored on quarterly basis. The frequency of underground instrumentation will be at least once a week

#### 11.5.7 GREENBELT/ PLANTATION

- Till date, plantation has been carried out in an area of 170.85 Hectares at various places in Zawar mines.
- During plan period 14.15 ha will be covered under greenbelt/plantation.
- At conceptual period, total land for Industrial/Mining area will be 276.52 ha, will be diverted for plantation on forest and non-forest land.
- 183.89 ha of Forest land will be restored.
- Total 321.63 ha area of non-forest land will be covered under plantation at the end of life of mine.
- The trees will be planted @ 11000 saplings per ha of land.



- The species planted area Neem, Kaner, Gulmohar, Karanj, Sheesam and Casaea as these are capable of surviving in semi arid climatic condition. The survival rate is around 70-80%.
- Regular maintenance of plants are carried out by Watering, deweeding and hoeing. Further, present Tailing storage facility which is in active use will be stabilized by vegetative cover, when it will have its full capacity of tailing storage.
- Native species will be planted as per CPCB guidelines.

## 11.6

### PROJECT BENEFITS

The project activity will help in meeting the demand of its existing smelter plant at Debari, Dariba and Chanderiya & hence help in the economic growth of the country. Hindustan Zinc Limited has been actively involved in the implementation of CSR activities. The company has undertaken/will continue to undertake various community development activities for the social upliftment of community as under:

1. Health and Hygiene;
2. Education;
3. Sustainable Livelihood;
4. Social Mobilization;
5. Model Village Development.

## 11.7

### CONCLUSION

The underground Mine project will prove beneficial to the local people as direct and indirect employment opportunity will be generated improving their living. There will be increase in revenue generation to the government by way of royalty, NMET, DMF, TCS and government taxes etc. Further improvement in infrastructure will take place like education, roads, availability of drinking water, medical facilities and growth of allied in adjacent villages.

There will be no significant pollution of air, water, soil and noise. Regular monitoring of all the components of environment will be done. Increased social welfare measures taken by the company will bring development in the near-by villages.





## CHAPTER - 12

### DISCLOSURE OF CONSULTANTS ENGAGED

#### 12.1 DISCLOSURE OF CONSULTANTS ENGAGED

J.M. EnviroNet Pvt. Ltd. (JMEPL), one of the companies of JM Group, was established in the year 1993. 'JM' in the name of the Company is derived from the name of 'Lord Shiva' - the Temple of 'Jharkhand Mahadev' (JM). The Temple is located at Queens Road, Vaishali Nagar, Jaipur.

The Registered Office of JMEPL is at Jaipur Centre, 403, 4<sup>th</sup> Floor, B2 Bye Pass, Tonk Road, Jaipur, 302018 (Rajasthan). Its Delhi-NCR Corporate Office is at 202-A, ABW Tower, MG Road, IFFCO Chowk, Sector-25, Gurugram-122001 (Haryana).

J.M. EnviroNet Pvt. Ltd. is accredited with ISO-9001: 2015 for EIA Division. EIA Division is also approved by National Accreditation Board for Education & Training (NABET) formerly NRBPT (Quality Council of India), Certificate no. NABET/EIA/2326/RA 0308, dated 29.11.2023 which is valid up to 07.08.2026.

JMEPL is offering Environmental Consultancy Services in various sectors viz Industrial Projects / Chemical Industries / Cement Plants / Thermal Power Plants / Mining Projects/ Coal Washery Projects/ Real Estate Projects / Distilleries / Steel Plants/Chemical Fertilizers/Mineral Beneficiation plants etc.

In the Mining sector, JMEPL have covered mines of minerals viz. Limestone, Bauxite, Chromite, Coal, Zinc Ore, Copper ore, Gypsum, Soapstone, Iron & Manganese ore, Clay, Silica Sand, Bajri, Khanda, Gitti, boulders, Feldspar, Quartz, lignite, magnesite and few other minor minerals etc.

JMEPL has a highly qualified team of Subject Experts. As faculty Heads of the EIA Division, we have Retd. General Managers of the Reputed Cement Companies, Ex-Head EIA Division of big Business Group, STP & ETP Designing Experts, Retd. Mining & Geology Experts with vast experience in their respective fields.

JM Group's business is spread over 22 States viz. Andhra Pradesh, Kerala, Gujarat, Maharashtra, Orissa, Tamil Nadu, Goa, Jammu & Kashmir, Himachal Pradesh, Punjab, Haryana, Delhi, Rajasthan, Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Assam, West Bengal, Karnataka, Jharkhand, Bihar & Uttarakhand.

The JM Group has its own Environmental Laboratory at Gurgaon (Haryana) approved under EPA (Environment Protection Act) by the Ministry of Environment & Forests, Govt. of India, and New Delhi and by the National Accreditation Board for Testing and Calibration Laboratories, Govt. of India (NABL).

Besides this, its MoEF and NABL approved Environmental Laboratory of JM Group is also providing Analytical Laboratory Services of various elements and environmental parameters.



Annual monitoring as per MoEF / CPCB / SPCB guidelines, Risk Assessment and Disaster Management Plan, consultancy for Rain Water Harvesting Plan, detailed Hydro-geological Study, preparation of Environmental Statement Reports (Environmental Clearance Compliance Conditions) etc. are amongst the various other consultancy services offered by the Company.



राजस्थान सरकार

Government of Rajasthan

कार्यालय खनि अभियन्ता, खण्ड उदयपुर ।

Office of Mining Engineer

खनिज भवन / Khanij Bhawan, उदयपुर Udaipur-313001

Phone: 0294-2583356 Email ID: meudaipur@dmg-raj.org

क्रमांक: खअ/उदय/सीसी-3/प्र/सराडा/323/08/3856 दिनांक: 26-2-2015

प्रेषित।

मेसर्स हिन्दूस्तान जिंक लि.,  
यशद भवन, स्वरूप सागर,  
उदयपुर (राज.) ।

विषय:- एम.एम.डी.आर. अधिनियम, 1957 की धारा 8 ए में किये गये संशोधन के अनुसार खनन पट्टों की अवधि वृद्धि के सम्बन्ध में।

प्रसंग:- आपके पक्ष में धारित खनन पट्टा वास्ते खनिज जिंक, लेड एवं सिल्वर निकट जावर तहसील सराडा जिला उदयपुर के सम्बन्ध में।

महोदय,

उपरोक्त विषयान्तर्गत आपको सूचित किया जाता है कि हाल में एम.एम.डी.आर. (संशोधन) अध्यादेश, 2015 की धारा 8 ए का समावेश किया गया है, जो कि खनन पट्टों की समयावधि से सम्बन्धित है।

आपके पक्ष में धारित प्रारम्भिक खनन पट्टे की अवधि दिनांक 29-3-2010 तक वैध थी, उक्त अध्यादेश जारी होने की दिनांक को खनन पट्टे का तृतीय नवीनीकरण आवेदनपत्र लम्बित था। एम.एम.डी.आर. (संशोधन) अध्यादेश, 2015 की धारा 8ए(5) के अनुसार उक्त खनन पट्टे की अवधि दिनांक 31-3-2030 तक स्वतः ही बढ़ गई है।

अतः आपके पक्ष में धारित उक्त खनन पट्टे की संविदा स्वतः ही संशोधित हुई मानी जाती है।

भवदीय,




(सतीश चन्द्र आर्य)  
खनि अभियन्ता  
उदयपुर

क्रमांक: खअ/उदय/सीसी-3/प्र/गिरा/4/98/3857-3859 दि: 26-02-15

प्रतिलिपि निम्न को सूचनार्थ हेतु :-

- 1- संयुक्त शासन सचिव, खान विभाग, शासन सचिवालय, जयपुर (राज.)।
- 2- निदेशक, खान एवं भू विज्ञान विभाग, राज0, उदयपुर को निदेशालय के निर्देश क्रमांक: निखामू/प्रधान/का.अ./569-818 दिनांक 10-02-2015 के सन्दर्भ में।
- 3- अधीक्षण खनि अभियन्ता, उदयपुर-वृत्त, उदयपुर।

  
 खनि अभियन्ता  
 उदयपुर





राजस्थान RAJASTHAN

AC 881942

### :- पूरक संविदा :-

यह स्टाम्प क्रमांक: 2030 दिनांक 01-7-2016 रुपये 100/- (अक्षरे रुपये सौ मात्र) वास्ते खनन पट्टा अवधि वृद्धि की पूरक संविदा के क्रम में सर्वश्री हिन्दुस्तान जिंक लिमिटेड, यशद भवन, स्वरूप सागर, उदयपुर (राज.) के पक्ष में स्वीकृत खनन पट्टा के निमित्त है।

चूंकि शासन आदेश क्रमांक प.12(20)खान/मुप-2/1990 दिनांक 20-10-1992 एवं आदेश क्रमांक प.17(12)खान/मुप-1/99 दिनांक 03-8-1999 के द्वारा खनन पट्टा वास्ते खनिज लेड, जिंक व सिल्वर, निकट आग जाकर, ताहसील सराडा, जिला उदयपुर में क्षेत्र 5178 हेक्टेयर का द्वितीय नवीनीकरण अवधि दिनांक 30-3-1990 से 29-3-2010 तक के लिए स्वीकृत किया गया।

अधीक्षण खनि अभियन्ता, उदयपुर वृत्त, उदयपुर के आदेश क्रमांक 155 दिनांक 15-3-2000 के द्वारा क्षेत्र 1558.00 हेक्टेयर (678.88 हेक्टेयर वन क्षेत्र एवं 879.12 हेक्टेयर राजस्व भूमि) का अध्वर्षण स्वीकृत किया गया। वर्तमान में उक्त खनन पट्टा में क्षेत्र 3620 हेक्टेयर (खनिज संख्या 1 कुल क्षेत्र 3172 हेक्टेयर तथा ब्लॉक संख्या 3 में 448 हेक्टेयर) स्वीकृत होकर प्रभावशील है, जिसमें से वन क्षेत्र 1537.91 हेक्टेयर है, जिसके अनाक्षण की स्वीकृति वन एवं पर्यावरण मंत्रालय, भारत सरकार द्वारा आदेश दिनांक 23-1-2015 के द्वारा जारी की गई है।

पट्टाधारी द्वारा नियमानुसार उक्त खनन पट्टा की मूल अवधि समाप्ति से पूर्व तृतीय नवीनीकरण आवेदन-पत्र संख्या 323/2008 दिनांक 25-11-2008 को प्रस्तुत किया गया, जो कि एम.एम.डी.आर संशोधन अध्यादेश-2015 प्रभावी होने की दिनांक को



*(Signature)*  
5/7/2016

(R. PANDWAL)  
COMPANY SECRETARY  
HINDUSTAN ZINC LTD.  
YASHAD BHAWAN, UDAIPUR

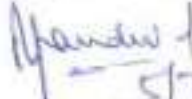
*(Signature)*  
खनि अभियन्ता  
वन एवं भू-विज्ञान विभाग  
उदयपुर वृत्त, उदयपुर

*(Signature)*  
अधीक्षण खनि अभियन्ता  
वन एवं भू-विज्ञान विभाग  
उदयपुर वृत्त, उदयपुर



396

लम्बित था। एम.एम.डी.आर.(संशोधन) अध्यादेश, 2015 जिसमें धारा 8ए का समावेश किया गया है, जो कि खनन पट्टों की समयावधि से सम्बन्धित है। एम.एम.डी.आर. (संशोधन) अध्यादेश 2015 की धारा 8ए(ब) के अनुसार उक्त खनन पट्टे की अवधि दिनांक 31-3-2030 तक स्वतः बढ़ गई है, एवं उक्त खनन पट्टे की सविदा स्वतः ही उक्तानुसार संशोधित हुई मानी गई है। वर्तमान में उक्त खनन पट्टा दिनांक 31-3-2030 तक एम.एम.डी.आर. एम.सी.आर. तथा भारत सरकार/राज्य सरकार द्वारा समय-समय पर जारी विभिन्न परिपत्रों/निर्देशों के अध्यक्षीन प्रभावी रहेगा। खनन पट्टा की उक्त पूरक सविदा का निष्पादन आज दिनांक 06.07.2016 को किया जाता है।

  
5/7/2016  
(Rajendra Pandwal)

(PoA)  
Signature Of The  
Lessee

(R. PANDWAL)  
COMPANY SECRETARY  
HINDUSTAN ZINC LTD.  
YASHAD BHAWAN, UDAIPUR

Signature Attached  
मुख्य अभियन्ता  
खान एवं भू-विज्ञान विभाग  
अजमेर जंक्शन, उदयपुर

**Witness No.1**

Shri Gopal Singh Rathore  
S/o Shri Mohan Singh Rathore  
173/12, Ashok Nahgar, Udaipur

5/7/2016

**Witness No.2**

Shri Jagdish Prasad Jhanwar  
S/o Shri Om Prakash Ji  
C-63, Five Story Building Zawar Mines, Udaipur

Signature  
By order and on behalf of the  
Governor of Rajasthan  
(Designation)  
मुख्य अभियन्ता  
खान एवं भू-विज्ञान विभाग  
अजमेर जंक्शन, उदयपुर

Executed before me  
& Identified by me

ATTESTED

ARJUN UPADHYAYA  
NOTARY, Dist. UDAIPUR

THIS INDENTURE made this \_\_\_\_\_ day of between  
H. H. the Rajpramukh of Rajasthan (hereinafter referred to  
as "the Government", which expression shall where the context  
so admits be deemed to include the successors in office and  
assigns of H. H. the Rajpramukh) of the one Part and the  
Metal Corporation of India Limited, a public limited Company  
registered under the Indian Companies Act, 1913 (as amended  
by Act XXII of 1936) having its registered office at No. 10,  
Clive Row in the town of Calcutta (hereinafter referred to as  
"the Lessee" which expression shall where the context so admits  
be deemed to mean and include its permitted assigns ) of the  
other part WHEREAS This Deed is supplemental to an Indenture  
of lease dated 18th August 1950 and made between the Government  
of the one Part that the Lessee of the other part being  
registered in *Udaipur Registration Office Book No 4,  
Serial No 3 on 30th August 1950* —

(hereinafter referred to as "the principal Deed") AND WHEREAS  
by the said Principal Deed in consideration of the rents  
royalties covenants and agreements by and in the said  
Indenture and the schedule thereunder written reserved and  
contained and on the part of the Lessee to be paid observed  
and performed, the Government granted and demised unto the  
Lessee the several mines beds veins and seams of lead zinc  
and silver ore as situate lying and being in or under certain  
lands referred to in Part I of the schedule thereunder written  
together with the liberties powers and privileges and subject  
to the terms and conditions as therein appearing to hold the  
same unto the Lessee for the term of 20 years commencing from  
1st April 1950 with option on the part of the lessee for renewal  
of the said lease for two other terms of like nature as therein  
mentioned AND WHEREAS in the said principal Deed no specific  
description or boundary of the 7.75 Sqr. miles of land mentioned  
in item 2 of the said part I of the Schedule thereto was given  
and it was provided therein that the lessee would specify the  
said.



said area to the Director of mines and Geology before 1st April 1951 AND WHEREAS the Lessee has accordingly submitted to the Director, of Mines & Geology Government of Rajasthan, a plan in respect of the said 7.75 Sq. miles of land mentioned in Item 2 of Part I of the schedule to the said principal deed as aforesaid AND WHEREAS the Government has accepted the said plan and has at the request of the Lessee agreed to rectify the said principal deed by substituting the description of the area covered by said plan submitted by the Lessee to the Director of Mines & Geology, Government of Rajasthan and being fully described in the schedule here under written in the place of the description given in item 2 of part I of the said Schedule thereto in the manner hereinafter appearing, NOW THIS INDENTURE WITNESSETH as follows :-

1. That in pursuance of the said agreement and in consideration of the premises the Government doth hereby rectify the said principal deed in the manner following that is to say the area and description of the land described in the schedule hereunder written: and delineated on the map or plan hereto annexed and whereon

shall be substituted for the area and description of the land contained in item (2) Part I of the Schedule to the said Principal Deed and the same along with the other lands mentioned in item (1) Part I of the said Schedule to the Principal Deed shall be held by the Lessee for the periods upon the terms and conditions therein contained.

2. That all other liberties powers privileges restrictions covenants conditions and agreements contained in the said Principal Deed shall remain in full force and shall apply to the lands described in the schedule hereto in all respects as if the same were originally included in the said principal deed and that henceforth the said principal deed shall be read in conjunction with these presents and be deemed to be modified accordingly.

THE SCHEDULE ABOVE REFERRED TO:

( Set out description of the area on reference to the Plan submitted to the Government.)

IN WITNESS WHEREOF these presents have been executed by the parties hereto the day and month and year first above written.

1. Signed by  
for and on behalf of  
Government of Rajasthan in  
the presence of :-
2. Signed sealed and delivered  
by  
as constituted attorney and in the  
name of the abovenamed The Metal  
Corporation of India Ltd., under a  
special power of attorney dated  
under the common seal of the said  
Company in his favour in the  
presence of :-

Encl of

THE METAL CORPORATION OF

ZAWAR MINES, UDAIPUR

429

22/1

Receipt No

Date

Replied No

Date

Dealt with by

File No



3 ✓  
4  
No: 11(8)/68-Estt. *4625*

Dated the 9th April, 1969.

The Chief Mining Engineer,  
Zawar Mines.

*urgent*

Subject: Renewal of Mining Lease.

Please refer to your letter No. 56-ME/8321 dated 23rd March, 1969 addressed to the Mining Engineer, Udaipur and copy endorsed to us.

We send herewith a letter No. ME/UD/F1/9197 dated 8th April, 1969 (in original) received from the Mining Engineer, Udaipur for your necessary action please.

*gc*  
*9/4/69*

*B.C. Sen*

(B.C. Sen Gupta)  
Establishment Officer.

*gc*  
*9/4/69*

Encl: 1 original.



OFFICE OF THE MINING ENGINEER, UDAIPUR

No. ME/UD/F1( )/9147

Dated: 8.4.1969.

To,

M/s. Hindustan Zinc Ltd.,  
11/221, Hospital Road,  
Udaipur

Sub: ML for Lead & Zinc near village Jawar  
Tehsil Distt. Udaipur.

Ref: Your application dated 24.3.1969.

On scrutiny of your above noted application the following marked descriptions have been noted:-

1. C.A. is not valid please submit its 4 copies duly attested by any Gazetted Officer.
2. I.T.C.C. is not valid please submit its 4 copies duly attested by the Gazetted Officer.
3. No dues certificate for surface rent in respect of the lessees held by you have not been enclosed, which may be submitted in 4 copies duly attested by any Gazetted Officer.
4. Heading on the plan has not been mentioned, which may please be mentioned now.
5. Power of attorney in favour of the person who has signed the registered application has not been attested herewith, which may please be submitted in 4 copies duly registered and attested by any gazetted Officer.
6. Partnership deed of the firm has not been attached/registered which may please be submitted in 4 copies duly attested/registered by any Gazetted Officer.
7. Registration certificate of the firm has not been attached, which may please be submitted in 4 copies duly attested by any Gazetted Officer.
8. List of Partners/Board of Directors has not been attached which may please be submitted in 4 copies duly attested by any Gazetted Officer.
9. Columns No. of the application have not been filled up properly which may please be filled up.
10. The Khasra numbers of the area applied for have not been ~~mentioned~~ mentioned which may please be submitted now.
11. The name and style mentioned in the I.T.C.C. and application are not identical with the C.A. grant by the Department, hence please submit an affidavit duly attested by Oath Commissioner clarifying and confirming position that the C.A. I.T.C.C. and application is the same and the same.

12. The copies of C.A./I.T.C.C. and other documents submitted by you with the application are not duly attested hence please submit the same duly attested by any Gazetted Officer.
  13. No dues certificate for surface rent, submitted by you are not valid, hence please submit valid 'No dues certificate' in 4 copies duly attested by any Gazetted Officer.
  14. You have prepared the plan & description report by taking fixed reference point as T.I. point No. where as you are requested to please prepare description report by taking permanent point as G.T. Station, Temple or Chatri available near the plot. Please note that the area applied for may not be changed.
  15. The applied areas as per deducting conflicting area comes to hecta/acres which is less than the minimum areas required under rules please attend the office within a period of three days and increase the applied area towards free side.
  16. A non conflicting description report of the applied areas has been prepared by this office. Please attend the Office within a period of three days and ~~submit same~~ and signed the same.
  17. The areas mentioned in the application differs with the calculated areas of description report. Please attend the office within a period threedays and correct the same.
  18. There are corrections in the application form and description report. Please attend the office within a period of 3 days, and sign on the corrections.
  19. Please submit 3 copies of each renewed certificate of Approval/I.T.C.C. duly attested by an Gazetted Officer.
  20. A sum of Rs. .... is outstanding against the leasee please deposit the same so that necessary action to consider the above application be taken.
  21. Please submit 2 more copies of application sets, alongwith 4 description report of the applied area.
- Please complete the above noted discrepancies within a period of three days positively from the date of the receipt of this letter, failing which the application will be disposed off as per Rules.

Sd/-

Mining Engineer, Udaipur.

No. ME/UD/Fi( )/

Dated the

Copy forwarded to the Director of Mines & Geology, Deptt. Rajasthan, Udaipur with reference to this office letter No. ME/UD/Fi/(1) (27)/69/9022 dated 30.4.1969 for information.

Sd/- Yogesh Gupta  
Mining Engineer, Udaipur.



Grant order dated 13. 03.1973 for 1<sup>st</sup> renewal of lease (01.04.1970 to 29.03.1990)

62  
13/3/73  
87

GOVERNMENT OF RAJASTHAN  
MINES DEPARTMENT

No. P. 2(4) Khair/70      Jaipur dated the, 13, March, 1973

ORDER

Whereas M/s Hindustan Zinc Limited of Udaipur has applied for grant of renewal of Mining lease for Lead, Zinc and Silver under Rule 22(2) of Mineral Concession Rules, 1960 and whereas Government is satisfied that the applicant is a suitable party for the grant of the said concession under the relevant rules in force in the State;

And whereas the area for which the concession is desired is already with applicant,

Now, therefore, the Government with the approval of the Government of India is hereby pleased to grant renewal of Mining lease to the applicant on the following terms and conditions, besides those mentioned in Mineral Concession Rules, 1960 and as amended from time to time:-

Mineral.	Lead, Zinc and Silver.
Area.	20 ( Twenty ) Sq. miles near village Zaver in District Udaipur as per description report the area shown in the plan.
Period.	Twenty years from 1.4.1970.
Deadrent.	Rs. 37.50 ( Thirty seven rupees and fifty paise ) only per hectare per year.
Royalty.	1) Lead Ore : Seventy five paise per unit percent of metal per tonne of ore and on prorata basis. 2) Zinc Ore : One rupee per unit percent and nine metal contained per tonne of ore and on prorata basis. 3) Silver : Twenty five rupees per Kg. of metal. 4) Cadmium : 5) Sulphur.
Security.	As per M.M.R. & D. Act, 1957, and amended from time to time.
Surface rent.	Rs. 1,000/- ( Rupees one thousand only).
Other taxes.	Equal to land revenue on the surface actually used for mine purposes.
Other terms and conditions.	As per Government rules.
	As per Mineral Concession Rules, 1960 and M.M.R. & D. Act, 1957 and amended from time to time.

1613  
10373

- Note 1. This order shall stand revoked without notice if the grantee did not execute a proper agreement within six months from the date of this order.
- Note 2. The grantee shall not work in the area unless he has already executed proper agreement save when he is permitted to do so by a specific order of the Government issued in this behalf.

By Order,

*Sd/*  
Asstt. Secretary to Government.

No. F.2(4) Khmiz/70

Jaipur dated the, 13 March, 73

Copy forwarded to the:-

- 1) The Director, Mines and Geology, Rajasthan, Udaipur for information and necessary action and with reference to Directorate No. MG/UD/F. 1(1)27/69/571 dated 24.3.1970.
- 2) The Accountant General, Rajasthan, Jaipur.
- 3) The Mining Engineer, Udaipur.
- 4) The Collector, Udaipur.
- 5) M/s Hindustan Zinc Limited, 6, Fatehpura, Udaipur.
- 6) The Controller, Indian Bureau of Mines, Nagpur.

*Redrawn*  
Asstt. Secretary to Government.

Suresh/  
9.3.1973.

*24.2*





- (A) The lessee shall keep its workings restricted to the area already worked and cleared of forest till the requisite permission from the Central Govt. under the provision of the Forest Conservation Act, 1980 is received for working additional area within the lease held. Meanwhile the lessee will be liable to pay dead rent for the whole of the lease area.
- (B) The lessee shall restore the worked-out area of lease held to the satisfaction of the Director, Mines and Geology and shall grow such trees and plan and in such number over the land to restored as may be desired by DNG.
- (C) The lease will be liable to be determined if the lessee violates conditions (A) and (B) at any time.

नोट : यदि अनुवर्ती दस आदेश की तिथि से 6 माह की अवधि के भीतर सम्पूण सरकारभारा, निम्नलिखित नहीं होगा तो यह आदेश बिना सूचना के ही प्रतिगृह्य कर दिया जायेगा।

आदेश से,

उत्तरा  
। राज्य दीक्षित ।  
शासन एवं सचिव

प्रतिनिधि :

- 11। समूह महा प्रमुख (उत्तरा)  
12। महा प्रमुख (विचार माग) - गुणवत्ता एवं पितर तर्कों के लिए जिन अभियंता के प्रसार में गतगु करने के लिए ।

। एन.सी. धाल ।  
मुख्य सुरक्षा ।  
वि.नि.नि., उदयपुर

खान अभियन्ता  
खान एवं मू-विज्ञान विभाग  
उदयपुर जिला, उदयपुर

(C. SANKARAN)  
Company Secretary  
Hindustan Zinc Limited  
Yashod Bhawan UDAIPUR-313004

मुख्य सुरक्षा  
(विचार)

A.K. Bhunia  
General Manager  
Hindustan Zinc Ltd  
Zaw. Jmgs

Amendment order dated 03.08.1999 for reduction of lease area from 5178 to 3620 Hect and validity renewal from 30.03.2000 to 29.03.2010

15/1-  
-6 AUG 1999

307

राजस्थान सरकार  
जयपुर-1 विभाग

क्रमांक: 174/26/आन/2/90

3 AUG 1999  
जयपुर, दिनांक:

संबोधित जायेगा:-

असल विभाग के जायेगा क्रमांक पं. 12/26/आन/2/90  
दिनांक 00.10.92 के मसखाना-2 पर क्षेत्र " 51.73 वर्ग  
कि.मी." के स्थान पर " 36.20 वर्ग कि.मी." को मस  
संख्या -3 पर क्षेत्र " 10 वर्ग " के स्थान पर " 20 वर्ग"  
प्रतिस्थापित किया जाता है।

महोदय,

विभागाध्यक्ष, जयपुर।

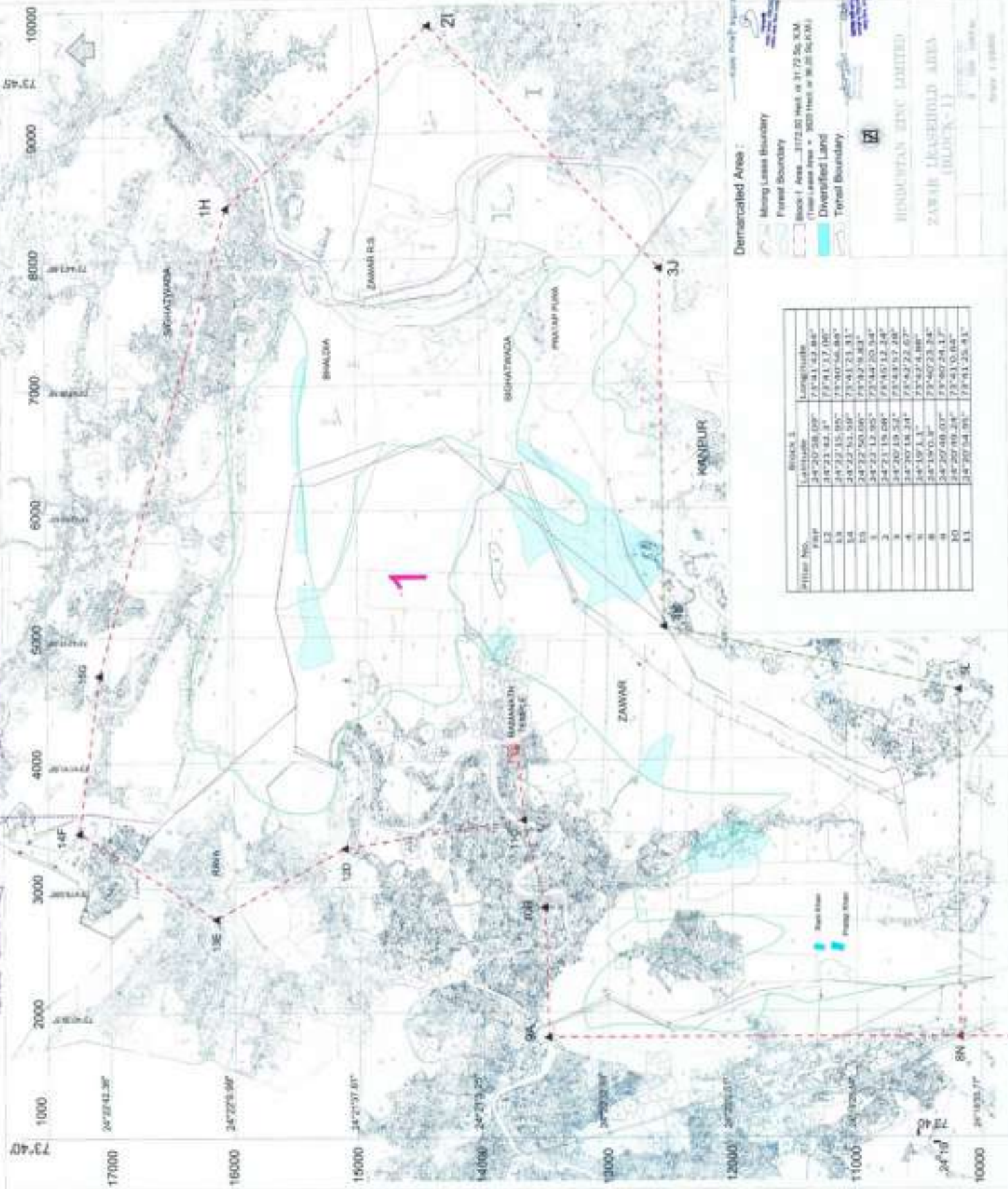
प्रतिनिधि निम्न को सूचना दी जा रही है कि कार्यवाही के लिए प्रेषित है:-

1. निदेशक, जयपुर एवं अधीक्षण विभाग, राज. उद्योगों को उनके क्रमांक 973 दिनांक 1.5.99।
2. महासचिव, राज. उद्योग।
3. जिला मजिस्ट्रेट, जयपुर।
4. अधीक्षण जैन अधिष्ठाता, जयपुर।
5. जैन अधिष्ठाता, जयपुर।
6. संचालक, जयपुर जूटो कार्प. मा. उ. नगपुर।
7. अधीक्षक विद्युत् आपूर्ति विभाग, आ. म. उ. जयपुर।
8. गार्ड फाईल।

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अधीक्षक विभागाध्यक्ष

दिनांक 31.7.99



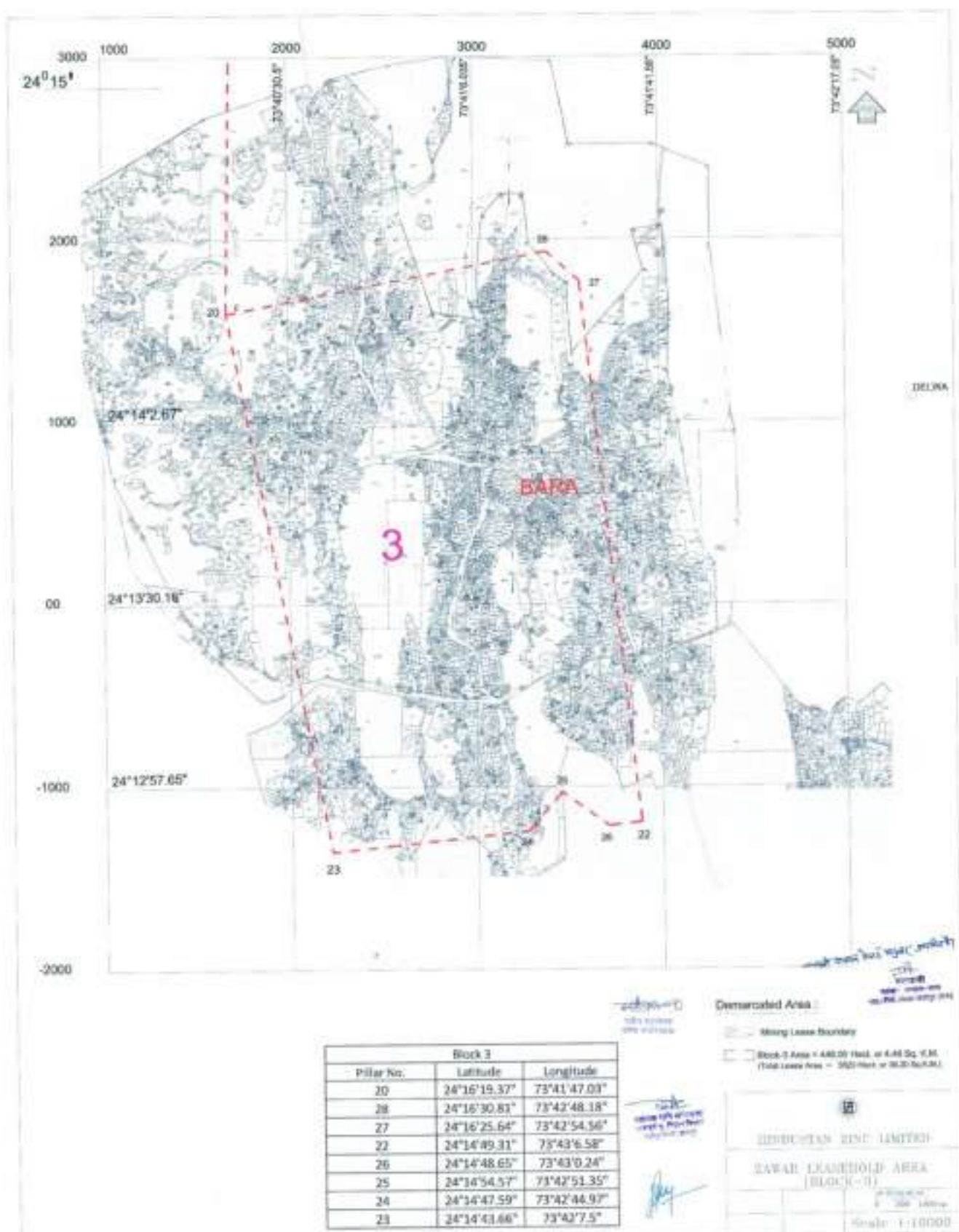


Block No.	Latitude	Longitude
1	24°20'28.00"	73°11'42.84"
2	24°23'42.81"	73°11'42.84"
3	24°23'15.95"	73°10'56.86"
4	24°22'52.58"	73°11'23.51"
5	24°22'50.08"	73°12'06.83"
6	24°22'12.95"	73°12'20.94"
7	24°21'15.08"	73°12'12.24"
8	24°20'15.58"	73°11'42.84"
9	24°20'14.24"	73°12'22.67"
10	24°19'11.31"	73°12'06.83"
11	24°20'40.03"	73°12'22.67"
12	24°20'40.24"	73°11'42.84"
13	24°20'40.95"	73°11'23.51"

Demarcated Area :

- Mining Lease Boundary
- Forest Boundary
- Block-1 Area - 3172.80 Hect. or 31.72 Sq. KM  
(Total Lease Area = 3025 Hect. or 30.25 Sq. KM)
- Diversified Land
- Tonal Boundary

**HINDUSTAN ZINC LIMITED**  
ZAWAR LEASEHOLD AREA  
(BLOCK-1)





भारत सरकार  
खान मंत्रालय  
भारतीय खान ब्यूरो  
क्षेत्रीय खान नियंत्रक का कार्यालय  
माखपुरा औद्योगिक क्षेत्र अजमेर 305002  
ई-मेल: ro.ajmer@ibm.gov.in



Government of India  
Ministry of Mines  
Indian Bureau of Mines  
Office of the Regional Controller of Mines.  
Makhupura Industrial Area, Ajmer- 305002  
Ph-145-2695165 / 2695476 Fax-2695202

सं. 584(4)(3)(1868)/2021-क्षेखानि-अजम

दिनांक : 15/07/2021

प्रेषित : ☒ मैसर्स हिंदुस्तान जिंक लिमिटेड,  
यशद भवन,  
उदयपुर- 313 001, राजस्थान  
E-mail – arun.misra@vedanta.co.in

Sub : Approval of Modified Mining Plan along-with Progressive Mine Closure Plan in respect of **Zawar Group of Mines** Mining lease for **Lead-zinc and Silver** mineral near village Zawar, Tehsil Sarada & Girwa, District **Udaipur**, Rajasthan over an area of **3620 hect.**, **M.L. No. 03/89**, submitted under Rule 17(3) of MCR, 2016 in favour of **M/s. Hindustan Zinc Limited**.

Ref : 1. Your letters, as received in this office on 27.05.2021 and 12.07.2021  
2. This office letter of even no. dated 14.06.2021

Sir,

In exercise of the powers conferred by the clause (b) of sub section (2) of Section 5 of Mines and Minerals (Development & Regulation) Act, 1957 read with Government of India Order number S.O. 445 (E), dated 28.04.87 and Indian Bureau of Mines Gazette Notification S.O. 1872 (E) dated 18<sup>th</sup> May, 2016, I hereby **APPROVE** the above said Modified Mining Plan. This approval is subject to the following conditions:

- (i) This Modified Mining Plan is approved without prejudice to any other laws applicable to the mine area from time to time whether made by the Central Government, State Government or any other authority and without prejudice to any order or direction from any court of competent jurisdiction.
- (ii) The proposals shown on the plates and/or given in the document is based on the lease map/sketch submitted by the applicant/lessee and is applicable from the date of approval.
- (iii) It is clarified that the approval of your aforesaid Modified Mining Plan does not in any way imply the approval of the Government in terms of any other provisions of the Mines and Minerals (Development & Regulation) Act, 1957 or the Minerals (Other Than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 and any other laws including Forest(Conservation) Act, 1980, Environment(Protection) Act, 1986 or the rules made there under, Mines Act, 1952 and Rule & Regulations made there under.
- (iv) Indian Bureau of Mines has not undertaken verification of the mining Lease boundary on the ground and does not undertake any responsibility regarding correctness of the boundaries of the precise area as furnished by the applicant/ lessee.



- (v) Lease boundary pillars shall be maintained at all times in accordance with the rule 12(1)(v) of Minerals (Other Than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016.
- (vi) At any stage, if it is observed that the information furnished, data incorporated in the document are incorrect or misrepresent facts, the approval of the document shall be revoked with immediate effect.
- (vii) The lessee shall ensure grassing/re-grassing in the reclaimed land in the lease area in accordance with the Hon'ble Supreme Court judgement dated 08.01.2020.
- (viii) Exploration shall be carried out as per approved Modified Mining Plan proposals and annual progress report on compliance of exploration proposals shall be submitted to this office before 30<sup>th</sup> June of every year for the preceding financial year.
- (ix) Next Financial Assurance shall be due for submission on 01.04.2025.
- (x) This approval has been given for the proposals given in the documents from 2021-22 to 2024-25.

Encl: One copy of approved Modified Mining Plan.

भवदीय

*बी. एल. कोटड़ीवाला*

(बी. एल. कोटड़ीवाला)  
क्षेत्रीय खान नियंत्रक  
भारतीय खान ब्यूरो

Copy for kind information to:-

1. The Director, Department of Mines & Geology, Govt. of Rajasthan, Shashtri Circle, Udaipur (Raj.) along with a copy of approved Modified mining plan by Registered Parcel.
2. Dr. Shashi Bhushan Shukla, Mining Geologist, Zawar group of Mines, P.O. Zawar Mines, Udaipur- 313 908, Rajasthan. E-mail – [shashi.shukla@vedanta.co.in](mailto:shashi.shukla@vedanta.co.in)

क्षेत्रीय खान नियंत्रक  
भारतीय खान ब्यूरो

**ANNEXURE-III**  
**EARLIER EC AND CERTIFIED COMPLIANCE REPORT**

**No. J-11015/289/2008-IA.II (M)**

Government of India  
 Ministry of Environment & Forests

Paryavaran Bhavan,  
 C.G.O. Complex, Lodi Road,  
 New Delhi-110 003.

Dated the 30<sup>th</sup> October, 2009

To

M/s Hinustan Zinc Limited  
 Zawar Mines,  
 District Udaipur,  
 Rajasthan -319 01  
 E-mail: amit.bhaumik@vedanta.co.in

**Subject: The Zawar Group of Mines and an Integrated Lead and Zinc Mining and Mineral Processing Unit of M/s Hindustan Zinc Limited, located in Village Zawar, Tehsil Sarada, District Udaipur, Rajasthan-environmental clearance regarding.**

Sir,

This has reference to your letter No. HZL/ZM/Env/2008-9/180 dated 23.08.2008 and subsequent letters dated 20.08.2009, 03.09.2009 and 18.09.2009 on the subject mentioned above. The proposal was earlier prescribed terms of reference (TORs) by the Ministry of Environment and Forests on 22.12.2008 for undertaking detailed EIA study for the purpose of obtaining environmental clearance. The proposal is for renewal of mine lease which fall due in March, 2010 and enhancement of production of lead zinc ore from 1.2 million tonnes per annum (million TPA) to 1.5 million TPA. A beneficiation plant, which already exists, will also be expanded in terms of its capacity from 1.2million TPA to 1.5million TPA. The total mine lease area of the project is 3620ha, spread over two blocks; Block-I (3172ha) and Block-III (448ha) with validity of current second renewal of mining lease upto 29.03.2010. Out of 3620ha of mining lease, 155.35ha is an agricultural land, 1537.91ha is forestland, 124.44ha is built up area (township, tailing dam, beneficiation plant, roads etc.), 164.6ha is plantation, 12.82ha is water bodies, 1015.74ha is barren land and 609.14ha is others. Surface rights have been acquired for 414.54ha. It has been envisaged that an additional land of 5.5ha (4ha for raising tailing dam height and 1.5ha for creating infrastructure for Baroi mine) will be required, which is non forest government barren land. Area proposed for excavation (incline) is 0.1ha, an area of 12ha is kept for temporary storage of over burden, 60.39ha for infrastructure (workshop, administrative building, beneficiation plant etc. ), 10ha for roads, 30ha for railways, 116.34ha for tailings pond, 10ha for mineral separation plant, 68.11ha for township area and 3313ha is others. The Tidi River forms major river system in core and peripheral area. It is an ephemeral river and has two catchment zones in the North and West of the area. The Northern catchment commences from the high peaks of Aravali Mountains towards North West and North East of Kaya Village, where these attain elevation of more than 1200m.

..2/-

*[Signature]*  
 12/11/09

*A. G. S. (Govt) S. S. S. / File*

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**ANNEXURE-III**  
**EARLIER EC AND CERTIFIED COMPLIANCE REPORT**

900mAMSL. The stream from these areas almost takes a South course and joins Tidi River at the base of a hill North West of mine area. The Western catchment commences from high hilly peaks around Sera Village where these attain elevation of more than 700m AMSL. The Tidi River near Tidi and Zawar Villages takes a meandering North East course. After flowing almost West-East course, in the North-North West of mining it changes its course towards South East where it is joined by the Daya River. The Daya River emerges from hill area around Keora Khurd Village. After flowing through hilly terrain as a narrow stream upto the Rela Village, the downstream course of river broadens with thin deposits of coarse alluvium. No national park/wildlife sanctuary/biosphere reserve/tiger reserve/elephant reserve etc. are reported to be located in the core and buffer zone of the mine and the area also does not report to form corridor for Schedule-I fauna. In support of this, a letter from the Deputy Conservator of Forests, Udaipur (South) dated 20.04.2009 has been provided. The Zawar Group of Mines is a conglomeration of four deposits namely Mochia, Balaria, Zawarmala and Baroi situated in a complexly folded geological structure. All the deposits have base metal mineralization in the form of tabular bodies formed out of concentration of galena (Pb) and sphalerite (Zn) veins. The mine working will be underground by mechanized method using sub level open stoping. Besides conventional stoping, extraction of remnant pillars at Mochia, Balaria and Zawarmala has been carried out through mass blasting. The targetted production capacity of the mine is 1.5million TPA of lead and zinc ore, which is cumulative of individual production of four operative mines namely Mochia, Balaria, Zawarmala and Baroi in the Block-I of Zawar leasehold. The life of mine is estimated to be 24years. Approximately 500TPD of concentrate will be transported through road. The beneficiation of ore produce from four mines namely Mochia, Balaria, Zawarmala and Baroi is done within the lease hold area at a centralized beneficiation plant. The process involves size reduction through crushing and grinding to -200 mesh sizes in the form of slurry for further chemical treatment to obtain lead and zinc concentrates. The tailings from beneficiation process are fed to three series tailing pumps in single stage pumping to tailing dam situated about 3.5km away from the plant through pipelines. The tailing dam have facility for dumping tailing slurry through pipeline network, collecting the decanted water and also pumping it back to beneficiation plant. In the present status of tailing disposal system, the first tailing dam with 38ha area (old tailing dam) saturated to its capacity in the year 1982 and has been completely stabilized by vegetation cover. The present active tailing dam is occupying an area of 78ha. The height of the tailing dam will be raised upto 60m and capacity will be adequate for the life of the mine. The tailing dam has been designed by the Indian Institute of Technology, Delhi. It is a rock fill dam with impervious layer of soil at bottom and inner surface. The decanted water will be recycled back for process use. The topography of Zawar area is marked by rugged and hilly terrain, dominated by steeply dipping outcrops and small valleys carved by the networks of ephemeral streamlets and streams. The drainage pattern is sub-dendretic to dendretic. The general slope of the area is from West to East and North West to South East. The major part of these hilly areas is under forest

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**ANNEXURE-III**  
**EARLIER EC AND CERTIFIED COMPLIANCE REPORT**

cover. The elevation above mean sea level reported to vary from 350m to 400m. The present working depth of mine is reported as 422m & 413m for Mochia (Central and West), 418m for Balaria, 260m for Zawarmala and 86m for Baroi. The maximum working depth of mine is reported as 487m (Mochia and Balaria). The depth of water table is shallow as observed from open wells in the mine and in Zawar village and ranges from 3m to 5m below the land surface during post-monsoon periods and 7-10m during pre-monsoon. The groundwater table intersected by mining at an average depth of 5m in the Mochia Mine, Balaria mine and the Baroi Mine and at an average depth of 8m in the Zawarmala mine. The hydro-geology provided in the EIA report. The water requirement of the project is estimated as 7,400m<sup>3</sup> per day, which will be met from the captive dam on Tidi River. The power requirement for the project will be 12.50MW, which will be met from their captive power plant. It has been reported that there are 9576 people in the core zone of the mine, however, displacement of population and R&R has not been envisaged. It has been estimated that out of 27.29million tonnes of tailings to be generated during the life of mine, about 15.9million tonnes will be backfilled. In addition, the solid waste generated during the mining operation will be temporarily stacked in the earmarked areas for backfilling. There will be no external OB dump after the fifth year. Plantation will be raised in an area of 180.6ha. The public hearing of the project was held on 03.08.2009 for enhancement of production of mine and beneficiation plant from 1.2million TPA to 1.5million TPA involving lease area of 3620ha. The Indian Bureau of Mines had approved scheme of mining for Zawar Group of Mines on 21.08.2009 for lease area of 3620ha. Forestry clearance for diversion of 114.94ha surface forestland and 1537.91ha for underground mining has been obtained on 16.06.1998, under Section 2 of the Forest (Conservation) Act, 1980 for renewal of Zawar mining lease. The Mining Engineer, Udaipur, Department of Mines and Geology, Government of Rajasthan vide letter No. KHA.AA./UDAI/CC-3/M.L.-3/89/387 dated 22.06.2009 stated that the mine lease for the said mine was granted prior to 16.12.2002 and hence it is not covered by the order of Hon'ble Supreme Court dated 08.04.2005 in Writ Petition (C) No. 412 in IA. No. 883 in IA 828. The Central Ground Water Authority have issued NOC for dewatering of 235m<sup>3</sup> per day of ground water from the Mochia UG mine, 135m<sup>3</sup> per day from Balaria UG mine and 108m<sup>3</sup> per day of ground water from Zawarmala and Baroi UG mines on 07.09.2009. The total cost of the project is Rs.191Crores, out of which Rs.30Crores will be the capital cost for environmental protection.

2. The Ministry of Environment and Forests has further noted that the Hon'ble Supreme Court in its order dated 08.04.2005 in Contempt Petition (C) No. 412/2004 In IA 833 in IA 820 has, pending further directions, restrained mining any area in Aravalli Hills falling in the State of Rajasthan, where permission may have been accorded after 16<sup>th</sup> December, 2002. As the mine lease area falls in the Aravalli Hills and it is an old working mine, the Ministry of Environment and Forests has examined the application in accordance with the EIA Notification, 2006 and hereby accords environmental clearance under the provisions thereof to the above mentioned Zawar Group of Mines and an

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**ANNEXURE-III**  
**EARLIER EC AND CERTIFIED COMPLIANCE REPORT**

Integrated lead and zinc Mining and Mineral Processing Unit of M/s Hindustan Zinc Limited for an annual production capacity of 15,00,000tonnes(1.5million tonnes) of lead and zinc ore by underground mechanized method and enhancement of capacity of beneficiation plant to 1.5million tonnes per annum involving total mining lease area of 3620ha, subject to the aforesaid order of the Hon'ble Supreme Court and implementation of the following conditions and environmental safeguards.

**A. Specific Conditions**

- (i) The project proponent shall obtain Consent to Establish and Consent to Operate from the Rajasthan State Pollution Control Board and effectively implement all the conditions stipulated therein.
- (ii) Environmental clearance is granted subject to final outcome of Hon'ble Supreme Court of India in Contempt Petition (C) 412/2004 in IA No. 833 in Writ Petition (C)No. 202 of 1995, as may be applicable to this project.
- (iii) The environmental clearance is subject to approval of the State Landuse Department, Government of Rajasthan for diversion of agricultural land for non-agricultural use.
- (iv) The project proponent shall utilize additional land of 5.5ha after transfer of the land to them by the competent authority.
- (v) 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.
- (vi) The project proponent shall ensure that no natural watercourse and/or water resources shall be obstructed due to any mining operations.
- (vii) The over burden generated during the mining operation shall be stacked temporarily at the earmarked site(s) only for backfilling. There shall be no external over burden dump after the fifth year. Monitoring and management of rehabilitated areas shall continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment & Forests and its Regional Office located at Lucknow on six monthly basis.
- (viii) Catch drains and siltation ponds of appropriate size shall be constructed around the mineral and temporary over burden dumps to prevent run off of water and flow of sediments directly into the Tidi 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 the monsoon and maintained properly.

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**ANNEXURE-III**  
**EARLIER EC AND CERTIFIED COMPLIANCE REPORT**

Garland drains, settling tanks and check dams of appropriate size, gradient and length shall be constructed around the mineral and temporary over burden dumps to prevent run off of water and flow of sediments directly into the Tidi 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.

- (ix) Regular monitoring of subsidence movement on the surface over working area and impact on water bodies/vegetation/ structures/ surrounding shall be continued till movement ceases completely. In case of observation of any high rate of subsidence movement, appropriate measures shall be taken to avoid loss of life and material. Cracks shall be effectively plugged with ballast and clayey soil/suitable material.
- (x) All the mine entries shall be above the highest flood level to avoid any anticipated flooding of mine from the surface water during the rainy season.
- (xi) In areas where subsidence is anticipated in shallow mineral occurrence, such areas be identified and provided with garland drains to ensure draining of water and avoid ingress of the same in to the underground mine.
- (xii) The project authorities shall check the possibility of existence of fault(s) before deciding about the thickness of safe barrier required to be maintained between the working face and the water bodies, if any, in consultation with the Director General Mines & Safety (DGMS). Depillaring should also be carried out after taking prior approval of the DGMS.
- (xiii) The project proponent shall carry out conditioning of the ore with water to mitigate fugitive dust emission, without affecting flow of ore in the ore processing and handling areas.
- (xiv) The effluent from the ore beneficiation plant shall be treated to conform to the prescribed standards and the tailings slurry shall be transported through a closed pipeline to the tailing dam.
- (xv) The decanted water from the tailing dam shall be re-circulated and there should be zero discharge from the tailing dam. Acid mine water, if any, shall be neutralized and reused within the plant.
- (xvi) Effective safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels

26/-

**ANNEXURE-III**  
**EARLIER EC AND CERTIFIED COMPLIANCE REPORT**

of SPM and RSPM such as haul road, loading and unloading point and all transfer points. It shall be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard.

- (xvii) Plantation shall be raised in an area of 180.6ha including a 7.5m wide green belt in the safety zone around the mining lease, rehabilitated areas, around beneficiation plant, around tailing dam, roads etc. by planting the native species in consultation with the local DFO/Agriculture Department. The density of the trees should be around 1500 plants per ha.
- (xviii) The project authority should implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.
- (xix) Regular monitoring of ground water level and quality shall be carried out in and around the project area (mine lease, beneficiation plant and tailing dam) by establishing a network of existing wells and installing new piezometers during the operation. The periodic monitoring [(at least four times in a year- pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January); once in each season)] shall be carried out in consultation with the State Ground Water Board/Central Ground Water Authority and the data thus collected may be sent regularly to the Ministry of Environment and Forests and its Regional Office Lucknow, the Central Ground Water Authority and the Regional Director, Central Ground Water Board. If at any stage, it is observed that the groundwater table is getting depleted due to the mining activity, necessary corrective measures shall be carried out.
- (xx) Groundwater and surface water in and around the mine shall be regularly monitored at strategic locations for heavy metals such as Ni, Co, Cu, Pb, Zn and Cd. The monitoring stations shall be established in consultation with the Regional Director, Central Ground Water Board and the State Pollution Control Board.
- (xxi) The project proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of water, required for the project.
- (xxii) Suitable rainwater harvesting measures on long term basis shall be planned and implemented in consultation with the Regional Director, Central Ground Water Board.
- (xxiii) Vehicular emissions shall be kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operation and in transportation of mineral. The vehicles carrying the mineral shall be covered with a tarpaulin and shall not be overloaded.

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**ANNEXURE-III**  
**EARLIER EC AND CERTIFIED COMPLIANCE REPORT**

- (xxiv) Mineral handling area shall be provided with adequate number of high efficiency dust extraction system. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated.
- (xxv) Pre-placement medical examination and periodical medical examination of the workers engaged in the project shall be carried out and records maintained. For the purpose, schedule of health examination of the workers should be drawn and followed accordingly.
- (xxvi) Sewage treatment plant shall be installed for the colony. ETP shall also be provided for the workshop and the wastewater generated during mining operation.
- (xxvii) 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.
- (xxviii) Acid mine water, if any, has to be treated and disposed of after conforming to the standard prescribed by the competent authority.
- (xxix) The critical parameters such as SPM, RSPM, NO<sub>x</sub> 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 and Forests, which is available on the website of the Ministry [www.envfor.nic.in](http://www.envfor.nic.in) shall also be referred in this regard for its compliance.
- (xxx) A Final Mine Closure Plan along with details of Corpus Fund should be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.

**B. General conditions**

- (i) No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forests.
- (ii) No change in the calendar plan including excavation, quantum of mineral lead and zinc ore and waste should be made.

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**ANNEXURE-III**  
**EARLIER EC AND CERTIFIED COMPLIANCE REPORT**

- (iii) Conservation measures for protection of flora and fauna in the core & buffer zone should be drawn up in consultation with the local forest and wildlife department.
- (iv) Atleast four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for RSPM, SPM, SO<sub>2</sub> & NO<sub>x</sub> monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board:
- (v) Data on ambient air quality (RSPM, SPM, SO<sub>2</sub> & NO<sub>x</sub>) should be regularly submitted to the Ministry including its Regional office located at Lucknow and the State Pollution Control Board / Central Pollution Control Board once in six months.
- (vi) Fugitive dust emissions from all the sources should be controlled regularly. Water spraying arrangement on haul roads, loading and unloading and at transfer points should be provided and properly maintained.
- (vii) 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.
- (viii) 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 19<sup>th</sup> May, 1993 and 31<sup>st</sup> December, 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.
- (ix) 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.

Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.
- (x) 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.
- (xi) 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 located at Lucknow.

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**ANNEXURE-III**  
**EARLIER EC AND CERTIFIED COMPLIANCE REPORT**

- (xii) The project authorities should inform to the Regional Office located at Lucknow regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.
- (xiii) The Regional Office of this Ministry located at Lucknow 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.
- (xiv) The project proponent shall submit six monthly reports on the status of compliance of the stipulated EC conditions including results of monitored data (both in hard copies as well as by e-mail) to the Ministry of Environment and Forests, its Regional Office Lucknow, the respective Zonal Office of CPCB and the SPCB. The proponent shall upload the status of compliance of the EC conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the Ministry of Environment and Forests, Lucknow, the respective Zonal Officer of CPCB and the SPCB.
- (xv) A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parishad/ Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the Company by the proponent.
- (xvi) The State Pollution Control Board should display a copy of the clearance letter at the Regional office, District Industry Centre and the Collector's office/ Tehsildar's Office for 30 days.
- (xvii) The environmental statement for each financial year ending 31<sup>st</sup> March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of EC conditions and shall also be sent to the Regional Office of the Ministry of Environment and Forests, at Lucknow by e-mail.
- (xviii) 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 and Forests at <http://envfor.nic.in> and a copy of the same should be forwarded to the Regional Office of this Ministry located at Lucknow.

7.10/-

**ANNEXURE-III**  
**EARLIER EC AND CERTIFIED COMPLIANCE REPORT**

3. The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.
4. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of the Environment (Protection) Act, 1986.
5. 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 thereunder and also any other orders passed by the Hon'ble Supreme Court of India/ High Court of Rajasthan and any other Court of Law relating to the subject matter.
6. Any appeal against this environmental clearance shall lie with the National Environment Appellate Authority, if preferred within a period of 30 days as prescribed under Section 11 of the National Environment Appellate Authority Act, 1997.

  
**(SATISH C. GARKOTI)**  
**Additional Director (S)**

**Copy to:**

- (i) The Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.
- (ii) The Department of Mines & Geology, Government of Rajasthan, Secretariat, Jaipur.
- (iii) The Secretary, Department of Environment, Government of Rajasthan, Secretariat, Jaipur.
- (iv) The Chief Conservator of Forests, Central Region, Ministry of Environment and Forests, B-1/72, Sector-A, Aliganj, Lucknow-226020.
- (v) The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD-cum-Office complex, East Arjun Nagar, New Delhi-1100032.
- (vi) The Member Secretary, Central Ground Water Authority, A-2, W3, Curzon Road Barracks, K.G. Marg, New Delhi-110001.
- (vii) The Chairman, Rajasthan State Pollution Control Board, 4, Institutional area, Jhalana, Doongri, Jaipur.

..11/-



**ANNEXURE-III**  
**EARLIER EC AND CERTIFIED COMPLIANCE REPORT**

- (viii) The Controller General, Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur-440 001.
- (ix) The District Collector, Udaipur District, Rajasthan.
- (x) EI Division, Ministry of Environment and Forests, Paryavaran Bhavan, C. G. O. Complex, Lodi Road, New Delhi-110 003.
- (xi) Monitoring File.
- (xii) Guard File.
- (xiii) Record File.

**Speed Post**

No. J-11015/259/2012-IA.II (M)  
 Government of India  
**Ministry of Environment, Forest and Climate Change**  
 Impact Assessment Division  
 \*\*\*\*\*

Indira Paryavaran Bhavan,  
 Aliganj, Jor Bag Road,  
 New Delhi-110 003

Dated: 5<sup>th</sup> January, 2017

To,

**M/s Hindustan Zinc Limited**  
 Zawar Mine  
 P.O. Dariba, Tehsil-Relmagra  
 District- Udaipur  
 Pin- 313901, Rajasthan

Tel. No. 0294-2726600;  
 Fax No. 0294 2726243

**Sub.: Zawar Group of Underground Mines with enhancement of production capacity from 1.5 million TPA to 4.0 million TPA of Lead-Zinc ore and ore beneficiation from 1.5 MTPA to 4.0 MTPA by M/s Hindustan Zinc Limited, located near village Zawar, Tehsil Girwa and Sarada District-Udaipur, Rajasthan (MLA: 3620ha)-Environmental Clearance regarding.**

Sir,

This has reference to above mentioned Environmental Clearance proposal of M/s Hindustan Zinc Limited for Zawar Group of Underground Mines with enhancement of production capacity from 1.5 million TPA to 4.0 million TPA of Lead-Zinc ore and ore beneficiation from 1.5 MTPA to 4.0 MTPA. The total mining lease area is 3620 hectares spread over two blocks; Block 1 (3172 hectares) and Block 3 (448 hectares). Zawar Group of mines are located near village Zawar, Tehsil Girwa and Sarada, District-Udaipur, Rajasthan. The area lies in Block 1 at Longitude E 73°40'22" to E 73°45'08" Latitude N 24°18'50" to N 24°22'47" and Block 3 at Longitude E 73°40'26" to E 73°41'46" Latitude N 24°12'37" to N 24°14'21" on the Survey of India topo sheet no. 45 H/11, 45 H/12, 45 H/15 and 45H/16.

2. The proposal of TOR was considered by the Expert Appraisal Committee (Mining) in its meeting held on December 19-21, 2012 to determine the Terms of Reference (TOR) for undertaking detailed EIA study. The TOR was issued by the Ministry vide letter no. J-11015/259/2012-IA.II (M), dated 1<sup>st</sup> April, 2013. Further, the Ministry, vide letter of even no. dated 18.02.2016, has amended the TOR and extended the validity of TOR upto 31.03.2017. The Proponent submitted the EIA/ EMP Report online to the Ministry for seeking Environmental Clearance after conducting Public Hearing. The proposal of EC was appraised in the EAC meeting held during November 23-25, 2016 wherein the Committee recommended the proposal for Environmental Clearance for Enhancement of production capacity from 1.5 million TPA to 4.0 million TPA of Lead-Zinc ore and ore beneficiation from 1.5 MTPA to 4.0 MTPA.

EC to M/s Hindustan Zinc Limited (MLA: 3620ha)

Page 1 of 12

3. The total mine lease area of the project is 3620 ha, out of which 155.35 ha is agricultural land, 59.84 ha is grazing land, 1537.91 ha is forest land, 99.75 ha is settlement, 169.65 ha is plantation area, 90.97 ha is water bodies, 1160.80 ha is barren land and 345.73ha is others. The mine lease number is ML-3/89 and valid till 31.03.2030. It has been proposed that after expansion an area of 8.66ha is kept for beneficiation plant, 2.0 ha for ore stock yard, 223.52ha for tailing dam, 96.14ha for utilities, 209.65ha for plantation, 47.06ha is remaining area. Ministry of Environment, Forest and Climate Change vide letter no. 8-1/1997-FC dated 23.01.2015 has diverted forest land (114.94 ha for surface rights and 1422.97ha for underground mining i.e. total forest land 1537.91 ha) under section 2 of Forest (Conservation) Act, 1980. The Tidi River forms major river system in core and peripheral area. It is an ephemeral river and has two catchment zones in the North and West of the area.

4. The Scheme of Mining with Progressive Mine Closure Plan was approved by IBM vide Letter No. 682(23)(M.P.671)/2009/MDRD(N)-UDAI dated 31.07.2015. The modified mining plan including Progressive Mine Closure Plan was approved by IBM vide letter no. 682(23)(M.P.671)/2009/MDRD(N)-UDAI dated 24.11.2016. The mine working will be underground mechanized method using sub level open stoping and its variants. The targeting production capacity of the mine is 4.0 Million TPA of Lead - Zinc ore and the life of the mine is over 15 years. The current mining method is most suitable considering the operating conditions prevalent in this mines. The various mining systems planned to be upgraded are in areas of exploration, mechanised mine development, mechanised mining operations, ventilation systems, training through simulator and safety initiatives around men and machinery, focussed emergency response system and rescue. It is proposed to have extensive exploration for enhancing reserve availability by accelerated surface and under exploration, develop decline and infrastructure for enhancing mechanization and deployment of large size equipment fleet like 50T LPDTs, 17T LHDs, Double boom drill jumbos etc. The Geo tech study in progress will help in assessing the correct method at lower level and overall stability of the mines. Improved Communication system underground will be established to enhance safety and productivity. Subsidence monitoring, underground monitoring systems, blast design and blast vibration monitoring are in place to track and ensure safe operations.

5. The Project Proponent reported that the power requirement for the proposed expansion project is estimated 22.5 MW and total of 35 MW which will be met from Captive generation and Vidyut Nigam Limited. Emergency Power requirements will be met through the ~8MW DG set capacities. The water requirement for the proposed expansion project is estimated 8000 m<sup>3</sup> per day, and total of 14000 m<sup>3</sup> per day which will be met from captive Tidi Dam. The Central Ground Water Authority has renewed the NOC for dewatering of ground water from underground mine vide letters No. 21-4(268)/CGWA/WR/2008/2183 dated 09.12.2013 for Zawarmala mine (108 m<sup>3</sup> per day); No. 21-4(267)/CGWA/WR/2008/2185 dated 09.12.2013 for mochia mine (235 m<sup>3</sup> per day); No. 21-4(345)/CGWA/WR/2008/2182 dated 09.12.2013 for Baroi mine (108 m<sup>3</sup> per day); and No. 21-4(266)/CGWA/WR/2008/2184 dated 09.12.2013 for Balaria mine (135 m<sup>3</sup> per day). The renewal is valid for 3 year i.e. 08.12.2016.

6. The Project Proponent reported the approximately 3.1 lakhs TPA of concentrate will be transported through the road in covered trucks/dumpers. The

separation of minerals (Galena and Sphalerite) carried out by physico-chemical process i.e. differential froth floatation. Tailing after dewatering will be disposed in the tailing dam. On implementation of backfill system, part of the tailing shall be backfilled into exhausted stocks. Proponent also explained the various alternatives like dry tailing disposal being explored. The Beneficiation plant for Lead - Zinc ore will be expanded from 1.5 Million TPA to 4.00 Million TPA. The concentrate will be transported through road and the proposed additional traffic is likely to be increased on the existing road network from Zawar Group of mines to Tidi road and then to Udaipur which is connecting the RJ NH-8 from the mine and based on the study conducted the same is found to be adequate. The concentrate will be transported through covered trucks/dumpers to HZL Smelters. The Project Proponent presented the Ventilation Plan in line with DGMS guidelines, provision of Personal Protective equipment's and necessary training and awareness programs for mine workers that will be undertaken. Occupational Health measures were also explained. The Project Proponent reported that the workers were provided Self Rescuer in addition to basic PPEs like gum boot, helmet with cap lamp, dust mask, goggles, ear plug etc. Proponent explained the mine environment and the vehicle emission data's. The Committee suggested monitoring PM<sub>2.5</sub> in the vehicle emission to improve the mine environment.

7. The Ministry has earlier accorded the Environmental Clearance, vide letter no. J-11015/289/2008-IA.II (M), dated 30<sup>th</sup> October, 2009. The Regional Office of the MoEFCC, Lucknow vide letter dated 27.06.2016 has submitted the certified compliance report. The Committee deliberated the compliance of earlier EC conditions and noted that the compliances are adequate.

8. Project Proponent reported that no eco-sensitive zones like National Park/Wildlife Sanctuary/Biosphere Reserve/Tiger Reserve/Elephant Reserve/Reserve Forest etc. are reported in the study area i.e. 10 Km radius of mine lease. DFO Udaipur vide letter date 20.04.2009 reported that there is no National Park/ Wildlife Sanctuary/Biosphere Reserve/Tiger Reserve/Elephant Reserve are reported in the 10 Km radius of mine lease area. The details of mine site have been seen by the EAC using KML/SHP files on Decision Support System and noted that the Jaisamand Wildlife Sanctuary is 8.74 Km from the mine lease area. However, the Proponent clarified that the Jaisamand Wildlife Sanctuary is beyond 10 Km of the mine lease and produced the relevant map approved by State Government in this regard. The Committee deliberated on the issue and is of the view that Project Proponent needs to verify once from the Wildlife Authority. In this context, Deputy Conservator of Forests, Wildlife, Udaipur vide letter dated 29.11.2016 has verified and certified that the Jaisamand Wildlife Sanctuary and other protected areas are not falling in 10 Km of aerial distance of mine lease area.

9. The State Government of Rajasthan, vide letter dated 22.06.2009 stated that the mining lease area does not fall in the Aravalli Hills. The Project Proponent reported that there are Schedule-I species viz. Peafowl (*Pavo cristatus*), Osprey (*Pandion haliaetus*), Tawny eagle (*Aquila rapax*), Crested honey buzzard (*Pernis ptilorhynchus*), Shikra (*Accipiter badius*), Leopard (*Panthera pardus*), Indian pangolin (*Manis crassicaudata*) in the study area for which Proponent has made Conservation plan in consultation with State Forest and Wildlife Department. The Committee deliberated the conservation plan and suggested to

enhance the budget for implementation of Conservation Plan for Schedule I Species and also increase the budget for plantation/green belt development.

10. The baseline data was generated for the summer season i.e. March 2016 to May 2016. All the parameters for water and soil quality were within permissible limits. The ambient air quality was also within permissible limits as the operations are underground mine and there are no significant emission sources near the site. The Committee deliberated the baseline data collected by the Project Proponent.

11. The Public Hearing for the proposed expansion project was conducted on 29<sup>th</sup> September 2016 at Bhaldia Panchayat Bhawan, Zawar Mines, Tehsil-Sarada, Udaipur. The Public Hearing was presided over by Mr. C.R. Dewasi, Additional District Collector (Admin). The representatives of Rajasthan State Pollution Control Board were also present. The Project Proponent informed about various Corporate Social Responsibilities under taken in Infrastructure development, Health, Hygiene and Water, Women Empowerment and rural lively hood in nearby villages.

12. Total Project cost of the expansion project is Rs. 1200 Crores and the capital cost for Environmental Protection measures is proposed as Rs. 148 Crores. Manpower requirement is about 1250. Project Proponent reported that there is no court case pending against the project.

13. The Ministry of Environment, Forest and 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 Hindustan Zinc Limited for Zawar Group of Underground Mines with enhancement of production capacity from 1.5 million TPA to 4.0 million TPA of Lead-Zinc ore and ore beneficiation from 1.5 MTPA to 4.0 MTPA in the mine lease area of 3620ha, located at near village Zawar, Tehsil Girwa and Sarada District-Udaipur, Rajasthan** subject to compliance of the followings terms and conditions and environmental safeguards mentioned below:

**A. Specific conditions**

- 1) Environmental clearance is granted subject to final outcome of Hon'ble Supreme Court of India, Hon'ble High Court of Rajasthan and any other Court of Law, if any, as may be applicable to this project.
- 2) This Environmental Clearance is subject to obtaining requisite NBWL Clearance from the Standing Committee of National Board for Wildlife, if any, applicable for this Mining project.
- 3) No mining activities will be allowed in forest area, if any, for which the Forest Clearance is not available.
- 4) The project proponent shall obtain Consent to Operate from the State Pollution Control Board, Rajasthan and effectively implement all the conditions stipulated therein.
- 5) **The Proponent should 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.**

- 6) 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. The report on slope and stability monitoring should be sent to MoEF&CC and its Regional office every six-months.
- 7) The reclamation at waste dump sites shall be ecologically sustainable. Scientific reclamation has been 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. This may be recommended to be studied by hiring Expert Ecology Group.
- 8) There is need for regular monitoring of invertebrates and aquatic life of water bodies including the reservoir located close to the mining lease to establish that fish and other animals including the water is not contaminated with heavy metal. There could be a research on "bio accumulation of heavy metals in invertebrates" to completely establish that there is no impact of mining.
- 9) A specialized Institution may be hired to carry out ecological survey on the plant species to evaluate their growth in terms of stunted, deformed and seed viability. The sensitive species and indicator species to heavy metal pollution may be screened out and plantation accordingly designed. Similarly, uptake of Zinc, Cadmium and lead etc. by crops and vegetables grown in the crop lands around the mining lease may be studied. Bottom sediment analysis of ponds, wells and Rivers to ascertain the level of accumulation of heavy metal may be done.
- 10) The Proponent shall conduct an Occupational health study with respect to the pressure impact on ear drums as person goes underground and implement the recommendations.
- 11) Project Proponent shall carry out vibration studies well before approaching any such habitats or other buildings to evaluate the zone of influence and impact of blasting on the neighborhood. Within 500 meters of such sites vulnerable to blasting vibrations, avoidance of use of explosives and adoption of alternative means of mineral extraction. A provision for monitoring of each blast should be made so that the impact of blasting on nearby habitation and dwelling units could be ascertained. The covenant of lease deed under Rule 31 of MCR 1960 provides that no mining operations shall be carried out within 50 meters of public works such as public roads and buildings or inhabited sites except with the prior permission from the Competent Authority.

- 12) 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. Belt-conveyors 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.
- 13) The monitoring of PM<sub>2.5</sub> in the vehicle emission shall be conducted to improve the mine environment and report submitted to the Regional Office of the MoEFCC.
- 14) The Project Proponent reported that there are seven Schedule-I species viz. Peafowl (*Pavo cristatus*), Osprey (*Pandion haliaetus*), Tawny eagle (*Aquila rapax*), Crested honey buzzard (*Pernis ptilorhynchus*), Shikra (*Accipiter badius*), Leopard (*Panthera pardus*), Indian pangolin (*Manis crassicaudata*) in the study area. The PP shall implement the Conservation Plan and enhance the budget for implementation of Conservation Plan for Schedule I Species and also increase the budget for plantation/green belt development. The Proponent shall implement the Wildlife Conservation Plan along with the funds so allocated with consultation of Chief Wild Life Warden of the State Govt. A copy of action plan shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office, Lucknow and the Chief Wild Life Warden of the State Govt.
- 15) Proponent shall carry out monitoring of lead in the blood samples of the employees and the villagers in the areas surrounding the mine in their schedule of health check-up. The nearby water bodies shall be monitored every six months and report submitted to Regional office of the MoEFCC to ascertain impact due to lead contamination.
- 16) Implementation of Action Plan on the issues raised during the Public Hearing shall be ensured. The Project Proponent shall complete all the tasks as per the Action Plan submitted with budgetary provisions during the Public Hearing.
- 17) Implementation of the outcome of study with regard to "optimization of blast design parameter for the safety and stability of surface structures and subsequent monitoring of vibration on the surface structures for their long term stability" which was carried out by Central Institute of Mining and Fuel Research should be ensured.
- 18) Continuous monitoring of radioactive elements, if any, shall be undertaken till entire mine is dewatered and report has to be submitted to MoEFCC Regional Office. Periodic monitoring of any adverse impact of Radon and its daughter products on any worker should be included in the Occupational Health Monitoring Programme.



## **B. Standard conditions**

- 1). 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.
- 2). No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment, Forest and Climate Change.
- 3). No change in the calendar plan including excavation, quantum of mineral and waste should be made.
- 4). 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.
- 5). Mining shall be carried out as per the provisions outlined in mining plan approved by Indian Bureau of Mines (IBM) as well as by abiding to the guidelines of Directorate General Mines Safety (DGMS).
- 6). 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.
- 7). 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.
- 8). 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.
- 9). 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.

- 10). 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.
- 11). 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.
- 12). 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.
- 13). 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.
- 14). 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.
- 15). 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.

- 16). 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.
- 17). 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.
- 18). 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.
- 19). 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.
- 20). 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.
- 21). 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.

- 22). 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 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.
- 23). 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", if any, applicable to the project.
- 24). 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.
- 25). 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.
- 26). 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.
- 27). 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.
- 28). 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.

- 29). 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 19<sup>th</sup> May, 1993 and 31<sup>st</sup> December, 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.
- 30). 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.
- 31). 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.
- 32). 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.
- 33). 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.
- 34). 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.
- 35). 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.
- 36). 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.
- 37). 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.
- 38). 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.in](http://www.environmentclearance.nic.in) and a copy of the same should be forwarded to the Regional Office.

14. The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.

15. 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 the Environment (Protection) Act, 1986.

16. 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 of Rajasthan and any other Court of Law relating to the subject matter.

17. 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)  
Director (S)

**Copy to:**

- 1). **The Secretary**, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.
- 2). **The Secretary**, Department of Mines & Geology, Government of Rajasthan, Secretariat, Jaipur.
- 3). **The Secretary**, Department of Environment, Government of Rajasthan, Secretariat, Jaipur.
- 4). **The Addl. Principal Chief Conservator of Forests**, Ministry of Environment, Forest and Climate Change, Kendriya Bhawan, 5<sup>th</sup> Floor, Sector "H", Aliganj, Lucknow-226020.
- 5). **The Chief Wild Life Warden**, Government of Rajasthan, Secretariat, Jaipur
- 6). **The Member Secretary**, Central Ground Water Authority, A-2, W3, Curzon Road Barracks, K.G. Marg, New Delhi-110001.
- 7). **The Chairman**, Rajasthan State Pollution Control Board, 4, Institutional area, Jhalana, Doongri, Jaipur.
- 8). **The Controller General**, Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur - 440 001.
- 9). **The District Collector**, District- **Udaipur**, State of Rajasthan.
- 10). **Guard File.**
- 11). **MoEFCC website.**

  
(Surendra Kumar)  
Director (S)





F.No.J-11015/259/2012-IA-II(M)  
Government of India  
Ministry of Environment, Forest and Climate Change  
IA Division

\*\*\*

2<sup>nd</sup> Floor, Prithvi Block  
Indira Paryavaran Bhawan  
Jor Bagh Road, Aliganj  
New Delhi-110003

Date: 16<sup>th</sup> October, 2020

To,

M/s.Hindustan Zinc Limited  
Yashad Bhawan, Girwa  
Udaipur-313 004  
Rajasthan

**Sub: Environmental Clearance under para 7(ii) of EIA notification 2006 for expansion of Zawar Group of underground lead- zinc mines of M/s Hindustan Zinc Limited proposed expansion from 4.0 MTPA to 4.8 MTPA zinc ore and expansion in beneficiation plant from 4.0 Million TPA to 4.8 MTPA from the mine lease area of 3620 ha (ML No.03/89) located at village Zawar Tehsil Girwa and Sarada, District Udaipur, Rajasthan- reg.**

Sir,

This has reference to proposal No. IA/ RJ/MIN/165786/2020 for Environmental Clearance (EC) under para 7(ii) of EIA notification 2006 for mining of M/s. Hindustan Zinc Limited is for expansion from 4.0 MTPA to 4.8 MTPA Zinc Ore and expansion in Beneficiation plant from 4.0 MTPA to 4.8 MTPA, from the mine lease area of 3620 ha, located at ML No.03/89 near village Zawar (including Bhaladia, Newatalai, Singhatwara, Tidi, Rava, Kodyakhet, Kanpur, Dhavaditalai, Paduna, Udiyakhera, Nayakhera, Chanavada, Bara, Saru), Tehsil Girwa and Sarada, District Udaipur, Rajasthan under para 7(ii) (a) of EIA Notification, 2006. The proposed project site falls in zone-III as per IS 1893 (Part-I):2002.

2. As per EIA Notification dated 14<sup>th</sup> September, 2006 as amended from time to time, the project falls under Category A, project activity 1(a) [Mining of Minerals] and 2(b) [mineral beneficiation] as the mining lease area is 3620 ha.

3. The proposal of Terms of Reference (ToR) was considered by the Expert Appraisal Committee in its 11<sup>th</sup> meeting held during 25<sup>th</sup> - 27<sup>th</sup> September 2013 to determine the ToR for undertaking detailed EIA study. The ToR was issued by MoEF&CC vide letter no.J-11015-259-2012-IA-II(M) dated 01.04.2013 and amended ToR was issued on 18.02.2016.

4. The project proponent has applied for Environmental Clearance for expansion production capacity from 4.0 MTPA to 4.8 MTPA zinc-lead ore (20% increase) and expansion

*Pauroy*



in beneficiation plant from 4.0 MTPA to 4.8 MTPA from the mine lease area of 3620 ha (ML No.03/89) located at village Zawar (including Bhaladia, Newatalai, Singhatwara, Tidi, Rava, Kodyakhet, Kanpur, Dhavaditalai, Paduna, Udiyakhera, Nayakhera, Chanavada, Bara, Saru), Tehsil Girwa and Sarada, District Udaipur, Rajasthan State.

5. The project proponent submitted that total mine lease area is 3620.0 ha. The lease was granted from 1<sup>st</sup> April 1950 for a period of 20 years for 5178 ha. The project proponent has reported that 1<sup>st</sup> renewal was made vide letter No.P.12(26)/Udaipur/Gp-2/90 on 13.03.1973 for the period from 01 Apr 1970 to 29 Mar 1990 for an area of 5178 ha. The 2<sup>nd</sup> renewal was granted on 20.10.1992 for the period from 30<sup>th</sup> March 1990 to 29<sup>th</sup> March, 2010 for 5178.0 ha. Amendment was made vide order dated 03.08.1999 for reduction of lease area from 5178.0 ha to 3620.0 ha and validity of renewal from 30.03.200 to 29.03.2010. The 3<sup>rd</sup> renewal has been granted vide letter No.ME/Udai/cc-3/P/Sarada/323/08/3856 dated 23.01.2015 for the period from 30<sup>th</sup> March 2010 to 31<sup>st</sup> March 2030 for an area of 3620.0 ha.

6. The project proponent has submitted that Approval of Review of Mining Plan long-with Progressive Mine Closure Plan has been approved by IBM vide letter no.584(4)(3)(1809)/2019-RCM-Ajm dated 17.12.2019.

7. The project proponent submitted that the project itself being an underground mine, all mine development and production activity will happen underground. The underground mine voids shall be backfilled with ore beneficiation tailings, as per the mine plan. Tailing dam will be rehabilitated by vegetative cover after utilization to its optimum capacity. At the end of mine life, major infrastructure in the mine and beneficiation plant shall be dismantled and reclaimed after decontamination of any contaminated sites, as envisaged in the mining plan.

The waste rock generation shall increase proportionate to increase in production capacity. The waste rock shall be utilized for tailing pond embankment height increase, surface leveling works and also backfilling into mine voids. There shall be no increase in external dumps for waste rock. The capacity of the existing tailing dam will be increased to dispose the tailings by increasing the height of the embankment. Waste oil, used oil and other hazardous wastes will be safely stored in drums/tanks/covered shed and sold to authorized recyclers. Waste water will be recycled and reused in the beneficiation plant. Zero effluent discharge shall be maintained.

8. The project proponent submitted that Range of Water Table is from 10 m bgl to 7 m bgl (Pre-Monsoon Season) and 3 m bgl to 5 mbgl (Post-Monsoon Season). The present water requirement is 14000 KLD for existing operations. No additional requirement will be there for proposed 20 % expansion. Water requirement for industry shall be met from the existing source i.e., captive Tidi dam. The project proponent submitted that they obtained NOC from CGWA vide letter No.21-4(267)/CGWAWR/2008-2185; 21-4(266)/CGWAWR/2008 dated 11.12.2013 for a period of 3 years. The project proponent submitted the application for renewal of NOC vide its letter No.HZL/ZM/ENV/CGWA/2016-17/557 dated 09.12.2016.





9. The project proponent has submitted that 373625 saplings have been planted in area of 170.85 ha. Further, it is proposed to plant 55000 saplings. The total area under greenbelt will be 251.43 ha.

10. The project proponent submitted that the mine lease area of 3620 Ha includes a forest area of 1537.91 ha. The entire forest area was granted Forest Clearance by MoEF&CC vide letter no.8-1/1997-FC dated 15/16.06.1998 with a validity coterminous with mining lease including 114.94 ha area for surface use and 1422.97 ha for underground mining. Renewal of Forest Diversion was granted by the Ministry's vide letter no.8-1/1997-FC dated 23.02.2015. The project proponent reported that no protected area under international conventions or local legislation for its ecological, landscape, cultural or other related values exists within 15 km radius.

11. The project proponent submitted that there is Presence of Schedule-I species which includes Osprey, Indian Peafowl, White-rumped Vulture, Indian Leopard, Indian Pangolin, Crimson rose, Bengal Monitor Lizard, etc. The project proponent has submitted that the present Wildlife Conservation Plan is prepared for 2 projects, namely expansion of zinc-lead ore production and beneficiation capacities from 1.5 MTPA to 4.0 MTPA and 'expansion of the capacity 4.0 MTPA to 4.8 MTPA of zinc-lead ore production and beneficiation capacities from its existing underground mines. According to the SoP for the Wildlife Conservation Plan, the cost allotted for the wildlife conservation is Rs.1845 Lakhs. The implementation of wildlife conservation plan is planned till the mine life i.e., for the duration of next 10 years (till March 2030) in 3 phases of 4 years, 3 years and 3 years. Accordingly, costing is allotted for the 3 phases, along with presentation of total cost required for the implementations for next 10 years. The project proponent has reported that Conservation Plan for Schedule-I Species has not been approved by competent authority.

12. The project proponent submitted that the project is being a major mineral there is no requirement of District Survey Report.

12. The project proponent submitted that there will be marginal increase in traffic internally as well as outside the lease area due to expansion by 0.8 MTPA in existing 4.0 MTPA. There will be an increase of 20 vehicle trips per day within mine lease area (mines to mill within mine lease area) and 5 trucks outside mine lease (from beneficiation plant to HZL smelters) and per day for the transportation of 20% proposed expansion. The project proponent also submitted the mitigation measures such as (i) ore transportation from Mochia and Balaria Mine to central Mochia Shaft through covered conveyor belt; (ii) dust extraction system at transfer points; (iii) water sprinkling arrangement at transfer points & ore stockpile; (iv) regular water spraying on haul roads for ore transportation; (v) transportation is done in tarpaulin covered trucks; (vi) blacktop paved road (haul roads) within the mine boundary and outside; (vii) proper maintenance, oiling and greasing of vehicles is ensured; (viii) vehicle with valid PUC are being used for transportation; (ix) plantation along haul roads & greenbelt development along mine lease boundary and (x) continued and same will be maintained in future.

13. The project proponent submitted that public hearing is not applicable in this case.





14. The project proponent submitted that the fund allocated towards the Corporate Environment Responsibility (CER) is Rs.3.25 crores.

15. The project proponent reported that rehabilitation and resettlement (R&R) is not applicable.

16. The project proponent submitted that the funds allocated for Environment Management Plan (EMP) is Rs.64 crores (Capital) and Rs.2.9 crores (recurring per annum).

17. The project proponent submitted the EC compliance report has been certified from RO, MoEF&CC, Lucknow vide letter No.IV/ENV/R/Mine-484/794/2008/814 dated 07.10.2019.

18. The project proponent has submitted that CTO has been granted vide letter No. F(Mines)/Udaipur(Sarada)/53(1)/2016-2017/8193-8197 and Order No.2017-2018/Mines/9658 dated 28.12.2017 for the period from 01.01.2018 to 31.12.2022.

19. The project proponent reported that there is no Court Cases pending against the project and/or land in which the project is proposed to be set up.

20. The project proponent has given an undertaking that the data and information given in the application and enclosures are true to the best of their knowledge and belief and they are aware that if any part of the data and information submitted is found to be false or misleading at any stage, the project will be rejected and clearance given, if any to the project will be revoked at their risk and cost. In addition to this, they hereby give undertaking that no activity/ construction/ expansion has since been taken up.

21. The project proponent submitted that cost of the project is Rs.1630 crores (existing Rs.1200 crore + proposed Rs.430 crore). The project proponent submitted that due to establishment of the project, large direct and indirect employment opportunities will be created. E-mail dated 15.09.2020 received from the project proponent wherein it was mentioned that the project on expansion will provide direct employment to 150 people (Total employment shall be 3400) of nearby area of mine site. Entrepreneurship development through ancillary or supporting industries/ businesses in the surrounding area will further increase the income levels of people.

22. The Committee during EAC meeting held on 19-21 August, 2020 observed that last public hearing was conducted on 29.09.2016 for expansion from 1.5 MTPA to 4.0 MTPA of ore production and beneficiation capacity. The Committee noted that the production capacity increased 20%, therefore, may be considered as per para 7(ii)(a) of the EIA Notification, 2006. The committee also observed that 55000 saplings to be planted by project proponent in the total area under greenbelt of 251.43 ha *inter alia* including lease boundary plantation of forests in the next 4-5 years. It was also advised to communicate to the Ministry regarding the surrender of land.

23. The Committee during EAC meeting held on 19-21 August, 2020 recommended the proposal of M/s. Hindustan Zinc Limited for expansion of Zawar Group of underground zinc-lead mines for proposed expansion from 4.0 MTPA to 4.8 MTPA zinc-lead ore and expansion



in beneficiation plant from 4.0 MTPA to 4.8 MTPA, from the mine lease area of 3620.0 ha located at MLNo.03/89 near village Zawar, Tehsil Girwa and Sarada, District Udaipur, Rajasthan under para 7(ii) (a) of EIA Notification, 2006 with specific conditions in addition to the conditions prescribed in the earlier EC dated 5<sup>th</sup> January, 2017.

24. The Ministry of Environment, forest and Climate Change has examined the proposal in accordance with the Environmental Impact Assessment Notification, 2006 and further amendments thereto; and after accepting the recommendation of EAC meeting held during 19-21 August, 2020, hereby decided to accord the amendment of Environmental Clearance (EC) under para 7(ii) for expansion from 4.0 MTPA to 4.8 MTPA zinc-lead ore and expansion in beneficiation plant from 4.0 MTPA to 4.8 MTPA from the mine lease area of 3620 ha located at village Zawar (including Bhaladia, Newatalai, Singhatwara, Tidi, Rava, Kodiyakheta, Kanpur, Dhavaditalai, Paduna, Udiyakhara, Nayakhara, Chanavada, Bara, Saru), Tehsil Girwa and Sarada, District Udaipur, Rajasthan State with following specific conditions in addition to the conditions prescribed in the earlier Environmental Clearance dated 5<sup>th</sup> January, 2017.

- (a) Gap plantation shall be carried in consultation with State Forest Department in the total mining lease area where the surface rights were not acquired. These plantations shall be maintained and monitoring to be done to achieve the survival rate of 90%.
- (b) The conservation plan for Schedule-I species reported in the study area namely, 1 reptilian (Bengal Monitor Lizard), 3 avifaunal (Osprey, Indian Peafowl and White-rumped Vulture), 2 mammalians (Indian Pangolin and Indian Leopard) and 1 butterfly (Crimson Rose) should be prepared and implemented in consultation with State Forest Department including the recommendations of the Chief Wildlife Warden.
- (c) As proposed no additional water shall be used for the proposed expansion. The requirement shall be met from the existing daily water demand of 14,000 KLD, out of which 2,400 KLD water is used for mining purpose, 8,600 KLD for beneficiation plant and 3,000 KLD for domestic use which is drawn from Tidi Dam through pipeline.
- (d) The project proponent should obtain the NOC from the CGWA regarding the intersection of workings with the groundwater table.
- (e) Mist spraying arrangements shall be provided to suppress the dust emission at the loading, crushing and transfer points. The effective water spraying arrangements shall be made at the tailing dam to control the air borne dust.
- (f) The project proponent should implement all the additional measures that are proposed in the present application.

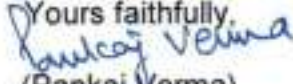
25. Further, as per Ministry's O.M No 22-34/2018-IA.III dated 16.01.2020 to comply with the direction made by Hon'ble Supreme Court on 8.01.2020 in W.P. (Civil) No 114/2014 in the matter Common Cause vs Union of India, *the mining lease holder shall after ceasing*



*mining operations, undertake re-grassing the mining area and any other area which may have been disturbed due to other mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc.*

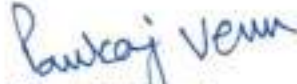
26. Any appeal against this Environmental Clearance under EIA notification 2006 for expansion shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

27. This issues with the approval of Competent Authority.

Yours faithfully,  
  
(Pankaj Verma)  
Scientist E

**Copy to:**

1. The Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi-110 001.
2. The Secretary, Department of Mines & Geology, Government of Rajasthan, Secretariat, Jaipur.
3. The Secretary, Department of Environment, Government of Rajasthan, Secretariat, Jaipur.
4. The Secretary, Department of Forests, Government of Rajasthan, Secretariat, Jaipur.
5. The Chief Wildlife Warden, Government of Rajasthan, Jaipur.
6. The Dy. Director General of Forests, Ministry of Environment, Forest and Climate Change, Regional Office (CZ), Kendriya Bhawan, 5<sup>th</sup> Floor, Sector "H", Aliganj, Lucknow – 226020
7. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.
8. The Member Secretary, Central Ground Water Authority, 18/11, Jam Nagar House, Man Singh Road, New Delhi-110011.
9. The Chairman, Rajasthan State Pollution Control Board, Jaipur, Rajasthan.
10. The Controller General, Indian Bureau of Mines, Indira Bhawan, Civil Lines, Nagpur-440 001.
11. The District Collector, Udaipur, District, Government of Rajasthan.
12. Guard File.
13. MoEF&CC Website.

  
(Pankaj Verma)  
Scientist E



भारत सरकार  
GOVERNMENT OF INDIA  
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय  
MINISTRY OF ENVIRONMENT, FOREST &  
CLIMATE CHANGE

By Speed Post/e-Mail



क्षेत्रीय कार्यालय, गांधीनगर/उप क्षेत्रीय कार्यालय, जयपुर /Regional  
Office, Gandhinagar/(Sub-Regional Office, Jaipur)



बी-213 "अरण्यभवन", झालाना संस्थानिक क्षेत्र, जयपुर - 302004/ A-218, "ARANYA  
BHAWAN", Jhalana Institutional Area, Jaipur-302004

दूरभाष/Tel No: 0141-2713786, 2713778 Email: iro.jaipur-mefcc@gov.in

Dated: 10<sup>th</sup> August, 2024

सेवा में,

निदेशक/वैज्ञानिक- 'एफ' /

The Director/Scientist-'F',

पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय

Ministry of Environment, Forest &amp; Climate Change,

3<sup>rd</sup> मंजिल, वायु विंग, इंदिरा पर्यावरण भवन/

3rd Floor, Vayu Wing, Indira Paryavaran Bhawan,

जोर बाग, नई दिल्ली/ Jor Bagh, New Delhi – 110003.

Sub: Environmental clearance under para 7(ii) of EIA notification 2006 for expansion of Zawar Group of Underground Lead- Zinc Mines of M/s Hindustan Zinc Limited proposed expansion from 4.0 Million TPA to 4.8 Million TPA zinc Ore and expansion in beneficiation plant from 4.0 Million TPA to 4.8 Million TPA from the mine lease area of 3620 ha (ML No. 03/89) located at village Zawar, Tehsil Girwa and Sarada, District Udaipur, Rajasthan- Certified Compliance Report Reg.

Ref: EC issued vide letter no. J-11015/259/2012-IA.II(M) dated 16.10.2020 and Letter No. – J-11015/259/2012-IA.II (M), dated 05.01.2017.

Sir,

In reference to the cited subject, it is bring to your kind notice that the aforesaid project was Inspected/ Monitored by the undersigned on 07/08/2024 for the purpose of issuing certified compliance report of the Environmental clearance issued vide letter no. J-11015/259/2012-IA.II(M) dated 16.10.2020 and Letter No. – J-11015/259/2012-IA.II (M), dated 05.01.2017.

2. Accordingly, a detailed monitoring report along with key observations is being attached herewith for perusal and further appropriate action.

भवदीय,

ई. महेश दत्त पुरोहित Er. Mahesh Dutt Purohit  
सं. निदेश/ वैज्ञा. 'डी' / Joint Director (S)/Scientist-D

Copy to: -

1. Mr. Ram Murari, CEO- Zawar Mines IBU, Hindustan Zinc Limited, PO- Zawar Mines, Tehsil- Sarada, Distt- Udaipur, Rajasthan: 313901- With directions to submit clarifications on partially complied/not complied conditions directly to the Ministry under intimation to this office.



**Ministry of Environment, Forest & Climate Change**  
**Regional Office, Gandhinagar/ (Sub-Regional Office, Jaipur)**  
**MONITORING REPORT**  
**PART - I**  
**DATA SHEET**

1.	Project Type	S. No. '1' (Mining of Minerals), Project or Activity '1(a) - (3)', Category "A" Project or Activity 2 (b) - 3 for "Ore Beneficiation."										
2.	Name of the Project	Environmental clearance under para 7(ii) of EIA notification 2006 for expansion of Zawar Group of Underground Lead- Zinc Mines of M/s Hindustan Zinc Limited proposed expansion from 4.0 Million TPA to 4.8 Million TPA zinc Ore and expansion in beneficiation plant from 4.0 Million TPA to 4.8 Million TPA from the mine lease area of 3620 ha (ML No. 03/89) located at village Zawar, Tehsil Girwa and Sarada, District Udaipur, Rajasthan.										
3.	Clearance letter / O.M No. & date	-EC letter no. J-11015/259/2012-IA.II(M) dated 16.10.2020 and Letter No. - J-11015/259/2012-IA.II (M), dated 05.01.2017.										
4.	<b>Location</b> a) Tehsil b) District (s) c) State (s) d) Latitudes/Longitudes	Tehsil: Girwa and Sarada Distt: Udaipur State: Rajasthan Latitude/ Longitude: <table border="1" style="margin-left: 20px;"> <tr> <td rowspan="2">Block 1</td> <td>Latitude</td> <td>24°19'0.3" to 24°22'51.59"</td> </tr> <tr> <td>Longitude</td> <td>73°40'23.24" to 73°45'12.24"</td> </tr> <tr> <td rowspan="2">Block 3</td> <td>Latitude</td> <td>24°14'43.66" to 24°16'30.81"</td> </tr> <tr> <td>Longitude</td> <td>73°41'47.03" to 73°43'6.58"</td> </tr> </table>	Block 1	Latitude	24°19'0.3" to 24°22'51.59"	Longitude	73°40'23.24" to 73°45'12.24"	Block 3	Latitude	24°14'43.66" to 24°16'30.81"	Longitude	73°41'47.03" to 73°43'6.58"
Block 1	Latitude	24°19'0.3" to 24°22'51.59"										
	Longitude	73°40'23.24" to 73°45'12.24"										
Block 3	Latitude	24°14'43.66" to 24°16'30.81"										
	Longitude	73°41'47.03" to 73°43'6.58"										
5.	<b>Address for correspondence</b> a) Address of Concerned Project Chief Engineer (with Pin Code/ Tel No./ Telex/Fax No./E-mail address) b) Address of Executive Project Engineer/Manager (with Pin Code/ Tel No./ Telex/Fax No./E-mail address)	Mr. Ram Murari, CEO- Zawar Mines IBU, Hindustan Zinc Limited PO- Zawar Mines, Tehsil- Sarada, Distt- Udaipur, Rajasthan: 313901  Email: <a href="mailto:ram.murari@vedanta.co.in">ram.murari@vedanta.co.in</a>										
6.	<b>Salient features</b> a) of the project  b) of the environmental management plans	Upgradation of mining systems using trackless mining and mechanization, Technology & Digitization, Infrastructure. Skill Building. Debottlenecking of beneficiation plant by increasing the overall equipment efficiency.  Introduction of road grader, enhancing backfilling of mines, improving ventilation system and enhancing plantation etc.										



7.	Product/Process/Activity Details	Underground Mining with sub level stoping method.  Ore beneficiation using froth flotation process.  Product: Zinc Concentrate and Lead concentrate
8.	Production Capacity	4.8 Million TPA Lead Zinc Ore Production and its beneficiation
9.	Break-up of project affected population	Nil
10.	<b>Financial details: (as reported by the PP)</b> a) Project cost as originally planned and subsequent revised estimates and the year of price reference b) Allocations made for environmental management plans with item wise and year wise break up c) Benefit cost ratio/internal rate of return and the year of assessment d) Whether (c) includes the cost of environmental management as shown in b) above e) Actual expenditure incurred on the project so far f) Actual expenditure incurred on the environmental management plans so far	No details provided.
11.	Forest land requirement:	<ul style="list-style-type: none"> <li>• Forest Diversion/ Clearance for carrying out Mining activities (total forest land: 1537.91 ha which includes diversion of 114.94 ha for surface rights and diversion of 1422.97 ha for underground mining).</li> <li>• Recent renewal of Forest diversion/ clearance was obtained vide letter no: F.No.8-1/1997-FC dated 23.01.2015</li> </ul>
12.	The status of clear felling in non-forest areas	Not details provided
13.	Status of construction: a) Date of commencement ( <i>actual and/or planned</i> ) b) Date of completion ( <i>actual and/or planned</i> )	Latest increase in capacity is from 4 to 4.8 MTPA for Ore production as well as Ore beneficiation. Ore Production (Mines): 12.01.2021 Ore Beneficiation (Beneficiation Plant): 29.01.2021
14.	Reasons for the delay, if the project is yet to start	Not applicable

15.	Details of correspondence with project Authorities for obtaining act on plans/information on status of compliance to safeguards other than the routine letters for logistic support for site visits). (The first monitoring report may contain the details of all the letters issued so far, but the later reports may cover only the letter issued subsequently)	
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## PART - II

**DESCRIPTIVE REPORT ON STATUS OF COMPLIANCE TO CONDITIONS OF ENVIRONMENTAL CLEARANCE** issued vide letter no. EC letter no. J-11015/259/2012-IA.II(M) dated 16.10.2020.

S.No.	Specific Conditions	Compliance Status
(a)	Gap plantation shall be carried in consultation with State Forest Department in the total Mining lease area where the surface rights were not acquired. These plantations shall be maintained and monitoring to be done to achieve the survival rate of 90%.	<b>Complied.</b> PP submitted the details pertaining to deposited money Rs 100 lacs to state forest department in FY 2020-21 and carried out plantation in 25 ha and 50 ha under RDF-1 & 2 scheme of forest department. Apart from this, as appraised by unit representative, PP has carried out 2500 nos. of plantation at tailing storage facility and 6000 nos. of plantation near township area.
(b)	The conversation plan for Schedule-I species reported in the study are namely. 1 reptilian (Bengal Monitor Lizard), 3 avifaunal (Osprey, Indian Peafowl and White rumped Vulture), 2 mammals (Indian Pangolin and Indian Leopard) and 1 butterfly (Crimson Rose) should be prepared and implemented in consultation with State Forest Department including the recommendations of the Chief Wildlife Warden.	<b>Complied.</b> Wild life conservation plan for Schedule-I for Zawar Mines is approved by Chief Wild Life Warden, Jaipur. Unit has deposited an amount of Rs. 3,69,00,000/- in 2022 through online transaction to the account of "Rajasthan Protected Areas, Conservator society, Udaipur" towards conservation of wildlife and administrative cost for processing inspections, etc. In 2021, contributed 8.8 lacs rupees to forest department towards development cum maintenance of safari park/ golden park and forest nursery. In 2023-24, an amount of Rs 100 lac deposited for forest department and plantation work has been initiated for plantation during monsoon in 2024. Also, working areas are properly fenced/ boundary in place to avoid any interaction.
(c)	As proposed no additional water shall be used for the proposed expansion. The requirement shall be met from the existing daily water demand of 14,000 KLD, out of which 2,400 KLD water is used for mining purpose, 8,600 KLD for beneficiation plant and 3,000 KLD for domestic use which is drawn from Tidi Dam through pipeline.	<b>Complied.</b> As appraised by the unit representative total water requirement for Mines, beneficiation and domestic purposes is kept below the 14,000 cum/ day/ and source of fresh water is Tidi dam.
(d)	The project proponent should obtain the NOC from the CGWA regarding the intersection of workings with the groundwater table.	<b>Complied.</b> PP has obtained NOC for ground water intersection from CGWA for all the four operating mines i.e. Mochia Mines, Balaria Mine, Baroi Mine and Zawarmala mine.
(e)	Mist spraying arrangements shall be provided to suppress the dust emission at the loading, crushing and	<b>Complied.</b> During site visit it was observed that PP has provided suitable water spraying

	transfer points. The effective water spraying arrangements shall be made at the tailing dam to control the air borne dust.	arrangement for water spraying to arrest fugitive dust generation. Also, moisture is maintained in ore while loading and crushing.
(f)	The project proponent should implement all the additional measures that are proposed in the present application.	<b>Agreed for compliance by the PP.</b>



**DESCRIPTIVE REPORT ON STATUS OF COMPLIANCE TO CONDITIONS OF ENVIRONMENTAL CLEARANCE** issued vide letter no. EC letter no. J-11015/259/2012-IA.II (M), dated 05.01.2017

S.No.	SPECIFIC CONDITIONS	COMPLIANCE STATUS
1	Environmental clearance is granted subject to final outcome of Hon'ble Supreme Court of India, Hon'ble High Court of Rajasthan and any other Court of Law, if any, as may be applicable to this project.	<b>Agreed for compliance by the PP.</b>
2	This Environmental Clearance is subject to obtaining requisite NBWL Clearance from the Standing Committee of National Board for Wildlife, if any, applicable for this Mining project	It has been appraised that the Jaisamand Wildlife Sanctuary and other protected areas are not falling within the 10 km of aerial distance of mine lease area.
3	No mining activities will be allowed in forest area, if any, for which the Forest Clearance is not available.	<b>Agreed for Compliance by the unit.</b> PP has obtained Forest Diversion/ Clearance for carrying out Mining activities (total forest land: 1537.91 ha which includes diversion of 114.94 ha for surface rights and diversion of 1422.97 ha underground mining) and Recent renewal of Forest diversion/ clearance was obtained vide letter no: F.No.8-1/1997-FC dated 23.01.2015. as per the mining plans and documents available on site related to current mining activity, the mining activity appears to be within the approved area.
4	The project proponent shall obtain Consent to Operate from the State Pollution Control Board, Rajasthan and effectively implement all the conditions stipulated therein.	<b>Complied.</b> The unit has obtained CTO for Mines & CTO for Beneficiation plant from Rajasthan State Pollution Control Board (RSPCB).
5	The Proponent should 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	<b>Complied.</b> PP has installed 3 nos of CAAQMS with digital display of data in front of the main gate of the mine site. Also, pH and turbidity meters for STP and water storage tank has also been provided.

6	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. The report on slope and stability monitoring should be sent to MoEF&CC and its Regional office every six-months.	<b>Complied.</b> The project is an underground mining project having sublevel stopping method of operation with backfilling. The waste rock generated during development heading is backfilled in the stopes. During the time of visit there is no unscientific storage of waste rock on surface was observed. Waste rock generated during initial mine development has been used to increase the height of tailing storage facilities and creation of rock garden. All initial waste dumps have been vegetated and rehabilitated.
7	The reclamation at waste dump sites shall be ecologically sustainable. Scientific reclamation has been 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. This may be recommended to be studied by hiring Expert Ecology Group.	<b>Complied.</b> The project is an underground mining project having sublevel stopping method of operation with backfilling. The waste rock generated during development heading is backfilled in the stopes. During the time of visit there is no unscientific storage of waste rock on surface was observed. Waste rock generated during initial mine development has been used to increase the height of tailing storage facilities and creation of rock garden. All initial waste dumps have been vegetated and rehabilitated.
8	There is need for regular monitoring of invertebrates and aquatic life of water bodies including the reservoir located close to the mining lease to establish that fish and other animals including the water is not contaminated with heavy metal. There could be a research on "bio accumulation of heavy metals in invertebrates" to completely establish that there is no impact of mining.	<b>Complied.</b> As per the reports submitted by PP, recent study was conducted by M/s JM Environet Pvt. Ltd. and there is no adverse impact of mining operation on aquatic life and ecological survey.
9	A specialized Institution may be hired to carry out ecological survey on the plant species to evaluate their growth in terms of stunted, deformed and seed viability. The sensitive species and indicator species to heavy metal pollution may be screened out and plantation accordingly designed. Similarly, uptake of Zinc, Cadmium and lead etc. by crops and vegetables grown in the crop lands around the mining lease may be studied. Bottom sediment analysis of ponds, wells and Rivers to ascertain the level of accumulation of heavy metal may be done.	<b>Complied.</b> As per the reports submitted by PP, recent study was conducted by M/s JM Environet Pvt. Ltd. and there is no adverse impact of mining operation on aquatic life and ecological survey.



10	The Proponent shall conduct an Occupational health study with respect to the pressure impact on ear drums as person goes underground and implement the recommendations.	<b>Complied.</b> PP conducted Occupational Health study with respect to the pressure impact on Ear drum in the underground working through M/s Sure Safety in June 2020.
11	Project Proponent shall carry out vibration studies well before approaching any such habitats or other buildings to evaluate the zone of influence and impact of blasting on the neighborhood. Within 500 meters of such sites vulnerable to blasting vibrations, avoidance of use of explosives and adoption of alternative means of mineral extraction. A provision for monitoring of each blast should be made so that the impact of blasting on nearby habitation and dwelling units could be ascertained. The covenant of lease deed under Rule 31 of MCR 1960 provides that no mining operations shall be carried out within 50 meters of public works such as public roads and buildings or inhabited sites except with the prior permission from the Competent Authority.	<b>Complied.</b> As appraised by unit representative Blast Vibration monitoring is being done regularly by inhouse team. CIMFR has been engaged for blast vibration monitoring and other controlling measures.
12	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. Belt-conveyors 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.	<b>Complied.</b> During visit it was observed that water sprinkling is done on haul road in mines on regular basis to arrest fugitive dust. Water sprinklers have also been provided at transfer points & Covered Conveyors have been provided to control fugitive emissions. Roads at surface are black tarred/ cemented and Mechanised vacuum road sweepers have been deployed to clean roads on the surface to arrest fugitive dust generation.
13	The monitoring of PM 2.5 in the vehicle emission shall be conducted to improve the mine environment and report submitted to the Regional Office of the MoEFCC.	<b>Complied.</b> PP has submitted the reports regarding the same from an accredited laboratory.
14	The Project Proponent reported that there are seven Schedule-I species viz. Peafowl ( <i>Pavo cristatus</i> ), Osprey ( <i>Pandion haliaetus</i> ), Tawny eagle ( <i>Aquila rapax</i> ), Crested honey buzzard ( <i>Pernis ptilorhynchus</i> ), Shikra ( <i>Accipiter badius</i> ), Leopard ( <i>Panthera pardus</i> ), Indian pangolin	<b>Complied.</b> Wild life conservation plan for Schedule-I for Zawar Mines is approved by Chief Wild Life Warden, Jaipur. Unit deposited an amount of Rs. 3,69,00,000/- in 2022 through online transaction to the account of "Rajasthan Protected Areas,



	( <i>Manis crassicaudata</i> ) in the study area. The PP shall implement the Conservation Plan and enhance the budget for implementation of Conservation Plan for Schedule I Species and also increase the budget for plantation/green belt development. The Proponent shall implement the Wildlife Conservation Plan along with the funds so allocated with consultation of Chief Wild Life Warden of the State Govt. A copy of action plan shall be submitted to the Ministry of Environment, Forest and Climate Change and its Regional Office, Lucknow and the Chief Wild Life Warden of the State Govt.	Conservator society, Udaipur" towards conservation of wildlife and administrative cost for processing inspections, etc. In 2021, contributed 8.8 lacs rupees to forest department towards development cum maintenance of safari park/ golden park and forest nursery. In 2023-24, an amount of Rs 100 lac deposited for forest department and plantation work has been initiated for plantation during monsoon in 2024. Also, working areas are properly fenced/ boundary in place to avoid any interaction.
15	Proponent shall carry out monitoring of lead in the blood samples of the employees and the villagers in the areas surrounding the mine in their schedule of health check-up. The nearby water bodies shall be monitored every six months and report submitted to Regional office of the MoEF&CC to ascertain impact due to lead contamination.	<b>Complied.</b>  As per reports submitted by PP wrt third party monitoring of lead in blood of employees and villagers indicates that lead level in blood are below the norms & as monitoring of nearby water bodies is conducted as part of post project monitoring and monitored data are within the limits.
16	Implementation of Action Plan on the issues raised during the Public Hearing shall be ensured. The Project Proponent shall complete all the tasks as per the Action Plan submitted with budgetary provisions during the Public Hearing.	<b>Agreed for compliance by the PP.</b>  Although no separate report has been submitted by the unit with reference to the commitments made during the public hearing, however no such adverse representation against the project has been received in this office and based on the overall compliance status of the unit, the condition is being considered as complied for present visit. The unit representative was advised to submit a specific report w.r.t. commitments made during the PH along with the next six-monthly compliance report.
17	Implementation of the outcome of study with regard to "optimization of blast design parameter for the safety and stability of surface structures and subsequent monitoring of vibration on the surface structures for their long term stability" which was carried out by Central Institute of Mining and Fuel Research should be ensured.	<b>Complied.</b>  As appraised by unit representative blast Vibration monitoring is being done regularly by inhouse team. CIMFR has been engaged for blast vibration monitoring and other controlling measures.
18	Continuous monitoring of radioactive elements, if any, shall be undertaken till entire mine is dewatered and report has to be submitted to MoEFCC Regional	<b>Complied.</b>  PP has conducted analysis for Mine dewatering water and reports infers that there is absence of any radioactive

	Office. Periodic monitoring of any adverse impact of Radon and its daughter products on any worker should be included in the Occupational Health Monitoring Programme.	elements.
<b>S.No</b>	<b>GENERAL CONDITIONS</b>	<b>COMPLIANCE STATUS</b>
1	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.	<b>Agreed for compliance by the PP.</b>
2	No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment, Forest and Climate Change.	<b>Agreed for compliance by the PP.</b> The Mining is being carried out as per Mine plan duly approved by IBM vide letter no. 584(4)(3)(1868)/2021- क्षेत्रानिअजम dated 15/07/2021
3	No change in the calendar plan including excavation, quantum of mineral and waste should be made.	<b>Agreed for compliance by the PP.</b> The Mining is being carried out as per Mine plan duly approved by IBM vide letter no. 584(4)(3)(1868)/2021- क्षेत्रानिअजम dated 15/07/2021
4	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.	<b>Complied.</b> Water is drawn from Captive Tidi Dam with permission of Water Resources department, Govt. of Rajasthan vide agreement dated 17.09.1976 and amended time to time.
5	Mining shall be carried out as per the provisions outlined in mining plan approved by Indian Bureau of Mines (IBM) as well as by abiding to the guidelines of Directorate General Mines Safety (DGMS).	<b>Agreed for compliance by the PP.</b>
6	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.	<b>Agreed for compliance by the PP.</b>
7	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.	<b>Complied.</b> Digital processing of the entire lease area using remote sensing technique is being carried out regularly once in three years by PP & last study was done in August 2021.
8	The critical parameters as per the Notification 2009 such as PM10, PM2.5, 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. Further,	<b>Complied.</b> PP has submitted analysis reports from accredited laboratory regarding ambient air and water quality. Also PP has installed 3 nos of CAAQMS with digital display of data in front of the main gate of the mine site. Also, pH



	<p>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.</p>	<p>and turbidity meters for STP and water storage tank has also been provided.</p>
9	<p>Effective safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of PM10 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</p>	<p><b>Complied.</b> During site visit it was observed that PP has provided suitable water spraying arrangement for water spraying to arrest fugitive dust generation. Also, moisture is maintained in ore while loading and crushing. Ambient Air Monitoring is being carried out fortnightly at 8 stations.</p>
10	<p>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.</p>	<p><b>Complied.</b> PP monitored Ground water level and quality through network of piezometers &amp; wells in and around mine area. Monitoring reports were available on site during the visit and being submitted with the 6 monthly compliance reports.</p>
11	<p>Regular monitoring of the flow rate of the springs and perennial nallahs flowing in and around the mine lease shall be carried out and</p>	<p><b>Complied.</b> Entire fresh water requirement of PP is sourced from a captive surface water source on the river Tidi. No ground</p>

	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.	water is reported to be extracted for industrial use. The natural water bodies and or streams which are flowing in an around the village, are not being disturbed as per vial inspection of the area. Ground water level and quality is being monitored through network of piezometers & key wells in and around mine area.
12	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.	<b>Complied.</b> PP has submitted the monitoring reports alongwith 6 monthly compliance of EC and to Central Ground Water Authority on yearly basis as part of annual compliance of CGWA NOC.
13	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.	<b>Complied.</b> A dedicated road for ore transportation has been constructed between Zawar and Tidi in PPP mode with PWD, GoR.
14	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	<b>Complied.</b> PP has submitted Noise level monitoring reports which are well within the limit. With reference to illumination, it has been observed that the mining activity is 100 % underground and nearby villages are away from the core zone.



	hours.	
15	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.	<b>Complied.</b> The min haulage is under ground as the mining activity is 100 % underground. During the visit it was observed that PP has provided suitable water spraying arrangement for water spraying to arrest fugitive dust generation on haul roads. Also, all the roads used for ore transportation are tarred/ cemented.
16	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.	<b>Complied.</b> Due to absence of surface waste dump, there are no artificial gullies in the mine lease.
17	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.	<b>Complied.</b> It was appraised by the unit representative that more than 35 rainwater harvesting structures i.e. check dams around all mines have been constructed and some of them were visited during the inspection and found appropriate.
18	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.	<b>Complied.</b> The mining activity is being done through underground mining method. Waste rock generated is backfilled in to underground voids. Parts of the waste rock are used for stabilizing slopes of tailing storage facilities. During site visit it was observed that there is no storage of waste rock on surface no artificial gullies in the mine lease because of absence of surface waste dump.
19	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.	<b>Same as Specific Condition No. 6 above.</b>
20	The top soil, if any, shall temporarily be stored at earmarked site(s) only	<b>Complied.</b> As the project is expansion of an

	<p>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.</p>	<p>underground mine and beneficiation plant within existing area. Thus, no top soil is generated &amp; PP has submitted the six monthly compliance report.</p>
21	<p>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.</p>	<p><b>Complied.</b> PP carrying out mining activities through underground mining method. Being underground mine, there is no generation of overburden and hence no OB dumps are there. Waste rock generated is backfilled in to underground voids. Parts of the waste rock are used for stabilizing slopes of tailing storage facilities. During site visit it was observed that there is no storage of waste rock on surface.</p>
22	<p>Plantation shall be raised in a 7.5m</p>	<p><b>Being Complied.</b></p>



	<p>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.</p>	<p>As appraised by the unit representative, plantation has been done in <b>170.85</b> ha in including rehabilitated areas, around beneficiation plant, on matured tailing dam, roads and social aforestry. Overall decent efforts on plantation has been observed. Apart from this, PP has carried out plantation in nearby forest area through forest department in <b>75 ha</b> in RDF 1 &amp; RDF 2 during FY 2019-20 and <b>75 ha</b> in RDF 1 &amp; RDF 2 during FY 2021-22. In addition to this, as appraised by unit representative, PP has carried out 2500 nos. of plantation at tailing storage facility and 6000 nos. of plantation near township area. In 2023-24, an amount of Rs 100 lac deposited to forest department and plantation work has been initiated for plantation during monsoon in 2024.</p>
23	<p>Project Proponent shall follow the mitigation measures provided in Office Memorandum No. Z-11013/57/2014-IA.II (M), dated 29<sup>th</sup> 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", if any, applicable to the project.</p>	<p><b>Complied.</b> As these mining activities are underground so there is no adverse impact on the habitations and suitable measures have been taken wrt environment management.</p>
24	<p>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.</p>	<p><b>Complied.</b> No grazing land has been acquired as a part of operations.</p>
25	<p>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</p>	<p><b>Same as condition no. (b) of EC letter no. J-11015/259/2012-IA.II(M) dated 16.10.2020</b></p>

	Environment, Forest and Climate Change and its Regional Office.	
26	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.	<b>Being Complied.</b> It was appraised by the unit representative that regular expenditure is being done under CSR.
27	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, creche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	<b>Complied.</b> There are no construction labors residing in the premises.
28	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	<b>Complied.</b> Ear plugs / muffs are being provided to the workmen alongwith proper training and awareness for its usage. Some noise control measures have been taken like Acoustic enclosures, specifying permissible noise level limit for equipment below 85 dB(A). Monitoring results submitted by PP are well within permissible limits.
29	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.	<b>Complied.</b> Two STP's with combined capacity of 450 KLD have been provided for treatment of domestic sewage. Treated sewage water is used for plantation and dust suppression. Oil and grease trap at workshop has been provided and water is reused for alternate uses. No unscientific effluent discharge was observed during the visit.
30	Personnel working in dusty areas should wear protective respiratory devices and they should also be	<b>Complied.</b> Personnel Protective Equipment (PPEs) have been provided to the workers. As



	provided with adequate training and information on safety and health aspects.	appraised by the unit representative, Initial and refresher training are also provided covering safety and occupational health aspects. Regular safety interactions are also carried out by PP.
31	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.	<b>Complied.</b> PP has a separate Environment Management cell with qualified environmental professionals headed by AGM- Environment.
32	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.	<b>Complied.</b> PP has reported the Year wise expenditure to MoEF and its Regional Office. As appraised by unit representative, Expenses during Oct'23 to Mar'24 is Rs. 752.69 Lakhs.
33	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.	<b>Agreed for compliance by the unit.</b>
34	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.	<b>Complied.</b> PP has submitted the six-monthly reports on regular basis for the EC.
35	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.	<b>Agreed for compliance by the PP.</b>
36	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.	<b>Agreed for compliance by the PP.</b>
37	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.	<b>Pertains to RSPCB.</b>
38	The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular	<b>Complied.</b> PP submitted the copies of the newspaper clippings to the Regional Office of the MOEF.

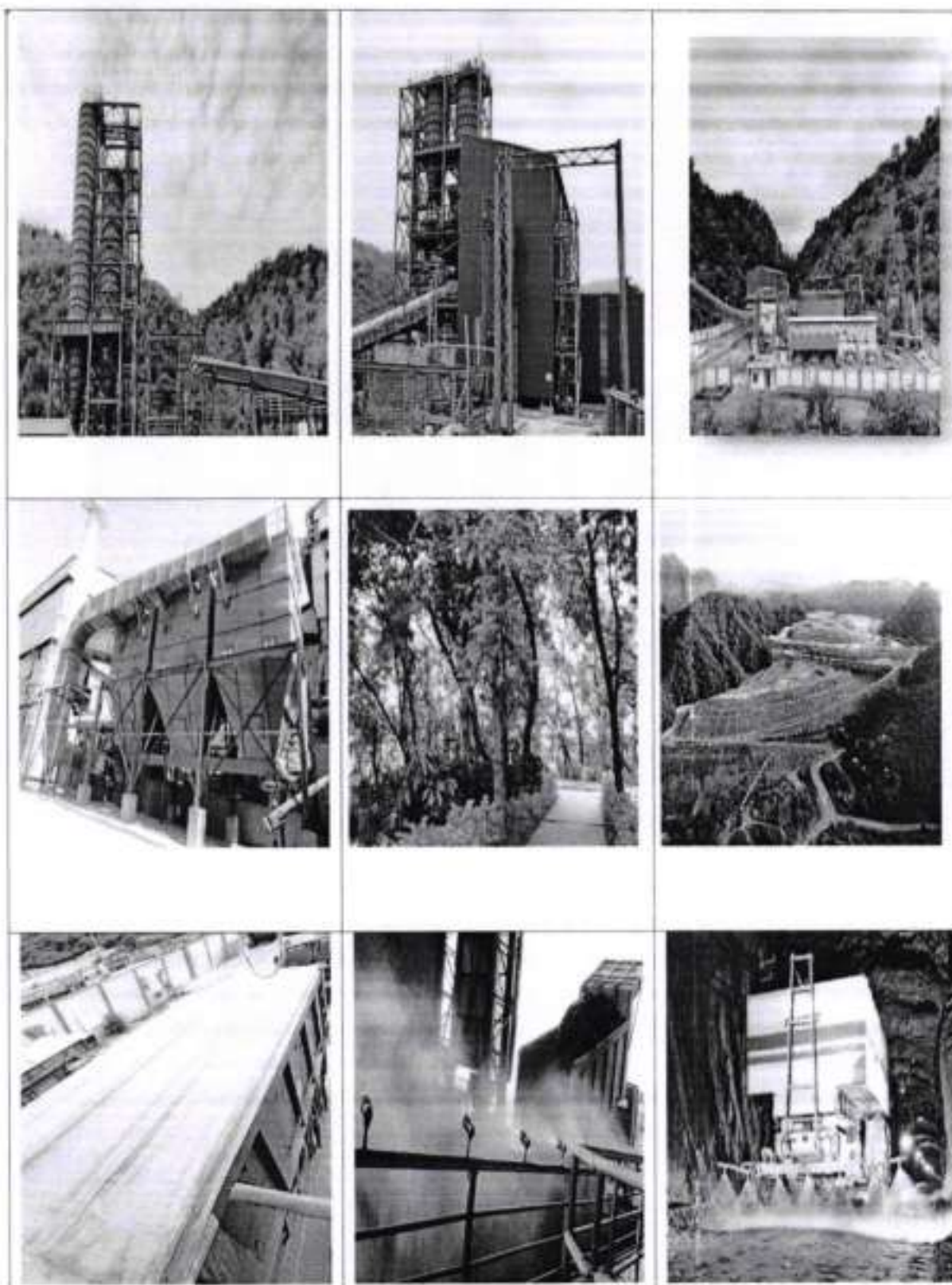
<p>language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment, Forest and Climate Change at <a href="http://www.environmentclearance.nic.in">www.environmentclearance.nic.in</a> and a copy of the same should be forwarded to the Regional Office.</p>	
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#### **Concluding Remarks:**

The project under reference named as 'Environmental clearance under para 7(ii) of EIA notification 2006 for expansion of Zawar Group of Underground Lead- Zinc Mines of M/s Hindustan Zinc Limited proposed expansion from 4.0 Million TPA to 4.8 Million TPA zinc Ore and expansion in beneficiation plant from 4.0 Million TPA to 4.8 Million TPA from the mine lease area of 3620 ha (ML No. 03/89) located at village Zawar, Tehsil Girwa and Sarada, District Udaipur, Rajasthan' is an underground mining unit having production capacity of 4.8 Million TPA Lead Zinc Ore. The project was visited on 07/08/2024 for the purpose of issuing Certified Compliance Report. Accordingly, monitoring of the conditions of environment clearance was done as narrated above.

  
 10/9/24  
 (Mahesh Dutt Purohit)  
 Joint Director/Scientist 'D'

**Photographs of M/s Hindustan Zinc Limited, Zawar Mines**









No.8-1/97-FC  
Government of India  
Ministry of Environment & Forests

\*\*\*

Annexure 5a\_FC dated 15.06.1998

Paryavaran Bhawan,  
CGO Complex,  
Lodhi Road,  
New Delhi-110 003.

Dated: 15.6.1998

16

To  
The Secretary (Forests),  
Govt. of Rajasthan,  
JAIPUR.

Sub:- Diversion of 114.94 HA. of Surface forest land and 1537.91 ha. for underground mining for renewal of Zawar mining lease in favour of M/S Hindustan Zinc Ltd. in Udaipur district, Rajasthan.

\*\*\*

Sir,

I am directed to refer to your letter No.P.1(11)Forest/97 dated 13.1.97 on the above mentioned subject seeking prior approval of the Central Government in accordance with Section-2 of the Forest (Conservation) Act, 1980.

After careful consideration of the proposal of the State Government, the Central Government hereby conveys its approval under Section-2 of the Forest (Conservation) Act, for diversion of 114.94 ha. of surface forest land and 1537.91 ha. for underground mining for renewal of Zawar mining lease in favour of M/S Hindustan Zinc Ltd. in Udaipur district of Rajasthan, subject to following conditions:-

- (i) Legal status of forest land shall remain unchanged.
- (ii) Compensatory afforestation over 459.76.9 ha. of degraded forest land shall be raised at the cost of user agency.
- (iii) The forest area being diverted shall be demarcated by RCC pillars on ground at the cost of user agency.
- (iv) Protection, Regeneration and maintenance of safety zone and enrichment plantation to an extent of one and half times of safety zone area over degraded forest elsewhere shall be done at the project cost.
- (v) Balance forest area shall be surrendered to forest department and adequate funds shall be provided to forest department for its reclamation.
- (vi) Reclamation of mined out area will be done including that of tailing dam to the satisfaction of forest department.
- (vii) The approval of mining lease will be for 20 years coterminus with lease under MMRD Act and subject to Environment clearance under EIA Notification, 1994.

- (viii) The forest land shall not be used for any purpose other than that specified in the proposal.
- (ix) Any other condition that the State Government may impose from time to time.

Yours faithfully,

(V.B. KUMAR)  
ASSTT. INSPECTOR GENERAL OF FORESTS

Copy to:-

1. Principal Chief Conservator of Forests, Govt. of Rajasthan, Jaipur.
2. Nodal Officer, Office of PCCF, Govt. of Rajasthan, Jaipur.
3. The CCF (Central), Regional Office, Lucknow.
4. RD(HQ), New Delhi.
5. Guard File.

*V.B. Kumar*  
16/6

(V.B. KUMAR)  
ASSTT. INSPECTOR GENERAL OF FORESTS

*Served  
1-2-1998*

*Re*



**F. No. 8-1/1997-FC**  
**Government of India**  
**Ministry of Environment & Forests**  
**(FC Division)**

Paryavaran Bhawan, CGO Complex,  
Lodhi Road, New Delhi-110 510.

Dated: 24<sup>th</sup> January, 2013

To

The Principal Secretary (Forests),  
Government of Rajasthan,  
Jaipur.

**Sub: Renewal of mining lease for diversion of 114.94 ha of forest land for surface rights and 1422.97 ha for underground mining (total forest land-1537.91 ha) of Zawar mines of M/s Hindustan Zinc Limited for mining of lead, zinc & silver in Udaipur district of Rajasthan.**

Sir,

I am directed to refer to the State Government's letter no. P-1(4)/2010 dated 27.01.2009 on the subject mentioned above seeking prior approval of the Central Government under section-2 of the Forest (Conservation) Act, 1980 and to say that the proposal has been examined by the Forest Advisory Committee constituted by the Central Government under section-3 of the said Act.

2. After careful examination of the proposal of the State Government and on the basis of the recommendation of the Forest Advisory Committee, the Central Government hereby conveys the 'in-principle' approval for renewal of mining lease for diversion of 114.94 ha of forest land for surface rights and 1422.97 ha for underground mining (total forest land-1537.91 ha) of Zawar mines of M/s Hindustan Zinc Limited for mining of lead, zinc & silver in Udaipur district of Rajasthan subject to fulfillment of the following conditions:

- i. Legal Status of the diverted forests shall remain unchanged;
- ii. Wherever possible and technically feasible, the User Agency shall undertake by involving local community, the afforestation measures in the blanks within the lease area, as well as along the roads outside the lease area diverted under this approval, in consultation with the State Forest Department at the project cost;
- iii. Fencing, protection and regeneration of the safety zone area (7.5 meter strip all along the outer boundary of the mining lease area) shall be done at the project cost. Besides this, afforestation on degraded forest land, to be selected elsewhere, measuring one and a half times the area under safety zone, shall also be done at the project cost;

*Shr*



- iv. Following activities shall be undertaken by the user agency under the supervision of the State Forest Department at the project cost:
- a. Preparation and implementation of a plan containing appropriate mitigative measures to minimize soil erosion and choking of streams;
  - b. Planting of adequate drought hardy plant species and sowing of seeds in the appropriate area within the mining lease to arrest soil erosion;
  - c. Construction of check dams, retention / toe walls along the contour to arrest sliding down of the excavated material;
  - d. Stabilize the overburden dumps by appropriate grading/benching so as to ensure that that angles of repose at any given place is less than  $28^{\circ}$ ; and
  - e. Strict adherence to the prescribed top soil management;
- v. User agency either himself or through the State Forest Department shall undertake gap planting and soil & moisture conservation activities to restock and rejuvenate the degraded open forests (having crown density less than 0.40), if any, located in the area within 100 m. from outer perimeter of the mining lease;
- vi. The user agency shall undertake mining in a phased manner after taking due care for reclamation of the mined over area. The concurrent reclamation plan as per the approved mining plan shall be executed by the User Agency from the very first year, and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, in the concerned State Government and the concerned Regional Office of the Ministry. If it is found from the annual report that the activities indicated in the concurrent reclamation plan are not being executed by the User Agency, the Nodal Officer or the Chief Conservator of Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities are satisfactorily executed;
- vii. The period of diversion of the said forest land under this approval shall be for a period co-terminus with the period of the mining lease proposed to be granted under the Mines and Minerals (Development & Regulating) Act, 1957, or Rules framed there under, subject to a maximum period of 30 years;
- viii. The State Government shall charge the Net Present Value of the forest area diverted under this proposal from the User Agency as per the Judgement of the Hon'ble Supreme Court of India dated 28.03.2008 & 09.05.2008 in IA No. 566 in WP (C) No. 202/1995 and as per the guidelines issued by this Ministry vide letter No. 5-3/2007-FC dated 05.02.2009 in this regard;
- ix. The User Agency shall furnish an undertaking to pay the additional NPV, if so

*Shr*



determined, as per the final decision of Hon'ble Supreme Court of India;

- x. All the funds received from the user agency under the project, except the funds realized for regeneration/ demarcation of safety zone, shall be transferred to Ad-hoc CAMPA in the Account pertaining to the State concerned;
- xi. The boundary of the diverted forest land, mining lease and safety zone, as applicable, shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, forward and back bearing and distance from pillar to pillar;
- xii. In case of under-ground mines, area on surface shall be fenced and afforested from the funds to be provided by the user agency;
- xiii. The user agency shall undertake de-silting of the village tanks and other water bodies located within five km from the mine lease boundary so as to mitigate the impact of siltation of such tanks/water bodies, whenever required;
- xiv. The user agency shall undertake greening of villages situated around the mine by planting fuel wood, fodder and agro-forestry plantations apart from creation of green belts;
- xv. The user agency shall ensure establishment of appropriate soil and moisture conservation structures including check dams in the mining lease area;
- xvi. Additional conditions under CSR to cater to the need of households of company employees and labourer living within one km from the outer boundary of the Zawar mines who are mainly dependent on forests for their fuel wood retirement:
  - (a) Distribute gas connection and minimum 9 gas cylinders free of cost to all the labourers employed by the Company or its contractors;
  - (b) Solar power light installation in all the habitations in and within one km of the lease shall be completed within a period of 3 years and shall be maintained for proper functioning including replacement for the entire lease period;
  - (c) Installation of Biogas plant of sufficient capacity in accordance with the livestock population of the village to meet the energy need of the household;
  - (d) Plantation activity - 50 ha per annum over the available land;
- xvii. Any tree felling shall be done only when it is unavoidable under strict supervision of the State Forest Department;

*Shu*



- xviii. No labour camps shall be set up inside the forest area;
- xix. No damage to the flora and fauna of the area shall be caused;
- xx. The forest land shall not be used for any purpose other than that specified in the proposal;
- xxi. The layout plan of the proposal shall not be changed without the prior approval of the Central Government;
- xxii. The forest land proposed to be diverted shall under no circumstances be transferred to any other agency, department or person without prior approval of the Central Government;
- xxiii. The user agency will obtain Environmental clearance and any other clearances required for such project before the final approval, if applicable;
- xxiv. The user agency will surrender equal extent of area duly reclaimed and afforested from the already diverted forest areas;
- xxv. The State Government shall complete settlement of rights, in terms of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, if any, on the forest land to be diverted and submit the documentary evidence as prescribed by this Ministry in its letter No. 11-9/1998-FC (pt.) dated 03.08.2009, in support thereof;
- xxvi. The user agency shall submit the annual self compliance report in respect of the above conditions to the State Government and to the concerned Regional Office of the Ministry regularly;
- xxvii. Any other condition that the concerned Regional Office of this Ministry may stipulate, from time to time, in the interest of conservation, protection and development of forests & wildlife;
- xxviii. The Hon'ble Supreme Court vide its order dated 19.02.2010 passed in IA. No 828 in W. P. No. 202 of 1995 has directed the Forest Survey of India (FSI) to carry out delineation work of the Aravalli Hills which is yet to be completed by the FSI. This approval shall be subject to the outcome of delineation work being undertaken by the FSI. If the forest land proposed to be diverted is found to be part of Aravalli Hills, the approval granted under the Forest (Conservation) Act, 1980 shall stand automatically cancelled. The Ministry shall ensure the location of the mine, *vis-a-vis*, Aravalli Hills before issue of final approval.
- xxix. The User Agency and the State Government shall ensure compliance to provisions of the all Acts, Rules, Regulations and Guidelines, for the time being in force, as applicable to the project.

Shy



3. After receipt of the Compliance report on the fulfillment of the above mentioned conditions contained in para 2 above, from the State Government of Jharkhand, formal approval will be issued in this regard under Section 2 of the Forest (Conservation) Act, 1980.

Yours faithfully,

(Shiv Pal Singh)

Sr. Assistant Inspector General of forests

Copy to:

1. The PCCF, Govt. of Rajasthan, Jaipur for information.
2. The Addl. PCCF (Central), Regional Office, Lucknow.
3. The Nodal Officer (FCA), o/o PCCF, Jaipur.
4. The User Agency.
5. The Monitoring Cell.
6. Guard File.

Shiv 24/1/13  
(Shiv Pal Singh)

Sr. Assistant Inspector General of forests

42

F. No. 8-1/1997-FC  
Government of India  
Ministry of Environment & Forests  
(FC Division)

Paryavaran Bhawan, CGO Complex,  
Lodhi Road, New Delhi-110 510.  
Dated: 23<sup>rd</sup> January, 2015

To  
The Principal Secretary (Forests),  
Government of Rajasthan,  
Jaipur.

Sub: **Renewal of mining lease for diversion of 114.94 ha of forest land for surface rights and 1422.97 ha for underground mining (total forest land-1537.91 ha) of Zawar mines of M/s Hindustan Zinc Limited for mining of lead, zinc & silver in Udaipur district of Rajasthan.**

Sir,

I am directed to refer to the State Government's letter no. P-1(4)/2010 dated 27.01.2009 on the subject mentioned above seeking prior approval of the Central Government under section-2 of the Forest (Conservation) Act, 1980. After careful examination of the proposal by the Forest Advisory Committee constituted under Section-3 of the said Act, 'in-principle' approval was granted vide this Ministry's letter of even number dated 24.01.2013 read with letter dated 29.04.2013 and 16.05.2013 subject to certain conditions prescribed therein. The State Government has furnished compliance report in respect of the conditions stipulated in the 'in-principle' approval and has requested the Central Government to grant final approval.

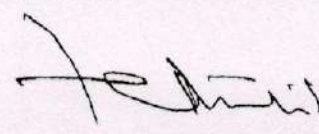
In this connection, I am directed to say that on the basis of the compliance report furnished by the State Government vide letter no. F-16/2009/FCA/Pramuvansh/421 dated 24.01.2014, 13.11.2014 and 19.01.2015, final approval of the Central Government is hereby granted under Section-2 of the Forest (Conservation) Act, 1980 for renewal of mining lease for diversion of 114.94 ha of forest land for surface rights and 1422.97 ha for underground mining (total forest land-1537.91 ha) of Zawar mines of M/s Hindustan Zinc Limited for mining of lead, zinc & silver in Udaipur district of Rajasthan subject to fulfillment of the following conditions:

- i. Legal Status of the diverted forests shall remain unchanged;
- ii. Wherever possible and technically feasible, the User Agency shall undertake by involving local community, the afforestation measures in the blanks within the lease area, as well as along the roads outside the lease area diverted under this approval, in consultation with the State Forest Department at the project cost;
- iii. Following activities shall be undertaken by the user agency for the management of safety zone:
  - (a) User agency shall ensure demarcation of boundary of safety zone (7.5 meter strip all along the outer boundary of the mining lease area), and its protection by erecting adequate number of 4 feet high RCC boundary pillars inscribed with DGPS coordinates and deploying adequate number of watchers under the supervision of the State Forest Department.





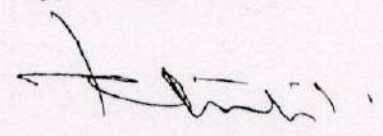
- (b) In case of the mining leases adjoining the habitation stretch of the boundary of the safety zone of the lease adjacent to the habitation/roads should be properly fenced by the user agency at the project cost to protect the vegetation /regeneration activities in the safety zone.
  - (c) Safety zone shall be maintained as green belt around the mining lease and to ensure dense canopy cover in the area, regeneration shall be taken in this area by the user agency at the project cost under the supervision of the State Forest Department.
  - (d) Afforestation on degraded forest land, to be selected elsewhere, measuring one and a half times the area under safety zone shall also be done by the user agency at the project cost under the supervision of the State Forest Department.
- iv. Though the forest area diverted will be used for underground mining which may not affect the surface area of the lease yet wherever required following activities shall be undertaken by the user agency under the supervision of the State Forest Department at the project cost:
  - a. Appropriate mitigative measures to minimize soil erosion and choking of streams;
  - b. Planting of adequate drought hardy plant species and sowing of seeds in the appropriate area within the mining lease to arrest soil erosion;
  - c. Construction of check dams, retention /toe walls along the contour to arrest sliding down of the excavated material;
  - d. Stabilize the overburden dumps by appropriate grading/benching so as to ensure that that angles of repose at any given place is less than 28°; and
  - e. Strict adherence to the prescribed top soil management;
- v. User agency either himself or through the State Forest Department shall undertake gap planting and soil & moisture conservation activities to restock and rejuvenate the degraded open forests (having crown density less than 0.40), if any, located in the area within 100 m. from outer perimeter of the mining lease;
- vi. The user agency shall undertake mining in a phased manner after taking due care for reclamation of the mined over area. The concurrent reclamation plan as per the approved mining plan shall be executed by the User Agency from the very first year, and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, in the concerned State Government and the concerned Regional Office of the Ministry. If it is found from the annual report that the activities indicated in the concurrent reclamation plan are not being executed by the User Agency, the Nodal Officer or the Chief Conservator of Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities are satisfactorily executed;
- vii. The period of diversion of the said forest land under this approval shall be for a period co-terminus with the period of the mining lease proposed to be granted under the Mines and Minerals (Development & Regulating) Act, 1957, or Rules framed





there under;

- viii. The User Agency shall pay the additional NPV, if so determined, as per the final decision of Hon'ble Supreme Court of India;
- ix. The boundary of the diverted forest land shall be demarcated on ground at the project cost, by erecting 10 feet high reinforced cement concrete pillars, each inscribed with its serial number, forward and back bearing and distance from pillar to pillar;
- x. In case of under-ground mines, area on surface shall be fenced and afforested from the funds to be provided by the user agency;
- xi. The user agency shall undertake de-silting of the village tanks and other water bodies located within five km from the mine lease boundary so as to mitigate the impact of siltation of such tanks/water bodies, whenever required;
- xii. The user agency shall undertake greening of villages situated around the mine by planting fuel wood, fodder and agro-forestry plantations apart from creation of green belts;
- xiii. The user agency shall ensure establishment of appropriate soil and moisture conservation structures including check dams in the mining lease area;
- xiv. The user agency shall ensure following under CSR to cater to the need of households of company employees and labourer living within one km from the outer boundary of the Zawar mines who are mainly dependent on forests for their fuel wood requirement:
  - (a) Distribute gas connection and minimum 9 gas cylinders free of cost to all the labourers employed by the Company or its contractors;
  - (b) Solar power light installation in all the habitations in and within one km of the lease shall be completed within a period of 3 years and shall be maintained for proper functioning including replacement for the entire lease period;
  - (c) Installation of Biogas plant of sufficient capacity in accordance with the livestock population of the village to meet the energy need of the household;
  - (f) Plantation activity - 50 ha per annum over the available land;
- xv. Any tree felling shall be done only when it is unavoidable under strict supervision of the State Forest Department;
- xvi. No labour camps shall be set up inside the forest area;
- xvii. No damage to the flora and fauna of the area shall be caused;
- xviii. The forest land shall not be used for any purpose other than that specified in the proposal;
- xix. The layout plan of the proposal shall not be changed without the prior approval of the Central Government;
- xx. The forest land proposed to be diverted shall under no circumstances be transferred to any other agency, department or person without prior approval of the Central





Government;

- xxi. The user agency will obtain Environmental clearance and any other clearances required for such project before the final approval, if applicable;
- xxii. The user agency will surrender equal extent of area duly reclaimed and afforested from the already diverted forest areas;
- xxiii. The user agency shall submit the annual self compliance report in respect of the above conditions to the State Government and to the concerned Regional Office of the Ministry regularly;
- xxiv. The State Government shall ensure compliances of all conditions for which undertakings have been submitted by the User Agency.
- xxv. The Hon'ble Supreme Court vide its order dated 19.02.2010 passed in IA. No 828 in W. P. No. 202 of 1995 has directed the Forest Survey of India (FSI) to carry out the satellite imagery work of the Aravalli Hills which is yet to be completed. The outcome of the study and final order of the Hon'ble Supreme Court will be binding on the user agency.
- xxvi. All other conditions stipulated in the Stage-I approval for which the user agency has submitted undertakings shall be complied with;
- xxvii. The user agency shall submit the annual self compliance report in respect of the above conditions to the State Government and to the concerned Regional Office of the Ministry regularly;
- xxviii. Any other condition that the concerned Regional Office of this Ministry may stipulate, from time to time, in the interest of conservation, protection and development of forests & wildlife;
- xxix. The User Agency and the State Government shall ensure compliance to provisions of the all Acts, Rules, Regulations and Guidelines, for the time being in force, as applicable to the project.

Yours faithfully,

(T. C. Nautiyal)

Assistant Inspector General of Forests

Copy to:

1. The PCCF, Government of Rajasthan, Jaipur.
2. The Addl. PCCF (Central), Regional Office, Lucknow.
3. The Nodal Officer (FCA), o/o PCCF, Government of Rajasthan, Jaipur.
4. The User Agency (M/s Hindustan Zinc Limited, Zawar Mines, Udaiपुर 313 901, Rajasthan).
5. The Monitoring Cell, FC Division, MoEF, New Delhi.
6. Guard File.

(T. C. Nautiyal)

Assistant Inspector General of Forests

**Acknowledgement Slip**

This is to certify that hard copy of the proposal seeking prior approval of Central Government under the Forest (Conservation) Act 1980, as per details given below, along with all necessary enclosures has been received in the Office of the Rajasthan on 16/03/2021.

**1. Proposal No. :** FP/RJ/MIN/25404/2017

**2. Proposal Name:** Diversion of 68.95 ha. Forest Land for Surface Rights for expansion of facilities related to Mining and Beneficiation Plant for enhancing the Production Capacity of Zawar Mines (ML No.-3/89) in Tehsil - Girwa & Sarada, District - Udaipur, Rajasthan by Hindustan Zinc Ltd.

**3. Category of the Proposal:** Mining

**4. Date of Submission:** 16/05/2017

**5. Name of the User Agency with Contact Details**

Name: Kishore Kumar S

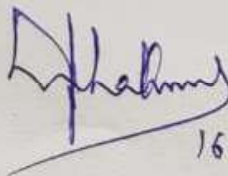
Mobile No. : 9799995890


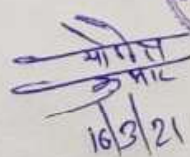
State: Rajasthan

District: Udaipur

Pincode: 313901

**6. Area Applied (ha.):** 68.95

  
16/3/2021

  
  
16/3/21 (System Administrator)

Director Zawar SBU  
Hindustan Zinc Limited  
Zawar Mines  
District Udaipur (Raj.)  
Pin 313901

2021/3/16 13:28





ज़ावर माइन्स  
पिन कोड - 313901  
ज़िला - उदयपुर (राज.)

**HINDUSTAN ZINC LIMITED**  
हिन्दुस्तान जिंक लिमिटेड

Telephone - (0294) 2726600, Fax-2726243

Zawar Mines  
PIN Code - 313901  
Dist-Udaipur (Raj.)

HZL/ZM/ENV/2021/137

Date: 16/03/2021

To,

The District Collector  
Udaipur, Rajasthan

**Subject:** Submission of Hard Copy of Forest Diversion Proposal for Scheduled Tribes and Other Traditional Forest Dwellers (STOTFD) Certificate wrt "Diversion of 68.95 ha. Forest Land for expansion of facilities related to Mining and Beneficiation Plant for enhancing the Production Capacity of Zawar Mines (ML No.-3/89) in Tehsil - Girwa & Sarada, District - Udaipur, Rajasthan by Hindustan Zinc Limited".

Sir,

We would like to inform that, Hindustan Zinc Limited, Zawar Mines, Udaipur has submitted the Forest Diversion Proposal of 68.95 ha. Forest Land to FCA Nodal Officer, Jaipur under FCA, 1980 Act. for expansion of facilities related to Mining and Beneficiation Plant for enhancing the Production Capacity of Zawar Mines (ML No.-3/89) in Tehsil - Girwa & Sarada, District - Udaipur, Rajasthan

In this context, as per the Ministry of Environment and Forest (MoEF) Notification and FCA Nodal Officer requirement, Scheduled Tribes and Other Traditional Forest Dwellers (STOTFD) Certificate is required to proceed the Forest Diversion Proposal, therefore we are herewith submitting the hard copy of Forest Diversion Proposal and request you to kindly provide the STOTFD Certificate at earliest.

**Proposal Details:**

- Proposal No.: FP/RJ/MIN/25404/2017
- Name of Project for which Forest Land is required: Diversion of 68.95 ha. Forest Land for Surface Rights for expansion of facilities related to Mining and Beneficiation Plant for enhancing the Production Capacity of Zawar Mines (ML No.-3/89) in Tehsil - Girwa & Sarada, District - Udaipur, Rajasthan by Hindustan Zinc Ltd.
- State: Rajasthan
- Category of the Project: Mining
- Area of forest land proposed for diversion (in ha.): 68.95

Thanking You.

Yours faithfully

(Kishore Kumar S)

Director, Zawar Mine SBU  
Hindustan Zinc Ltd.

**Director Zawar SBU**  
**Hindustan Zinc Limited**  
**Zawar Mines**  
**District Udaipur (Raj.)**  
**Pin 313901**

Regd. Office: Yashad Bhawan, Udaipur (Rajasthan) - 313004  
Website: [www.hzindia.com](http://www.hzindia.com)

o/c

2021/3/16 13:28

## List of Proposals Submitted Online by User Agencies

## Help

Using this report, you can view details of proposals . Click on Proposal no to view detail of FORM-A part I. Click on  to print


☒ Allocation of fresh forest land (Form-A) ☐ Application Under Section 2(iii) ☐ Renewal of lease (Form-B) ☐ Prospecting of Minerals (Form-C)

Proposal Year : -All Years- 

Region : Select 

Category : Mining 




State : Rajasthan 

Status of the Proposal : -Select All- 

Enter value for Search : 25404

SEARCH

Note :-All areas are in Hectares(ha.)

Sno.	State Name	Proposal No.	RO/Ministry File Number	Proposal Name	Category	User Agency Name	Area (ha.)	Proposal Status	Proposal received electronically on	View Report of Part-I	View Report of PartII	View Tim
1	Rajasthan	FP/RJ/MIN/25404/2017	NA	Diversion of 68.95 ha. Forest Land for Surface Rights for expansion of facilities related to Mining and Beneficiation Plant for enhancing	Mining	HINDUSTAN ZINC LIMITED	68.95	Under Examination	16 May 2017	 (viewreport.aspx?pid=FP/RJ/MIN/25404/2017)	 (PartIIReport_A.aspx?pid=FP/RJ/MIN/25404/2017)	 (tin pid=FP/R)



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For any Technical support, Please Contact EFCCID, NIC, New

Delhi, monitoring-fc(at)nic(dot)in



Head Office (Mines )

Rajasthan State Pollution Control Board  
4, Institutional Area, Jhalana Doongari, Jaipur-302 004  
Phone: 0141-5159600,5159695 Fax: 0141-5159697



Registered

File No F(Mines)/Udaipur(Sarada)/53(1)/2016-2017/4486-4490

Order No 2020-2021/Mines/10212

Date: 12/01/2021

Unit Id : 10,974

M/s Hindustan Zinc Limited (Zawar Mines)

P.O.- Zawar Mines, Udaipur- 313 901,

District :Udaipur

E-Mail : hitendra.bhuptawat@vedanta.co.in

**Sub:** Grant of Consent to Establish under section 21(4) of Air (Prevention & Control of Pollution) Act, 1981 and under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 for your **Major Mineral** Mine at near Village-**Zawar**, Tehsil-**Sarada**, District- **Udaipur (M.L.No-03/89-R-323/08 )**.

**Ref:** (i) Your applications dated 12/12/2020  
(ii) Received on 12/12/2020  
(iii) Received at Head office on 11/12/2020

Sir,

In view of the details submitted vide your above referred applications/ documents, the **Consent to Establish** under section 21(4) of Air (Prevention & Control of Pollution) Act,1981 and under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 is hereby granted for carrying mining activities. This consent is subject to the following stipulations:-

- 1 That this consent is being granted in favour of **M/s. Hindustan Zinc Limited (Zawar Mines)**, a Mine of **Major Mineral** having **M.L.No.- 03/89-R-323/08 in an area measuring 3620.0000 Hectares** at/near Village - **Zawar**, Tehsil-**Sarada**, District-**Udaipur**.
- 2 That this consent is valid for a period from **12/01/2021** to **31/12/2022**, or **commencement of production whichever is earlier**.
- 3 That this consent is valid for following mining activities :-

Mineral	Permitted Mining Capacity
<b>1</b> LEAD & ZINC ORE MINING	0.8000 MILLION TONNES PER ANNUM

- 4 That the project proponent will comply with the Standard as prescribed vide the Ministry of Environment, Forest and Climate Change notification no. GSR 826(E) dated 16th November, 2009 with respect to National Ambient Air Quality standards.

Signature Not Verified

Digitally signed by Khem Chand Gupta  
Date: 2021.01.12 13:03:39 IST  
Reason: Self Attested  
Location:





Head Office (Mines )

Rajasthan State Pollution Control Board  
4, Institutional Area, Jhalana Doongari, Jaipur-302 004  
Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No F(Mines)/Udaipur(Sarada)/53(1)/2016-2017/4486-4490

Order No 2020-2021/Mines/10212

Date: 12/01/2021

Unit Id : 10,974

- 5 That the occupier/operator of mine shall ensure that all the conditions imposed in the Environmental Clearance granted by the , vide letter No F.NO.J-11015/259/2012-IA-II(M) dated 16/10/2020 shall be strictly complied with.
- 6 That the occupier/operator of mine shall ensure that all the conditions imposed in the Forest Diversion Letter issued by the , vide letter No F.NO.8-1/1997-FC dated 23/01/2015 shall be strictly complied with.
- 7 That this consent to establish/consent to operate is only for carrying out mining of mineral/ore and not for any processing/beneficiation or crushing/grinding of ore/mineral for which a separate application for consent to establish and/or consent to operate should be submitted. The project proponent is required to obtain seprate consent to establish and consent to operate for carrying out mining of other minerals(s), if any or processing/beneficiation of such mineral(s) and for any addition/modification/alteration or change in process.
- 8 That you shall not operate the mine without obtaining **Consent to Operate** from the Board.
- 9 That this **Consent to Establish** is for mining / processing / beneficiation of product as mentioned above in **M.L.No.-03/89-R-323/08** and a separate **Consent to Establish** is required to be obtained for any other Mineral mining/ processing/ beneficiation Plant/process if any and for any addition/ modification/ alteration or change in process.
- 10 That the occupier/operator of mine shall ensure that all the conditions imposed in the Environmental Clearance granted by the Ministry of Environment, Forest and Climate Change vide letter No.J-11015/259/2012-IA. II (M), dated 05/01/2017 and further expansion issued vide letter No.J-11015/259/2012-IA. II (M), dated 16/10/2020 are strictly complied with.
- 11 That this consent to establish is valid for production of Lead & Zine Ore Mining @ 0.80 Million TPA. For any change in product and/or increase in capacity/lease area, the mine has to seek fresh Environmental Clearance, consent to establish & consent to operate.
- 12 That the lessee shall get renewal of permission for dewatering of ground Water in mine pit and intersection of Water table from of Central Ground Water Authority (CGWA), as the earlier permissions granted by CGWA vide letters dated 11/12/2013 stands expired.
- 13 That plantation shall be developed so as to cover at least 33% of the total land use for mining and allied activities as given in Approved Mining Plan and shall be maintained at all the time to maintain ambient air quality around the mine.

Signature Not Verified

Digitally signed by Khem Chand  
Gupta  
Date: 2021.01.12 13:03:39 IST  
Reason: Self Attested  
Location:







Head Office (Mines )

Rajasthan State Pollution Control Board  
4, Institutional Area, Jhalana Doongari, Jaipur-302 004  
Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No F(Mines)/Udaipur(Sarada)/53(1)/2016-2017/4486-4490

Order No 2020-2021/Mines/10212

Date: 12/01/2021

Unit Id : 10,974

- 14 That ground water shall not be abstracted without prior permission of the Central Ground Water Authority (CGWA).
- 15 That haul roads should be regularly graded and compacted. Regular water sprinkling should be carried out on haul roads to minimize dust generations.
- 16 That adequate measure shall be taken for control of fugitive emissions from the areas prone to air pollution.
- 17 That you shall not establish/operate any stone crusher/mineral grinding/mineral processing plant within said lease without obtaining prior consent of the State Board.
- 18 That this consent to establish shall not be valid, if the lessee has not obtained permissions required, if any, from NBWL/Forest Department etc. with respect to Wild Life Sanctuary /National Parks/ Critical Tiger Habitats in compliance of various orders passed by any other law /act/rule/regulation or order of MOE&F and/or any Court / Tribunal time to time.
- 19 That regular water sprinkling should be carried out in critical areas prone to air pollution and having high levels of SPM and RSPM such as on haul road, loading and unloading points and transfer points.
- 20 That the lessee should dump the overburden in such a manner that it does not get washed away to nearby water tanks and lakes etc. during rainy season.
- 21 That no discharge of effluent shall be made within or outside the premises.
- 22 This consent to establish shall be subject to validity of mining lease.
- 23 That this consent to establish shall be subject to compliance of direction/order passed by Courts of Law in the matter, if any.
- 24 That the mine shall install adequately designed rain water harvesting structure for prevention and recharge of ground water in and around the lease area.
- 25 That the mine shall not allow making any obstacles to any natural water flow i.e. natural nallah/steam carrying rain water to any water body.
- 26 That the mine shall not allow unauthorized disposal of any solid waste on land inside or outside the premises.
- 27 That all other general conditions enclosed as **Annexure** shall be strictly complied with.
- 28 That this Consent is subject to the conditions as stated above and general conditions as stated in Annexure. Further, the mining unit will comply with the provisions of the Air (Prevention & Control of Pollution) Act, 1981 & Water (Prevention & Control of Pollution) Act, 1974 and any such conditions as may be specified from time to time by the State Board under the provisions of the aforesaid Acts.

Signature Not Verified

Digitally signed by Khem Chand  
Gupta  
Date: 2021.01.12 13:03:39 IST  
Reason: Self Attested  
Location:





**Head Office (Mines )**

Rajasthan State Pollution Control Board  
4, Institutional Area, Jhalana Doongari, Jaipur-302 004  
Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

**File No** F(Mines)/Udaipur(Sarada)/53(1)/2016-2017/4486-4490

**Order No** 2020-2021/Mines/10212

**Date:** 12/01/2021

**Unit Id :** 10,974

- 29 That the grant of this **Consent to Establish** is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility, to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.
- 30 That the grant of this **Consent to Establish** shall not, in any way, adversely affect or jeopardize the legal proceedings, if any, instituted in the past or that could be instituted against you by the State Board for violation of the provisions of the Act or the Rules made thereunder.
- 31 That the grant of this consent to establish/operate is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other legal instrument in force. The sole and complete responsibility, to comply with the conditons laid down in all other laws for the time-being in force, rests with the industry/unit/project proponent.

This bears approval of the competent authority.

Encl: As Above

**Yours Sincerely**

**Group Incharge-Mines**

**(A): Copy To:-**

- 1 Director, Department of Mines & Geology, Government of Rajasthan, Shastri Circle, Udaipur..
- 2 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Udaipur - please ensure compliance of the consent conditions and monitor time to time
- 3 Mining Engineer, Department of Mines & Geology, Government of Rajasthan, Udaipur - To inform that this consent has been issued from the environmental angle only, and ensuring compliance of any other law/act/rule/regulation or order of any Court/Tribunal is the sole responsibility of the project proponent and the concerned departments.
- 4 Master File .

**Signature Not Verified**

Digitally signed by Khem Chand  
Gupta  
Date: 2021.01.12 13:03:39 IST  
Reason: Self Attested  
Location:







**Head Office (Mines )**

**Rajasthan State Pollution Control Board**  
4, Institutional Area, Jhalana Doongari, Jaipur-302 004  
Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

**File No**      **F(Mines)/Udaipur(Sarada)/53(1)/2016-2017/4486-4490**

**Order No**      2020-2021/Mines/10212

**Date:**      **12/01/2021**

**Unit Id :**      10,974

(B):

- <sup>1</sup> The Additional PCCF (WL) and Chief Wild Life Warden, Aranya Bhawan, Jhalana Institutional Area, Jaipur / DCF(W), Udaipur - To inform that this consent has been issued from the environmental angle only, and ensuring compliance of any other law/act/rule/regulation or order of any Court/Tribunal is the sole responsibility of the project proponent and the concerned departments.

**Group Incharge-Mines**

**Signature Not Verified**

Digitally signed by Khem Chand  
Gupta  
Date: 2021.01.12 13:03:39 IST  
Reason: Self Attested  
Location:





Head Office (Mines )

Rajasthan State Pollution Control Board  
4, Institutional Area, Jhalana Doongari, Jaipur-302 004  
Phone: 0141-5159600,5159695 Fax: 0141-5159697



Registered

File No F(Mines)/Udaipur(Sarada)/53(1)/2016-2017/10641-10645

Order No 2016-2017/Mines/9159

Date: 16/02/2017

Unit Id : 10,974

M/s Hindustan Zinc Limited (Zawar Mines)

P.O.- Zawar Mines, Udaipur- 313 901,

District :Udaipur

E-Mail : dineshkumar.paliwal@vedanta.co.in

**Sub:** Grant of Consent to Establish under section 21(4) of Air (Prevention & Control of Pollution) Act, 1981 and under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 for your **Major Mineral** Mine at near Village-Zawar, Tehsil-Sarada, District- Udaipur (M.L.No-03/89-R-323/08 ).

**Ref:** (i) Your applications dated 23/01/2017  
(ii) Received on 01/02/2017

Sir,

In view of the details submitted vide your above referred applications/ documents, the **Consent to Establish** under section 21(4) of Air (Prevention & Control of Pollution) Act, 1981 and under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 is hereby granted for carrying mining activities. This consent is subject to the following stipulations:-

- 1 That this consent is being granted in favour of **M/s. Hindustan Zinc Limited (Zawar Mines)**, a Mine of **Major Mineral** having **M.L.No.- 03/89-R-323/08** in an area **measuring 3620.0000 Hectares** at/near Village-Zawar, Tehsil-Sarada, District-Udaipur.
- 2 That this consent is valid for a period from **16/02/2017** to **31/12/2017**, or **commencement of production whichever is earlier.**
- 3 That this consent is valid for following mining activities :-

Mineral	Permitted Mining Capacity
1 LEAD ZINC ORE MINING	2.5000 MILLION TONNES/ ANNUM
2 D. G. SET	500.0000 KW
3 D. G. SET	250.0000 KW

Signature valid  
Digitally signed by  
NIPAN MAHAR  
Date: 2017.02.16  
13:12:05 +05:30





Rajasthan State Pollution Control Board  
4, Institutional Area, Jhalana Doongari, Jaipur-302 004  
Phone: 0141-5159600,5159695 Fax: 0141-5159697  
website: www.rpcb.nic.in

Registered

File No F(Mines)/Udaipur(Sarada)/9(1)/2009-2010/ 6139

Order No 2009-2010/Mines/472

Date: 10/3/2010

M/s Hindustan Zinc Limited (Zawar Mines)

P.O.- Zawar Mines, Udaipur- 313 901,

District :Udaipur

Sub: Grant of Consent to Establish under section 21(4) of Air (Prevention & Control of Pollution) Act, 1981 and under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 for your **Major Mineral** Mine at near Village-Zawar, Tehsil-Sarada, District- Udaipur (M.L.No.-03/89 ).

- (i) Your applications dated 02/12/2009  
(ii) Received on 02/12/2009  
(iii) Received at Head office on 08/12/2009

Sir,

In view of the details submitted vide your above referred applications/ documents, the **Consent to Establish** under section 21(4) of Air (Prevention & Control of Pollution) Act,1981 and under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 is hereby granted for carrying mining activities. This consent is subject to the following stipulations:-

- 1 That this consent is being granted in favour of **M/s. Hindustan Zinc Limited (Zawar Mines)**, a Mine of **Major Mineral** having **M.L.No.-03/89** in an area measuring **3620 Hectares** at/near Village-Zawar, Tehsil-Sarada, District-Udaipur.
- 2 That this consent is valid for a period from **23/02/2010** to **31/01/2013**, or **commencement of production whichever is earlier.**
- 3 That this consent is valid for following mining activities :-

Mineral	Permitted Mining Capacity
1 LEAD ZINC ORE MINING	1.50 MILLION TONNES PER ANNUM
2 BENEFICIATION FOR LEAD - ZINC ORE	1.50 MILLION TONNES PER ANNUM

- 4 That you shall achieve following standards in ambient air in mine area / mining activities.

Pollutant	Standards for Ambient Air	Standards for mining activity
SPM	500 $\mu\text{g}/\text{M}^3$	SPM = 600 $\mu\text{g}/\text{M}^3$ (To be measured between 3 to 10 meters from mining activity)
SO <sub>2</sub>	120 $\mu\text{g}/\text{M}^3$	
NO <sub>x</sub>	120 $\mu\text{g}/\text{M}^3$	
CO	5000 $\mu\text{g}/\text{M}^3$	





Rajasthan State Pollution Control Board  
4, Institutional Area, Jhalana Doongari, Jaipur-302 004  
Phone: 0141-5159600, 5159695 Fax: 0141-5159697  
website: www.rpcb.nic.in  
Revised Consent

File No F(Mines)/Udaipur(Sarada)/9(1)/2009-2010/4423-4427

Order No 2011-2012/Mines/1179

Date: 21/09/2011

M/s Hindustan Zinc Limited (Zawar Mines)

P.O.- Zawar Mines, Udaipur- 313 901,

District :Udaipur

Sub: Grant of Consent to Establish under section 21(4) of Air (Prevention & Control of Pollution) Act, 1981 and under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 for your **Major Mineral** Mine at near Village-Zawar, Tehsil-Sarada, District- Udaipur (M.L.No-03/89 ).

Ref: (i) Your applications dated 02/12/2009

(ii) Received on 02/12/2009

(iii) Received at Head office on 08/12/2009

Sir,

In view of the details submitted vide your above referred applications/ documents, the **Consent to Establish** under section 21(4) of Air (Prevention & Control of Pollution) Act, 1981 and under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 is hereby granted for carrying mining activities. This consent is subject to the following stipulations:-

- 1 That this consent is being granted in favour of **M/s. Hindustan Zinc Limited (Zawar Mines)**, a Mine of **Major Mineral** having **M.L.No.- 03/89** in an area measuring **3620.0000 Hectares** at/near Village-Zawar, Tehsil-Sarada, District-Udaipur.
- 2 That this consent is valid for a period from **23/02/2010** to **31/01/2013**, or **commencement of production whichever is earlier.**
- 3 That this consent is valid for following mining activities -

Mineral	Permitted Mining Capacity
1 LEAD ZINC ORE MINING	1.5000 MILLION TONNES PER ANNUM
2 BENEFICIATION FOR LEAD - ZINC ORE	1.5000 MILLION TONNES PER ANNUM



Registered

File No : F(HDF)/Udaipur(Sarada)/1(1)/2020-2021/4882-4884

Order No : 2020-2021/HDF/3262

Dispatch Date: 29/01/2021

Unit Id : 10974

M/s Hindustan Zinc Limited (Zawar Mines)

P.O.- Zawar Mines, Udaipur- 313 901, ,

District:Udaipur

Sub: **Consent to Establish** under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21(4) of Air (Prevention & Control of Pollution) Act, 1981.

Ref: Your application(s) for Consent to Establish dated 12/12/2020 and subsequent correspondence.

Sir,

**Consent to Establish** under the provisions of section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter to be referred as the Water Act) and under section 21 of the Air (Prevention & Control of Pollution) Act, 1981, (hereinafter to be referred as the Air Act) as amended to date and rules & the orders issued thereunder ,**is hereby granted** for your **Beneficiation plant** situated / proposed at **PO- Zawar Mines Zawar Tehsil:Sarada District:Udaipur** , Rajasthan under the provisions of the said Act(s). This consent is granted on the basis of examination of the information furnished by you in consent application(s) and the documents submitted therewith, subject to the following conditions:-

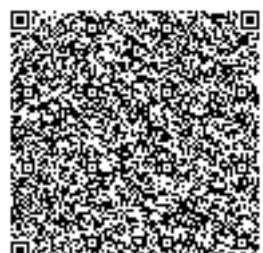
- 1 That this Consent to Establish is valid for a period from **29/01/2021 to 31/12/2025 or date of Commencement of production / commissioning of the project or activities whichever is earlier .**
- 2 That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/processes or providing following services with capacities given below.

Particular	Type	Quantity / Capacity
Beneficiation for Lead Zinc Ore	Activity	0.80 MILLION TONES PER ANNUM

- 3 That in case of any increase in capacity or addition / modification / alteration or change in product mix or process or raw material or fuel the project proponent is required to obtain fresh consent to establish.
- 4 That the control equipment as proposed by the applicant shall be installed before trial operation is started for which prior consent to operate under the provision of the **Water Act and Air Act** shall be obtained. This consent to establish shall not be treated as consent to operate.

Signature Not Verified

Digitally signed by Rajeev Mahnot  
Date: 2021.02.01 17:17:14 IST  
Reason: SelfAttested  
Location:





Head Office (HDF )

**Rajasthan State Pollution Control Board**

4, Institutional Area, Jhalana Doongari, Jaipur-302

Phone: 0141-5159600, 5159695 Fax: 0141-5159697

Registered

File No : F(HDF)/Udaipur(Sarada)/1(1)/2020-2021/4882-4884

Order No : 2020-2021/HDF/3262

Dispatch Date: 29/01/2021

Unit Id : 10974

- 5 That the **Beneficiation plant** will comply with the standards as prescribed vide MOEF notification No. GSR 826(E) dated 16th November, 2009 with respect to National Ambient Air Quality Standards.
- 6 That this consent to establish is being issued for enhancement of production capacity of Lead Zinc Ore Beneficiation plant from 4.00 MTPA to 4.80 MTPA (20 % increase) in the existing plant premises by debottlenecking of existing equipments. The industry has to seek fresh consent to establish for any change in product/by product/ process / service/activity and for any modification / alteration.
- 7 That additional plant & machinery shall not be installed for increase in production capacity and same will be achieved by debottlenecking of existing equipments used for 4.00 MTPA production capacity by upgrading upto 4.80 MTPA (Mochia Crusher: 1.2 MTPA, Balaria Crusher: 1.6 MTPA & New Crusher: 2.0 MTPA).
- 8 That the industry shall comply with all the conditions of Environmental Clearance (E.C.) issued by the Ministry of Environment, Forest & Climate Change (MoEF& CC), Government of India, vide letter no. J-11015/259/2012-IA.II(M) dated 05.01.2017 and 16.10.2020.
- 9 That proposed capital investment for increase in production capacity by debottlenecking of existing equipments is Rs. 170 Crore as per C.A. certificate submitted by the industry.
- 10 That total water consumption and waste water generation of the industry shall not exceed from existing as allowed under consent to operate order no 2017-2018/CPM/5114 dated 21.03.2018 due to proposed expansion in the production capacity by debottlenecking of existing equipments.
- 11 That the industry shall not abstract ground water without obtaining prior NOC/Permission from CGWA for withdrawal of ground water.
- 12 That no additional source of Air/Water pollution shall be installed without prior consent to establish from the State Board.
- 13 That the industry shall install adequately designed rain water harvesting structure for recharge of ground water in and around the area.
- 14 That industry shall comply with the provisions of Hazardous Waste (Management, Handling and Trans boundary Movement) Rules, 2016 and daily record of Hazardous waste generation and its disposal shall be maintained.
- 15 That the plantation of local species in the 33% of total area of the project shall be carried out.

Signature Not Verified

Digitally signed by Rajeev Mahnot  
Date: 2021.02.01 17:17:14 IST  
Reason: SelfAttested  
Location:







Head Office (HDF )

**Rajasthan State Pollution Control Board**

**4, Institutional Area, Jhalana Doongari, Jaipur-302**

**Phone: 0141-5159600, 5159695 Fax: 0141-5159697**

**Registered**

**File No : F(HDF)/Udaipur(Sarada)/1(1)/2020-2021/4882-4884**

**Order No : 2020-2021/HDF/3262**

**Dispatch Date: 29/01/2021**

**Unit Id : 10974**

- 16** That, notwithstanding anything provided hereinabove, the State Board shall have power and reserves its right, as contained **under section 27(2) of the Water Act and under section 21(6) of the Air Act** to review anyone or all the conditions imposed here in above and to make such variation as it deemed fit for the purpose of compliance of the **Water Act and Air Act**.
- 17** That the grant of this **Consent to Establish** is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility, to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.
- 18** That the grant of this **Consent to Establish** shall not, in any way, adversely affect or jeopardize the legal proceedings, if any, instituted in the past or that could be instituted against you by the State Board for violation of the provisions of the Act or the Rules made thereunder.

This **Consent to Establish** shall also be subject, beside the aforesaid specific conditions, to the general conditions given in the enclosed Annexure. The project proponent will comply with the provisions of the **Water Act and Air Act** and to such other conditions as may, from time to time, be specified by the State Board under the provisions of the aforesaid Act(s). Please note that, non compliance of any of the above stated conditions would tantamount to revocation of **Consent to Establish** and project proponent / occupier shall be liable for legal action under the the relevant provisions of the said Act(s).

This bears the approval of the competent authority.

**Yours Sincerely**

**Group Incharge[ HDF ]**

**(A): Copy To:-**

- 1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Udaipur to ensure the compliance.
- 2 Master File.

Page 3 of 4

**Signature Not Verified**

Digitally signed by Rajeev Mahnot  
Date: 2021.02.01 17:17:14 IST  
Reason: SelfAttested  
Location:





Head Office (HDF )

**Rajasthan State Pollution Control Board**

**4, Institutional Area, Jhalana Doongari, Jaipur-302**

**Phone: 0141-5159600, 5159695 Fax: 0141-5159697**

**Registered**

**File No : F(HDF)/Udaipur(Sarada)/1(1)/2020-2021/4882-4884**

**Order No : 2020-2021/HDF/3262**

**Dispatch Date: 29/01/2021**

**Unit Id : 10974**

**Group Incharge[ HDF ]**

**Signature Not Verified**

Digitally signed by Rajeev Mahnot  
Date: 2021.02.01 17:17:14 IST  
Reason: Self Attested  
Location:





Head Office (CPM )  
**Rajasthan State Pollution Control Board**  
4, Institutional Area, Jhalana Doongari, Jaipur-302  
Phone: 0141-5159600, 5159695 Fax: 0141-5159697



Registered

File No : F(CPM)/Udaipur(Sarada)/1(1)/2017-2018/5407-5409

Order No: 2017-2018/CPM/4954

Dispatch Date: 08/09/2017

Unit Id : 10974

M/s Hindustan Zinc Limited (Zawar Mines)

P.O.- Zawar Mines, Udaipur- 313 901, ,

District:Udaipur

Sub: **Consent to Establish** under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21(4) of Air (Prevention & Control of Pollution) Act, 1981.

Ref: Your application(s) for Consent to Establish dated 28/02/2017 and subsequent correspondence.

Sir,

**Consent to Establish** under the provisions of section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter to be referred as the Water Act) and under section 21 of the Air (Prevention & Control of Pollution) Act, 1981, (hereinafter to be referred as the Air Act) as amended to date and rules & the orders issued thereunder, **is hereby granted** for your **Beneficiation plant** situated / proposed at **PO- Zawar Mines Zawar Tehsil: Sarada District: Udaipur**, Rajasthan under the provisions of the said Act(s). This consent is granted on the basis of examination of the information furnished by you in consent application(s) and the documents submitted therewith, subject to the following conditions:-

- 1 That this Consent to Establish is valid for a period from **03/03/2017 to 28/02/2022 or date of Commencement of production / commissioning of the project or activities whichever is earlier**.
- 2 That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/processes or providing following services with capacities given below.

Particular	Type	Quantity / Capacity
LEAD ZINC ORE BENEFICIATION	Product	2.50 MILLION TONNES PER ANNUM

- 3 That in case of any increase in capacity or addition / modification / alteration or change in product mix or process or raw material or fuel the project proponent is required to obtain fresh consent to establish.
- 4 That the control equipment as proposed by the applicant shall be installed before trial operation is started for which prior consent to operate under the provision of the **Water Act and Air Act** shall be obtained. This consent to establish shall not be treated as consent to operate.



Rajasthan State Pollution Control Board  
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Registered

File No F(Mines)/Udaipur(Sarada)/53(1)/2016-2017/5003-5007

Order No 2022-2023/Mines/10683

Date: 20/12/2022

Unit Id : 10,974

M/s Hindustan Zinc Limited (Zawar Mines)

P.O.- Zawar Mines, Udaipur- 313 901,

District :Udaipur

E-Mail : hitendra.bhuptawat@vedanta.co.in

**Sub:** Grant of Consent to Operate under Section 21(4) of Air (Prevention & Control of Pollution) Act, 1981 and under Section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 for your **Major Mineral** Mine at near Village-**Zawar**, Tehsil-**Sarada**, District- **Udaipur (M.L.No-03/89-R-323/08 )**.

**Ref:** (i) Your applications dated 17/08/2022  
(ii) Received on 17/08/2022

Sir,

In view of the details submitted vide your above referred applications/ documents, the **Consent to Operate** under Section 21(4) of Air (Prevention & Control of Pollution) Act,1981 and under Section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 is hereby granted for carrying mining activities. This consent is subject to the following stipulations:-

- 1 That this consent is being granted in favour of **M/s. Hindustan Zinc Limited (Zawar Mines)**, a Mine of **Major Mineral** having **M.L.No.- 03/89-R-323/08 in an area measuring 3 6 2 0 . 0 0 0 0 H e c t a r e s** at/near Village - **Z a w a r** ,Tehsil-**Sarada**,District-**Udaipur**.
- 2 That this consent is valid for a period from **01/01/2023** to **31/12/2027**
- 3 That this consent is valid for following mining activities :-

Mineral	Permitted Mining Capacity
1 LEAD & ZINC ORE MINING	4.8000 MILLION TONNES PER ANNUM
2 D G SET	250.0000 KW
3 D G SET	500.0000 KW

- 4 That the project proponent will comply with the Standard as prescribed vide the Ministry of Environment, Forest and Climate Change notification no. GSR 826(E) dated 16th November, 2009 with respect to National Ambient Air Quality standards.







Head Office (Mines )

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Registered

File No F(Mines)/Udaipur(Sarada)/53(1)/2016-2017/5003-5007

Order No 2022-2023/Mines/10683

Date: 20/12/2022

Unit Id : 10,974

- 5 That this consent to establish/consent to operate is only for carrying out mining of mineral/ore and not for any processing/beneficiation or crushing/grinding of ore/mineral for which a separate application for consent to establish and/or consent to operate should be submitted. The project proponent is required to obtain separate consent to establish and consent to operate for carrying out mining of other minerals(s), if any or processing/beneficiation of such mineral(s) and for any addition/modification/alteration or change in process.
- 6 That this **Consent to Operate** is for mining / processing / beneficiation of product as mentioned above in **M.L.No.-03/89-R-323/08** and a separate **Consent to Operate** is required to be obtained for any other Mineral mining/ processing/ beneficiation Plant/process if any and for any addition/ modification/ alteration or change in process.
- 7 That the occupier/operator of mine shall ensure that all the conditions imposed in the Environmental Clearance granted by the MoEF&CC vide letter dated 05/01/2017 and further expansion issued vide letter dated 16/10/2020 are strictly complied with.
- 8 That this consent to operate is valid for production of Lead & Zinc Ore Mining @ 4.80 Million TPA, DG Sets- 500 KW & 250 KW. For any change in product and/or increase in capacity/lease area, the mine has to seek fresh Environmental Clearance, consent to establish & consent to operate
- 9 That plantation shall be developed so as to cover at least 33% of the total land use for mining and allied activities as given in Approved Mining Plan and shall be maintained at all the time to maintain ambient air quality around the mine.
- 10 That the lessee shall submit monitoring report of Ambient Air Quality within the lease area, once in 3 months.
- 11 That ground water shall not be abstracted without prior permission of the Central Ground Water Authority (CGWA).
- 12 That haul roads should be regularly graded and compacted. Regular water sprinkling should be carried out on haul roads to minimize dust generations
- 13 That adequate measure shall be taken for control of fugitive emissions from the areas prone to air pollution.
- 14 That you shall not establish/operate any stone crusher/mineral grinding/mineral processing plant within said lease without obtaining prior consent of the State Board.





Head Office (Mines )

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Registered

File No F(Mines)/Udaipur(Sarada)/53(1)/2016-2017/5003-5007

Order No 2022-2023/Mines/10683

Date: 20/12/2022

Unit Id : 10,974

- 15 That this consent to operate shall not be valid, if the lessee has not obtained permissions required, if any, from NBWL/Forest Department etc. with respect to Wild Life Sanctuary /National Parks/ Critical Tiger Habitats in compliance of various orders passed by any other law /act/rule/regulation or order of MOE&F and/or any Court / Tribunal time to time.
- 16 That regular water sprinkling should be carried out in critical areas prone to air pollution and having high levels of SPM and RSPM such as on haul road, loading and unloading points and transfer points.
- 17 That the lessee should dump the overburden in such a manner that it does not get washed away to nearby water tanks and lakes etc. during rainy season.
- 18 That no discharge of effluent shall be made within or outside the premises.
- 19 That this consent to operate shall be subject to compliance of direction/order passed by Courts of Law in the matter, if any.
- 20 That the mine shall install adequately designed rain water harvesting structure for prevention and recharge of ground water in and around the lease area.
- 21 That the mine shall not allow making any obstacles to any natural water flow i.e. natural nallah/steam carrying rain water to any water body
- 22 That the mine shall not allow unauthorized disposal of any solid waste on land inside or outside the premises
- 23 This consent to operate shall be subject to validity of mining lease.
- 24 That all other general conditions enclosed as **Annexure** shall be strictly complied with.
- 25 That this Consent is subject to the conditions as stated above and general conditions as stated in Annexure. Further, the mining unit will comply with the provisions of the Air (Prevention & Control of Pollution) Act, 1981 & Water (Prevention & Control of Pollution) Act, 1974 and any such conditions as may be specified from time to time by the State Board under the provisions of the aforesaid Acts.
- 26 That the grant of this **Consent to Operate** is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility, to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.







**Head Office (Mines )**

Rajasthan State Pollution Control Board  
4, Institutional Area, Jhalana Doongari, Jaipur-302 004  
Phone: 0141-2716814,2716813 Fax: 0141-2716814

Registered

**File No** F(Mines)/Udaipur(Sarada)/53(1)/2016-2017/5003-5007

**Order No** 2022-2023/Mines/10683

**Date:** 20/12/2022

**Unit Id :** 10,974

27 That the grant of this **Consent to Operate** shall not, in any way, adversely affect or jeopardize the legal proceedings, if any, instituted in the past or that could be instituted against you by the State Board for violation of the provisions of the Act or the Rules made thereunder.

28 That the grant of this consent to establish/operate is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other legal instrument in force. The sole and complete responsibility, to comply with the conditons laid down in all other laws for the time-being in force, rests with the industry/unit/project proponent.

This bears approval of the competent authority.

Encl: As Above

**Yours sincerely,**

**Group Incharge-Mines**

**(A): Copy To:-**

- 1 Director, Department of Mines & Geology, Government of Rajasthan, Shastri Circle, Udaipur..
- 2 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Udaipur-please ensure compliance of the consent conditions and monitor time to time
- 3 Mining Engineer, Department of Mines & Geology, Government of Rajasthan, Udaipur - To inform that this consent has been issued from the environmental angle only, and ensuring compliance of any other law/act/rule/regulation or order of any Court/Tribunal is the sole responsibility of the project proponent and the concerned departments.
- 4 Master File .

**(B):**

- 1 The Additional PCCF (WL) and Chief Wild Life Warden, Aranya Bhawan, Jhalana Institutional Area, Jaipur /DCF(W), Udaipur - To inform that this consent has been issued from the environmental angle only, and ensuring compliance of any other law/act/rule/regulation or order of any Court/Tribunal is the sole responsibility of the project proponent and the concerned departments.

**Group Incharge-Mines**





Head Office (HDF )

**Rajasthan State Pollution Control Board**  
**4, Institutional Area, Jhalana Doongari, Jaipur-302 004**  
**Phone: 0141-5159600,5159695**

**Registered****File No : F(HDF)/Udaipur(Sarada)/1(1)/2020-2021/5368-5370****Order No : 2022-2023/HDF/9187****Date: Dec 28 2022 5:41PM****Unit Id : 10974****M/s Hindustan Zinc Limited (Zawar Mines)****P.O.- Zawar Mines, Udaipur- 313 901, ,****District:Udaipur**

**Sub: Consent to Operate** under Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under Section 21(4) of Air (Prevention & Control of Pollution) Act, 1981.

**Ref:** Your application for Consent to Operate dated 17/08/2022 and subsequent correspondence.

Sir,

**Consent to Operate** under the provisions of Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter to be referred as the Water Act) and under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981, (hereinafter to be referred as the Air Act) as amended to date and rules & the orders issued thereunder **is hereby granted** for your **Beneficiation plant** situated at **PO- Zawar Mines Zawar Tehsil:Sarada District:Udaipur** , Rajasthan, subject to the following conditions:-

- 1 That this Consent to Operate is valid for a period from **01/01/2023 to 31/12/2027** .
- 2 That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/processes or providing following services with capacities given below:

Particular	Type	Quantity with Unit
Beneficiation for Lead - Zinc Ore	Activity	4.80 MILLION TONNES PER ANNUM

- 3 That this Consent to Operate is for existing plant, process & capacity and separate Consent to Establish/Operate is required to be taken for any addition / modification / alteration in process or change in capacity or change in fuel.
- 4 That the quantity of effluent generation along with mode of disposal for the treated effluent shall be as under:





Head Office (HDF )  
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Phone: 0141-5159600,5159695

Registered

File No : F(HDF)/Udaipur(Sarada)/1(1)/2020-2021/5368-5370  
Order No : 2022-2023/HDF/9187  
Unit Id : 10974

Date: Dec 28 2022 5:41PM

Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD)and mode of disposal
Domestic Sewage	400.000	NIL	400.000 To be treated in STP and to be utilized in plantation and horticulture within the factory premises
Trade Effluent	17200.000	8,600.000	8,600.000 Sludge & Evaporation Loss

5 That the sources of air emissions along with pollution control measures and the emission standards for the prescribed parameters shall be as under:

Sources of Air Emissions	Pollution Control Measures	Prescribed	
		Parameter	Standard
Balaria Crusher( 1.6MTPA)	ADEQUATE AIR POLLUTION CONTROL MEASURES , ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter	150mg/NM3
Mochia Crusher( 1.2MTPA)	ADEQUATE AIR POLLUTION CONTROL MEASURES , ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter	150 mg/NM3





Head Office (HDF )  
Rajasthan State Pollution Control Board  
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File No : F(HDF)/Udaipur(Sarada)/1(1)/2020-2021/5368-5370

Order No : 2022-2023/HDF/9187

Date: Dec 28 2022 5:41PM

Unit Id : 10974

New Crusher( 2MTPA)	ADEQUATE AIR POLLUTION CONTROL MEASURES , ADEQUATE STACK HEIGHT , Bag Filter	Particulate Matter	150 mg/NM3
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- 6 That the **Beneficiation plant** will comply with the standards as prescribed vide MoEF notification No. GSR 826(E) dated 16th November, 2009 with respect to National Ambient Air Quality Standards.
- 7 That the domestic sewage shall be treated before disposal so as to conform to the standards prescribed under the Environvent (Protection) Act-1986for disposal **Into Inland Surface Water**. The main parameters for regular monitoring shall be as under:

Parameters	Standards
Total Suspended Solids	Not to exceed 100 mg/l
pH Value	Between 5.5 to 9.0
Oil and Grease	Not to exceed 10 mg/l
Ammonical Nitrogen ( as N )	Not to exceed 50 mg/l
Biochemical Oxygen Demand (3 days at 27°C)	Not to exceed 30 mg/l
Chemical Oxygen Demand	Not to exceed 250 mg/l
Nitrate (as NO3)	Not to exceed 50 mg/l

- 8 That this consent to operate is valid for lead zinc ore beneficiation plant of 4.8 Million Ton/Annum capacity.
- 9 That total capital investment (as on 31.03.2022) as per the C.A. certificate submitted by the unit is Rs. 635.49 crore which includes the cost of Land, Building, Plant & Machinery and miscellaneous assets.
- 10 That the industry shall comply with all the conditions of Environmental Clearance (E.C.) issued by the Ministry of Environment, Forest & Climate Change (MoEF& CC), Government of India, vide letter no. J-11015/259/2012-IA.II(M) dated 05.01.2017.





**Head Office (HDF )**  
**Rajasthan State Pollution Control Board**  
**4, Institutional Area, Jhalana Doongari, Jaipur-302 004**  
**Phone: 0141-5159600,5159695**

**Registered**

**File No : F(HDF)/Udaipur(Sarada)/1(1)/2020-2021/5368-5370**

**Order No : 2022-2023/HDF/9187**

**Date: Dec 28 2022 5:41PM**

**Unit Id : 10974**

- 11 That the industry shall conduct a study from a reputed govt. agency on total capacity of the tailing dam, daily disposal of tailing, overall life of facility & stability analysis of the slope.
- 12 That Hazardous Waste as defined under schedule IV of Hazardous & others Waste (Management, and Transboundary Movement) Rules, 2016 shall not be used as raw material without obtaining prior registration & authorization from the State Board.
- 13 That industry shall comply with the provisions of Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2016 & Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 (as notified under Environment (Protection) Act, 1986 and daily record of hazardous waste generation and its disposal shall be maintained.
- 14 That the total fresh water consumption shall not exceed to 11,600 KLD (for domestic use -3000 KLD & for industrial use -8600 KLD) and same shall be met from Tidi Dam.
- 15 That no ground water shall be abstracted/utilized without prior permission/NOC from CGWA for withdrawal of ground water.
- 16 That water flow meters shall be provided at all suitable points to measure quantity of daily water received from Tidi Dam and water consumption for different purposes. Record of the same shall be maintained on daily basis.
- 17 That total trade effluent generated from beneficiation plant shall be disposed in tailing dam having impervious lining alongwith tailings and 8600 KLD reclaimed trade effluent will be reused in beneficiation plant and 1000 KLD for dust suppression.
- 18 That domestic sewage (400 KLD) shall be treated in the existing sewage treatment plants (STP) of 300 KLD & 150 KLD (i.e. 450 KLD) capacity up to the norms prescribed at condition no 7.
- 19 That industry shall apply separately for consent to establish/operate for colony/township.
- 20 That the entire treated domestic waste water shall be utilized for horticulture/plantation and other gainful utilization within the premises.
- 21 That no waste water (domestic & trade effluent) shall be discharged outside the factory premises in any case and complete zero discharge status shall be maintained.
- 22 That proper logbook of STP & Tailing Dam shall be maintained and record of daily consumption of chemicals and running hours of STP shall be maintained.
- 23 That flow meters shall be maintained at inlet & outlet of STP & Tailing Dam and on the pipeline used for carrying treated domestic waste water for plantation and daily record of the same shall be maintained.





**Head Office (HDF )**  
**Rajasthan State Pollution Control Board**  
**4, Institutional Area, Jhalana Doongari, Jaipur-302 004**  
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**Registered**

**File No : F(HDF)/Udaipur(Sarada)/1(1)/2020-2021/5368-5370**

**Order No : 2022-2023/HDF/9187**

**Date: Dec 28 2022 5:41PM**

**Unit Id : 10974**

- 24 That separate energy meter shall be maintained at STP and record of daily energy consumption shall be maintained in log book.
- 25 That trained/skilled operators/supervisors shall be employed to operate the STP.
- 26 That treated & untreated sewage and trade effluent carrying pipeline should be in different colors.
- 27 That industry shall maintain adequate air pollution control measures & stack of adequate height at all the crushers to achieve the prescribed standards/norms.
- 28 That adequate infrastructure facility shall be provided & maintained for stack emission monitoring at the stacks of all the crushers and permanent structure or platform for ambient air quality monitoring.
- 29 That adequate air pollution control measures shall be provided and maintained at all the transfer points & other sources of fugitive emissions like ball mill, jaw crushers etc.
- 30 That closed conveyor belts shall be used for the transfer of material to minimize the fugitive emissions.
- 31 That water sprinkling and cleaning of roads shall be done regularly to control the fugitive emissions generated due to vehicular movement.
- 32 That all the raw materials shall be stored in closed shed.
- 33 That industry shall provide & maintain cement concrete/metallic roads inside the factory premises to avoid fugitive emissions due to vehicular movement.
- 34 That the quality of ground water of the village Kanpur is not qualifying the prescribed standards; therefore, provision of the supply of drinking water should be undertaken by the industry under the CSR activities.
- 35 That the CSR activities w.r.t. plantation and water supply in nearby area shall be improved.
- 36 That the regular monitoring of ground water level and quality shall be carried out in and around the project area by establishing a network of adequate number of wells and piezometers and periodic monitoring atleast four times a year shall be carried out including for the heavy metals such as Cr, Fe, Ni, Co, Cu, Pb, Zn and Cd and report be submitted to the Board.
- 37 That the regular monitoring of concentration of constituents (w.r.t. NaCN and other chemicals / reagents being used in the processes of beneficiation) of the wastewater being disposed in the tailing dam shall be carried out in and around the project area.







Head Office (HDF )  
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File No : F(HDF)/Udaipur(Sarada)/1(1)/2020-2021/5368-5370

Order No : 2022-2023/HDF/9187

Date: Dec 28 2022 5:41PM

Unit Id : 10974

- 38 That the industry shall carryout effluent sampling/stack monitoring/ambient air quality monitoring and submit quarterly analysis report from the State Board laboratory/laboratory recognized by Ministry of Environment, Forest & Climate Change (MoEF& CC), Government of India.
- 39 That no additional source of Air/Water pollution shall be installed without prior consent to establish/operate from the State Board.
- 40 That the industry shall install & maintain adequately designed rain water harvesting structure for recharge of ground water in and around the area.
- 41 That the plantation of local species in the 33% of total area of the project shall be carried out & maintained.
- 42 That the industry shall investigate through MoEF approved agency regarding cause of presence of pollutants like organic matter, chemical contamination etc. in the ground water of the piezometric wells and hand pumps in the nearby area and submit an action plan within one month for remedial measures to be taken .
- 43 That the industry shall not use petcoke/furnace oil in any process/service/utility in compliance to the order dated 17/11/2017 of Hon'ble Supreme Court, wherein ban has been imposed on the use of petcoke and furnace oil in the State of Rajasthan.
- 44 That the industry shall submit quaterly compliance report of all the above conditions to the State Board.
- 45 That, notwithstanding anything provided hereinabove, the State Board shall have the power and reserves its right, as contained **under Section 27(2) of the Water Act and under Section 21(6) of the Air Act** to review anyone or all of the conditions imposed here in above and to make such variation as it deems fit for the purpose of **Air Act & Water Act**.
- 46 That the grant of this **Consent to Operate** is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.
- 47 That the grant of this **Consent to Operate** shall not, in any way, adversely affect or jeopardize the legal proceeding, if any, instituted in the past or that could be instituted again you by the State Board for violation of the provisions of the Water Act and Air Act or the Rules made thereunder.





**Head Office (HDF )**  
**Rajasthan State Pollution Control Board**  
**4, Institutional Area, Jhalana Doongari, Jaipur-302 004**  
**Phone: 0141-5159600,5159695**

**Registered**

**File No : F(HDF)/Udaipur(Sarada)/1(1)/2020-2021/5368-5370**

**Order No : 2022-2023/HDF/9187**

**Date: Dec 28 2022 5:41PM**

**Unit Id : 10974**

- 48 That the Project Proponent shall comply with provisions of the E-waste (Management) Rules, 2016 and ensure that e-waste generated by them is channelized through collection centre or dealer of authorized producer or dismantler or recycler or through designated take back service provider of the producer to authorized dismantler or recycler.
- 49 That the Project Proponent shall maintain record of e-waste generated by them in Form-2 and make such records available for scrutiny by the Board.
- 50 That the Project Proponent shall file annual returns in Form-3, to the Board on or before the 30th day of June following the financial year to which that return relates.
- 51 That the transportation of e-waste shall be carried out as per the manifest system whereby the transporter shall be required to carry a document (three copies) prepared by the sender, giving the details as per Form-6.
- 52 That the Project Proponent shall comply with provisions of the Batteries (Management and Handling) Rules, 2001 (as amended) and submit half yearly returns (as bulk consumer, importer, auctioneer, recycler as the case may be) to the State Board as provided under Rule 10 (2) (ii) of the Battery (Management and Handling) Rules, 2001 (as amended). In case the Project Proponent is not a bulk consumer even then the used batteries shall be returned to the authorized dealers or recyclers only.
- 53 That the record of batteries purchased and sold/ returned to registered dealers and/ or authorized recyclers shall be maintained and made available to the officers of the Board during inspections.

This **Consent to Operate** shall also be subject, besides the aforesaid specific conditions, to the general conditions given in the enclosed Annexure. The Project Proponent will comply with the provisions of the **Water Act and Air Act** and to such other conditions as may, from time to time , be specified, by the State Board under the provisions of the aforesaid Act(s). Please note that, non compliance of any of the above stated conditions would tantamount to revocation of **Consent to Operate** and Project Proponent / occupier shall be liable for legal action under the relevant provisions of the said Act(s).

This bears approval of the competent authority.

**Yours sincerely,**

**Group Incharge[ HDF ]**





**Head Office (HDF )**  
**Rajasthan State Pollution Control Board**  
**4, Institutional Area, Jhalana Doongari, Jaipur-302 004**  
**Phone: 0141-5159600,5159695**

**Registered**

**File No : F(HDF)/Udaipur(Sarada)/1(1)/2020-2021/5368-5370**

**Order No : 2022-2023/HDF/9187**

**Date: Dec 28 2022 5:41PM**

**Unit Id : 10974**

**(A): Copy to:-**

- 1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Udaipur to ensure the compliance of conditions of the consent.
- 2 Master File.

**Group Incharge[ HDF ]**





(भूजल निकासी हेतु अनापत्ति प्रमाण पत्र)

**NO OBJECTION CERTIFICATE (NOC) FOR GROUND WATER ABSTRACTION**

Project Name:	M/s Hindustan Zinc Limited		
Project Address:	M/s Hindustan Zinc Limited		
Village:	Jawad	Block:	Sarada
District:	Udaipur	State:	Rajasthan
Pin Code:			
Communication Address:	Hindustan Zinc Limited, Zawarmala Mines, Admin Block, Zawar Mines, Zawarmala Mines, Sarada, Udaipur, Rajasthan - 313901		
Address of CGWB Regional Office :	Central Ground Water Board Western Region, 6-a, Jhalana Doongri, Jaipur, Rajasthan - 302004		

1.	NOC No.:		CGWA/NOC/MIN/REN/3/2023/8015				2.	Date of Issuance		17/07/2023						
3.	Application No.:		21-4/268/RJ/MIN/2008				4.	Category: (GWRE 2022)		Critical						
5.	Project Status:		Existing With Additional Ground Water Requirment				6.	NOC Type:		Renewal						
7.	Valid from:		11/12/2022				8.	Valid up to:		10/12/2024						
9.	Ground Water Abstraction Permitted:															
Fresh Water				Saline Water				Dewatering				Total				
m³/day		m³/year		m³/day		m³/year		m³/day		m³/year		m³/day		m³/year		
0.00		0.00						250.00		91250.00						
10.	Details of ground water abstraction /Dewatering structures															
Total Existing No.:1								Total Proposed No.:0								
				DW	DCB	BW	TW	MP	MPu	DW	DCB	BW	TW	MP	MPu	
Dewatering Structure*				0	0	0	0	1	0	0	0	0	0	0	0	
*DW- Dug Well; DCB-Dug-cum-Bore Well; BW-Bore Well; TW-Tube Well; MP-Mine Pit;MPu-Mine Pumps																
11.	Ground Water Abstraction/Restoration Charges paid (Rs.):								404528.00							
12.	Number of Piezometers(Observation wells) to be constructed/ monitored & Monitoring mechanism.						No. of Piezometers		Monitoring Mechanism							
								Manual	DWLR**	DWLR With Telemetry						
**DWLR - Digital Water Level Recorder						1		0	1	0						

(Compliance Conditions given overleaf)

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Phone: (011) 23383561 Fax: 23382051, 23386743

Website: cgwa-noc.gov.in

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Validity of this NOC shall be subject to compliance of the following conditions:

**Mandatory conditions:**

- 1) Installation of tamper proof digital water flow meter with telemetry on all the abstraction structure(s) shall be mandatory for all users seeking No Objection Certificate and intimation regarding their installation shall be communicated to the CGWA within 30 days of grant of No Objection Certificate.
- 2) Proponents shall mandatorily get water flow meter calibrated from an authorized agency once in a year.
- 3) Construction of purpose-built observation wells (piezometers) for ground water level monitoring shall be mandatory as per Section 14 of Guidelines. Water level data shall be made available to CGWA through web portal. Detailed guidelines for construction of piezometers are given in Annexure-II of the guidelines.
- 4) Proponents shall monitor quality of ground water from the abstraction structure(s) once in a year. Water samples from bore wells/ tube wells / dug wells shall be collected during April/May every year and analysed in NABL accredited laboratories for basic parameters (cations and anions), heavy metals, pesticides/ organic compounds etc. Water quality data shall be made available to CGWA through the web portal.
- 5) In case of mining projects, additional key wells shall be established in consultation with the Regional Director, CGWB for ground water level monitoring four (4) times a year (January, May, August and November) in core as well as buffer zones of the mine.
- 6) In case of mining project the firm shall submit water quality report of mine discharge/ seepage from Govt. approved/ NABL accredited lab.
- 7) The firm shall report compliance of the NOC conditions online in the website ([www.cgwa-noc.gov.in](http://www.cgwa-noc.gov.in)) within one year from the date of issue of this NOC.
- 8) Industries abstracting ground water in excess of 100 m<sup>3</sup>/d shall undertake annual water audit through certified auditors and submit audit reports within three months of completion of the same to CGWA. All such industries shall be required to reduce their ground water use by at least 20% over the next three years through appropriate means.
- 9) Application for renewal can be submitted online from 90 days before the expiry of NOC. Ground water withdrawal, if any, after expiry of NOC shall be illegal & liable for legal action as per provisions of Environment (Protection) Act, 1986.
- 10) This NOC is subject to prevailing Central/State Government rules/laws/norms or Court orders related to construction of tube well/ground water abstraction structure / recharge or conservation structure/discharge of effluents or any such matter as applicable.

**General conditions:**

- 11) No additional ground water abstraction and/or de-watering structures shall be constructed for this purpose without prior approval of the Central Ground Water Authority (CGWA).
- 12) The proponent shall seek prior permission from CGWA for any increase in quantum of groundwater abstraction (more than that permitted in NOC for specific period).
- 13) Proponents shall install roof top rain water harvesting in the premise as per the existing building bye laws in the premise.
- 14) The project proponent shall take all necessary measures to prevent contamination of ground water in the premises failing which the firm shall be responsible for any consequences arising thereupon.
- 15) In case of industries that are likely to contaminate the ground water, no recharge measures shall be taken up by the firm inside the plant premises. The runoff generated from the rooftop shall be stored and put to beneficial use by the firm.
- 16) Wherever feasible, requirement of water for greenbelt (horticulture) shall be met from recycled / treated waste water.
- 17) Wherever the NOC is for abstraction of saline water and the existing wells (s) is /are yielding fresh water, the same shall be sealed and new tubewell(s) tapping saline water zone shall be constructed within 3 months of the issuance of NOC. The firm shall also ensure safe disposal of saline residue, if any.
- 18) Unexpected variations in inflow of ground water into the mine pit, if any, shall be reported to the concerned Regional Director, Central Ground Water Board.
- 19) In case of violation of any NOC conditions, the applicant shall be liable to pay the penalties as per Section 16 of Guidelines.
- 20) This NOC does not absolve the proponents of their obligation / requirement to obtain other statutory and administrative clearances from appropriate authorities.
- 21) The issue of this NOC does not imply that other statutory / administrative clearances shall be granted to the project by the concerned authorities. Such authorities would consider the project on merits and take decisions independently of the NOC.
- 22) In case of change of ownership, new owner of the industry will have to apply for incorporation of necessary changes in the No Objection Certificate with documentary proof within 60 days of taking over possession of the premises.
- 23) This NOC is being issued without any prejudice to the directions of the Hon'ble NGT/court orders in cases related to ground water or any other related matters.
- 24) Proponents, who have installed/constructed artificial recharge structures in compliance of the NOC granted to them previously and have availed rebate of upto 50% (fifty percent) in the ground water abstraction charges/ground water restoration charges, shall continue to regularly maintain artificial recharge structures.
- 25) Industries which are likely to cause ground water pollution e.g. Tanning, Slaughter Houses, Dye, Chemical/ Petrochemical, Coal washeries, pharmaceutical, other hazardous units etc. (as per CPCE list) need to undertake necessary well head protection measures to ensure prevention of ground water pollution as per Annexure III of the guidelines.
- 26) In case of new infrastructure projects having ground water abstraction of more than 20 m<sup>3</sup>/day, the firm/entity shall ensure implementation of dual water supply system in the projects.
- 27) In case of infrastructure projects, paved/parking area must be covered with interlocking/perforated tiles or other suitable measures to ensure groundwater infiltration/harvesting.
- 28) In case of coal and other base metal mining projects, the project proponent shall use the advance dewatering technology (by construction of series of dewatering abstraction structures) to avoid contamination of surface water.
- 29) The NOC issued is conditional subject to the conditions mentioned in the Public notice dated 27.01.2021 failing which penalty/EC/cancellation of NOC shall be imposed as the case may be.
- 30) This NOC is issued subject to the clearance of Expert Appraisal Committee (EAC) (if applicable).

(Non-compliance of the conditions mentioned above is likely to result in the cancellation of NOC and legal action against the proponent.)

## CENTRAL GROUND WATER AUTHORITY

Department of Water Resources, River Development and Ganga Rejuvenation  
Ministry of Jal Shakti, Govt. of India

18/11, जामनगर हाउस, मानसिंह रोड, नई दिल्ली - 110011 / 18/11, Jamnagar House, Mansingh Road, New Delhi-110011

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# Receipt

(As per the guideline Gazette Notification S.O. 3281(E) regarding the New Guidelines dated 24.09.2020 of CGWA, MoJS, Govt. of India)  
<https://cgwa-noc.gov.in>

Application No.:	21-4/268/RJ/MIN/2008		
Name of Firm:	M/S HINDUSTAN ZINC LIMITED		
AppType Category:	Base Metal Ores		
Application Type:	Mining		
PAN/GSTIN No. of Firm/Individual:	/		

S N	Description	Amount (Rs.)
1.	Application Processing Fee	
2.	Ground Water Abstraction /Restoration charges	404528.00
3.	Environmental Compensation Charges (ECRGW) (Date From to ) Days-	
4.	Penalty for non-Compliance of NOC conditions Condition to be mentioned	
Rs. Rupees Four Lakh Four Thousand Five Hundred Twenty Eight Only		404528.00

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भारत सरकार  
जल शक्ति मंत्रालय  
जल संसाधन, नदी विकास  
और गंगा संरक्षण विभाग  
केन्द्रीय भूमि जल प्राधिकरण  
Government of India  
Ministry of Jal Shakti  
Department of Water Resources,  
River Development & Ganga Rejuvenation  
Central Ground Water Authority

(भूजल निकासी हेतु अनापत्ति प्रमाण पत्र)  
**NO OBJECTION CERTIFICATE (NOC) FOR GROUND WATER ABSTRACTION**

Project Name:		M/s Hindustan Zinc Ltd.					
Project Address:		Mochia Underground Mine					
Village:		Jawad		Block:		Sarada	
District:		Udaipur		State:		Rajasthan	
Pin Code:							
Communication Address:		Hindustan Zinc Limited, Mochia Mines, Admin Block, Zawar Mines, Sarada, Udaipur, Rajasthan - 313901					
Address of CGWB Regional Office :		Central Ground Water Board Western Region, 6-a, Jhalana Doongri, Jaipur, Rajasthan - 302004					

1. <b>NOC No.:</b>	CGWA/NOC/MIN/REN/3/2024/9739	2. <b>Date of Issuance</b>	18/07/2024
3. Application No.:	21-4/267/RJ/MIN/2008	4. Category: (GWRE 2023)	Critical
5. Project Status:	Existing With Additional Ground Water Requirment	6. NOC Type:	Renewal
7. <b>Valid from:</b>	11/12/2022	8. <b>Valid up to:</b>	10/12/2024

9. Ground Water Abstraction Permitted:							
Fresh Water		Saline Water		Dewatering		Total	
m <sup>3</sup> /day	m <sup>3</sup> /year	m <sup>3</sup> /day	m <sup>3</sup> /year	m <sup>3</sup> /day	m <sup>3</sup> /year	m <sup>3</sup> /day	m <sup>3</sup> /year
0.00	0.00			1800.00	657000.00		

10. Details of ground water abstraction /Dewatering structures													
Total Existing No.:1							Total Proposed No.:0						
	DW	DCB	BW	TW	MP	MPu	DW	DCB	BW	TW	MP	MPu	
Dewatering Structure*	0	0	0	0	1	0	0	0	0	0	0	0	

\*DW- Dug Well; DCB-Dug-cum-Bore Well; BW-Bore Well; TW-Tube Well; MP-Mine Pit;MPu-Mine Pumps

11. Ground Water Abstraction/Restoration Charges paid (Rs.):	6802474.00
12. Environment Compensation (if applicable) paid (Rs.):	0.00

13. Number of Piezometers(Observation wells) to be constructed/ monitored & Monitoring mechanism.	No. of Piezometers	Monitoring Mechanism		
		Manual	DWLR**	DWLR With Telemetry
**DWLR - Digital Water Level Recorder	2	0	1	1

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Website: cgwa-noc.gov.in

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**(Compliance Conditions given overleaf)**

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CENTRAL GROUND WATER AUTHORITY

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**Validity of this NOC shall be subject to compliance of the following conditions:**

**Mandatory conditions:**

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- 2) Proponents shall mandatorily get water flow meter calibrated from an authorized agency once in a year.
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- 5) In case of mining projects, additional key wells shall be established in consultation with the Regional Director, CGWB for ground water level monitoring four (4) times a year (January, May, August and November) in core as well as buffer zones of the mine.
- 6) In case of mining project the firm shall submit water quality report of mine discharge/ seepage from Govt. approved/ NABL accredited lab.
- 7) The firm shall report compliance of the NOC conditions online in the website ([www.cgwa-noc.gov.in](http://www.cgwa-noc.gov.in)) within one year from the date of issue of this NOC.
- 8) Industries abstracting ground water in excess of 100 m<sup>3</sup>/d shall undertake annual water audit through certified auditors and submit audit reports within three months of completion of the same to CGWA. All such industries shall be required to reduce their ground water use by at least 20% over the next three years through appropriate means.
- 9) Application for renewal can be submitted online from 90 days before the expiry of NOC. Ground water withdrawal, if any, after expiry of NOC shall be illegal & liable for legal action as per provisions of Environment (Protection) Act, 1986.
- 10) This NOC is subject to prevailing Central/State Government rules/laws/norms or Court orders related to construction of tube well/ground water abstraction structure / recharge or conservation structure/discharge of effluents or any such matter as applicable.

**General conditions:**

- 11) No additional ground water abstraction and/or de-watering structures shall be constructed for this purpose without prior approval of the Central Ground Water Authority (CGWA).
- 12) The proponent shall seek prior permission from CGWA for any increase in quantum of groundwater abstraction (more than that permitted in NOC for specific period).
- 13) Proponents shall install roof top rain water harvesting in the premise as per the existing building bye laws in the premise.
- 14) The project proponent shall take all necessary measures to prevent contamination of ground water in the premises failing which the firm shall be responsible for any consequences arising thereupon.
- 15) In case of industries that are likely to contaminate the ground water, no recharge measures shall be taken up by the firm inside the plant premises. The runoff generated from the rooftop shall be stored and put to beneficial use by the firm.
- 16) Wherever feasible, requirement of water for greenbelt (horticulture) shall be met from recycled / treated waste water.
- 17) Wherever the NOC is for abstraction of saline water and the existing wells (s) is /are yielding fresh water, the same shall be sealed and new tubewell(s) tapping saline water zone shall be constructed within 3 months of the issuance of NOC. The firm shall also ensure safe disposal of saline residue, if any.
- 18) Unexpected variations in inflow of ground water into the mine pit, if any, shall be reported to the concerned Regional Director, Central Ground Water Board.
- 19) In case of violation of any NOC conditions, the applicant shall be liable to pay the penalties as per Section 16 of Guidelines.
- 20) This NOC does not absolve the proponents of their obligation / requirement to obtain other statutory and administrative clearances from appropriate authorities.
- 21) The issue of this NOC does not imply that other statutory / administrative clearances shall be granted to the project by the concerned authorities. Such authorities would consider the project on merits and take decisions independently of the NOC.
- 22) In case of change of ownership, new owner of the industry will have to apply for incorporation of necessary changes in the No Objection Certificate with documentary proof within 60 days of taking over possession of the premises.
- 23) This NOC is being issued without any prejudice to the directions of the Hon'ble NGT/court orders in cases related to ground water or any other related matters.
- 24) Proponents, who have installed/constructed artificial recharge structures in compliance of the NOC granted to them previously and have availed rebate of upto 50% (fifty percent) in the ground water abstraction charges/ground water restoration charges, shall continue to regularly maintain artificial recharge structures.
- 25) Industries which are likely to cause ground water pollution e.g. Tanning, Slaughter Houses, Dye, Chemical/ Petrochemical, Coal washeries, pharmaceutical, other hazardous units etc. (as per CPCB list) need to undertake necessary well head protection measures to ensure prevention of ground water pollution as per Annexure III of the guidelines.
- 26) In case of new infrastructure projects having ground water abstraction of more than 20 m<sup>3</sup>/day, the firm/entity shall ensure implementation of dual water supply system in the projects.
- 27) In case of infrastructure projects, paved/parking area must be covered with interlocking/perforated tiles or other suitable measures to ensure groundwater infiltration/harvesting.
- 28) In case of coal and other base metal mining projects, the project proponent shall use the advance dewatering technology (by construction of series of dewatering abstraction structures) to avoid contamination of surface water.
- 29) The NOC issued is conditional subject to the conditions mentioned in the Public notice dated 27.01.2021 failing which penalty/EC/cancellation of NOC shall be imposed as the case may be.
- 30) This NOC is issued subject to the clearance of Expert Appraisal Committee (EAC) (if applicable).
- 31) In the self-compliance report, the PP shall submit details of Drilling Agency/ Agencies, which has/ have constructed BW(s)/ TW(s) along with undertaking to the effect that all necessary measures have been taken as per directions of Hon'ble Supreme Court provided in Annexure-VII of guidelines dated 24.09.2020 in respect of abandoned/ failed BW(s)/ TW(s)/Piezometer(s), if any. The PP is advised to engage registered drilling agency/ agencies. In the event of any mishap/ unfortunate incident due to negligence in taking measures for prevention of accident due to falling in Bore Well, both PP and concerned drilling agency shall jointly be held responsible and penal action as per extant Government rules shall be taken.

**(Non-compliance of the conditions mentioned above is likely to result in the cancellation of NOC and legal action against the proponent.)**

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# CENTRAL GROUND WATER AUTHORITY

Department of Water Resources, River Development and Ganga Rejuvenation  
Ministry of Jal Shakti, Govt. of India

## Receipt

(As per the guideline Gazette Notification S.O. 3281(E) regarding the New Guidelines dated 24.09.2020 of CGWA, MoJS, Govt. of India)  
<https://cgwa-noc.gov.in>

Application No.:	21-4/267/RJ/MIN/2008	Date of Issuance:	18/07/2024
Name of Firm:	M/S HINDUSTAN ZINC LTD.		
AppType Category:	Base Metal Ores		
Application Type:	Mining		
PAN/GSTIN No. of Firm/Individual:	/		

S N	Description	Amount (Rs.)
1.	Application Processing Fee	5000.00
2.	Ground Water Abstraction charges	6802474.00
3.	Ground Water Restoration charges	0
4.	Environmental Compensation Charges (ECRGW) (Date From to ) Days-	
5.	Penalty for non-Compliance of NOC conditions Condition to be mentioned	50000.00
6.	Adjustment Charges	
7.	Rebate	
8.	Charges for correction/modification in the existing issued No Objection Certificate	
S.No.	Description	Rate
(i)	Change in User ID	Rs. 1000
(ii)	Change in firm Name	Rs. 5000
(iii)	Extension of No Objection Certificate	Rs. 5000
(iv)	Issuance of duplicate No Objection Certificate	Rs. 5000
(v)	Issuance of corrigendum to No Objection Certificate	Rs. 5000
(vi)	Any other items/correction etc.	Rs. 500
Rs. Rupees Sixty Eight Lakh Fifty Seven Thousand Four Hundred Seventy Four Only		6857474.00

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Term and conditions:

- i. All disputes are subject to Delhi Jurisdiction.
- ii. Any complaint in regard to the rates will not be entertained.

Member-Secretary  
CGWA, New Delhi

CENTRAL GROUND WATER AUTHORITY



भारत सरकार  
जल शक्ति मंत्रालय  
जल संसाधन, नदी विकास  
और गंगा संरक्षण विभाग  
केन्द्रीय भूमि जल प्राधिकरण  
Government of India  
Ministry of Jal Shakti  
Department of Water Resources,  
River Development & Ganga Rejuvenation  
Central Ground Water Authority

(भूजल निकासी हेतु अनापत्ति प्रमाण पत्र)  
**NO OBJECTION CERTIFICATE (NOC) FOR GROUND WATER ABSTRACTION**

Project Name:		M/s Hindustan Zinc Ltd.					
Project Address:		M/s Hindustan Zinc Ltd., Balaria Underground Mine					
Village:		Jawad		Block:		Sarada	
District:		Udaipur		State:		Rajasthan	
Pin Code:							
Communication Address:		Hindustan Zinc Limited, Balaria Mines, Admin. Block, Zawar Mines, Sarada, Udaipur, Rajasthan - 313901					
Address of CGWB Regional Office :		Central Ground Water Board Western Region, 6-a, Jhalana Doongri, Jaipur, Rajasthan - 302004					

1. <b>NOC No.:</b>	CGWA/NOC/MIN/REN/3/2024/9741	2. <b>Date of Issuance</b>	18/07/2024
3. Application No.:	21-4/266/RJ/MIN/2008	4. Category: (GWRE 2023)	Critical
5. Project Status:	Existing With Additional Ground Water Requirment	6. NOC Type:	Renewal
7. <b>Valid from:</b>	11/12/2022	8. <b>Valid up to:</b>	10/12/2024

9. Ground Water Abstraction Permitted:							
Fresh Water		Saline Water		Dewatering		Total	
m <sup>3</sup> /day	m <sup>3</sup> /year	m <sup>3</sup> /day	m <sup>3</sup> /year	m <sup>3</sup> /day	m <sup>3</sup> /year	m <sup>3</sup> /day	m <sup>3</sup> /year
0.00	0.00			1900.00	693500.00		

10. Details of ground water abstraction /Dewatering structures													
Total Existing No.:1							Total Proposed No.:0						
	DW	DCB	BW	TW	MP	MPu	DW	DCB	BW	TW	MP	MPu	
Dewatering Structure*	0	0	0	0	1	0	0	0	0	0	0	0	

\*DW- Dug Well; DCB-Dug-cum-Bore Well; BW-Bore Well; TW-Tube Well; MP-Mine Pit;MPu-Mine Pumps

11. Ground Water Abstraction/Restoration Charges paid (Rs.):	7202570.00
12. Environment Compensation (if applicable) paid (Rs.):	0.00

13. Number of Piezometers(Observation wells) to be constructed/ monitored & Monitoring mechanism.	No. of Piezometers	Monitoring Mechanism		
		Manual	DWLR**	DWLR With Telemetry
**DWLR - Digital Water Level Recorder	2	0	1	1

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**(Compliance Conditions given overleaf)**

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Website: [cgwa-noc.gov.in](http://cgwa-noc.gov.in)

**पानी बचाये – जीवन बचाये**  
**SAVE WATER - SAVE LIFE**

**Validity of this NOC shall be subject to compliance of the following conditions:**

**Mandatory conditions:**

- 1) Installation of tamper proof digital water flow meter with telemetry on all the abstraction structure(s) shall be mandatory for all users seeking No Objection Certificate and intimation regarding their installation shall be communicated to the CGWA within 30 days of grant of No Objection Certificate.
- 2) Proponents shall mandatorily get water flow meter calibrated from an authorized agency once in a year.
- 3) Construction of purpose-built observation wells (piezometers) for ground water level monitoring shall be mandatory as per Section 14 of Guidelines. Water level data shall be made available to CGWA through web portal. Detailed guidelines for construction of piezometers are given in Annexure-II of the guidelines.
- 4) Proponents shall monitor quality of ground water from the abstraction structure(s) once in a year. Water samples from bore wells/ tube wells / dug wells shall be collected during April/May every year and analysed in NABL accredited laboratories for basic parameters (cations and anions), heavy metals, pesticides/ organic compounds etc. Water quality data shall be made available to CGWA through the web portal.
- 5) In case of mining projects, additional key wells shall be established in consultation with the Regional Director, CGWB for ground water level monitoring four (4) times a year (January, May, August and November) in core as well as buffer zones of the mine.
- 6) In case of mining project the firm shall submit water quality report of mine discharge/ seepage from Govt. approved/ NABL accredited lab.
- 7) The firm shall report compliance of the NOC conditions online in the website ([www.cgwa-noc.gov.in](http://www.cgwa-noc.gov.in)) within one year from the date of issue of this NOC.
- 8) Industries abstracting ground water in excess of 100 m<sup>3</sup>/d shall undertake annual water audit through certified auditors and submit audit reports within three months of completion of the same to CGWA. All such industries shall be required to reduce their ground water use by at least 20% over the next three years through appropriate means.
- 9) Application for renewal can be submitted online from 90 days before the expiry of NOC. Ground water withdrawal, if any, after expiry of NOC shall be illegal & liable for legal action as per provisions of Environment (Protection) Act, 1986.
- 10) This NOC is subject to prevailing Central/State Government rules/laws/norms or Court orders related to construction of tube well/ground water abstraction structure / recharge or conservation structure/discharge of effluents or any such matter as applicable.

**General conditions:**

- 11) No additional ground water abstraction and/or de-watering structures shall be constructed for this purpose without prior approval of the Central Ground Water Authority (CGWA).
- 12) The proponent shall seek prior permission from CGWA for any increase in quantum of groundwater abstraction (more than that permitted in NOC for specific period).
- 13) Proponents shall install roof top rain water harvesting in the premise as per the existing building bye laws in the premise.
- 14) The project proponent shall take all necessary measures to prevent contamination of ground water in the premises failing which the firm shall be responsible for any consequences arising thereupon.
- 15) In case of industries that are likely to contaminate the ground water, no recharge measures shall be taken up by the firm inside the plant premises. The runoff generated from the rooftop shall be stored and put to beneficial use by the firm.
- 16) Wherever feasible, requirement of water for greenbelt (horticulture) shall be met from recycled / treated waste water.
- 17) Wherever the NOC is for abstraction of saline water and the existing wells (s) is /are yielding fresh water, the same shall be sealed and new tubewell(s) tapping saline water zone shall be constructed within 3 months of the issuance of NOC. The firm shall also ensure safe disposal of saline residue, if any.
- 18) Unexpected variations in inflow of ground water into the mine pit, if any, shall be reported to the concerned Regional Director, Central Ground Water Board.
- 19) In case of violation of any NOC conditions, the applicant shall be liable to pay the penalties as per Section 16 of Guidelines.
- 20) This NOC does not absolve the proponents of their obligation / requirement to obtain other statutory and administrative clearances from appropriate authorities.
- 21) The issue of this NOC does not imply that other statutory / administrative clearances shall be granted to the project by the concerned authorities. Such authorities would consider the project on merits and take decisions independently of the NOC.
- 22) In case of change of ownership, new owner of the industry will have to apply for incorporation of necessary changes in the No Objection Certificate with documentary proof within 60 days of taking over possession of the premises.
- 23) This NOC is being issued without any prejudice to the directions of the Hon'ble NGT/court orders in cases related to ground water or any other related matters.
- 24) Proponents, who have installed/constructed artificial recharge structures in compliance of the NOC granted to them previously and have availed rebate of upto 50% (fifty percent) in the ground water abstraction charges/ground water restoration charges, shall continue to regularly maintain artificial recharge structures.
- 25) Industries which are likely to cause ground water pollution e.g. Tanning, Slaughter Houses, Dye, Chemical/ Petrochemical, Coal washeries, pharmaceutical, other hazardous units etc. (as per CPCB list) need to undertake necessary well head protection measures to ensure prevention of ground water pollution as per Annexure III of the guidelines.
- 26) In case of new infrastructure projects having ground water abstraction of more than 20 m<sup>3</sup>/day, the firm/entity shall ensure implementation of dual water supply system in the projects.
- 27) In case of infrastructure projects, paved/parking area must be covered with interlocking/perforated tiles or other suitable measures to ensure groundwater infiltration/harvesting.
- 28) In case of coal and other base metal mining projects, the project proponent shall use the advance dewatering technology (by construction of series of dewatering abstraction structures) to avoid contamination of surface water.
- 29) The NOC issued is conditional subject to the conditions mentioned in the Public notice dated 27.01.2021 failing which penalty/EC/cancellation of NOC shall be imposed as the case may be.
- 30) This NOC is issued subject to the clearance of Expert Appraisal Committee (EAC) (if applicable).
- 31) In the self-compliance report, the PP shall submit details of Drilling Agency/ Agencies, which has/ have constructed BW(s)/ TW(s) along with undertaking to the effect that all necessary measures have been taken as per directions of Hon'ble Supreme Court provided in Annexure-VII of guidelines dated 24.09.2020 in respect of abandoned/ failed BW(s)/ TW(s)/Piezometer(s), if any. The PP is advised to engage registered drilling agency/ agencies. In the event of any mishap/ unfortunate incident due to negligence in taking measures for prevention of accident due to falling in Bore Well, both PP and concerned drilling agency shall jointly be held responsible and penal action as per extant Government rules shall be taken.

**(Non-compliance of the conditions mentioned above is likely to result in the cancellation of NOC and legal action against the proponent.)**

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**पानी बचाये – जीवन बचाये  
SAVE WATER - SAVE LIFE**

# CENTRAL GROUND WATER AUTHORITY

Department of Water Resources, River Development and Ganga Rejuvenation  
Ministry of Jal Shakti, Govt. of India

## Receipt

(As per the guideline Gazette Notification S.O. 3281(E) regarding the New Guidelines dated 24.09.2020 of CGWA, MoJS, Govt. of India)  
<https://cgwa-noc.gov.in>

Application No.:	21-4/266/RJ/MIN/2008	Date of Issuance:	18/07/2024
Name of Firm:	M/S HINDUSTAN ZINC LTD.		
AppType Category:	Base Metal Ores		
Application Type:	Mining		
PAN/GSTIN No. of Firm/Individual:	/		

S N	Description	Amount (Rs.)
1.	Application Processing Fee	5000.00
2.	Ground Water Abstraction charges	7202570.00
3.	Ground Water Restoration charges	0
4.	Environmental Compensation Charges (ECRGW) (Date From to ) Days-	
5.	Penalty for non-Compliance of NOC conditions Condition to be mentioned	50000.00
6.	Adjustment Charges	
7.	Rebate	
8.	Charges for correction/modification in the existing issued No Objection Certificate	
S.No.	Description	Rate
(i)	Change in User ID	Rs. 1000
(ii)	Change in firm Name	Rs. 5000
(iii)	Extension of No Objection Certificate	Rs. 5000
(iv)	Issuance of duplicate No Objection Certificate	Rs. 5000
(v)	Issuance of corrigendum to No Objection Certificate	Rs. 5000
(vi)	Any other items/correction etc.	Rs. 500
Rs. Rupees Seventy Two Lakh Fifty Seven Thousand Five Hundred Seventy Only		7257570.00

This is an system generated invoice, hence, does not require ink signed.

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SAVE WATER - SAVE LIFE

Term and conditions:

- i. All disputes are subject to Delhi Jurisdiction.
- ii. Any complaint in regard to the rates will not be entertained.

Member-Secretary  
CGWA, New Delhi

CENTRAL GROUND WATER AUTHORITY



भारत सरकार  
जल शक्ति मंत्रालय  
जल संसाधन, नदी विकास  
और गंगा संरक्षण विभाग  
केन्द्रीय भूमि जल प्राधिकरण  
Government of India  
Ministry of Jal Shakti  
Department of Water Resources,  
River Development & Ganga Rejuvenation  
Central Ground Water Authority

(भूजल निकासी हेतु अनापत्ति प्रमाण पत्र)  
**NO OBJECTION CERTIFICATE (NOC) FOR GROUND WATER ABSTRACTION**

Project Name:	M/s Hindustan Zinc Ltd.		
Project Address:	Baroi Underground Mine		
Village:	Jawad	Block:	Sarada
District:	Udaipur	State:	Rajasthan
Pin Code:			
Communication Address:	Hindustan Zinc Limited, Baroi Mines, Admin Block, Zawar Mines, Sarada, Udaipur, Rajasthan - 313901		
Address of CGWB Regional Office :	Central Ground Water Board Western Region, 6-a, Jhalana Doongri, Jaipur, Rajasthan - 302004		

1.	NOC No.:	CGWA/NOC/MIN/REN/3/2024/9231				2.	Date of Issuance				11/03/2024					
3.	Application No.:	21-4/345/RJ/MIN/2009				4.	Category: (GWRE 2023)				Critical					
5.	Project Status:	Existing With Additional Ground Water Requirement				6.	NOC Type:				Renewal					
7.	Valid from:	11/12/2022				8.	Valid up to:				10/12/2024					
9.	Ground Water Abstraction Permitted:															
Fresh Water				Saline Water				Dewatering				Total				
m³/day		m³/year		m³/day		m³/year		m³/day		m³/year		m³/day		m³/year		
0.00		0.00						350.00		127750.00						
10.	Details of ground water abstraction /Dewatering structures															
Total Existing No.:1								Total Proposed No.:0								
				DW	DCB	BW	TW	MP	MPu	DW	DCB	BW	TW	MP	MPu	
Dewatering Structure*				0	0	0	0	1	0	0	0	0	0	0	0	
*DW- Dug Well; DCB-Dug-cum-Bore Well; BW-Bore Well; TW-Tube Well; MP-Mine Pit;MPu-Mine Pumps																
11.	Ground Water Abstraction/Restoration Charges paid (Rs.):								1085768.00							
12.	Environment Compensation (if applicable) paid (Rs.):								0.00							
13.	Number of Piezometers(Observation wells) to be constructed/ monitored & Monitoring mechanism.						No. of Piezometers				Monitoring Mechanism					
										Manual	DWLR**	DWLR With Telemetry				
**DWLR - Digital Water Level Recorder						1				0	1	0				

(Compliance Conditions given overleaf)

This is an auto generated document & need not to be signed.

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SAVE WATER - SAVE LIFE

CENTRAL GROUND WATER AUTHORITY

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SAVE WATER - SAVE LIFE



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## CENTRAL GROUND WATER AUTHORITY

Department of Water Resources, River Development and Ganga Rejuvenation  
Ministry of Jal Shakti, Govt. of India

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SAVE WATER - SAVE LIFE

# Receipt

(As per the guideline Gazette Notification S.O. 3281(E) regarding the New Guidelines dated 24.09.2020 of CGWA, MoJS, Govt. of India)  
<https://cgwa-noc.gov.in>

Application No.:	21-4/345/RJ/MIN/2009	Date of Issuance:	11/03/2024
Name of Firm:	M/S HINDUSTAN ZINC LTD.		
AppType Category:	Base Metal Ores		
Application Type:	Mining		
PAN/GSTIN No. of Firm/Individual:	/		

S N	Description	Amount (Rs.)
1.	Application Processing Fee	5000.00
2.	Ground Water Abstraction /Restoration charges	1085768.00
3.	Environmental Compensation Charges (ECRGW) (Date From to ) Days-	
4.	Penalty for non-Compliance of NOC conditions Condition to be mentioned	
Rs. Rupees Ten Lakh Ninty Thousand Seven Hundred Sixty Eight Only		1090768.00

This is an system generated invoice, hence, does not require ink signed.

## कार्यालय उप वन संरक्षक, वन्यजीव उदयपुर

बडी रोड देवाली, पोस्ट बॉक्स न. 161, फोन 0294-2453686

Email ID - dcfwl.udpr.forest@rajasthan.gov.in

क्रमांक: एफ 9(10 किमी.-469)सर्वे/उवस/वजी/2023-24/ 6405 दिनांक: 14/08/2023

निमित्त

खनि अभियन्ता,  
उदयपुर

विषय: राष्ट्रीय उद्यान/वन्यजीव अभयारण्य की सीमा से 10 किमी. परिधि से बाहर होने या नहीं होने के आशय का प्रमाण पत्र के संबंध में।

संदर्भ: आपका पत्रांक: 2652 दिनांक 04.08.2023 एवं इस कार्यालय का पत्रांक 11715 दिनांक 29.11.2016 के क्रम में।

महोदय,

उपरोक्त विषयान्तर्गत प्रारंभिक पत्र के क्रम में लेख है कि मैसर्स हिन्दुस्तान जिंक लिमिटेड, यशद भवन, स्वरूप सागर, उदयपुर के पक्ष में खनिज लेड जिंक एवं सिल्वर, खनन पट्टा संख्या - 03/1989, निकट ग्राम जावर, तहसील सराड़ा, जिला उदयपुर के सम्बंध में राष्ट्रीय उद्यान/वन्यजीव अभयारण्य की सीमा से 10 किमी की परिधि में होने या नहीं होने का आशय प्रमाण पत्र चाहा गया है। जिसके क्रम में उक्त आवेदित क्षेत्र के जी.पी.एस. रीडिंग की जांच की गयी, जिसके अनुसार उक्त आवेदित क्षेत्र इस वनमण्डल के अभयारण्यों की सीमा से निम्नानुसार है:-

क्र.सं.	विषय	सूचना		
		Pillar No.	Latitude	Longitude
1.	आवेदित खनन क्षेत्र के सीमा स्तम्भों का विवरण	Block No.- A (1)		
		11	24 20 55.69	73 41 25.35
		12	24 21 42.3	73 41 17.06
		13	24 22 15.95	73 40 55.84
		14	24 22 51.59	73 41 21.31
		15	24 22 50.06	73 42 9.83
		1	24 22 12.95	73 44 20.54
		2	24 21 19.08	73 45 12.24
		3	24 20 19.52	73 43 57.28
		4	24 20 18.2	73 43 22.67
		5	24 19 1.1	73 42 4.88
		8	24 19 0.3	73 40 23.24
		9	24 20 48.07	73 40 24.17
		10	24 20 49.24	73 41 0.64
		11	24 20 54.95	73 41 25.41
		Block No.- B (3)		
		8	24 16 19.37	73 41 47.03
		20	24 16 30.81	73 42 48.18
		28	24 16 25.64	73 42 54.56
		27	24 14 49.31	73 43 6.58
		22	24 14 48.65	73 43 0.24
		26	24 14 54.57	73 42 51.35
		25	24 14 47.59	73 42 44.97
		24	24 14 43.66	73 42 7.5
		23	24 16 18.8	73 41 46.32
2.	सज्जनगढ़ वन्यजीव अभयारण्य की सीमा से दूरी	23.085 किलोमीटर		
3.	सज्जनगढ़ वन्यजीव अभयारण्य के ईको सेन्सिटिव जोन की सीमा से दूरी	21.450 किलोमीटर		
4.	जयसमन्द वन्यजीव अभयारण्य की सीमा से दूरी	10.800 किलोमीटर		
5.	जयसमन्द वन्यजीव अभयारण्य के ईको सेन्सिटिव जोन की सीमा से दूरी	3.180 किलोमीटर		
6.	फुलवाड़ी की नाल, वन्यजीव अभयारण्य की सीमा से दूरी।	35.490 किलोमीटर		
7.	फुलवाड़ी की नाल, वन्यजीव अभयारण्य के ईको सेन्सिटिव जोन की सीमा से दूरी।	25.490 किलोमीटर		

अतः उक्त आवेदित खनन क्षेत्र की सीमा से 10 किमी. की परिधि में कोई भी राष्ट्रीय उद्यान/वन्यजीव अभयारण्य स्थित नहीं है।

Signature valid

Digitally signed by Arun Kumar  
Designation: Deputy Conservator  
Of Forest  
Date: 2023.08.13 10:12:39 IST  
Reason: Approved

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भूमि

प्रधान मुख्य वन संरक्षक एवं मुख्य वन्यजीव प्रतिपालक, राजस्थान, जयपुर  
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दिनांक 21/03/2023

निमित्त

✓ मैसर्स हिन्दुस्तान जिंक लिमिटेड,  
प्लॉट 300 जावर माईन्स उदयपुर  
राजस्थान, पिन कोड- 313801

विषय-Environment Clearance under Para 7(ii) of EIA Notification 2006 for expansion to Zawar Group of underground lead zinc mines of M/S Hindustan Zinc Limited Proposed expansion from 4.0 MTPA To 4.8 MTPA Zinc ore and expansion in beneficiation plant from 4.0 million TPA to 4.8 MTPA from the mine lease area to 3620 ha [M/I No. 03/89] located at village zawar Tehsil Girwa and sarada District Udaipur, Rajasthan reg.

संदर्भ- Ministry of Environment, Forest and Climate Change Government of India Letter No J-11015/259/2017-IA II(M) दिनांक 16.10.2020, मुख्य वन संरक्षक (वन्यजीव), उदयपुर का पत्रांक 1421 दिनांक 22.07.2020 एवं 4/5 दिनांक 15.02.2023, इस कार्यालय द्वारा जारी वैधान्तिक स्वीकृति पत्रांक 192 दिनांक 27.01.2022 एवं आपका पत्रांक HZL/JM/ENB/2022 दिनांक 20.06.2022 के क्रम में।

महोदय

उपरोक्त विषयवस्तुनागत सन्दर्भित पत्र के क्रम लेख है कि इस कार्यालय के पत्र क्रमांक 192 दिनांक 27.01.2022 द्वारा वाईल्डलाईफ कंजर्वेशन प्लान के संक्षेप में जारी वैधान्तिक स्वीकृति की अनुपालना में मैसर्स हिन्दुस्तान जिंक लिमिटेड, प्लॉट 300 जावर माईन्स उदयपुर, राजस्थान द्वारा योजना कि कुल राशि रु. 1845.00 लाख की 20 प्रतिशत राशि रु. 369.00 लाख दिनांक 26.05.2022 को आवेदन खाते में जमा की जा चुकी है।

इस कार्यालय के पत्रांक 8451-8483 दिनांक 24.05.2019 द्वारा जारी दिशा-निर्देशों में उल्लेखित व शर्तों की पालना में प्रस्तावित वाईल्ड लाईफ कंजर्वेशन प्लान, नक्शा तथा परियोजना क्षेत्र में पाये जाने वाली वनस्पति एवं वन्यजीवों की सूची उप वन संरक्षक (वन्यजीव), उदयपुर द्वारा प्रमाणित कर मुख्य वन संरक्षक (वन्यजीव), उदयपुर की अभिरक्षा के साथ प्रस्तुत की गई है।

प्रयोजन वन एवं जलवायु परिवर्तन मंत्रालय भारत सरकार नई दिल्ली के पत्र क्रमांक J-11015/259/2017 IA II(M) दिनांक 16.10.2020 के विषय संख्या 24 की पालना के लिये इस कार्यालय द्वारा वन्यजीव संरक्षण योजना (WLCP) की निम्न शर्तों के साथ अंतिम स्वीकृति जारी की जाती है-

- यदि परियोजना लागत में कोई वृद्धि होती है तो तदनुसार वन्यजीव संरक्षण योजना में भी वृद्धि की जाकर अपेक्षित राशि वन्यजीव प्रभाग में जमा कराई जावे।
- केन्द्र सरकार द्वारा जारी सन्दर्भित आदेशों व सम्पक दिशानिर्देशों के अनुरूप इस योजना के क्रियान्वयन का प्रबोधन किया जावे।
- वन्यजीव संरक्षित योजना में उल्लेखित कार्यों का वन भूमि पर परियोजना प्रस्तावक द्वारा क्रियान्वयित कराया जावेगा।
- तकनीकी कार्य हेतु प्रादेशिक/ वन्यजीव मंडल से परामर्श किया जा सकता है।
- संलग्न नक्शे व सूची को भी उप वन संरक्षक की अभिरक्षा अनुसार प्रमाणित किया जाता है।

संलग्न - 1. नक्शा, 2. एनेक्सर-1, 3. वाईल्ड लाईफ कंजर्वेशन प्लान की प्रति

भवदीय

(अरिन्दम तोमर)

प्रधान मुख्य वन संरक्षक  
एवं मुख्य वन्यजीव प्रतिपालक  
राजस्थान, जयपुर

दिनांक:

क्रमांक: एफ11(300) विकास-11/मु.व.जी.प्र./2022-23/

प्रतिलिपि निम्न को सूचना एवं आवश्यक कार्रवाई हेतु संलग्न प्रेषित है-

1. मुख्य वन संरक्षक (वन्यजीव), उदयपुर।
2. उप वन संरक्षक (वन्यजीव), उदयपुर।

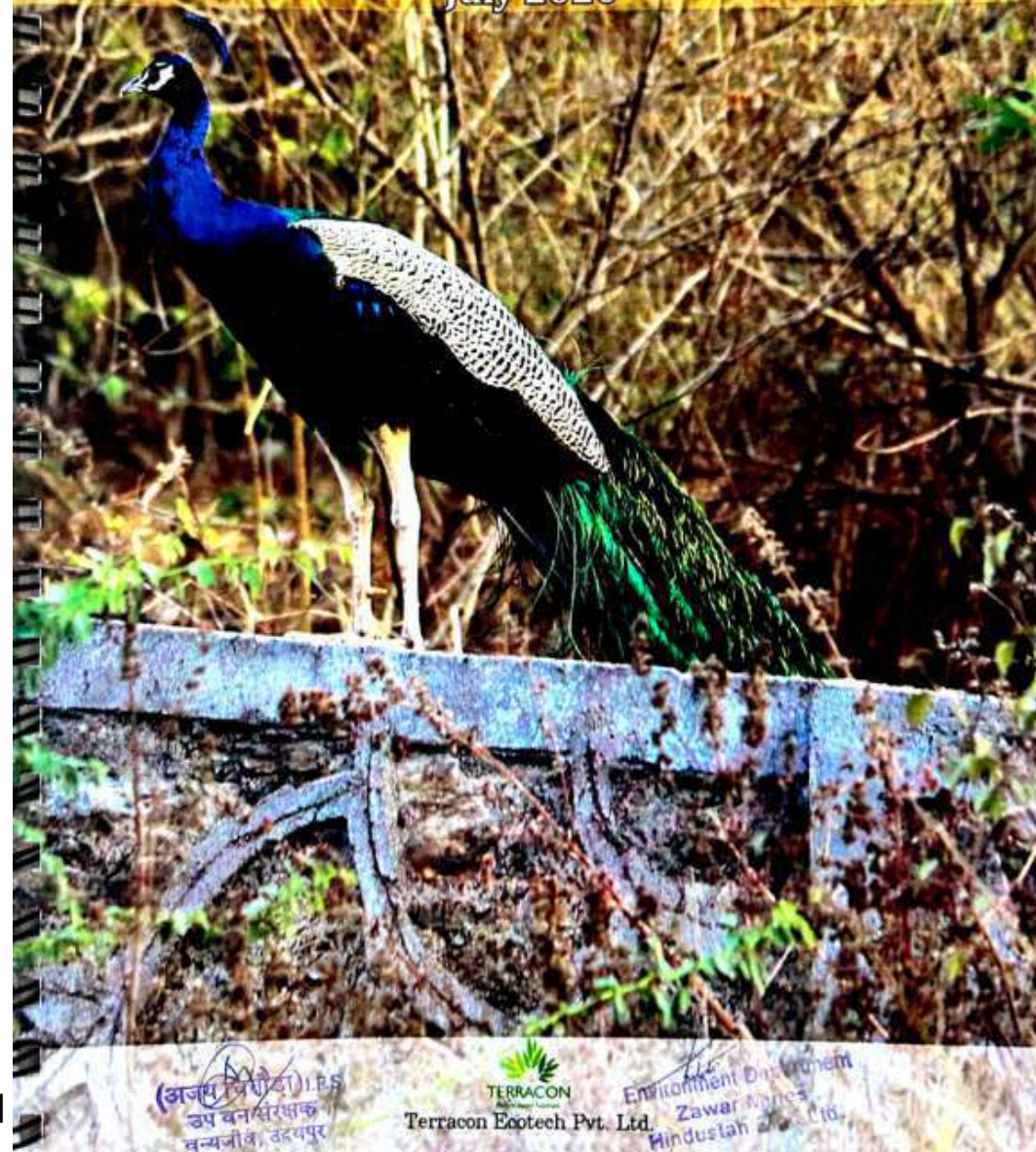
Signature valid

Digitally signed by Arindam Tomar  
Designation: Principal Chief  
Conservator of Forest  
Date: 2023.03.17 18:02:06 IST  
Reason: Approved

RajKaj Ref No.: 3396014



# Wildlife Conservation Plan for Schedule-1 Species For Zawar Group of Mines, Hindustan Zinc Ltd. July 2020



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Terracon  
Terracon Ecotech Pvt. Ltd.  
Environment Document  
Zawar Mines  
Hindustan Zinc Ltd.



## Contents

Executive summary .....	5
1. Chapter 1 – Introduction .....	11
1.1. About the Project .....	11
1.2. Project utility .....	11
1.3. Applicable Acts and Regulations in the WCP area .....	12
1.4. Socio-economic environment of the WCP area .....	13
1.4.1. Demographic composition .....	13
1.4.2. Literacy rate .....	14
1.4.3. Occupational profile .....	14
1.4.4. Existing cropping pattern .....	14
1.4.5. Cattle population .....	14
1.4.6. Forest dependency .....	15
1.4.7. Impact of Project on forest growth in WCP area .....	15
1.5. Environmental details .....	15
1.5.1. Topography .....	15
1.5.2. Land use .....	15
1.5.3. Geology .....	15
1.5.4. Climate .....	15
1.5.5. Natural disasters .....	16
1.5.6. Natural drainage lines and water bodies .....	16
1.5.7. Linear infrastructure that can affect Megafauna in WCP area .....	17
1.5.8. Flora .....	17
1.5.9. Fauna .....	26
1.5.10. Aquatic Biodiversity .....	31
1.6. Description of Forest and Habitat conditions and Wildlife Scenario of WCP area .....	33
1.6.1. Population status of Wildlife .....	33
1.6.2. Movement of Wildlife in the WCP area .....	33
1.7. Man-animal conflict .....	33
1.8. Other projects in the WCP area .....	34
1.9. Experts in Wildlife Conservation Plan .....	34
1.10. Field visits and data collection methodologies .....	34
1.11. Literature review .....	36
1.11.1. Impact of project activities on Biodiversity .....	36

1.11.2. Relevant research on WCP area .....	36
1.11.3. Geographical information of WCP area .....	37
2. Chapter 2 – Threats and Impacts .....	38
2.1. Threat analysis .....	38
2.1.1. Impact of project on environment and other factors .....	38
2.1.2. Pollutants from the project and their effect on environment .....	40
2.2. Quantification of degradation of environmental parameters due to project activities .....	40
2.2.1. Soil .....	40
2.2.2. Air .....	41
2.2.3. Water .....	42
2.2.4. Noise .....	44
2.2.5. Increase in Vehicular traffic and its impacts .....	46
2.3. Impact on ecology and Biodiversity .....	47
2.3.1. Impact on Flora .....	47
2.3.2. Impact on Fauna .....	47
2.3.3. Impact on habitats – Water body .....	48
2.3.4. Impact on habitats – Terrestrial .....	48
2.3.5. Impact on biological environment due to increased human intervention and vehicular traffic in the WCP area .....	48
2.3.6. Impact on displacement/movement of Fauna .....	48
2.4. Study techniques and Observations .....	49
2.4.1. Study techniques .....	49
2.4.2. Field visits and observation .....	50
2.4.3. Records and Secondary references .....	51
2.4.4. Justification in extrapolation .....	51
3. Chapter 3 – Mitigation measures .....	52
3.1. Objectives of Wildlife Conservation .....	52
3.2. Strategies to mitigate and minimize adverse impacts of project activities .....	52
4. Chapter 4 – Implementations in Core area .....	56
4.1. Schedule I species of WCP area .....	56
4.1.1. Osprey ( <i>Pandion haliaetus</i> ) .....	57
4.1.2. White-rumped Vulture ( <i>Gyps bengalensis</i> ) .....	57
4.1.3. Indian Peafowl ( <i>Pavo cristatus</i> ) .....	59
4.1.4. Indian Leopard ( <i>Panthera pardus fusca</i> ) .....	60



4.1.5. Indian Pangolin ( <i>Manis crassicaudata</i> ) .....	62
4.1.6. Crimson Rose ( <i>Pachliopta hector</i> ) .....	63
4.1.7. Bengal Monitor Lizard ( <i>Varanus bengalensis</i> ) .....	64
4.2. Implementations in Core area for Conservation .....	65
5. Chapter 5 – Implementations in Buffer area .....	68
6. Chapter 6 – Costing .....	71
7. Chapter 7 – Maps .....	78
7.1. Wildlife conservation plan area map .....	78
7.2. Land use map of WCP area .....	79

## Executive summary

### Introduction

Hindustan Zinc Limited (HZL) has Lead and Zinc ore production and beneficiation capacity of 4.0 MTPA from underground mine and 90 MW Captive Power Plant (CPP) at Zawar, Udaipur district, Rajasthan. Block 1, with a lease hold area of 3172 Ha comprises of four underground Pb-Zn mines viz. Mochia, Balaria, Zawarmala and Baroi with matching integrated ore beneficiation plant located at Mochia mine. Block 3 located near Bara (lease area 448 Ha) is a lead dominant prospect mine.

Environment Clearance was granted to Zawar Mines, Hindustan Zinc Ltd. on 5th Jan 2017 for expansion of Lead and Zinc ore production and beneficiation capacities from 1.5 Million Tonnes Per Annum (MTPA) to 4.0 MTPA and expansion of the captive power plant (CPP) from its existing underground mines at Zawar, Udaipur district, Rajasthan. Hindustan Zinc further has been proposed for expansion from 4 MTPA to 4.8 MTPA (million tonne per annum) of Lead and Zinc ore production and beneficiation capacities from its existing underground mines.

Some species included in the Schedule I of the Indian Wildlife Protection Act (1972) are recorded within the 10 km radial distance of the mine area. Hence, a Wildlife Conservation Plan (WCP) is prepared to ensure provision of a relatively stress-free habitat to wildlife in the impact area that would be capable of meeting the basic needs of resident wildlife. The present report includes impact of the project, mitigation measures taken for the same and implementations to protect and improve wildlife habitats in the WCP area.

### Location of WCP area

The study area covers 10 km radius around the proposed mine lease area, termed as WCP area. The proposed expansion mine lease area is located at Latitude:

Block-I: 24°18'50" N, 73°40'22" E to 24°22'47" N, 73°45'08" E

Block-III: 24°12'37" N, 73°40'26" E to 24°14'21" N, 73°41'46" E

Zawar group of mine is situated at about 45 Km. south west of Udaipur district of Rajasthan. Tidi River passes through the mine lease area. Site elevation is about 350-400 m above MSL. The present land use is industrial activity

### Project description

The existing lead zinc ore underground mines at Zawar group of mines operate at 4.0 MTPA. 'Long Hole Open Stopping' method of mining is practiced for extraction.

### Project activities

The salient features of project are given in table Table 1.



Table 1 - Salient features of the project

Sr. No.	Description	Details
1	Mine lease area	3620 Ha
2	Ore Mineral	Lead, Zinc and associated metals
3	In situ grade	4.68% Zinc and 2.31% Lead
4	Ore body width	2 m to 45 m
5	Mode of entry	Adit, Incline, Shaft and Ramp
6	Method of mining	Sub level open Stopping and its variant
7	Estimated project cost -	
	1.5 MTPA to 4 MTPA of Lead-Zinc Ore production and Ore Beneficiation	INR 1200 Crores
	4 MTPA to 4.8 MTPA of Lead-Zinc Ore production and Ore Beneficiation	INR 430 Crores
	<b>Total Cost</b>	<b>INR 1630 Crores</b>
8	Investment of pollution control measures	INR 148 Crores

#### Environmental profile of the study area

##### Land use

As per satellite imagery, the built-up land is 2.23%, forest land occupies 22.47%, agricultural land is about 13.36%, water body covers 1.75% and remaining land is either area available for cultivation, termed as cultivable waste land.

There are no ecologically sensitive area/protected area as per Wildlife Protection Act, 1972 is present within 10 Km radius of the lease area. However, 4 reserve forests namely Dingri, Kewra, Palodra and Jabla Reserve Forest are present in the WCP area.

##### Soil quality

Soil in the study area is sandy clayey and alkaline in nature. Nitrogen quantity in the soil is in the very less to better range, whereas phosphorus and potassium are observed to be in very less to more than sufficient category. The soil samples do not indicate any industrial contamination.

##### Meteorology

Temperature in the WCP area ranges from 20.4°C to 42.1°C. Relative humidity in the region ranges from 33.2-51.3%. Climate represents dry arid conditions. Predominant wind direction is West with wind speeds ranging from 1-19 Km/h.

##### Ambient air quality

11 ambient air quality monitoring stations were selected in and around project site. The minimum and maximum values of PM<sub>10</sub> and PM<sub>2.5</sub> were observed in range of 30.7 µg/m<sup>3</sup> - 70.5 µg/m<sup>3</sup> and 22.6 µg/m<sup>3</sup> - 38.9 µg/m<sup>3</sup>, respectively. Ambient air quality analysis results reveal that the constituents in air are well within limits at all locations as per National Ambient Air Quality Standards.

##### Water quality

The baseline water quality status in the region is established by analyzing samples at 14 locations - 8 ground water sources and 6 surface water sources. All water sources showed

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eligibility as 'drinking water'. Surface water was found to be suitable for drinking after the conventional treatment followed by disinfection.

#### Noise levels

The noise monitoring has been conducted for determination of noise levels at 10 locations in the study area. Noise monitoring results reveal ambient noise levels in all the locations are well within the limits as per CPCB ambient noise standards.

#### Ecological environment

Primary survey carried out with respect to flora in the study area revealed about 247 species of plants, of which 68 are tree species, 49 shrub and climbers and 130 species are of herbs and grasses. Among life-forms recorded, herbs showed the highest species diversity and density in outer buffer layer, compared to inner buffer layer. About 82 species of birds, 20 species of mammals, 10 species of butterflies, 10 amphibians and 12 reptile species were reported from the WCP area. Out of these, 3 species of birds, 2 species of Mammals, 1 species of reptile and 1 species of butterfly are included in schedule I of IWPA, which require protection. Conservation plan for these species is elaborated in Chapter 4. Moreover, the IUCN status of world population of the species observed in the study area were analyzed. Based on this status, 2 species of plants, 7 species of Birds (vulnerable, critically endangered and near threatened) and 4 species of mammals (vulnerable, near threatened and endangered) were found to be important species for conservation.

As per records of state forest department and ministry of Environment, Forests and Climate change, there are no protected areas and also wildlife corridors in 10 km radius from mine lease area boundary. 4 reserved forests are present within the WCP area, as authenticated by the Forest Department.

#### Social environment

The WCP area has total population of 97,027 according to 2011 census. Total male population is about 51.10% and total female population is around 48.90%. The average literacy rate is 47.44% in the buffer area of Zawar mines. The population is dependent on forests for fuelwood, fodder and collection of other products.

#### Environmental impact

##### Topography

The mining operations are underground. There are no major changes in the topography and landscape for excavation of mining stopes, storage of overburden, storage of ore, construction of buildings for office and machineries. Some excavation for approach, mill expansion and road construction were done while expanding the mines capacity. The increased capacities are facilitated by the existing setup, thus, not making perceptible impact on the topography and the landscape.

##### Land use

No land degradation in the surrounding area occurs due to mining as the mines operate underground. The waste coming out of mines is utilized for construction of tailing dam and some quantity is used for leveling work at all the mine just outside the new entries whereas the balance quantity is dumped in stope voids.

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### Solid waste

Waste rock, mostly dolomite is generated from the mine processes. Facilities for handling waste by dumping into exhausted stope voids and hoisting to surface for tailing dam construction are set up at all the mines. Some waste generated is used for leveling and creating base for new infrastructure site development, which will be compacted and developed into green belt.

Tailings from beneficiation are impounded in separate dam. Water contained in the tailing slurry is reclaimed at the tailing dam and seepage water is re-circulated to mill for reuse without any treatment. Zero discharge is maintained at tailing dam.

### Air quality

Ore loading activities, waste dumping and vehicular movement are the sources of air pollution on the surface. Drilling, blasting and crushing activities that generate particulate matter are confined below ground but 2 crushing systems have been planned at the surface. Sufficient plantation around these systems along with its planning in accordance to the wind direction will help reduce impact on air quality. Wet drilling is used to suppress dust generation. Water spraying is carried out to ensure moisture in the ore transported to the surface. Crushers and screen houses in beneficiation plants are provided with bag filters with outlets connected to stacks which are regularly monitored.

### Noise levels

Compressors/ fans for ventilation for the underground operations are the only sources of noise on surface. The ventilation fans are installed in isolated locations and in a manner to control noise levels. The noise levels and vibrations induced by blasting are attenuated in depth of mine below ground. With mine expansions, the mine development will occur into deeper levels that will further reduce the noise and vibration impact on the surface. Blasting is carried as per the recommendations of the CIMFR, Dhabad and every blasting is monitored for vibration as per the DGMS rules and is found well within the permissible limits.

The current noise levels in residential and commercial areas are found well within the permissible limits.

### Water quality

The total water requirement of mine and beneficiation plant is 14,000 m<sup>3</sup>/ day. HZL has built Tidi dam in 1976, from which it has permission from the Government of Rajasthan to draw water at nominal cost.

The runoff water from ore storage and tailing dam are likely sources of suspended solids, if allowed to escape to the natural drainage without any treatment, may affect the quality of water bodies. The quality of water before it enters and after it leaves the leasehold is monitored. The mine operates on 0 discharge and no impact is seen on water quality of the area.

The ground water in WCP area is within safe limits in core zone. The ground water inflow in the mines and its withdrawal does not influence any nearby private or public wells. Thus, there is no significant impact of mining operations on ground water quality.

### Flora and fauna

Detailed biodiversity assessment of the WCP area in both core and buffer zones was carried out, revealing presence of species protected under Schedule I of the IWPA, 1972, enlisted in Table 9. Other floral and faunal diversity of the WCP area is presented in Table 4 and Table 7, Table 8, respectively.

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No degradation of land will occur as the mining operations are underground. Also, 170.85 Ha land is converted into greenery which has positive impact on the local biodiversity. Development of 50 Ha of land with 31,250 saplings under greenbelt development program will be implemented in a progressive manner during next 5 years. HZL has allotted Rs. 2875 towards seedling rising/Ha and Rs. 67,687 for plantation/Ha. In addition, Rs. 97 Lakhs has been allotted for Wildlife conservation works in reserve forests of the WCP area.

### Environment Monitoring Program (EMP)

Regular environmental monitoring studies will be conducted in and around project area as per stipulated guidelines by State Pollution Control Board norms, Central Pollution Control Board (CPCB), New Delhi and as per conditions stipulated in environmental clearance an amount of Rs. 105 Crores has been allotted for pollution control implementations.

### Project benefits

The proposed expansion has generated direct and indirect employment, improved social and economic environment in the surrounding area and also met raw material requirement of the expanded capacities of company's existing plants. The project also contributed to meet the global Zinc demand and 'Make in India' vision.

### Conclusion

While the project has benefits to the locality as well as the nation in many aspects, environmental and biological assessments of the study area showed minimal impact on the physical and biological parameters in the core as well as buffer zone of the Zawar group of mines. Numerous mitigation measures are already practiced to reduce impacts on the mining activities. The present wildlife conservation plan will assist Zawar mines in creating a safe habitat for its existing biodiversity, conserving and improving the wildlife in the mine lease and surrounding area.

### Objectives of the Wildlife Conservation Plan

The main objectives of WCP are -

- Determination of the present status of flora and fauna and habitats of major wildlife species in the project area as well as in its impact area of 10 km radial distance from the lease area. Core area and buffer area together are referred to as 'WCP area'.
- Identification of threats to habitats and wildlife in the WCP area
- Formulation appropriate mitigating measures to prevent degradation of habitats in and around the project area as consequence of the expansion project.

While achieving the purpose of the beneficiation project, HZL aims to perform its duty towards the environment and the communities that support them. The current conservation plan goes in accordance with the Company's objectives of -

1. Minimizing the impact of up scaled mining activities, maintaining current levels of pollutants within the permissible limits in the surrounding environment and conserving wildlife populations in their habitats in the surrounding area.

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2. Working in coordination with the Forest Department to achieve harmony through awareness in existence of wildlife and the communities in the WCP area.

### Wildlife Conservation Plan (WCP)

'Wildlife conservation plan' acknowledges the biodiversity in the core and the area in 10 km radius of the core site, called the buffer area. Together, these areas are referred to as 'Wildlife conservation plan (WCP) area'. It encompasses the habitat observations, ecology and the floral as well as faunal diversity in the WCP area.

7 of the faunal species found in the WCP area are included under the highest order of protection - Schedule I under the Indian Wildlife Protection Act (IWPA), 1972. These **1 reptilian (Bengal Monitor Lizard)**, **3 avifaunal (Osprey, Indian Peafowl and White-rumped Vulture)**, **2 mammalian (Indian Pangolin and Indian Leopard)** and **1 butterfly (Crimson Rose) species** and their habitats require stringent protection and careful management, methods of which are described in the present 'Wildlife Conservation Plan'.

The direct or possible threats to these 7 species, either from mining operations or from communities in the WCP area were identified. Based on this information, conservation measures such as -

- I. Habitat creation and conservation and
- II. Awareness generation among the industrial staff and the buffer area population regarding the biodiversity found in the WCP area, its importance, activities that threaten them and conservation actions, along with species-specific interventions are elaborated in Chapter 4 and Chapter 5, respectively.

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## 1. Chapter 1 - Introduction

### 1.1. About the Project

Zawar group of mines consists of 4 mines namely Mochia, Balaria, Zawarmala and Baroi. It is inclusive of a beneficiation plant of 4.0 MTPA capacity and a 90 MW captive power plant.

Environment Clearance was granted to Zawar Mines, Hindustan Zinc Ltd. on 5th Jan 2017 for expansion of Lead and Zinc ore production and beneficiation capacities from 1.5 Million Tonnes Per Annum (MTPA) to 4.0 MTPA from its existing underground mines at Zawar, Udaipur district, Rajasthan. Hindustan Zinc further expansion from 4 MTPA to 4.8 MTPA (million tonne per annum) of Lead and Zinc ore production and beneficiation capacities from its existing underground mines has been proposed.

### 1.2. Project utility

Hindustan Zinc Limited (HZL) is one of the largest Lead-Zinc integrated producer and a leading producer of silver with more than 60 years of experience in Mining & Smelting. HZL is the only integrated Lead & Zinc manufacturer in India and owns captive lead and zinc mines at Rampura Agucha, Rajpura Dariba, Kayad, Sindesar Khurd and Zawar Mines that cater to the requirement of lead and zinc concentrate for its smelters located at Chanderiya, Dariba and Debari.

The Zawar group of mines in Rajasthan is the oldest Lead-Zinc mines in India. The commencement of ore beneficiation took place at Zawar in year 1950 - under the name of 'Metal Corporation of India (MCI)'. In 1966, the Government of India took over the activities of MCI and Hindustan Zinc Limited was formed. The Government of India has disinvested HZL in April 2002. HZL is since a Vedanta Group Company with 65% stakes and 29% stake with Government of India and 6% with others.

As India is one of the fastest growing economies in the world, sufficient support from metal sectors is essential for infrastructure development so as to sustain the growth rate. Galvanized iron products play key role in infrastructure development and therefore the requirement of zinc metal is also essential. Although the current production capacities of Zinc are sufficient to meet the domestic requirements, the demand is expected to grow which makes it essential for the expansion of the zinc production capacities. Further, the deficit in international market during the upcoming years provides an opportunity for export. As per the global demand and supply projections upto 2020, India has the potential for exporting zinc profitably. The industrial growth in developing countries of the world backed by growth in automotive sector, construction industry, engineering products and consumer goods drives the demand for Zinc. Thus, the Lead-Zinc ore mines and beneficiation of capacity 4.0 MTPA and captive power plant (CPP) at Zawar Mines, Udaipur, Rajasthan are extremely beneficial for the country's economy.

### Project benefits

The completed expansion of Zinc and Lead underground mine and its beneficiation plan to capacity of 4.0 MTP has created far reaching socio-economic benefits for Zawar villages and its surrounding area. The proposed expansion project will bring in an investment to the tune of Rs. 1200 Crores.

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Besides meeting the Company's requirement of its own downstream plants, the mining processing of both these minerals is vital for the development of our country at large, as benefits include –

1. **Employment potential** – The mines provide employment to persons of different skills and trades. About 3250 individuals have gotten direct or indirect employment in the operations and maintenance of the project. Through CSR initiatives, HZL is providing various skills development opportunity through vocational training enabling people to become self-employed. Assistance in providing to the villages access to banking facilities, health facilities, educational material and scholarships is added benefit. All these actions have direct economic and social benefits to the people in the buffer area by increasing income and reducing expenditure for health, education and interests.
2. **Infrastructure** – The mining and its associated activities require development of basic infrastructure such as roads, water supply, electricity, housing, health care, etc. to facilitate production and processing. The existing project has developed many infrastructure facilities and the proposed expansion will provide more opportunities to further improve the already developed infrastructure facilities, such as
  - Widening and upgradation of road connectivity and village roads
  - Construction of healthcare centres
  - Provision of solar power lightings for street lights
  - Development of training centres
  - Construction of sanitation facilities
3. **National Economic development** – The demand for Zinc in India is expected to grow at a rate of 8% which makes it viable for the expansion of the Zinc production capacities. Further, the deficit in international market expected in the upcoming years provides opportunity for export.
4. **Land value appreciation** – The infrastructure development related to the proposed project is likely to cause appreciation of land prices in the nearby areas, from which locals with land holdings are expected to benefit.
5. **Corporate Social Responsibility** – Being aware of its social responsibilities, HZL is undertaking various social development projects in line with the needs of people in partnership with them. The main focus areas at Zawar mines are:
  - Health and Hygiene
  - Education
  - Sustainable livelihood
  - Social mobilization
  - Model Village Development

These initiatives are undertaken through involvement of the Governmental bodies or NGOs.

### 1.3. Applicable Acts and Regulations in the WCP area

1. The Mines and Minerals (Regulation and Development) Act, 1957, (amended 2015)
2. Wildlife (Protection) Act, 1972
3. The Environment Protection Act, 1986
4. Biological Diversity Act, 2002
5. The Forest (Conservation) Act, 1980
6. Wild Birds and Animals Protection Act, 1912

(अजय चितौड़ा) I.F.S.  
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Zawar Mines  
Hindustan Zinc Ltd.

7. Environmental Impact Assessment Notification, 2006
8. The Water (Prevention and Control of Pollution) Act, 1974, (amended 1988)
9. The Air (Prevention and Control of Pollution) Act, 1981, (amended 1987)
10. The Mineral Concession Rules, 1960 (amended 2012)
11. The Mineral Conservation and Development Rules, 2017
12. Ash Content Notification, 1997 (amended 2015)
13. Disposal of Fly Ash Notification, 1999
14. Public Hearing Notification, 1997
15. Hazardous Wastes (Management & Handling) Rules, 1989 (amended May, 2003)
16. The Aravali Notification, 1992

### 1.4. Socio-economic environment of the WCP area

Study of socio-economic environment helps determining its impact on the habitats and biodiversity of an area. The methodology adopted for this study includes review of latest published secondary data (District Census Statistical Handbook -2011 and Primary Census Abstract of Census -2011) with respect to population, social structure, literacy levels and occupational structure available for 10 Km. radius study area.

#### 1.4.1. Demographic composition

As per 2011 census, the study area is inhabited by 97,027 people in 19,132 households. The population distribution and specifications are presented in Table 2.

Table 2 - Distribution of population in WCP area

Particulars	0-3 Km.	3-7 Km.	7-10 Km.	0-10 Km.
No. of households	2829	9230	7073	19132
Male population	7750	23625	18205	49580
Female population	7306	22448	17693	47447
Total population	15056	46073	35898	97027
Male population (0-6 years)	1360	3923	3621	8904
Female population (0-6 years)	1291	3669	3529	8489
Total population (0-6 years)	2651	7592	7150	17393
Average household size	5.32	4.99	5.08	5.07
% of Males to total population	51.47	51.28	50.71	51.10
% of Females to total population	48.53	48.72	49.29	48.90
Sex ratio (no. of females per 1000 males)	943	950	972	957
Density	203	195	122	161

The average family size is of 5.07 as per the 2011 Census. Population density of the study area is found to be 161 persons per 2 Km. The configuration of male and female indicates that the males constitute to about 51.10% and females to 48.90% of the total population. The study area has an average of 957 females per 1000 males.

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### 1.4.2. Literacy rate

The study area experiences a literacy rate of 47.44%, with 63.43% male literacy rate i.e. percentage of literate males to the total males of the study area and 36.57% female literacy rate. Female literacy rate is an important indicator for social change.

### 1.4.3. Occupational profile

The occupation structure of residents in the study area is studied with reference to main workers, marginal workers and non-workers. The main workers include 10 categories of workers defined by the Census Department, consisting of cultivators, agriculture laborers, those engaged in live-stock, forestry, fishing, mining and quarrying; manufacturing, processing and repairs in household industry; also construction, trade and commerce, transport and communication and other services.

Marginal workers are workers engaged in some work for a period of less than 6 months. Non-workers include those engaged in unpaid household duties, students, retired persons, dependents, beggars, vagrants, etc.

As per 2011 census records altogether the main workers out to be 18.27% of the total population. The marginal workers and non-workers constitute to 23.25% and 58.49% of the total population, respectively. The distribution of workers by occupation indicates that the non-workers are the predominant population. The occupation structure of the study area is shown in Table 3.

Table 3 - Occupational structure of the WCP area

Particulars	0-3 Km.	3-7 Km.	7-10 Km.	0-10 Km.
Total population	15056	46073	35898	97027
Total workers	6482	18300	15495	40277
Work participation rate (%)	43.05	39.72	43.16	41.51
Total main workers	3243	8221	6258	17722
% of main workers to total population	21.54	17.84	17.43	18.27
Marginal workers	3239	10079	9237	22555
% of marginal workers to total population	21.51	21.88	25.73	23.25
Non-workers	8574	27773	20403	56750
% of non-workers to total population	56.95	60.28	56.84	58.49

### 1.4.4. Existing cropping pattern

Rajasthan's economy is primarily agricultural and pastoral. Rainwater is the main source for irrigation and drinking water in the region, tube wells and wells also supplement as a source of water for irrigation purposes. Sprinkler systems are utilized for irrigating crops through tube wells. The main crops grown in the study area are Wheat, Maize, Malt, Pulses, Cotton, Mustard and Rice.

### 1.4.5. Cattle population

Live-stock rearing is one of the occupations practiced in the study area. Animals like Buffalo, Sheep, Goat, Horses and Ponies, Donkeys, Camel, Pig, Poultry at Backyard are reared. Cow breeds include Rathi, Crossbred and Desi.

(Source: 19<sup>th</sup> and 20<sup>th</sup> Livestock Census 2012, 2019)

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### 1.4.6. Forest dependency

The communities are dependent on existing forests for fuel wood, fodder, fruits, etc.

### 1.4.7. Impact of Project on forest growth in WCP area

The mining activities like extraction, drilling and blasting are completely underground, leading to no impact on terrestrial habitats of the surrounding area.

Moreover, habitat creation i.e. plantation of trees undertaken by HZL in the core area will lead to increase in green cover. Gaps in the plantations will also be filled. Provided the planted species are carefully selected to create a habitat matching the local habitat, it will support the regional diversity. When this habitat is established, the plantations will function similar to natural forests in the WCP area.

## 1.5. Environmental details

### 1.5.1. Topography

The Zawar group of mines is located within hilly area and marked by rugged and hilly terrain, dominated by steeply dipping outcrops and small valleys carved by the networks of ephemeral streamlets and streams.

### 1.5.2. Land use

The total mine lease area of the project is 3620 Ha, out of which 155.35 Ha is agricultural land, 59.84 Ha is grazing land, 1537.91 Ha is forest land, 99.75 Ha is settlement, 169.65 Ha is plantation area, 9097 Ha is water bodies, 1160.80 Ha is barren land and 345.73 Ha has other land use. Other land use includes 8.66 Ha area occupied by the beneficiation plant, 2.0 Ha by Ore stock yard, 223.52 Ha by tailing dam, 96.14 Ha by utilities, 209.65 Ha by plantation and 47.06 Ha is the remaining area.

### 1.5.3. Geology

Zawar is situated in NW-SE trending hills of Rajasthan and is a type area of Paleo-Proterozoic age (1700-1800 Million Years) The lithological sequence comprises of meta-sedimentary rocks overlying a basement (Sarara Inlier) contemporary to BGC (Banded Gneissic Complex) of Rajasthan.

### 1.5.4. Climate

The meteorological data recorded during the monitoring and historical data on meteorological parameters have been referred to for identification of the general meteorological regime of the region. The year may broadly be divided into 4 seasons:

December to February – Winter

March to May – Pre-monsoon

June to September – Monsoon

October to November – Post-monsoon

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The minimum and maximum temperatures recorded at site during study period (March to May) were 20.4° C – 42.1° C. relative Humidity was observed to range from 33.2 – 71.3% during the study period at the site.

#### 1.5.5. Natural disasters

The WCP area is prone to floods, lightning strikes and storms. The WCP area falls in seismic zone II area, which is a low damage risk zone, hence, chances of earthquake are low.

An 'Emergency management committee' and a 'Rescue recovery committee' are in place at Zawar mines, which are well-equipped to deal with impacts of natural calamities on the mine lease area.

#### 1.5.6. Natural drainage lines and water bodies

The drainage pattern is sub-dendritic to dendritic. The general slope of the area is from west to east and northwest to southwest. In the northern and western part of the area, there are some high peaks of the hills. The southwestern part has comparatively lower elevation having lowest elevation i.e. at Khakhadara. The major part of these hilly areas is under forest cover.

##### Drainage pattern

The Tidi River forms major river system in core and buffer area. It is an ephemeral river and has two catchment zones - in the north and the west of the area. The northern catchment commences from the high peaks of mountains towards northwest and northeast of Kaya village. The stream from this area almost takes a south and southeasterly course and joins Tidi River at the base of a hill northwest of mine area.

The western catchment commences from high hilly peaks around Sera village. The Tidi River near Tidi and Zawar village takes a meandering northeast course. After flowing almost west-east course, north-northwest of mining area it changes its course towards southeast where it is joined by Daya River. Daya River emerges from hill area around Keora Khurd village. After flowing through hilly terrain as a narrow stream upto Rela village the downstream course of River broadens with thin deposits of coarse alluvium.

Tidi River further south of the area, joins Gomti River which is tributary of Som River. The Som River joins Mahi River near Deola village in Dungarpur District and after draining a part of Eastern Gujrat ultimately joins Gulf of Cambey of Arabian Sea.

##### Nature of occurrence of ground water in mine lease area

Ground water occurs under water table (phreatic conditions) in crystalline metamorphics, mostly dolomite and mica schist. Metamorphics are impervious in nature and ground water is held and moves through secondary openings like foliations, fractures, joints, etc. Fracture porosity and hydraulic conductivity of metamorphics is very low.

##### Depth of Water table at Balaria Mine area

Depth of water table is shallow as observed from open wells in the mine and in nearby wells and ranges from 3 m to 5 m below the land surface during post-monsoon period. The depth of water table during pre-monsoon period is deeper and ranges from 7 m to 10 m.

##### Depth of water table at Baroi Mine area

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Environment Department  
Zawar Mines  
Hindustan Zinc Ltd.

Depth of water table is shallow as observed from open wells in the mine area and ranges from 3 – 5 m below the land surface during post monsoon period but 7 – 12 m during the pre-monsoon period.

##### Depth of water table at Mochia Mine Area

Depth of water table is 3 – 5 m below the land surface during post-monsoon period and 7 – 10 m during the pre-monsoon period.

##### Depth of water table at Zawarmala Mine Area

Depth of water is shallow, ranging between 3 and 5 m below the land surface during the post-monsoon period and 7 – 10 m during the pre-monsoon period.

#### 1.5.7. Linear infrastructure that can affect Megafauna in WCP area

NH8 is the nearest highway traversing the WCP area. The vehicular traffic on this road poses a threat to the wildlife in WCP area as the animals trying to cross the road may get hit by vehicles, leading to roadkills.

Further, the present railway route in meter gauge from Udaipur-Ahmedabad runs within the mine lease area. When the existing gauge will be converted to broad gauge by Indian Railways, the present railway siding infrastructure will be upgraded suitably to reduce road traffic.

#### 1.5.8. Flora

The vegetation in study area is semi-arid type, consisting of deciduous trees and ephemeral vegetation, emerging during monsoons, completing life cycle within 2-3 months of availability of water and drying off thereafter. Most trees have thorns and reduced leaves to combat with low water and excessive heat. About 255 species of plants (except algae, fungi and bryophytes) are recorded from the study area and authenticated by the Forest department. These species are presented in Table 4.

Table 4 - Floral diversity of WCP area

Sr. No.	Scientific name	Family	Common name	Origin	IUCN Status	Recorded in
<b>Trees</b>						
1	<i>Acacia nilotica</i>	Leguminosae	Babool	Native	LC	Core/Buffer
2	<i>Acacia auriculiformis</i>	Leguminosae	Australian Acacia	Exotic	LC	Buffer
3	<i>Acacia ferruginea</i>	Leguminosae	Rusty Acacia	Native	VU	Core/Buffer
4	<i>Acacia leucophloea</i>	Leguminosae	White-bark Acacia	Native	LC	Core/Buffer
5	<i>Aegle marmelos</i>	Rutaceae	Wood Apple	Native	NA	Core/Buffer
6	<i>Ailanthus excelsa</i>	Simaroubaceae	Indian Tree of Heaven	Native	NA	Core/Buffer
7	<i>Alangium salviifolium</i>	Alangiaceae	Sage-leaved Alangium	Native	NA	Buffer
8	<i>Albizia lebbek</i>	Leguminosae	Siris Tree	Native	NA	Core/Buffer
9	<i>Albizia odoratissima</i>	Leguminosae	Ceylon Rosewood	Native	LC	Core/Buffer
10	<i>Anogeissus latifolia</i>	Combretaceae	Axle Wood Tree	Native	NA	Buffer
11	<i>Azadirachta indica</i>	Meliaceae	Neem	Native	LC	Core/Buffer

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Zawar Mines  
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Sr. No.	Scientific name	Family	Common name	Origin	IUCN Status	Recorded in
12	<i>Bauhinia variegata</i>	Leguminosae	Orchid Tree	Native	LC	Buffer
13	<i>Bombax ceiba</i>	Malvaceae	Red Silk Cotton	Native	NA	Core/Buffer
14	<i>Boswellia serrata</i>	Burseraceae	Indian Frankincense	Native	NA	Core/Buffer
15	<i>Butea monosperma</i>	Leguminosae	Flame of Forest	Native	DD	Core/Buffer
16	<i>Carica papaya</i>	Caricaceae	Papaya	Exotic	DD	Core/Buffer-planted
17	<i>Cassia fistula</i>	Leguminosae	Golden Shower	Native	LC	Core/Buffer
18	<i>Cocos nucifera</i>	Arecaceae	Coconut	Native	NA	Buffer-planted
19	<i>Cordia myxa</i>	Boraginaceae	Clammy Cherry	Native	NA	Buffer
20	<i>Cordia dichotoma</i>	Boraginaceae	Indian Cherry	Native	LC	Core/Buffer
21	<i>Dalbergia lanceolaria</i> subsp. <i>Paniculata</i>	Leguminosae	-	Native	NA	Core
22	<i>Dalbergia sissoo</i>	Leguminosae	Indian Rosewood	Native	NA	Buffer-planted
23	<i>Delonix regia</i>	Leguminosae	Flame Tree	Exotic	LC	Buffer-planted
24	<i>Dichrostachys cinerea</i>	Leguminosae	Sickle Bush	Native	LC	Buffer
25	<i>Eucalyptus globulus</i>	Myrtaceae	Eucalyptus	Exotic	LC	Core/Buffer
26	<i>Euphorbia nivulia</i>	Euphorbiaceae	Leafy Milk Hedge	Native	NA	Core/Buffer
27	<i>Feronia elephantum</i>	Rutaceae	Wood Apple	Native	NA	Core/Buffer
28	<i>Ficus benghalensis</i>	Moraceae	Banyan Tree	Native	NA	Core/Buffer
29	<i>Ficus racemosa</i>	Moraceae	Cluster Fig	Native	LC	Core/Buffer
30	<i>Ficus religiosa</i>	Moraceae	Peepal Tree	Native	NA	Core/Buffer
31	<i>Garguga pinnata</i>	Burseraceae	Grey Downy Balsam	Native	NA	Core
32	<i>Gmelina arborea</i>	Verbenaceae	Gamhar	Native	LC	Core/Buffer
33	<i>Holarrhena pubescens</i>	Apocynaceae	Indrajao	Native	LC	Core/Buffer
34	<i>Holoptelea integrifolia</i>	Ulmaceae	Indian Elm	Native	NA	Core/Buffer
35	<i>Ixora parviflora</i>	Rubiaceae	Small-flowered Ixora	Native	NA	Buffer
36	<i>Jacaranda mimosifolia</i>	Leguminosae	Jacaranda	Exotic	NA	Buffer
37	<i>Kigelia pinnata</i>	Bignoniaceae	Sausage Tree	Exotic	NA	Buffer
38	<i>Lannea coromandelica</i>	Anacardiaceae	Indian Ash Tree	Native	NA	Core/Buffer
39	<i>Leucaena leucocephala</i>	Leguminosae	White Babool	Exotic	NA	Core/Buffer
40	<i>Madhuca longifolia</i>	Sapotaceae	Indian Butter Tree	Native	NA	Buffer
41	<i>Mangifera indica</i>	Anacardiaceae	Mango	Native	DD	Core/Buffer

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Zawar Mines  
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Sr. No.	Scientific name	Family	Common name	Origin	IUCN Status	Recorded in
42	<i>Milusa tomentosa</i>	Annonaceae	Hoom	Native	NA	Core
43	<i>Millingtonia hortensis</i>	Bignoniaceae	Indian Cork Tree	Native	NA	Core/Buffer
44	<i>Mitragyna parvifolia</i>	Rubiaceae	True Kadamba	Native	NA	Core/Buffer
45	<i>Moringa concanensis</i>	Moringaceae	Konkan Moringa	Native	NA	Core
46	<i>Moringa oleifera</i>	Moringaceae	Drumstick Tree	Native	NA	Buffer
47	<i>Pandanus tectorius</i>	Pandanaceae	Screw Pine	Exotic	LC	Core
48	<i>Peltophorum pterocarpum</i>	Leguminosae	Copperpod	Exotic	NA	Core-planted
49	<i>Phoenix sylvestris</i>	Arecaceae	Date Palm	Native	NA	Core/Buffer
50	<i>Phyllanthus emblica</i>	Euphorbiaceae	Indian Gooseberry	Native	NA	Core
51	<i>Pithecellobium dulce</i>	Leguminosae	Sweet Tamarind	Exotic	LC	Core/Buffer
52	<i>Plumeria alba</i>	Apocynaceae	Pagoda Tree	Exotic	NA	Core
53	<i>Pongamia glabra</i>	Leguminosae	Pongam Tree	Native	LC	Core/Buffer
54	<i>Prosopis juliflora</i>	Leguminosae	Mesquite	Exotic	NA	Core/Buffer
55	<i>Psidium guajava</i>	Myrtaceae	Guava	Exotic	LC	Core/Buffer-planted
56	<i>Ricinus communis</i>	Euphorbiaceae	Castor	Native	NA	Core/Buffer
57	<i>Saraca indica</i>	Leguminosae	Seeta Ashok	Native	VU	Core-planted
58	<i>Schrebera swietenoides</i>	Oleaceae	Weaver's Beam Tree	Native	NA	Buffer
59	<i>Senna siamea</i>	Leguminosae	Siamese Cassia	Exotic	LC	Core/Buffer-planted
60	<i>Syzygium cumini</i>	Myrtaceae	Java Plum	Native	LC	Core/Buffer
61	<i>Tamarindus indica</i>	Leguminosae	Tamarind	Exotic	LC	Core/Buffer
62	<i>Tectona grandis</i>	Verbenaceae	Teak	Native	NA	Buffer
63	<i>Terminalia bellirica</i>	Combretaceae	Belliric Myrobalan	Native	NA	Buffer
64	<i>Thevetia nerifolia</i>	Apocynaceae	Mexican oleander	Exotic	NA	Core/Buffer
65	<i>Toona ciliata</i>	Meliaceae	Toon Tree	Native	LC	Buffer
66	<i>Vitex negundo</i>	Verbenaceae	Chaste Tree	Native	LC	Core/Buffer
67	<i>Wrightia tinctoria</i>	Apocynaceae	Sweet Indrajao	Native	LC	Core/Buffer
68	<i>Ziziphus jujuba</i>	Rhamnaceae	Indian Jujube	Native	LC	Core/Buffer
<b>Shrubs and Climbers</b>						
1	<i>Abrus precatorius</i>	Fabaceae	Coral Bead Vine	Native	NA	Buffer
2	<i>Abutilon indicum</i>	Malvaceae	Indian Mallow	Native	NA	Core/Buffer
3	<i>Acanthocereus tetragonus</i>	Cactaceae	-	Exotic	LC	Core/Buffer
4	<i>Justicia adhatoda</i>	Acanthaceae	Malabar Nut	Native	NA	Core/Buffer
5	<i>Asparagus racemosus</i>	Asparagaceae	Asparagus	Native	NA	Core/Buffer
6	<i>Atalantia monophylla</i>	Rutaceae	Climbing Atalantia	Native	NA	Buffer

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वन्यजीव, उदयपुर

Environment Department  
Zawar Mines  
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Sr. No.	Scientific name	Family	Common name	Origin	IUCN Status	Recorded in
7	<i>Bougainvillea spectabilis</i>	Nyctaginaceae	Bougainvillea	Exotic	NA	Core-planted
8	<i>Breynia retusa</i>	Phyllanthaceae	Cup-Saucer Plant	Native	LC	Buffer
9	<i>Caesalpinia bonduc</i>	Leguminosae	Fever Nut	Native	LC	Buffer
10	<i>Caesalpinia pulcherrima</i>	Leguminosae	Peacock Flower	Native	LC	Buffer
11	<i>Calotropis gigantea</i>	Apocynaceae	Crown Flower	Native	NA	Core/Buffer
12	<i>Capparis decidua</i>	Capparidaceae	Bare Caper	Native	NA	Core/Buffer
13	<i>Carissa spinarum</i>	Apocynaceae	Wild Karanda	Native	NA	Core
14	<i>Cissus quadrangularis</i>	Vitaceae	Devil's Backbone	Native	NA	Buffer
15	<i>Citrus limon</i>	Rutaceae	Lemon	Native	NA	Buffer-planted
16	<i>Citrus medica</i>	Rutaceae	Citron	Native	NA	Buffer-planted
17	<i>Citorea ternatea</i>	Leguminosae	Cowpea	Exotic	NA	Core/Buffer
18	<i>Crotalaria pusilla</i>	Leguminosae	Small Rattlepod	Native	NA	Core
19	<i>Cocculus hirsutus</i>	Menispermaceae	Broom Creeper	Native	NA	Buffer
20	<i>Cucumis melo</i>	Cucurbitaceae	Muskmelon	Native	NA	Core/Buffer
21	<i>Datura metel</i>	Solanaceae	Downy Thorn Apple	Native	NA	Core/Buffer
22	<i>Dioscorea bulbifera</i>	Dioscoreaceae	Air Yam	Native	NA	Core/Buffer
23	<i>Dodonaea viscosa</i>	Celastraceae	Hop Bush	Native	NA	Buffer-planted
24	<i>Euphorbia nerifolia</i>	Euphorbiaceae	Indian Spurge Tree	Native	NA	Core/Buffer
25	<i>Flueggea leucopyrus</i>	Phyllanthaceae	Indian Snowberry	Native	NA	Core/Buffer
26	<i>Gossypium hirsutum</i>	Malvaceae	Mexican Cotton	Exotic	VU*	Buffer
27	<i>Grewia abutilifolia</i>	Malvaceae	Mallow-leaved Crossberry	Native	LC	Core/Buffer
28	<i>Grewia hirsuta</i>	Malvaceae	-	Native	NA	Buffer
29	<i>Helicteres isora</i>	Malvaceae	Screw Tree	Native	NA	Buffer
30	<i>Hemidesmus indicus</i>	Apocynaceae	Indian Sarsaparilla	Native	NA	Core
31	<i>Hibiscus micranthus</i>	Malvaceae	Tiny Flower Hibiscus	Native	NA	Buffer
32	<i>Indigofera tinctoria</i>	Leguminosae	True Indigo	Exotic	NA	Buffer
33	<i>Ipomoea aquatica</i>	Convolvulaceae	Water Morning Glory	Native	LC	Buffer
34	<i>Ipomoea carnea</i>	Convolvulaceae	Bush Morning Glory	Exotic	NA	Core/Buffer
35	<i>Ipomoea violacea</i>	Convolvulaceae	Sea Moonflower	Native	NA	Core/Buffer
36	<i>Jatropha gossypifolia</i>	Euphorbiaceae	Bellyache Bush	Native	LC	Core/Buffer
37	<i>Labiata purpureus</i>	Leguminosae	Egyptian Bean	Native	NA	Core/Buffer

(अजय चितौड़ा) J.F.S.  
उप वन संरक्षक  
वन्यजीव, उदयपुर

Environment Department  
TERRACON  
Zawar Mines  
Hindustan Zinc Ltd.

Sr. No.	Scientific name	Family	Common name	Origin	IUCN Status	Recorded in
38	<i>Lantana camara</i>	Verbenaceae	Lantana	Exotic	NA	Core/Buffer
39	<i>Luffa acutangula</i>	Cucurbitaceae	Wild Ridge Gourd	Native	NA	Buffer
40	<i>Mimosa hamata</i>	Leguminosae	Sickle Bush	Native	NA	Buffer
41	<i>Momordica charantia</i>	Cucurbitaceae	Bittergourd	Native	NA	Core
42	<i>Momordica dioica</i>	Cucurbitaceae	Wild Buttergourd	Native	NA	Core/Buffer
43	<i>Nerium oleander</i>	Apocynaceae	Oleander	Native	LC	Core/Buffer
44	<i>Opuntia elatior</i>	Cactaceae	Prickly Pear	Exotic	LC	Core
45	<i>Passiflora foetida</i>	Passifloraceae	Stinking Passionflower	Exotic	NA	Core
46	<i>Perularia daemia</i>	Apocynaceae	Hair Knot Plant	Native	NA	Core
47	<i>Senna auriculata</i>	Leguminosae	Tanner's Cassia	Native	NA	Core/Buffer
48	<i>Tecoma stans</i>	Bignoniaceae	Yellow Bell	Exotic	NA	Core-planted
49	<i>Trichosanthes cucumerina</i>	Cucurbitaceae	Snake Gourd	Native	NA	Core
Climber species						
Herbs						
1	<i>Acalypha lanceolata</i>	Euphorbiaceae	Toothed-bract Indian Copperleaf	Native	NA	Buffer
2	<i>Acanthospermum hispidum</i>	Asteraceae	Bristly Starbur	Native	NA	Core/Buffer
3	<i>Adiantum aleuticum</i>	Pteridaceae	Western Maidenhair Fern	Exotic	NA	Buffer
4	<i>Aerva lanata</i>	Amaranthaceae	Mountain Knot Grass	Native	NA	Buffer
5	<i>Ageratum conyzoides</i>	Asteraceae	Goatweed	Exotic	NA	Core/Buffer
6	<i>Allium sativum</i>	Alliaceae	Garlic	Exotic	NA	Core/Buffer
7	<i>Alternanthera sessilis</i>	Amaranthaceae	Sessile Joyweed	Exotic	NA	Buffer
8	<i>Alysicarpus hamosus</i>	Leguminosae	Round-leaf Alyce Clover	Native	NA	Buffer
9	<i>Amaranthus albus</i>	Amaranthaceae	Common Tumbleweed	Exotic	NA	Core/Buffer
10	<i>Amaranthus spinosus</i>	Amaranthaceae	Prickly Amaranth	Native	NA	Buffer
11	<i>Amaranthus viridis</i>	Amaranthaceae	Green Amaranth	Native	NA	Core/Buffer
12	<i>Amaranthus wrightii</i>	Amaranthaceae	Wright's Amaranth	Exotic	NA	Core
13	<i>Andrographis paniculata</i>	Acanthaceae	Creast	Native	NA	Core/Buffer
14	<i>Arachis hypogaea</i>	Leguminosae	Ground nut	Native	NA	Core/Buffer
15	<i>Argemone mexicana</i>	Papaveraceae	Mexican Poppy	Exotic	NA	Core/Buffer
16	<i>Barleria acanthoides</i>	Poaceae	-	Native	NA	Core/Buffer
17	<i>Barleria cristata</i>	Acanthaceae	Porcupine Flower	Native	NA	Buffer

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वन्यजीव, उदयपुर

Environment Department  
TERRACON  
Zawar Mines  
Hindustan Zinc Ltd.



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18	<i>Bidens biternata</i>	Asteraceae	Yellow-flowered Blackjack	Native	NA	Buffer
19	<i>Bidens pilosa</i>	Asteraceae	Spanish Needle	Exotic	NA	Core/Buffer
20	<i>Blepharis maderaspatensis</i>	Acanthaceae	Madras Blepharis	Native	NA	Buffer
21	<i>Blumea lacera</i>	Asteraceae	Lettuce-leaf Blumea	Native	NA	Core
22	<i>Boerhavia diffusa</i>	Nyctaginaceae	Red Spiderling	Exotic	NA	Core/Buffer
23	<i>Borreria articularis</i>	Rubiaceae	Jointed Buttonweed	Native	NA	Core/Buffer
24	<i>Brassica oleraceae</i>	Brassicaceae	Cabbage	Native	DD	Core/Buffer
25	<i>Catharanthus pusillus</i>	Apocynaceae	Tiny Periwinkle	Native	NA	Core/Buffer
26	<i>Celosia argentea</i>	Amaranthaceae	Cock's Comb	Native	NA	Core/Buffer
27	<i>Cleome gynandra</i>	Cleomaceae	Wild Spiderflower	Native	NA	Core/Buffer
28	<i>Colocasia esculenta</i>	Arecaceae	Taro	Native	NA	Core/Buffer
29	<i>Commelina benghalensis</i>	Commelinaceae	Benghal Dayflower	Native	NA	Core/Buffer
30	<i>Commelina diffusa</i>	Commelinaceae	Creeping Dayflower	Native	NA	Buffer
31	<i>Commelina maculata</i>	Commelinaceae	Spotted Dayflower	Native	NA	Core/Buffer
32	<i>Corchorus capsularis</i>	Malvaceae	White Jute	Native	NA	Buffer
33	<i>Corchorus trilocularis</i>	Malvaceae	Wild Jute	Native	NA	Buffer
34	<i>Cosmos sulphureus</i>	Asteraceae	Cosmos Orange	Exotic	NA	Core/Buffer
35	<i>Crotalaria medicaginea</i>	Leguminosae	Medick Rattlepod	Native	NA	Core/Buffer
36	<i>Crotalaria scabrella</i>	Leguminosae	-	Native	LC	Buffer
37	<i>Croton bonplandianus</i>	Euphorbiaceae	-	Native	NA	Buffer
38	<i>Cynarospermum asperum</i>	Acanthaceae	Hill Blepharis	Native	NA	Buffer
39	<i>Cyperus dubius</i>	Cyperaceae	Soft Sedge	Native	NA	Buffer
40	<i>Cyperus esculentus</i>	Cyperaceae	Common Nut Sedge	Native	NA	Core/Buffer
41	<i>Cyperus squarrosus</i>	Cyperaceae	Bearded Flatsedge	Native	NA	Core/Buffer
42	<i>Daucus carota</i>	Apiaceae	Carrot	Exotic	NA	Core
43	<i>Desmodium triflorum</i>	Leguminosae	Creeping Tick Trefoil	Native	NA	Core
44	<i>Digera muricata</i>	Amaranthaceae	False Amaranth	Native	NA	Buffer
45	<i>Echinops echinatus</i>	Asteraceae	Indian Globe Thistle	Native	NA	Core/Buffer
46	<i>Eclipta prostrata</i>	Asteraceae	False Daisy	Native	NA	Buffer
47	<i>Euphorbia heterophylla</i>	Euphorbiaceae	Wild Poinsettia	Native	NA	Buffer

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वन्यजीव, उदयपुर



Environment Department  
Zawar Mines  
Hindustan Zinc Ltd.

Sr. No.	Scientific name	Family	Common name	Origin	IUCN Status	Recorded in
48	<i>Euphorbia hirta</i>	Euphorbiaceae	Asthma Weed	Native	NA	Core/Buffer
49	<i>Evolvulus alsinoides</i>	Convolvulaceae	Dwarf Morning Glory	Exotic	NA	Core/Buffer
50	<i>Fagonia cretica</i>	Zygophyllaceae	Virgin's Mantle	Exotic	NA	Core/Buffer
51	<i>Glossocardia bosvallea</i>	Asteraceae	Patthar Suva	Native	NA	Buffer
52	<i>Gomphrena celosioides</i>	Amaranthaceae	Cockscomb Gomphrena	Exotic	NA	Buffer
53	<i>Gomphrena globosa</i>	Amaranthaceae	Globe Amaranth	Exotic	NA	Core
54	<i>Hyptis suaveolens</i>	Lamiaceae	American Mint	Exotic	NA	Core/Buffer
55	<i>Impatiens balsamina</i>	Balsaminaceae	Balsam	Native	NA	Core
56	<i>Indigofera cordifolia</i>	Leguminosae	Heart-leaf Indigo	Native	NA	Core
57	<i>Ipomoea rubriflora</i>	Convolvulaceae	Redstar	Exotic	NA	Buffer
58	<i>Justicia diffusa</i>	Acanthaceae	Spreading Justicia	Native	NA	Core/Buffer
59	<i>Justicia glauca</i>	Acanthaceae	Glaucus Justicia	Native	NA	Core/Buffer
60	<i>Justicia japonica</i>	Acanthaceae	-	Native	NA	Core/Buffer
61	<i>Lepidagathis cristata</i>	Acanthaceae	Crested Lepidagathis	Native	NA	Buffer
62	<i>Leucas aspera</i>	Lamiaceae	Common Leucas	Native	NA	Core/Buffer
63	<i>Leucas lamifolia</i>	Lamiaceae	Mint-leaved Leucas	Native	NA	Buffer
64	<i>Lycopersicon esculentum</i>	Solanaceae	Tomato	Exotic	NA	Core/Buffer-planted
65	<i>Malvastrum coromandelianum</i>	Malvaceae	False Mallow	Native	NA	Buffer
66	<i>Mimosa pudica</i>	Leguminosae	Touch-me-not	Native	NA	Buffer
67	<i>Musa x paradisiaca</i>	Musaceae	Banana	Native	NA	Core
68	<i>Ocimum americanum</i>	Lamiaceae	Hoary Basil	Native	NA	Buffer
69	<i>Ocimum gratissimum</i>	Lamiaceae	Wild Basil	Native	NA	Core/Buffer
70	<i>Ocimum tenuiflorum</i>	Lamiaceae	Holy Basil	Native	NA	Core/Buffer
71	<i>Oldenlandia corymbosa</i>	Rubiaceae	Diamond Flower	Native	NA	Core/Buffer
72	<i>Oldenlandia umbellata</i>	Rubiaceae	Chay Root	Native	NA	Buffer
73	<i>Oxalis corniculata</i>	Oxalidaceae	Creeping Wood Sorrel	Native	NA	Core
74	<i>Parthenium hysterophorus</i>	Asteraceae	Congress Grass	Exotic	NA	Core/Buffer
75	<i>Pavonia zeylanica</i>	Malvaceae	Ceylon Swamp Mallow	Native	NA	Buffer
76	<i>Pedaliu murex</i>	Pedaliaceae	Crow Thorn	Native	NA	Core/Buffer
77	<i>Phyllanthus niruri</i>	Phyllanthaceae	Gulf Leaf Flower	Native	NA	Core/Buffer
78	<i>Physalis minima</i>	Solanaceae	Ground Cherry	Native	NA	Core/Buffer
79	<i>Raphanus sativus</i>	Brassicaceae	Radish	Native	NA	Core-

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Environment Department  
Zawar Mines  
Hindustan Zinc Ltd.



Sr. No.	Scientific name	Family	Common name	Origin	IUCN Status	Recorded in
						cultivated
80	<i>Senna alata</i>	Leguminosae	Candle Bush	Exotic	LC	Buffer
81	<i>Senna insularis</i>	Leguminosae	-	Exotic	NA	Core/Buffer
82	<i>Senna occidentalis</i>	Leguminosae	Coffee Senna	Native	NA	Core
83	<i>Senna tora</i>	Leguminosae	Stinking Senna	Native	NA	Core/Buffer
84	<i>Sida acuta</i>	Malvaceae	Common Wireweed	Native	NA	Core/Buffer
85	<i>Sida cordifolia</i>	Malvaceae	Heart-leaf Sida	Native	NA	Buffer
86	<i>Sida rhombifolia</i>	Malvaceae	Jellyleaf	Native	NA	Core/Buffer
87	<i>Solanum melongena</i>	Solanaceae	Brinjal	Native	NA	Core/Buffer
88	<i>Solanum nigrum</i>	Solanaceae	Black Nightshade	Native	NA	Buffer
89	<i>Solanum tuberosum</i>	Solanaceae	Potato	Native	NA	Core
90	<i>Solanum xanthocarpum</i>	Solanaceae	Thorny Nightshade	Native	NA	Buffer
91	<i>Spermacoce neohispida</i>	Rubiaceae	-	-	NA	Core/Buffer
92	<i>Spermacoce verticillata</i>	Rubiaceae	Shrubby False Buttonweed	Exotic	NA	Core/Buffer
93	<i>Sphaeranthus indicus</i>	Asteraceae	Globe Thistle	Native	NA	Core/Buffer
94	<i>Tephrosia purpurea</i>	Leguminosae	Wild Indigo	Native	NA	Core/Buffer
95	<i>Tribulus terrestris</i>	Zygophyllaceae	Puncture Vine	Native	NA	Core/Buffer
96	<i>Trichodesma indicum</i>	Boraginaceae	Indian Borage	Native	NA	Core
97	<i>Tridax procumbens</i>	Asteraceae	Mexican Daisy	Exotic	NA	Core/Buffer
98	<i>Trigonella corniculata</i>	Leguminosae	Wild Trefoil	Native	NA	Core/Buffer
99	<i>Trigonella foenum-graecum</i>	Leguminosae	Fenugreek	Native	NA	Core/Buffer
100	<i>Triumfetta cordifolia</i>	Malvaceae	-	Exotic	NA	Core/Buffer
101	<i>Triumfetta rhomboidea</i>	Malvaceae	Burr Bush	Native	NA	Core/Buffer
102	<i>Withania somnifera</i>	Solanaceae	Winter Cherry	Native	DD	Buffer

## Grasses

1	<i>Aristida adscensionis</i>	Poaceae	Common Needle Grass	Native	NA	Core/Buffer
2	<i>Axonopus compressus</i>	Poaceae	Summer Grass	Native	NA	Buffer
3	<i>Bambusa arundinaceae</i>	Poaceae	Bamboo	Native	NA	Buffer-planted
4	<i>Bothriochloa bladhii</i>	Poaceae	Australian Bluestem	Exotic	NA	Core
5	<i>Brachiaria reptans</i>	Poaceae	Running Grass	Native	NA	Core/Buffer
6	<i>Cenchrus ciliaris</i>	Poaceae	Buffel Grass	Native	NA	Core/Buffer
7	<i>Cymbopogon martini</i>	Poaceae	Palmarosa Grass	Native	NA	Buffer
8	<i>Cynodon dactylon</i>	Poaceae	Bermuda Grass	Native	NA	Core/Buffer
9	<i>Dactyloctenium</i>	Poaceae	Crowfoot Grass	Exotic	NA	Core/Buffer

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Environment Department  
Zawar Mines  
Hindustan Zinc Ltd.

Sr. No.	Scientific name	Family	Common name	Origin	IUCN Status	Recorded in
	<i>aegyptium</i>					
10	<i>Dendrocalamus strictus</i>	Poaceae	Calcutta Bamboo	Native	NA	Core/Buffer
11	<i>Dichanthium annulatum</i>	Poaceae	Sheda Grass	Native	NA	Buffer
12	<i>Digitaria stricta</i>	Poaceae	-	Native	NA	Buffer
13	<i>Enteropogon dolichostachyus</i>	Poaceae	Long-spike Finger Grass	Native	NA	Buffer
14	<i>Eragrostiella bifaria</i>	Poaceae	Double-row Lovegrass	Native	NA	Core/Buffer
15	<i>Eragrostis amabilis</i>	Poaceae	Chinese Lovegrass	Native	NA	Core/Buffer
16	<i>Eragrostis japonica</i>	Poaceae	Lovegrass	Native	NA	Buffer
17	<i>Heteropogon contortus</i>	Poaceae	Black Speargrass	Native	NA	Core/Buffer
18	<i>Imperata cylindrica</i>	Poaceae	Cogon Grass	Native	NA	Buffer
19	<i>Melinis repens</i>	Poaceae	Rose Natal Grass	Native	NA	Buffer
20	<i>Oryza sativa</i>	Poaceae	Rice	Native	NA	Core/Buffer -cultivated
21	<i>Paspalum distichum</i>	Poaceae	Knot Grass	Exotic	NA	Core/Buffer
22	<i>Pennisetum glaucum</i>	Poaceae	Bajra/Pearl Millet	Native	NA	Core/Buffer
23	<i>Saccharum officinarum</i>	Poaceae	Sugarcane	Native	NA	Core/Buffer -cultivated
24	<i>Sorghum bicolor</i>	Poaceae	Jowar	Exotic	NA	Core/Buffer
25	<i>Themeda quadrivalvis</i>	Poaceae	Grader Grass	Native	NA	Core/Buffer
26	<i>Themeda triandra</i>	Poaceae	Kangaroo Grass	Native	NA	Buffer
27	<i>Triticum aestivum</i>	Poaceae	Wheat	Native	NA	Core/Buffer -cultivated
28	<i>Zea mays</i>	Poaceae	Corn	Exotic	LC	Core/Buffer -cultivated

NA - Not Assessed, LC - Least Concern, VU - Vulnerable, VU\* - Vulnerable in Native Range, DD - Data Deficient

Of all the plant species, none are included in the schedules of Indian wildlife protection act. But 2 of the species found in study area are included in 'vulnerable' category by IUCN, enlisted in Table 5. These species and their habitats require deliberate protection and measures to increase their population need to be taken for their local conservation.

Table 5 - Plant species enlisted in IUCN 'vulnerable' category

Sr. No.	Scientific name	Common name	Family	IUCN status	WPA
1	<i>Acacia ferruginea</i>	Rusty Acacia	Leguminosae	Vulnerable	Not listed
2	<i>Saraca indica</i>	Seeta Ashok	Leguminosae	Vulnerable	Not listed

Based on the population trend of plant species observed in study area, some species encountered rarely or with their habitats under threat were identified. The reason behind threats to these species

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Environment Department  
Zawar Mines  
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could be their extensive harvesting for use in medicines. These species are enlisted in Table 6. Plantation of these species will help fulfil the need to pharmaceutical companies, reducing pressure on the wild population of these plants. Propagation of these species in nurseries and their plantation in the designated greenbelts is essential to maintain their local population and bring them out of threat in the WCP area.

Table 6 - Threatened plant species in WCP area

Sr. No.	Scientific name	Common name	Local name	Family	Habit	Presence in WCP area	Status in WCP area
1	<i>Abrus precatorius</i>	Coral Bead Vine	Gunja	Leguminosae	Climber	Buffer	R
2	<i>Aegle marmelos</i>	Wood Apple	Bael	Rutaceae	Tree	Buffer	EN
3	<i>Barleria acanthoides</i>	-	-	Acanthaceae	Herb	Core, Buffer	VU
4	<i>Cassia fistula</i>	Indian Laburnum	Amaltash	Leguminosae	Tree	Buffer	VU
5	<i>Celastrus paniculatus</i>	-	-	Celastraceae	Climber	Buffer	VU
6	<i>Evolvulus alsinoides</i>	-	-	Convolvulaceae	Herb	Core, Buffer	R
7	<i>Gloriosa superba</i>	Glory Lily	Agnishikha	Colchicaceae	Climber	Buffer	VU
8	<i>Hemidesmus indicus</i>	Indian Sarsaparilla	Anantamool	Apocynaceae	Climber	Buffer	NT
9	<i>Justicia adhatoda</i>	Malabar nut	Adulsa	Acanthaceae	Herb	Core, Buffer	R
10	<i>Phyllanthus niruri</i>	-	-	Phyllanthaceae	Herb	Core, Buffer	VU
11	<i>Terminalia bellirica</i>	Belliric Myrobalan	Behda	Combretaceae	Tree	Buffer	T

R - Rare, EN - Endangered, VU - Vulnerable, NT - Near threatened, T - Threatened

#### 1.5.9. Fauna

Primary studies were conducted in and around the mine lease area, colony, villages in buffer area, along the water bodies in WCP area and the tailing dam area. All the faunal diversity, authenticated by the Forest Department, is presented in Table 7.

Table 7 - Faunal diversity of WCP area

Sr. No.	Common name	Scientific name	Family	WPA Schedule	IUCN status
<b>Reptiles</b>					
1	Common Cat Snake	<i>Boiga trigonata</i>	Colubridae	IV	LC
2	Spectacled Cobra	<i>Naja Naja</i>	Elapidae	II (Part II)	NA
3	Barred wolf Snake	<i>Lycodon striatus</i>	Colubridae	IV	NA
4	Common wolf Snake	<i>Lycodon aulicus</i>	Colubridae	IV	NA
5	Common Krait	<i>Bungarus caeruleus</i>	Elapidae	IV	NA

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Environment Department  
Zawar Mines  
Hindustan Zinc Ltd.

Sr. No.	Common name	Scientific name	Family	WPA Schedule	IUCN status
6	Saw Scaled Viper	<i>Echis carinatus</i>	Viperidae	II (Part II)	NA
7	Oriental garden lizard	<i>Calotes versicolor</i>	Agamidae	Not listed	NA
8	Asian Chameleon	<i>Chamaeleo zeylanicus</i>	Chamaeleonidae	II (Part II)	LC
9	Fan Throated Lizard	<i>Sitona spinaecephalus</i>	Agamidae	Not listed	LC
10	Bengal monitor	<i>Varanus bengalensis</i>	Varanidae	I (Part II)	LC
<b>Amphibians</b>					
1	Indian Bullfrog	<i>Hoplobatrachus tigerinus</i>	Dicroglossidae	IV	LC
2	-	<i>Duttaphrynus stomaticus</i>	Bufonidae	IV	LC
3	Common Indian toad	<i>Duttaphrynus melanostictus</i>	Bufonidae	IV	LC
4	Ant Frog	<i>Microhyla ornata</i>	Microhylidae	IV	LC
5	Marbled balloon frog	<i>Uperodon systoma</i>	Microhylidae	IV	LC
6	Chunam tree frog	<i>Polypedates maculatus</i>	Rhacophoridae	IV	LC
7	Alpine cricket frog	<i>Fejervarya limnocharis</i>	Dicroglossidae	IV	LC
8	Common Skittering frog	<i>Euphyctis cyanophlyctis</i>	Dicroglossidae	IV	LC
9	Burrowing Frog	<i>Sphaerotheca breviceps</i>	Dicroglossidae	IV	LC
<b>Butterflies</b>					
1	Crimson Rose	<i>Pachliopta hector</i>	Papilionidae	I (Part IV)	NA
2	Lime Swallowtail	<i>Papilio demoleus</i>	Papilionidae	Not listed	NA
3	Tailed Jay	<i>Graphium agamemnon</i>	Papilionidae	Not listed	NA
4	Blue Mormon	<i>Papilio polymnestor</i>	Papilionidae	Not listed	NA
5	Grey Pansy	<i>Junonia atlites</i>	Nymphalidae	Not listed	NA
6	Peacock Pansy	<i>Junonia almana</i>	Nymphalidae	Not listed	LC
7	Common Sailor	<i>Neptis hylas</i>	Nymphalidae	Not listed	NA
8	Glassy Tiger	<i>Parantica aglea</i>	Nymphalidae	Not listed	NA
9	Great Orange-tip	<i>Hebomoia glaucippe</i>	Pieridae	Not listed	NA
10	Common Leopard	<i>Phalanta phalantha</i>	Nymphalidae	Not listed	NA
<b>Mammals</b>					
1	Indian Grey Mongoose	<i>Herpestes edwardsii</i>	Herpestidae	II (Part I)	LC
2	Indian Hare	<i>Lepus nigricollis</i>	Leporidae	IV	LC
3	Indian Flying Fox	<i>Pteropus giganteus</i>	Pteropodidae	IV	LC
4	House Rat	<i>Rattus rattus</i>	Muridae	IV/ V	LC
5	Wild Boar	<i>Sus scrofa</i>	Suidae	III	LC

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Environment Department  
Zawar Mines  
Hindustan Zinc Ltd.



Sr. No.	Common name	Scientific name	Family	WPA Schedule	IUCN status
6	Five-striped Palm Squirrel	<i>Funambulus pennantii</i>	Sciuridae	IV	LC
7	Leopard	<i>Panthera pardus</i>	Felidae	I (Part I)	VU
8	Northern Plains Langur	<i>Semnopithecus entellus</i>	Cercopithecidae	II (Part I)	LC
9	Sambar	<i>Rusa unicolor</i>	Cervidae	III	VU
10	Nilgai	<i>Boselaphus tragocamelus</i>	Bovidae	III	LC
11	Bengal Fox	<i>Vulpes bengalensis</i>	Canidae	II (Part I)	LC
12	Lesser bandicoot rat	<i>Bandicota bengalensis</i>	Muridae	V	LC
13	Striped Hyena	<i>Hyaena hyaena</i>	Hyaenidae	II (Part I)	NT
14	Golden Jackal	<i>Canis aureus</i>	Canidae	II (Part I)	LC
15	Common Palm Civet	<i>Paradoxurus hermaphroditus</i>	Viverridae	II (Part I)	LC
16	Indian Gerbil	<i>Tatera indica</i>	Muridae	IV/ V	LC
17	Indian Crested Porcupine	<i>Hystrix indica</i>	Hystriidae	IV	LC
18	Lesser Short-nosed Fruit Bat	<i>Cynopterus brachyotis</i>	Pteropodidae	IV	LC
19	Indian Pangolin	<i>Manis crassicaudata</i>	Manidae	I (Part I)	EN

**IUCN status** – DD – Data Deficient, EN – Endangered, LC – Least Concern, NA – Not assessed, NT – Near threatened, VU – Vulnerable

Species included in Schedule I of IWPA, 1972

For bird species, their resident or migratory status has been specified, as a justification for need for urgency of protection of their habitats and the present individuals in WCP area. The avifaunal diversity of WCP area is presented in Table 8.

Table 8 - Bird diversity of WCP area

Sr. No.	Common Name	Scientific name	Family	WPA Schedule	IUCN Status	Resident/ Migrant
1	Asian pied starling	<i>Gracupica contra</i>	Sturnidae	IV	LC	R
2	Common Barn-owl	<i>Tyto alba</i>	Tytonidae	IV	LC	R
3	Barred Buttonquail	<i>Turnix suscitator</i>	Turnicidae	IV	LC	R
4	Black Drongo	<i>Dicrurus macrocercus</i>	Dicruridae	IV	LC	R
5	Black-headed Cuckooshrike	<i>Lalage melanoptera</i>	Campephagidae	IV	LC	R
6	Glossy Ibis	<i>Plegadis falcinellus</i>	Threskiornithidae	IV	LC	R
7	Blue-tailed Bee-eater	<i>Merops philippinus</i>	Meropidae	IV	LC	M
8	Brahminy Kite	<i>Haliastur indus</i>	Accipitridae	IV	LC	R
9	Brahminy Starling	<i>Sturnia pagodarum</i>	Sturnidae	IV	LC	R
10	Brown Fish-owl	<i>Ketupa zeylonensis</i>	Strigidae	IV	LC	R

Sr. No.	Common Name	Scientific name	Family	WPA Schedule	IUCN Status	Resident/ Migrant
11	Brown hawk-owl	<i>Ninox scutulata</i>	Strigidae	IV	LC	R
12	Cattle Egret	<i>Bubulcus ibis</i>	Ardeidae	IV	LC	R
13	Chestnut-headed Bee-eater	<i>Merops leschenaulti</i>	Meropidae	IV	LC	R
14	Cinereous Vulture	<i>Aegypius monachus</i>	Accipitridae	IV	NT	R
15	Common Babbler	<i>Argya caudata</i>	Leiothrichidae	IV	LC	R
16	Green Bee-eater	<i>Merops orientalis</i>	Meropidae	IV	LC	R
17	Common Hawk-cuckoo	<i>Hierococcyx varius</i>	Cuculidae	IV	LC	R
18	Indian Nightjar	<i>Caprimulgus asiaticus</i>	Caprimulgidae	IV	LC	R
19	Common Kingfisher	<i>Alcedo atthis</i>	Alcedinidae	IV	LC	R
20	Common Moorhen	<i>Gallinula chloropus</i>	Rallidae	IV	LC	M
21	Common Myna	<i>Acridotheres tristis</i>	Sturnidae	IV	LC	R
22	Common Tailorbird	<i>Orthotomus sutorius</i>	Cisticolidae	IV	LC	R
23	Common Teal	<i>Anas crecca</i>	Anatidae	IV	LC	M
24	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	Vangidae	IV	LC	R
25	Greater Coucal	<i>Centropus sinensis</i>	Cuculidae	IV	LC	R
26	Crested Bunting	<i>Emberiza lathami</i>	Emberizidae	IV	LC	R
27	Oriental Darter	<i>Anhinga melanogaster</i>	Anhingidae	IV	NT	R
28	Dusky Eagle-owl	<i>Bubo coromandus</i>	Strigidae	IV	LC	R
29	Grey Francolin	<i>Francolinus pondicerianus</i>	Phasianidae	IV	LC	R
30	Great Grey Shrike	<i>Lanius excubitor</i>	Laniidae	IV	LC	M
31	Southern grey Shrike	<i>Lanius meridionalis</i>	Laniidae	IV	VU	R
32	Oriental Honey-buzzard	<i>Pernis ptilorhynchus</i>	Accipitridae	IV	LC	R
33	House Crow	<i>Corvus splendens</i>	Corvida	IV	LC	R
34	House Sparrow	<i>Passer domesticus</i>	Passeridae	IV	LC	R
35	House Swift	<i>Apus nipalensis</i>	Apodidae	IV	LC	R
36	Indian Golden Oriole	<i>Oriolus kundoo</i>	Oriolidae	IV	LC	R
37	Indian Roller	<i>Coracias benghalensis</i>	Coraciidae	IV	LC	R
38	Baya Weaver	<i>Ploceus philippinus</i>	Ploceidae	IV	LC	R
39	Indian Cuckoo	<i>Cuculus micropterus</i>	Cuculidae	IV	LC	V
40	Indian Grey Hornbill	<i>Ocyeros birostris</i>	Bucerotidae	IV	LC	R



Sr. No.	Common Name	Scientific name	Family	WPA Schedule	IUCN Status	Resident/ Migrant
41	Jungle Nightjar	<i>Caprimulgus indicus</i>	Caprimulgidae	IV	LC	R
42	Pied Kingfisher	<i>Ceryle rudis</i>	Alcedinidae	IV	LC	R
43	Indian Pond-heron	<i>Ardeola grayii</i>	Ardeidae	IV	LC	R
44	River Tern	<i>Sterna aurantha</i>	Laridae	IV	NT	R
45	Indian Silverbill	<i>Euodice malabarica</i>	Estrildidae	IV	LC	R
46	Scaly-breasted Munia	<i>Lonchura punctulata</i>	Estrildidae	IV	LC	R
47	Jungle Babbler	<i>Turdoides striata</i>	Leiotherichidae	IV	LC	R
48	Jungle Bush-quail	<i>Perdica asiatica</i>	Phasianidae	IV	LC	R
49	Large-billed Crow	<i>Corvus macrorhynchos</i>	Corvida	IV	LC	R
50	Jungle Owlet	<i>Glaucidium radiatum</i>	Strigidae	IV	LC	R
51	Alexandrine Parakeet	<i>Psittacula eupatria</i>	Psittaculidae	IV	NT	R
52	Little Egret	<i>Ardea intermedia</i>	Ardeidae	IV	LC	R
53	Little Grebe	<i>Tachybaptus ruficollis</i>	Podicipedidae	IV	LC	R
54	Oriental Magpie-robin	<i>Copsychus saularis</i>	Muscicapidae	IV	LC	R
55	Mottled Wood-owl	<i>Strix ocellata</i>	Strigidae	IV	LC	R
56	Oriental Scops-owl	<i>Otus sunia</i>	Strigidae	IV	LC	R
57	Oriental White-eye	<i>Zosterops palpebrosus</i>	Zosteropidae	IV	LC	R
58	Osprey	<i>Pandion haliaetus</i>	Pandionidae	I	LC	M
59	Painted Francolin	<i>Francolinus pictus</i>	Phasianidae	IV	LC	V
60	Indian Paradise-flycatcher	<i>Terpsiphone paradisi</i>	Monarchidae	IV	LC	R
61	Indian Peafowl	<i>Pavo cristatus</i>	Phasianidae	I	LC	R
62	Pied Bushchat	<i>Saxicola caprata</i>	Muscicapidae	IV	LC	R
63	Purple Sunbird	<i>Cinnyris asiaticus</i>	Nectariniidae	IV	LC	R
64	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	Nectariniidae	IV	LC	R
65	Red Turtle-dove	<i>Streptopelia tranquebarica</i>	Columbidae	IV	LC	R
66	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Pycnonotidae	IV	LC	R
67	Red-wattled lapwing	<i>Vanellus indicus</i>	Charadriidae	IV	LC	R
68	Rock pigeon	<i>Columba livia</i>	Columbidae	IV	LC	R
69	Rose-ringed parakeet	<i>Psittacula krameri</i>	Pittacidae	IV	LC	R
70	Rufous treepie	<i>Dendroclitta vagabunda</i>	corvidae	IV	LC	R

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वन्यजीव, उदयपुर

Environment Department  
Zawar Mines  
Hindustan Zinc Ltd.

Sr. No.	Common Name	Scientific name	Family	WPA Schedule	IUCN Status	Resident/ Migrant
71	Shikra	<i>Accipiter badius</i>	Accipitridae	IV	LC	R
72	Small Minivet	<i>Pericrocotus cinnamomeus</i>	Campephagidae	IV	LC	R
73	Spotted Dove	<i>Stigmatopelia chinensis</i>	Columbidae	IV	LC	R
74	Spotted owl	<i>Athene brama</i>	Strigidae	IV	LC	R
75	Tawny eagle	<i>Aquila rapax</i>	Accipitridae	IV	VU	R
76	Thick-billed Flowerpecker	<i>Dicaeum agile</i>	Dicaeidae	IV	LC	R
77	White-browed Fantail	<i>Rhipidura aureola</i>	Rhipiduridae	IV	LC	R
78	White-rumped Vulture	<i>Gyps bengalensis</i>	Accipitridae	I	CR	R
79	White-throated kingfisher	<i>Halcyon smyrnensis</i>	Alcedinidae	IV	LC	R

IUCN status – DD – Data Deficient, EN – Endangered, LC – Least Concern, NA – Not assessed, NT – Near threatened, VU – Vulnerable

Of the recorded species, 7 species – 1 butterfly, 1 reptile, 3 birds and 2 mammals are included in the Schedule I of IWPA, 1972, listed in Table 9.

Table 9 - Species found in WCP area protected under Schedule I of IWPA, 1972

Sr. No.	Common Name	Scientific name	Family	IUCN Status	WPA
<b>Birds</b>					
1	Osprey	<i>Pandion haliaetus</i>	Pandionidae	LC	I
2	Indian Peafowl	<i>Pavo cristatus</i>	Phasianidae	LC	I
3	White-rumped Vulture	<i>Gyps bengalensis</i>	Accipitridae	CR	I
<b>Mammals</b>					
4	Indian Leopard	<i>Panthera pardus fusca</i>	Felidae	Vu	I
5	Indian Pangolin	<i>Manis crassicaudata</i>	Manidae	EN	I
<b>Butterflies</b>					
6	Crimson rose	<i>Pachliopta hector</i>	Papilionidae	LC	I
<b>Reptiles</b>					
7	Bengal Monitor Lizard	<i>Varanus bengalensis</i>	Varanidae	LC	I, Part II

#### 1.5.10. Aquatic Biodiversity

Surface water samples collected from 4 surface water bodies were analyzed for presence of phytoplanktons and zooplanktons. Basillariophyceae, Chlorophyceae, Myxohyceae, Rotifers and Cladocerans are predominant in the studies water bodies. Plankton diversity index for phyto and zooplankton ranged between 2.85 and 2.56 and 2.52 and 2.16, respectively. Physio-chemical, biological parameters and diversity index reveals that the studied water bodies are slightly mesotrophic i.e. having moderate amount of dissolved nutrients.

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Environment Department  
Zawar Mines  
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राजस्थान, जयपुर



4 water samples for plankton study were collected in winter season from surface water of upstream and downstream of Tidi River. The plankton diversity observed in these samples is presented in Table 10.

Table 10 - Plankton diversity in Tidi River

Phytoplankton	Zooplankton
<i>Anabaena sp.</i>	<i>Asplancha sp.</i>
<i>Ankistrodesmus sp.</i>	<i>Brachionus sp.</i>
<i>Chroococcus sp.</i>	<i>cerodaphnia sp.</i>
<i>Clostridium sp.</i>	<i>Cyclops sp.</i>
<i>Cosmarium sp.</i>	<i>Cypris sp.</i>
<i>Crucigenia sp.</i>	<i>Daphnia sp.</i>
<i>Euglena sp.</i>	<i>Keratella sp.</i>
<i>Gomphonema sp.</i>	<i>Mesocyclops sp.</i>
<i>Microcystis sp.</i>	
<i>Navicula rhyncocephala</i>	
<i>Navicula sphaerophora</i>	
<i>Oocystis sp.</i>	
<i>Oscillatoria sp.</i>	
<i>Pediastrum sp.</i>	
<i>Phacus sp.</i>	
<i>Scenedesmus sp.</i>	
<i>Synedra ulna</i>	

The fish, insect, amphibian and riparian faunal species observed during aquatic habitat studies are enlisted in Table 11.

Table 11 - Biodiversity in running water body i.e. Tidi River

Sr. No.	Scientific name	Common name	Family	IUCN status
<b>Fish</b>				
1	<i>Channa striatus</i>	Snakehead Murrel	Channidae	LC
2	<i>Cirrhinus mrigala</i>	Mrigal Carp	Cyprinidae	LC
3	<i>Clarias batrachus</i>	Walking Catfish	Clariidae	LC
4	<i>Esomus danricus</i>	Indian Flying Barb	Cyprinidae	LC
5	<i>Labeo catla</i>	South Asian Carp	Cyprinidae	NA
6	<i>Labeo rohita</i>	Rohu	Cyprinidae	LC
7	<i>Mystus vittatus</i>	Striped Dwarf Catfish	Bagridae	LC
8	<i>Notopterus notopterus</i>	Bronze Featherback	Notopteridae	LC
<b>Amphibians</b>				
1	<i>Euphyctis cyanophlyctis</i>	Skittering Frog	Dicroglossidae	LC
<b>Insects</b>				
1	<i>Dytiscus sp.</i>	Diving Beetle	Dytiscidae	-
2	<i>Nepa sp.</i>	Water Scorpion	Nepidae	-
3	<i>Ranatra sp.</i>	Water Scorpion	Nepidae	-

Environment Department  
Zawar Mines  
Hindustan Zinc Ltd.

अजय चितौड़ा (I.F.S.)  
उप वन संरक्षक  
वन्यजीव, उदयपुर

TERRACON

Sr. No.	Scientific name	Common name	Family	IUCN status
<b>Birds</b>				
1	<i>Alcedo atthis</i>	Common Kingfisher	Alcedinidae	LC
2	<i>Ardea cinerea</i>	Grey Heron	Ardeidae	LC
3	<i>Bubulcus ibis</i>	Cattle Egret	Ardeidae	LC
4	<i>Dendrocygna javanica</i>	Lesser Whistling Duck	Anatidae	LC
5	<i>Egretta garzetta</i>	Little Egret	Ardeidae	LC
6	<i>Phalacrocorax carbo</i>	Great Cormorant	Phalacrocoracidae	LC

## 1.6. Description of Forest and Habitat conditions and Wildlife Scenario of WCP area

4 reserve forests fall in the 10 km radius area from the project site. These areas are enlisted in Table 12.

Table 12 - List of Reserve forest blocks in WCP area

Name of the Forest	Distance (Km.)	Direction
Dingri Reserve Forest	2	SSE
Kewra Reserve Forest	7.8	NE
Palodra Reserve Forest	4.9	E
Jabla Reserve Forest	9	WSW

These reserved forests are in good condition. Vegetation comprises of dry deciduous tree species such as Gum Arabic (*Acacia sp.*), Indian Axlewood Tree (*Anogeissus latifolia*), Red Silk Cotton (*Bombax ceiba*), Indian Frankincense (*Boswellia serrata*), Mesquite (*Prosopis juliflora*), Sweet Tamarind (*Pithecellobium dulce*), Leafy Milk Hedge (*Euphorbia nivulia*), Sweet Indrajao (*Wrightia tinctoria*) and associated shrubs like Prickly Pear (*Opuntia elatior*), Tanner's Cassia (*Senna auriculata*), Lantana (*Lantana camara*) and herbs like Wild Indigo (*Tephrosia purpurea*), Cock's comb (*Celosia argentea*), etc.

### 1.6.1. Population status of Wildlife

Wildlife population status of Udaipur division is available from the 'Wildlife Animal Census 2018'. However, the population status of the Zawar mines area is unavailable. Generation of this information is a goal of the present wildlife conservation plan.

### 1.6.2. Movement of Wildlife in the WCP area

Monitoring of wildlife in WCP area is required to gain data on movement patterns of various species present in the WCP area.

### 1.7. Man-animal conflict

News reports indicate considerable leopard-human conflict in the Zawar mines area, where a small girl was taken by a leopard, whose body was found partially eaten by the Leopard in 2015. Another

Environment Department  
Zawar Mines  
Hindustan Zinc Ltd.

अजय चितौड़ा (I.F.S.)  
उप वन संरक्षक  
वन्यजीव, उदयपुर

TERRACON



Incident reports 2-3 people working in field injured by leopard attack. In light of these and multiple incidences, a Human-Leopard conflict workshop was conducted in Udaipur, organized by the Forest Department of Udaipur. The workshop was conducted by various wildlife experts, naturalists, researchers, wildlife conservators and journalists. (<https://www.dailyudaipur.com/human-leopard-conflict-workshop-held-at-udaipur/>)

Creating awareness via Human-leopard conflict workshops for communities is essential to avoid such conflicts. The workshop will also train people sensible handling of the wildlife. Documentation and proper resolution of these conflicts without bringing harm to the animal and with due compensation granted to the affected people is in the agenda of wildlife conservation plan.

### 1.8. Other projects in the WCP area

The WCP area consists of group of mines which consists of 4 mines namely Mochia, Balaria, Zawar Mala and Barol and beneficiation plant.

### 1.9. Experts in Wildlife Conservation Plan

Sr. No.	Name	Designation	Role in Project
1	Mr. Suresh Thorat	Retd. APCCF	Advisor
2	Mr. Ashok Jain	Managing Director	Financial Advisor
3	Dr. Ninad Raut	Lead, Ecology and Biodiversity Department	Project Head
4	Mr. Akshay Nachane	Co-lead, Ecology and Biodiversity Department	Project Coordinator
5	Mr. Abhijeet Jagtap	Specialist – Biodiversity	Technical Assistant
6	Ms. Sayee Girdhari	Analyst – Biodiversity	Technical Assistant

### 1.10. Field visits and data collection methodologies

Field monitoring studies for collection of primary data to evaluate the baseline status of the project site was carried out during 1<sup>st</sup> March 2016 – 31<sup>st</sup> May 2016, representing pre-monsoon season, 2016. The methods employed for collection of data on soil, water, noise, socio-economic and ecological parameters are described in Table 13.

Table 13 - Environmental assessment methodologies

Sr. No.	Parameter	Methodology
1	Soil quality analysis	8 locations in the study area were selected for collection of soil samples. The soil samples were collected from 3 different depths viz. 30 cm, 60 cm and 90 cm below the surface and were homogenized (IS: 2720 & Methods of Soil Analysis, part-1, 2 <sup>nd</sup> edition, 1986 or American Society for Agronomy and Soil Science Society of America)

(अजय चितौड़ा) I.E.S.  
उप सचिव संरक्षक

Environment Department  
Zawar Mines  
Hindustan Zinc Ltd.

		The samples were analyzed as per established scientific methods for physico-chemical parameters. Heavy metals content was analyzed using Atomic Absorption Spectrophotometer and Inductive Coupled Plasma Analyzer.
2	Water quality analysis	To assess the water quality regarding critical parameters and predict impact on water quality due to proposed project and related activities, samples collected from 6 surface water and 8 ground water resources within the WCP area were analyzed. Water sample analysis was done as per the procedures specified in 'Standard Methods for the Examination of Water and Wastewater' published by American Public Health Association (APHA)
3	Air quality analysis	Ambient Air Quality Monitoring (AAQM) stations were set up at 11 locations based on meteorological conditions, topography and consideration of regional background air quality, pollution receptor areas and environmentally sensitive areas.
4	Noise levels	Noise level monitoring was carried out continuously for 24-hours with one hour interval starting at 0030 hours to 0030 hours the next day, on working days only. During each hour, Leq value was directly computed by the instrument based on the sound pressure levels. Lday (Ld), Lnight (Ln) and Ldn values were computed using corresponding hourly Leq of day and night, respectively.
5	Socio-economic conditions	Review of latest published secondary data (District Census Statistical Handbooks-2011 and Primary Census Abstract of Census-2011) with respect to population, social structure, literacy levels and occupational structure was done to generate baseline on socio-economic status of the population in WCP area.
6	Ecology and Biodiversity status	Different methods were adopted for collection of ecological data in the WCP area – Compilation of secondary data from published literature and government agencies Generation of primary data by systematic ecological studies in WCP area Discussion with local communities to gain information about local plants, animals and their uses.  <u>Terrestrial ecological survey</u> – Quadrat study for floral diversity and opportunistic sightings of faunal diversity were employed for baseline data collection.  <u>Aquatic ecological survey</u> – 4 surface water samples for plankton study were collected in winter upstream and

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उप सचिव संरक्षक  
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Environment Department  
Zawar Mines  
Hindustan Zinc Ltd.



		downstream of Tidi River. The samples were collected in polyethylene cans at depth of 30 cm from surface and fixed with 4% buffer formalin solution. Frequency of phyto and zooplankton species and number of important organisms was counted as per Lackey method, 17 <sup>th</sup> edition, APHA, AWWA 1992.
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## 1.11. Literature review

### 1.11.1. Impact of project activities on Biodiversity

'Mining' is defined as extraction of minerals and metals from the Earth's crust. The process causes land degradation, degradation of forest cover and loss of biodiversity. Mining impacts environmental components like soil, air, water, drainage patterns and noise levels in the vicinity of the mining site. Land degradation and soil pollution is one of the most significant impacts of mining activities, as the excavation changes surface topography, soil quality, land use, natural drainage system, ground water table, etc. The waste produced from the mines and processing of the ores further causes change in the quality of environment. (Arunima Dasgupta, 2012)

Underground mining involves removal of geological material to create a work environment for extraction of coal, oil, shale and other miners or geological materials. Land degradation is the most prominent impact of underground mining. Effects of underground mining include subsidence, slope deformation, etc. Subsidence or collapse may occur gradually or suddenly and catastrophically; affecting slopes, damage engineering structures, settlement areas, natural water bodies and infiltration of contaminants into groundwater (Altun et al. 2010). Another mining-related phenomenon is the withdrawal of water to facilitate underground mining (Blodgett and Kupiers, 2002), which causes formation of cavities (which were once filled with water) and may result in subsidence due to change in the hydro-geological properties of the strata. The mining activities may cause a relative increase in groundwater level (terrain surface depression) which usually causes saturation of the slope material, worsening the stability of the slope. Terrain depression can lead to the formation of undrained depressions (lakes or small lakes). The underground mining process has a large negative influence on the environment of the whole undermined area. If after mining out of the seam, large depressions and reactivation of extensive slope deformations (blocks and landslides) on the surface occurs, the surrounding infrastructures may be affected (Malgot and Baliak, 2004). Other impacts of underground mining include noise pollution due to drilling and blasting, water and soil pollution (Altun et al, 2010), loss of natural vegetation, promotion of growth of invasive species in the affected areas (Goswami, 2015). Health and safety related problems (Mehta, 2002) to employees and residents in the vicinity, etc. the magnitude of these pollutions depend on the harvest of mines, its treatment methods, effluents from the treatments and their mode of disposal.

### 1.11.2. Relevant research on WCP area

An environmental impact assessment was done in the mine lease area as well as in 10 km radius of the Zawar mines block I and block III, which comes to be an area of 3620 Ha. The report comprises of study of topography, hydrogeology, soil, water, air, noise levels and ecology of the study area along with impact of the mining activities on these components. The study considers mitigation measures already implemented by HZL to compensate for environmental damage and suggests measures to

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उप वन संरक्षक  
वन्यजीव, उदयपुर

Environment Department  
Zawar Mines  
Hindustan Zinc Ltd.

further prevent and/or minimize the impact. An environmental monitoring programme is prescribed by the EIA report to regularly monitor the impacts of mining and related activities and devise action plans to mitigate them as per the current situation. Further, for socio-economic conditions in the study area, census reports were referred. Forest department's data and news articles revealed man-wildlife conflict scenario in the study area. Indian Wildlife Protection Act (IWPA), 1972 was referred for enlisting the legally protected biodiversity in the study area in order to devise conservation measures to be implemented in the study area.

### 1.11.3. Geographical information of WCP area

Geographical information regarding the geology, other projects, topography, water and drainage patterns, land use, transport routes in the WCP area are included in [Chapter 1](#). Study area map showing waterbodies, rivers, roads, etc and landuse map are presented in [Chapter 7](#).

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Zawar Mines  
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## 2. Chapter 2 – Threats and Impacts

### 2.1. Threat analysis

#### 2.1.1. Impact of project on environment and other factors

At Zawar Mines, the mining and processing involves various activities. Nature of these activities is as follows –

##### Mining

At Zawar, the litho-environment is competent and self supporting and thus allows creation of open stopes. Depending on ore body configuration, the open stopes are made longitudinal and transverse with respect to ore bodies. Besides conventional stoping, mass blast of remnant pillars has also been successfully executed. Mining method with backfill method is being conceptualized at Mochla, Balaria and Zawarmala mine. The backfill method may be waste fill/ CRF/ Pastefill/ Hydraulic fill etc.

##### Processing

The ore is further crushed and milled before undergoing a flotation process, to produce the concentrate. Zinc and Lead concentrates produced are transferred to the smelters. The tailings generated due to beneficiation of ore are stored in specially constructed tailing dam which is considered as the most compatible on-site storage facility for long term disposal of tailings. The base of the tailing dam is fully sealed by the application of layer of impervious soil at bottom. After settling the tailings, water gets recycled to plant thus maintaining zero discharge.

These processes, although carefully designed to minimize environmental impact, have some impact from fugitive pollutants such as dust. These impacts are specified in Table 14.

Table 14 - Impacts of mining activities on environment of WCP area

Sr. No.	Parameter	Anticipated impact
1	Topography and landscape	The existing facilities are adequate for the project. Other than some excavation for approach, mill expansion and road construction were done in the existing land with some leveling, no changes in topography and landscape occurred due to the project.
2	Drainage	The mining plan does not cause disturbance or diversion to the drainage pattern of the mine lease area or the acquired lease area.
3	Climate	No effect on the local climate has occurred as the expansion was underground. No significant impact on overall climate of this region due to mining is expected as mining area is very small as compared to the WCP area. No perceptible change is expected in local temperatures owing to mining operations as all the activities are being carried underground.
4	Land use	The impact on land use in buffer area due to mining activities is limited to the acquired leasehold area, which is insignificant as compared to the total study area.

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Sr. No.	Parameter	Anticipated impact
		Thus, no land degradation took place on account of underground mining operations.
5	Impact on soil	Zawar mining operations are underground and there was no removal of top soil. The top soil disturbance occurring during surface exploration activity or during tailing dam expansion was preserved and utilized in plantations.
6	Air quality	Ore loading activities, ore transportation, waste dumping and vehicular movement are the sources of air pollution on the surface. 2 crushing systems planned at the surface will also act as a source of air pollution. It has been planned to transport ore from Zawarmala & Baroi mines to beneficiation plant using trucks, which are at distance of 8 and 5 km, respectively. The increase in truck movement from 8 minutes to 5 minutes, impacting the air quality of WCP area.
7	Water quality	<u>Surface water resources</u> The rainwater runoff from ore storage and tailing dam are likely sources of suspended solids. If allowed to escape to the natural drainage without any treatment, this runoff may affect the quality of water bodies. The vehicle maintenance garage is also a source of surface water contamination due to leaks and spills of oil and grease. Other than these 2 sources, there is no impact from discharge from the mines on the surface water quality  <u>Ground water quality</u> The ground water development is within safe limits in core zone and will remain so even at the conceptual stage. The ground water inflow in the mines and its withdrawal will not influence any nearby private or public wells. As the mining method is underground, there is no significant impact on ground water quality.
8	Noise levels and ground vibrations	Noise levels due to drilling, blasting, crushing and operation of mining equipment rise due to expansion but remain confined to underground and attenuated due to depth of the operation. The only noise generating sources situated above ground are the compressors/ fans for ventilation for the underground operations.
9	Biological environment	<u>Flora</u> Vegetation planned to suppress fugitive dust from ore transport and other surface activities are affected due to dust. Stunted growth, lowered regeneration ability and degradation of sensitive tissues are some possible impacts of dust deposition on plants

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Sr. No.	Parameter	Anticipated impact
		<p><b>Fauna</b></p> <p>Underground expansion of mine does not change habitats in the WCP area. The noise levels are confined in the underground mines and do not have considerable impact on the fauna in WCP area.</p> <p>The increased vehicular traffic leading to increased incidences of roadkills is likely to affect wildlife of WCP area.</p>

### 2.1.2. Pollutants from the project and their effect on environment

Pollutants released from mining activities and their effects on biological environment of the WCP area are presented in [Table 15](#).

Table 15 - Impacts of pollutants from mining activities on flora and fauna in WCP area

Pollutant	Effects on flora	Effects on fauna
SOx	Crops and green zone vegetation – Detrimental effects include reduction in total chlorophyll, ascorbic acid and carotenoid content, thus affecting the rate of photosynthesis and overall physiology of the plants, resulting in stunted growth and reduction in yield from crops.	Alterations of the tracheal epithelium leading to respiratory problems in animals.
NOx		
Respiratory suspended particulate matter (RSPM)		

### 2.2. Quantification of degradation of environmental parameters due to project activities

Environmental parameters such as soil, water, air and noise levels are tested in the WCP area. Various sampling points were selected strategically for analyzing each parameter, so as to get a robust baseline status of the environment in area surrounding the mines. Levels of each component that is affected due to mining activities such as pH and heavy metals content in soil, particulate matter and other air pollutants in ambient air, phenolic compounds and grease/oil content in ground and surface water and noise levels in the WCP area were quantified. The results are elaborated in the respective sections below.

#### 2.2.1. Soil

Soil sampling sites and results of sample analysis are discussed in this section.

For studying soil quality of WCP area, 8 samples were taken from different locations. These locations were selected to include all land use types. These locations are mentioned in [Table 16](#).

Table 16 - Soil sampling locations in WCP area

Location code	Location	Distance from ML boundary
S1	Guest house	-
S2	Kevra kalan Village	4.3

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Location code	Location	Distance from ML boundary
S3	Oda Village	1.2
S4	Gawadi	0.9
S5	Kanpur	0.1
S6	Tidi	4
S7	Rawa	1.0*
S8	Bara	1.7*

\*with respect to Block III

The 8 samples were analysed for 23 parameters. The parameters that are affected majorly due to mining activities and in turn have impact on the biological environment of the WCP area are mentioned in [Table 17](#).

Table 17 - Soil sample analysis results

Sr. No.	Parameter	Unit	S1	S2	S3	S4	S5	S6	S7	S8
1	pH	-	8.2	8.4	8.2	8.5	8.0	8.2	8.1	8.4
2	Chloride as Cl	mg/Kg	99.3	70.9	85.1	72.3	80.6	71.3	73.4	56.7
3	Sulphates as SO4	mg/Kg	100.6	73.4	121.6	75.6	113.5	98.7	86.4	78.6
4	Aluminium	%	1.52	2.76	1.89	2.51	1.51	3.56	1.76	1.93
5	Total Iron	%	1.83	3.04	2.12	2.86	1.79	3.23	2.14	2.23
6	Manganese	mg/Kg	417.3	326.5	356.4	411.5	335.9	547.6	389.3	420.8
7	Boron	mg/Kg	25.6	18.4	22.3	34.7	21.3	36.6	20.7	29.7
8	Zinc	mg/Kg	75.6	93.4	70.7	85.6	68.7	79.7	112.6	91.3

It has been observed that the texture of soil is sandy clayey in the WCP area. pH of soil indicates that soil is moderately alkaline in nature. The levels of macronutrients i.e. potassium, nitrogen and phosphorus is in the 'very less to more than sufficient' category.

#### 2.2.2. Air

Ambient air quality monitoring was carried out to determine current status of ambient air quality in the WCP area. To sample the air, 11 locations were selected in the study area based on the meteorological conditions, topography, regional background air quality, impact areas and environmental sensitivity. Details of the sampling stations are presented in [Table 18](#).

Table 18 - Ambient air quality sampling locations

Station code	Name of the station	Distance (Km)
AAQ1	Guest House	-
AAQ2	Kevra kalan village	5.9
AAQ3	Ora village	4.3
AAQ4	Near Gawadi village	0.5
AAQ5	Kanpur village	0.9
AAQ6	Tidi village	1.1
AAQ7	Rava village	0.1

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Station code	Name of the station	Distance (Km)
AAQ8	Block III	-
AAQ9	Bara village	1.0*
AAQ10	Tarnesilawar village	1.9
AAQ11	Saru village	1.7*

\*with respect to Block III

Air sampling analysis is summarized in Table 19.

Table 19 - Ambient air quality analysis results

Sr. No.	Component	Range	NAAQ Standards
1	PM <sub>10</sub> (µg/m <sup>3</sup> )	30.7-70.5	100
2	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	22.6-38.9	60
3	SO <sub>2</sub> (µg/m <sup>3</sup> )	10.9-17.5	80
4	NO <sub>x</sub> (µg/m <sup>3</sup> )	10.8-18.1	80
5	CO (µg/m <sup>3</sup> )	107-476	2000
6	O <sub>3</sub> (µg/m <sup>3</sup> )	4.1-17.9	100 (8 hours)
7	Ammonia (µg/m <sup>3</sup> )	<20	400
8	Benzene (µg/m <sup>3</sup> )	<0.01	5
9	B(a)P (ng/m <sup>3</sup> )	<0.01	1

#### Summary of observations

**PM<sub>10</sub>** – The high concentration of PM<sub>10</sub> is attributed to use of firewood and due to NH8 traffic, observed at Tidi village.

**PM<sub>2.5</sub>** – The levels of PM<sub>2.5</sub> at all the ambient air quality locations were found within the prescribed standards for residential and industrial areas. This could be attributed to very low urbanization and thus low traffic density that contributes to PM<sub>2.5</sub> levels. Absence of any major air polluting industries in the WCP area also leads to the low PM<sub>2.5</sub> levels.

**SO<sub>x</sub>, NO<sub>x</sub>, CO** – All the results were found to be well within the NAAQ standards.

#### 2.2.3. Water

Water quality was assessed in the WCP area to understand current status of water pollution and anticipate impact of the proposed expansion project.

6 surface water and 8 ground water samples were collected in the WCP area, as presented in Table 20.

Table 20 - Water sample locations in WCP area

Sr. No.	Code	Location	Distance (Km)
<b>Surface water</b>			
1	SW 1	Tidi Dam	2.8

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Sr. No.	Code	Location	Distance (Km)
2	SW 2	ML Tidi River (Near Zawar)	-
3	SW 3	Chandri River (Near Chanda)	2.1
4	SW 4	ML Tidi River (Near Police outpost)	-
5	SW 5	Oda (Nallah)	4.2
6	SW 6	Tidi River (Near Rela)	4.7
<b>Ground water</b>			
1	GW 1	Mine water	-
2	GW 2	Signal Wadra	0.3
3	GW 3	Kanpur	0.9
4	GW 4	Padla	4.0
5	GW 5	Tidi village	1.1
6	GW 6	Rawa village	0.1
7	GW 7	Delwas village	2.1
8	GW 8	Saru village*	1.7

\*with respect to Block III

The surface water sources and ground water sources were examined to evaluate the physico-chemical, heavy metal and bacteriological parameters. Of these, the parameters determined by presence of mining activities in the vicinity of water sources and those impacting the biological environment of the water bodies are presented in Table 21 and Table 22.

Table 21 - Surface water samples analysis results

Sr. No.	Parameters	Units	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6
1	pH	-	7.7	7.4	7.4	7.3	7.0	7.3
2	Total hardness as CaCO <sub>3</sub>	mg/L	125	160	170	165	275	160
3	Chlorides	mg/L	49.6	53.1	56.7	56.7	81.5	56.7
4	Sulphates	mg/L	13.5	17.7	12.5	14.2	84.1	12.4
5	Fluorides	mg/L	0.3	0.2	0.3	0.4	0.6	0.4
6	Phenolic compounds	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
7	Lead	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
8	Arsenic	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
9	Cadmium	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
10	Mercury	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
11	Zinc	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
12	Selenium as Se	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
13	Cyanide	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
14	Oil and grease	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

#### Surface water quality

- The results of surface water sample analysis indicated that the pH value was observed to be in range of 7.3 to 7.7, which are well within the specified standards of 6.5 to 8.5.
- The total hardness was well within the standards at all locations.

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- Chlorides and fluorides concentrations were well within the prescribed limits.
- Cyanides and phenolic compounds were found to be below detection limits.

Table 22 - Ground water samples analysis results

[illegible]

### Ground water quality

- Ground water samples showed pH in range of 6.6-7.4, which is within the specified standard limit of 6.5-8.5.
- The total hardness values were below the permissible limits except at Signal Wadra (GW 2).
- Range of chlorides and sulphates concentrations at all the locations is between 63.8 and 124 mg/L and 26.5 and 101.5 mg/L, respectively.
- Fluoride concentrations were within the permissible limits and phenolic compound quantities were below detectable limit.
- All metal concentrations were observed to be below detectable limits.

Based on the above results, it is evident that all the parameters in most samples of ground water in the WCP area meet the desirable standard limits of IS: 10500.

#### 2.2.4. Noise

The noise monitoring in the study area is done to establish the baseline noise levels and assess the impact of total noise generated by the mine operations. The locations in WCP area were identified based on activities in the village area, ambient noise due to traffic and the noise at sensitive areas like hospitals and schools. Locations of ambient noise sampling stations are listed in [Table 23](#).

Table 23 - Locations of ambient noise sampling in WCP area

Station Code	Name of the Station	Distance (Km)	Category of Area
N1	Guest House	-	Industrial
N2	Kevra kalan village	5.9	Residential
N3	Ora village	4.3	Residential
N4	Gawadi village	1.2	Residential
N5	Kanpur village	0.9	Residential
N6	Tidi village	1.1	Residential
N7	Rava village	0.1	Residential
N8	Block III	-	Residential
N9	Bara village	1.0*	Residential
N10	Saru village	1.7*	Residential

\*with respect to Block III

The statistical analysis is done for measured noise levels at 10 locations during pre-monsoon season. The parameters are analyzed for  $L_{day}$ ,  $L_{night}$  and  $L_{dn}$ . These results are tabulated in Table 24.

Table 24 - Ambient noise levels at survey locations in WCP area

Code	Location	Land use	Lday	Lnight	Ldn	Leq	Ambient noise standards Noise levels dB (A)	
							Leq limits	
							Day time	Night time
N1	Guest House	Industrial	53.4	49.6	56.8	52.5	75	70
N2	Kevra kalan village	Residential	55.6	50.7	58.2	53.6	55	45
N3	Ora village	Residential	54.5	50.9	58.0	53.7		
N4	Gawadi village	Residential	50.1	46.2	53.4	48.9		
N5	Kanpur village	Residential	51.1	46.7	54.1	50.1		
N6	Tidi village	Residential	50.7	46.4	53.7	49.1		
N7	Rava village	Residential	51.8	46.0	53.9	49.7		
N8	Block III	Residential	47.8	43.2	50.6	46.9		
N9	Bara village	Residential	51.2	46.6	54.0	50.3		
N10	Saru village	Residential	45.8	41.2	48.6	44.9		

Day time noise levels ( $L_{day}$ )

The daytime noise levels at all locations are observed to be in the range of 45.8 dB (A) to 55.6 dB (A). These are within the prescribed limit of 55 dB (A) for residential areas.

Night time noise levels ( $L_{night}$ )

The night time noise levels which ranged in 41.2 dB (A) and 50.9 dB (A) which are within the prescribed limit of 45 dB (A) for residential areas.



### 2.2.5. Increase in Vehicular traffic and its impacts

The current traffic scenario was assessed by traffic density survey at 3 locations in the WCP area. The results are presented in [Table 25](#).

Table 25 - Pre-expansion traffic density in the WCP area

Code	Location		Total no. of Vehicles
T1	Tidi (NH)	Towards Udaipur	4629
		Towards Ahmedabad	5936
		Towards Zawar	847
T2	Oda	Towards Jaisamund	2189
		Towards Udaipur	1717
		Towards Zawar Mines	425
T3	Bus stop, Zawar Mines	Towards Zawar Hospital	1636
		Towards Tidi	1843
		Towards Guest house	1893

Due to the expansion project, increase in vehicular traffic is anticipated. Rise in traffic has impact on the air quality, noise levels and biological environment of the surrounding area. There will be an increase in internal traffic for ore transport of about 0.8 MTPA from Baroi mine to the centralized beneficiation plant near Mochia-Balaria block. Impact assessment has been carried out for the increased vehicular traffic from the present 14 to 30 trucks/ day. The impacts include –

- Rise in PM<sub>10</sub> and PM<sub>2.5</sub> levels in the ambient air, especially along the roads which will be frequented by the increased number of vehicles.
- Generation of particulate emissions and the tail pipe emissions from transport vehicles in a primary concern regarding increase in vehicular traffic due to expansion of the mines.
- The predicted CO and NO<sub>x</sub> concentrations from additional vehicular traffic are presented in [Table 26](#).

Table 26 - Predicted peak hourly air pollution due to additional traffic

Sr. No.	Parameter	Concentration ( $\mu\text{g}/\text{m}^3$ )
1	Carbon Monoxide (8 hours)	0.11
2	Oxides of Nitrogen (24 hours)	0.14

It can be observed that the maximum incremental concentrations of CO and NO<sub>x</sub> due to the additional traffic load would be about 0.11  $\mu\text{g}/\text{m}^3$  and 0.14  $\mu\text{g}/\text{m}^3$ , respectively and likely to occur at 10 m from the center of the road. The CO and NO<sub>x</sub> concentrations are likely to be very low when compared with the NAAQ standards for CO (2000  $\mu\text{g}/\text{m}^3$ ) and WHO standards of 400  $\mu\text{g}/\text{m}^3$  for hourly average of NO<sub>x</sub>. Hence, it is assessed that the impact on the present ambient air quality will be negligible due to the additional traffic from the proposed project.

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### 2.3. Impact on ecology and Biodiversity

#### 2.3.1. Impact on Flora

##### Impact of air pollution on flora

Mechanical and physical disturbance associated with the surface-level mining activities such as surface exploration, transportation of materials, processing of ore can lead to dust pollution. Dust is generated throughout the life of mine. Dust particles suspended in air affect the surrounding vegetation. These effects can be chemical and/or physical in nature. Chemically active dust, such as highly alkaline limestone dust or highly acidic dust can affect the pH of the soil and plant surfaces, becoming toxic for vegetation. Physical effects of dust include surface abrasion, blockage of plant stomata, leading to increased number of stomata and heightened rate of respiration, leading to eventual death. Dust deposition on plant surfaces also leads to restricted growth, less regeneration and degradation and local extinction of sensitive species.

Since mining operations are underground, there is no degradation of land because of mining. In addition to that, 170.85 Ha land is converted into vegetation which has positive impact in the area.

##### Impact of soil, water and noise pollution on flora

As per analysis of these parameters, it was found that the presence of toxicants and heavy metals was within permissible limits. Hence, currently minimum impact is predicted of these components on the floral diversity of the WCP area.

#### 2.3.2. Impact on Fauna

The EIA study in WCP area revealed presence of Leopard, Peafowl, Pangolin and raptors which are included in Schedule I of the Indian Wildlife Protection Act, 1972, the other faunal species observed in this area are enlisted in [Table 7](#) and [Table 8](#). These species can be affected due to the mining activities. Anticipated impacts are as follows –

##### Impact of soil pollution on fauna

Soil pollution affects plants. Presence of heavy metals and other pollutants enter the food chain through plants, which are consumed by the herbivores. The pollutants accumulate in the bodies of these herbivores, passing them on to the carnivores and scavengers feeding on them. This phenomenon of 'Bioaccumulation' affects the entire ecosystem, from primary producers to the scavengers. Some components found present in the soil can prove fatal for animals when they accumulate in high concentrations.

Survey of soil samples in the WCP area revealed presence of heavy metals and other pollutants in harmless quantities. Provided these levels are maintained at low levels, minimal impact on the faunal diversity of WCP area can be ensured.

##### Impact of air, water and noise pollution on fauna

Mining activities that generate noise, dust and other pollutants are known to impact the surrounding biodiversity. However, as the mining activities are primarily underground, the noise will be confined to below the ground. Thus, no adverse impact on fauna occurred due to the mining activities.

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Also, the massive green belt development program and construction of water bodies within the lease area will provide and improve habitats of the endangered species.

#### **Impact of underground pollution on fauna**

Groundwater is chiefly affected due to underground activities. Analysis of groundwater resources in the WCP area showed that the pollutant levels are within the prescribed limits. These levels are ensured by regular monitoring of water quality in the WCP area by the environment department of Zawar mines. Hence, no adverse effects of underground pollution are expected on the faunal diversity of WCP area.

#### **2.3.3. Impact on habitats – Water body**

The mine functions at zero water discharge. Every possible measure will be taken to ensure that no water is discharged out of the mine premises. Garland drains have been constructed around the dumps at Bara to prevent washing away of waste during rainy season. Contamination of surface water is not observed. Hence impact on aquatic habitats is insignificant. Moreover, creation of waterbody planned in the lease area will be added support to the aquatic habitats in WCP area.

#### **2.3.4. Impact on habitats – Terrestrial**

On the basis of field monitoring studies and review of literature reveals that there are no endangered, threatened plant species in WCP area. The mining activities do not involve any tree felling. The impact on terrestrial ecology is primarily due to emission of pollutants like particulate matter.

To mitigate the dust generated due to few surface level mining operations, development of green belt is planned. Increased vegetation will function as habitat for the faunal diversity in and around the mine area. This step will increase and improve the terrestrial ecology of the WCP area.

#### **2.3.5. Impact on biological environment due to increased human intervention and vehicular traffic in the WCP area**

Rise in noise levels, leading to potential damage to hearing, physiological responses and annoyance and general community responses.

The expansion of mines has attracted human population for increased demand for manpower. Increased human intervention may have effects like clearing of land to establish temporary housing, increased dependency on trees for firewood for the migrated population, disturbance of wildlife due to human inhabitation in their territories, etc.

#### **2.3.6. Impact on displacement/movement of Fauna**

There is a data deficit on records of migration routes or movements of faunal diversity in WCP area. From the available data, some conclusions regarding faunal displacement of animals in the study area can be derived.

The expansion project will lead to increase in vehicular traffic will affect the terrestrial fauna, causing increase in roadkills.

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Considering the avifaunal diversity of WCP area, it is found that numerous migratory bird species visit the area in during their migration period. But there are no project activities that disrupt or obstruct the routes of these birds. Hence, minimal disturbance is expected to the displacement/movement of faunal diversity of WCP area.

## **2.4. Study techniques and Observations**

### **2.4.1. Study techniques**

Field monitoring studies for collection of primary data to evaluate the baseline status of the project site were carried out during March 2016 to May 2016, the pre-monsoon period.

The EIA referred for preparation of the present Wildlife Consecration Plan follows the study techniques enlisted in [Table 27](#).

**Table 27 - Methodologies of primary data collection in WCP area**

Sr. No.	Parameter	Study technique
1	Land use	Monoscopic visual interpretation of geocoded scenes of IRS-P6 satellite LISS-III and field observations were made for preparation of land use/ land cover thematic map
2	Land – Soil	Soil profile of the region was prepared by sampling at different locations to assess physical, chemical and heavy metal concentrations. The samples were collected by ramming a core-cutter into soil up to a depth of 90 cm. Sampling location details are given in <a href="#">Table 16</a> .
3	Meteorology	The meteorological station was installed at a height of 10 m and data was recorded every hour continuously from March to May 2016. The generated data was compared with meteorological data generated by nearest India Meteorological Department (IMD) station, Udaipur.
4	Water	Water samples were collected from surface water and groundwater sources in the WCP area. The samples were analyzed as per the procedure specified in 'Standard methods for the Examination of Water and Wastewater' published by American Public Health Association (APHA).
5	Air	Ambient Air Quality Monitoring (AAQM) stations were set up at 11 locations ( <a href="#">Table 18</a> ) The monitoring was carried out at frequency of 2 days per week for 3 months at each location during March to May 2016. Sampling duration for PM10, PM2.5, SO <sub>2</sub> and NO <sub>x</sub> are 24 hours continuous sampling per day and CO, O <sub>3</sub> is sampled for 8 hours continuously thrice a day, twice a week for the study duration.
6	Vehicular traffic density survey	The traffic studies were carried out at 3 locations for 24 hours once during study period. The vehicles plying in both directions were counted continuously for 24 hours at the selected locations. The vehicles were categorized under various heads like 2/3

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Sr. No.	Parameter	Study technique
		wheelers, cars/jeeps, light motor vehicles. This categorization was done as the speed and emission factors vary for each type of vehicle. The results are presented in Table 25
7	Noise	Sound pressure level (SPL) measurements were measured at all locations. The readings were taken for every hour for 24 hours. The day noise levels (L <sub>day</sub> ) have been monitored during 6 am to 10 pm and night levels during 10 pm to 6 am at all the locations covered in 10 km radius of the study area.
8	Biological diversity	For biodiversity survey, different methods adopted are as follows – Terrestrial biodiversity Preparation of checklists of all plants encountered in WCP area, inclusive of wild diversity and cultivated plants, Determination of bird population that was migratory and local from data collected by 10 random readings at every sampling location, Opportunistic sightings of mammals, amphibians and reptiles, noting their calls, droppings, burrows, pugmarks and other signs, Physical observation of village area during day as well as night for nocturnal terrestrial fauna, Interviewing local inhabitants for knowing the uses of plants and animals and to get ethno biological data. Aquatic studies 4 water samples for plankton study were collected in winter from upstream and downstream of Tidi River. The samples were collected from 30 cm depth in polyethylene cans and fixed with 4% buffered formalin solution. Frequency of plankton diversity was measured by observing 1 drop of sediment plankton under microscope. 10 different microscope fields were examined and number of important organisms was counted (Lackey method, 17 <sup>th</sup> edition, APHA, AWWA, 1992) The plankton forms were identified up to species level.
9	Demography and Socio-economic status	Review of latest published secondary data (District Census Statistical Handbooks-2011 and Primary Census Abstract of Census-2011) with respect to population, social structure, literacy levels and occupational structure available for the WCP area was done to obtain baseline data.

#### 2.4.2. Field visits and observation

Field monitoring studies for collection of primary data to evaluate the base line status of the project site were carried out during pre-monsoon season March to May, 2016. The observations for each of the environmental parameters studied are included in Chapter 2.

#### 2.4.3. Records and Secondary references

1. Environmental Impact Assessment for the proposed expansion of existing lead zinc ore mining and its beneficiation capacity from 1.5 MTPA to 4.0 MTPA at Zawar mines, Udaipur district, Rajasthan, October 2016.
2. John L. Fletcher, R. G. Busnel, 1978. Effects of Noise on Wildlife. Symposium on the Effects of Noise on Wildlife (1977: Madrid, Spain)
3. Tavakkoli E, Rengasamy P, McDonald GK. 2010. High concentrations of Na<sup>+</sup> and Cl<sup>-</sup> ions in soil solution have simultaneous detrimental effects on growth of faba bean under salinity stress. Journal of Experimental Botany 61, 4449–4459.
4. Sribas Goswami, 2015. Impact of Coal Mining on Environment. Russian Federation European Researcher, Vol 92, Is. 3, 2015.
5. Aysen Oksan Altun, Isik Yilmaz and Mustafa Yildirim, 2013. A short review on the surficial impacts of underground mining. Scientific Research and Essays Vol. 5 (21), November, 2010.
6. Pradeep S. Mehta, 2002. CCNM Global Forum on International Investment, February, 2002.

#### 2.4.4. Justification in extrapolation

Environmental data collected at a few locations has been used to conclude about the environmental status of the entire WCP area. These sampling locations were selected with due consideration to all the existing land use types, topographies, regional background environmental parameter quality for obtaining baseline status and representatives of likely impact areas.

### 3. Chapter 3 – Mitigation measures

#### 3.1. Objectives of Wildlife Conservation

Sustainable development is the principle goal of HZL. HZL strives to reduce its environmental footprint and meet community expectations to support sustainable development. Most of the risks to sustainability are related to environment.

HZL has defined policies that –

(HSE policy)

- Ensure zero harm to personnel and environment
- Identify and evaluate HSE risks for all activities and take actions to eliminate/ mitigate risks and hazards.
- Conserve natural resources and eliminate waste through reduction, recycling and reuse methods, which are environment-friendly and energy-efficient.

(Biodiversity policy)

- Creating awareness to prevent, where possible, minimize and mitigate biodiversity risks throughout HZL's businesses. The lands under HZL operations are managed and used in a manner that allows biodiversity conservation, which is integrated with business needs throughout the project lifecycle, including decommissioning, closure and rehabilitation.
- Comply with and exceed, where possible, the local, regional and national legislative requirements on land management and biodiversity conservation and applicable international conventions in all jurisdictions in which it operates.
- Identification and assessment of biodiversity status, value and its impacts, due to resettlement, loss of cultural heritage, loss of protected land and endangered species before the start and over of the project lifecycle.
- Consideration of the impacts on ecosystem services in business decisions.
- Work towards the conservation of threatened/ rare and endemic species and high priority conservation areas, and support local, national and global conservation initiatives.
- Provide information and raising awareness among the employees and other stakeholders to enhance knowledge and understanding of biodiversity and conservation issues, where applicable.

#### 3.2. Strategies to mitigate and minimize adverse impacts of project activities

Some existing and proposed mitigation measures for impact of mining activities on the environment of WCP area are enlisted in Table 28.

Table 28 - Mitigation measures in WCP area.

Sr. No.	Parameter	Anticipated impact	Mitigation measures
1	Topography	The existing facilities are adequate for	Topography and landscape were not

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Sr. No.	Parameter	Anticipated impact	Mitigation measures
	and landscape	the current capacity of the project. Other than some excavation for approach, mill expansion and road construction which shall be done in the existing land with some leveling, no changes in topography and landscape occurred due to the project.	affected due to expansion, hence no mitigation was required.
2	Drainage	The mining plan does not envisage any disturbance or diversion to the drainage pattern of the mine lease area or the acquired lease area.	The mineral storage and mine portal are provided in proper garland drain, distillation pit to collect runoff.
3	Climate	No effect on the local climate is anticipated as this is an expansion of underground mining. No significant impact on overall climate of this region due to mining is expected as mining area is very small as compared to the WCP area. No perceptible change is expected in local temperatures owing to mining operations as all the activities are being carried underground.	Implementation of massive plantation scheme will help improve the local climate.
4	Land use	The impact on land use in buffer area due to mining activities are limited to the acquired leasehold area would be insignificant. Thus, no land degradation would take place on account of underground mining operations.	The waste coming out of mines will be utilized for construction of tailing dam and some leveling work at all the mines. Most of the built up structures like the garage, workshop, office building, rest rooms, electrical substations and training centres shall be dismantled during the mine closure. Thus, the impact of mining on land use pattern of project area will not be a long-term.
5	Impact on soil	The top soil disturbance occurring during surface exploration activity or during tailing dam expansion is preserved and utilized in plantations.	Zawar mining operations are underground and there was no removal of top soil.
6	Air quality	Ore loading activities, ore transportation, waste dumping and vehicular movement are the sources	Dust generated from 2 surface-level crushing system in mine will be reduced by sufficient plantation and

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Sr. No.	Parameter	Anticipated impact	Mitigation measures
		of air pollution on the surface. 2 crushing systems planned at the surface also act as a source of air pollution. It has been planned to transport ore from Zawarmala & Baroi mines to beneficiation plant using trucks, which are at distance of 8 and 5 km, respectively. The increase in truck movement from 8 minutes to 5 minutes has impact on the air quality of WCP area.	consideration to wind direction while designing the crushing plant. Wet drilling is practiced to suppress dust generation. Water spraying is carried out to ensure sufficient moisture in the ore transported to the surface, to minimize fugitive dust.
7	Water quality	<u>Surface water resources</u> The rainwater runoff from ore storage and tailing dam are likely sources of suspended solids. If allowed to escape to the natural drainage without any treatment, this runoff may affect the quality of water bodies. The vehicle maintenance garage is also a source of surface water contamination due to leaks and spills of oil and grease. Other than these 2 sources, no impact from discharge from the mines is observed on the surface water quality.  <u>Ground water quality</u> The ground water development is within safe limits in core zone and will remain so even at the conceptual stage. The ground water inflow in the mines and its withdrawal will not influence any nearby private or public wells. As the mining method is underground, there is no significant impact on ground water quality.	<u>Surface water resources</u> The quality of water before it enters the leasehold and after it leaves is being regularly monitored. Sewage generated shall be treated in sewage treatment plant and reused in mining operations/green belt development. The vehicle maintenance area is provided with water containment area and oil trap. All garage effluent is treated for oil and sediments before its reuse in vehicle maintenance, mining operations and dust suppression.  <u>Ground water quality</u> No mitigation was required as no impact on the ground water is observed.
8	Noise levels and ground vibrations	Noise levels due to drilling, blasting, crushing and operation of mining equipment rose due to expansion but remain confined to underground and attenuated due to depth of the operation.	Noise from ventilation fans was reduced by designing their installation in a manner to control the noise levels and their placement at isolated locations in the mine area.

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Sr. No.	Parameter	Anticipated impact	Mitigation measures
		The only noise generating sources situated above ground are the compressors/ fans for ventilation for the underground operations.	
9	Biological environment	<u>Flora</u> Vegetation planned to suppress fugitive dust from ore transport and other surface activities can be affected due to dust. Stunted growth, lowered regeneration ability and degradation of sensitive tissues are some impacts of dust deposition on plants.  <u>Fauna</u> Underground expansion of mine did not lead to change in habitats in the WCP area. The increase in noise levels is confined in the underground mines and will not have considerable impact on the fauna in WCP area. The increased vehicular traffic leading to increased incidences of roadkills is an anticipated effect on wildlife of WCP area.	170.85 Ha land is converted into greenery which is expected to have positive impact on flora and fauna of the WCP area. The Wildlife Conservation Plan includes measures to create awareness about existing Biodiversity and impacts of human activities on the flora and fauna. Such measures will assist conservation in WCP area.

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#### 4. Chapter 4 – Implementations in Core area

Biodiversity survey carried out in the WCP area provided baseline data on floral and faunal diversity of the area. Of the species recorded, 7 species of reptiles, birds, mammals and butterflies are included in the Schedule I of Indian Wildlife Protection Act, 1972, imparting highest level of protection to these species. Planned interventions in order to protect and conserve these species require to be taken in the WCP area to ensure their sustenance in their natural habitat and maintain local populations.

Table 29 enlists the faunal species found in the WCP area, core as well as buffer, which are protected under Schedule I of WPA.

Table 29 - Schedule I species observed in WCP area

Sr. No.	Common Name	Scientific name	Family	IUCN Status	WPA
<b>Birds</b>					
1	Osprey	<i>Pandion haliaetus</i>	Pandionidae	LC	I
2	Indian Peafowl	<i>Pavo cristatus</i>	Phasianidae	LC	I
3	White-rumped Vulture	<i>Gyps bengalensis</i>	Accipitridae	CR	I
<b>Mammals</b>					
4	Indian Leopard	<i>Panthera pardus fusca</i>	Felidae	Vu	I
5	Indian Pangolin	<i>Manis crassicaudata</i>	Manidae	EN	I
<b>Butterflies</b>					
6	Crimson rose	<i>Pachilopta hector</i>	Papilionidae	LC	I
<b>Reptiles</b>					
7	Bengal Monitor Lizard	<i>Varanus bengalensis</i>	Varanidae	LC	I, Part II

##### 4.1. Schedule I species of WCP area

Information on appearance, behavior, population status in the world and threats to the schedule I species present in the WCP area is essential to understand need and methods of their conservation. This information is presented in this section.

**Notes:** All the images of Schedule I species are for reference only and not site-specific.

##### 4.1.1. Osprey (*Pandion haliaetus*)

###### Description

More specifically known as 'Western Osprey', it is a diurnal, exclusively fish-eating bird of prey with a cosmopolitan range with migratory tendency. It is a large raptor with a wingspan of 180 cm. It is brown on upper parts and greyish white on head and underparts. Ospreys tolerate wide range of habitats, ranging from forest, inland wetlands to coastal, it prefers nesting near a waterbody which provides adequate food supply.



###### Conservation actions

Ospreys are included in the least concern category by IUCN. It is protected under Schedule I in India. The populations are under threat due to energy production and mining, hunting and trapping, pollution and human intrusion. Use of pesticide is a minor threat.

(Source: IUCN Red list, <https://www.iucnredlist.org/species/22694938/155519951#threats>)

In the WCP area, awareness regarding presence, preferred habitat and behavior of the bird will aid conservation. Measures to be implemented in the WCP area include –

- Creation of terrestrial habitats
- Protection of tall trees, snags (dead trees) at the periphery of waterbodies
- Release of fish fries in waterbodies
- Installation of reflectors on electric lines near waterbodies to check electrocution
- Prevention of discarding fishing nets/pieces at the shores of waterbodies
- Perching poles near waterbodies will provide for nesting space for the species, helping sustain the Osprey population in WCP area.

##### 4.1.2. White-rumped Vulture (*Gyps bengalensis*)

###### Description

The White-rumped Vulture is native to South and Southeast Asia. It is a typical medium-sized vulture with bald head and neck, very broad wings and short tail feathers. It has a neck ruff. The adults are dark in colour with whitish rump (part of the back leading to the tail). The head and neck is tinged pink and bill is silvery with dark ceres. Nostril openings are slit-like. In flight, the adults show a dark leading edge of the wing and have white wing-lining on the underside.

White-rumped vulture nests on tall trees, often near human habitations. It is a scavenger, feeding on carcasses of dead animals which they spot by soaring high and spotting other scavengers. They often fly and sit in flocks.



### Conservation actions

In 1980s, White-rumped Vulture was the most populous Vulture in the world, but presently it is critically endangered as per IUCN. By mid 2000s, they were being found dead all over India. The deaths were attributed to Diclofenac, a drug used to treat domestic livestock. Vultures feeding on dead cattle treated with diclofenac suffer kidney failure and death. Other threats to the species come from changing land use leading to loss of habitat, hunting, pollution, invasive species, genetic disorders and other diseases, etc. One study recorded that the sex of fledglings, dead adults and adults with visceral gout (caused by diclofenac) were all male-biased (Arshad et al., 2009), which may lead to low reproduction rate and difficulty in revival of the White-rumped vulture population.

(Source: IUCN Red list, <https://www.iucnredlist.org/species/22695194/118307773#threats>)



To protect the White-rumped vulture population in WCP area, measures to be implemented are –

- Meloxicam, as alternative veterinary drug that is of low toxicity to vultures need to be promoted in the WCP area, as a replacement to diclofenac. Regular supply of Meloxicam for the local veterinary hospitals should be ensured.
- A ban on diclofenac needs to be implemented. If some cattle have been treated with diclofenac, after its death, the carcass should be disposed by burial method to keep it away from the vultures.
- Unskinned cattle carcasses are of limited use for vultures. Skinning of dead cattle should be promoted to provide food for the vultures.
- Awareness generation is most essential for conservation of White-rumped vulture. Imparting information on importance of vultures, effect of human activities on their populations and need for conservation is essential.
- Other factors that require awareness for conservation of vultures include –
  - Dog menace at the cattle dump site,
  - Checking activity of dogs at the river pools which are bathing sites for vultures
  - Checking presence of dogs at Vulture roosting sites, as overfed vultures tend to spend the night on the ground and are susceptible to predators such as feral dogs
- The tribals are known to hunt vultures to use their feathers as arrows. This should be banned and checked by creating awareness about the declining population of vultures.
- Regular monitoring of vulture roosting sites is needed. Diseased, injured or sick birds should be reported to the area authorities.

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- No pruning, lopping, topping and uprooting of trees should be allowed at vulture roosting and nesting sites. Creation of habitats and protection of present habitats, especially tall trees in the WCP areas will be beneficial for conservation of White-rumped vulture.

### 4.1.3. Indian Peafowl (*Pavo cristatus*)



### Description

Indian Peafowl or 'Peacock' is the most popular bird owing to its splendid appearance and status as the National Bird. Ecologically, the species exists in small groups. It forages on the ground in open areas early in mornings, feeding on seeds and insects and tend to stay in cover during the heat of the day. They inhabit scrubland habitats and uncultivated agricultural lands.

### Conservation actions

In India, the Indian Peafowl is given the highest level protection i.e. under Schedule I of WPA. They are endemic to India, found nowhere else in the world. Their population is in least concern category of IUCN Red list. Threats to the population include pet trade, feathers trade and hunting for flesh.

(Source: IUCN Red list, <https://www.iucnredlist.org/species/22679435/92814454#threats>)

In the WCP area, Peafowls are present in core as well as buffer area. There are no major threats to the population and thus, no special implementation for their conservation is required. To further enhance their habitation in the WCP area -

- Tall trees that are used as roosts by the peafowls need to be protected.

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- Regular Surveillance in villages is required to prevent hunting of peafowls using poison traded grains.
- Placing 'Parindas (water pots)' for the peafowls during dry seasons to provide drinking water should be encouraged.
- Planting of trees like Peepal (*Ficus religiosa*), Indian Elm (*Holoptelea integrifolia*), etc. which provide roosting sites and fruiting plants like Sandpaper Raisin (*Grewia flavescens*), White Crossberry (*Grewia tenax*), Jhar Beri (*Ziziphus nummularia*), Indian Jujube (*Ziziphus mauritiana*), etc.
- Night roosting places should be identified and 'zero disturbance' should be ensured.
- Wounded or sick bird, if noticed, should be brought to the attention of authorities.
- Installation of reflectors on electric lines near roost sites will prevent electrocution.
- Raising awareness about the natural habitats and food habits of the peafowls, including effect of human activities like conversion of scrublands into other farmlands and bulldups and ill-effects of feeding grains to the local population of peacocks will be helpful to maintain the peafowl population in natural state in the WCP area.

#### 4.1.4. Indian Leopard (*Panthera pardus fusca*)

##### Description

Characterized by black rosettes all a yellow body, the Indian Leopard is found in variety of habitats like forests, rocky areas like cliffs, mountain peaks, grasslands, shrublands and fringes of human habitation. Thus, the WCP area makes the most natural habitat for this medium-sized cat.



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Leopards are elusive, solitary and mainly nocturnal. They are excellent climbers, found resting on tree branches and even dragging their kills up the trees. They are versatile, opportunistic hunters. Their diet comprises of a large variety of animals, including deer, wild boar, langur, hares and even peafowl.

##### Conservation actions

Leopard population is Vulnerable all over the world, as per IUCN Red list. It is under threat from habitat destruction, energy production and mining, hunting, roadkills, retaliatory killing and human intrusion into their habitats.

(Source: IUCN Red list, <https://www.iucnredlist.org/species/15954/163991139#threats>)

For conservation of Leopard –

- Securing the open wells in the study area with 1.0 m parapet walls will make the habitat safer for Leopard population.
- Old mining dumps are often used by Leopards for living, sleeping and littering. If dump voids are occupied by a Leopard/ Leopard family, it should not be removed.
- If natural water sources are observed to have dried up, man-made waterholes should be created in the same area. The manmade waterholes should have slanting sides to make them safer for the animals. Disturbance by human activities should be checked in the areas around waterholes.
- Use of rodenticide should be prohibited in and around the Leopard habitats.
- Game trails should be protected. No obstacles should be erected across the game trails.
- If any Langur (*Semnopithecus entellus*) troops are residing in and around Leopard habitat, they should not be displaced and allowed to stay.
- Use of camera traps without knowledge/ advice of the Forest Department is prohibited.
- Awareness regarding its behavior, network to notify the Forest Department of its presence in human settlements or any mishaps to the creature, measures to control road traffic speed and preservation of habitats will play a major role.
- Regular monitoring of the present Leopard population is essential to understand the exact number of individuals, their behavior, frequently visited places, etc.

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#### 4.1.5. Indian Pangolin (*Manis crassicaudata*)



##### Description

Indian Pangolin, a unique mammal is found all over India and Sri Lanka. It is characterized by presence of large, rigid scales all over its body, except for the belly and inside of the legs. It is solitary, shy and slow-moving. Its sticky tongue, which is longer than its body, is specially adapted to reach and eat insects in deep crevices. Pangolin makes burrows, which are of 2 categories – feeding and living burrows. The living burrows are wider, circular and deeper, occupied by the animal for longer time where it sleeps and rests during the day. Although they make new burrows closer to food source, they are also known to reuse old ones.

Indian Pangolin requires trees, herbs and shrubs in its habitat because it is easier to dig burrows around them. Features like grasses, bare grounds, base of trees and shrubs, leaf litter, fallen logs and a few more attract presence of the Pangolin in their habitat.

##### Conservation actions

The Indian Pangolin is primarily threatened by overexploitation including hunting and poaching for its meat, scales and skin which are used and consumed at a local, subsistence level, but increasingly for illegal international trade (Misra and Hanfee, 2000; Mahmood et al. 2012; Challender and Waterman, 2017; D'Cruze et al., 2018). The scales are used as aphrodisiac or made into decorative objects and ornaments. Flesh is also believed to be medicinal in many parts of the world. Illegal demand for these products has increased over the past 20 years, depleting the populations by hunting and poaching. The majority of hunting is carried out by nomads and trained local hunters. As Pangolins have only one offspring per year, the heavy trafficking is taking a serious toll on Pangolin population. Pangolins are the most heavily trafficked CITES-protected mammal. Other threats include the expansion of agriculture, habitat loss and deterioration, which opens up previously inaccessible areas to hunting and poaching, pesticide use and roadkill (Karawiat et al., 2018; Murthy and Mishra, 2010).

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(Source: IUCN Red list, <https://www.iucnredlist.org/species/12761/123583998#threats>)

Presence of Indian Pangolin in the WCP area is extremely crucial, for its national and local population. The authorities at Zawar mines have an important task of its conservation and contributing to reducing threats to Pangolin population. In order to provide protection to the Pangolin –

- Natural termitarium should be protected. Rotting logs and dead wood should not be removed from Pangolin habitats, as they help in building termite population. Also, swarming termites should not be killed during the first few monsoon rains.
- Night vehicle drivers should be avoided for preventing running over the animal if encountered.
- Use of insecticides to kill ants and termites should be prohibited in Pangolin habitats.
- Excavations in Pangolin habitats should be prohibited.
- Box pits in the Pangolin habitats should have at least one side slanting.
- Waterholes and water tanks in the Pangolin habitats should not pose harm to the Pangolins. They should have slanting edges on at least one side.
- Fire safety should be ensured in Pangolin habitat. As Pangolin is a slow moving animal, it cannot escape in case of fire.
- Awareness creation among the masses about the present status of Pangolin population in the world and ban on its hunting and trading, which is subject to heavy penalty under the Indian Wildlife Protection Act, 1972 is essential. The importance of Pangolins in terms of benefits to humans from their presence in the vicinity can be conveyed to reduce fear and misconceptions and create harmony.
- Monitoring of the present population, their locations will be helpful in protecting the Pangolins in the study area. Camera trap method can be used for the monitoring.
- Further, habitat protection, protection specifically to areas with Pangolin's presence with the help of Forest Department, habitat creation by tree plantation and artificial waterholes will aid conservation of Indian Pangolin in the WCP area.

#### 4.1.6. Crimson Rose (*Pachliopta hector*)

##### Description

Crimson Rose is a large swallowtail butterfly with bright red body and great black wings with patterns of white and red. It is found in forests, shrublands as well as artificial landscapes. The species is thought to be around throughout the year, with higher densities during August-November and April-June (Ramana et al. 2004). They collect Nectar from flowers such as Lantana, which is an invasive weed almost all over the world. Crimson Rose basks in small groups, 10-15 up in tree tops and has strong migratory senses, with large congregations (of several thousand



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वन्यजीव, उदयपुर

Environment Department  
Zawar Mines  
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at the highest), often found when the peak season ends, subsequently leading to the species migrating to adjoining areas. (Kunte, 2000)

(Source: IUCN Red list, <https://www.iucnredlist.org/species/121972074/122602161#threats>)

Butterflies have very specific plants that they lay eggs on, which are known as 'Host plants'. Host plants of Crimson Rose butterfly are *Aristolochia indica*, *Aristolochia littoralis*, *Thottea siliquosa*, etc., belonging to the Duck flower family Aristolochiaceae.

#### Conservation actions

Crimson Rose population, although least concern as per IUCN, suffers majorly from habitat destruction from increased urbanization, developmental projects, energy production projects, spreading agriculture and human intrusions. The species is impacted by land, water and atmospheric pollution (from industries). Although the species is found in trade, the extent of impact of collection and trade on its population is not known.

To maintain a species population in an area –

- Continuous vegetation cover inclusive of plants that attract butterflies will help sustain butterfly population.
- Host plants of Crimson Rose Butterfly i.e. *Aristolochia indica* and *Aristolochia bracteolata* should be planted in the study area. Moreover, the existing larval host plants in the study area should be protected.
- Use of insecticide should be avoided to check death of the larval stage (butterfly) of the butterfly.
- Wet mud points should be maintained at different sites in the study area to allow mud puddling of adult butterflies.
- Raising awareness, conveying information on life cycle and importance of the species and deterring the communities from collation of Butterflies will be helpful in conservation of Crimson Rose as well as other butterflies in the WCP area.

#### 4.1.7. Bengal Monitor Lizard (*Varanus bengalensis*)

##### Description



Monitor Lizards are the most conspicuous lizards of the Indian Subcontinent. They are distinguished by their long, flattened body, long tail, elongated neck and slender, forked tongue similar to that of snakes. The Bengal Monitor Lizard prefers scrubland habitat, found near inland wetlands, rocky areas, etc. It is mainly ground dweller, but an excellent climber as well. It lives a solitary life. They are found on the ground, feeding on insects, snails and other

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invertebrates, sometimes feeding on frogs, lizards, fish, snakes and rodents. They are also scavengers, feeding on dead animals. These giant lizards take shelter in burrows and rock crevices, also making use of abandoned termite mounds. Being a reptile, it has to bask in sunlight during day to maintain an ambient body temperature.

#### Conservation actions

Although the world population of Bengal Monitor Lizard is in the least concern category of IUCN Red list, its threatened Indian population has led to its addition in the Schedule I of WPA.

There are many threats to this majestic lizard. It is hunted for the meat and skin, which is the greatest threat of its population. It is also killed due to misconceptions about its venomous nature and blind faith. Use of pesticides leading to loss of its food resources is also considered a threat. The species is possibly threatened by habitat destruction, but as it can utilize a wide range of habitat, it is not currently considered a major threat.

(Source: IUCN Red list, <https://www.iucnredlist.org/species/164579/5909661#threats>)

For conservation of Monitor Lizard population in the WCP area,

- Termitarium in the study area should be protected.
- Small animals like frogs, toads, skinks, etc. should be protected as they are important foods for Bengal Monitor Lizard.
- Rodenticides should not be used in the study area, as Bengal Monitor Lizards feed on rodents. Eating poisoned rodents can pose threat to the Monitor Lizard population.
- Creation of waterbodies will provide habitat to the species.
- Minimum 1.0 m tall parapets wall should be installed lining open wells in the study area.
- Generation of awareness about its behavior and harmless nature along with protection to the areas it is found present will help maintain the species in WCP area. Non-venomous nature of Bengal Monitor Lizard should be re-iterated.
- Hatchlings of Bengal Monitor Lizards may enter residential buildings habitually. They should not be harmed and released to safety by experts.

#### 4.2. Implementations in Core area for Conservation

In the present scenario, the management of HZL envisages and values the essence of 'Wildlife Conservation in the WCP area'. The practical, species and site-specific action plan for conservation of schedule I fauna shall be adhered by the management of HZL, in consultation and collaboration with local forest department, Government of Rajasthan, besides entrusting the responsibility to exclusive 'in-house expertise'.

For conservation of schedule I species in the core area, implementations are planned keeping in view the schedule I species as well as other biodiversity in the core area. These actions are elaborated in Table 30.

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Table 30 - Wildlife conservation implementations in Core area

Sr. No.	Intervention	Justification for Implementation	Location of Implementation
1	Protection wall	1.0 m high parapet walls should be installed at the edges of open wells to prevent falling of wild animals in the wells.	Open wells in the core area.
2	Herbivorous augmentation	Plantation of suitable species in the mine lease area will create habitats for schedule I as well as other species in the WCP area. The increased vegetation will also mitigate air pollution caused by particulate matter and SOx, NOx emissions from mining activities.	170.85 Ha land is dedicated to plantation. The gaps present in these plantations will be filled.
3	Boards, signages, posters on Wildlife and Human-animal conflict	Installation of biodiversity information will keep citizens always aware of the plants and animals that share residence with them and educate new visitors of existing biodiversity of Zawar mines area.	Along the roads, gardens and parks, residential areas
4	Awareness session on Biodiversity and Wildlife from Experts	Seminars and workshop conducted by experts to educate the various stakeholders in WCP area will ensure support to conservation activities and active participation from the citizens in protecting biodiversity of Zawar mine lease area.	Offices and schools in mine lease area
5	Study through WII/BNHS	Holistic study on the current status of human-animal conflict in the core area will help devise better and efficient control measures	Entire mine lease area
6	Panther population estimation	Estimation of the existing population of Leopards will help understand their distribution and plan necessary conservation measures effectively	Mine lease area
7	Artificial nest, water arrangements for birds and food arrangements for	Provision of artificial housing, habitats and food to the existing biodiversity will provide temporary support to the existing population till natural habitats	Suitable locations in the mine lease area identified by experts.

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Sr. No.	Intervention	Justification for Implementation	Location of Implementation
	vultures, Development of Waterholes, Installation of Perching Poles for Birds	are hospitable for the faunal diversity in the mine lease area.	
6	Comprehensive ecological and Biodiversity monitoring by HZL once in every 5 years and Eco development	Regular biodiversity surveys will reveal impact of the conservation action plan on the schedule I species. It will also help modify the implementations as per current status of the biodiversity in core area.	All over the mine lease area

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## 5. Chapter 5 – Implementations in Buffer area

The 7 schedule I species enlisted in Table 29 are present in buffer area. Hence, actions for their conservation are planned for the buffer zone. 4 reserve forests, namely Dingri, Kewra, Palodra and Jabla are present in the Buffer zone of the WCP area. Measure to assist management of these forests and conservation of their wildlife are included in implementation of the buffer zone. Moreover, the forest department stations are present in the buffer and their maintenance will also be included in buffer zone interventions. These interventions are explained in Table 31.

Conservation actions in buffer areas i.e. maintenance of plantation sites and plantation in gaps, supply of water for waterholes, monitoring of wildlife and watch and ward of habitats will be implemented with intervention of Forest Department. HZL will provide the financial assistance.

Table 31 - Wildlife conservation implementations in Buffer area

Sr. No.	Intervention	Justification for Implementation	Location of Implementation
1	Grassland management	Grasslands form important habitats for wildlife as well as water sinks for the entire ecosystem. Hence, the grasslands should be protected from encroachment and maintained.	Grasslands in buffer area
2	Water conservation and waterholes	Water is a scarce resource in the study area. Judicious use of water for plantation and other activities is necessary. Manmade waterholes will ensure availability of water for wildlife during dry seasons.	Suitable locations in buffer area
3	Boards, signages, posters on Wildlife and Human-animal conflict.	Installation of biodiversity information will keep citizens always aware of the plants and animals that share residence with them and educate new visitors of existing biodiversity of Zawar mines area.	Roadsides, biodiverse areas in buffer zone (like reserve forests)
4	Awareness session on Biodiversity and Wildlife by Experts	Seminars and workshop conducted by experts to educate the various stakeholders in WCP area will ensure support to conservation activities and active participation from the citizens in protecting	Schools, public meeting places in buffer zone.

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Sr. No.	Intervention	Justification for Implementation	Location of Implementation
		biodiversity of WCP area.	
5	Study through WII/BNHS	Holistic study on the current status of human-animal conflict in the core area will help devise better and efficient control measures	Entire buffer area
6	Panther population estimation	Estimation of the existing population of Leopards will help understand their distribution and plan necessary conservation measures effectively	Buffer area
4	Support forest department for the maintenance of plantation sites and plantation in gaps and supply of water for water holes and Monitoring of wildlife	Harmonious functioning of Forest department in the study area will be ensured by assistance from all stake holders in the FD territory. It will be provided in the form of Veterinary facilities, rehabilitation and provision of tranquillization guns. All these facilities will allow better caring for the rescued and captured animals.	Forest department in the Buffer
5	Amount for conservation of Reserve forest	Contribution for better equipment and methods to monitor, rescue and protect wildlife	Reserve forests in buffer zone of WCP area
6	Watch and Ward of Habitats	Habitats prepared and maintained by HZL in the buffer area will be monitored by the Forest Department, preventing and resolving any wildlife related conflicts. This function will be assisted by HZL	All over Buffer area
7	Artificial nest, water arrangement for birds and food arrangement for Vultures, Development of waterholes, installation of perching poles for birds	Provision of artificial housing, habitats and food to the existing biodiversity will provide temporary support to the existing population till natural habitats are hospitable for the faunal diversity in the mine lease area.	Suitable locations in buffer area identified by experts

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Sr. No.	Intervention	Justification for Implementation	Location of Implementation
8	Comprehensive ecological and Biodiversity monitoring by HZL once in every 5 years and Eco development	Regular biodiversity surveys will reveal impact of the conservation action plan on the schedule I species. It will also help modify the implementations as per current status of the biodiversity in core area.	Entire WCP area

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## 6. Chapter 6 – Costing

The present Wildlife Conservation Plan is prepared for 2 projects, namely 'expansion of Lead and Zinc ore production and beneficiation capacities from 1.5 Million Tonnes Per Annum (MTPA) to 4.0 MTPA' and 'expansion of the capacity 4.0 MTPA to 4.8 MTPA of Lead and Zinc ore production and beneficiation capacities from its existing underground mines'. The project costs are as follows –

Project title	Project cost
1.5 MTPA to 4 MTPA of Lead-Zinc Ore production and Ore Beneficiation	INR 1200 crore
4 MTPA to 4.8 MTPA of Lead-Zinc Ore production and Ore Beneficiation	INR 430 crore
<b>Total Cost</b>	<b>INR 1630 crore</b>

According to the SOP for the Wildlife Conservation Plan, the cost allotted for the wildlife conservation is as per the formulae –

**Formula 1: 1% of the total project cost**

**Or**

**Formula 2: 0.50% Lacs per hectare of core area (project area) + Rs. 5 Lacs for the buffer area for each schedule I species**

The financial outlay of the WCP will be the maximum of the costs derived by the above formulae.

Project cost (in Crores)	Cost as per Formula 1 (in Crores)	Cost as per Formula 2 (in Crores)
INR 1630	INR 16.30	INR 18.10 + INR 0.35 = INR 18.45

As per the SOP, greater amount of the two acquired by applying both formulae is to be dedicated for Wildlife Conservation Plan. Thus, Formula 2 i.e. amount of Rs. 18.45 Crores is allotted to the WCP implementation. As the major biodiversity is present within the mine lease area, majority of the budget is applied in the core area, with some funds allotted to support of the forest department and maintenance of reserve forests in the buffer area. The implementation of wildlife conservation plan is planned till the mine life i.e. for the duration of next 10 years (till March 2030) in 3 phases of 4 years, 3 years and 3 years. Accordingly, costing is allotted for the 3 phases, along with presentation of total cost required for the implementations for next 10 years. The total costing of Wildlife conservation interventions to be implemented in the core and buffer zones of WCP area is presented in Table 32.

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Table 32 - Total costing of wildlife conservation plan for the WCP area

Sr. No.	SOP	Activities	Cost as per percentage outlay (Rs. in Lakhs) of Total WCP cost	Core area			Buffer area			Total Cost in Buffer area
				Phase I (5 Years)	Phase II (5 Years)	Total Cost per activity	Phase I (5 Years)	Phase II (5 Years)	Total Cost per activity	
1	Habitat improvement, mitigation measures (food, water, shelter, movement, etc.) and measures to reduce/minimize the human animal conflict	1. Protection wall 2. Herbivorous augmentation 3. Grassland management 4. Water conservation and waterholes	922.50	369.00	138.37	507.37	0.00	0.00	0.00	415.13
2	Awareness and extension (Forest staff will also be invited for various activities to ensure participation)	1. Boards, signages, posters on Wildlife and Human-animal conflict. Awareness session on Biodiversity and Wildlife by Experts 2. Study through WWI/BNHS etc.	184.5	27.68	27.68	55.35	64.58	64.58	129.15	129.15



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Sr. No.	SOP	Activities	Cost as per percentage outlay (Rs. in Lakhs) of Total WCP cost	Core area			Total Cost in Core area	Buffer area			Total Cost in Buffer area
				Phase I (5 Years)	Phase II (5 Years)	Total Cost per activity		Phase I (5 Years)	Phase II (5 Years)	Total Cost per activity	
3	Support to Forest department for monitoring, rescue and rehabilitation of Wildlife (Veterinary care, animal health, rescue, tools and equipments, etc.)	1. Veterinary facilities 2. Rehabilitation centre, transitional centre 3. Tranquilization gun	184.50	0.00	0.00	0.00	0.00	92.25	92.25	184.50	184.50
4	Contribution towards conservation of wildlife in PAs (to be deposited in RPACS)	Amount for conservation of Reserve forest	184.50	0.00	0.00	0.00	0.00	92.25	92.25	184.50	184.50
5	Administrative cost for processing inspections, etc. (to be deposited in RPACS)	1. Watch and ward of habitats 2. Rescue vehicles	184.50	0.00	0.00	0.00	0.00	92.25	92.25	184.50	184.50



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Sr. No.	SOP	Activities	Cost as per percentage outlay (Rs. In Lakhs) of Total WCP cost	Core area			Total Cost In Core area	Buffer area			Total Cost in Buffer area
				Phase I (5 Years)	Phase II (5 Years)	Total Cost per activity		Phase I (5 Years)	Phase II (5 Years)	Total Cost per activity	
6	Miscellaneous Including Eco-development	Artificial nest, water arrangement for birds and food arrangement for Vultures, Development of waterholes, Installation of perching poles for birds	184.50	50.74	50.74	101.48	129.15	13.84	13.84	27.68	55.35
		13.84		13.84	27.68	13.84		13.84	27.68		
Total			1845.00	461.25	230.62	691.87	645.75	507.38	1153.13	1153.13	

Of these, some activities will be implemented in the core area, some in core as well as buffer and some only in the buffer area. Separate costing for these categories of interventions is presented in Table 33 and Table 34.



Table 33 - Costing of Interventions in Core area

Sr. No.	SOP	Activities	Core area			Total Cost in Core area
			Phase I (5 Years)	Phase II (5 Years)	Total Cost per activity	
1	Habitat improvement, mitigation measures (food, water, shelter, movement, etc.) and measures to reduce/minimize the human animal conflict	1. Protection wall 2. Herbivorous augmentation	369.00	138.37	507.37	507.37
2	Awareness and extension (Forest staff will also be invited for various activities to ensure participation)	1. Boards, signages, posters on Wildlife and Human-animal conflict. Awareness session on Biodiversity and Wildlife by Experts 2. Study through WWI/BNHS etc. 3. Panther population estimation	27.68	27.68	55.35	55.35
3	Miscellaneous including Eco-development	Artificial nest, water arrangement for birds and food arrangement for Vultures, Development of waterholes, installation of perching poles for birds Comprehensive ecological and Biodiversity monitoring by HZL once in every 5 years and Eco development	50.74	50.74	101.48	129.15
Total			461.25	230.62	691.87	691.87



Table 34 : Cost of Interventions in Buffer area

Sr. No.	SOP	Activities	Buffer area		Total Cost in Buffer area
			Phase I (5 Years)	Phase II (5 Years)	
1	Habitat improvement, mitigation measures (food, water, shelter, movement etc.) and measures to reduce/minimize the human animal conflict	3. Grassland management 4. Water conservation and waterholes	276.75	138.38	415.13
2	Awareness and extension (Forest staff will also be invited for various activities to ensure participation)	1. Boards, signages, posters on Wildlife and Human-animal conflict. Awareness session on Biodiversity and Wildlife by Experts 2. Study through WWI/BNHS etc. 3. Panther population estimation	64.58	64.58	129.15
3	Support to Forest department for monitoring, rescue and rehabilitation of Wildlife (Veterinary care, animal health, rescue, tools and equipments, etc.)	1. Veterinary facilities 2. Rehabilitation centre, transitional centre 3. Tranquilization gun	92.25	92.25	184.50
4	Contribution towards conservation of wildlife in PAs (to be deposited in RPACS)	Amount for conservation of Reserve forest	92.25	92.25	184.50
5	Administrative cost for processing inspections, etc. (to be deposited in RPACS)	1. Watch and ward of habitats 2. Rescue vehicles	92.25	92.25	184.50

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Sr. No.	SOP	Activities	Buffer area		Total Cost in Buffer area
			Phase I (5 Years)	Phase II (5 Years)	
6	Miscellaneous including Eco-development	Artificial nest, water arrangement for birds and food arrangement for Vultures, Development of waterholes, installation of perching poles for birds Comprehensive ecological and Biodiversity monitoring by HZL once in every 5 years and Eco development	13.84	13.84	27.68
Total			645.75	507.38	1153.13

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Amounts abovementioned are indicative. The costs will differ in core and buffer area as per requirements of interventions for conservation of Biodiversity in WCP area. However, HZL will ensure total expenditure of the allotted budget.

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मुख्य वन्यजीव प्रसिपालक  
राजस्थान, जयपुर

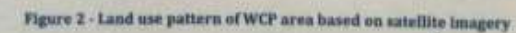






### 7.1. Wildlife conservation plan area map



  
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528  
3

AGREEMENT FOR HANDING OVER TIDI DAM TO HINDUSTAN ZINC LTD, UDAIPUR

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This agreement made this day of.....17.9.76.....  
between the Governor of State of Rajasthan (hereinafter referred to as Government which expression shall unless excluded by or repugnant to the context include his heirs, successors or assigns) of the First Part and the Hindustan Zinc Ltd., a company registered under Indian Companies Act, 1913 having its registered office at 6, New Fatehpura in the City of Udaipur, hereinafter referred to as Hindustan Zinc (which expression where context so requires include its successors, liquidators and assigns) of the other party.

Whereas the parties have agreed to the handing over of the Tidi Dam to the Hindustan Zinc Ltd., this agreement witnesseth the transfer of the Dam on the terms and conditions mentioned below:-

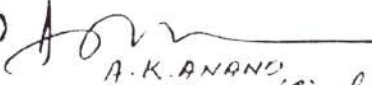

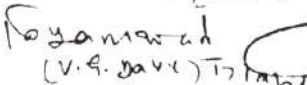
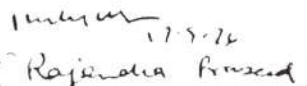
1. The State Government will charge nominal cost of water stored in the dam coming from Rajasthan State Territory from Hindustan Zinc @ Rs. 1/- per Mc.ft. as the Dam is built at their cost. The quantity of water will be calculated from the present capacity curve of the dam between highest gauge attained after rains and lowest gauge reached before next rains ignoring inflow in any other season which is rare and so negligible.
2. Hindustan Zinc will not raise the dam beyond R.L. 1407.00 as per approved scheme, without sanction of the State Government and before completing all formalities of acquiring lands in submergence.
3. In view of the stability of the dam influencing the safety of life and public property downstream, Hindustan Zinc Ltd. shall maintain the dam properly. For this purpose the Chief Engineer, Irrigation, Government of Rajasthan or his nominee shall inspect the Dam every year on 1st day of April and

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558

1st day of November and lay down instructions for safety and maintenance of the dam as are required to be complied with by the Hindustan Zinc Ltd. In the event of such instructions not being considered reasonable for compliance by Hindustan Zinc Ltd. the matter will be referred to the Central Water Commission, New Delhi, whose decision shall be final and binding.

In witness whereof the parties have signed this deed in the presence of witnesses named hereunder:-

- Witness: 1)  For and on behalf of Hindustan Zinc Limited (A Government of India Enterprise)  
A.K. ANAND  
Supt. H. Engineer (Civil)
- 2)  (Ibrahim Ali)  
S.K. Sharma  
Executive Engineer (Civil)  
Chief Engineer (Civil)  
Signed on behalf of Hindustan Zinc Limited, Udaipur
- Witness: 1)  17/9/76  
P. S. Datta  
Executive Engineer,  
Irrigation Department,  
For and on behalf of  
Governor of Rajasthan.
- 2)  17.9.76  
(Rajendra Prasad)

R/o. 25/4/07. from.  
W.R.B. of H.S.  
25/4/07.

राजस्थान सरकार  
जल संसाधन विभाग

क्रमांक- राजस्व/ 2006/ 5142

दिनांक- 21.4.07

जनरल मैनेजर,  
हिन्दुस्तान जिक लिमिटेड,  
जावर माइन्स, उदयपुर ।

विषय:- Addendum to the Existing Agreement for TIDI DAM signed between HZL & GoR in 1976

सन्दर्भ:- आपके पत्रांक HZL / ZM/ 07-08/ 23 दिनांक 08 अप्रैल 2007

महोदय,

उपरोक्त विषयान्तर्गत निवेदन है कि टीडी बॉय से हिन्दुस्तान जिक लिमिटेड द्वारा पानी लेने के लिये पूर्व वर्ष 1976 में किये गये अनुबन्ध की शर्तों में संशोधन करने हेतु अधीक्षण अभियन्ता, एवं प्रा.व. सहा. ( कार्य ) वास्ते मुख्य अभियन्ता, जल संसाधन विभाग, राजस्थान जयपुर के पत्र क्रमांक मुअजस/ टीडी/ (का) 1952 दि. 20-11-2006 से प्राप्त स्वीकृति अनुसार पूर्व अनुबन्ध में Addendum की कार्यवाही सम्पादित कर Addendum की एक छाया प्रति इस पत्र के साथ संलग्न कर वास्ते अग्रिम आवश्यक कार्यवाही प्रेषित है ।

संलग्न- उपरोक्तानुसार  
एक छाया प्रति ।

भवदीय,

अधीक्षक अभियन्ता,

जल संसाधन खण्ड, उदयपुर ।

दिनांक-

क्रमांक- राजस्व/ 2006/

प्रतिलिपि निम्न को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित है-

- 1- श्रीमान् अधीक्षण अभियन्ता, एवं प्रा.व. सहा. ( कार्य ) वास्ते मुख्य अभियन्ता, जल संसाधन विभाग, राजस्थान जयपुर को उनके पत्र क्रमांक मुअजस/ टीडी/ (का) 1952 दि. 20-11-2006 जो अतिरिक्त मुख्य अभियन्ता, जल संसाधन विभाग, उदयपुर को संबोधित है के सन्दर्भ में ।
- 2- श्रीमान् अतिरिक्त मुख्य अभियन्ता, जल संसाधन विभाग, उदयपुर को इस कार्यालय के पत्र क्र. 3677/79 दि. 29-3-2007 के क्रम में ।
- 3- श्रीमान् अधीक्षण अभियन्ता, जल संसाधन वृत्त, उदयपुर को इस कार्यालय के पत्र क्र. 3677/79 दि. 29-3-2007 एवं उनके पत्र क्र. राजस्व/ 07/ 2817-18 दि. 30-3-2007 के सन्दर्भ में ।
- 4- सहायक अभियन्ता, जल संसाधन उपखण्ड, गिरवा को इस कार्यालय के पत्र क्र. 18849-52 दि. 20-12-2006 के क्रम में प्रेषित कर लेख है कि उक्त के क्रम में टीडी बॉय से उपयोग में लिये गये जल के शुल्क का बिल नियमानुसार तैयार करा हिन्दुस्तान जिक लि. को शीघ्र भिजवाने का श्रम करे ।

संलग्न- उपरोक्तानुसार  
एक-एक छाया प्रति ।

अधीक्षक अभियन्ता,

जल संसाधन खण्ड, उदयपुर ।



राजस्थान RAJASTHAN



**ADDENDUM TO THE AGREEMENT ON TITANIUM WITH  
HINDUSTAN ZINC LIMITED UDAIPUR SIGNED & EXECUTED  
ON 17<sup>TH</sup> SEPTEMBER, 1976 IN BETWEEN (राज. ०)**

The Governor of the State of Rajasthan (hereinafter referred to as Government which expression shall unless excluded by or repugnant to the context include his heirs, successors or assigns) of the first party.

**AND**

Hindustan Zinc Limited, a company registered under the Indian Companies Act, 1956 - having its registered office at Yashad Bhawan, Udaipur (hereinafter referred to as Hindustan Zinc which expression where context so requires shall includes its successors, liquidators and assigns) of the other party.

The terms & conditions at Sl. No.1 of the agreement as signed & agreed on 17/9/1976 as amended shall remain effective in full force with effect from 20/7/2006 and the amended Para Sl. No. 1 will now read as under:


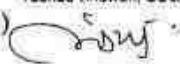
  
(K. C. Jain)  
प्रबंधक  
General Manager  
हिन्दुस्तान जिंक लि.  
Hindustan Zinc Ltd.  
बारमाइस, उदयपुर (राज.)  
Barma Mas, Udaipur (Raj.)


1. The State Government will charge nominal cost of water stored in the dam coming from Rajasthan State Territory from Hindustan Zinc @ Rs 2000/- per Mcft or as prevailing from time to time henceforth as the dam is built at their cost. The quantity of water will be calculated from the present capacity curve of the dam between highest gauge attained after rains and lowest gauge reached before next rains ignoring inflow in any other season which is rare and so negligible.

Other terms and conditions shall remain as here to before.

In witness whereof, the parties have executed and signed this deed at Udaipur this the 19<sup>th</sup> day of APRIL 2007, in the presence of witnesses named hereunder:



Witness


- 1)   
(H. PANDWAL)  
COMPANY SECRETARY  
HINDUSTAN ZINC LIMITED  
Yashad Bhawan, Udaipur
- 2)   
(B. S. Rathore)

  
(K. C. Jain)  
For and on behalf of  
Hindustan Zinc Limited  
Yashad Bhawan, Udaipur (Raj.)

General Manager  
हिन्दुस्तान जिंक लि.,  
Hindustan Zinc Ltd.,  
यशवदन, उदयपुर (राज.)  
Yashad Bhawan, Udaipur (Raj.)

Witness

- 1)   
(S. S. Chaudhary)  
सहायक अभियन्ता  
जल संसाधन उपखण्ड-गिरवा, उदयपुर
- 2)   
(M. C. Gangal)  
सहायक अभियन्ता एवं तट सहायक  
बांस्ते घाट प्राचीन अभियन्ता

  
Executive Engineer  
Water Resources Division,  
Udaipur (Raj.)  
For and on behalf of  
Governor of Rajasthan



**Annexure 12 \_ Authenticated Past Production Figures****Government of Rajasthan****Office of Mining Engineer, Udaipur Div Udaipur**

Production Details of Lease

**Name of Lessee- M/s HZL**

Mineral Lead, Zinc Silver

Near Village  
Zawar

Tehsil Sarada

Dist Udaipur

Lease  
Area

3620 Hectares

Lease No

M.L 3/89

Year	Production as per Approved Mine Plan (t)	Ore Production( t)	Ref No of Approved Mine Plan With Date	Ore Beneficiation (t)
1974-75		591865		628590
1975-76		714470		715064
1976-77		834580		808509
1977-78		940526		916924
1978-79		1090332		1145089
1979-80		986126		899580
1980-81		848936		811505
1981-82		946272		903205
1982-83		847658		837379
1983-84		1094661		1104287
1984-85		954445		965471
1985-86		989334		1014614
1986-87		1012261		1012076
1987-88		935000		935005
1988-89		1030431		1042717
1989-90		986732		970467
1990-91	4000 tpd, 12 Lac ton per Year	1045084	682(23)(103)/89- MCCM(N) UDP Dated 20.10.90	1029705
1991-92		954987		967493
1992-93		1016898		1022848
1993-94		860138		850836
1994-95		734102		725900
1995-96		755870		770030
1996-97		810000		780595
1997-98		903850		922763
1998-99		853550		873412
1999-00		864150		855517
2000-01		778100		802551
2001-02		696800		701251
2002-03		747740		746601
2003-04		851100		839000

Zawar Mines has integrated ore production and ore treatment capacity of 4000tpd ( 12 lacs tons per year) as per approved mine plan

Mining Engineer  
Department of Mines & Geology, Udaipur Div. UDAIPUR

खनि अभियन्ता

अन एवं विज्ञान विभाग

उदयपुर खण्ड, उदयपुर (रज.)

राजस्थान सरकार

कार्यालय खनि अभियन्ता, खान एवं भू विज्ञान विभाग, उदयपुर खण्ड, उदयपुर

क्रमांक: खअ/उदय/सीसी-3/एम.एल. 231/08/ 81

दिनांक: 23.12.2009

प्रमाण-पत्र

प्रमाणित किया जाता है कि सर्वश्री हिन्दुस्तान जिंक लिमिटेड, जावर के पक्ष में स्वीकृत खनन पट्टा वास्ते खनिज लेड, जिंक, सिल्वर खनन पट्टा संख्या 3/89 निकट ग्राम जावर तह. सराड़ा जिला- उदयपुर द्वारा वर्ष 2004-05 से 2008-09 में खनिज अयस्क, खनिज अयस्क का सज्जीकरण, सीसा-जस्ता सान्द्र का उत्पादन उनके द्वारा प्रस्तुत किये गये आंकड़ों के अनुसार निम्न है :-

क्र.सं.	वर्ष	खनिज अयस्क उत्पादन (मेट्रिक टन)	खनिज अयस्क का सज्जीकरण (Beneficiation) (मेट्रिक टन)	सीसा-जस्ता सान्द्र उत्पादन (मेट्रिक टन)
1	2004-05	938100	951300	87522
2	2005-06	807500	799220	74274
3	2006-07	812000	812600	71873
4	2007-08	901635	900345	81851
5	2008-09	944300	943177	74230

  
खनि अभियन्ता  
उदयपुर खण्ड, उदयपुर

राजस्थान सरकार  
कार्यालय खनिज अभियन्ता, खान एवं भू विज्ञान विभाग, उदयपुर खण्ड उदयपुर

क्रमांक: खअ/उदय/सीसी-3/एम.एल. 231/12/45 दिनांक: 26.10.2012

**प्रमाण-पत्र**

प्रमाणित किया जाता है कि मै. हिन्दुस्तान जिंक लिमिटेड खनन पट्टाधारी खनिज लेड, जिंक, सिल्वर खनन पट्टा संख्या 3/89 निकट ग्राम जावर तह. सराड़ा जिला- उदयपुर द्वारा वर्ष 2009-10 से 2011-12 में खनिज अयस्क, खनिज अयस्क का सज्जीकरण, सीसा-जस्ता सांद्र का उत्पादन उनके द्वारा प्रस्तुत किये गये आंकड़ों के अनुसार निम्नानुसार किया गया है।

व.सं.	वर्ष	खनिज अयस्क उत्पादन (मेट्रिक टन)	खनिज अयस्क का सज्जीकरण (Beneficiation) (मेट्रिक टन)	सीसा-जस्ता सांद्र उत्पादन (मेट्रिक टन)
1	2009-10	1020250	1013580	73048
2	2010-11	240550	233872	18079
3	2011-12	204150	230722	17447

23  
खाने अभियन्ता  
खान एवं भू-विज्ञान विभाग  
उदयपुर खण्ड, उदयपुर (राज.)

राजस्थान सरकार  
कार्यालय खनि अभियन्ता, खान एवं भू विज्ञान विभाग, उदयपुर खण्ड उदयपुर

क्रमांक: खअ/उदय/सांख्य/एम.एल. 3/89/ 661

दिनांक: 19.01.2015

प्रमाण-पत्र

प्रमाणित किया जाता है कि मैं, हिन्दुस्तान जिंक लिमिटेड खनन पट्टाधारी खनिज लेड, जिंक, सिल्वर खनन पट्टा संख्या 3/89 निकट ग्राम जावर तह. सराडा जिला- उदयपुर द्वारा वर्ष 2013-14 में खनिज अयस्क खनिज अयस्क का सज्जीकरण, सीसा-जस्ता सान्द्र का उत्पादन उनके द्वारा प्रस्तुत किये गये आंकड़ों के अनुसार निम्नानुसार किया गया है।

क्र.सं.	वर्ष	खनिज अयस्क उत्पादन (मेट्रिक टन)	खनिज अयस्क का सज्जीकरण (Beneficiation) (मेट्रिक टन)	सीसा-जस्ता सान्द्र उत्पादन (मेट्रिक टन)
1	2013-14	1003600	996889	69006

खनि अभियन्ता  
उदयपुर

राजस्थान सरकार  
कार्यालय खनि अभियन्ता, खान एवं भू विज्ञान विभाग, उदयपुर खण्ड उदयपुर

क्रमांक: खअ/उदय/सांख्य/एम.एल. 3/89/ 24 दिनांक: 18.05.2015

प्रमाण-पत्र

प्रमाणित किया जाता है कि मै. हिन्दुस्तान जिंक लिमिटेड खनन पट्टाधारी खनिज लेड, जिंक, सिल्वर खनन पट्टा संख्या 3/89 निकट ग्राम जावर तह. सराड़ा जिला- उदयपुर द्वारा वर्ष 2014-15 में खनिज अयस्क, खनिज अयस्क का सज्जीकरण, सीसा-जस्ता सान्द्र का उत्पादन उनके द्वारा प्रस्तुत किये गये आंकड़ों के अनुसार निम्नानुसार किया गया है।

क्र. सं.	वर्ष	खनिज अयस्क उत्पादन (मेट्रिक टन)	खनिज अयस्क का सज्जीकरण (Beneficiation) (मेट्रिक टन)	सीसा-जस्ता सान्द्र उत्पादन (मेट्रिक टन)
1	2014-15	10,56,000	10,77,142	74,186

खनि अभियन्ता  
उदयपुर



राजस्थान सरकार  
कार्यालय खनि अभियन्ता, खान एवं भू विज्ञान विभाग, उदयपुर खण्ड उदयपुर

क्रमांक: खअ/उदय/सांख्य/एम.एल. 3/89/ 63 दिनांक: 15 07.2016

प्रमाण-पत्र

प्रमाणित किया जाता है कि मै. हिन्दुस्तान जिंक लिमिटेड खनन पट्टाधारी खनिज लेड, जिंक, सिल्वर खनन पट्टा संख्या 3/89 निकट ग्राम जावर तह. सराडा जिला- उदयपुर द्वारा वर्ष 2015-16 में खनिज अयस्क, खनिज अयस्क का सञ्जीकरण, सीसा जस्ता सान्द्र का उत्पादन, कार्यालय में प्रस्तुत माहवार सांख्यिकी आंकड़ों के अनुसार निम्न है :-

क्र. सं.	वर्ष	खनिज अयस्क उत्पादन (मेट्रिक टन)	खनिज अयस्क का सञ्जीकरण (Beneficiation) (मेट्रिक टन)	सीसा जस्ता सान्द्र उत्पादन (मेट्रिक टन)
1	2015-16	13,49,850	13,27,514	1,02,988



खनि अभियन्ता  
उदयपुर

राजस्थान सरकार

कार्यालय खनि अभियन्ता, खान एवं भू विज्ञान विभाग, उदयपुर (राज.)  
क्रमांक: खअ/उदय/सांख्य/एमएल 3/1989/07 दिनांक: 30/07/2020

संशोधित प्रमाण पत्र

प्रमाणित किया जाता है कि मैसर्स हिन्दुस्तान जिंक लिमिटेड, उदयपुर के पक्ष में खनन पट्टा सख्या 3/1989 वास्ते खनिज लेड, जिंक एवं सिल्वर निकट ग्राम जावर तहसील सराडा जिला उदयपुर क्षेत्रफल 3620 हेक्टेयर अवधि दिनांक 01.04.1950 से 31.03.2030 तक वैध है।

उक्त खनन पट्टे का वर्ष 2016-17 से 2019-20 में खनिज अयस्क, खनिज अयस्क का (Beneficiation) का उत्पादन उनके द्वारा प्रस्तुत दिनांक 30.07.2020 के अनुसार पूर्व में जारी प्रमाण पत्र क्रमांक 03 दिनांक 15.07.2020 में आंशिक संशोधन करते हुये प्राप्त आंकड़ों के अनुसार संशोधित प्रमाण पत्र निम्नानुसार जारी किया जाता है:-

क्र.स.	वर्ष	खनिज अयस्कत उत्पादन (मे.टन)	खनिज अयस्क का (Beneficiation) (मे.टन)
1	2016-17	1770000.000	1457179.000
2	2017-18	2176111.000	2016815.000
3	2018-19	2832003.000	2895431.000
4	2019-20	3283832.000	3274146.000

  
खनि अभियन्ता  
उदयपुर

**प्रमाण पत्र**

प्रमाणित किया जाता है कि मैसर्स हिन्दुस्तान जिंक लिमिटेड, उदयपुर के पक्ष में खनन पट्टा सख्या 3/1989 वास्ते खनिज लेड, जिंक एवं सिल्वर निकट ग्राम जावर तहसील सराडा जिला उदयपुर क्षेत्रफल 3620 हेक्टेयर अवधि दिनांक 01.04.1950 से 31.03.2030 तक वैध है।

उक्त खनन पट्टे का वर्ष 2020-21 में खनिज अयस्क, खनिज अयस्क का (Beneficiation) का उत्पादन उनके द्वारा प्रस्तुत आंकड़ों के अनुसार प्रमाण पत्र निम्नानुसार जारी किया जाता है:-

क्र.स.	वर्ष	खनिज अयस्कत उत्पादन (मे.टन)	खनिज अयस्क का (Beneficiation) (मे.टन)
1	2020-21	3951281.000	3945313.000

  
खनि अभियन्ता,  
उदयपुर विभाग,  
उदयपुर, राजस्थान

राजस्थान सरकार  
कार्यालय खनि अभियन्ता, खण्ड उदयपुर  
खनिज भवन / Khanij Bhawan, उदयपुर Udaipur-313001  
Phone: 0294-2583356 Email ID: me.udaipur@rajasthan.gov.in  
क्रमांक : खअ/उदय/संगणक/2024-25/352 दिनांक : 28/08/2024

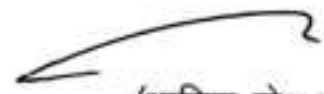
**प्रमाण-पत्र**

यह प्रमाणित किया जाता है कि मैसर्स हिन्दुस्तान जिंक लि०, उदयपुर खनन पट्टा संख्या 03/1989 वास्ते खनिज लेड-जिंक-सिल्वर, निकट ग्राम जावर, तहसील सराडा, जिला उदयपुर (राज०) क्षेत्रफल 3620 हैक्टेयर है।

उक्त खनन पट्टे में मैसर्स हिन्दुस्तान जिंक लि० द्वारा दिए गए उत्पादन महावारी सांख्यिकी आंकड़ों के अनुसार वर्ष 2021-22 से वर्ष 2023-24 तक खनिज अयस्क के (Beneficiation) उत्पादन प्रस्तुत किये गये आंकड़ों के अनुसार निम्नानुसार है :-

क्र.स.	वर्ष	खनिज अयस्क उत्पादन (मै0टनों में)	खनिज अयस्क (Beneficiation) (मै0टनों में)
1.	2021-22	4410639	4416711
2.	2022-23	4302812	4289517
3.	2023-24	4032141	4008592

  
अजीत बुहाडिया  
वरिष्ठ सहायक

  
(आसिफ मो० अंसारी)  
खनि अभियन्ता, उदयपुर

## AMBIENT AIR QUALITY

Location - 1: Village Premnagar (Block-I)

(Unit:  $\mu\text{g}/\text{m}^3$ )

DATE OF MONITORING	CLOCKHOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
01.03.2021	7.1	17.6	8.5	20	9.5	18	68.2	35.7
02.03.2021	7.7	18.8	9.5	21.5	8.3	19.4	68.9	34.4
08.03.2021	7.3	18	8.8	20.4	7.8	18.5	69.9	36.4
09.03.2021	7.6	18.5	9.3	21.2	8	18.9	66.7	37.2
15.03.2021	6.4	16.5	12.9	20.5	7.1	17.2	68.7	36.2
16.03.2021	7.8	18.9	10.7	21.8	8.1	19.2	70.3	36.8
22.03.2021	6.9	17.3	11.1	19.5	6.9	17.3	67.4	34.9
23.03.2021	8.1	19.5	10.3	22.7	8.5	19.9	69.1	36.6
29.03.2021	7.2	17.7	10.7	20.2	7.4	17.9	67.8	35.3
30.03.2021	8	19.4	10.1	22.5	8.4	19.8	74.3	36.8
05.04.2021	6.8	17.1	10	19.4	7.1	17.4	69.8	37.3
06.04.2021	7.5	18.4	9.2	21	8.1	19	76.7	37.2
12.04.2021	6.9	17.3	10.1	19.5	7.4	17.8	72.7	38.2
13.04.2021	7.8	18.9	9.7	21.8	8.4	19.5	70.2	35.7
19.04.2021	6.7	17	10.9	19.1	9	17.3	71.3	38.8
20.04.2021	7.4	18.2	9.1	20.7	9.6	18.4	74	37.5
26.04.2021	8.1	19.5	10.3	22.7	10.3	19.7	78.2	40.1
27.04.2021	7.1	17.6	10.5	20	9.5	18	69.1	39.6
03.05.2021	7.6	18.5	9.3	21.2	8.1	19	71	38.5
04.05.2021	7	17.4	8.2	19.7	7.2	17.6	70.9	32.4
10.05.2021	8.2	19.7	10.6	24.9	8.6	20.1	69.3	30.8
11.05.2021	7.3	18	11.8	20.4	7.8	18.5	67.8	35.3
17.05.2021	6.7	17	11.9	19.1	7	17.3	70.3	37.8
18.05.2021	7.8	18.9	10.7	21.8	8.1	19.2	69.5	37
24.05.2021	7.2	17.7	10.7	20.2	7.5	18	71	38.5
25.05.2021	8	19.4	10.1	22.5	8.3	19.7	65.6	39.1

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	24.9	12.9	75.2	39.8
Min.	16.5	6.4	62.3	29.6
95%tile	24.48	12.575	74.555	39.29
98%tile	24.732	12.77	74.942	39.596



# **AMBIENT AIR QUALITY**

Location - 2: Mochia Mine(Block-I)

(Unit: µg/m³)

DATEOF MONITORING	CLOCKHOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
01.03.2021	7.5	15.6	8.9	19	7.9	16	75.1	40.8
02.03.2021	8.1	16.8	9.9	19.5	8.7	17.4	79.8	36.5
08.03.2021	7.7	16	11.2	18.4	8.2	16.5	82.8	38.5
09.03.2021	8	16.5	12.7	19.2	8.4	16.9	79.6	39.3
15.03.2021	6.8	14.5	14.3	19.5	7.5	15.2	81.6	42.3
16.03.2021	8.2	16.9	13.1	19.8	8.5	17.2	79.2	38.9
22.03.2021	7.3	15.3	12.5	23.5	7.3	15.3	82.3	40
23.03.2021	8.5	17.5	13.7	24.7	8.9	17.9	79	41.7
29.03.2021	7.6	15.7	11.1	21.2	7.8	15.9	78.7	40.4
30.03.2021	8.4	17.4	10.5	22.5	8.8	17.8	81.2	36.9
05.04.2021	7.2	15.1	9.4	21.4	7.5	15.4	76.7	46.4
06.04.2021	7.9	16.4	9.6	19	8.5	17	83.6	39.3
12.04.2021	7.3	15.3	10.5	21.5	7.8	15.8	77.6	43.3
13.04.2021	8.2	16.9	10.1	19.8	8.8	17.5	85.1	40.8
19.04.2021	7.1	15	10.7	20.1	7.4	15.3	78.2	43.9
20.04.2021	7.8	16.2	9.5	18.7	8	16.4	83.9	39.6
26.04.2021	8.5	17.5	12.7	20.7	8.7	17.7	86.3	47.6
27.04.2021	7.5	15.6	10.9	21	7.9	16	76	41.7
03.05.2021	8	16.5	9.7	19.2	8.5	17	77.9	43.6
04.05.2021	7.4	15.4	10.6	23.7	7.6	15.6	71.8	37.5
10.05.2021	8.6	17.7	11	25.7	9	18.1	80.2	36.9
11.05.2021	7.7	16	9.2	18.4	8.2	16.5	84.7	35.9
17.05.2021	7.1	15	10.3	22.1	7.4	15.3	77.2	36.9
18.05.2021	8.2	16.9	12.1	19.8	8.5	17.2	70.2	36.1
24.05.2021	7.6	15.7	9.1	18.2	7.9	16	75.9	37.6
25.05.2021	8.4	17.4	10.5	20.5	8.7	17.7	72.5	38.2

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
MAX.	25.7	14.3	82.3	46.6
MIN.	14.5	6.8	68.2	32.9
95%tile	25.14	13.925	81.595	45.915
98%tile	25.476	14.15	82.018	46.326

# **AMBIENT AIR QUALITY**

Location- 3: Balaria Mine(Block-I)

(Unit: µg/m³)

DATEOF MONITORING	CLOCKHOUR							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
01.03.2021	7.3	16.3	8.7	18.7	7.7	16.7	75.1	36.2
02.03.2021	7.9	17.5	9.7	20.2	8.5	18.1	70.8	31.9
08.03.2021	7.5	16.7	11	19.1	8	17.2	72.8	33.9
09.03.2021	7.8	17.2	12.5	19.9	8.2	17.6	73.6	34.7
15.03.2021	6.6	15.2	13.8	12.5	7.3	15.9	75.6	36.7
16.03.2021	8	17.6	11.9	20.5	8.3	17.9	73.2	34.3
22.03.2021	7.1	16	11.3	20.2	7.1	16	74.3	35.4
23.03.2021	8.3	18.2	10.5	21.4	8.7	18.6	76	37.1
29.03.2021	7.4	16.4	8.9	18.9	7.6	16.6	74.7	35.8
30.03.2021	8.2	18.1	10.3	21.2	8.6	18.5	71.2	40.3
05.04.2021	7	15.8	8.2	18.1	7.3	16.1	76.7	37.8
06.04.2021	7.7	17.1	9.4	19.7	8.3	17.7	73.6	39.7
12.04.2021	7.1	16	8.3	18.2	7.6	16.5	77.6	38.7
13.04.2021	8	17.6	9.9	20.5	8.6	18.2	75.1	38.2
19.04.2021	6.9	15.7	8.1	17.8	7.2	16	78.2	39.3
20.04.2021	7.6	16.9	9.3	19.4	7.8	17.1	73.9	40
26.04.2021	8.3	18.2	10.5	21.4	8.5	18.4	81.8	42.1
27.04.2021	7.3	16.3	8.7	18.7	7.7	16.7	76	39.1
03.05.2021	7.8	17.2	9.5	19.9	8.3	17.7	77.9	39
04.05.2021	7.2	16.1	8.4	23.4	7.4	16.3	71.8	32.9
10.05.2021	8.4	18.4	10.8	27.1	8.8	18.8	70.2	31.3
11.05.2021	7.5	16.7	9	25.1	8	17.2	74.7	35.8
17.05.2021	6.9	15.7	8.1	22.8	7.2	16	77.2	38.3
18.05.2021	8	17.6	9.9	20.5	8.3	17.9	70.4	31.5
24.05.2021	7.4	16.4	8.9	18.9	7.7	16.7	77.9	39
25.05.2021	8.2	18.1	10.3	21.2	8.5	18.4	72.5	33.6

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
MAX.	27.1	13.8	74.6	40.1
MIN.	15.2	6.6	62.1	30.3
95%tile	26.505	13.44	73.975	39.61
98%tile	26.862	13.656	74.35	39.904

# **AMBIENT AIR QUALITY**

Location – 4: Baroi Mine(Block-I)

(Unit: µg/m³)

DATEOF MONITORING	CLOCKHOURS							
	00–08		08–16		16–24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
01.03.2021	8	16	9.4	18.4	8.4	16.4	77.2	39.7
02.03.2021	8.6	17.2	10.4	19.9	9.2	17.8	72.9	35.4
08.03.2021	8.2	16.4	9.7	18.8	8.7	16.9	74.9	37.4
09.03.2021	8.5	16.9	10.2	19.6	8.9	17.3	75.7	38.2
15.03.2021	7.3	14.9	14.5	22.5	8	15.6	77.7	40.2
16.03.2021	8.7	17.3	10.6	20.2	9	17.6	75.3	37.8
22.03.2021	7.8	15.7	9	17.9	7.8	15.7	76.4	38.9
23.03.2021	9	17.9	11.2	21.1	9.4	18.3	78.1	40.6
29.03.2021	8.1	16.1	9.6	18.6	8.3	16.3	76.8	39.3
30.03.2021	8.9	17.8	11	20.9	9.3	18.2	73.3	35.8
05.04.2021	7.7	15.5	8.9	21.8	8	15.8	78.8	41.3
06.04.2021	8.4	16.8	10.1	19.4	9	17.4	75.7	38.2
12.04.2021	7.8	15.7	9	21.9	8.3	16.2	79.7	42.2
13.04.2021	8.7	17.3	10.6	20.2	9.3	17.9	77.2	39.7
19.04.2021	7.6	15.4	8.8	21.5	7.9	15.7	80.3	42.8
20.04.2021	8.3	16.6	10	19.1	8.5	16.8	81	44.5
26.04.2021	9	17.9	11.2	21.1	9.2	18.1	84.7	46.5
27.04.2021	8	16	9.4	18.4	8.4	16.4	82.1	40.6
03.05.2021	8.5	16.9	10.2	19.6	9	17.4	80	42.5
04.05.2021	7.9	15.8	9.1	22.1	8.1	16	73.9	36.4
10.05.2021	9.1	18.1	11.5	26.3	9.5	18.5	72.3	34.8
11.05.2021	8.2	16.4	9.7	24.8	8.7	16.9	76.8	39.3
17.05.2021	7.6	15.4	8.8	21.5	7.9	15.7	79.3	41.8
18.05.2021	8.7	17.3	10.6	20.2	9	17.6	75.5	39
24.05.2021	8.1	16.1	9.6	18.6	8.4	16.4	80	38.5
25.05.2021	8.9	17.8	11	20.9	9.2	18.1	74.6	37.1

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	26.3	14.5	78.9	42.5
Min.	14.9	7.3	66.3	33.8
95%tile	25.73	14.14	78.27	42.065
98%tile	26.072	14.356	78.648	42.326

# **AMBIENT AIR QUALITY**

Location -5: ZawarMala Mine(Block-I)

(Unit: µg/m<sup>3</sup>)

DATEOF MONITORING	CLOCKHOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
01.03.2021	7.8	17.1	9.2	19.5	8.2	17.5	81	39.9
02.03.2021	8.4	18.3	10.2	21	9	18.9	76.7	35.6
08.03.2021	8	17.5	9.5	19.9	8.5	18	78.7	37.6
09.03.2021	8.3	18	10	20.7	8.7	18.4	79.5	38.4
15.03.2021	7.1	16	14.5	19.5	7.8	16.7	81.5	40.4
16.03.2021	8.5	18.4	15.6	21.3	8.8	18.7	79.1	38
22.03.2021	7.6	16.8	12.8	24	7.6	16.8	80.2	39.1
23.03.2021	8.8	19	11	27.9	9.2	19.4	81.9	40.8
29.03.2021	7.9	17.2	9.4	25.7	8.1	17.4	80.6	39.5
30.03.2021	8.7	18.9	10.8	22	9.1	19.3	77.1	36
05.04.2021	7.5	16.6	9.7	18.9	7.8	16.9	82.6	41.5
06.04.2021	8.2	17.9	9.9	20.5	8.8	18.5	79.5	38.4
12.04.2021	7.6	16.8	8.8	19	8.1	17.3	83.5	42.4
13.04.2021	8.5	18.4	10.4	21.3	9.1	19	81	39.9
19.04.2021	7.4	16.5	8.9	18.6	7.7	16.8	84.1	43
20.04.2021	8.1	17.7	9.8	20.2	8.3	17.9	86.8	45.9
26.04.2021	8.8	19	11	26.2	9	19.2	84.4	43.3
27.04.2021	7.8	17.1	9.2	22.5	8.2	17.5	81.9	40.8
03.05.2021	8.3	18	10	20.7	8.8	18.5	83.8	42.7
04.05.2021	7.7	16.9	8.9	19.2	7.9	17.1	77.7	36.6
10.05.2021	8.9	19.2	11.3	22.5	9.3	19.6	76.1	35
11.05.2021	8	17.5	9.5	19.9	8.5	18	80.6	39.5
17.05.2021	7.4	16.5	10.8	18.6	7.7	16.8	83.1	42
18.05.2021	8.5	18.4	10.4	21.3	8.8	18.7	76.3	35.2
24.05.2021	7.9	17.2	9.4	19.7	8.2	17.5	83.8	42.7
25.05.2021	8.7	18.9	10.8	22	9	19.2	78.4	37.3

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	27.9	15.6	81.8	44.9
Min.	16.0	7.1	67.1	35
95%tile	27.305	15.175	81.065	44.405
98%tile	27.662	15.43	81.506	44.702

# **AMBIENT AIR QUALITY**

Location - 6: Village Jawar

(Unit: µg/m<sup>3</sup>)

DATE OF MONITORING	CLOCKHOURS							
	00-08		08-16		16-24		2 4	2 4
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
03.03.2021	6.5	17.4	7.9	19.8	6.9	17.8	67.6	34.9
04.03.2021	7.1	18.6	8.9	21.3	7.7	19.2	63.3	30.6
10.03.2021	6.7	17.8	9.2	20.2	7.2	18.3	65.3	32.6
11.03.2021	7	18.3	11.7	21	7.4	18.7	66.1	33.4
17.03.2021	5.8	16.3	12.4	22.5	6.5	17	68.1	35.4
18.03.2021	7.2	18.7	9.1	21.6	7.5	19	65.7	33
24.03.2021	6.3	17.1	8.5	19.3	6.3	17.1	66.8	34.1
25.03.2021	7.5	19.3	9.7	22.5	7.9	19.7	68.5	35.8
31.03.2021	6.6	17.5	8.1	20	6.8	17.7	67.2	34.5
01.04.2021	7.4	19.2	9.5	22.3	7.8	19.6	63.7	31
07.04.2021	6.2	16.9	8.4	23.2	6.5	17.2	69.2	36.5
08.04.2021	6.9	18.2	8.6	26	7.5	18.8	66.1	33.4
14.04.2021	6.3	17.1	8.5	24.3	6.8	17.6	70.1	37.4
15.04.2021	7.2	18.7	9.1	21.6	7.8	19.3	67.6	34.9
21.04.2021	6.1	16.8	8.3	18.9	6.4	17.1	70.7	38
22.04.2021	6.8	18	8.5	20.5	7	18.2	69.4	33.7
28.04.2021	7.5	19.3	9.7	22.5	7.7	19.5	74.1	40.4
29.04.2021	6.5	17.4	7.9	19.8	6.9	17.8	72.5	38.3
05.05.2021	7	18.3	8.7	21	7.5	18.8	70.4	37.7
06.05.2021	6.4	17.2	9.6	19.5	6.6	17.4	64.3	31.6
12.05.2021	7.6	19.5	10	22.8	8	19.9	62.7	30
13.05.2021	6.7	17.8	8.2	20.2	7.2	18.3	67.2	34.5
19.05.2021	6.1	16.8	8.3	18.9	6.4	17.1	69.7	37
20.05.2021	7.2	18.7	9.1	21.6	7.5	19	62.9	30.2
26.05.2021	6.6	17.5	8.1	20	6.9	17.8	70.4	37.7
27.05.2021	7.4	19.2	9.5	22.3	7.7	19.5	65	32.3

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>Max.</b>	26.0	12.4	74.1	40.4
<b>Min</b>	16.3	5.8	62.7	30.0
<b>95%tile</b>	25.515	12.07	73.53	39.88
<b>98%tile</b>	25.806	12.268	73.872	40.192



# **AMBIENT AIR QUALITY**

Location- 7: CPP

(Unit: µg/m³)

DATE OF MONITORING	CLOCKHOURS							
	00-08		08-16		16- 24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
03.03.2021	9.6	20.9	11	23.3	10	21.3	82.2	41.3
04.03.2021	10.2	22.1	12	24.8	10.8	22.7	77.9	37
10.03.2021	9.8	21.3	11.3	23.7	10.3	21.8	79.9	39
11.03.2021	10.1	21.8	15.8	24.5	10.5	22.2	80.7	39.8
17.03.2021	8.9	19.8	14.5	22.5	9.6	20.5	82.7	41.8
18.03.2021	10.3	22.2	17.7	25.1	10.6	22.5	80.3	39.4
24.03.2021	9.4	20.6	16.6	22.8	9.4	20.6	81.4	40.5
25.03.2021	10.6	22.8	14.8	26	11	23.2	83.1	42.2
31.03.2021	9.7	21	13.2	23.5	9.9	21.2	81.8	40.9
01.04.2021	10.5	22.7	12.6	25.8	10.9	23.1	78.3	37.4
07.04.2021	9.3	20.4	10.5	22.7	9.6	20.7	83.8	42.9
08.04.2021	10	21.7	11.7	24.3	10.6	22.3	80.7	39.8
14.04.2021	9.4	20.6	10.9	22.8	9.9	21.1	84.7	43.8
15.04.2021	10.3	22.2	12.2	25.1	10.9	22.8	82.2	41.3
21.04.2021	9.2	20.3	10.7	22.4	9.5	20.6	85.3	44.4
22.04.2021	9.9	21.5	11.6	24	10.1	21.7	81	40.1
28.04.2021	10.6	22.8	12.8	26	10.8	23	85.6	44.7
29.04.2021	9.6	20.9	11	27.3	10	21.3	88.6	49.8
05.05.2021	10.1	21.8	11.8	28.5	10.6	22.3	85	47.1
06.05.2021	9.5	20.7	10.7	30.2	9.7	20.9	82.9	42
12.05.2021	10.7	23	13.1	26.3	11.1	23.4	77.3	39.4
13.05.2021	9.8	21.3	11.3	25.7	10.3	21.8	81.8	40.9
19.05.2021	9.2	20.3	10.9	22.4	9.5	20.6	84.3	43.4
20.05.2021	10.3	22.2	12.2	25.1	10.6	22.5	77.5	36.4
26.05.2021	9.7	21	11.2	23.5	10	21.3	85	37.1
27.05.2021	10.5	22.7	12.6	25.8	10.8	23	79.6	38.7

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>Max.</b>	30.2	17.7	84.6	46.8
<b>Min.</b>	19.8	8.9	71.3	36.4
<b>95%tile</b>	29.68	17.26	83.935	46.28
<b>98%tile</b>	29.992	17.524	84.334	46.592

# **AMBIENT AIR QUALITY**

Location - 8: Mine Site Bara (Block III)

(Unit: µg/m³)

DATE OF MONITORING	CLOCKHOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
03.03.2021	7.2	16.3	8.6	18.7	7.6	16.7	73.4	36.7
04.03.2021	7.8	17.5	9.6	20.2	8.4	18.1	69.1	32.4
10.03.2021	7.4	16.7	8.9	19.1	7.9	17.2	71.1	34.4
11.03.2021	7.7	17.2	11.4	19.9	8.1	17.6	71.9	35.2
17.03.2021	6.5	15.2	13.8	12.5	7.2	15.9	73.9	37.2
18.03.2021	7.9	17.6	9.8	20.5	8.2	17.9	71.5	34.8
24.03.2021	7	16	8.7	18.2	7	16	72.6	35.9
25.03.2021	8.2	18.2	10.4	21.4	8.6	18.6	74.3	37.6
31.03.2021	7.3	16.4	8.8	24.6	7.5	16.6	73	36.3
01.04.2021	8.1	18.1	10.2	21.2	8.5	18.5	69.5	32.8
07.04.2021	6.9	15.8	8.7	18.1	7.2	16.1	75	38.3
08.04.2021	7.6	17.1	9.3	19.7	8.2	17.7	71.9	35.2
14.04.2021	7	16	8.9	18.2	7.5	16.5	75.9	39.2
15.04.2021	7.9	17.6	9.8	20.5	8.5	18.2	73.4	36.7
21.04.2021	6.8	15.7	8.8	22.8	7.1	16	76.5	39.8
22.04.2021	7.5	16.9	9.2	19.4	7.7	17.1	72.2	35.5
28.04.2021	8.2	18.2	10.4	21.4	8.4	18.4	76.8	37.6
29.04.2021	7.2	16.3	8.6	18.7	7.6	16.7	78.9	39.7
05.05.2021	7.7	17.2	9.4	19.9	8.2	17.7	76.2	37.4
06.05.2021	7.1	16.1	8.3	18.4	7.3	16.3	70.1	33.4
12.05.2021	8.3	18.4	10.7	21.7	8.7	18.8	68.5	31.8
13.05.2021	7.4	16.7	8.9	19.1	7.9	17.2	73	36.3
19.05.2021	6.8	15.7	8.9	17.8	7.1	16	75.5	38.8
20.05.2021	7.9	17.6	9.8	20.5	8.2	17.9	68.7	32
26.05.2021	7.3	16.4	8.8	18.9	7.6	16.7	76.2	39.5
27.05.2021	8.1	18.1	10.2	21.2	8.4	18.4	70.8	34.1

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	24.6	13.8	78.9	39.7
Min.	15.2	6.5	68.5	31.8
95%tile	24.13	13.435	78.38	39.305
98%tile	24.412	13.654	78.692	39.542

# **AMBIENT AIR QUALITY**

Location- 9: Singatwara

(Unit: µg/m³)

DATE OF MONITORING	CLOCKHOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
03.03.2021	7.2	16.3	8.6	18.7	7.6	16.7	73.4	36.7
04.03.2021	7.8	17.5	9.6	20.2	8.4	18.1	69.1	32.4
10.03.2021	7.4	16.7	8.9	19.1	7.9	17.2	71.1	34.4
11.03.2021	7.7	14.2	11.2	19.9	8.1	17.6	71.9	35.2
17.03.2021	6.3	13.7	10.8	21.4	7.2	15.9	73.9	37.2
18.03.2021	7.9	15.6	9.8	20.5	8.2	17.9	71.5	34.8
24.03.2021	7	16	8.7	18.2	7	16	72.6	35.9
25.03.2021	8.2	18.2	10.4	21.4	8.6	18.6	74.3	37.6
31.03.2021	7.3	16.4	8.8	21.4	7.5	16.6	73	36.3
01.04.2021	8.1	18.1	10.2	21.2	8.5	18.5	69.5	32.8
07.04.2021	6.9	15.8	8.7	18.1	7.2	16.1	75	38.3
08.04.2021	7.6	17.1	9.3	19.7	8.2	17.7	71.9	35.2
14.04.2021	7	16	8.9	18.2	7.5	16.5	75.9	29.4
15.04.2021	7.9	17.6	9.8	20.5	8.5	18.2	73.4	32.7
21.04.2021	6.8	15.7	8.8	21.4	7.1	16	76.5	38.6
22.04.2021	7.5	16.9	9.2	19.4	7.7	17.1	72.2	35.5
28.04.2021	8.2	18.2	10.4	21.4	8.4	18.4	76.7	38.8
29.04.2021	7.2	16.3	8.6	18.7	7.6	16.7	75.9	37.6
05.05.2021	7.7	17.2	9.4	19.9	8.2	17.7	76.2	38.5
06.05.2021	7.1	16.1	8.3	18.4	7.3	16.3	70.1	33.4
12.05.2021	8.3	18.4	10.7	20.7	8.7	18.8	62.4	31.8
13.05.2021	7.4	16.7	8.9	19.1	7.9	17.2	67	36.3
19.05.2021	6.8	15.7	8.9	17.8	7.1	16	68.7	29.8
20.05.2021	7.9	17.6	9.8	20.5	8.2	17.9	72	32
26.05.2021	7.3	16.4	8.8	18.9	7.6	16.7	76.2	38.8
27.05.2021	8.1	18.1	10.2	21.2	8.4	18.4	70.8	34.1

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	21.4	11.2	76.7	38.8
Min.	13.7	6.3	62.4	29.4
95%tile	21.015	10.955	75.985	38.33
98%tile	21.246	11.102	76.414	38.612

# AMBIENT AIR QUALITY

Location- 10: kalipipli

(Unit: µg/m³)

DATE OF MONITORING	CLOCKHOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
03.03.2021	7.5	18.7	8.9	21.1	7.9	19.1	74.7	37.1
04.03.2021	8.1	19.9	9.9	22.6	8.7	20.5	70.4	32.8
10.03.2021	7.7	19.1	9.2	21.5	8.2	19.6	72.4	34.8
11.03.2021	8	19.6	9.7	22.3	8.4	20	73.2	35.6
17.03.2021	6.8	17.6	14.5	21.5	7.5	18.3	75.2	37.6
18.03.2021	8.2	20	15.3	22.9	8.5	20.3	82.8	35.2
24.03.2021	7.3	18.4	13.5	21.6	7.3	18.4	79.9	36.3
25.03.2021	8.5	20.6	10.7	23.8	8.9	21	75.6	38
31.03.2021	7.6	18.8	10.1	21.3	7.8	19	74.3	36.7
01.04.2021	8.4	20.5	10.5	23.6	8.8	20.9	80.8	33.2
07.04.2021	7.2	18.2	9.4	21.5	7.5	18.5	76.3	38.7
08.04.2021	7.9	19.5	9.6	22.1	8.5	20.1	73.2	35.6
14.04.2021	7.3	18.4	10.5	23.6	7.8	18.9	77.2	39.6
15.04.2021	8.2	20	10.1	22.9	8.8	20.6	74.7	37.1
21.04.2021	7.1	18.1	9.7	20.9	7.4	18.4	77.8	40.2
22.04.2021	7.8	19.3	9.5	21.8	8	19.5	83.5	43
28.04.2021	8.5	20.6	10.7	23.8	8.7	20.8	78.1	41.5
29.04.2021	7.5	18.7	8.9	21.1	7.9	19.1	85.1	43.5
05.05.2021	8	19.6	9.7	22.3	8.5	20.1	82.5	39.9
06.05.2021	7.4	18.5	10.6	21.8	7.6	18.7	79.4	37.8
12.05.2021	8.6	20.8	11	24.1	9	20.2	79.8	32.2
13.05.2021	7.7	19.1	9.2	28.7	8.2	19.6	74.3	36.7
19.05.2021	7.1	18.1	9.3	25.2	7.4	18.4	76.8	39.2
20.05.2021	8.2	20	10.1	22.9	8.5	20.3	77.5	32.4
26.05.2021	7.6	18.8	9.1	21.3	7.9	19.1	72.1	39.9
27.05.2021	8.4	20.5	10.5	23.6	8.7	20.8	69.8	34.5

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	28.7	15.3	82.1	41.5
Min.	17.6	6.8	65.8	32.2
95%tile	28.145	14.875	81.285	41.035
98%tile	28.478	15.13	81.774	41.314

# AMBIENT AIR QUALITY

Location- 11: Kanpur

(Unit: µg/m³)

DATE OF MONITORING	CLOCKHOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
05.03.2021	6.8	15.2	8.2	17.6	7.2	15.6	68.7	32.5
06.03.2021	7.4	16.4	9.2	19.1	8	17	64.4	28.2
12.03.2021	7	15.6	8.5	18	7.5	16.1	66.4	30.2
13.03.2021	7.3	16.1	9	18.8	7.7	16.5	67.2	31
19.03.2021	6.1	14.1	11.6	20.5	6.8	14.8	69.2	33
20.03.2021	7.5	16.5	9.4	19.4	7.8	16.8	66.8	30.6
26.03.2021	6.6	14.9	8.8	18.1	6.6	14.9	67.9	31.7
27.03.2021	7.8	17.1	10	20.3	8.2	17.5	69.6	33.4
02.04.2021	6.9	15.3	8.4	22.3	7.1	15.5	68.3	32.1
03.04.2021	7.7	17	9.8	20.1	8.1	17.4	64.8	28.6
09.04.2021	6.5	14.7	8.7	18.9	6.8	15	70.3	34.1
10.04.2021	7.2	16	8.9	18.6	7.8	16.6	67.2	31
16.04.2021	6.6	14.9	8.8	18.1	7.1	15.4	71.2	35
17.04.2021	7.5	16.5	9.4	19.4	8.1	17.1	68.7	32.5
23.04.2021	6.4	14.6	8.6	19.7	6.7	14.9	71.8	35.1
24.04.2021	7.1	15.8	8.8	18.3	7.3	16	67.5	31.3
30.04.2021	7.8	17.1	10	20.3	8	17.3	72.1	35.3
01.05.2021	6.8	15.2	8.2	17.6	7.2	15.6	74.7	35.4
07.05.2021	7.3	16.1	9	18.8	7.8	16.6	71.5	33.4
08.05.2021	6.7	15	9.9	17.3	6.9	15.2	65.4	29.2
14.05.2021	7.9	17.3	10.3	20.6	8.3	17.7	63.8	27.6
15.05.2021	7	15.6	8.5	18	7.5	16.1	68.3	32.1
21.05.2021	6.4	14.6	8.6	19.7	6.7	14.9	70.8	34.6
22.05.2021	7.5	16.5	9.4	19.4	7.8	16.8	64	29.8
28.05.2021	6.9	15.3	8.4	17.8	7.2	15.6	71.5	35.3
29.05.2021	7.7	17	9.8	20.1	8	17.3	66.1	29.9

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	22.3	11.6	74.7	35.4
Min.	14.1	6.1	63.8	27.6
95%tile	21.89	11.325	74.155	35.01
98%tile	22.136	11.49	74.482	35.244



# **AMBIENT AIR QUALITY**

Location- 12: Kevra Khurd

(Unit: µg/m³)

DATE OF MONITORING	CLOCKHOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
05.03.2021	7.3	16	8.7	18.9	7.7	19.4	69.9	36.4
06.03.2021	7.9	17.2	9.7	19.9	8.5	17.8	65.6	32.1
12.03.2021	7.5	16.4	9	18.8	8	16.9	67.6	34.1
13.03.2021	7.8	16.9	10.5	19.6	8.2	17.3	68.4	34.9
19.03.2021	6.6	14.9	12.7	20.5	7.3	15.6	70.4	36.9
20.03.2021	8	17.3	9.9	20.2	8.3	17.6	68	34.5
26.03.2021	7.1	15.7	8.9	19.9	7.1	15.7	69.1	35.6
27.03.2021	8.3	17.9	10.5	21.1	8.7	18.3	70.8	37.3
02.04.2021	7.4	16.1	8.9	18.6	7.6	16.3	69.5	36
03.04.2021	8.2	17.8	10.3	20.9	8.6	18.2	66	32.5
09.04.2021	7	15.5	8.9	18.8	7.3	15.8	71.5	38
10.04.2021	7.7	16.8	9.4	19.4	8.3	17.4	68.4	34.9
16.04.2021	7.1	15.7	8.9	18.9	7.6	16.2	72.4	38.9
17.04.2021	8	17.3	9.9	20.2	8.6	17.9	69.9	36.4
23.04.2021	6.9	15.4	8.9	18.5	7.2	15.7	73	39.5
24.04.2021	7.6	16.6	9.3	19.1	7.8	16.8	68.7	35.2
30.04.2021	8.3	17.9	10.5	21.1	8.5	18.1	73.3	39.8
01.05.2021	7.3	16	8.7	18.8	7.7	16.4	78.9	40.2
07.05.2021	7.8	16.9	9.5	19.6	8.3	17.4	72.7	39.2
08.05.2021	7.2	15.8	8.7	23.8	7.4	16	66.6	33.1
14.05.2021	8.4	18.1	10.8	21.4	8.8	18.5	65	31.5
15.05.2021	7.5	16.4	9	18.8	8	16.9	69.5	36
21.05.2021	6.9	15.4	8.8	19.5	7.2	15.7	72	38.5
22.05.2021	8	17.3	9.9	20.2	8.3	17.6	65.2	31.7
28.05.2021	7.4	16.1	8.9	18.6	7.7	16.4	72.7	39.2
29.05.2021	8.2	17.8	10.3	20.9	8.5	18.1	67.3	33.8

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>Max.</b>	23.8	12.7	78.9	40.2
<b>Min.</b>	14.9	6.6	65.0	31.5
<b>95%tile</b>	23.355	12.395	78.205	39.765
<b>98%tile</b>	23.355	12.395	78.205	39.765

# **AMBIENT AIR QUALITY**

Location- 13: Nangela

(Unit: µg/m³)

DATE OF MONITORING	CLOCKHOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
05.03.2021	6.2	14.7	7.6	17.1	6.6	15.1	59.8	31.1
06.03.2021	6.8	15.9	8.6	18.6	7.4	16.5	55.5	26.8
12.03.2021	6.4	15.1	7.9	17.5	6.9	15.6	57.5	28.8
13.03.2021	6.7	15.6	8.4	18.3	7.1	16	58.3	29.6
19.03.2021	5.5	13.6	10.3	20	6.8	14.3	60.3	31.6
20.03.2021	6.9	16	8.8	18.9	7.2	16.3	57.9	29.2
26.03.2021	6	14.4	7.9	16.6	6.9	14.4	59	30.3
27.03.2021	7.2	16.6	9.4	19.8	7.6	17	60.7	32
02.04.2021	6.3	14.8	7.8	17.3	6.5	15	59.4	30.7
03.04.2021	7.1	16.5	9.2	19.6	7.5	16.9	55.9	27.2
09.04.2021	5.9	14.2	7.9	16.5	6.7	14.5	61.4	32.7
10.04.2021	6.6	15.5	8.3	18.1	7.2	16.1	58.3	29.6
16.04.2021	6	14.4	9.2	16.6	6.5	14.9	62.3	33.6
17.04.2021	6.9	16	8.8	18.9	7.5	16.6	59.8	31.1
23.04.2021	5.8	14.1	7.8	18.7	7.1	14.4	62.9	34.2
24.04.2021	6.5	15.3	8.2	17.8	6.7	15.5	58.6	29.9
30.04.2021	7.2	16.6	9.4	19.8	7.4	16.8	63.2	33.7
01.05.2021	6.2	14.7	7.6	17.1	6.6	15.1	67.3	34.3
07.05.2021	6.7	15.6	8.4	18.3	7.2	16.1	62.6	32.9
08.05.2021	6.1	14.5	7.4	16.8	6.3	14.7	56.5	27.8
14.05.2021	7.3	16.8	9.7	20.3	7.7	17.2	54.9	26.2
15.05.2021	6.4	15.1	7.9	17.5	6.9	15.6	59.4	30.7
21.05.2021	5.8	14.1	7.8	16.7	6.8	14.4	61.9	33.2
22.05.2021	6.9	16	8.8	18.9	7.2	16.3	55.1	26.4
28.05.2021	6.3	14.8	7.8	17.3	6.6	15.1	62.6	33.9
29.05.2021	7.1	16.5	9.2	19.6	7.4	16.8	57.2	28.5

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>Max.</b>	20.3	10.3	67.3	34.3
<b>Min.</b>	13.6	5.5	54.9	26.2
<b>95%tile</b>	19.965	10.06	66.68	33.895
<b>98%tile</b>	20.166	10.204	67.052	34.138

# **AMBIENT AIR QUALITY**

Location- 14: Dewala

(Unit: µg/m³)

DATE OF MONITORING	CLOCKHOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
05.03.2021	6.7	14.1	8.1	16.5	7.1	14.5	68	33.9
06.03.2021	7.3	15.3	9.1	18	7.9	15.9	63.7	29.6
12.03.2021	6.9	14.5	8.4	16.9	7.4	15	65.7	31.6
13.03.2021	7.2	15	8.9	17.7	7.6	15.4	66.5	32.4
19.03.2021	6	13	11.9	20.5	6.7	13.7	68.5	34.4
20.03.2021	7.4	15.4	9.3	18.3	7.7	15.7	66.1	32
26.03.2021	6.5	13.8	8.7	18	6.5	13.8	67.2	33.1
27.03.2021	7.7	16	9.9	19.2	8.1	16.4	68.9	34.8
02.04.2021	6.8	14.2	8.3	16.7	7	14.4	67.6	33.5
03.04.2021	7.6	15.9	9.7	19	8	16.3	64.1	32
09.04.2021	6.4	13.6	8.6	17.9	6.7	13.9	69.6	35.5
10.04.2021	7.1	14.9	8.8	17.5	7.7	15.5	66.5	32.4
16.04.2021	6.5	13.8	8	18	7	14.3	70.5	36.4
17.04.2021	7.4	15.4	9.3	18.3	8	16	68	33.9
23.04.2021	6.3	13.5	8.5	17.6	6.6	13.8	71.1	37
24.04.2021	7	14.7	8.7	17.2	7.2	14.9	69.8	32.7
30.04.2021	7.7	16	9.9	23.3	7.9	16.2	76	38.6
01.05.2021	6.7	14.1	8.1	19.5	7.1	14.5	74.9	36.8
07.05.2021	7.2	15	8.9	17.7	7.7	15.5	70.8	34.7
08.05.2021	6.6	13.9	8	16.8	6.8	14.1	64.7	30.6
14.05.2021	7.8	16.2	10.2	19.5	8.2	16.6	63.1	29
15.05.2021	6.9	14.5	8.4	16.9	7.4	15	67.6	33.5
21.05.2021	6.3	13.5	7.9	17.6	6.6	13.8	70.1	36
22.05.2021	7.4	15.4	9.3	18.3	7.7	15.7	63.3	29.2
28.05.2021	6.8	14.2	8.3	16.7	7.1	14.5	70.8	36.7
29.05.2021	7.6	15.9	9.7	19	7.9	16.2	65.4	31.3

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>Max.</b>	23.3	11.9	76.0	38.6
<b>Min.</b>	13.0	6.0	63.1	29.0
<b>95%tile</b>	22.785	11.605	75.355	38.12
<b>98%tile</b>	23.094	11.782	75.742	38.408

# **AMBIENT AIR QUALITY**

Location- 15: Moridungri

(Unit: µg/m³)

DATE OF MONITORING	CLOCKHOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
05.03.2021	7.1	15.9	8.5	18.3	7.5	16.3	72.4	36.6
06.03.2021	7.7	17.1	9.5	19.8	8.3	17.7	68.1	32.3
12.03.2021	7.3	16.3	8.8	18.7	7.8	16.8	70.1	34.3
13.03.2021	7.6	16.8	9.3	19.5	8	17.2	70.9	35.1
19.03.2021	6.4	14.8	11.8	20.5	7.1	15.5	72.9	37.1
20.03.2021	7.8	17.2	9.7	20.1	8.1	17.5	70.5	34.7
26.03.2021	6.9	15.6	8.8	19.8	6.9	15.6	71.6	35.8
27.03.2021	8.1	17.8	10.3	21	8.5	18.2	73.3	37.5
02.04.2021	7.2	16	8.7	18.5	7.4	16.2	72	36.2
03.04.2021	8	17.7	10.1	20.8	8.4	18.1	68.5	32.7
09.04.2021	6.8	15.4	8.6	18.7	7.1	15.7	74	32
10.04.2021	7.5	16.7	9.2	19.3	8.1	17.3	70.9	35.1
16.04.2021	6.9	15.6	8.7	18.8	7.4	16.1	74.9	37.1
17.04.2021	7.8	17.2	9.7	20.1	8.4	17.8	72.4	36.6
23.04.2021	6.7	15.3	8.9	18.4	7	15.6	75.5	35.7
24.04.2021	7.4	16.5	9.1	19	7.6	16.7	71.2	35.4
30.04.2021	8.1	17.8	10.3	21	8.3	18	79.4	37.5
01.05.2021	7.1	15.9	8.5	18.3	7.5	16.3	73.3	37.5
07.05.2021	7.6	16.8	9.3	19.5	8.1	17.3	75.2	33.4
08.05.2021	7	15.7	8.9	18	7.2	15.9	69.1	31.9
14.05.2021	8.2	17	10.6	22.3	8.6	18.4	67.5	31.7
15.05.2021	7.3	16.3	8.8	19.7	7.8	16.8	72	36.2
21.05.2021	6.7	15.3	8.9	18.4	7	15.6	74.5	32.7
22.05.2021	7.8	17.2	9.7	20.1	8.1	17.5	67.7	31.9
28.05.2021	7.2	16	8.7	18.5	7.5	16.3	75.2	33.4
29.05.2021	8	17.7	10.1	20.8	8.3	18	69.8	34

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Max.	22.3	11.8	79.4	37.5
Min.	14.8	6.4	67.5	31.7
95%tile	21.925	11.53	78.805	37.21
98%tile	22.15	11.692	79.162	37.384

## Annexure 13b\_Detailed AAQM (March to May, 2024)

Site 1: Village Premnagar (Block-I)									
Date	CLOCK HOURS								CO
	00-08		08-16		16-24		24 HOURS PM <sub>10</sub>	24 HOURS PM <sub>2.5</sub>	
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>			
01.03.2024	11.0	19.7	12.1	22.2	11.4	20.1	55.4	29.3	0.56
02.03.2024	11.7	20.3	13.0	22.8	12.3	20.9	56.6	30.6	0.57
08.03.2024	11.1	19.4	12.7	22.4	11.6	19.9	61.5	31.5	0.58
09.03.2024	11.7	20.0	12.9	22.6	12.1	20.4	56.4	32.4	0.56
15.03.2024	8.6	18.2	11.7	20.3	9.3	18.9	61.3	31.3	0.57
16.03.2024	11.5	20.8	13.1	22.9	11.8	21.1	61.2	31.2	0.58
22.03.2024	10.8	19.3	11.9	21.8	10.8	19.3	57.6	34.1	0.59
23.03.2024	11.9	21.8	13.2	23.3	12.3	22.2	61.7	30.2	0.60
31.03.2024	11.1	19.8	12.5	22.2	11.3	20.0	56.8	30.6	0.57
01.04.2024	11.7	21.4	13.2	23.1	12.1	21.8	65.2	30.7	0.65
08.04.2024	8.8	18.9	11.7	21.4	9.1	19.2	61.6	30.8	0.58
09.04.2024	11.6	19.8	12.9	22.5	12.2	20.4	56.5	30.9	0.59
15.04.2024	10.8	19.3	11.9	21.8	11.3	19.8	63.4	32.7	0.60
16.04.2024	11.5	20.8	13.1	22.9	12.1	21.4	60.3	31.6	0.61
22.04.2024	8.7	18.6	11.6	21.1	9.0	18.9	63.5	31.5	0.59
23.04.2024	11.2	19.6	12.8	22.5	11.4	19.8	62.7	31.4	0.56
30.04.2024	11.9	21.8	13.2	23.3	12.1	22.0	59.5	31.3	0.57
01.05.2024	11.0	19.7	12.1	22.2	11.4	20.1	59.4	32.2	0.58
08.05.2024	11.7	20.0	12.9	22.6	12.2	20.5	59.3	30.4	0.58
09.05.2024	10.9	19.6	12.0	22.1	11.1	19.8	58.3	30.5	0.61
15.05.2024	12.0	22.1	13.3	23.4	12.4	22.5	63.4	30.6	0.62
16.05.2024	11.1	19.4	12.7	22.4	11.6	19.9	58.3	30.7	0.58
22.05.2024	8.7	18.6	11.6	21.1	9.0	18.9	63.2	31.7	0.63
23.05.2024	11.5	20.8	13.1	22.9	11.8	21.1	59.4	31.6	0.61
29.05.2024	11.1	19.8	12.5	22.2	11.4	20.1	58.6	31.5	0.59
30.05.2024	11.7	21.4	13.2	23.1	12.0	21.7	63.7	31.4	0.58

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO
Unit (µg/m <sup>3</sup> )					Unit (mg/m <sup>3</sup> )
Max.	23.40	13.30	65.20	34.10	0.65
Min.	18.20	8.60	55.40	29.30	0.56
95%tile	23.10	13.19	63.65	32.63	0.63
98%tile	23.30	13.23	64.45	33.40	0.64



Site 2: Mochia Mine (Block-I)									
Date	CLOCK HOURS								CO
	00-08		08-16		16-24		24 HOURS PM10	24 HOURS PM2.5	
	SO2	NO2	SO2	NO2	SO2	NO2			
01.03.2024	12.5	22.8	13.5	24.8	12.9	23.2	76.4	35.7	0.65
02.03.2024	13.1	22.8	14.4	25.6	13.7	23.4	59.6	36.7	0.66
08.03.2024	12.9	22.4	14.1	25.2	13.4	22.9	60.5	37.6	0.67
09.03.2024	13.1	22.6	14.3	25.4	13.5	23.0	59.4	37.7	0.68
15.03.2024	9.0	19.3	13.1	22.8	9.7	20.0	70.3	37.6	0.69
16.03.2024	12.9	23.1	14.5	25.7	13.2	23.4	66.2	42.5	0.70
22.03.2024	11.0	20.8	13.3	24.0	11.0	20.8	59.4	37.4	0.65
23.03.2024	13.3	24.0	14.6	26.1	13.7	24.4	65.6	45.7	0.66
31.03.2024	12.9	22.8	13.9	24.8	13.1	23.0	59.7	37.3	0.67
01.04.2024	13.1	23.6	14.6	25.9	13.5	24.0	59.8	37.5	0.68
08.04.2024	10.1	20.7	13.1	23.6	10.4	21.0	58.4	41.6	0.69
09.04.2024	13.0	22.6	14.3	25.3	13.6	23.2	64.2	37.7	0.83
15.04.2024	11.0	20.8	13.3	24.0	11.5	21.3	64.3	38.8	0.74
16.04.2024	12.9	23.1	14.5	25.7	13.5	23.7	59.5	41.9	0.75
22.04.2024	10.0	19.8	13.0	23.4	10.3	20.1	61.6	41.8	0.76
23.04.2024	12.9	22.4	14.2	25.3	13.1	22.6	64.8	41.7	0.77
30.04.2024	13.3	24.0	14.6	26.1	13.5	24.2	69.9	37.6	0.66
01.05.2024	12.5	22.8	13.5	24.8	12.9	23.2	62.5	37.5	0.67
08.05.2024	13.1	22.6	14.3	25.4	13.6	23.1	62.8	39.5	0.68
09.05.2024	11.6	22.8	13.4	24.3	11.8	23.0	62.9	39.4	0.69
15.05.2024	13.4	24.3	14.7	26.2	13.8	24.7	67.0	41.3	0.70
16.05.2024	12.9	22.4	14.1	25.2	13.4	22.9	67.8	41.4	0.70
22.05.2024	10.0	19.8	13.0	23.4	10.3	20.1	63.7	40.3	0.71
23.05.2024	12.9	23.1	14.5	25.7	13.2	23.4	67.6	38.3	0.72
29.05.2024	12.9	22.8	13.9	24.8	13.2	23.1	67.4	43.2	0.73
30.05.2024	13.1	23.6	14.6	25.9	13.4	23.9	68.3	38.5	0.65

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO
Unit (µg/m <sup>3</sup> )					Unit (mg/m <sup>3</sup> )
Max.	26.20	14.70	76.40	45.70	0.83
Min.	19.30	9.00	58.40	35.70	0.65
95%tile	25.90	14.59	70.20	43.03	0.77
98%tile	26.10	14.63	73.35	44.45	0.80

Site 3: Balaria Mine (Block-I)									
Date	CLOCK HOURS								CO
	00-08		08-16		16-24		24 HOURS PM10	24 HOURS PM2.5	
	SO2	NO2	SO2	NO2	SO2	NO2			
01.03.2024	8.3	16.2	9.0	18.2	8.7	16.6	53.2	32.1	0.55
02.03.2024	8.6	16.2	9.8	19.0	9.2	16.8	54.6	33.5	0.56
06.03.2024	8.4	15.9	9.6	18.6	8.9	16.3	54.5	34.6	0.57
07.03.2024	8.6	16.0	9.8	18.8	9.0	16.4	54.4	34.9	0.55
13.03.2024	6.8	15.9	8.6	16.2	7.5	16.6	56.3	34.7	0.57
14.03.2024	8.4	16.5	9.9	19.1	8.7	16.8	60.2	36.6	0.56
20.03.2024	7.6	16.2	8.8	17.4	7.6	16.2	55.7	34.4	0.55
21.03.2024	8.8	17.4	10.1	19.5	9.2	17.8	55.6	37.4	0.56
30.03.2024	8.4	16.2	9.4	18.2	8.6	16.4	61.5	35.0	0.55
01.04.2024	8.6	17.0	10.1	19.3	9.0	17.4	56.6	35.1	0.55
10.04.2024	7.5	16.1	8.6	17.0	7.8	16.4	55.5	35.3	0.57
11.04.2024	8.5	16.0	9.8	18.7	9.1	16.6	54.4	35.4	0.55
17.04.2024	7.6	16.2	8.8	17.4	8.1	16.7	56.3	33.5	0.58
18.04.2024	8.4	16.5	9.9	19.1	9.0	17.1	56.2	33.6	0.59
24.04.2024	7.4	16.0	8.5	16.8	7.7	16.3	54.5	33.7	0.58
25.04.2024	8.4	15.9	9.7	18.7	8.6	16.0	55.6	36.8	0.56
30.04.2024	8.8	17.4	10.1	19.5	9.0	17.6	55.7	34.9	0.61
01.05.2024	8.3	16.2	9.0	18.2	8.7	16.6	58.9	34.8	0.56
06.05.2024	8.6	16.0	9.8	18.8	9.1	16.5	57.8	35.7	0.56
07.05.2024	8.2	16.2	8.9	17.7	8.4	16.4	54.7	36.6	0.55
13.05.2024	8.9	17.7	10.2	19.6	9.3	18.1	57.5	36.5	0.55
14.05.2024	8.4	15.9	9.6	18.6	8.9	16.3	57.4	33.4	0.57
20.05.2024	7.4	16.0	8.5	16.8	7.7	16.3	57.4	33.3	0.56
21.05.2024	8.4	16.5	9.9	19.1	8.7	16.8	55.3	33.6	0.57
27.05.2024	8.4	16.2	9.4	18.2	8.7	16.5	59.2	36.7	0.58
28.05.2024	8.6	17.0	10.1	19.3	8.9	17.3	58.2	36.9	0.56

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO
Unit (µg/m <sup>3</sup> )					Unit (mg/m <sup>3</sup> )
Max.	19.60	10.20	61.50	37.40	0.61
Min.	15.90	6.80	53.20	32.10	0.55
95%tile	19.30	10.09	59.95	36.88	0.59
98%tile	19.50	10.13	60.85	37.15	0.60

Site 4: Baroi Mine (Block-I)									
Date	CLOCK HOURS								CO
	00-08		08-16		16-24		24 HOURS PM10	24 HOURS PM2.5	
	SO2	NO2	SO2	NO2	SO2	NO2			
01.03.2024	12.0	21.4	12.7	23.4	12.4	21.8	60.4	36.6	0.61
02.03.2024	12.3	21.4	13.6	24.2	12.9	22.0	61.4	37.3	0.62
06.03.2024	12.1	21.0	13.3	23.8	12.6	21.5	68.5	41.5	0.61
07.03.2024	12.3	21.2	13.5	24.0	12.7	21.6	68.6	38.6	0.68
13.03.2024	9.5	19.6	12.3	21.4	10.2	20.3	66.7	38.5	0.62
14.03.2024	12.1	21.7	13.7	24.3	12.4	22.0	62.6	43.9	0.62
20.03.2024	11.3	21.3	12.5	22.6	11.3	21.3	62.5	41.3	0.62
21.03.2024	12.5	22.6	13.8	24.7	12.9	23.0	65.5	41.4	0.63
30.03.2024	12.1	21.4	13.1	23.4	12.3	21.6	65.4	41.5	0.65
01.04.2024	12.3	22.2	13.8	24.5	12.7	22.6	62.4	38.6	0.65
10.04.2024	10.3	21.2	12.3	22.2	10.6	21.5	63.3	39.0	0.61
11.04.2024	12.2	21.2	13.5	23.9	12.8	21.8	63.2	38.9	0.61
17.04.2024	11.3	21.3	12.5	22.6	11.8	21.8	63.4	38.8	0.63
18.04.2024	12.1	21.7	13.7	24.3	12.7	22.3	64.5	38.2	0.61
24.04.2024	10.2	21.0	12.2	22.0	10.5	21.3	64.6	40.0	0.65
25.04.2024	12.1	21.0	13.4	23.9	12.3	21.2	72.0	39.8	0.65
30.04.2024	12.5	22.6	13.8	24.7	12.7	22.8	65.7	39.7	0.63
01.05.2024	12.0	21.4	12.7	23.4	12.4	21.8	67.6	39.3	0.63
06.05.2024	12.3	21.2	13.5	24.0	12.8	21.7	65.5	41.4	0.63
07.05.2024	11.9	21.3	12.6	22.9	12.1	21.5	65.4	39.5	0.63
13.05.2024	12.6	22.9	13.9	24.8	13.0	23.3	63.4	39.4	0.64
14.05.2024	12.1	21.0	13.3	23.8	12.6	21.5	64.4	39.4	0.64
20.05.2024	10.2	21.0	12.2	22.0	10.5	21.3	64.3	39.3	0.64
21.05.2024	12.1	21.7	13.7	24.3	12.4	22.0	64.2	40.2	0.64
27.05.2024	12.1	21.4	13.1	23.4	12.4	21.7	65.2	40.2	0.64
28.05.2024	12.3	22.2	13.8	24.5	12.6	22.5	68.2	40.1	0.65

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO
Unit (µg/m <sup>3</sup> )					Unit (mg/m <sup>3</sup> )
Max.	24.80	13.90	72.00	43.90	0.68
Min.	19.60	9.50	60.40	36.60	0.61
95%tile	24.50	13.79	68.58	41.50	0.65
98%tile	24.70	13.83	70.30	42.70	0.67

Site 5: ZawarMala Mine (Block-I)									
Date	CLOCK HOURS								CO
	00-08		08-16		16-24		24 HOURS PM10	24 HOURS PM2.5	
	SO2	NO2	SO2	NO2	SO2	NO2			
01.03.2024	13.2	22.1	13.9	24.1	13.6	22.5	63.2	34.9	0.67
02.03.2024	13.5	22.1	14.8	24.9	14.1	22.7	64.7	35.6	0.67
08.03.2024	13.3	21.7	14.5	24.5	13.8	22.2	66.6	37.5	0.67
09.03.2024	13.5	21.9	14.7	24.7	13.9	22.3	67.5	37.4	0.68
15.03.2024	10.3	17.7	13.5	22.1	11.0	18.4	66.4	37.3	0.68
16.03.2024	13.3	22.4	14.9	25.0	13.6	22.7	66.4	35.2	0.68
22.03.2024	12.5	22.0	13.7	23.3	12.5	22.0	70.9	41.6	0.69
23.03.2024	13.7	23.3	15.0	25.4	14.1	23.7	67.3	41.7	0.69
31.03.2024	13.3	22.1	14.3	24.1	13.5	22.3	67.6	35.6	0.75
01.04.2024	13.5	22.9	15.0	25.2	13.9	23.3	64.5	35.5	0.69
08.04.2024	11.5	21.5	13.5	22.9	11.8	21.8	64.5	38.4	0.69
09.04.2024	13.4	21.9	14.7	24.6	14.0	22.5	64.4	36.4	0.67
15.04.2024	12.5	22.0	13.7	23.3	13.0	22.5	64.4	38.3	0.67
16.04.2024	13.3	22.4	14.9	25.0	13.9	23.0	66.3	39.3	0.67
22.04.2024	11.4	20.6	13.4	22.7	11.7	20.9	66.3	36.5	0.68
23.04.2024	13.3	21.7	14.6	24.6	13.5	21.9	68.4	36.6	0.67
30.04.2024	13.7	23.3	15.0	25.4	13.9	23.5	65.4	36.7	0.7
01.05.2024	13.2	22.1	13.9	24.1	13.6	22.5	67.3	36.8	0.7
08.05.2024	13.5	21.9	14.7	24.7	14.0	22.4	67.2	40.6	0.7
09.05.2024	13.1	22.0	13.8	23.6	13.3	22.2	65.5	42.3	0.7
15.05.2024	13.8	23.6	15.1	25.5	14.2	24.0	65.4	41.5	0.67
16.05.2024	13.3	21.7	14.5	24.5	13.8	22.2	65.3	42.0	0.67
22.05.2024	11.4	20.6	13.4	22.7	11.7	20.9	65.3	36.3	0.67
23.05.2024	13.3	22.4	14.9	25.0	13.6	22.7	65.2	36.0	0.68
29.05.2024	13.3	22.1	14.3	24.1	13.6	22.4	65.5	36.8	0.67
30.05.2024	13.5	22.9	15.0	25.2	13.8	23.2	67.6	36.7	0.67

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO
Unit (µg/m <sup>3</sup> )					Unit (mg/m <sup>3</sup> )
Max.	25.50	15.10	70.90	42.30	0.75
Min.	17.70	10.300	63.20	34.90	0.67
95%tile	25.20	14.99	68.20	41.93	0.70
98%tile	25.40	15.03	69.65	42.15	0.73

Site 6: Village Jawar									
Date	CLOCK HOURS								CO
	00-08		08-16		16-24		24 HOURS PM <sub>10</sub>	24 HOURS PM <sub>2.5</sub>	
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>			
01.03.2024	10.9	19.1	11.6	21.1	11.3	19.5	56.8	33.8	0.54
02.03.2024	11.2	19.1	12.5	21.9	11.8	19.7	57.4	34.5	0.55
07.03.2024	11.0	18.7	12.2	21.5	11.5	19.2	59.3	35.6	0.59
08.03.2024	11.2	18.9	12.4	21.7	11.6	19.3	60.3	35.7	0.58
14.03.2024	8.0	16.0	11.2	19.1	8.7	16.7	63.2	35.6	0.57
15.03.2024	11.0	19.4	12.6	22.0	11.3	19.7	61.2	35.5	0.55
21.03.2024	10.2	19.0	11.4	20.3	10.2	19.0	66.0	35.4	0.57
22.03.2024	11.4	20.3	12.7	22.4	11.8	20.7	61.4	36.2	0.55
30.03.2024	11.0	19.1	12.0	21.1	11.2	19.3	61.5	37.3	0.59
01.04.2024	11.2	19.9	12.7	22.2	11.6	20.3	57.7	38.7	0.56
12.04.2024	9.2	18.8	11.2	19.9	9.5	19.1	57.6	34.5	0.59
13.04.2024	11.1	18.9	12.4	21.6	11.7	19.5	57.5	34.7	0.58
19.04.2024	10.2	19.0	11.4	20.3	10.7	19.5	58.4	34.4	0.59
20.04.2024	11.0	19.4	12.6	22.0	11.6	20.0	61.4	34.3	0.56
26.04.2024	9.1	17.9	11.1	19.7	9.4	18.2	58.3	34.2	0.55
27.04.2024	11.0	18.7	12.3	21.6	11.2	18.9	58.2	35.4	0.6
30.04.2024	11.4	20.3	12.7	22.4	11.6	20.5	58.1	35.4	0.59
01.05.2024	10.9	19.1	11.6	21.1	11.3	19.5	59.3	35.3	0.56
10.05.2024	11.2	18.9	12.4	21.7	11.7	19.4	59.5	36.5	0.63
11.05.2024	10.8	19.0	11.5	20.6	11.0	19.2	59.6	36.7	0.55
17.05.2024	11.5	20.6	12.8	22.5	11.9	21.0	60.7	36.9	0.60
18.05.2024	11.0	18.7	12.2	21.5	11.5	19.2	60.6	34.0	0.55
24.05.2024	9.1	17.9	11.1	19.7	9.4	18.2	60.5	34.8	0.56
25.05.2024	11.0	19.4	12.6	22.0	11.3	19.7	61.4	34.7	0.57
29.05.2024	11.0	19.1	12.0	21.1	11.3	19.4	62.3	37.6	0.57
30.05.2024	11.2	19.9	12.7	22.2	11.5	20.2	61.3	37.2	0.56

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO
Unit (µg/m <sup>3</sup> )					Unit (mg/m <sup>3</sup> )
Max.	22.5	12.80	66.00	38.70	0.63
Min.	16.00	8.00	56.80	33.80	0.54
95%tile	22.20	12.69	62.98	37.53	0.60
98%tile	22.40	12.73	64.60	38.15	0.62



Site 7: CPP									
Date	CLOCK HOURS								CO
	00-08		08-16		16-24		24 HOURS	24 HOURS	
	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	
01.03.2024	16.3	27.4	17.0	29.4	16.7	27.8	68.5	38.3	0.75
02.03.2024	16.6	27.4	17.9	30.2	17.2	28.0	69.5	39.5	0.75
07.03.2024	16.4	27.0	17.6	29.8	16.9	27.5	71.4	43.6	0.79
08.03.2024	16.6	27.2	17.8	30.0	17.0	27.6	72.3	43.7	0.78
14.03.2024	12.2	21.5	16.6	27.4	12.9	22.2	71.2	39.8	0.77
15.03.2024	16.4	27.7	18.0	30.3	16.7	28.0	71.5	39.7	0.78
21.03.2024	15.6	27.3	16.8	28.6	15.6	27.3	70.7	43.6	0.8
22.03.2024	16.8	28.6	18.1	30.7	17.2	29.0	70.6	40.5	0.81
30.03.2024	16.4	27.4	17.4	29.4	16.6	27.6	72.5	44.5	0.83
01.04.2024	16.6	28.2	18.1	30.5	17.0	28.6	72.4	43.4	0.76
12.04.2024	14.6	27.2	16.6	28.2	14.9	27.5	73.3	43.3	0.76
13.04.2024	16.5	27.2	17.8	29.9	17.1	27.8	73.3	45.9	0.92
19.04.2024	15.6	27.3	16.8	28.6	16.1	27.8	73.6	40.3	0.76
20.04.2024	16.4	27.7	18.0	30.3	17.0	28.3	72.5	40.5	0.76
26.04.2024	14.3	26.3	16.5	28.0	14.6	26.6	76.3	42.6	0.82
27.04.2024	16.4	27.0	17.7	29.9	16.6	27.2	69.4	42.7	0.76
30.04.2024	16.8	28.6	18.1	30.7	17.0	28.8	69.3	40.6	0.75
01.05.2024	16.3	27.4	17.0	29.4	16.7	27.8	69.3	41.5	0.78
10.05.2024	16.6	27.2	17.8	30.0	17.1	27.7	71.5	40.4	0.77
11.05.2024	16.2	27.3	16.9	28.9	16.4	27.5	69.6	39.3	0.77
17.05.2024	16.9	28.9	18.2	30.8	17.3	29.3	72.5	39.5	0.79
18.05.2024	16.4	27.0	17.6	29.8	16.9	27.5	70.4	39.6	0.77
24.05.2024	14.3	26.3	16.5	28.0	14.6	26.6	70.3	42.8	0.79
25.05.2024	16.4	27.7	18.0	30.3	16.7	28.0	71.3	40.6	0.78
29.05.2024	16.4	27.4	17.4	29.4	16.7	27.7	71.2	42.5	0.8
30.05.2024	16.6	28.2	18.1	30.5	16.9	28.5	73.4	42.4	0.83

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO
Unit (µg/m <sup>3</sup> )					Unit (mg/m <sup>3</sup> )
Max.	30.80	18.20	76.30	45.90	0.92
Min.	21.50	12.20	68.50	38.30	0.75
95%tile	30.50	18.09	73.55	44.30	0.83
98%tile	30.70	18.13	74.95	45.20	0.88

Site 8: Mine Site Bara (Block III)									
Date	CLOCK HOURS								CO
	00-08		08-16		16-24		24 HOURS PM10	24 HOURS PM2.5	
	SO2	NO2	SO2	NO2	SO2	NO2			
01.03.2024	9.3	19.7	10.0	21.7	9.7	20.1	64.3	33.6	0.58
02.03.2024	9.6	19.7	10.9	22.5	10.2	20.3	61.5	34.4	0.59
07.03.2024	9.4	19.3	10.6	22.1	9.9	19.8	57.7	35.3	0.62
08.03.2024	9.6	19.5	10.8	22.3	10.0	19.9	58.4	34.4	0.62
14.03.2024	7.7	17.9	9.6	19.7	8.4	18.6	61.2	34.5	0.62
15.03.2024	9.4	20.0	11.0	22.6	9.7	20.3	60.4	34.6	0.60
21.03.2024	9.1	19.6	9.8	20.9	9.1	19.6	60.5	34.7	0.60
22.03.2024	9.8	20.9	11.1	23.0	10.2	21.3	60.5	34.8	0.60
30.03.2024	9.4	19.7	10.4	21.7	9.6	19.9	62.4	35.6	0.62
01.04.2024	9.6	20.5	11.1	22.8	10.0	20.9	58.3	35.6	0.61
12.04.2024	9.1	19.5	9.6	20.5	9.4	19.8	58.3	38.0	0.65
13.04.2024	9.5	19.5	10.8	22.2	10.1	20.1	58.2	34.5	0.59
19.04.2024	9.1	19.6	9.8	20.9	9.6	20.1	61.3	34.3	0.58
20.04.2024	9.4	20.0	11.0	22.6	10.0	20.6	62.4	35.3	0.58
26.04.2024	8.8	19.4	9.5	20.3	9.1	19.7	68.0	36.5	0.58
27.04.2024	9.4	19.3	10.7	22.2	9.6	19.5	59.5	36.6	0.59
30.04.2024	9.8	20.9	11.1	23.0	10.0	21.1	59.7	36.8	0.62
01.05.2024	9.3	19.7	10.0	21.7	9.7	20.1	59.6	37.9	0.58
10.05.2024	9.6	19.5	10.8	22.3	10.1	20.0	65.5	36.7	0.58
11.05.2024	9.2	19.6	9.9	21.2	9.4	19.8	62.4	37.6	0.58
17.05.2024	9.9	21.2	11.2	23.1	10.3	21.6	62.4	37.5	0.60
18.05.2024	9.4	19.3	10.6	22.1	9.9	19.8	60.3	37.4	0.60
24.05.2024	8.8	19.4	9.5	20.3	9.1	19.7	62.6	34.3	0.61
25.05.2024	9.4	20.0	11.0	22.6	9.7	20.3	59.7	34.3	0.62
29.05.2024	9.4	19.7	10.4	21.7	9.7	20.0	63.0	37.5	0.59
30.05.2024	9.6	20.5	11.1	22.8	9.9	20.8	62.1	37.7	0.59

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO
Unit (µg/m <sup>3</sup> )					Unit (mg/m <sup>3</sup> )
Max.	23.10	11.20	68.00	38.00	0.65
Min.	17.90	7.70	57.70	33.60	0.58
95%tile	22.80	11.09	65.20	37.85	0.62
98%tile	23.00	11.13	66.75	37.95	0.64

Site 9: Singatwara									
Date	CLOCK HOURS								CO
	00-08		08-16		16-24		24 HOURS PM10	24 HOURS PM2.5	
	SO2	NO2	SO2	NO2	SO2	NO2			
01.03.2024	7.6	15.4	8.3	17.4	8.0	15.8	49.5	27.1	BDL
02.03.2024	7.9	15.4	9.1	18.2	8.5	16.0	50.4	28.4	BDL
08.03.2024	7.7	15.0	8.9	17.8	8.2	15.5	60.5	29.5	BDL
09.03.2024	7.9	15.2	9.1	18.0	8.3	15.6	51.6	29.6	BDL
15.03.2024	5.5	13.5	7.9	15.4	6.2	14.2	60.7	28.4	BDL
16.03.2024	7.7	15.7	9.2	18.3	8.0	16.0	60.6	28.3	BDL
22.03.2024	7.4	15.3	8.1	16.6	7.4	15.3	60.4	28.4	BDL
23.03.2024	8.1	16.6	9.4	18.7	8.5	17.0	52.4	28.5	BDL
31.03.2024	7.7	15.4	8.7	17.4	7.9	15.6	59.3	35.0	BDL
01.04.2024	7.9	16.2	9.4	18.5	8.3	16.6	50.4	32.7	BDL
08.04.2024	7.4	15.2	7.9	16.2	7.7	15.5	50.5	32.6	BDL
09.04.2024	7.8	15.2	9.1	17.9	8.4	15.8	50.7	29.5	BDL
15.04.2024	7.4	15.3	8.1	16.6	7.9	15.8	60.8	29.5	BDL
16.04.2024	7.7	15.7	9.2	18.3	8.3	16.3	62.7	29.5	BDL
22.04.2024	6.6	15.1	7.8	16.0	6.9	15.4	53.0	30.5	BDL
23.04.2024	7.7	15.0	9.0	17.9	7.9	15.2	58.9	30.3	BDL
30.04.2024	8.1	16.6	9.4	18.7	8.3	16.8	53.8	30.5	BDL
01.05.2024	7.6	15.4	8.3	17.4	8.0	15.8	54.8	30.4	BDL
08.05.2024	7.9	15.2	9.1	18.0	8.4	15.7	53.7	30.3	BDL
09.05.2024	7.5	15.3	8.2	16.9	7.7	15.5	53.6	31.5	BDL
15.05.2024	8.2	16.9	9.5	18.8	8.6	17.3	53.5	29.6	BDL
16.05.2024	7.7	15.0	8.9	17.8	8.2	15.5	55.4	32.8	BDL
22.05.2024	6.6	15.1	7.8	16.0	6.9	15.4	58.3	29.7	BDL
23.05.2024	7.7	15.7	9.2	18.3	8.0	16.0	56.3	33.4	BDL
29.05.2024	7.7	15.4	8.7	17.4	8.0	15.7	57.2	32.3	BDL
30.05.2024	7.9	16.2	9.4	18.5	8.2	16.5	58.1	32.3	BDL

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO
Unit (µg/m <sup>3</sup> )					Unit (mg/m <sup>3</sup> )
Max.	18.80	9.50	62.70	35.00	BDL
Min.	13.50	5.50	49.50	27.10	BDL
95%tile	18.50	9.39	60.78	33.25	BDL
98%tile	18.70	9.42	61.75	34.20	BDL

Site 10: Kalipipli									
Date	CLOCK HOURS								CO
	00-08		08-16		16-24		24 HOURS PM10	24 HOURS PM2.5	
	SO2	NO2	SO2	NO2	SO2	NO2			
01.03.2024	7.2	13.9	7.9	15.9	7.6	14.3	46.9	26.0	BDL
02.03.2024	7.5	13.9	8.7	16.7	8.1	14.5	47.4	27.3	BDL
07.03.2024	7.3	13.5	8.5	16.3	7.8	14.0	49.6	28.4	BDL
08.03.2024	7.5	13.7	8.7	16.5	7.9	14.1	51.7	30.5	BDL
14.03.2024	5.0	12.3	7.5	13.9	5.7	13.0	55.7	30.6	BDL
15.03.2024	7.3	14.2	8.8	16.8	7.6	14.5	56.8	30.5	BDL
21.03.2024	7.0	13.8	7.7	15.1	7.0	13.8	57.0	27.4	BDL
22.03.2024	7.7	15.1	9.0	17.2	8.1	15.5	47.6	27.3	BDL
30.03.2024	7.3	13.9	8.3	15.9	7.5	14.1	47.5	27.5	BDL
01.04.2024	7.5	14.7	9.0	17.0	7.9	15.1	47.4	27.7	BDL
12.04.2024	7.0	13.7	7.5	14.7	7.3	14.0	48.4	27.9	BDL
13.04.2024	7.4	13.7	8.7	16.4	8.0	14.3	49.3	28.0	BDL
19.04.2024	7.0	13.8	7.7	15.1	7.5	14.3	49.3	28.9	BDL
20.04.2024	7.3	14.2	8.8	16.8	7.9	14.8	49.5	28.8	BDL
26.04.2024	6.2	13.6	7.4	14.5	6.5	13.9	50.6	28.7	BDL
27.04.2024	7.3	13.5	8.6	16.4	7.5	13.7	51.7	28.6	BDL
30.04.2024	7.7	15.1	9.0	17.2	7.9	15.3	57.2	33.8	BDL
01.05.2024	7.2	13.9	7.9	15.9	7.6	14.3	48.6	29.4	BDL
10.05.2024	7.5	13.7	8.7	16.5	8.0	14.2	48.5	27.6	BDL
11.05.2024	7.1	13.8	7.8	15.4	7.3	14.0	48.4	29.7	BDL
17.05.2024	7.8	15.4	9.1	17.3	8.2	15.8	48.4	29.8	BDL
18.05.2024	7.3	13.5	8.5	16.3	7.8	14.0	48.8	29.5	BDL
24.05.2024	6.2	13.6	7.4	14.5	6.5	13.9	50.7	29.4	BDL
25.05.2024	7.3	14.2	8.8	16.8	7.6	14.5	52.6	30.2	BDL
29.05.2024	7.3	13.9	8.3	15.9	7.6	14.2	53.5	30.4	BDL
30.05.2024	7.5	14.7	9.0	17.0	7.8	15.0	54.8	31.3	BDL

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO
Unit (µg/m <sup>3</sup> )					Unit (mg/m <sup>3</sup> )
Max.	17.30	9.10	57.20	33.80	BDL
Min.	12.30	5.00	46.90	26.00	BDL
95%tile	17.00	8.99	56.95	31.13	BDL
98%tile	17.20	9.02	57.10	32.55	BDL

Site 11: Kanpur									
Date	CLOCK HOURS								CO
	00-08		08-16		16-24		24 HOURS PM10	24 HOURS PM2.5	
	SO2	NO2	SO2	NO2	SO2	NO2			
01.03.2024	7.0	13.3	7.7	15.3	7.4	13.7	48.5	25.3	BDL
02.03.2024	7.3	13.3	8.5	16.1	7.9	13.9	44.9	26.4	BDL
07.03.2024	7.1	12.9	8.3	15.7	7.6	13.4	45.3	27.5	BDL
08.03.2024	7.3	13.1	8.5	15.9	7.7	13.5	50.5	28.6	BDL
14.03.2024	4.9	11.9	7.3	13.3	5.6	12.6	45.6	28.7	BDL
15.03.2024	7.1	13.6	8.6	16.2	7.4	13.9	45.7	28.6	BDL
21.03.2024	6.8	13.2	7.5	14.5	6.8	13.2	45.6	31.5	BDL
22.03.2024	7.5	14.5	8.8	16.6	7.9	14.9	48.5	28.4	BDL
30.03.2024	7.1	13.3	8.1	15.3	7.3	13.5	48.4	28.3	BDL
01.04.2024	7.3	14.1	8.8	16.4	7.7	14.5	48.4	28.6	BDL
12.04.2024	6.8	13.1	7.3	14.1	7.1	13.4	55.6	26.5	BDL
13.04.2024	7.2	13.1	8.5	15.8	7.8	13.7	49.3	26.4	BDL
19.04.2024	6.8	13.2	7.5	14.5	7.3	13.7	46.4	26.6	BDL
20.04.2024	7.1	13.6	8.6	16.2	7.7	14.2	48.6	26.7	BDL
26.04.2024	6.0	13.0	7.2	13.9	6.3	13.3	51.7	26.6	BDL
27.04.2024	7.1	12.9	8.4	15.8	7.3	13.1	46.7	26.5	BDL
30.04.2024	7.5	14.5	8.8	16.6	7.7	14.7	46.6	27.4	BDL
01.05.2024	7.0	13.3	7.7	15.3	7.4	13.7	46.5	27.3	BDL
10.05.2024	7.3	13.1	8.5	15.9	7.8	13.6	46.4	27.3	BDL
11.05.2024	6.9	13.2	7.6	14.8	7.1	13.4	47.4	26.7	BDL
17.05.2024	7.6	14.8	8.9	16.7	8.0	15.2	52.4	26.6	BDL
18.05.2024	7.1	12.9	8.3	15.7	7.6	13.4	47.3	26.5	BDL
24.05.2024	6.0	13.0	7.2	13.9	6.3	13.3	47.5	26.4	BDL
25.05.2024	7.1	13.6	8.6	16.2	7.4	13.9	47.7	27.8	BDL
29.05.2024	7.1	13.3	8.1	15.3	7.4	13.6	53.8	27.7	BDL
30.05.2024	7.3	14.1	8.8	16.4	7.6	14.4	54.0	27.6	BDL

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO
Unit (µg/m <sup>3</sup> )					Unit (mg/m <sup>3</sup> )
Max.	16.70	8.90	55.60	31.50	BDL
Min.	11.900	4.90	44.90	25.30	BDL
95%tile	16.40	8.79	53.95	28.68	BDL
98%tile	16.60	8.82	54.80	30.10	BDL



Site 12: Kevra Khurd									
Date	CLOCK HOURS								CO
	00-08		08-16		16-24		24 HOURS PM10	24 HOURS PM2.5	
	SO2	NO2	SO2	NO2	SO2	NO2			
01.03.2024	9.2	17.9	9.9	19.9	9.6	18.3	60.1	31.3	0.55
02.03.2024	9.5	17.9	10.8	20.7	10.1	18.5	61.4	32.5	0.56
07.03.2024	9.3	17.5	10.5	20.3	9.8	18.0	61.5	33.4	0.57
08.03.2024	9.5	17.7	10.7	20.5	9.9	18.1	62.7	32.3	0.59
14.03.2024	6.8	14.6	9.5	17.9	7.5	15.3	61.6	32.5	0.58
15.03.2024	9.3	18.2	10.9	20.8	9.6	18.5	61.5	33.6	0.57
21.03.2024	9.0	17.8	9.7	19.1	9.0	17.8	61.4	37.8	0.60
22.03.2024	9.7	19.1	11.0	21.2	10.1	19.5	67.3	38.5	0.60
30.03.2024	9.3	17.9	10.3	19.9	9.5	18.1	61.2	33.5	0.59
01.04.2024	9.5	18.7	11.0	21.0	9.9	19.1	61.4	33.4	0.63
12.04.2024	9.0	17.6	9.5	18.7	9.3	17.9	69.0	34.3	0.56
13.04.2024	9.4	17.7	10.7	20.4	10.0	18.3	63.6	34.2	0.61
19.04.2024	9.0	17.8	9.7	19.1	9.5	18.3	63.5	32.2	0.58
20.04.2024	9.3	18.2	10.9	20.8	9.9	18.8	63.4	32.4	0.58
26.04.2024	8.1	16.9	9.4	18.5	8.4	17.2	63.3	32.8	0.58
27.04.2024	9.3	17.5	10.6	20.4	9.5	17.7	66.2	35.7	0.57
30.04.2024	9.7	19.1	11.0	21.2	9.9	19.3	63.4	35.6	0.58
01.05.2024	9.2	17.9	9.9	19.9	9.6	18.3	63.5	35.5	0.56
10.05.2024	9.5	17.7	10.7	20.5	10.0	18.2	63.6	35.4	0.56
11.05.2024	9.1	17.8	9.8	19.4	9.3	18.0	63.7	37.4	0.57
17.05.2024	9.8	19.4	11.1	21.3	10.2	19.8	63.6	37.3	0.58
18.05.2024	9.3	17.5	10.5	20.3	9.8	18.0	64.5	34.7	0.59
24.05.2024	8.1	16.9	9.4	18.5	8.4	17.2	63.4	36.6	0.56
25.05.2024	9.3	18.2	10.9	20.8	9.6	18.5	65.4	36.5	0.57
29.05.2024	9.3	17.9	10.3	19.9	9.6	18.2	64.3	37.4	0.59
30.05.2024	9.5	18.7	11.0	21.0	9.8	19.0	64.4	36.0	0.58

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO
Unit (µg/m <sup>3</sup> )					Unit (mg/m <sup>3</sup> )
Max.	21.30	11.10	69.00	38.50	0.63
Min.	14.60	6.80	60.10	31.30	0.55
95%tile	21.00	10.99	67.03	37.70	0.61
98%tile	21.20	11.03	68.15	38.15	0.62

Site 13: Nangela									
Date	CLOCK HOURS								CO
	00-08		08-16		16-24		24 HOURS PM10	24 HOURS PM2.5	
	SO2	NO2	SO2	NO2	SO2	NO2			
01.03.2024	6.7	12.3	7.4	14.3	7.1	12.7	47.8	26.9	BDL
02.03.2024	7.0	12.3	8.2	15.1	7.6	12.9	48.6	27.4	BDL
08.03.2024	6.8	11.9	8.0	14.7	7.3	12.4	54.5	29.6	BDL
09.03.2024	7.0	12.1	8.2	14.9	7.4	12.5	54.4	28.7	BDL
15.03.2024	5.2	10.4	7.0	12.3	5.9	11.1	49.6	29.9	BDL
16.03.2024	6.8	12.6	8.3	15.2	7.1	12.9	49.7	29.7	BDL
22.03.2024	6.5	12.2	7.2	13.5	6.5	12.2	57.0	31.4	BDL
23.03.2024	7.2	13.5	8.5	15.6	7.6	13.9	54.5	30.6	BDL
31.03.2024	6.8	12.3	7.8	14.3	7.0	12.5	54.4	30.4	BDL
01.04.2024	7.0	13.1	8.5	15.4	7.4	13.5	49.3	27.3	BDL
08.04.2024	6.5	12.0	7.0	13.1	6.8	12.3	49.5	27.4	BDL
09.04.2024	6.9	12.1	8.2	14.8	7.5	12.7	49.6	27.6	BDL
15.04.2024	6.5	12.2	7.2	13.5	7.0	12.7	53.7	28.7	BDL
16.04.2024	6.8	12.6	8.3	15.2	7.4	13.2	52.8	28.9	BDL
22.04.2024	5.6	11.7	6.9	12.9	5.9	12.0	52.6	27.7	BDL
23.04.2024	6.8	11.9	8.1	14.8	7.0	12.1	49.5	27.6	BDL
30.04.2024	7.2	13.5	8.5	15.6	7.4	13.7	50.4	29.5	BDL
01.05.2024	6.7	12.3	7.4	14.3	7.1	12.7	55.3	28.4	BDL
08.05.2024	7.0	12.1	8.2	14.9	7.5	12.6	49.7	30.3	BDL
09.05.2024	6.6	12.2	7.3	13.8	6.8	12.4	49.7	28.6	BDL
15.05.2024	7.3	13.8	8.6	15.7	7.7	14.2	49.5	28.7	BDL
16.05.2024	6.8	11.9	8.0	14.7	7.3	12.4	51.7	28.9	BDL
22.05.2024	5.6	11.7	6.9	12.9	5.9	12.0	50.8	29.8	BDL
23.05.2024	6.8	12.6	8.3	15.2	7.1	12.9	50.3	30.5	BDL
29.05.2024	6.8	12.3	7.8	14.3	7.1	12.6	52.5	30.0	BDL
30.05.2024	7.0	13.1	8.5	15.4	7.3	13.4	50.6	27.9	BDL

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO
Unit (µg/m <sup>3</sup> )					Unit (mg/m <sup>3</sup> )
Max.	15.70	8.60	57.00	31.40	BDL
Min.	10.40	5.20	47.80	26.90	BDL
95%tile	15.40	8.49	55.10	30.58	BDL
98%tile	15.60	8.52	56.15	31.00	BDL

Site 14: Nawa Talai									
Date	CLOCK HOURS								CO
	00-08		08-16		16-24		24 HOURS PM10	24 HOURS PM2.5	
	SO2	NO2	SO2	NO2	SO2	NO2			
01.03.2024	7.4	11.4	8.1	13.4	7.8	11.8	40.2	22.7	BDL
02.03.2024	7.7	11.4	8.9	14.2	8.3	12.0	41.5	23.3	BDL
06.03.2024	7.5	11.0	8.7	13.8	8.0	11.5	41.3	30.4	BDL
07.03.2024	7.7	11.2	8.9	14.0	8.1	11.6	42.7	25.6	BDL
13.03.2024	6.2	10.8	7.7	11.4	6.9	11.5	50.7	29.8	BDL
14.03.2024	7.5	11.7	9.0	14.3	7.8	12.0	47.6	25.6	BDL
20.03.2024	7.2	11.3	7.9	12.6	7.2	11.3	47.5	25.5	BDL
21.03.2024	7.9	12.6	9.2	14.7	8.3	13.0	49.4	24.6	BDL
30.03.2024	7.5	11.4	8.5	13.4	7.7	11.6	49.3	27.7	BDL
01.04.2024	7.7	12.2	9.2	14.5	8.1	12.6	53.0	23.8	BDL
10.04.2024	7.2	11.2	7.7	12.2	7.5	11.5	43.7	23.8	BDL
11.04.2024	7.6	11.2	8.9	13.9	8.2	11.8	43.6	24.7	BDL
17.04.2024	7.2	11.3	7.9	12.6	7.7	11.8	49.5	25.6	BDL
18.04.2024	7.5	11.7	9.0	14.3	8.1	12.3	49.4	27.6	BDL
24.04.2024	6.3	11.1	7.6	12.0	6.6	11.4	49.4	32.8	BDL
25.04.2024	7.5	11.0	8.8	13.9	7.7	11.2	46.3	23.5	BDL
30.04.2024	7.9	12.6	9.2	14.7	8.1	12.8	46.0	28.4	BDL
01.05.2024	7.4	11.4	8.1	13.4	7.8	11.8	46.9	25.3	BDL
06.05.2024	7.7	11.2	8.9	14.0	8.2	11.7	44.8	25.6	BDL
07.05.2024	7.3	11.3	8.0	12.9	7.5	11.5	49.7	26.8	BDL
13.05.2024	8.0	12.9	9.3	14.8	8.4	13.3	48.6	24.9	BDL
14.05.2024	7.5	11.0	8.7	13.8	8.0	11.5	48.5	24.8	BDL
20.05.2024	6.3	11.1	7.6	12.0	6.6	11.4	48.4	24.7	BDL
21.05.2024	7.5	11.7	9.0	14.3	7.8	12.0	45.2	26.5	BDL
27.05.2024	7.5	11.4	8.5	13.4	7.8	11.7	49.4	27.5	BDL
28.05.2024	7.7	12.2	9.2	14.5	8.0	12.5	49.8	26.7	BDL

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO
Unit (µg/m <sup>3</sup> )					Unit (mg/m <sup>3</sup> )
Max.	14.80	9.30	53.00	32.80	BDL
Min.	10.80	6.20	40.20	22.70	BDL
95%tile	14.50	9.19	50.48	30.25	BDL
98%tile	14.70	9.22	51.85	31.60	BDL

Site 15: Moridungri									
Date	CLOCK HOURS								CO
	00-08		08-16		16-24		24 HOURS PM10	24 HOURS PM2.5	
	SO2	NO2	SO2	NO2	SO2	NO2			
01.03.2024	8.2	16.3	9.0	19.3	8.6	16.7	57.6	30.5	BDL
02.03.2024	8.6	17.0	9.8	20.1	9.2	17.6	58.5	31.5	BDL
06.03.2024	8.3	16.0	9.6	19.7	8.8	16.5	60.4	32.6	BDL
07.03.2024	8.6	16.6	9.8	19.9	9.0	17.0	59.3	32.7	BDL
13.03.2024	6.8	14.5	8.6	17.0	7.5	15.2	59.2	32.8	BDL
14.03.2024	8.4	17.5	9.9	20.2	8.7	17.8	59.5	33.5	BDL
20.03.2024	8.0	15.9	8.8	18.5	8.0	15.9	60.6	31.3	BDL
21.03.2024	8.8	18.5	10.1	20.6	9.2	18.9	59.7	31.2	BDL
30.03.2024	8.3	16.4	9.4	19.3	8.5	16.6	61.8	31.5	BDL
01.04.2024	8.6	18.1	10.1	20.4	9.0	18.5	64.6	31.7	BDL
10.04.2024	7.0	15.5	8.6	18.1	7.3	15.8	62.5	31.8	BDL
11.04.2024	8.5	16.4	9.8	19.8	9.1	17.0	66.5	33.9	BDL
17.04.2024	8.0	15.9	8.8	18.5	8.5	16.4	61.5	33.7	BDL
18.04.2024	8.4	17.5	9.9	20.2	9.0	18.1	58.7	33.0	BDL
24.04.2024	6.9	15.2	8.5	17.8	7.2	15.5	58.6	33.9	BDL
25.04.2024	8.4	16.2	9.7	19.8	8.6	16.4	62.5	35.7	BDL
30.04.2024	8.8	18.5	10.1	20.6	9.0	18.7	60.4	34.6	BDL
01.05.2024	8.2	16.3	9.0	19.3	8.6	16.7	60.3	31.5	BDL
06.05.2024	8.6	16.6	9.8	19.9	9.1	17.1	60.5	31.4	BDL
07.05.2024	8.1	16.2	8.9	18.8	8.3	16.4	62.7	31.3	BDL
13.05.2024	8.9	18.8	10.2	20.7	9.3	19.2	61.8	34.7	BDL
14.05.2024	8.3	16.0	9.6	19.7	8.8	16.5	58.9	34.7	BDL
20.05.2024	6.9	15.2	8.5	17.8	7.2	15.5	62.7	34.6	BDL
21.05.2024	8.4	17.5	9.9	20.2	8.7	17.8	62.6	32.5	BDL
27.05.2024	8.3	16.4	9.4	19.3	8.6	16.7	59.5	32.4	BDL
28.05.2024	8.6	18.1	10.1	20.4	8.9	18.4	63.4	34.3	BDL

	NO <sub>2</sub>	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO
Unit (µg/m <sup>3</sup> )					Unit (mg/m <sup>3</sup> )
Max.	20.70	10.20	66.50	35.700	BDL
Min.	14.50	6.80	57.60	30.5	BDL
95%tile	20.40	10.09	64.30	34.70	BDL
98%tile	20.60	10.13	65.55	35.20	BDL

## Annexure 14\_Chemical characterization of RSPM

Chemical characterization of RSPM

S. NO.	IONS	QUANTITY ( $\mu\text{g}/\text{m}^3$ )
1.	Calcium (Ca)	13.2
2.	Magnesium (Mg)	10.5
3.	Iron (Fe)	2.1
4.	Aluminum (Al)	1.9
5.	Sodium (Na)	2.3
6.	Potassium (K)	2.0
7.	Manganese (Mn)	4.1
8.	Chromium (Cr)	0.12
9.	Nickel (Ni)	2.3
10.	Zinc (Zn)	1.4
11.	Copper (Cu)	0.96
12.	Cobalt (Co)	0.45
13.	Lead (Pb)	0.53
14.	Mercury (Hg)	BDL
15.	Cadmium (Cd)	BDL
16.	Free Silica (SiO <sub>2</sub> )	1.03 (%)



राजस्थान सरकार

कार्यालय खनि अभियन्ता खान एवं भू विज्ञान विभाग, उदयपुर खण्ड, उदयपुर

क्रमांक: खअ/उदय/सीसी-3/एम.एल.-3/89/387

दिनांक 22.06.09

प्रेषित:-

मैसर्स हिन्दुस्तान जिक लि०  
यशद भवन, स्वरूप सागर रोड,  
उदयपुर ।

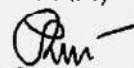
विषय:- खनन पट्टा वास्ते खनिज लेड, जिंक एवं सिल्वर निकट ग्राम जावर  
तहसील सराडा जिला उदयपुर में स्वीकृत के कम में ।

प्रसंग:- आपका पत्र क्रमांक निल दिनांक 19.06.09

महोदय,

उपरोक्त विषय में लेख है कि आपके पक्ष में धारित विषयाकित खनन पट्टा शासन के आदेश क्रमांक प 12(26)खान/गुप-2/90 दिनांक 20.10.92 से अवधि दिनांक 30.03.90 से 29.03.2000 तक के लिये द्वितीय नवीनीकरण स्वीकृत किया गया जिसके द्वितीय किस्त शासन के आदेश क्रमांक प 17(12)खान/गुप-1/99 दिनांक 03.08.99 से अवधि दिनांक 30.03.2000 से 29.03.2010 तक के लिये स्वीकृत की गई अर्थात् उक्त खनन पट्टा दिनांक 16.12.02 से पूर्व ही नवीनीकृत कर दिया गया है । माननीय सर्वोच्च न्यायालय, नई दिल्ली के द्वारा पिटीशन (सी) नम्बर 412 इन आई.ए. 833 इन आई. ए. 828 में दिये गये निर्देश अनुसार उक्त धारित खनन पट्टे पर अरावली हिल्स का प्रावधान लागु नहीं होता है ।

भवदीय,



खनि अभियन्ता,

उदयपुर खण्ड, उदयपुर

## कार्यालय जिला कलक्टर, उदयपुर

क्रमांक : प-39/1(1)राज0/व.अ.एम./08/ 4720

दिनांक : 16/ 01/ 2015

## संशोधित प्रमाण पत्र

पर्यावरण एवं वन मंत्रालय (एम.ओ.इ.एफ) भारत सरकार के पत्र संख्या 11-9/98एफसी(पीटी) दिनांक 3 अगस्त 2009, द्वारा जारी दिशा निर्देशों के अनुसार जिसमें कि वन भूमि पर अनुसूचित जनजाति एवं अन्य परम्परागत वनवासी (वन अधिकारों की मान्यता) अधिनियम 2006 (एफ.आर.ए.) के तहत वन अधिकार के निपटान की प्रक्रिया प्रारम्भ कर प्रक्रिया पूर्ण होने के साक्ष्य प्रस्तुत करने की दिशा में, यह प्रमाणित किया जाता है कि 1537.91 हेक्टेयर वन भूमि हिन्दुस्तान जिंक लिमिटेड, जावर माइन्स (प्रयोगकर्ता एजेंसी) के पक्ष में गैर वन उद्देश्यों के लिए (खनन कार्य) उदयपुर जिले की दो तहसील सराडा और गिर्वा के सात ग्राम पंचायतों के अधिकार क्षेत्र में पड़ती हैं, जिनमें तहसील सराडा के ग्राम पंचायत भालडीया रकबा 177.88 हे०, ग्राम पंचायत सिघटवाडा रकबा 120.60 हे०, ग्राम पंचायत नेवातलाई रकबा 62.69 हे०, ग्राम पंचायत पाडला रकबा 4.00 हे० एवं तहसील गिर्वा के ग्राम पंचायत जावर के राजस्व ग्राम जावर, कानपुर, उदियाखेडा, रवा, व नया खेडा कुल 1120.44 हे० वन भूमि ग्राम पंचायत टीडी के राजस्व ग्राम टीडी 26.00 हे० वन भूमि एवं ग्राम पंचायत चणावदा के राजस्व ग्राम नला 26.30 हे० वन भूमि के अधिकार क्षेत्र में पड़ते हैं। इस तरह सम्पूर्ण 1537.91 हेक्टेयर वन भूमि गैर वन उद्देश्यों के लिए प्रत्यावर्तन किया जाना प्रस्तावित है।

यह भी प्रमाणित किया जाता है कि -

- क. सराडा में 365.17 हे० वन भूमि जो कि प्रत्यावर्तन हेतु प्रस्तावित है, के लिए वनाधिकार अधिनियम के तहत अधिकारों की पहचान और निस्तारण के लिए पूरी प्रक्रिया अपनाई गई। सभी वन अधिकार समितियों, ग्राम सभाओं, उप-खण्ड स्तरीय समितियों, जिला स्तरीय समिति की बैठक के दौरान हुए विचार-विमर्श एवं रिकॉर्ड की प्रतियाँ अनुलग्न 1 से 42 तक संलग्न हैं। इसी प्रकार गिर्वा के सम्पूर्ण 1172.74 हे० वन भूमि जो कि प्रत्यावर्तन हेतु प्रस्तावित है, के लिए वनाधिकार अधिनियम के तहत अधिकारों की पहचान एवं निस्तारण के लिए पूरी प्रक्रिया अपनाई गई। जिसके अनुसार सम्बन्धित ग्राम पंचायतों जावर, टीडी, चणावदा की ग्राम सभाओं द्वारा भूमि प्रत्यावर्तन का अनुमोदन सर्वसम्मति से किया गया। (ग्राम जावर की 20 पत्रावलिया जो प्रारम्भिक जाँच में निरस्त योग्य पाई गई हैं, उनका अंतिम रूप से निस्तारण पंचायत चुनाव आचार संहिता की समाप्ति के पश्चात विधिवत रूप से कर दिया जाएगा)
- ख. उपर्युक्त प्रत्यावर्तन प्रस्ताव तहसील सराडा की ग्राम पंचायतों में (पूर्ण परियोजना के विवरण और उसके प्रभाव के साथ स्थानीय भाषा में) एफ.आर.ए. की प्रासंगिकता के तहत पात्र वनवासियों से सम्बन्धित ग्राम सभा के समक्ष रखा गया है। एवं गिर्वा में प्रत्यावर्तन प्रस्ताव ग्राम पंचायतों में (पूर्ण परियोजना के विवरण और उसके प्रभाव के साथ स्थानीय भाषा में) एफ.आर.ए. की प्रासंगिकता के तहत पात्र वनवासियों से सम्बन्धित ग्राम सभा में रखा गया है। तथा तीनों ग्राम पंचायतों की जावर, (क के अध्यक्षीन) टीडी एवं चणावदा की ग्राम सभाओं द्वारा भूमि को प्रत्यावर्तन हेतु प्रस्तावित किया गया।
- ग. तहसील सराडा से सभी सम्बन्धित ग्राम सभाओं ने प्रासंगिकता के तहत सभी औपचारिकताएँ/प्रक्रियाओं को अपनाते हुए प्रस्तावित प्रत्यावर्तन के उद्देश्यों को विस्तृत रूप से समझकर विकास और मुआवजा (यदि कोई हो) के उपाय करने एवं प्रस्तावित प्रत्यावर्तन के लिए अपनी सहमति दे दी है एवं प्रमाणित किया है। सम्बन्धित ग्राम सभाओं द्वारा जारी प्रमाण पत्रों की प्रतियाँ अनुलग्नक 1 से 42 तक संलग्न हैं। एवं गिर्वा से सभी सम्बन्धित ग्राम सभाओं ने प्रासंगिकता के तहत सभी औपचारिकताएँ/प्रक्रियाओं को अपनाते हुए प्रस्तावित प्रत्यावर्तन के उद्देश्यों को विस्तृत रूप से समझकर विकास और मुआवजा (यदि कोई हो) के उपाय करने एवं प्रस्तावित प्रत्यावर्तन के लिए अपनी सहमति दे दी है एवं प्रमाणित किया है। जिसकी प्रतियाँ अनुलग्नक 1 से 46 तक संलग्न हैं।
- घ. सराडा में इस प्रस्ताव पर ग्राम सभा के 50 प्रतिशत से अधिक उपस्थित सदस्यों की कोरम में चर्चा कर निर्णय लिया गया। एवं गिर्वा में ग्राम सभा में प्रत्येक ग्राम पंचायत जावर, टीडी, एवं चणावदा में प्रत्यावर्तन हेतु प्रस्तावित भूमि पर पूर्ण कोरम होने के पश्चात विधिवत सर्वसम्मति से निर्णय लिया जाकर सशर्त अनापत्ति दी गई है।
- इ. वनाधिकार अधिनियम की धारा 3(2) के तहत जरूरी सरकार द्वारा प्रबन्धित सुविधाओं के लिए वन भूमि का प्रत्यावर्तन पूरा हो चुका है और ग्राम सभाओं ने यह करने के लिए अपनी सहमति दे दी है।
- ई. आदिम जनजाति समूह एवं पूर्व कृषि समुदाय के अधिकार (जहाँ लागू हो) वनाधिकार अधिनियम की धारा 3(1)(इ) लागू नहीं है।

अनुलग्नक-उपर्युक्तानुसार

(अश्वतोष ए. टी. पेडणेकर)  
जिला कलक्टर  
उदयपुर

प्रतिलिपि:-

वाईस प्रेसिडेंट एवं लोकेशन हेड हिन्दुस्तान जिंक लि० जावर माइन्स उदयपुर को सूचनार्थ।

हो-  
जिला कलक्टर  
उदयपुर

2020/8/27 18:37

**SUBMISSION TO MOEFCC, NEW DELHI**

**HYDROGEOLOGICAL REPORT**

**FOR**

**EIA/EMP REPORT**

**(PH DOCUMENTS SUBMISSION)**

In compliance to ToR issued by MoEF&CC, New Delhi

vide letter No: J-11015/259/2012-IA-II (M) dated 8th September 2021

**EXPANSION OF ZAWAR GROUP OF UNDERGROUND  
LEAD- ZINC MINES  
ML AREA 3620 HA (ML NO.03/89)  
AT  
VILLAGES- ZAWAR, TEHSIL: GIRWA AND SARADA,  
DISTRICT- UDAIPUR, RAJASTHAN**

**NABET ACCREDITED CONSULTANT**



**J.M. ENVIRONET PVT. LTD.**

(NABET CERTIFICATE NO. NABET/EIA/2023/RA 0186)  
EMMAR DIGITAL GREENS, TOWER – B, UNIT NO. 1517, GOLF COURSE  
EXT. ROAD, SECTOR – 61, GURUGRAM (HARYANA)  
Email: [jmenviron@hotmail.com](mailto:jmenviron@hotmail.com)

**PROJECT PROPONENT**



**HINDUSTAN ZINC LIMITED**

REGD.OFFICE: YASHAD BHAWAN,  
UDAIPUR  
RAJASTHAN: 313004

September 2021



## INDEX

S. NO.	CONTENTS	PAGE NO.
1.1	INTRODUCTION	1
1.2	SCOPE OF WORK	2
1.3	METHODOLOGY	2
1.4	CLIMATE & RAINFALL	2
1.5	GEOMORPHOLOGY AND TOPOGRAPHY	4
1.6	DRAINAGE PATTERN OF THE STUDY AREA	7
1.7	WATER REQUIREMENT OF THE UNDERGROUND LEAD ZINC MINE	7
1.8	GEOLOGY OF STUDY AREA	9
1.9	HYDROGEOLOGY OF THE AREA	13
1.10	WATER QUALITY	22
1.11	GROUND WATER RESOURCES	22
1.12	IMPACT OF MINING ON SURFACE & GROUND WATER RESOURCES	26
1.13	RAINWATER HARVESTING PROPOSAL	31
1.14	FACTORS AFFECTING RUN-OFF POTENTIAL	32
1.15	DETAILS OF RAINWATER HARVESTING STRUCTURES INSIDE THE MINE	32
2.0	SUMMARY & CONCLUSION	36

## LIST OF FIGURES

S. NO.	DESCRIPTION	PAGE NO.
FIGURE 1.1	GOOGLE MAP OF THE MINE SITE	1
FIGURE 1.2	RAINFALL GRAPH OF THE DISTRICT (SOURCE: IMD: <a href="https://indiawris.gov.in/wris/#/datadownload">HTTPS://INDIAWRIS.GOV.IN/WRIS/#/DATADOWNLOAD</a> )	4
FIGURE 1.3	MAP SHOWING GEOMORPHOLOGY IN AND AROUND 10KM STUDY AREA OF EXISTING UNDERGROUND PB ZN ZAWAR MINE (ML AREA: 3620 HA) (SOURCE: BHUKOSH)	5
FIGURE 1.4	MAP SHOWING DIGITAL ELEVATION MODEL 10 KM STUDY AREA OF EXISTING UNDERGROUND PB ZN ZAWAR MINE (ML AREA: 3620 HA) (SOURCE: USGS)	6
FIGURE 1.5	MAP SHOWING DRAINAGE PATTERN IN AND AROUND 10KM STUDY AREA OF EXISTING UNDERGROUND PB ZN ZAWAR MINE (ML AREA: 3620 HA) (SOURCE: USGS)	8
FIGURE 1.6	MAP SHOWING GEOLOGY OF UDAIPUR DISTRICT (SOURCE: <a href="https://www.researchgate.net/figure/2-GEOLOGICAL-MAP-OF-THE-UDAIPUR-DISTRICT_FIG2_315293214">HTTPS://WWW.RESEARCHGATE.NET/FIGURE/2-GEOLOGICAL-MAP-OF-THE-UDAIPUR-DISTRICT_FIG2_315293214</a> )	9
FIGURE 1.7	STRATIGRAPHIC SUCCESSION OF UDAIPUR_RAJASTHAN (SOURCE: GSI)	11

Figure 1.8	MAP SHOWING GEOLOGICAL FORMATIONS IN AND AROUND 10 KM BUFFER ZONE OF EXISTING UNDERGROUND PB ZN ZAWAR MINE (ML AREA: 3620 HA) (SOURCE: BHUKOSH)	12
FIGURE 1.9	AQUIFER MAP OF UDAIPUR DISTRICT (SOURCE: CGWB)	13
FIGURE 1.10	MAP SHOWING LITHOLOGICAL FORMATIONS IN AND AROUND 10 KM BUFFER ZONE OF EXISTING UNDERGROUND PB ZN ZAWAR MINE (ML AREA: 3620 HA) (SOURCE: BHUKOSH)	15
FIGURE 1.11	MAP SHOWING LITHOLOGICAL FORMATIONS IN AND AROUND 10 KM BUFFER ZONE OF EXISTING UNDERGROUND PB ZN ZAWAR MINE (ML AREA: 3620 HA) (SOURCE: BHUKOSH)	16
FIGURE 1.12	SCHEMATIC DIAGRAM OF THE ROOFTOP MODEL	17
FIGURE 1.13	PHOTOGRAPHS SHOWING WATER LEVEL MONITORING IN BUFFER ZONE	18
FIGURE 1.14	DEPTH TO WATER LEVEL (MBGL) OF PRE MONSOON IN 10 KM BUFFER ZONE OF EXISTING PB ZN ZAWAR MINE (ML AREA: 3620 HA) (SOURCE: FIELD SURVEY)	20
FIGURE 1.15	PRE MONSOON WATER TABLE MAP (AMSL) IN 10 KM BUFFER ZONE OF EXISTING PB ZN ZAWAR MINE (ML AREA: 3620 HA) (SOURCE: FIELD SURVEY)	21
FIGURE 1.16	SCHEMATIC DIAGRAM OF ZONE OF INFLUENCE	27
FIGURE 1.17	RECHARGE STRUCTURES PRESENT IN THE UNDERGROUND PB ZN MINES OF ZAWAR	32
FIGURE 1.18	STREAM NETWORK AND CATCHMENT AREA OF CHECK DAM -1 TO 3	33
FIGURE 1.19	STREAM NETWORK AND CATCHMENT AREA OF CHECK DAM -4 TO 10	34
FIGURE 1.20	STREAM NETWORK AND CATCHMENT AREA OF CHECK DAM -11 TO 15	35

#### LIST OF TABLES

S.NO.	DESCRIPTION	PAGE NO.
TABLE 1.1	EXTENT OF THE MINING LEASE AREA	1
TABLE 1.2	RAINFALL STATISTICS OF UDAIPUR DISTRICT	3
TABLE 1.3	GEOMORPHIC UNITS OF THE STUDY AREA	4
TABLE 1.4	TOPOGRAPHIC ELEVATION OF THE STUDY AREA	4
TABLE 1.5	GEOLOGICAL SEQUENCE OF ZAWAR BUFFER ZONE	9
TABLE 1.6	LOCAL LITHO STRATIGRAPHY OF THE STUDY AREA	10
TABLE 1.7	AQUIFER PROPERTIES OF THE STUDY AREA	13
TABLE 1.8	DETAILS OF SITE ELEVATION, WATER LEVEL AND WORKING DEPTH OF THE EXISTING PB ZN ZAWAR MINE (ML AREA: 3620 HA)	17
TABLE 1.9	DETAILS OF GROUNDWATER LEVEL MONITORING IN AND AROUND 10 KM	19



	BUFFER ZONE OF EXISTING PB ZN ZAWAR MINE (ML AREA: 3620 HA)_PRE MONSOON	
TABLE 1.10	BLOCK WISE WORKING DETAILS	26
TABLE 1.11	WENZEL'S TABLE, SHOWING VALUES OF W (U) CORRESPONDING TO VALUES OF U AND 1/U	29
TABLE 1.12	DEPTH WISE UNDERGROUND MINING IN BALARIA	29
TABLE 1.13	DEPTH WISE UNDERGROUND MINING IN BAROI	29
TABLE 1.14	DEPTH WISE UNDERGROUND MINING IN ZAWARMALA	30
TABLE 1.15	DEPTH WISE UNDERGROUND MINING IN MOCHIA	30
TABLE 1.16	GROUNDWATER INFLOW INTO ZAWAR UNDERGROUND PB ZN MINES (ESTIMATED) AT MAXIMUM WORKING DEPTH	31
TABLE 1.17	DETAILED BREAKUP OF WATER PUMPED OUT FROM MINE PITS DURING PLAN PERIOD	31
TABLE 1.18	CHECK DAM SPECIFICATION (1 TO 3)	33
TABLE 1.19	CHECK DAM SPECIFICATION (4 TO 10)	34
TABLE 1.20	CHECK DAM SPECIFICATION (11 TO 15)	35



## HYDRO-GEOLOGICAL STUDY & RAINWATER HARVESTING PLAN

### 1.1 INTRODUCTION

Hindustan Zinc Limited (HZL), after its inception in the year 1966 as a public sector undertaking is engaged in mining of base metals and its smelting activities. HZL has been a leading producer of Zinc in India with its own captive four underground mines located at Tehsil Sarada & Girwa district Udaipur, Rajasthan and is the world's second largest integrated producer with a global share of approximately 6.0% in Zinc.

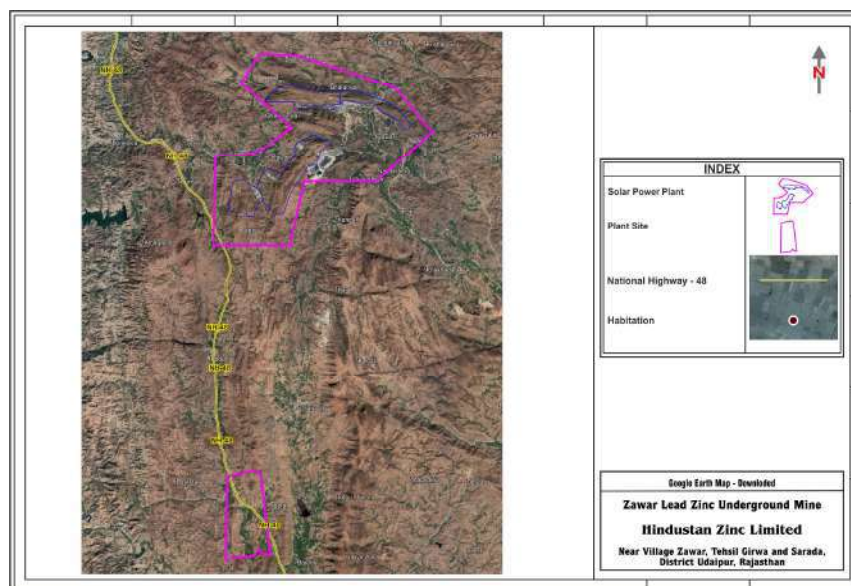
Hindustan Zinc Limited has Zawarmala Underground Lead- Zinc Mine with has proposed Expansion from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total Excavation: 7.78 Million TPA including Waste rock 1.28 MTPA and Beneficiation from 4.8 Million TPA to 7.3 Million TPA within ML Area of 3620 ha (ML No.03/89) at Villages- Zawar, Tehsil: Girwa and Sarada, District- Udaipur, Rajasthan.

Zawar mine comprises of four underground mines, i.e. Mochia falls in Girwa and Sarada Tehsil, Balaria falls in Sarada Tehsil, Zawarmala and Baroi are fall in Girwa Tehsil. The total lease area covers 3620 hectares and is divided in to two blocks i.e. Block 1 and Block 3. The block 1 constitutes main Zawar group of mines that are under active exploration and exploitation in above stated four underground mines. The Block 3 comprising of Bara prospect is situated near Bara village about 12 kilometers from Tiri village on National Highway No. 76. The two blocks lie between following longitudes and latitudes:

**Table 1.1**  
**Extent of the Mining Lease Area**

<b>Block 1</b>	<b>Longitude</b>	<b>73 40' 25" to 73 45' 35"</b>
	<b>Latitude</b>	<b>24 17' 50" to 24 22' 40"</b>
<b>Block 3</b>	<b>Longitude</b>	<b>73 40' 22" to 73 41' 40"</b>
	<b>Latitude</b>	<b>24 12' 50" to 24 22' 47"</b>

The company has approached Ministry of Environment, Forest and Climate Change (MoEFCC), Govt. of India, New Delhi for grant of Terms of References (ToR) for environmental clearance of the proposal which has been recommended in the 35<sup>th</sup> EAC Meeting. The ToR was granted by MoEFCC vide its letter number **S.No. J-11015/259/2012-IA-II (M) dated 8th September 2021**



**Figure 1.1: Google Map of the Mine Site**

## 1.2 SCOPE OF WORK

The scope of work includes the following:

1. To analyze physiographic conditions of the study area with the help of field observations, GPS readings, Survey of India (SOI) Toposheet and Satellite images.
2. To observe hydro geological conditions and study of aquifer system of the area i.e. in Core and 10 km Buffer Zone.
3. To work out quantitative as well as qualitative variations in groundwater with respect to aerial extent and to find out water balance.
4. To observe surface water features and their impact on groundwater balance.
5. To ascertain the impact of the Underground Lead Zinc mine on groundwater conditions of the surrounding area.
6. To work out scope of Rainwater harvesting within the Underground Lead Zinc mine and design suitable recharge system to the extent possible within the lease area.
7. To suggest ways and means of creating artificial recharge to negate adverse impact on groundwater regime and their impact on groundwater regime of the area if any.
8. To prepare detailed Hydro-geological Report and Rainwater Harvesting Plan.

## 1.3 METHODOLOGY

Following methodology has been adopted to conduct hydro-geological investigation in the area:

1. Physiographic studies of the Underground Lead Zinc mine and its surroundings with the help of latest Google images, site visit, GPS survey etc. which helps in determining physiographic gradient.
2. Secondary data collection i.e. climate and rainfall, soil and topography, geology, drainage etc. for interpretation.
3. Detailed hydro-geological survey in core and buffer zone including geology, types of aquifer and their hydraulic parameters governing the groundwater regime of the area, depth to water level, groundwater quality, water abstraction structures and their discharge, surface water bodies, drainage pattern, major irrigation sources and their potential etc.
4. Groundwater resources evaluation based on the norms recommended by Groundwater Estimation Committee (GEC), 2013.
5. Evaluation of present groundwater scenario as well as future course of action for protecting the natural environment
6. Scope of Rainwater Harvesting from runoff generated from different sections of Underground Lead Zinc mine depending upon average annual rainfall and its intensity, recharge capacity of the aquifers & the design considerations.

## 1.4 CLIMATE AND RAINFALL

There is an IMD meteorological station located at Udaipur which is 30 km in north of Zawar mines and meteorological data recorded at Udaipur can be considered as applicable to Zawar mines except rainfall which is being recorded at Zawar mines by HZL.

The Indian Meteorological Department (IMD) has divided Rajasthan in two meteorological sub-divisions, i.e. west Rajasthan and east Rajasthan and the sub-basin falls in east Rajasthan sub-division.

Based on Koppen classification of climatic pattern, Debari buffer zone may be classified as tropical steppe, semi-arid and hot. The year is divided in to four seasons. The winter season is from mid-December to February and is followed by the hot summer season from March to mid-July, including the pre-monsoon season from April to June. The period from July to mid-September constitutes the south west monsoon season and the period from the latter half of September to mid-December as post monsoon season. Average annual rainfall of the district is 637.0mm. However normal rainfall for the period 1901 to 1970 is 633.50mm. The southern part of the district receives slightly more rainfall. The climate of the district is dry except SW monsoon season. The cold season is from December to February and is followed by summer from March to June. Period from mid of September to end of November constitutes post monsoon season. The droughts are in general of mild or normal type. However, severe type of droughts has been recorded at Udaipur, Gogunda, Kherwara, Jharol, Kotra and Vallabh Nagar. Very severe type of drought has been recorded in the year 1987 at Kotra.

#### **HUMIDITY:**

Relative humidity during the south west monsoon is generally over 60%. During the rest of the year, air is normally dry. Relative humidity during summer afternoon is as low as 20% while during monsoon, it does not go more than 80 %. The mean annual humidity values in the morning are 65.4 % and in the evening 37.6%.

The annual average rainfall in the region is around 805.15 mm (average of last eleven years rainfall data from 2010-2020) varying from minimum 594.07 mm in 2018 to maximum 1077.79 mm in 2019.

**Table 1.2**  
**Rainfall Statistics of Udaipur District**

S.No	Year	Rainfall
1.	2010	775.24
2.	2011	855.97
3.	2012	880.71
4.	2013	880.73
5.	2014	701.32
6.	2015	652.31
7.	2016	976..71
8.	2017	823.99
9.	2018	594.07
10.	2019	1077.79
11.	2020	717.91
<b>Average</b>		<b>805.15</b>

(Source: India Meteorological Department)

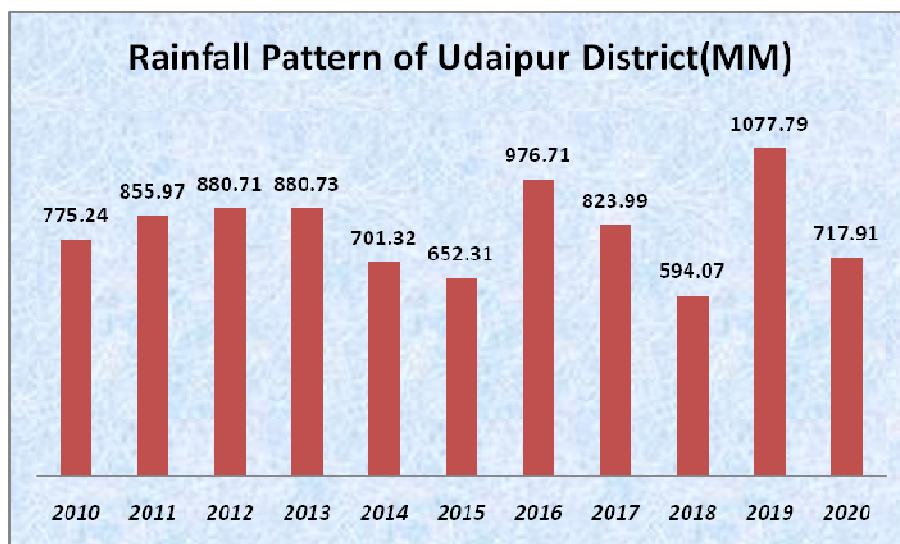


Figure 1.2: Rainfall Graph of the District (Source: IMD: <https://indiawris.gov.in/wris/#/DataDownload>)

## 1.5 GEOMORPHOLOGY AND TOPOGRAPHY

The district is characterized by undulating topography. Towards the western part of district, series of Aravalli hills run along NE-SW direction. A typical plain of gneisses and granites without any alluvial cover is observed to the east of Aravalli ridges. Geomorphic units falling in the district are given in Table 1.3.

Table 1.3  
Geomorphic Units of the Study Area

Origin	Land Forms	Occurrence in the District
Fluvial	Valley Fill	Scattered in the entire district in between structural hill
Denudation	Pediment	Main concentration in north east and scattered in entire district.
	Buried pediment	Main concentration in east and scattered in entire district
Hill	Structural hill	Covers entire district except north east

The Zawar group of mines lease area consisting hilly terrain of variable heights ranging from 350mRL to 600mRL and marked by rugged and hilly terrain, dominated by steeply dipping outcrops and small valleys carved by the networks of ephemeral streamlets and streams. The drainage pattern is sub-dendretic to dendretic. The general slope of the area is from west to east and north-west to south-west. In the northern and western part of the area, there are some high peaks of the hills. The south-eastern part has comparatively lower elevation having lowest elevation, i.e. at Khakhadara. The major part of this hilly area is under forest cover. The total leasehold area (3620 Ha) is divided in two blocks – Block 1 & Block 3. The details of general RL is given below –

Table 1.4  
Topographic Elevation of the Study Area

Blocks	Lease area	Minimum RL	Maximum RL
Block 1	3172 Ha	345mRL	695mRL
Block 3	448 Ha	410mRL	540mRL



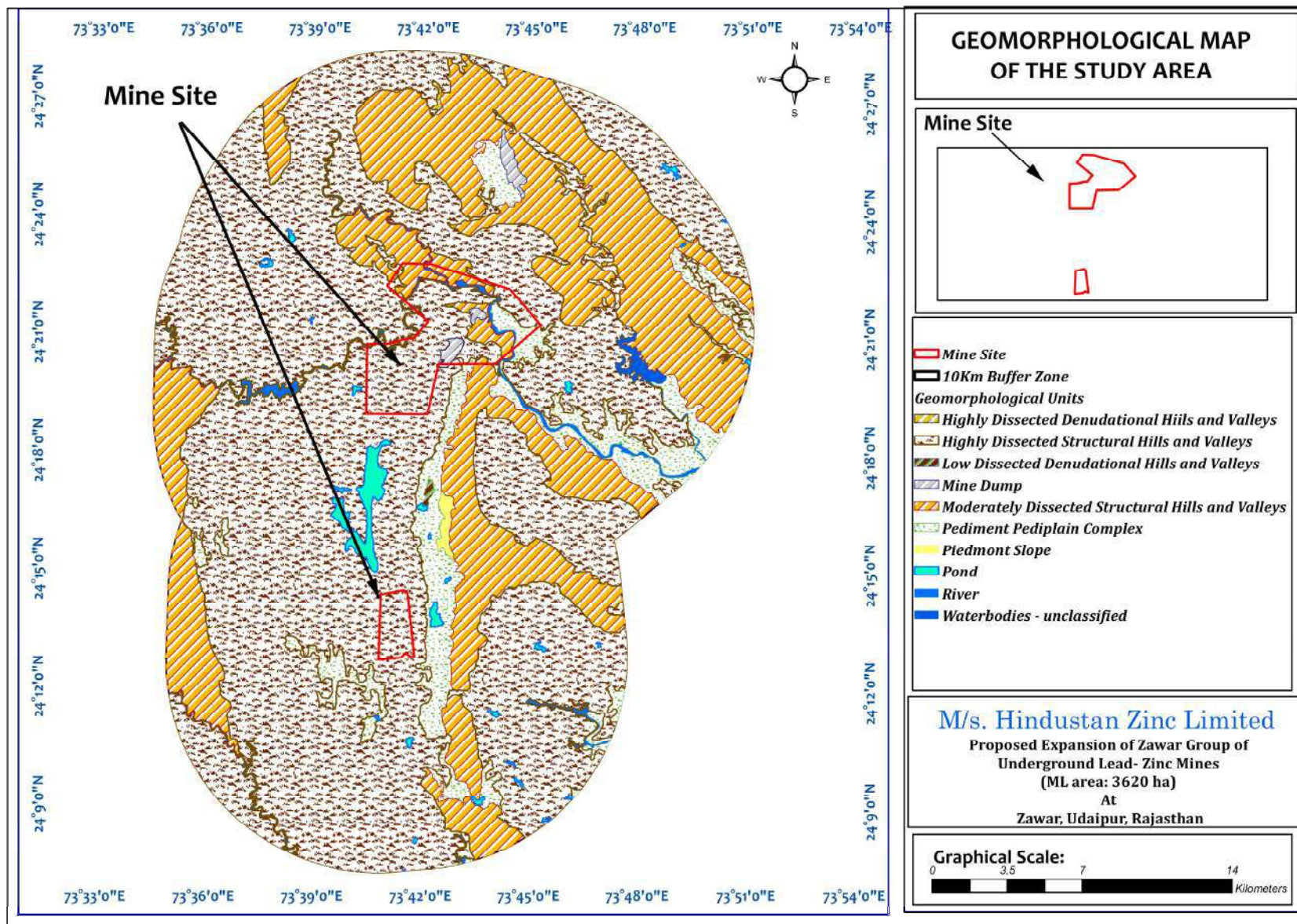


Figure 1.3: Map showing Geomorphology in and around 10km study area of Existing Underground Pb Zn Zawar Mine (ML Area: 3620 ha) (Source: Bhukosh)

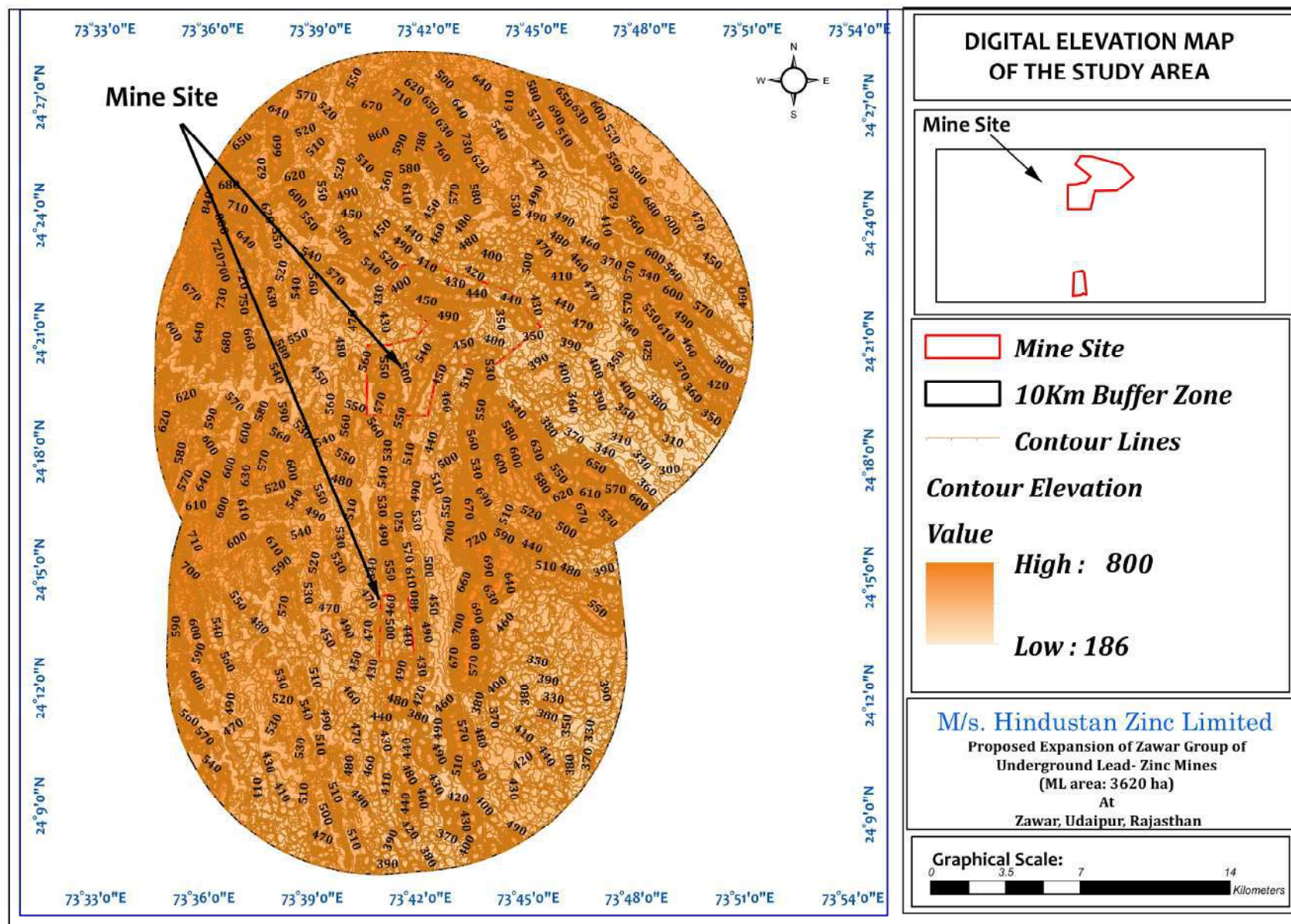


Figure 1.4: Map showing Digital Elevation Model 10 km study area of Existing Underground Pb Zn Zawar Mine (ML Area: 3620 ha) (Source: USGS)



## 1.6 DRAINAGE PATTERN IN LEASE AREA

The buffer zone Zawar group of mines is drained by Tidi River, a tributary of River Mahi originates in the south western part of Debari hills which takes southerly course and joins Gomti River near village Jharol. Tidi River after flowing through Zawar valley takes southerly course and meets Gomti River, just after Jaisamand dam which is getting flow of Gomti, Godi and Vagruva rivers.

The western catchment area of Tidi River up to Tidi dam covers 105 km<sup>2</sup> and the northern catchment area of Tidi River, when it enters within lease area is 265 Km<sup>2</sup> with total catchment area of the river before it enters Zawar valley is 370 km<sup>2</sup>. Out of the catchment area of 105 km<sup>2</sup> of Tidi River up to Tidi dam, the catchment yield has been estimated as 10.16 mcm during a normal a rainfall year. Of this 7.18 mcm (the present storage capacity due to silt accumulation in the dam with storage capacity of 8.49 mcm) has been harnessed by Tidi dam and rest overflows through the Tidi River downstream. It means 70% of the catchment yield has been harnessed by Tidi dam and rest flows downstream.

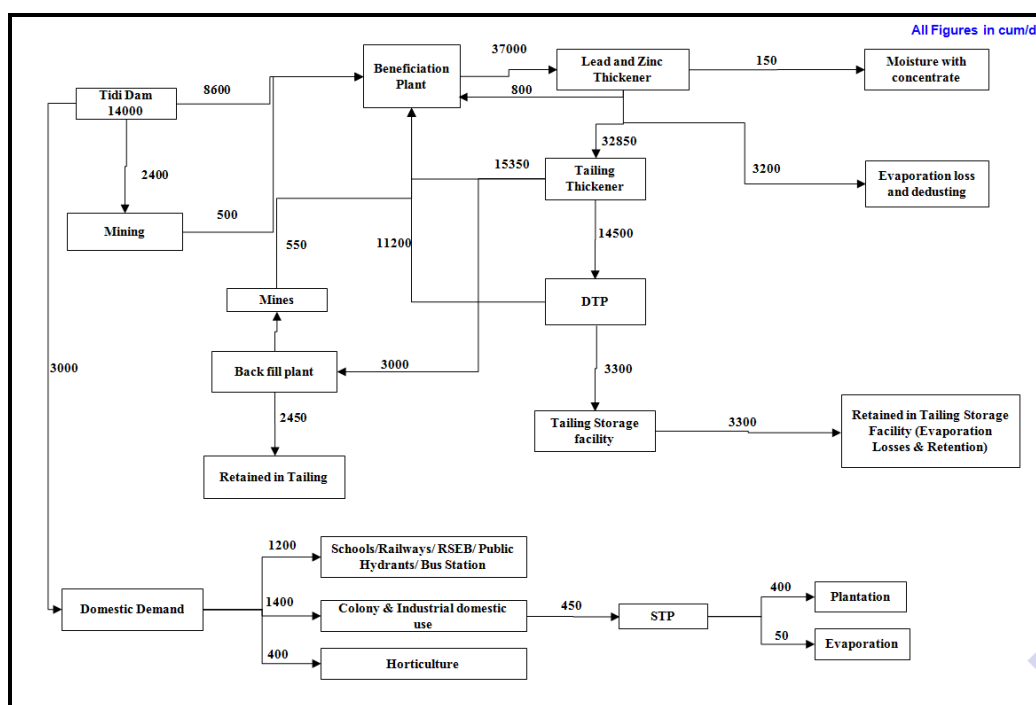
## 1.7 WATER REQUIREMENT OF THE UNDERGROUND LEAD ZINC MINE

Existing water requirement for the project is 14000 KLD. There will be no Additional water requirement for the proposed expansion project; therefore the total water requirement after expansion will remain the same as 14000 KLD. Water will be sourced from the Tidi Dam. Permission for the same was obtained from the Water Source Department, Government of Rajasthan on 17.09.1976.

NOC for dewatering of ground water from Baroi, Balaria, Mochia and Zawarmala Blocks were obtained from CGWA vide letter dated 07.09.2009. Offline Application for second renewal of NOC was submitted to CGWA vide letter dated 09.12.2016 which was recommended by CGWB and as per recent guidelines online Application for 2nd renewal of NOC for dewatering has been submitted on 10th June 2021. Presently applications are in process with CGWA, New Delhi.

The break-up of water requirement is given **Chapter 2 of Draft EIA/EMP Report**.

**FLOW CHART SHOWING WATER BALANCE DIAGRAM**



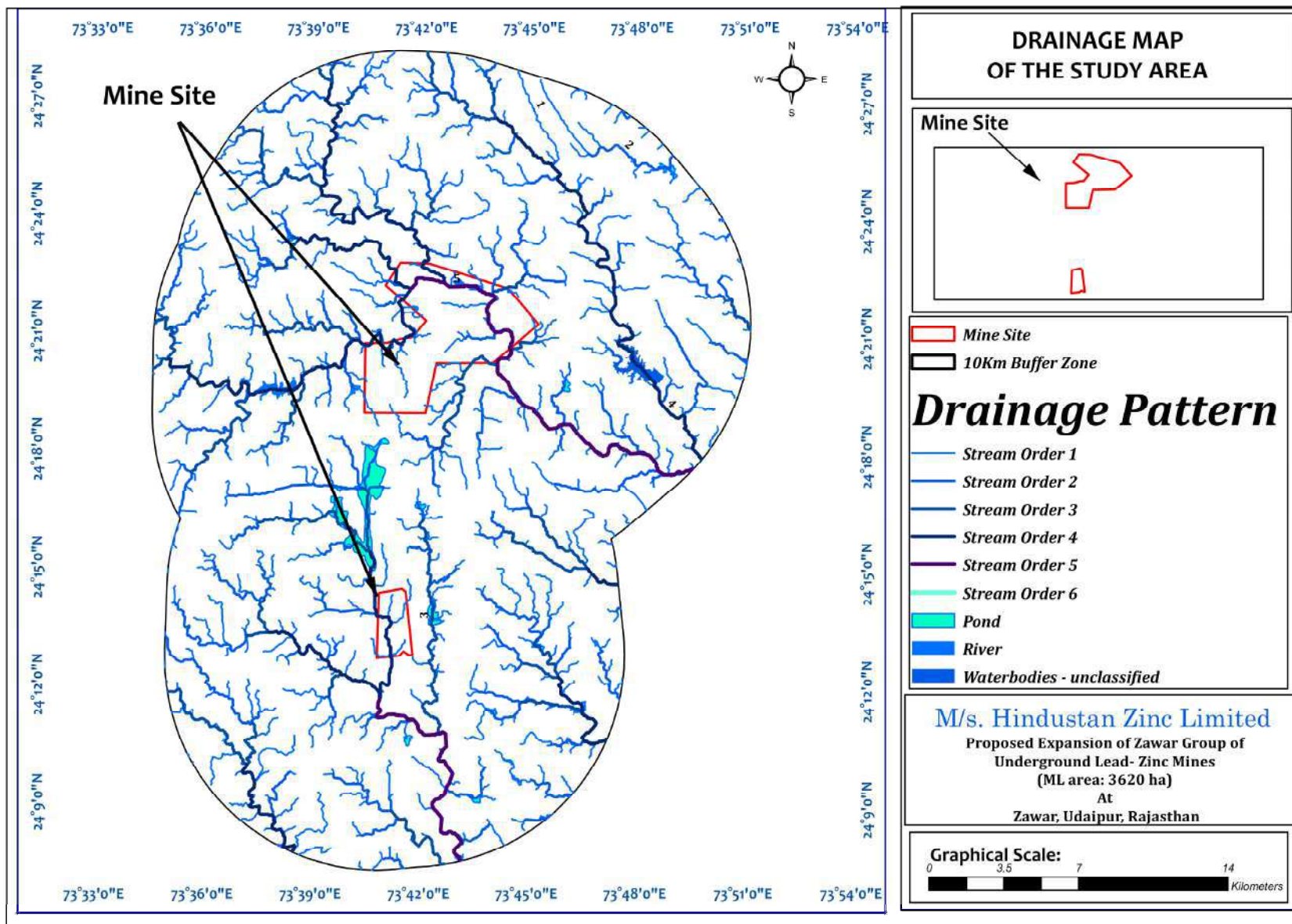


Figure 1.5: Map showing Drainage Pattern in and around 10km study area of Existing Underground Pb Zn Zawar Mine (ML Area: 3620 ha) (Source: USGS)

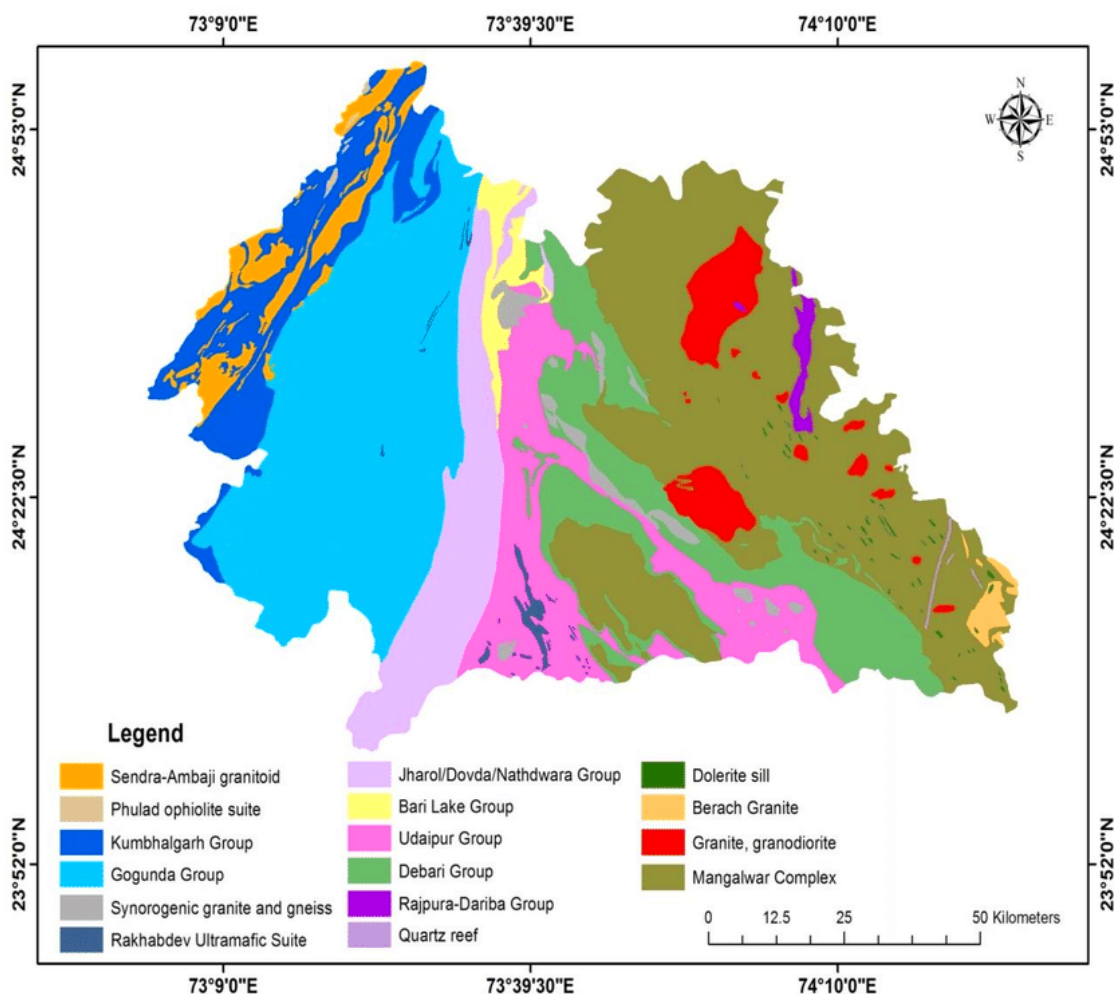
## 1.8 GEOLOGY OF THE STUDY AREA

The geology of the area is mainly composed of thin alluvial cover, belonging to Sub-Recent to Recent period of Quaternary Period followed by, metamorphic of Udaipur, Group of Aravali Super Group of Proterozoic Era and Mewar Gneiss Complex Group of Bhilwara Super Group of Achaean.

The geological succession can be summarized as under

**Table-1.5**  
**Geological sequence of Zawar buffer zone**

Age	Super Group	Group	Rock types
Sub-Recent to Recent	Alluvium	Fluvial & colluvium	Sand, silt, clay, gravel etc.
<b>-----Unconformity-----</b>			
Precambrian	Post Delhi Super Group	Intrusives	Pegmatite, quartz vein
	Arvali Super Group	Udaipur Group	Phyllite, dolomite, Quartzite
Archaean	Bhilwara Super Group	Mewar Gneiss complex	Gneisse, meta -sediment, amphibolite etc,



**Figure 1.6: Map showing Geology of Udaipur District**

(Source: [https://www.researchgate.net/figure/2-Geological-map-of-the-Udaipur-District\\_fig2\\_315293214](https://www.researchgate.net/figure/2-Geological-map-of-the-Udaipur-District_fig2_315293214))



The Stratigraphic succession of Aravali Super group has been further classified (Roy et.al, 1988, 1993) in to Upper, Middle and Lower Aravali Groups. The Upper Aravali Group has been classified in to three formations, Lakhavali phyllite, Kabita dolomite and Debari formations (mostly Quartzite, arkose). Middle Aravali group represents four formations, Tiri formations (mostly phyllite and slate), Bowa formations (quartzite and quartzitic phyllite), Mochia Magra / Zawar formations (Dolomite, carbonaceous phyllite having Pb, Zn and Ag ores) and Udaipur formations (mostly Greywacke /phyllite and conglomerate). The Lower Aravali Group has been classified in to two formations, Jhamar Kotra formations (Dolomite, quartzite, carbon phyllite having thin bands of stromatolitic phosphorite) and Delwara formation (Meta-basalt with thin bands of dolomite and quartzite).

#### LOCAL GEOLOGY

**BLOCK 1:** Block 1 is a conglomeration of four deposits Mochia, Balaria, Zawarmala & Baroi situated in a complexly folded geological structure. All the deposits are hosted in meta-sedimentary sequence for base metal mineralization. Host dolomite is flanked by Greywacke, Phyllites on south and Phyllites & Quartzite on the north. Stratigraphically, the rocks of the mine area form part of Mandli, Baroi Magra and Zawar formations of Tiri Series in the regional stratigraphical sequence. Generalized succession of the deposit is given below:

**Table 1.6**  
**Local Litho Stratigraphy of the Study Area**

Series	Formation	Member	Litho Unit
			Quartz and quartz-felspar veins, metadolerite dykes
	----- Unconformity -----		
Tiri Series	Zawar Formation	Haran Member	Upper Phyllites, Quartzite
	Baroi Magra Formation	Mochia Member	Dolomitic quartzite, pure dolomite, siliceous dolomite (Host rock), sub-greywacke (?), argillaceous quartzite and interbedded phyllites
	Mandli Formation		Greywackes

**Baroi** - Disseminated Pb & Zn mineralization is in the form of NE-SW trending tabular ore bodies dipping due NW and plunging due West. Zawar lease area is situated in NW-SE trending hills of Rajasthan and is a type area of Paleo-Proterozoic age (1700-1800 Million Years).

**Mochia & Balaria** - Galena (Pb ore) & Sphalerite (Zn ore) veins and veinlets concentrate into E-W to NW-SE trending, steeply dipping & westerly plunging tabular ore bodies having a width ranging from 2 m to 45 m. Zawar lease area is situated in NW-SE trending hills of Rajasthan and is a type area of Paleo-Proterozoic age (1700-1800 Million Years).

#### BLOCK 3

**Block 3:** Bara prospect is situated 25 km south of Block 1. The local geological setting of the area indicates the general trend of rocks as N-S with steep westerly dips. Quartzites, calcareous conglomerate, dolomite, greywacke with phyllitic intercalations are the main rock types observed in the area, at places in footwall of mineralization graphitic phyllites are also noticed. The rocks had been subjected to intricate multi-phased folding; along North- South fold axes and exhibit moderate plunge of 30-40° due North. Bara area was part of very unstable basin resulting into rapid fluctuation

in its depositional environment as indicated by integration of dolomite with calcareous conglomerate.

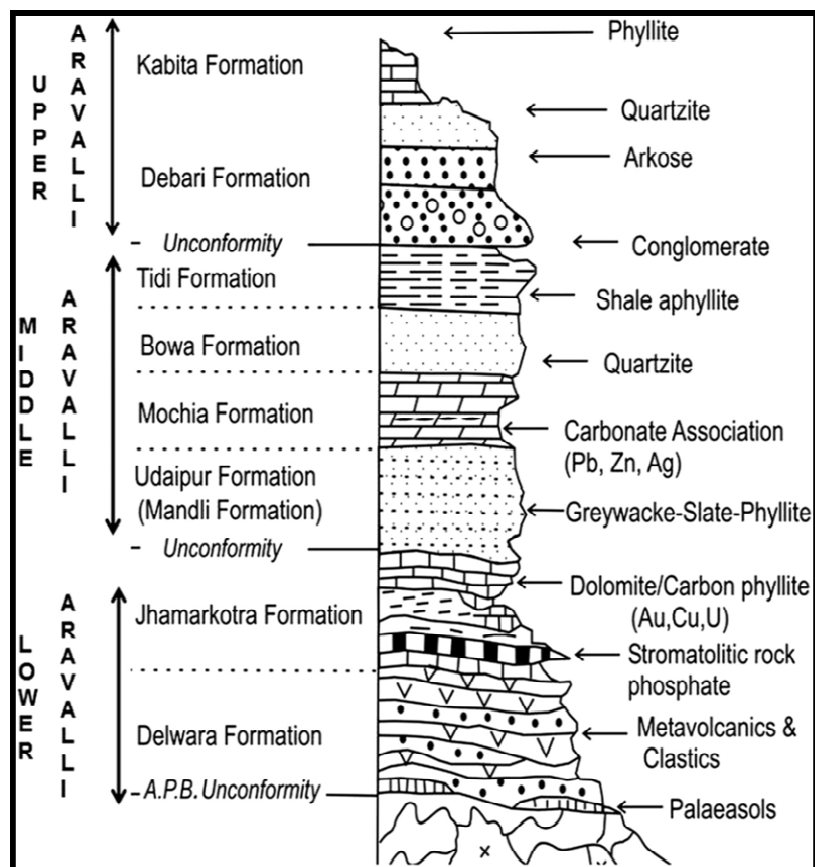


Figure 1.7: Stratigraphic succession of Udaipur\_Rajasthan (Source: GSI)

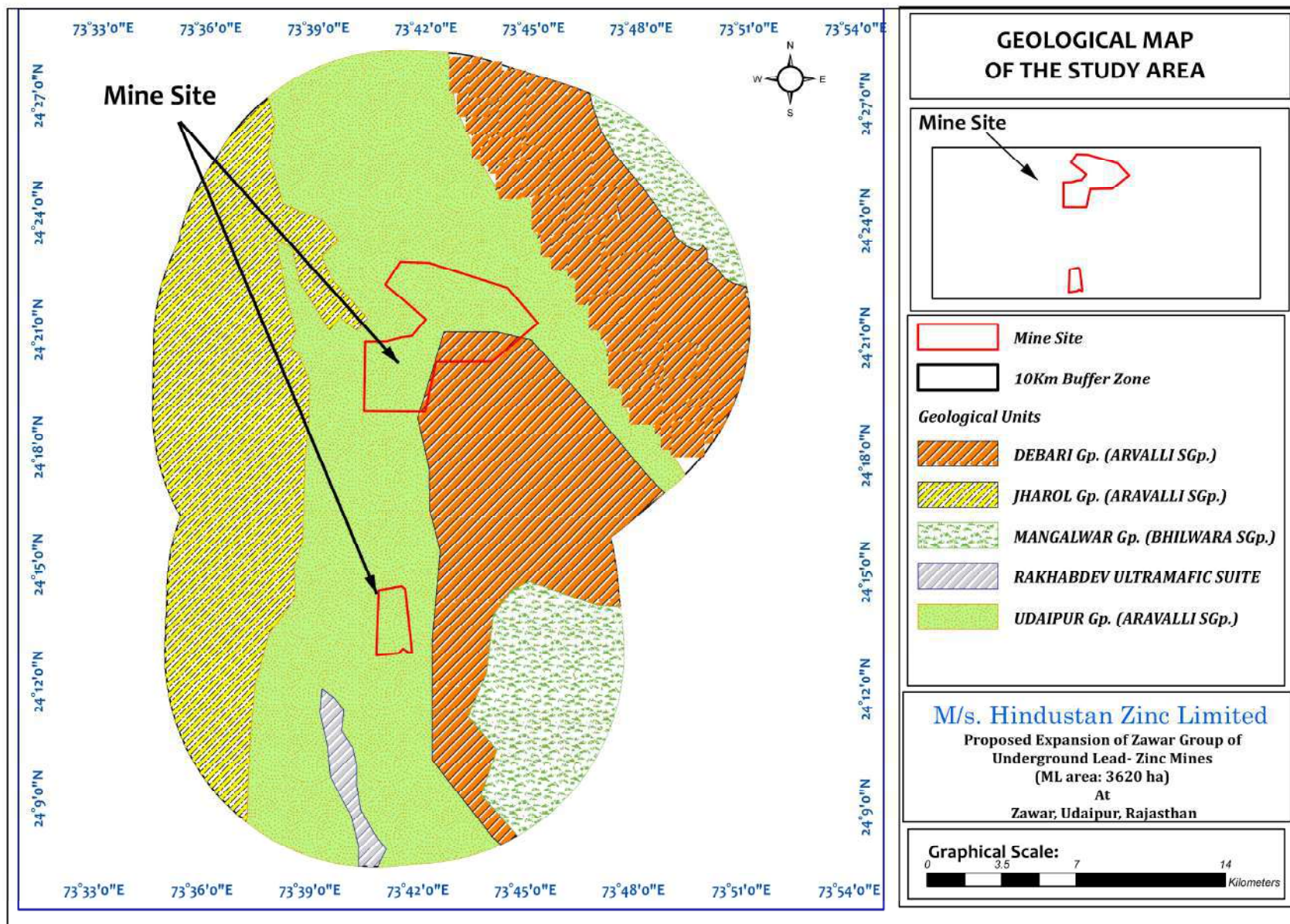


Figure 1.8: Map showing Geological Formations in and around 10 km Buffer Zone of Existing Underground Pb Zn Zawar Mine (ML Area: 3620 ha) (Source: Bhukosh)

## 1.9 HYDROGEOLOGY OF THE AREA (AQUIFER TYPES, WATER LEVEL AND YIELD POTENTIAL)

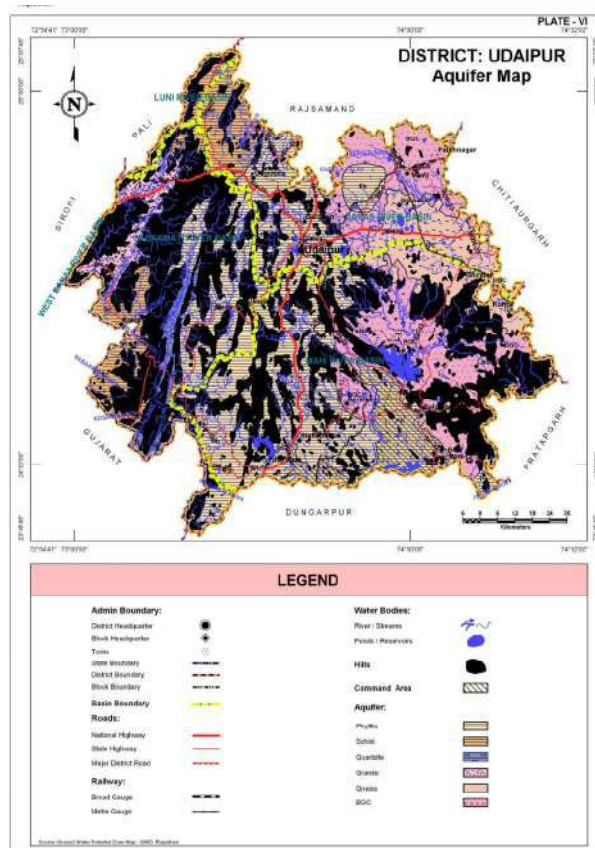
The occurrence of ground water in the district is mainly controlled by the topographic and structural features present in the geological formations. Its occurrence is controlled by topography, physiographic and structural features of the geological formations. The movement of the groundwater in hard rock areas is governed by size, openness, interconnection and continuity of structurally weak planes while in unconsolidated formations, ground water movement takes places through pore spaces between grains.

### SITE SPECIFIC HYDROGEOLOGY IN AND AROUND 2 KM CORE ZONE

The Mine lies in Aravalli Super group. Phyllites are the principal aquifer in the area having specific yield in the range of 80 KLD. Groundwater in these units occurs at a relatively shallow depth. Detail of the aquifer type, their properties is given below:

**Table 1.7**  
**Aquifer Properties of the Study Area**

S.No.	Particular	Details
A.	Aquifer	Phyllites (Metamorphic)
B.	Water level	3-35 mbgl
C.	Specific yield	80 KLD
D.	Hydraulic conductivity	0.065m/day
E.	Fluctuation	3-5m
F.	Water level trend	Inclining



**Figure 1.9: Aquifer Map of Udaipur District (Source: CGWB)**



#### AQUIFER DESCRIPTION:

**Groundwater in Bhilwara Super Group:** The eastern part of the district is underlain by the rocks belonging to Bhilwara super group. Few intrusive are also found which have low permeability. Ground water in these rocks occurs under water table conditions in the zone of weathering and fracturing, joints and foliation planes. The rate of recuperation is slow in gneisses and schists while it is comparatively faster in granites. The depth of dug wells ranges from 15 to 35 metres and the Yield varies from 20m<sup>3</sup>/day to 60 m<sup>3</sup>/day. The depth to water level in the area tapping this aquifer ranges from 3m to 35m.

**Groundwater in Aravalli Formation:** Aravalli Supergroup consisting of Phyllites, Quartzites and dolomite form important aquifer especially around Jharol, Udaipur and Barapal. Ground water occurs in weathered zones like schistosity, joints, fissures and bedding planes. Quartzites generally occur intercalated with phyllites and are well jointed. Ground water in phyllites occurs mainly in fractured cleavages. Carbonate formations are cavernous, wherever calcium content is high. The depth to water level varies from 5 to 20 meter below ground level whereas depth of wells varies from 8 to 30 metres below ground level. The average yield of wells is around 40 m<sup>3</sup>/day. In carbonates, the yield of wells varies from 20 to 200m<sup>3</sup>/day.

**Groundwater in Delhi super group:** The formations belonging to Delhi super group are exposed in the western part of the district. Ground water in Quartzites occurs in the joints and fractures. Depth to water level is generally shallow. The yield of wells averages 50m<sup>3</sup>/day. Ground water in biotite schist and hornblende schist occurs in joints and fractures. The depth to water level ranges from 5 to 20 metre below ground level and yield of wells varies from 12 to 250 m<sup>3</sup>/day. In Calc schist and Calc gneiss, the yield of dug wells varies from 10 to 100m<sup>3</sup>/day. The yield is high when the lenticular cavities along Calc bands are saturated and interconnected.

**Groundwater in Alluvium:** Ground water occurs under unconfined condition in the unconsolidated formations consisting of sand, gravel, pebbles, cobbles and boulders in areas close to river courses near Kanpur area.

Ground water occurs under water table (phreatic conditions) in crystalline metamorphic, mostly dolomite and mica schist. Metamorphic are impervious in nature and ground water is held and moves through secondary openings like foliations, fractures, joints etc. Fracture porosity and hydraulic conductivity of metamorphic is very low. The elevation range is 420-706 and flow of water from North to South direction. The ground water movement follows the natural topography and general slope of the lease area. The general slope of the lease area is towards SE following the natural drainage pattern. Water level of the area is 7 – 10 m deep in pre-monsoon and 3 -5 m in post-monsoon season. Minimum and Maximum depth of working in the Conceptual Stage is -100m RL and -600m RL. The water quality is potable in nature in the study area; hence there is no contamination in ground water. Protective measure will be taken to safeguard the natural flowing streams.



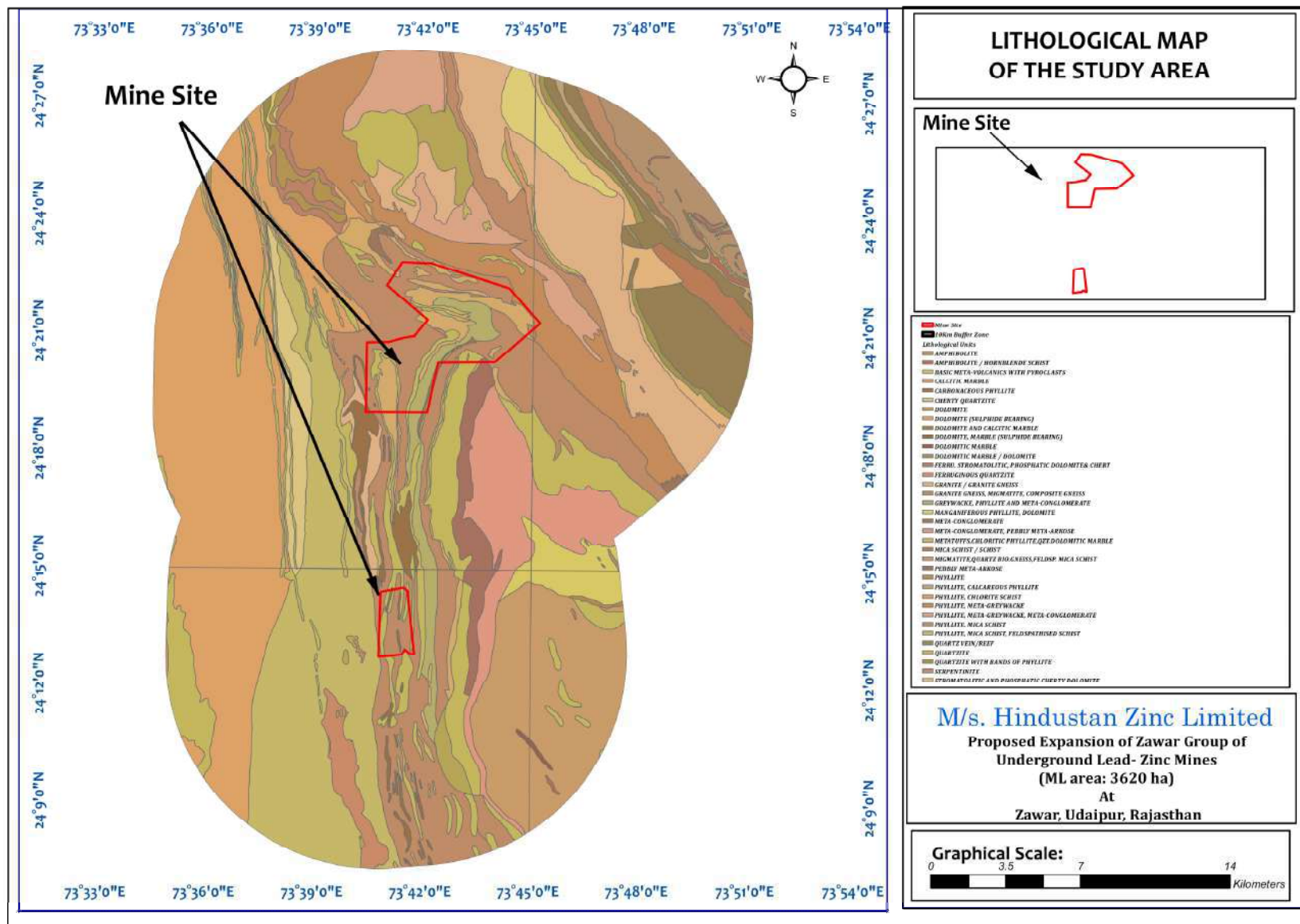
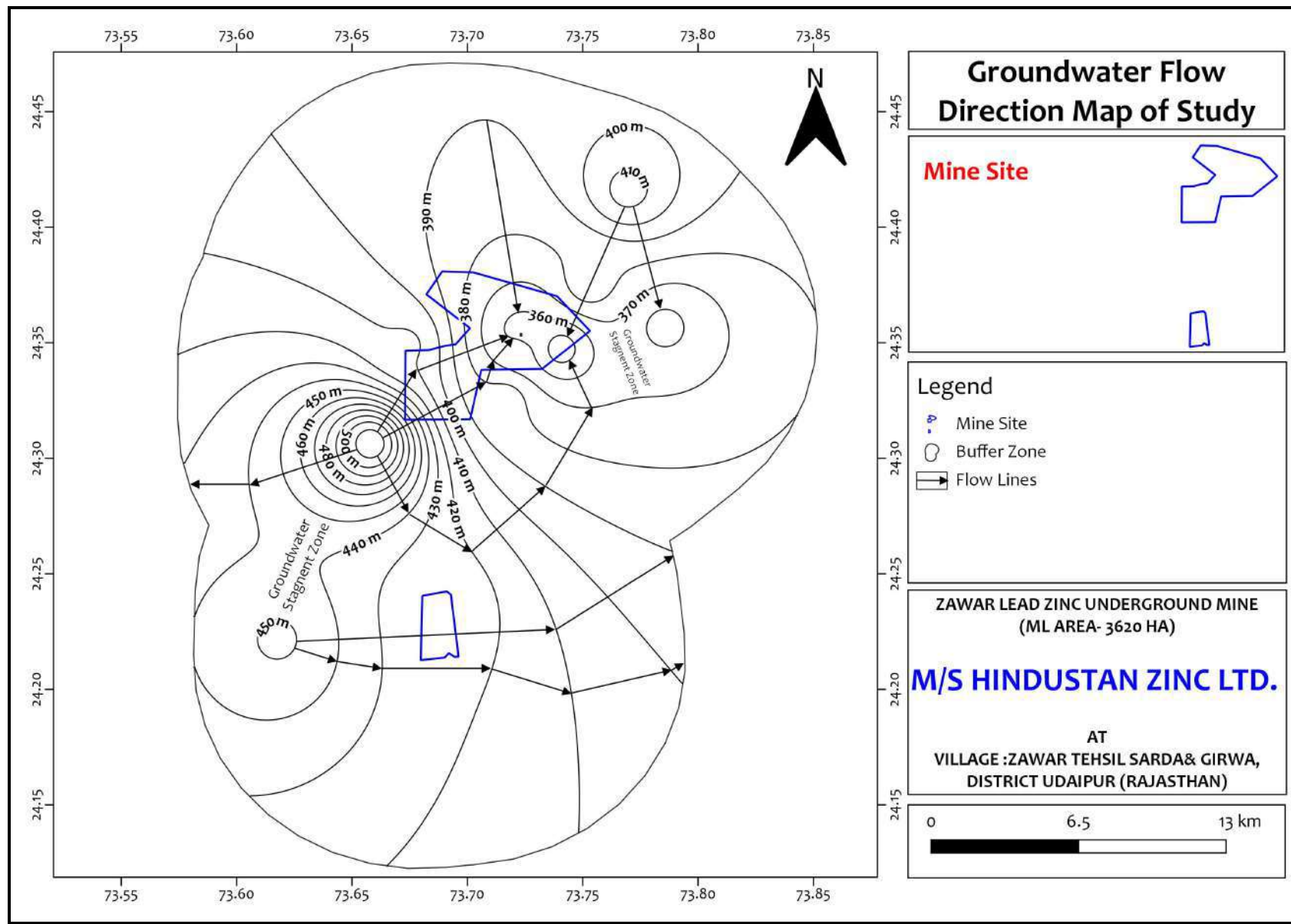


Figure 1.10: Map showing Lithological Formations in and around 10 km Buffer Zone of Existing Underground Pb Zn Zawar Mine (ML Area: 3620 ha) (Source: Bhukosh)



1.11: Map showing Lithological Formations in and around 10 km Buffer Zone of Existing Underground Pb Zn Zawar Mine (ML Area: 3620 ha) (Source: Bhukosh)

## GROUNDWATER LEVEL MONITORING

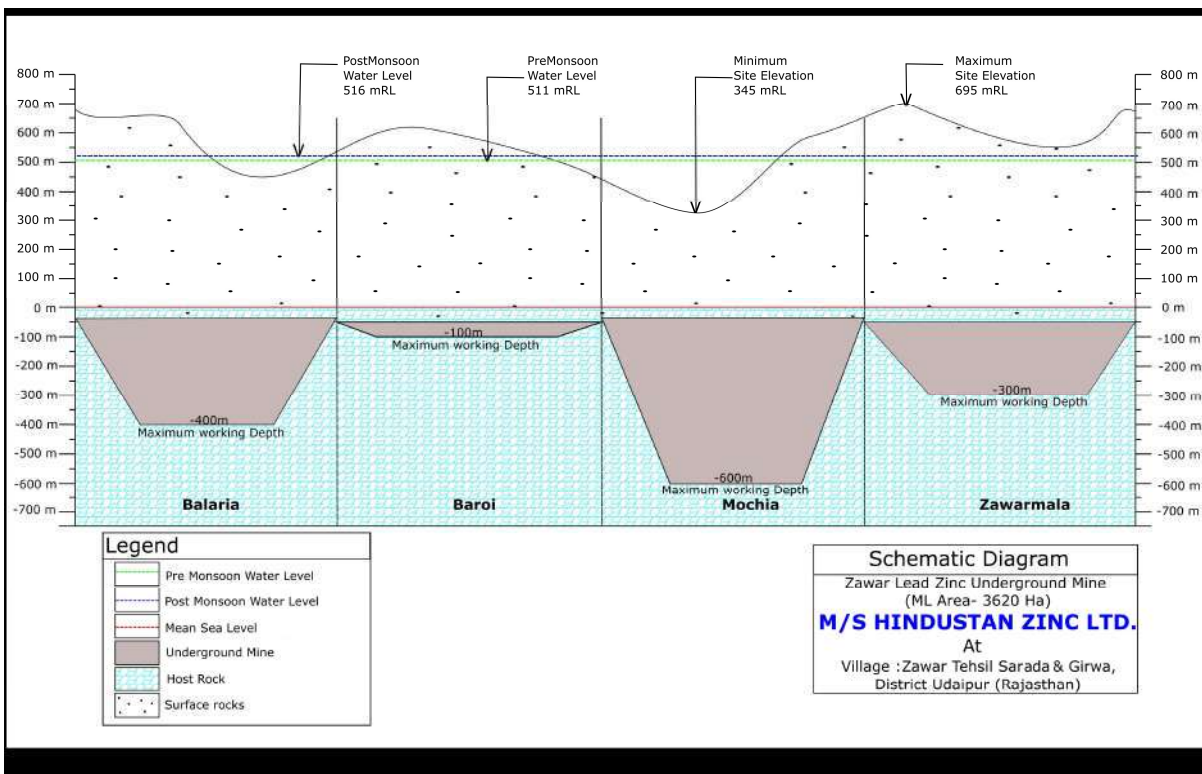
A detailed groundwater level monitoring has been carried during pre-monsoon season at about 10 different locations within buffer zone from existing open wells and bore wells. Based on field investigation, contour map for depth to water level (m bgl) and depth to water level (m amsl) for core and buffer zone has been prepared. Complete hydro-geological details are presented in **Table 1.8** and **Table 1.9**. Based on field investigation, contour map for depth to water level (m bgl) and depth to water level (m amsl) for core and buffer zone has been prepared and represented in **Figure 1.15 & 1.16**.

Depth to water level in lease area was found to vary between 2.67 m to 17.56 m bgl indicating water level to be moderately shallow. The minimum and maximum surface elevation of monitoring points in the study area is found to vary between 347 mRL to 534 mRL respectively.

**Table 1.8:**

**Details of Site elevation, Water Level and Working Depth of the Existing Pb Zn Zawar Mine (ML Area: 3620 ha)**

S. No	Particulars	Balaria	Baroi	Mochia	Zawarmala
1.	Site Elevation	345-695			
2.	General Ground Level	520			
3.	Working Depth @ Minimum	-30	-50	-33	-50
4.	Working Depth @ Maximum	-400	-100	-600	-300
5.	Ground Water Level	517-510			
6.	Pre Monsoon Water Level	513-510			
7.	Post Monsoon Water Level	517-515			



**Figure 1.12: Schematic Diagram**





Figure 1.13: Photographs showing Water level Monitoring in buffer zone

**Table 1.9**

**Details of Groundwater Level Monitoring in and around 10 km Buffer Zone of Existing Pb Zn Zawar Mine (ML Area: 3620 ha)\_Pre Monsoon**

S.No.	Location	Latitude	Longitude	Water level (m bgl)	Elevation (m)	Water level (m amsl)
1	Village Singatwara	24.35694	73.78517	13.73	370.8	357.07
2	Village Kevra Khurd	24.37556	73.75244	8.31	394.1	385.79
3	Village Kanpur	24.41586	73.76967	14.36	427.7	413.34
4	Village Kalipili	24.32525	73.71681	4.2	388.2	384
5	Ramnagar	24.34903	73.67392	7	418.4	411.4
6	Moridungri	24.34744	73.74031	4	347.9	343.9
7	Village Nangela	24.22167	73.61797	6.82	458	451.18
8	Bara Mines (Near Bara Village)	24.3065	73.65814	17.56	534.7	517.14
9	Tailing Dam Piezometer I	24.23783	73.68619	13.09	440.3	427.21
10	Tailing Dam Piezometer II	24.35333	73.72333	2.67	352.2	349.53



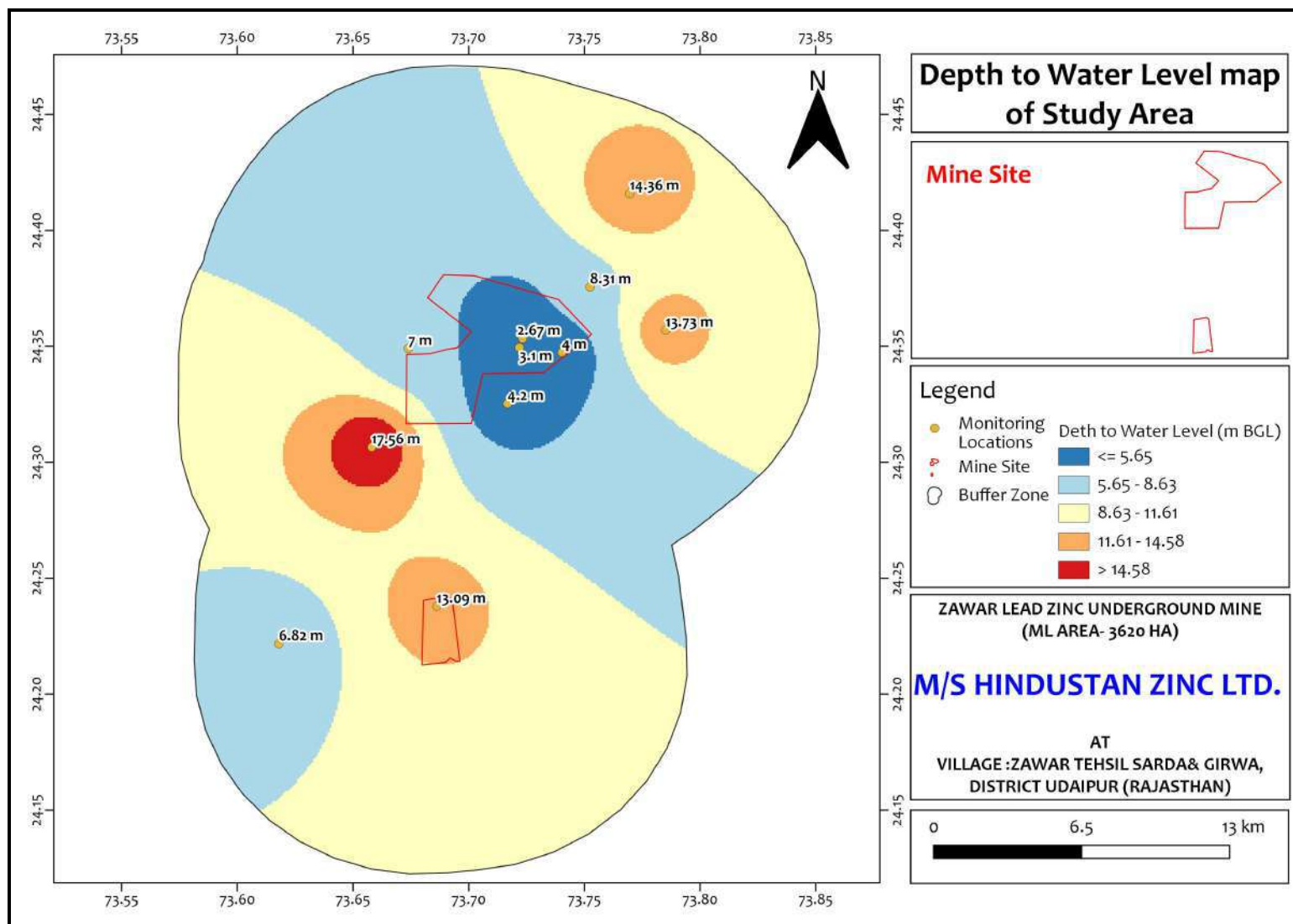


Figure 1.14: Depth to Water Level (mbgl) of Pre Monsoon in 10 km Buffer Zone of Existing Pb Zn Zawar Mine (ML Area: 3620 ha) (Source: Field Survey)

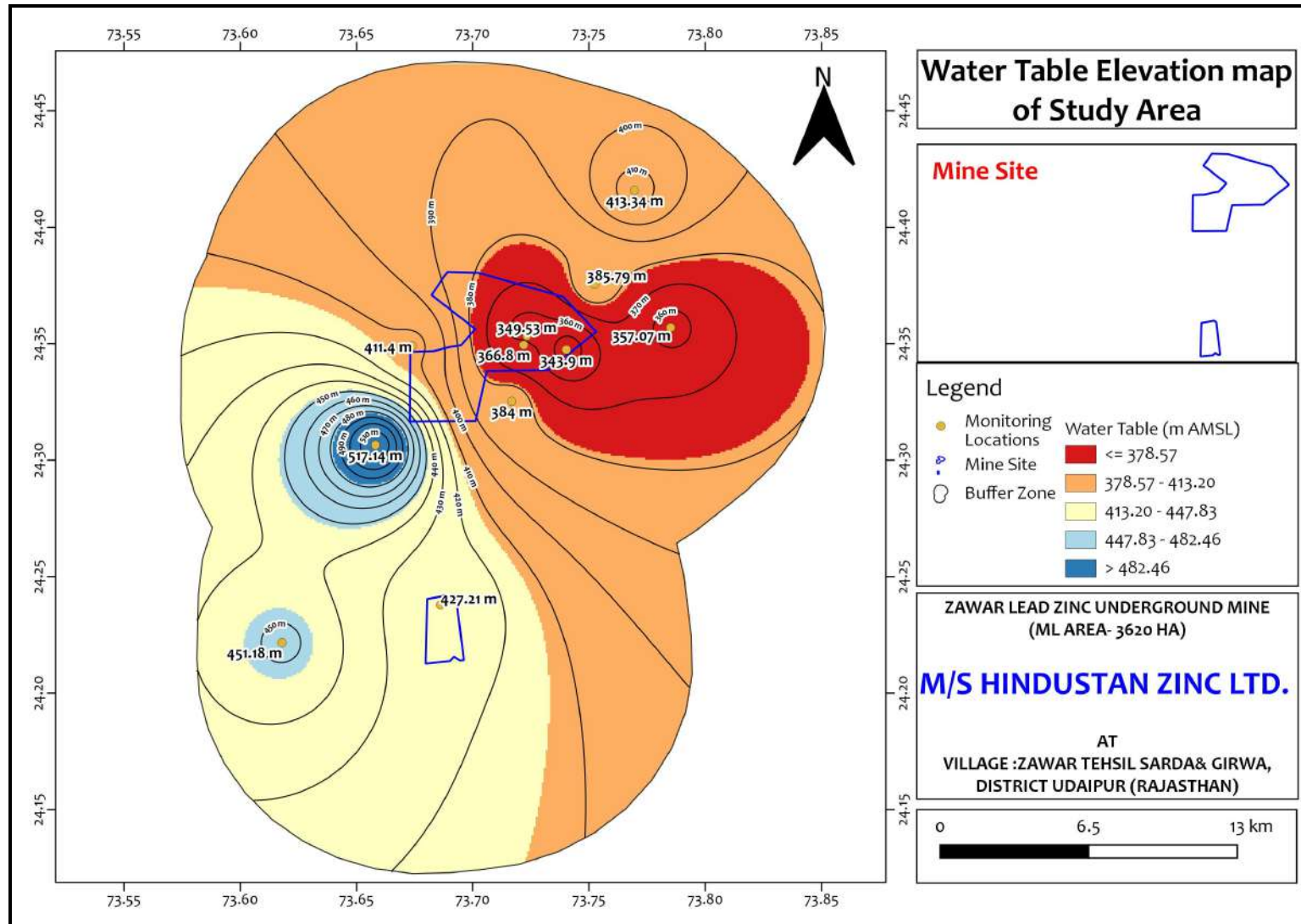


Figure 1.15: Pre Monsoon Water Table Map (amsl) in 10 km Buffer Zone of Existing Pb Zn Zawar Mine (ML Area: 3620 ha) (Source: Field Survey)

#### 1.10 WATER QUALITY

Surface and Ground water quality are analyzed from the water samples in and around the mine site. Detailed regarding the same are given in **Chapter 3 of Draft EIA/EMP Report**.

#### 1.11 GROUND WATER RESOURCES

Groundwater Resources of an area can be distinguished under two categories-

1. Dynamic Ground Water Resources
2. Static Ground Water Resources

##### DYNAMIC GROUNDWATER RESOURCES

Dynamic groundwater is that amount of water, which is found in the natural zone of fluctuation in an aquifer due to ground water recharge. Total Ground water Recharge ( $R_t$ ) of the area can be estimated by assessing the various component of the following equation.

$$\text{Equation : } R_t = R_r + R_s + R_i + R_s + R_c$$

where:

$R_r$  = Recharge from Rainfall

$R_s$  = Recharge from irrigation due to surface water

$R_i$  = Recharge from irrigation due to groundwater

$R_s$  = Recharge through surface water bodies

$R_c$  = Recharge to confined aquifer

##### GROUND WATER RESOURCES FOR BUFFER ZONE

Area of buffer zone is coming about 831.95 sq.km. (As per land use/land cover map).

The area of Buffer zone lies in Girwa Tehsil of Udaipur district, Rajasthan. This buffer zone has phyllites and alluvium as the main aquifer. Main recharging factors in this area is recharge due to rainfall, due to return flow from the applied irrigation from surface and groundwater and recharge from the surface water bodies.

Geographical area, specific yield and infiltration index are the parameters for determining the amount of water which is stored in the aquifer.

##### RECHARGE DUE TO RAINFALL

###### (a) BY GROUNDWATER TABLE FLUCTUATION METHOD

The buffer zone has Alluvium and Metamorphic rocks as principal aquifer whose average specific yield can be taken as 10% and 2% as per norms of GWRE 2009, while difference between pre and post monsoon seasonal fluctuation is taken as 3 m. Recharge due to rainfall computed by specific yield and water table fluctuation method is as follows:-

RECHARGE IN BUFFER ZONE BY WATER LEVEL FLUCTUATION METHOD	
Description of items	Quantity
1.Area (sq.km)	831.95
2.Water Table Fluctuation(m)	3
3a.Specific Yield for alluvium	10%
3b.Specific Yield for Metamorphic	2%
4a.Total Groundwater Storage [(1)*(2) *(3a) ](Mcum)	83.19*3.0*0.1
4b. Total Groundwater Storage [(1)*(2) *(3b) ](Mcum)	748.76*3.0*0.02
5.Total(M cum)	69.87

### (b) BY RAINFALL INFILTRATION FACTOR

In areas where groundwater level monitoring is not adequate in space & time, rainfall infiltration may be adopted. The ground water estimation committee, Govt. of India (2009) has suggested norms of recharge from rainfall under various hydro geological conditions. The committee has suggested 12% for alluvium and 6% for metamorphic origin. An attempt can be made to find out if it matches with the groundwater recharge calculated by seasonal fluctuation method.

RECHARGE IN BUFFER ZONE BY RAINFALL INFILTRATION FACTOR METHOD	
Description of items	Quantity
1.Area (sq.km)	831.95
2. Average Annual Rainfall (m)	0.805
3a.Rainfall infiltration factor for Alluvium	12%
3b. Rainfall infiltration factor for Metamorphic	6%
4a. Rainfall recharge in Buffer zone by Rainfall Infiltration Factor Method for alluvium	$83.19 \times 0.805 \times 0.12$
4b. Rainfall recharge in Buffer zone by Rainfall Infiltration Factor Method for metamorphic	$748.76 \times 0.805 \times 0.06$
Gross Rainfall Recharge (Mcum)	44.19

As per the recommendations of Groundwater Estimation Committee (GEC), 2013, if the difference between the two, expressed as a percentage of rainfall infiltration method is greater than or equal to -20% or less than or equal to +20 %, then the recharge is taken as the value estimated by the water level fluctuation method. If it is less than -20%, then it is taken as 0.8 times the value estimated by rainfall infiltration factor method. If it is greater than +20%, then recharge is taken as equal to 1.2 times the value estimated by rainfall infiltration factor method.

RAINFALL RECHARGE IN BUFFER ZONE AFTER COMPARING RESULTS FROM WATER LEVEL FLUCTUATION METHOD AND RAINFALL INFILTRATION FACTOR METHOD	
Description of items	Quantity
1.Rainfall Recharge during monsoon season in Buffer Zone	
a. By Water Level Fluctuation Method(Mcum)	69.87
b. By Rainfall Infiltration Factor Method(Mcum)	44.19
2.Difference between (1a) and (1b) expressed as a percentage of (1b), 'PD' $\left[ \frac{(1a) - (1b)}{(1b)} \times 100 \right]$	58.12%
3.Rainfall Recharge in the Buffer Zone during monsoon season (Mcum) [=(1a) if 'PD' is between -20 and +20% =0.8*(1b) if 'PD' is less than -20% =1.20*(1b) if 'PD' is greater than +20% ]	53.02

### RECHARGE DUE TO IRRIGATION

As suggested by the GEC committee, groundwater recharge from the return flow of irrigation water is normally taken as 30% of the total water applied for irrigation in an area consists of Alluvium and Metamorphic. Total groundwater applied for irrigation is 3.51 mcm/annum. Groundwater recharge from the above factors is as under:

$$R_{IB} = 3.51 \times 0.3$$

$$= 1.053 \text{ mcm/annum}$$

### RECHARGE DUE TO SURFACE WATER BODIES

As per the land use pattern of the buffer zone, total area under surface water bodies water bodies' work out to be 14.66 sq km. As per the GEC, groundwater recharge through surface water bodies

can be taken as 40% of the total water spread area. Hence, groundwater recharge from the above factors is as under:

$$\begin{aligned} S_{rB} &= 14.66 \text{ sq.km.} \times 0.4 \\ &= 5.86 \text{ mcm/annum} \end{aligned}$$

#### TOTAL RECHARGE OF BUFFER ZONE

NET ANNUAL GROUNDWATER AVAILABILITY IN BUFFER ZONE	
Description of items	(Mcum)
1.RainfallRechargein Buffer Zone	
Rainfall Infiltration Method	53.02
2. Recharge from 'Other Sources'	
A. Return flow to Groundwater system(30%)through Irrigation Total groundwater applied for irrigation is 3.51 mcm/annum (3.51 *0.3)	1.053
B. Recharge through surface water bodies in the area: (14.66 sq km x 0.4)	5.86
Total Annual[(2a)+(2b) ]	6.91
3.Gross Annual Groundwater Recharge	59.93

#### GROUNDWATER DRAFT OF BUFFER ZONE

In the investigated area, groundwater draft will occur mainly due to applied irrigation, domestic and industrial uses. Evapo-transpiration losses are considered nil as they are already taken into account while calculating recharge by water table fluctuation and rainfall infiltration factor method. Hence, groundwater draft can be computed by reducing the equation (B) to:

$$D_{tB} = D_{iB} + D_{dB} + D_{lB} + D_{inB}$$

#### DRAFT DUE TO APPLIED IRRIGATION ( $D_{iB}$ )

For assured water, supply canals and groundwater become the major source. The farmers in the study area rely mainly on groundwater for irrigation. Borewell and dug wells are the only structures that abstract water from subsurface to meet that requirement. Therefore, the volume of groundwater pumped out by tube-wells is considered as groundwater draft for irrigation in the area. There are about 366 dug wells bore wells tapping the aquifer consist of Phyllite and Alluvium. These tube wells usually have an average discharge of 80 cum/day. The annual draft has been calculated after considering that these structures generally operate for 4 months in a year. The annual groundwater withdrawal from these wells is calculated as-

$$\begin{aligned} \text{Groundwater draft by wells} &= 366 \times 120 \text{ days} \times 80 \text{ m}^3/\text{day} \\ &= 3.51 \text{ mcm/ annum} \end{aligned}$$

#### DRAFT DUE TO DOMESTIC USE ( $D_{dB}$ )

The total population in buffer zone area was around 74970 according to census figure for 2011 which has increased to 94109 in 2021 as per population growth rate of 25.53 % per decade. Considering 100 Liters (0.1 m<sup>3</sup>) as domestic use in rural and semi urban area (GEC, 2013), the total groundwater withdrawal for domestic use will be.

$$\begin{aligned} D_{dB} &= 94109 \times 0.1 \times 365 \\ &= 3435009 \\ &= 3.44 \text{ mcm/ annum} \end{aligned}$$

#### DRAFT DUE TO LIVESTOCK USE ( $D_{lB}$ )



The water consumption for livestock has been empirically considered as 5% of human consumption which is calculated as

$$\begin{aligned} D_{IB} &= 3.44 \times 0.05 \\ &= 0.17 \text{ mcm/annum} \end{aligned}$$

#### DRAFT DUE TO INDUSTRIAL USE ( $D_{in}$ )

There are many major and minor industries. Therefore, total groundwater withdrawal for industrial use is about 1000 KLD which is sourced from ground water

$$\begin{aligned} D_{inB} &= 1000 \times 330 \\ &= 330000 \\ &= 0.33 \text{ mcm/annum} \end{aligned}$$

GROSS ANNUAL GROUND WATER DRAFT FOR 'ALL USES' IN BUFFER ZONE	
GROUNDWATER DRAFT	Mcum
<b>NET IRRIGATIONUSE</b>	
For Combined (366*120*80)	3.51
Net irrigation use	<b>3.51</b>
<b>COMMUNITYUSE</b>	
Total population 94109 (@ 100 lpcd for 365 days)	3.44
For cattle population (5% of community use):	0.17
Industrial/Mine use(for all industries/mines falling in the buffer zone)	0.33
Total Community use	<b>3.94</b>
<b>GROSS ANNUAL GROUND WATER DRAFT FOR 'ALL USES' IN BUFFER</b>	<b>7.45</b>

#### TOTAL DRAFT OF BUFFER ZONE:

$$\begin{aligned} D_{tB} &= D_{IB} + D_{dB} + D_{IB} + D_{inB} \\ &= 3.51 + 3.44 + 0.17 + 0.33 \\ &= 7.45 \text{ mcm/annum} \end{aligned}$$

#### ALLOCATION OF GROUND WATER FOR DOMESTIC USE FOR FUTURE DEVELOPMENT

Domestic use of population within 10 km radius of project site has been projected for year 2041. Considering population growth percentage @25.53% per decade, population in year 2041 is estimated to be 148294 persons. Dependency of population is mainly on the groundwater in this area. Considering 100 litres (0.1 m<sup>3</sup>) as domestic consumption in rural and semi urban area, the total water withdrawal for domestic use will be:

$$\begin{aligned} D_{dB} &= 148294 \times 0.1 \times 365 \text{ days} \\ &= 5.41 \text{ mcm/annum} \end{aligned}$$

Present draft due to domestic use is 3.44 mcm/annum; hence additional water allocated for future domestic use works out to be 5.41-3.44 = 1.97 mcm/annum.

Total ground water resource of the buffer zone is 59.93 mcm/annum while total groundwater draft is 7.45 mcm/annum. The groundwater development in the area is about 12.43% of total groundwater resources. Therefore, buffer zone is coming under **Safe** category as per groundwater development status.

In spite of the above clarification the project lies in Sarada & Girwa Assessment Block of Udaipur District which comes under Semi-Critical Category as per CGWB Categorization 2017.

<http://cgwb.gov.in/GW-Assessment/Categorization%20of%20AU.pdf>

## SUMMARY OF BUFFER ZONE WATER BALANCE

STAGE OF GROUNDWATER DEVELOPMENT IN BUFFER ZONE	
Description of items	Buffer Zone
1.Stage of Groundwater Development	
a. Net Groundwater Availability (Mcum)	59.93
b. Annual Gross Groundwater Draft (Mcum)	7.45
c. Stage of Groundwater Development [ $\{(1b)/(1a)\} * 100$ ]	12.43%
d. Category of Groundwater Development	Safe

So, in view of the above the project will not bring any adverse impact to the ground water conditions within 10 km of the study area.

### 1.12 IMPACT OF MINING ON SURFACE & GROUND WATER RESOURCES

The mining operations are being carried out by underground mining. Mining is being done by deployment of Heavy Earth Moving Machineries (HEMM).

Mode of Entry: UG shaft (466 to 165 m RL) and level Entries- 433, 355, 300, 250, 225, 200 & 173 m RL, and Ramp [430 to (-) 55 m RL] with level Entries- 355, 300, 250, 200, 173, 80, 35, (-) 5 & (-) 30 m RL and various sub-levels.

Underground Layout:

- ❖ Balaria mine extends from 2400 to 2900 Dep and Adit as main entry followed by Shaft & Ramp.
- ❖ Baroi mine extends from 2400 to 2900 Dep and Adit as main entry followed by Shaft & Ramp.
- ❖ Zawarmala mine extends from 2400 to 2900 Dep and Adit as main entry followed by Shaft & Ramp.
- ❖ Mochia mine extends from 2400 to 2900 Dep and Adit as main entry followed by Shaft & Ramp.

Ground water occurs under water table conditions and is transmitted through fractures, joints and foliations. Mica schist is impervious in nature and has developed secondary porosity only due to joints and fractures. There is very limited thickness of weathered zone and generally it lies above the zone of saturation.

The depth of water level varies from 3-5m bgl during post monsoon and 7-10m bgl during pre-monsoon season. The depth of mining is given below:

**Table 1.10**  
**Block Wise Working Details**

S.No	Block	Ultimate Depth of Mining
1	Balaria	-400 m RL
2	Baroi	-100 m RL
3	Mochia	-600 m RL
4	Zawarmala	-300 m RL

Source: Approved Mining Plan with Progressive Mine Closure Plan

According to detailed water level monitoring in and around mine lease area, depth to water level is relatively shallow in the surrounding study area and depth to water level/major aquifer is occurring between 517 mRL (3 m bgl) to 510 mRL (10 m bgl). The mineral availability and depth of mine working will go up to -100 mRL minimum and up to maximum of -600mRL. Hence, there is every possibility of groundwater table intersection by mine workings, or ground water ingress in the mine pits.

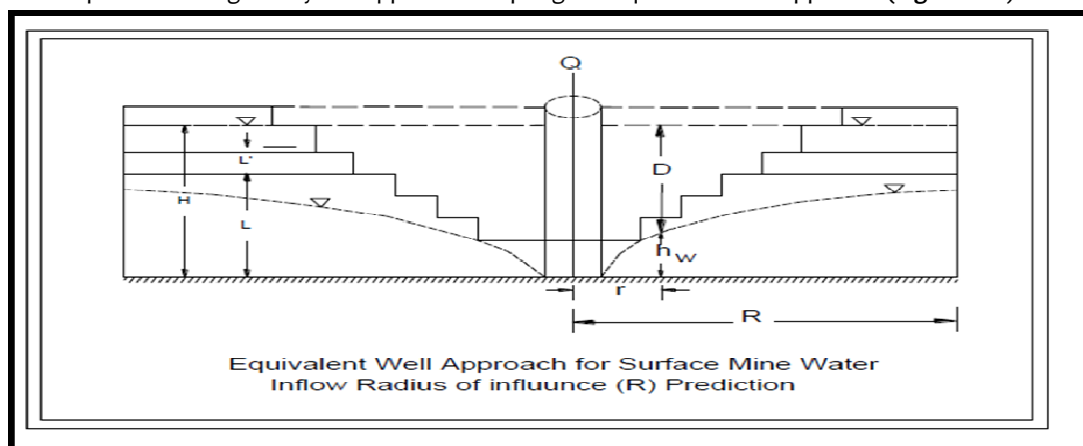
## ESTIMATION OF MINE SEEPAGE

Estimation of water inflow to a surface mining operation is a necessary requirement for mine drainage design. Water inflow in a shallow surface mining may originate solely from a surface source and from the atmosphere in the form of precipitation. However, depending upon the depth of mining the water inflow contribution from ground water flow may be a significant component. In flow from surface sources and precipitation are generally estimated using hydrological balance equations, using the catchment characteristics and several empirical formulae's are available in literature. Assuming the extent of contribution from surface sources and precipitation, the mine plan usually incorporates measures to divert these water through garland drains designed considering the slope and it is ensured that the water do not outlet in to the mine pits. Hence, the most important and critical component of mine water inflow remains is seepage from ground water, which needs to be carefully and rationally estimated so as to plan the dewatering mechanism to allow mining activity.

Many analytical solutions for prediction of water inflow into mine excavations can be found in the literature (Hanna et al., 1994; Shevenell, 2000; Singh and Atkins, 1985a, b; Marinelli and Niccoli, 2000); these models often were developed based on some very specific assumptions and boundary conditions that restrict their applicability in many mining situations. The prediction of the amount of water inflow into a pit is very important for development of a mine dewatering program. The ground water flow in the mine pit can be estimated by one of the techniques:

- Equivalent flow approach
- Two dimensional flow equation
- Numerical Techniques through simulation

Accurate estimation of groundwater inflow to mine excavation is important and generally accomplished through analytical approach adopting the equivalent flow approach (Figure 1.16).



**Figure 1.16: Schematic Diagram of Zone of Influence**

Numerical modelling requires huge data and skill, however the complexities and in homogeneity can be better approximated in numerical modelling.

The numerical groundwater modelling approach also involves predictive simulation to determine the potential magnitude and extent of the impact of mining on the surrounding groundwater system, including the potential impact on neighbouring groundwater users.

In the present context, an attempt has been made to assess the mine seepage as per mine plan both with depth and time and quantification of computation of mine water inflow and radius of influence. Effort has also been made to plan the details of utilization of water being pumped out along with quantification of its various uses. Further, with the help of analytical techniques and statistical analysis of water level observations attempt has been made to study the impact of mining on ground water regime, both with depth and time as well as on surface water sources in the surrounding areas and suggest mitigation measures.

This model is based on the rate of flow and mine expansion rate. The mine inflow takes place during depillaring in two phases. i. In the first part, after depillaring the water present in the collapsed aquifer part of the roof immediately drain out ( $Q_1$ ). ii. Then, in the second segment, water present adjacent to the collapsed aquifer part of the roof used to percolate continuously ( $Q_2$ ). The collapsed mass would act as a fully draining well. Hence, during depillaring stage the total water inflow ( $Q$ ) will be  $Q = Q_1 + Q_2$ . The  $Q_1$  and  $Q_2$  can be calculated using the following formulas:

$$\left. \begin{aligned} Q_1 &= SRH \\ Q_2 &= 2\pi KH^2 / W(U_0) \\ U_0 &= SR / (4\pi KH) \end{aligned} \right\} \text{eq.3}$$

**Where,**  
**S** = Storativity/ Specific yield  
**R** = Mine expansion rate ( $\text{m}^2/\text{day}$ )  
**K** = Permeability ( $\text{m}/\text{day}$ )  
**H** = Saturated thickness of aquifer, m  
**T** = Transmissivity ( $\text{m}/\text{day}$ )  
**W ( $U_0$ )** = Well function (obtained from Wenzel's Table)

Table 1.11

Wenzel's table, showing values of  $w(u)$  corresponding to values of  $u$  and  $1/u$ .

VALUES OF $W(u)$											
$u$ or $1/u$	$N \times 10^{-10}$	$N \times 10^{-9}$	$N \times 10^{-8}$	$N \times 10^{-7}$	$N \times 10^{-6}$	$N \times 10^{-5}$	$N \times 10^{-4}$	$N \times 10^{-3}$	$N \times 10^{-2}$	$N \times 10^{-1}$	$N$
1.0	22.4486	20.1460	17.8435	15.5409	13.2383	10.9357	8.6332	6.3315	4.0379	1.8229	0.2194
1.5	22.0432	19.7406	17.4380	15.1354	12.8328	10.5303	8.2278	5.9266	3.6374	1.4645	0.1000
2.0	21.7555	19.4529	17.1503	14.8477	12.5451	10.2426	7.9402	5.6394	3.3547	1.2227	0.04890
2.5	21.5323	19.2298	16.9272	14.6246	12.3220	10.0194	7.7172	5.4167	3.1365	1.0443	0.02491
3.0	21.3500	19.0474	16.7449	14.4423	12.1397	9.8371	7.5348	5.2349	2.9591	0.9057	0.01305
3.5	21.1959	18.8933	16.5907	14.2881	11.9855	9.6830	7.3807	5.0813	2.8099	0.7942	0.006970
4.0	21.0623	18.7598	16.4572	14.1546	11.8520	9.5495	7.2472	4.9482	2.6813	0.7024	0.003779
4.5	20.9446	18.6420	16.3394	14.0368	11.7342	9.4317	7.1295	4.8310	2.5684	0.6253	0.002073
5.0	20.8392	18.5366	16.2340	13.9314	11.6280	9.3263	7.0242	4.7261	2.4679	0.5598	0.001148
5.5	20.7439	18.4413	16.1387	13.8361	11.5330	9.2310	6.9289	4.6313	2.3775	0.5034	0.0006409
6.0	20.6569	18.3543	16.0517	13.7491	11.4465	9.1440	6.8420	4.5448	2.2953	0.4544	0.0003601
6.5	20.5768	18.2742	15.9717	13.6691	11.3665	9.0640	6.7620	4.4652	2.2201	0.4115	0.0002034
7.0	20.5027	18.2001	15.8976	13.5950	11.2924	8.9899	6.6879	4.3916	2.1508	0.3738	0.0001155
7.5	20.4337	18.1311	15.8280	13.5260	11.2234	8.9209	6.6190	4.3231	2.0867	0.3403	0.0000658
8.0	20.3692	18.0666	15.7640	13.4614	11.1589	8.8563	6.5545	4.2591	2.0269	0.3106	0.0000376
8.5	20.3086	18.0060	15.7034	13.4008	11.0982	8.7957	6.4939	4.1990	1.9711	0.2840	0.0000216
9.0	20.2514	17.9488	15.6462	13.3437	11.0411	8.7386	6.4368	4.1423	1.9187	0.2602	0.0000124
9.5	20.1973	17.8948	15.5922	13.2896	10.9870	8.6845	6.3828	4.0887	1.8695	0.2387	0.0000071

#### BALARIA MINES

Table 1.12

Depth Wise Underground Mining in Balaria

Level (mRL)	Position	m	Departure extent
407to(-130)	Decline	4631	8250 to 6650
383 to 50	Incline	1593	7700 to 6500
415 to 373	Adits	1560	9000 to 6700
378	Adit & Exhausted level	1418	9000 to 7970
314	Exhausted level	1200	8800 to 7890
250	Production Incline (Phase I & Phase II)	2555	8770 to 6500
190	Extraction level	2102	8800 to 7000
120	Extraction level	1880	8760 to 7320
105	Loco Haulage, Production Incline Phase II and Main sump	2280	8750 to 7340
45	Haulage / Extraction level	2440	8740 to 6500
(-) 25	Extraction level	1439	8740 to 7230
(-) 40	LPDT Haulage / Extraction level & Exploratory drive level	1465	8650 to 7420
(-) 105	LPDT Haulage / App Ramp/ Extraction level & Exploratory drive level	458	7950 to 8700

#### BAROI MINES

Table 1.13

Depth Wise Underground Mining in Baroi

Level (mRL)	Position	m	Departure extent
430mRL	Exploratory & Connection drive	1550	4100 to 5150
390/384mRL	Extraction level / Haulage Dr.	1000	4500 to 5150
360mRL	Extraction level	550	4360 to 4500
346mRL	Exploratory Drive	295	4300 to 4400
311mRL	Extraction level	295	4500 to 4745
276mRL	Extraction Level & Expl. Drive	1075	4300 to 4525
190mRL	Extraction Level & Expl. Drive	380	4284 to 4500
110mRL	Extraction Level & Expl. Drive	574	4284 to 4350
390mRL	Exploratory drive & Extraction level	840	5100 to 5632



302mRL	Extraction Level & Expl. Drive	340	4950 to 5122
305mRL	Exploration Level & Expl. Drive	865	5000 to 5200
230mRL	Exploration Level & Expl. Drive	1160	4650 to 5000

**ZAWARMALA MINES**

**Table 1.14**  
**Depth Wise Underground Mining in Zawarmala**

Level (mRL)	Position	m	Departure extent
474	Extraction level	6687	2450 to 3350
430	Adit Level, Shaft inset	7223	2400 to 3300
355	Shaft Inset, Extraction level	3950	2600 to 2830
338	Extraction level	1373	2640 to 2860
300	Shaft Inset, Extraction level	2533	2655 to 2810
280	Extraction level	725	2655 to 2810
265	Extraction level	924	2655 to 2810
250	Shaft Inset, LPDT dumping, Expl. Drive	2033	2600 to 2900
228	Extraction level	399	2640 to 2790
225	Extraction level	251	2870 to 2900
210	Extraction level	772	2650 to 2800
200	Shaft Inset	492	2660 to 2900
187	Sub-level	374	2660 to 2810
173	Shaft Inset, Expl. Dr., Extraction level	1129	2600 to 2900
160	Sub-level	174	2650 to 2800
150	Extraction level	545	2630 to 2780
132	Extraction level	352	2680 to 2790
118	Extraction level	299	2675 to 2800
100	Extraction level	700	2675 to 2800
80	Expl. Dr., Extraction level	756	2650 to 2800
35	Extraction level	750	2605 to 2790
(-)5	Extraction level, Expl. Dr.	1242	2550 to 2740
(-)30	Extraction level	811	2550 to 2740
(-) 84	Extraction level	1150	2550 to 2810

Source: Approved Mining Plan

**MOCHIA MINES**

**Table 1.15**  
**Depth Wise Underground Mining in Mochia**

Level (mRL)	Position	m	Departure extent
395	Surface & Shaft inset	-	6173
5thL – 307/312	Connection level	5484	4230 to 6600
6thL – 250	Shaft inset	1200	5470 to 6640
7thL – 173	Extraction level	1453.80	5530 to 6450
8thL– 106	Extraction level	3819.25	5350 to 6310
52	Extraction level	3142	5170 to 6350
-28mRL	Extraction level	886.8	5170 to 6350
9thL – 39/44	Haulage level/Extraction level	3284.20	4400 to 6400
9thA L – 3	Crusher Chamber	110	6160 to 6180
10th L – (-)29	Skip loading station	900	5770 to 6190
452	Adit 5 & Shaft inset	720	4900
413	Shaft inset	653	4350 to 4920
370	Shaft inset	220	4690 to 4960
252	Extraction level	3846.4	4530 to 5120

192	Extraction level	3146.6	4550 to 5270
132	Extraction level	2576.7	4500 to 5240
57	Extraction level	3350.5	4200 to 5300
-23	Extraction level	1378	4200 to 5300
-48	Extraction Level	140	4000 to 5300

Source: Approved Mining Plan

Table 1.16

Groundwater inflow into Zawar Underground Pb Zn Mines (Estimated) at maximum working depth

Period	Depth of Mine (m)	H (m)	R (m <sup>2</sup> /day)	K (m/day)	S	U <sub>o</sub>	W(U <sub>o</sub> )	Q <sub>1</sub>	Q <sub>2</sub>	Q m/day
Balaria	400	76	83.29	0.065	0.00001	1.34E-05	10.5303	0.047477	223.9028	223.95
Baroi	100	76	20.82	0.065	0.00001	3.36E-06	11.9855	0.011871	196.718	196.73
Mochia	600	76	124.93	0.065	0.00001	2.01E-05	10.2426	0.07212	230.1919	230.26
Zawarmala	300	76	62.47	0.065	0.00001	1.01E-05	10.9357	0.035606	215.6024	215.64
Total Estimated Seepage								0.167074	866.4151	866.58

It is apparent from the assessment in Table 1.16 that the mine inflow will be in the tune 866.58 KLD in the conceptual stage considering maximum depth of working, depending on aquifer thickness and its potentiality. Moreover, during depillaring due to caving, a number of cracks and fractures generate in the aquifers lying in the roof of the working seam and thus induces to secondary porosity and increase the permeability of the aquifers. However, with the spatial variation in aquifer parameters and recharge, the observed inflow may slightly deviate from that estimated.

#### MINE DEWATERING GAINFUL UTILIZATION OF PUMPED WATER

Existing water requirement for the project is 14000 KLD. There will be no Additional water requirement for the proposed expansion project; therefore the total water requirement after expansion will remain the same as 14000 KLD. Water will be sourced from the Tidi Dam. Permission for the same was obtained from the Water Source Department, Government of Rajasthan on 17.09.1976.

The total seepage calculated at the end of conceptual period is **866.58 KLD or 867 KLD**. The pumped water will be utilized to meet daily mine water requirement including Benefitted Area, Dust Suppression and Greenbelt Development. Details have been elaborated below:

Table 1.17

Detailed breakup of Water Pumped out from Mine Pits during Plan Period

S.No	Particulars	Zawar Underground Pb Zn Mines
		Water Quantity (KLD)
1.	Benefitted Area	272.00
2.	Dust Suppression	353.00
3.	Greenbelt Development	242.00
Total		867.00

#### PLAN FOR REDUCTION OF GROUND WATER

- ❖ The water accumulated in the mine pit will be utilized in various mining activities.

#### 1.13

#### RAINWATER HARVESTING PROPOSAL

Rainwater harvesting is a technique of collection and storage of rainwater into natural reservoirs or tanks, or the infiltration of surface water into subsurface aquifers (before it is lost as surface runoff). The process involves collection and storage of rainwater with help of artificially designed systems, that runs off natural or man-made catchment areas e.g. rooftop, compounds, rocky surface, hill

slopes or artificially repaired impervious / semi-pervious land surface. The collected rainwater from surfaces on which rain falls may be filtered, stored and utilized in different ways or directly used for recharge purposes. Rainwater harvesting is unrestricted from any kind of impurity, with relatively less storage cost and no maintenance cost involved except for periodical cleaning.

With depleting groundwater levels and fluctuating climate conditions, this measure can go a long way to help mitigate the adverse effects of rising water scarcity. Reserving rainwater can help recharge local aquifers, reduce urban flooding and most notably, ensure water availability in water-scarce zones.

Artificial recharge techniques normally addresses to following issues –

- (i) To enhance the sustainable yield in areas where over-development has depleted the aquifer.
- (ii) Conservation and storage of excess surface water for future requirements, since these requirements often change within a season or a period.
- (iii) To improve the quality of existing groundwater through dilution.
- (iv) To remove bacteriological and other impurities from sewage and waste water so that water is suitable for re-use.

The basic purpose of artificial recharge of groundwater is to restore supplies from aquifers depleted due to excessive groundwater development.

#### 1.14 FACTORS AFFECTING RUN-OFF POTENTIAL

##### i. Climate and Rainfall Pattern

##### ii. Evaporation Losses

##### iii. Geological Formation and Catchment Characteristics

#### 1.15 DETAILS OF RAINWATER HARVESTING STRUCTURES INSIDE THE MINE

They have constructed 39 rainwater harvesting structures (Check dams, gabion, weirs, earthen check dams and cemented check dams) through the Forest Department during the period 2017-2019, a typical section is shown below.

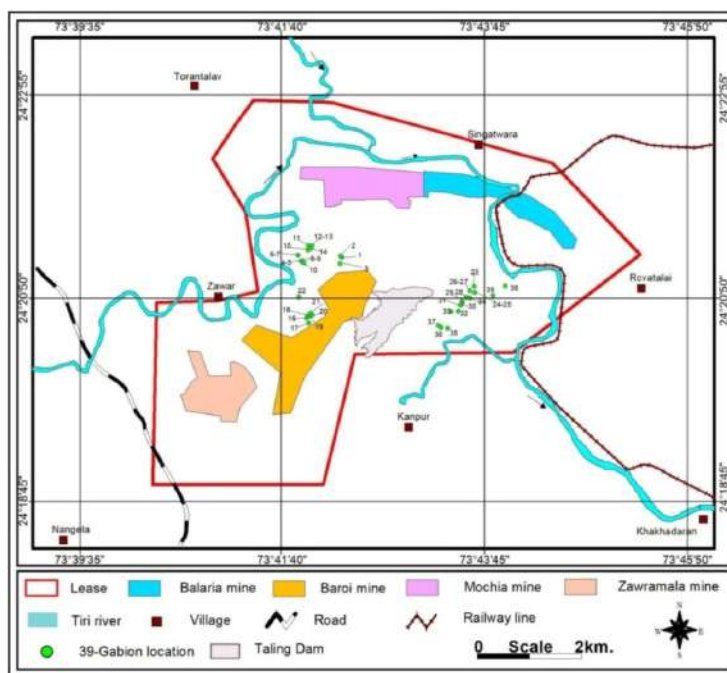


Figure-1.17. Recharge Structures present in the Underground Pb Zn Mines of Zawar

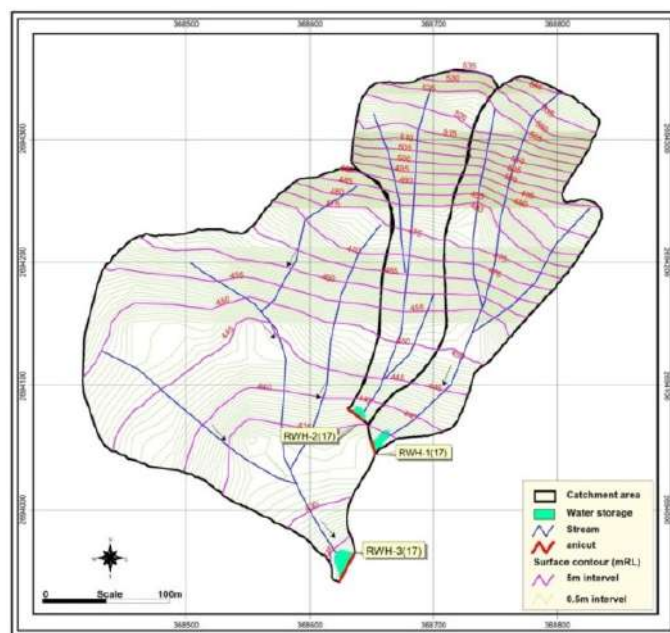





Figure-1.18. Stream network and catchment area of check dam -1 to 3

Table 1.18

Check dam specification (1 to 3)

Check dam No.	CKD-1	CKD-2	CKD-3
Easting	73° 42' 18.42"	73° 42' 17.79"	73° 42' 17.63"
Northing	24° 21' 14.98"	24° 21' 15.87"	24° 21' 11.22"
Catchment area (m2)	23646	16902	52745
Catchment Yield (m3)	5875	4199	13104
Total water storage (m3)	227	264	3641
Net-availability of water	1136	1322	18204
Net recharge	568	661	9102
<div style="display: flex; justify-content: space-around;">   </div>			
<div style="display: flex; justify-content: space-around;"> <div>Photo plate 1: Check Dam 1</div> <div>Photo plate 2: Check Dam 2</div> </div>			
			
Photo plate 3: Check Dam 3			

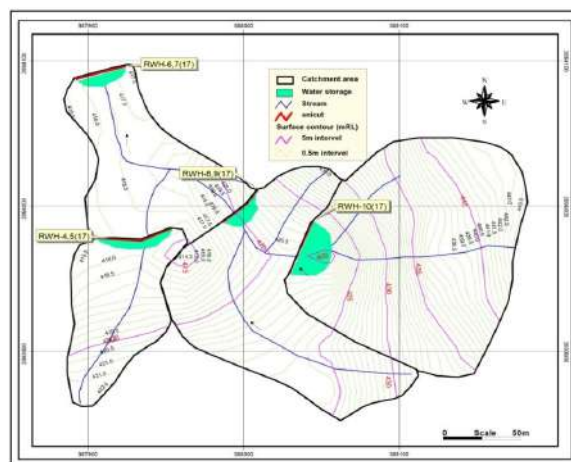


Figure-1.19. Stream network and catchment area of Check dam -4 to 10

Table 1.19

Check dam specification (4 to 10)

Check dam No.	CKD-4	CKD-5	CKD-6	CKD-7	CKD-8	CKD-9	CKD-10
Easting	73° 41' 53.92"	73° 41' 53.92"	73° 41' 52.09"	73° 41' 52.09"	73° 41' 54.86"	73° 41' 54.86"	73° 41' 55.63"
Northing	24° 21' 12.75"	24° 21' 12.75"	24° 21' 16.26"	24° 21' 16.26"	24° 21' 13.02"	24° 21' 13.02"	24° 21' 11.64"
Catchment area (m <sup>2</sup> )	5956	5956	8000	8000	2693	2693	18385
Catchment Yield (m <sup>3</sup> )	1480	1480	1988	1988	669	669	4568
Total water storage (m <sup>3</sup> )	2914	2914	5760	5760	11684	11684	3505
Net-availability of water	14570	14570	28802	28802	58420	58420	17523
Net recharge	7285	7285	14401	14401	29210	29210	8762

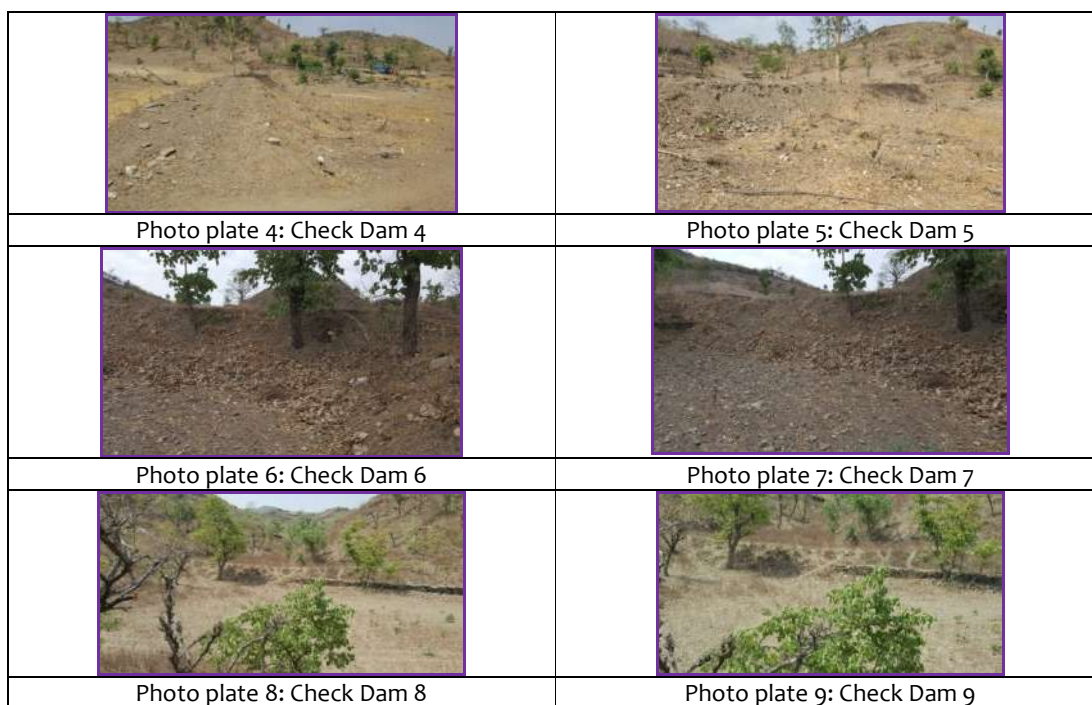






Photo plate 10: Check Dam 10

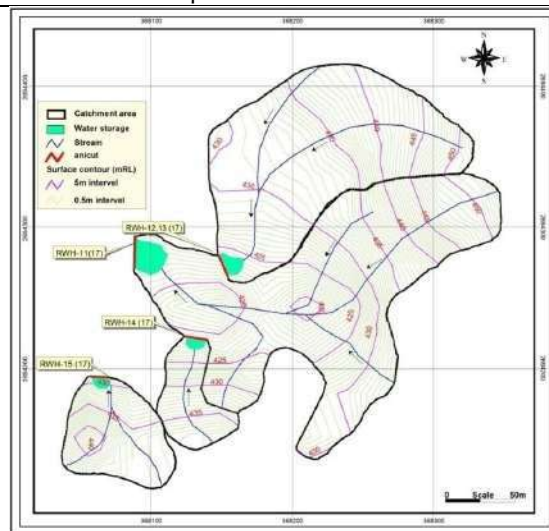


Figure-1.20: Stream network and catchment area of Check dam -11 to 15

Table 1.20

Check dam specification (11 to 15)

Check dam No.	CKD-11	CKD-12	CKD-13	CKD-14	CKD-15
Easting	73° 41' 58.38"	73° 42' 00.45"	73° 42' 00.45"	73° 41' 59.80"	73° 41' 58.10"
Northing	24° 21' 21.93"	24° 21' 21.97"	24° 21' 21.97"	24° 21' 20.43"	24° 21' 19.37"
Catchment area (m <sup>2</sup> )	22851	16292	16292	2690	4525
Catchment Yield (m <sup>3</sup> )	5677	4047	4047	668	1124
Total water storage (m <sup>3</sup> )	2541	1237	1237	4421	302
Net-availability of water	12707	6185	6185	22106	1511
Net recharge	6353	3093	3093	11053	756



Photo plate 11: Check Dam 11



Photo plate 12: Check Dam 12



Photo plate 13: Check Dam 13



Photo plate 14: Check Dam 14



Photo plate 15: Check Dam 15

Twelve rain water recharge structures in the form of Gabions, earthen check dams and concrete check dams were constructed in the year 2018 and 2019.

## 2.0 SUMMARY & CONCLUSION

Hindustan Zinc Limited has Zawarmala Underground Lead- Zinc Mine with proposed Expansion from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total Excavation: 7.78 Million TPA including Waste rock 1.28 MTPA and Beneficiation from 4.8 Million TPA to 7.3 Million TPA within ML Area of 3620 ha (ML No.03/89) at Villages- Zawar, Tehsil: Girwa and Sarada, District- Udaipur, Rajasthan.

The company has approached Ministry of Environment, Forest and Climate Change (MoEFCC), Govt. of India, New Delhi for grant of Terms of References (ToR) for environmental clearance of the proposal which has been recommended in the 35<sup>th</sup> EAC Meeting. The ToR was granted by MoEFCC vide its letter number **F. No. J-11015/259/2012-IA-II (M) dated 8th September 2021**

The following ToR conditions related to hydrogeological study have been addressed in the report are as follows:

- ❖ ***The water requirement for the project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the project should also be indicated.***

Existing water requirement for the project is 14000 KLD. There will be no Additional water requirement for the proposed expansion project; therefore the total water requirement after expansion will remain the same as 14000 KLD. Water will be sourced from the Tidi Dam. Permission for the same was obtained from the Water Source Department, Government of Rajasthan on 17.09.1976.

The complete water balance & water requirement details are given in section 1.7.

- ❖ ***Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be secured and copy furnished.***

Existing water requirement for the project is 14000 KLD. There will be no Additional water requirement for the proposed expansion project; therefore the total water requirement after expansion will remain the same as 14000 KLD. Water will be sourced from the Tidi Dam. Permission for the same was obtained from the Water Source Department, Government of Rajasthan on 17.09.1976.

NOC for dewatering of ground water from Baroi, Balaria, Mochia and Zawarmala Blocks were obtained from CGWA vide letter dated 07.09.2009. Offline Application for second renewal of NOC was submitted to CGWA vide letter dated 09.12.2016 which was recommended by CGWB and as per recent guidelines online Application for 2nd renewal of NOC for dewatering has been submitted on 10th June 2021. Presently applications are in process with CGWA, New Delhi.

- ❖ ***Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.***

Detailed rainwater harvesting proposal is given in section 1.15.

- ❖ **Information on site elevation, working depth, ground water table, etc, should be provided both in AMSL and bgl. A Schematic Diagram may also be provided for the same.**

Detailed site elevation, working depth, ground water table, etc, has been explained in table 1.8 and Schematic Diagram is elaborated in Figure 1.12.

- ❖ **Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.**

The buffer zone Zawar group of mines is drained by Tidi River, a tributary of River Mahi originates in the south western part of Debari hills which takes southerly course and joins Gomti River near village Jharol. Tidi River after flowing through Zawar valley takes southerly course and meets Gomti River, just after Jaisamand dam which is getting flow of Gomti, Godi and Vagruva rivers. Details of the same are given in **Section 1.6**.

- ❖ **Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.**

According to detailed water level monitoring in and around mine lease area, depth to water level is relatively shallow in the surrounding study area and depth to water level/major aquifer is occurring between 517 mRL (3 m bgl) to 510 mRL (10 m bgl). The mineral availability and depth of mine working will go up to -30 mRL minimum and up to maximum of -600mRL. Hence, there is every possibility of groundwater table intersection by mine workings, or ground water ingress in the mine pits.

NOC for dewatering of ground water from Baroi, Balaria, Mochia and Zawarmala Blocks were obtained from CGWA vide letter dated 07.09.2009. Offline Application for second renewal of NOC was submitted to CGWA vide letter dated 09.12.2016 which was recommended by CGWB and as per recent guidelines online Application for 2nd renewal of NOC for dewatering has been submitted on 10th June 2021. Presently applications are in process with CGWA, New Delhi.



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**CSIR-CENTRAL INSTITUTE OF MINING & FUEL RESEARCH  
(Council of Scientific & Industrial Research)**

**Barwa Road, Dhanbad – 826 001**



***Draft Report on***

**Study and advice for blasting optimization at  
Mochia underground mines of M/s HZL for safe  
and efficient exploitation of minerals**

**PROJECT No. SSP/306/2018-19**

**February 2021**

## **Project Title**

# **Study and advice for blasting optimization at Mochia underground mines of M/s HZL for safe and efficient exploitation of minerals**

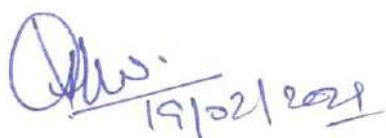
**Project No.: SSP/306/2018-19**

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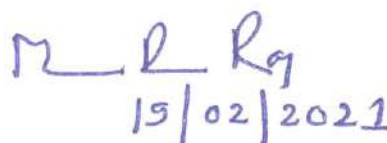
This report is meant for internal use of your organization only and it should not be published in full or part by your organization. It should not be communicated or circulated to outside parties except concerned departments. However, CSIR-CIMFR reserves the right to publish the results of the investigations 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.

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**(Vivek K Himanshu)**  
**Scientist**



**(Murari P Roy)**  
**Sr. Principal Scientist & Project Leader**



## **Contents**

S.No.		Page Nos.
	Executive Summary	1
1.	Introduction	3
2.	Location and Geology	3
3.	Instrumentation	4
4.	Experimental blast details	5
5.	Analyses of recorded vibration data	6
5.1	Frequency of blast vibration	7
5.2	Waveform analysis of blast	7
6.	Existing vibration standard and criteria to prevent damage	10
7.	Suggested blast design parameters for safety of underground Structures	11
7.1	Suggested Blast Design Parameters for Safety of Surface Structures	12
7.2	Safety precautions while blasting	12
8.	Review of development face blasting pattern	12
9.	Review of ring blasting pattern	14
10.	Monitoring of velocity of detonation (VOD) of explosives	16
11.	Quality test of delay detonators	18
11.1	Quality test of NONEL delay detonators during 1st visit	18
11.2	Quality test of NONEL delay detonators during 6th visit	23
12.	Conclusions and Recommendations	27
	Acknowledgements	28

# **ANNEXURE**

## EXECUTIVE SUMMARY

This report relates to the study conducted by CSIR-Central Institute of Mining and Fuel Research, Dhanbad on blast optimization study at development faces as well as at production blast (slot/ring) faces for safe and efficient exploitation of minerals at Mochia underground mine. The methodology adopted to reach at the recommendations under this study includes the experimental trials, instrumentation and data monitoring and data analysis. The results of the study and recommendations, made thereof with the important observations and methodology, are summarised below:

- ❖ The major objectives of the study were suggesting blast design parameters to prohibit damages around important underground structures, review of development face, production face blast pattern and qualitative assessments of explosives and its accessories. These objectives were achieved by experimental trials at the mine, generation of data for development of blast vibration predictors, and data analysis etc. The blast designs to address the major concerns has been suggested in the report on the basis of results of the data analysis and experimental trials. The experimental trials were carried out during the six visits to the mine.
- ❖ Altogether, 31 blasts were conducted at different development and production blast faces of the mine. The blast vibrations were monitored around different underground structures located in the proximity of the blasting face. Most of the vibration were recorded at near field distances from the blast face.
- ❖ During the monitoring time, the number of holes detonated in a blast round varied from 3 to 20. The total explosives weight detonated in a blast round were varied from 110 to 850 kg. The maximum explosives weight per delay varied between 16 and 184 kg. The hole diameter of 64, 70 and 102 mm were used in all the blasts. Blast holes were charged with emulsion cartridge explosives. Non-electric detonators (NONEL) was used for initiation of charged holes.
- ❖ Maximum level of ground vibration recorded during experimental trial was 59.32 mm/s at peak dominant frequency of 110.2 Hz. The vibration was recorded at a distance of 57 m from the blast face CW0 stope on 15.03.2018. The location of seismograph was at the same level of the blast face. The blast was conducted for 8 numbers of hole having depth of about 10m. The total explosive charge of 250 kg was fired in this blast keeping explosive weight per delay of 31 kg.
- ❖ The statistical predictor equation has been developed for the safety of underground structures while underground blasting. The Ground vibrations data recorded were grouped together for this purpose.

- ❖ The maximum explosive charge weight per delay and total explosive charge for the mine has been computed considering different vibration limits based on RMR values of the roof rock. The suggested MCPD and total charge is given in Annexure of the report. The suggested charging pattern should be followed for day-to-day blasting at the mine with the aim to safeguard nearby underground structures.
- ❖ The frequencies of the recorded vibration were more than 43.25 Hz in all the blasting rounds. The most common recorded frequency ranges between 80.94 Hz and 223.3 Hz. The maximum recorded frequency was 248.6 Hz.
- ❖ The existing drilling pattern for the face blast at the mine has been reviewed. The suggested firing pattern have focused on increasing the impact of explosive energy in the cut portion. It has been suggested to take all the initial four cut holes at the same delay to enhance the pull with cumulative impact of the explosive energy. The minimum distribution of the energy has been done in the cut holes using this principle. However, the over-break control in the periphery holes demands the explosive energy distribution in the blast holes of the periphery portion. Accordingly, the focus was to reduce the total number of blast holes firing simultaneously in the periphery portion. The maximum number of blast holes to be fired simultaneously from the blast design is 8.
- ❖ The optimum burden for different blast hole diameter used at the mine has been computed using the empirical formulae suggested by Rustan. The differential charging pattern has been suggested to reduce the over-break. The delay sequence for day-to-day blasting at the production blast faces of the mine has been suggested.
- ❖ In-the-hole Velocity of detonation (VOD) of Powergel - 801 explosives (390 gm of 40 mm dia.) of M/s IEL-Orica was recorded on 20.07.2018 and 20.07.2019. The recorded VOD of the explosive was 3573 m/s and 3702 m/s.
- ❖ The scattering tests of NONEL delay detonators were performed during 1<sup>st</sup> and 6<sup>th</sup> visits to the mine. The tests were conducted using High speed video camera. The test result reveals that the delay timing of the detonators is within acceptable limit for the test conducted during 6<sup>th</sup> visit.
- ❖ The scattering percentage should be restricted to maximum 10 % up to 10 no. delay and thereafter it should be within 5 % to get the optimum results from the blast.

## **1. Introduction**

M/s Hindustan Zinc Limited entrusted CSIR-Central Institute of Mining and Fuel Research, Dhanbad PO No.: 2000046826/5100022254 dated 13.01.2018 for conducting blast optimization study at development faces as well as at production blast (slot/ring) faces for safe and efficient exploitation of minerals at Zawar group of mines.

In view of the above Rock Excavation Engineering team of CSIR-Central Institute of Mining & Fuel Research (CIMFR), Dhanbad conducted total six field visits during March 26 – 31 2018, July 13<sup>th</sup> -21<sup>st</sup> 2018, September 25- October 5 2018, January 16 - February 01 2019, July 16 - 27 2019 and January 20-30 2020 to perform trial blasts. Methodology of blast design optimization was discussed with HZL officials. Near field blast induced vibration were measured by placement of seismographs for trial blasts of development and production faces. Qualitative assessment of explosive and its accessories were performed by Velocity of detonation (VOD) and scattering tests.

Based on the discussion with mine management, the major objectives of the study were as follows:

1. Development of nearfield blast vibration predictor and suggestion on blast design parameters to prohibit damages of underground structures.
2. Review of blasting pattern for excavation of development faces.
3. Review of blasting pattern followed for production blast faces of the mine.
4. Qualitative assessments of explosive and its accessories.









The above objectives were achieved by experimental trials at the mine. The statistical predictor equation has been developed on the basis of recorded vibration data. The data was gathered during the visits to the mine. The data gathered by the mine management were also taken together with the data from the experimental trial for the statistical analysis. The charging parameters for the blast at different distances from the underground structures has been suggested on the basis of the predictor. The necessary instrumentation was carried out during field visits for the assessment of explosive and its accessories.

## **2. Location and Geology**

The region is one of the significant parts of the Aravalli Supergroup which have been deposited in a Paleoproterozoic rift setting. The Archean metamorphic sequences of the Banded Gneissic Complex form the basement of Aravalli Supergroup. The area in and around Udaipur constitutes the type area for Aravalli Supergroup. The economically noteworthy lower part of Aravalli Supergroup is best exposed in the vicinity of Zawar region. This area incorporates four separate Pb-Zn deposits namely, Balaria, Baroi, Mochia, Zawarmala. the mineralization in this region have been found to be around 1700 Ma old as evident from Pb-Pb model age. Further, the major lithologies of this region are dolomite (with varieties), phyllites, quartzite and conglomerates. The rocks of this area are steeply dipping and are in the form of ridge and valley topography as shown in Figure 1. The ridges are of quartzite and dolomite whereas



**Legend**

	Conglomerate		Bedding plane bearing
	Dolomite		Foliation plane bearing
	Qartzite		Fault
	Phyllite		Shear zone

### 3. Instrumentations

4

All the seismographs record vibration in three directions i.e. Longitudinal (L), Vertical (V) and Transverse (T). They also record peak frequency of vibration and compute the peak vector sum of the vibration.

The in-the-hole VOD of the explosives was recorded with the help of VOD-Mate of M/s Instantel Inc., Canada.

Blaster's Ranger II™ high speed digital video camera (made in Canada by M/s MREL Group of Companies Limited) was used for scattering tests of delay detonators.

#### **4. Experimental blast details**

Altogether, 31 blasts were conducted at different development and production blast faces of the mine. The blast vibrations were monitored around different underground structures located in the proximity of the blasting face. Most of the vibration were recorded at near field distances from the blast face. During the monitoring time, the number of holes detonated in a blast round varied from 3 to 20. The total explosives weight detonated in a blast round were varied from 110 to 850 kg. The maximum explosives weight per delay varied between 16 and 184 kg. The hole diameter of 64, 70 and 102 mm were used in all the blast faces. Blast holes were charged with emulsion cartridge explosives and ANFO. Non-electric detonators (NONEL) was used for initiation of charged holes. The production blast was conducted by downhole as well as uphole charging and blasting fashion.

The blast induced ground vibration was recorded at different underground locations by placement of seismographs. A view of monitoring of blast vibration is shown in Photograph 1. Maximum level of ground vibration recorded from during experimental trial was 59.32 mm/s at peak dominant frequency of 110.2 Hz. The vibration was recorded at a distance of 57 m from the blast face CW0 stope on 15.03.2018. The location of seismograph was at the same level of the blast face. The blast was conducted for 8 numbers of hole having depth of about 10 m. The total explosive charge of 250 kg was fired in this blast keeping explosive weight per delay of 31 kg.



Photograph 1. View of the monitoring of blast induced vibration at different locations of Mochia underground Mine, HZL.

## 5. Analyses of recorded vibration data

Ground vibrations data recorded were grouped together for statistical analysis. The data gathered in study at Mochia UG Mine has been taken together with the data provided by the officials of HZL of Mochia Ug Mine. Analysis was performed based on vibration data recorded at different underground locations due to underground blasting and the 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). The generalised established equation combining all the underground vibration data for Mochia Underground mine is:

$$v = 737.85 \times \left( \frac{R}{\sqrt{Q_{\max}}} \right)^{-1.496} \dots\dots\dots \text{(Equation 1)}$$

Correlation co-efficient ( $R$ ) = 93.16 %

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 predicting vibrations at underground locations of Mochia underground mine. It may be used to compute the maximum explosives weight to be detonated in a delay for distances of concerned in the mine. The regression plots of vibration data recorded at their respective scaled distances is shown in Figure 2.

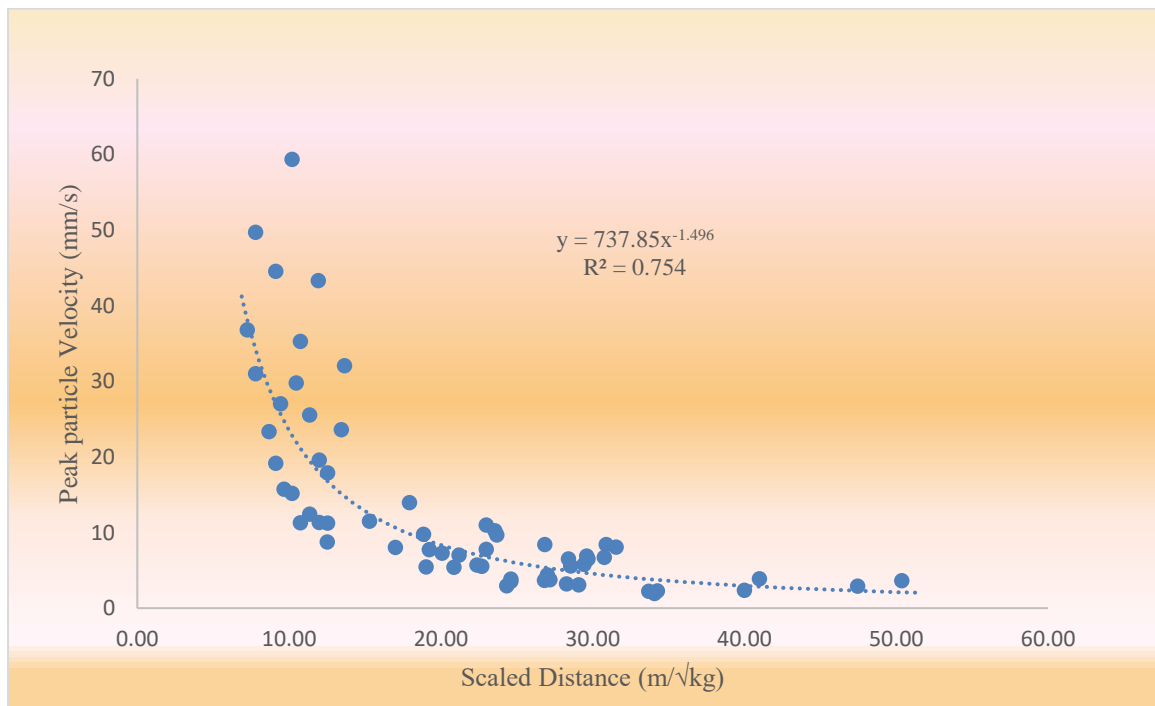


Figure 2. Regression plot of recorded PPV at different underground locations with their respective scaled distances at Mochia underground mine.

## 5.1 Frequency of blast vibration

The frequency of blast induced vibration wave is mainly controlled by geological conditions of transmitting media and meagrely by delay arrangements. There are geological forms and structures that are favourable for formation of low frequency waves. The frequencies of the recorded vibration were more than 43.25 Hz in all the blasting rounds. The most common recorded frequency ranges between 80.94 Hz and 223.3 Hz. The maximum recorded frequency was 248.6 Hz. The Plot of recorded dominant peak frequency of vibration at various radial distances in Mochia underground mine for blast conducted at different stopes is shown in Figure 3.

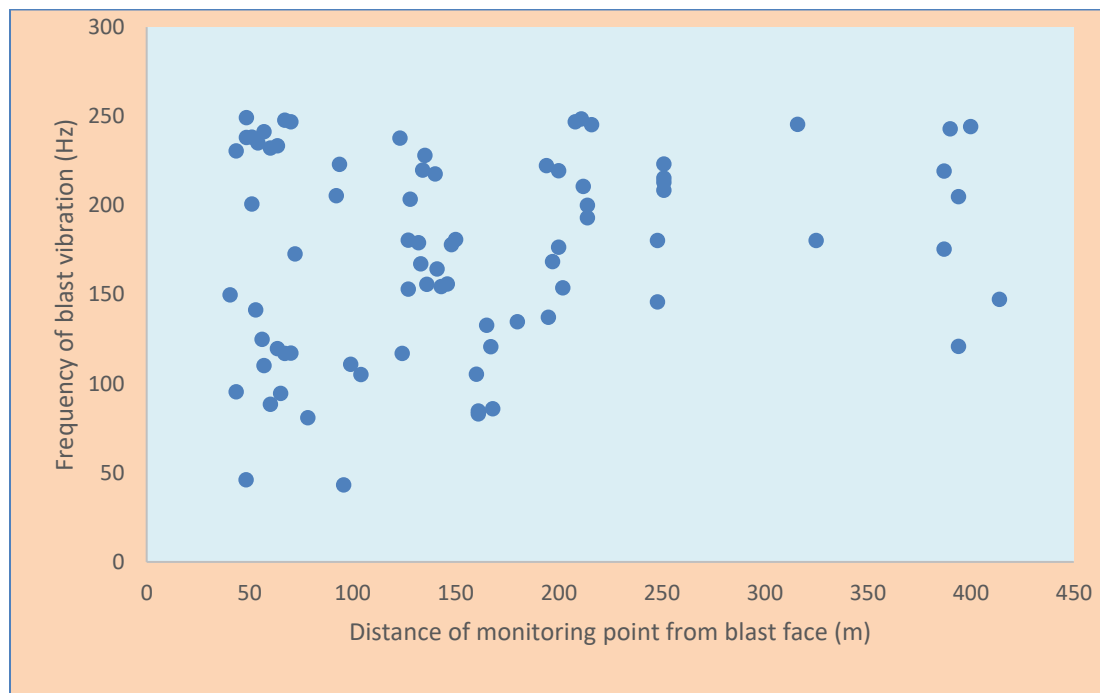


Figure 3. Plot of recorded dominant peak frequency of vibration at various radial distances in Mochia underground mine for blast conducted at different stopes.

## 5.2 Waveform analysis of blast

The maximum magnitude of vibration recorded during trial blast was 59.32 mm/s at peak dominant frequency of 110.2 Hz. The vibration was recorded near Mochia decline sidewall at a distance of 57 m from the blast face. The blast was conducted for a stope on 15.03.2018 with maximum explosive charge per delay of 31 kg and total explosive charge of 250 kg. The waveform of the recorded blast vibration and its Fast Fourier Transform (FFT) analysis has been presented in Figure 4 & Figure 5 respectively. The maximum magnitude of vibration recorded near 132 mRL shaft inset was 32.03 mm/s at peak dominant frequency of 105.2 Hz. The blast was conducted at CW0 stope on 31.03.2018 with maximum explosive weight per delay of 58 kg and total explosive charge of 357 kg. The vibration was recorded at a distance of 104 m from the blast face. The waveform of the recorded blast vibration and its Fast Fourier Transform (FFT) analysis has been presented in Figure 6 & 7 respectively.

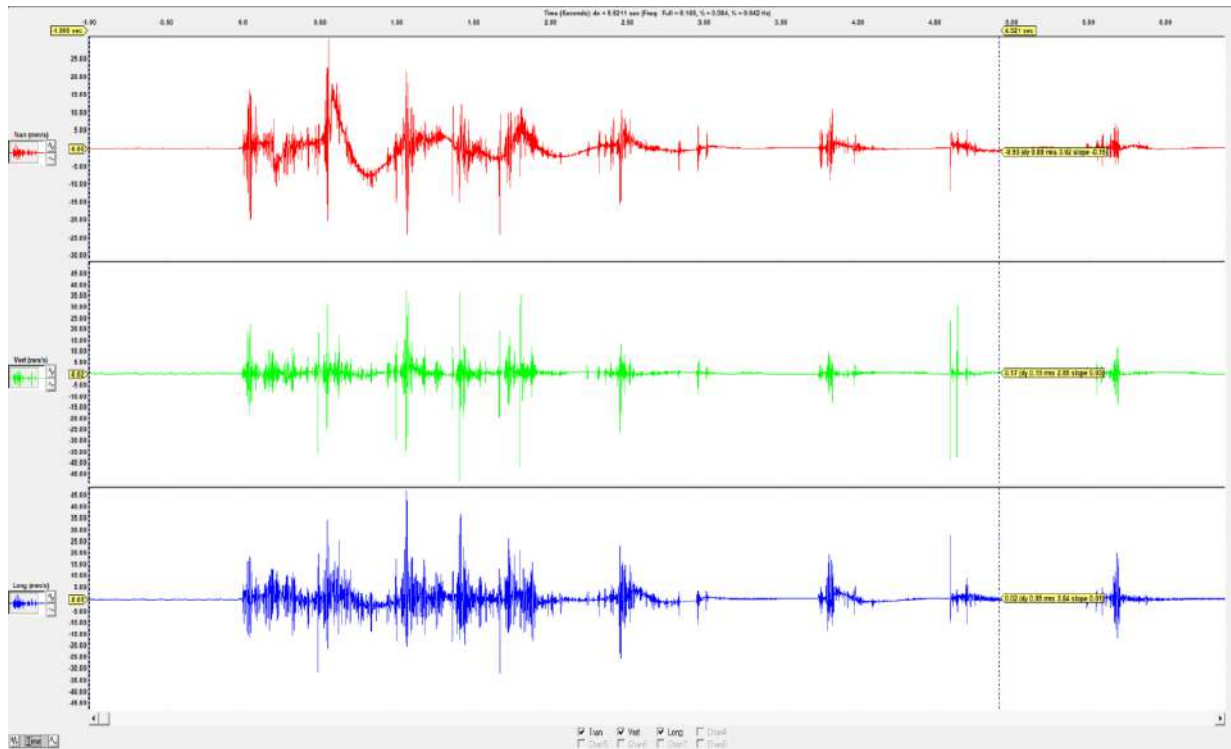


Figure 4. Blast wave history recorded near decline for slope blast conducted on 15.03.2018.

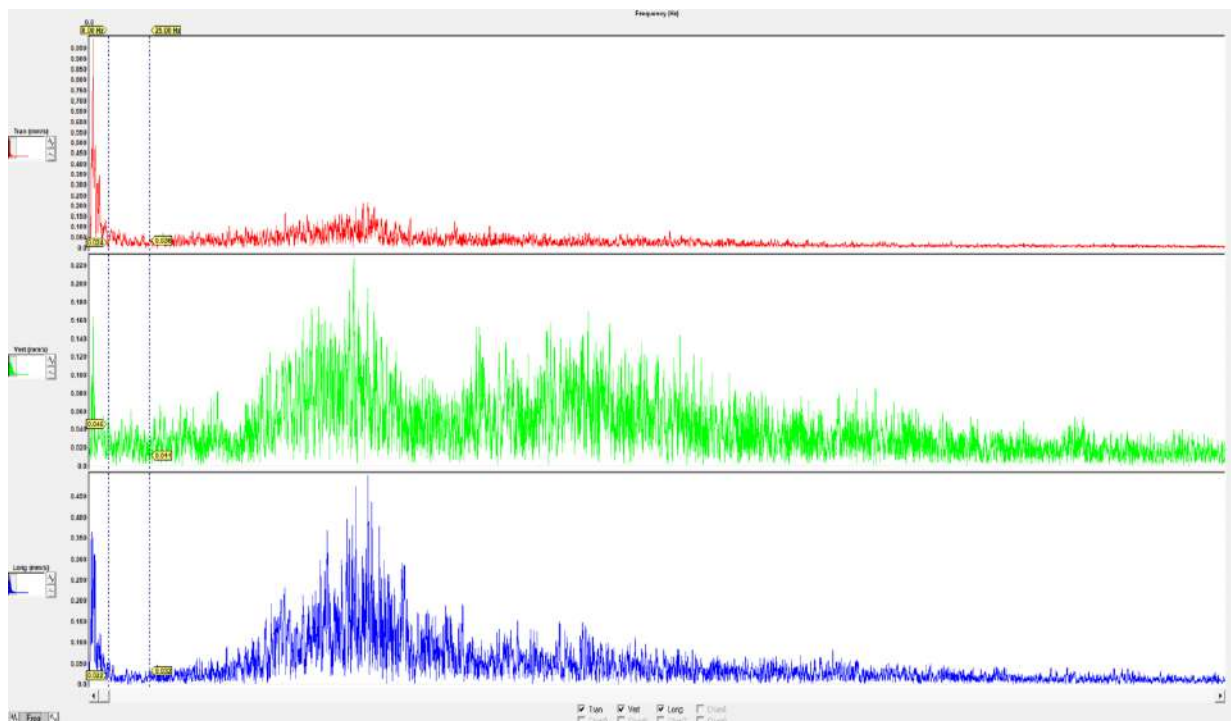


Figure 5. FFT of Blast vibration recorded near decline for slope blast conducted on 15.03.2018.



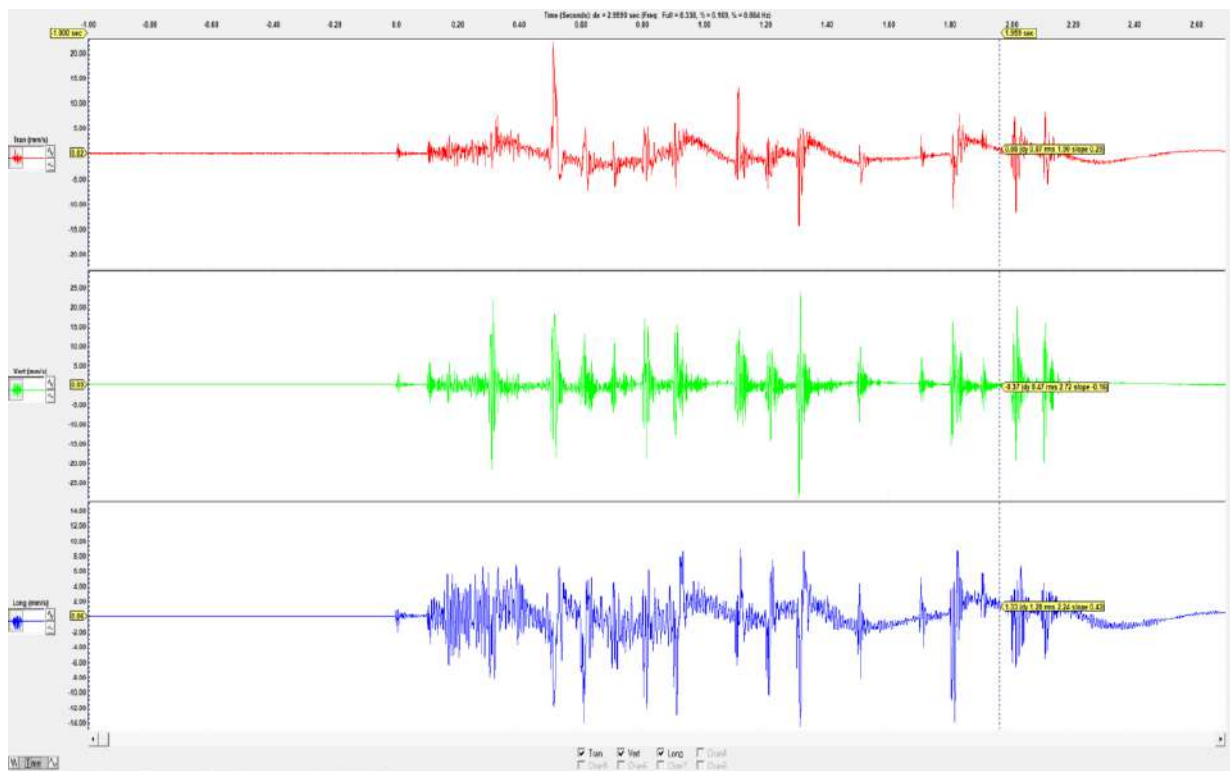


Figure 6. Blast wave signature recorded near 132 mRL shaft inset for stope blast conducted on 31.03.2018.

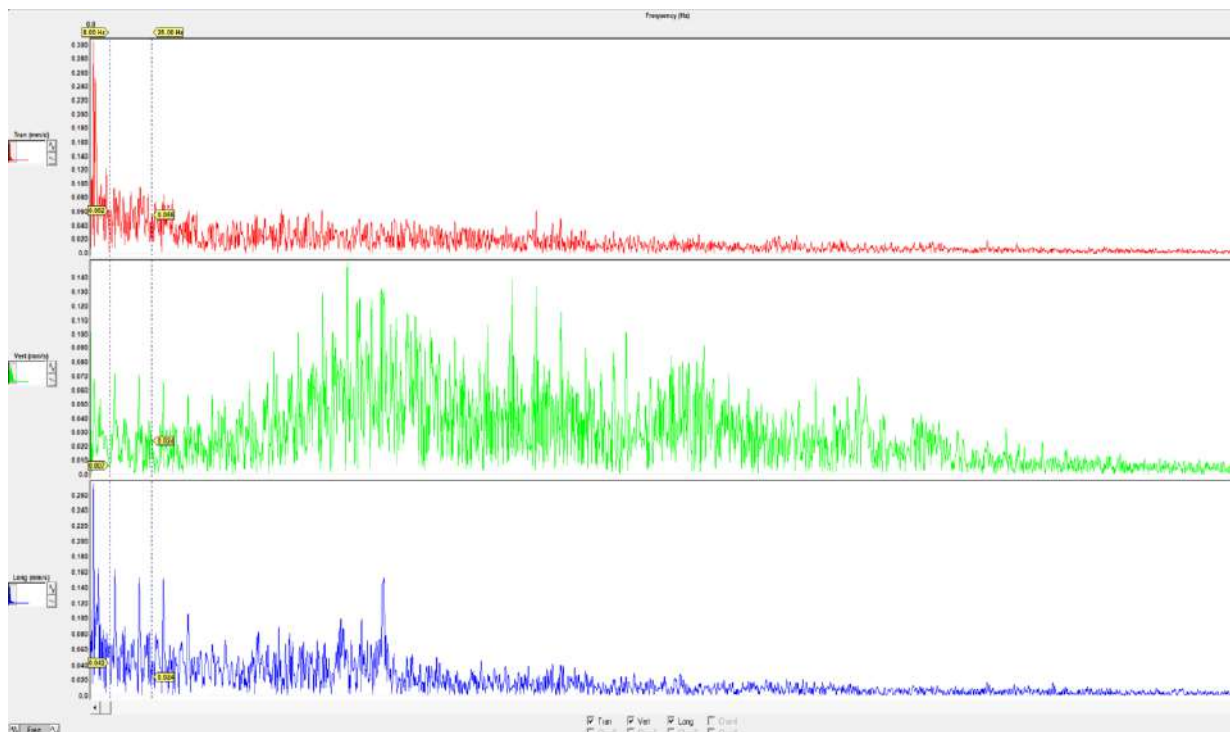


Figure 7. FFT of Blast vibration recorded near 132 mRL shaft inset for stope blast conducted on 31.03.2018.

## 6. Existing vibration standard and criteria to prevent damage

Peak particle velocity has been globally used in practice for assessment of blast-induced damage to structures. The degree of damage observed in the belowground openings is influenced by the RMR of roof rock. Thus, the damage criterion for below ground workings is based on RMR. Based on the extensive study conducted by the project proponents [erstwhile Central Mining Research Institute (Currently, CSIR- Central Institute of Mining & Fuel Research), Dhanbad], the DGMS issued a Tech (S&T) Circular no. 06 of 2007 for threshold value of vibration for the safety of roof and pillar in the belowground workings for different RMR. The DGMS standard for the safety of roof and pillar are given in Tables 1 and 2 respectively.

Table 1. Threshold values of vibration generated due to open-pit blasting for the safety of roof in the below ground working for different RMR.

<b>RMR of roof rock</b>	<b>Threshold value of vibration in terms of peak particle velocity [mm/s]</b>
20-30	50
30-40	50-70
40-50	70-100
50-60	100-120
60-80	120

Table 2. Threshold values of vibration generated due to open-pit blasting for the safety of pillars in the below ground workings for different RMR.

<b>RMR of the rock</b>	<b>Threshold value of vibration in terms of peak particle velocity [mm/s]</b>
20-30	20
30-40	20-30
40-50	30-40
50-60	40-50
60-80	50

The damages of surface structures by blast induced vibration are dependent on magnitude and frequency of ground vibration. The resonant frequency of structural vibration and blast vibration lead to cause maximum damage even at lower magnitude. Directorate General of Mines Safety (DGMS) have framed regulation under circular 7, 1997 to define limits of blast vibration near surface structures. The framed regulation has been presented in Table 3.

Table 3. DGMS standard (*Technical Circular Number 7 of 1997*)

Type of structure	Dominant excitation frequency, Hz		
	< 8 Hz	8-25 Hz	> 25 Hz
<b>(A) Buildings/structures not belonging to the owner</b>			
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>(B) Buildings with limited span of life and belonging to owner</b>			
1. Domestic houses/structures	10	15	25
2. Industrial buildings	15	25	50

## 7. Suggested blast design parameters for safety of underground Structures

Geotechnical studies at Mochia underground Mine suggest that RMR of the roof rock is dominantly in the range of 50 to 65. Thus the threshold values of vibration for different RMR of the roof rock viz. 50, 55 &  $\geq 60$  may be taken as 100 mm/s, 110 mm/s & 120 mm/s respectively.

The suggested threshold vibration limit is as per DGMS circular No. 06 of 2007. The formulated standard is based on impact of surface blasting on stability of underground structures. The same circular is also being referred in this case i.e. impact of underground blasting on underground structures as no specific guideline has been framed in DGMS Circular for the blast vibration limits for safety of underground structures from underground blasting. However, the blasting at underground metal mine along with monitoring of nearfield vibration in same working level represents propagation of vibration wave through homogeneous media. The vibration limit in such case will certainly be increased considering the high values of RMR and high dominant frequency (recorded dominant frequency for Mochia underground Mine – 43.25 to 248.6 Hz).

The maximum explosive charge weight per delay and total explosive charge for the mine has been computed considering different vibration limits based on RMR values of the roof rock. The suggested MCPD for safety of underground structures at different distances from the blast face is shown in Annexure as Table A2. The predicted level of vibration under different MCPD is shown in Annexure as Table A3. The suggested total explosive charge for blast at different distances from the underground structures is shown in Annexure as Table A4. The magnitude of vibration can be reduced by separation of blast holes by longer delay interval. It is suggested to use 40 ms delay between holes and 500 ms as delay between rings for larger blast with increased explosive consumption.

## **7.1 Suggested Blast Design Parameters for Safety of Surface Structures**

The explosive weight per delay and total explosive charge for safety of surface residential/industrial structures has been computed from site specific predictor equation. The suggested explosive charge weight per delay and total explosive charge for safety of surface structures has been presented in Annexure as Table A5. The mine management is suggested to decide minimum charging parameters (i.e. explosive weight per delay and total explosive charge in a blasting round) for stability of underground structures as well as surface structures.

## **7.2 Safety precautions while blasting**

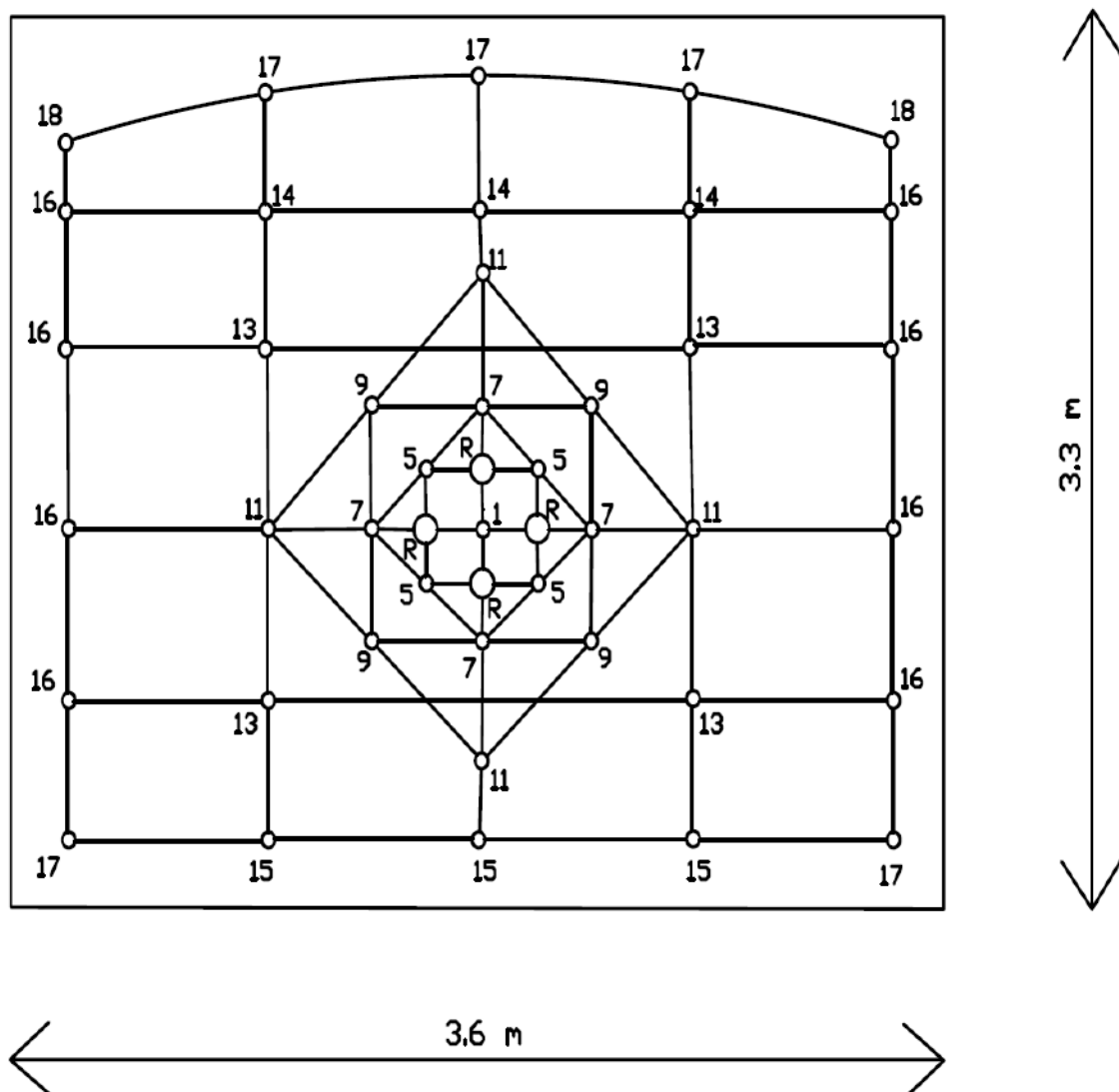
Following safety precautions need to be taken by Mine Management while planning and implementation of a blast:

- ✓ Charge weight per delay and total explosive charge in a blasting round should be followed considering the minimisation of blast vibration within stipulated standards for safety of nearfield underground structures, far filed underground structures as well as surface residential/industrial structures.
- ✓ The decision on maximum explosive weight per delay should be done on the basis of predictor equation for the blast faces having RMR of the roof rock is less than 50. The threshold vibration limit in such case should be taken from DGMS Tech. Circular No. 06 of 2007.
- ✓ Hole deviation measurement should be done to ensure proper toe burden as well as collapsing of two holes. As the collapsing of holes may lead to increased charge weight per delay.
- ✓ Special precautions at permanent underground structures viz. drivages, decline, shaft pillars, crown pillar etc. should be taken to ensure proper support after blasting. The in-situ stresses are redistributed after blasting, which may lead to requirement of additional supports to regain rock strength.
- ✓ Loose rocks should be dressed properly before drilling/charging behind blasted face.
- ✓ Stope should be scanned after blasting to get actual view of void generated after blasting. Precautions should be taken while charging where additional cavity in toe of down-hole face have been observed in scan.

## **8. Review of development face blasting pattern**

The existing drilling and blasting pattern for the face blast at the mine has been reviewed. The firing pattern has been suggested for day-to-day face blasting at the mine. The suggested firing pattern is shown in Figure 8. The suggested firing pattern have focused on increasing the impact of explosive energy in the cut portion. It has been suggested to take all the initial four cut holes at the same delay to enhance the pull with cumulative impact of the explosive energy.

The minimum distribution of the energy has been done in the cut holes using this principle. However, the over-break control in the periphery holes demands the explosive energy distribution in the blast holes of the periphery portion. Accordingly, the focus was to reduce the total number of blast holes firing simultaneously in the periphery portion. The maximum number of blast holes to be fired simultaneously from the blast design is 8. The reduced number of holes will reduce the maximum charge weight per delay and thereby will help in minimizing the over-break.



Delay No.	Reamer Holes (R)	1	5	7	9	11	13	14	15	16	17	18
No. of Holes	4	1	4	4	4	4	4	3	3	8	5	2
Delay (ms)	0	25	200	300	400	500	1000	1400	1800	2400	3000	3800

Figure 8. Suggested blast design pattern for face blasting at Mochia Underground mine.



## 9. Review of ring blasting pattern

The blasting pattern for ring blasting has been reviewed in terms of its geometry, delay sequence and delay timing. Optimised burden-spacing plays prime role to get desired fragmentation output from a blast. Researchers around the globe have established various relations for optimisation of burden-spacing. Sometimes, burden-spacing terminologies are also confusing for underground ring blast. The terminology suggested by Dyno Nobel underground manual as- hole to hole distance to be taken as spacing and ring to ring distance as burden. The toe spacing as per this manual is shown in Figure 9.

The thumb rule for computation of burden-spacing for underground stope blast has been suggested by Rustan. The suggested thumb rule is presented in Equation 2. Rustan has also suggested the maximum and minimum limits of the burden for this formula. The maximum burden should be kept 50 % more than the computed burden and the minimum burden can be 35 % less than the computed burden. Toe Spacing of the holes may be kept up to 1.2 times of burden/ring spacing as suggested by various researchers.

$$\text{Burden} = 11.8 \times \Phi^{0.63} \quad (\text{Equation 2})$$

Where,

$\Phi$  = Blast hole diameter

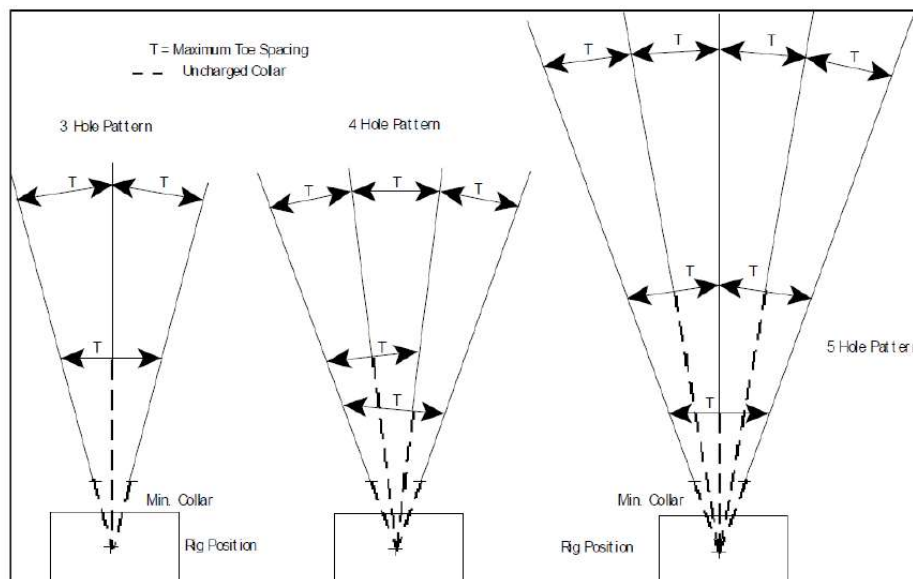


Figure 9. Ring drilling pattern showing toe spacing design (Dyno Nobel underground manual)

Based on the above equation, the optimum burden for different blast hole diameter has been computed. The computed burden is shown in Table 4. The variation in the suggested burden may be done based on the rock mass condition at the stopping site. The hard strata should be blasted with the reduced burden and soft strata with the increased burden in order to get the optimum output from the blast.

Table 4. Suggested burden-spacing for ring hole blasting to be conducted using different drill hole diameters at Mochia Underground mine, HZL.

Blast Hole Diameter (mm)	Computed Burden (m)		
	Minimum	Optimum	Maximum
57	1.3	1.9	2.9
64	1.4	2.1	3.1
70	1.4	2.2	3.3
76	1.5	2.3	3.5
89	1.7	2.6	3.9
102	1.8	2.8	4.2
115	2.0	3.0	4.5

The suggested toe spacing of the holes, which varies at different depths between drill level and draw level. It is suggested to do differential charging or alternate hole charging in the portion where blast holes are closer. A view of suggested differential charging is shown in Figure 10.

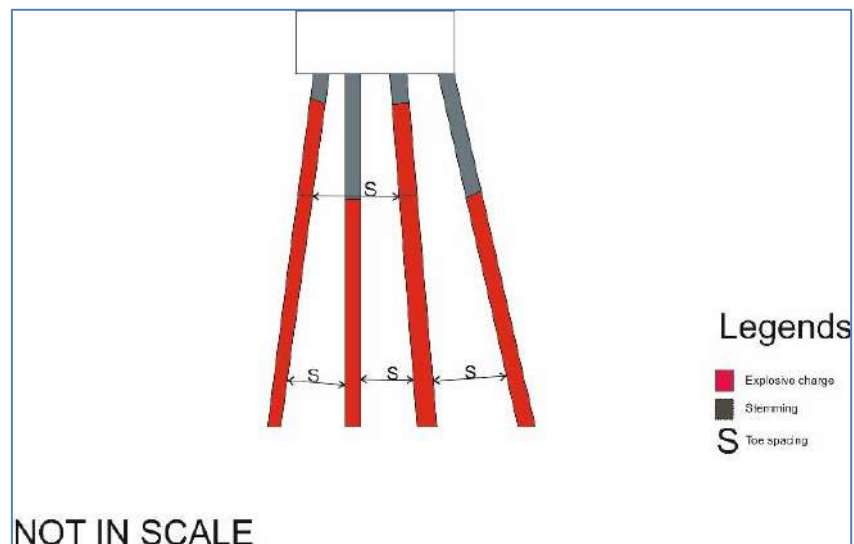


Figure 10. The suggested differential charging pattern for ring blasting.

The delay sequence for ring blasting at the mine has been suggested to get the optimum result. The common ring blasting pattern practiced at Mochia Underground mine includes the simultaneous excavation of uphole and downhole rings. The delay sequence for a ring with up and down-blast holes is shown in figure 11.

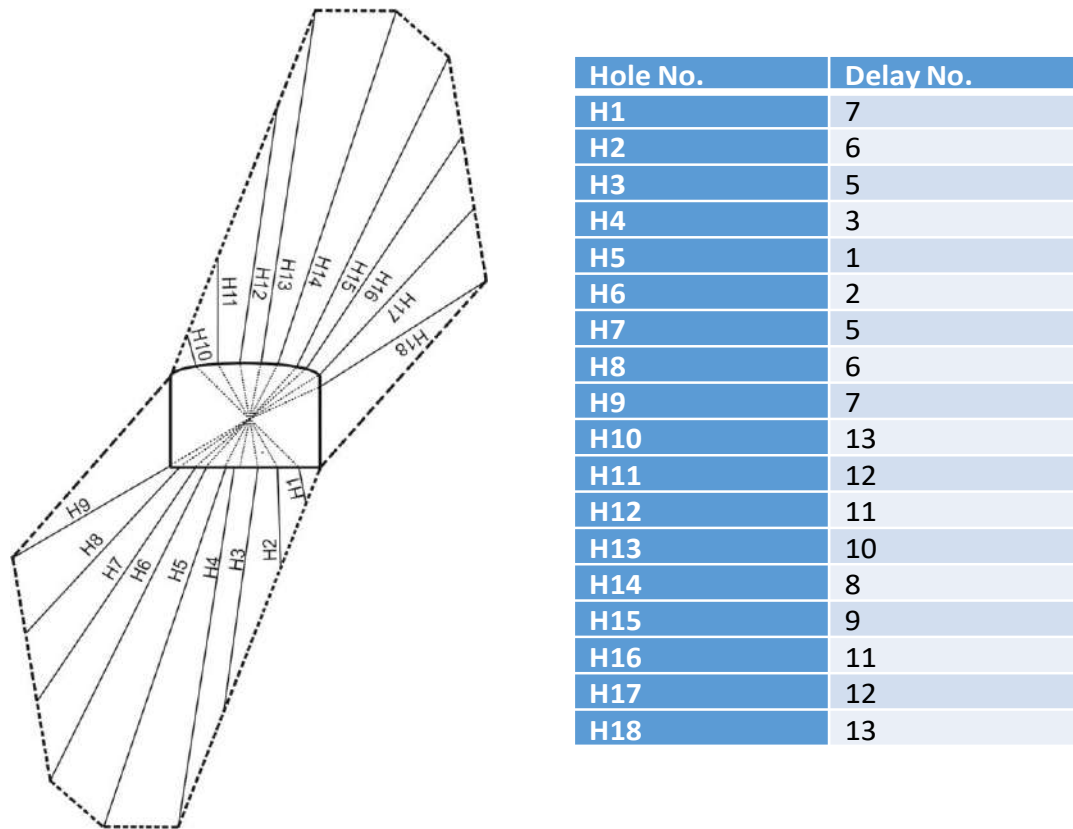


Figure 11. Suggested delay pattern for day-to-day stope blasting at the mine.

## 10. Monitoring of 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.

$$P_d = \frac{1}{4} \rho_e (VOD)^2 10^{-6}$$

Where,

- $P_d$  = Detonation pressure (MPa)
- $\rho_e$  = Density of explosive ( $\text{kg/m}^3$ )
- VOD = Velocity of detonation (m/s)

Uniform VOD is essentially required throughout the blast holes in harder formations in order to produce sufficient detonation pressure to the blast hole walls. Velocity of detonation (VOD) of explosives which are being used in underground blasting such as, Powergel -801 explosives (390 gm of 40 mm dia) of M/s IEPL-Orica were recorded on 20.07.2018 and 20.07.2019. The recorded VOD of the explosive was 3573 m/s and 3702 m/s respectively. The trace of recorded in-the-hole VOD of Powergel-801 explosives (390 gm of 40 mm dia.) is presented in Figure 12 and Figure 13.

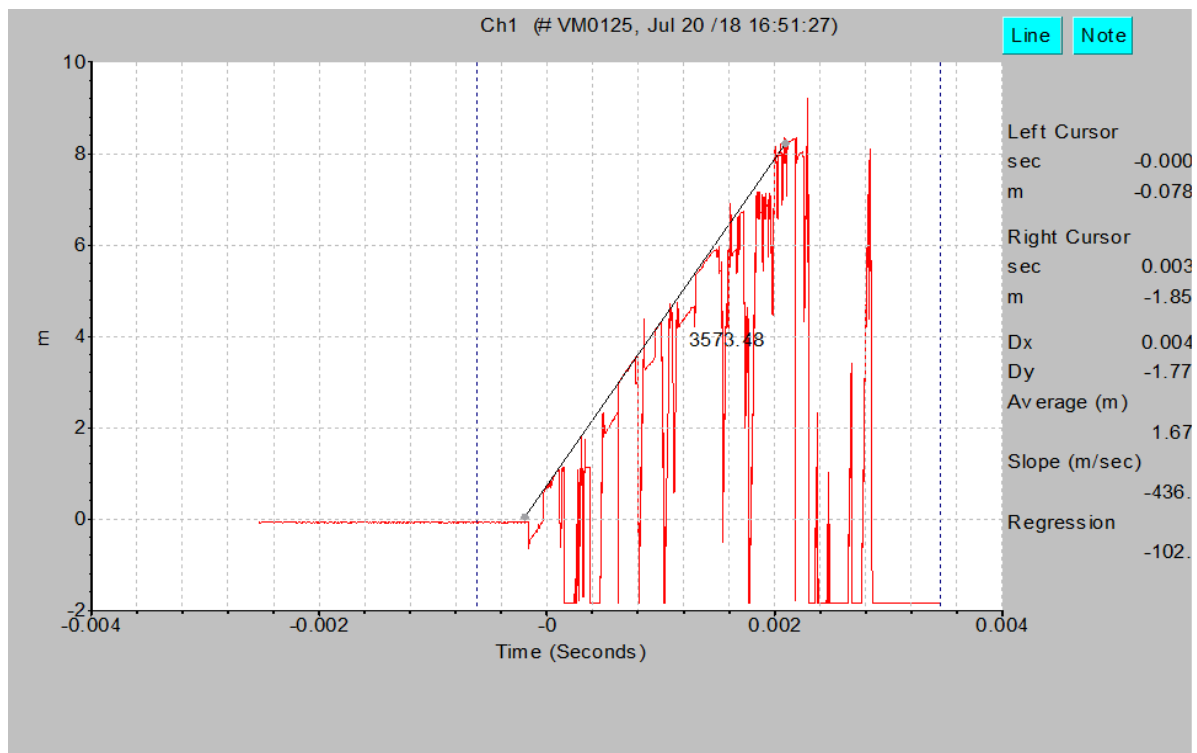


Figure 12. Recorded In-the-hole VOD trace of Powergel-801 (390 gm of 40 mm dia.) cartridge explosives of M/s IEPL, Orica at Production face of Mochia mine, HZL on July 20, 2018.

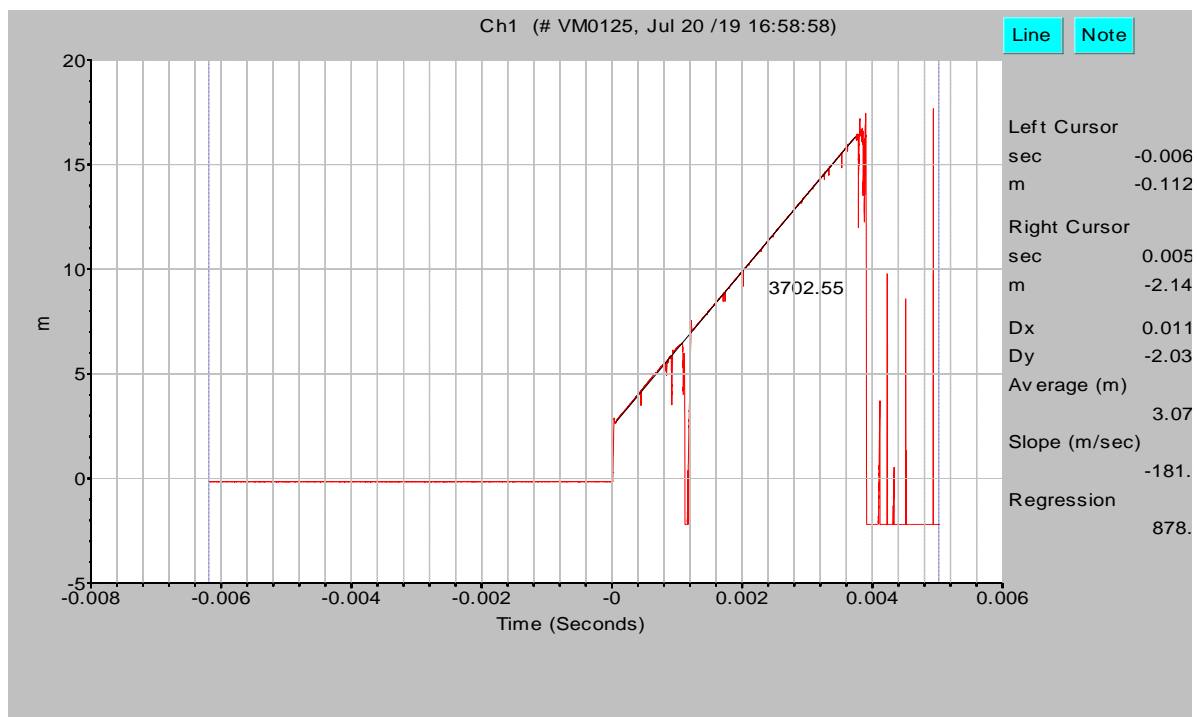


Figure 13. Recorded In-the-hole VOD trace of Powergel-801 (390 gm of 40 mm dia.) cartridge explosives of M/s IEPL, Orica at Production face of Mochia mine, HZL on July 20, 2019.

## 11. Quality test of delay detonators

### 11.1 Quality test of NONEL delay detonators during 1<sup>st</sup> visit

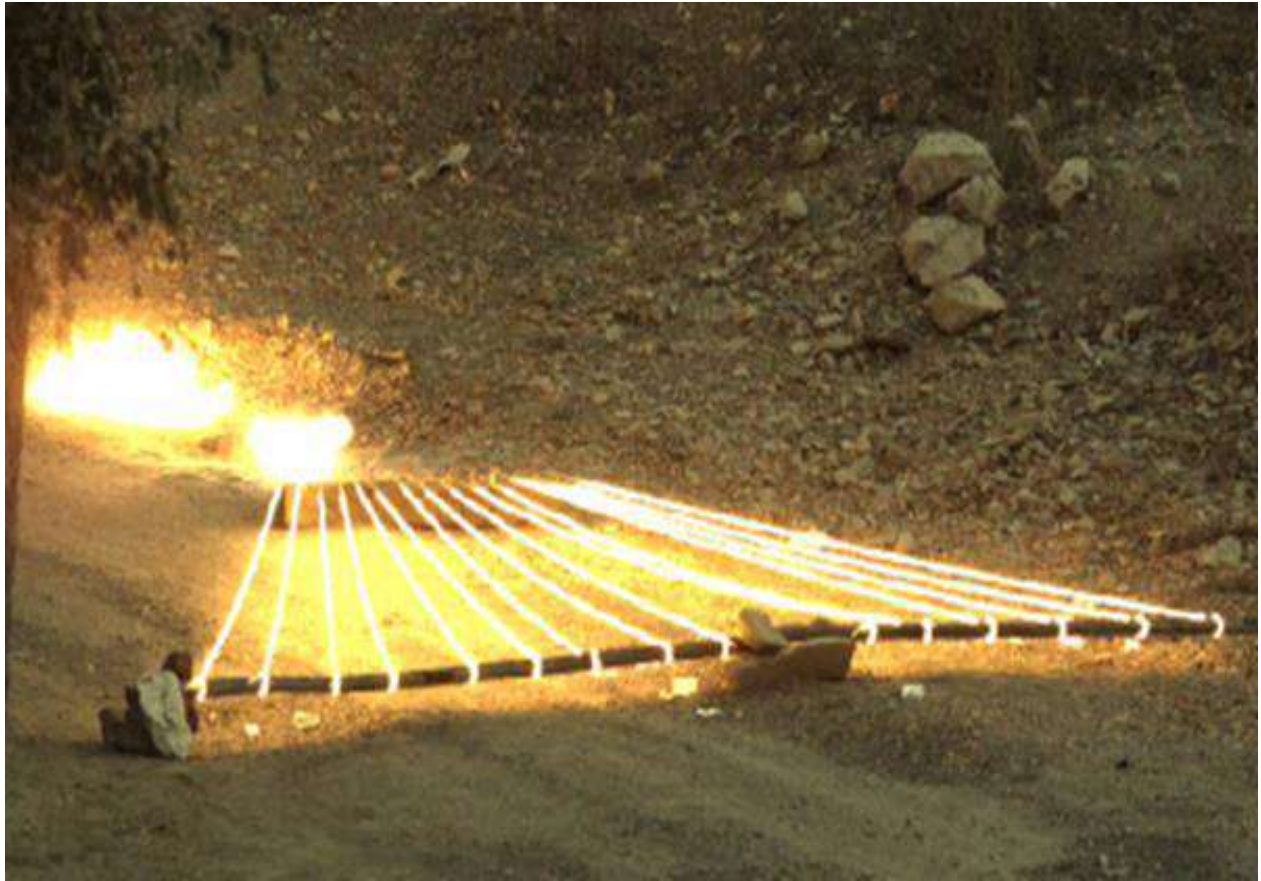
The qualities of Nonel delay detonators of M/s Indian Explosive Private Limited (IEPL), Orica used to initiate the explosives at Production as well as development face of the mine, has been recorded with the help of Blaster Ranger II, High Speed Color Video camera. Tests were performed for 3 sets of Nonel delay detonators from 1 to 20 numbers used at production face as well as 3 sets of alternate delay detonators i.e 1,3,5,7,9,11 and 13-20 numbers, used at development face. View of NONEL delay detonators connection arrangements for delay scattering test is depicted in Photograph 2. After analysis of the video data, it was found that the sequence of detonations is in order for all the delay detonator but high scattering up to (-)75% is observed for delay detonator used at production face and up to (-) 38% for development face detonators. Photograph 3 depicts the analysis of actual firing time from video data for delay numbers 1 to 5 with the help of ProAnalyst software. The observed firing sequence of the NONEL detonators for production face and development face are presented in Table 5 and Table 6 respectively. The graphical presentation of the design firing vs actual firing time of Nonel delay detonators (1 to 20 delay numbers) used at production faces and Nonel delay detonator (1,3,5,7,9,11 and 13-20 numbers) used at development face of Zawar group of mine is depicted in Figure 14 and Figure 15 respectively.

The scattering percentage should be restricted to maximum 10% up to 10 no. delay and thereafter it should be within 5%.



Photograph 2. View of NONEL delay detonators (3 sets of delay number 1-5) connection for delay detonator scattering test.





Photograph 3. Analysis of actual firing time from video data with the help of Pro-Analyst software for 1 to 5 numbers delay detonators.

Table 5. Analyzed firing time of the NONEL delay detonators 1 to 20 numbers (3 sets) used at Production blast face of Zawar group of mines tested during 1<sup>st</sup> visit.

Delay No.	Design delay timing (ms)	Actual Firing timing (ms)	Scattering (ms)	% of scattering
1	17	24	7	41.2
1	17	24	7	41.2
1	17	28	11	64.7
2	65	56	-9	-13.8
2	65	56	-9	-13.8
2	65	60	-5	-7.7
3	100	72	-28	-28
3	100	72	-28	-28
3	100	76	-24	-24
4	150	100	-50	-33.3
4	150	100	-50	-33.3
4	150	100	-50	-33.3
5	200	120	-80	-40
5	200	124	-76	-38
5	200	108	-92	-46

6	250	148	-102	-40.8
6	250	148	-102	-40.8
6	250	148	-102	-40.8
7	300	172	-128	-42.7
7	300	172	-128	-42.7
7	300	168	-132	-44
8	350	196	-154	-44
8	350	208	-142	-40.6
8	350	208	-142	-40.6
9	400	244	-156	-39
9	400	248	-152	-38
9	400	252	-148	-37
10	600	304	-296	-49.3
10	600	304	-296	-49.3
10	600	304	-296	-49.3
11	800	348	-452	-56.5
11	800	336	-464	-58
11	800	328	-472	-59
12	1000	408	-592	-59
12	1000	400	-600	-59
12	1000	404	-596	60
13	1400	472	-928	-66.3
13	1400	468	-932	-66.6
13	1400	464	-936	-66.9
14	1800	508	-1292	-71.8
14	1800	504	-1296	-72
14	1800	488	-1312	-72.9
15	2400	584	-1816	-75.7
15	2400	584	-1816	-75.7
15	2400	600	-1800	-75
16	3000	988	-2012	-67.1
16	3000	1008	-1992	-66.4
16	3000	1012	-1988	-66.3
17	3600	1444	-2156	-59.9
17	3600	1448	-2152	-59.8
17	3600	1472	-2128	-59.1
18	4200	1848	-2352	-56
18	4200	1792	-2408	-57.3
18	4200	1788	-2412	-57.4
19	4800	2432	-2368	-49.3
19	4800	2456	-2344	-48.8
19	4800	2456	-2344	-48.8
20	5400	3264	-2136	-39.6
20	5400	3196	-2204	-40.8
20	5400	3176	-2224	-41.2

Table 6. Analyzed firing time of the NONEL delay detonators 1, 3, 5, 7, 9, 11 and 13 to 20 numbers (3 sets) used at development blast face at Zawar group of mines tested during 1<sup>st</sup> visit.

Delay no	delay timing	Actual firing time	Scattering	% of scattering
	(ms)	(ms)	(ms)	
1(5m)	17	24	7	41.18
1(5m)	17	24	7	41.18
1(5m)	17	24	7	41.18
3(5m)	100	92	-8	-8
3(5m)	100	100	0	0
3(5m)	100	100	0	0
5(5m)	200	212	12	6
5(5m)	200	204	4	2
5(5m)	200	208	8	4
7(5m)	300	304	4	1.33
7(5m)	300	288	-12	-4
7(5m)	300	304	4	1.33
9(5m)	400	408	8	2
9(5m)	400	400	0	0
9(5m)	400	404	4	1
11(5m)	800	496	-304	-38
11(5m)	800	492	-308	-38.5
11(5m)	800	496	-304	-38
13(5m)	1400	976	-424	-30.29
13(5m)	1400	964	-436	-31.14
13(5m)	1400	980	-420	-30.29
14(5m)	1800	1432	-368	-20.44
14(5m)	1800	1428	-372	-20.67
14(5m)	1800	1416	-384	-21.33
15(5m)	2400	1804	-596	-24.83
15(5m)	2400	1788	-612	-25.5
15(5m)	2400	1824	-576	-24
16(5m)	3000	2304	-696	-23.2
16(5m)	3000	2288	-712	-23.73
16(5m)	3000	2336	-664	-22.13
17(5m)	3600	2968	-632	-17.56
17(5m)	3600	2880	-720	-20
17(5m)	3600	3032	-568	-15.78
18(5m)	4200	3660	-540	-12.86
18(5m)	4200	3728	-472	-11.24
18(5m)	4200	3668	-532	-12.67
19(5m)	4800	4556	-244	-5.08
19(5m)	4800	4564	-236	-4.92
19(5m)	4800	4568	-232	-4.83
20(5m)	5400	5332	-68	-1.26
20(5m)	5400	5300	-100	-1.85
20(5m)	5400	5404	4	0.07

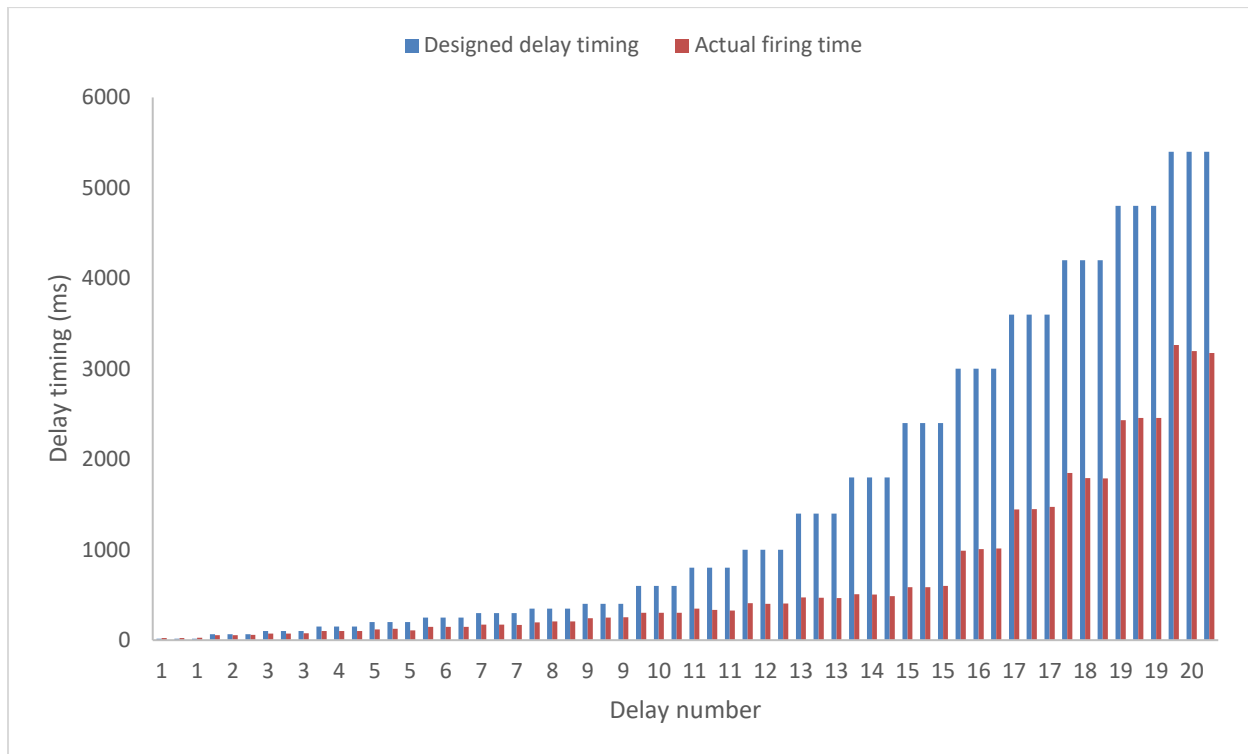


Figure 14. Graphical presentation of the design firing vs actual firing time of Nonel delay detonators (1 to 20 numbers) used at Production blast face at Zawar group of mines tested during 1<sup>st</sup> visit.

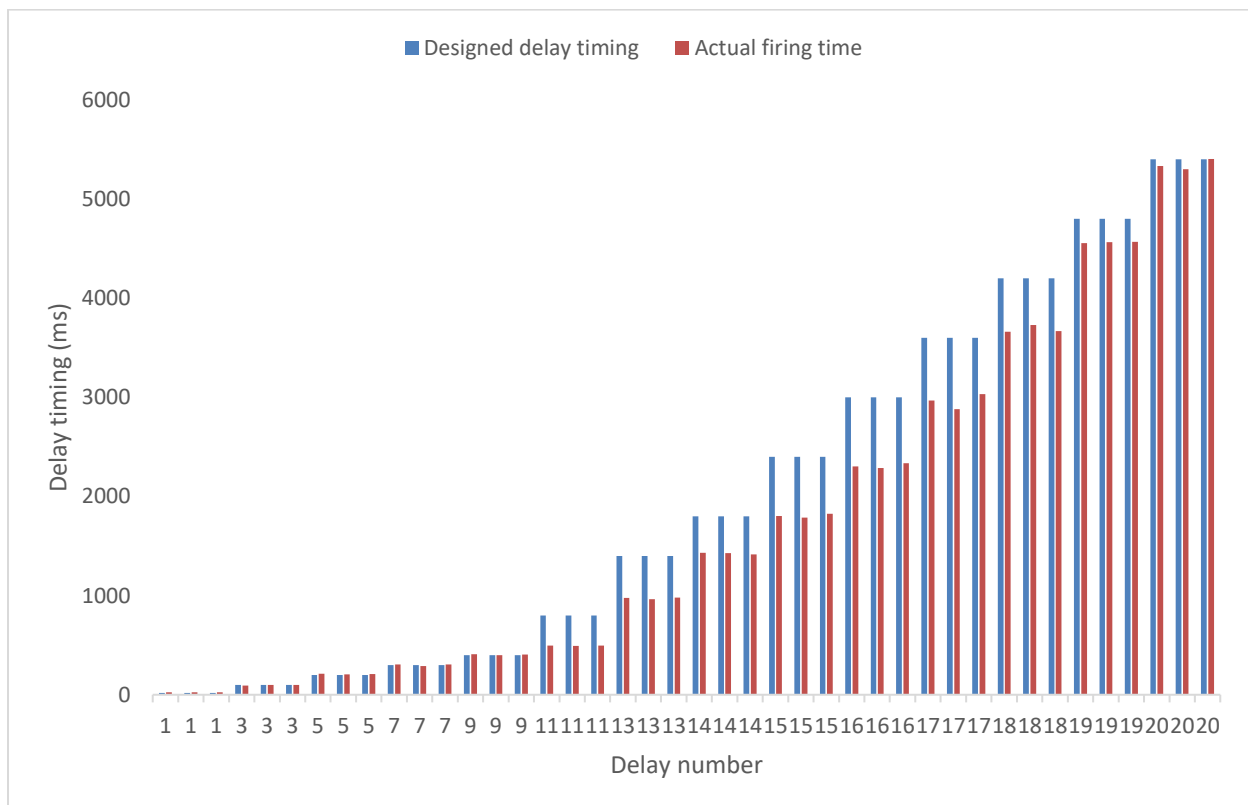


Figure 15. Graphical presentation of the design firing vs actual firing time of Nonel delay detonators used at development blast face at Zawar group of mines tested during 1<sup>st</sup> visit.

## 11.2 Quality test of NONEL delay detonators during 6<sup>th</sup> visit

The qualities of Nonel delay detonators of M/s Indian Explosive Private Limited (IEPL), Orica used to initiate the explosives at Production as well as development face of the mine, were again tested during 6<sup>th</sup> visit to the mine. The results of the scattering test for NONEL delay detonators used at production and development faces of the mine is shown in Table 7 and Table 8 respectively. The graphical representation of the scattering results is shown in Figure 16 and Figure 17. The analysis of the scattering test reveals that the maximum scattering in NONEL delay detonators used at production blast faces is 9.3%. The maximum scattering in the NONEL delay detonators used at development blast faces is 12%. The result of scattering is acceptable.

Table 7. Analyzed firing time of the NONEL delay detonators used at production blast face of Zawar group of mines tested during 6<sup>th</sup> visit.

Delay No.	Defined Delay time	Recorded delay time	Scattering	% scattering
1	25	26	1	4.0
1	25	24	-1	-4.0
1	25	24	-1	-4.0
2	50	46	-4	-8.0
2	50	46	-4	-8.0
2	50	46	-4	-8.0
3	75	80	5	6.7
3	75	76	1	1.3
3	75	82	7	9.3
4	100	94	-6	-6.0
4	100	92	-8	-8.0
4	100	92	-8	-8.0
5	125	132	7	5.6
5	125	128	3	2.4
5	125	130	5	4.0
6	150	152	2	1.3
6	150	148	-2	-1.3
6	150	150	0	0.0
7	175	178	3	1.7
7	175	178	3	1.7
7	175	174	-1	-0.6
8	200	198	-2	-1.0
8	200	200	0	0.0
8	200	194	-6	-3.0
9	250	252	2	0.8
9	250	254	4	1.6
9	250	252	2	0.8
10	300	272	-28	-9.3



10	300	272	-28	-9.3
10	300	278	-22	-7.3
11	350	356	6	1.7
11	350	356	6	1.7
11	350	364	14	4.0
12	400	382	-18	-4.5
12	400	388	-12	-3.0
12	400	410	10	2.5
13	450	452	2	0.4
13	450	460	10	2.2
13	450	440	-10	-2.2
14	500	476	-24	-4.8
14	500	486	-14	-2.8
14	500	484	-16	-3.2
15	600	634	34	5.7
15	600	594	-6	-1.0
15	600	630	30	5.0
16	1000	1024	24	2.4
16	1000	1008	8	0.8
16	1000	1008	8	0.8
17	1400	1396	-4	-0.3
17	1400	1412	12	0.9
17	1400	1412	12	0.9
18	1800	1844	44	2.4
18	1800	1892	92	5.1
18	1800	1860	60	3.3
19	2400	2376	-24	-1.0
19	2400	2384	-16	-0.7
19	2400	2328	-72	-3.0
20	3000	2920	-80	-2.7
20	3000	2972	-28	-0.9
20	3000	2948	-52	-1.7

Table 8. Analyzed firing time of the NONEL delay detonators used at development blast face of Zawar group of mines tested during 6<sup>th</sup> visit.

Delay No.	Designed delay timing (ms)	Actual firing time (ms)	Scattering (ms)	% of scattering
1	25	26	1	4.0
1	25	28	3	12.0
1	25	26	1	4.0
3	100	100	0	0.0
3	100	96	-4	-4.0
3	100	100	0	0.0

5	200	198	-2	-1.0
5	200	204	4	2.0
5	200	200	0	0.0
7	300	298	-2	-0.7
7	300	296	-4	-1.3
7	300	298	-2	-0.7
9	400	372	-28	-7.0
9	400	376	-24	-6.0
9	400	378	-22	-5.5
11	500	502	2	0.4
11	500	496	-4	-0.8
11	500	500	0	0.0
13	1000	968	-32	-3.2
13	1000	976	-24	-2.4
13	1000	992	-8	-0.8
14	1400	1364	-36	-2.6
14	1400	1350	-50	-3.6
14	1400	1346	-54	-3.9
15	1800	1752	-48	-2.7
15	1800	1752	-48	-2.7
15	1800	1766	-34	-1.9
16	2400	2368	-32	-1.3
16	2400	2430	30	1.3
16	2400	2356	-44	-1.8
17	3000	2996	-4	-0.1
17	3000	2940	-60	-2.0
17	3000	2972	-28	-0.9
18	3800	3776	-24	-0.6
18	3800	3740	-60	-1.6
18	3800	3880	80	2.1
19	4600	4492	-108	-2.3
19	4600	4584	-16	-0.3
19	4600	4636	36	0.8
20	5500	5296	-204	-3.7
20	5500	5252	-248	-4.5
20	5500	5328	-172	-3.1

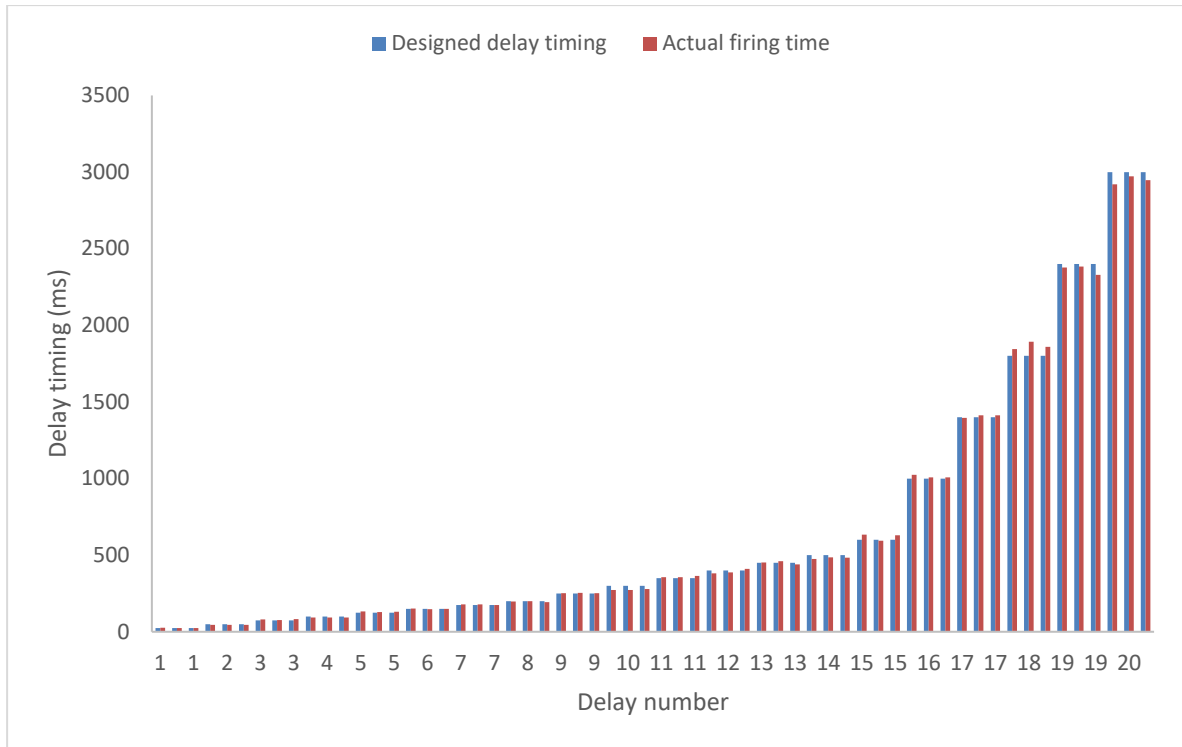


Figure 16. Graphical presentation of the design firing vs actual firing time of Nonel delay detonators used at production blast face of Zawar group of mines tested during 6<sup>th</sup> visit.

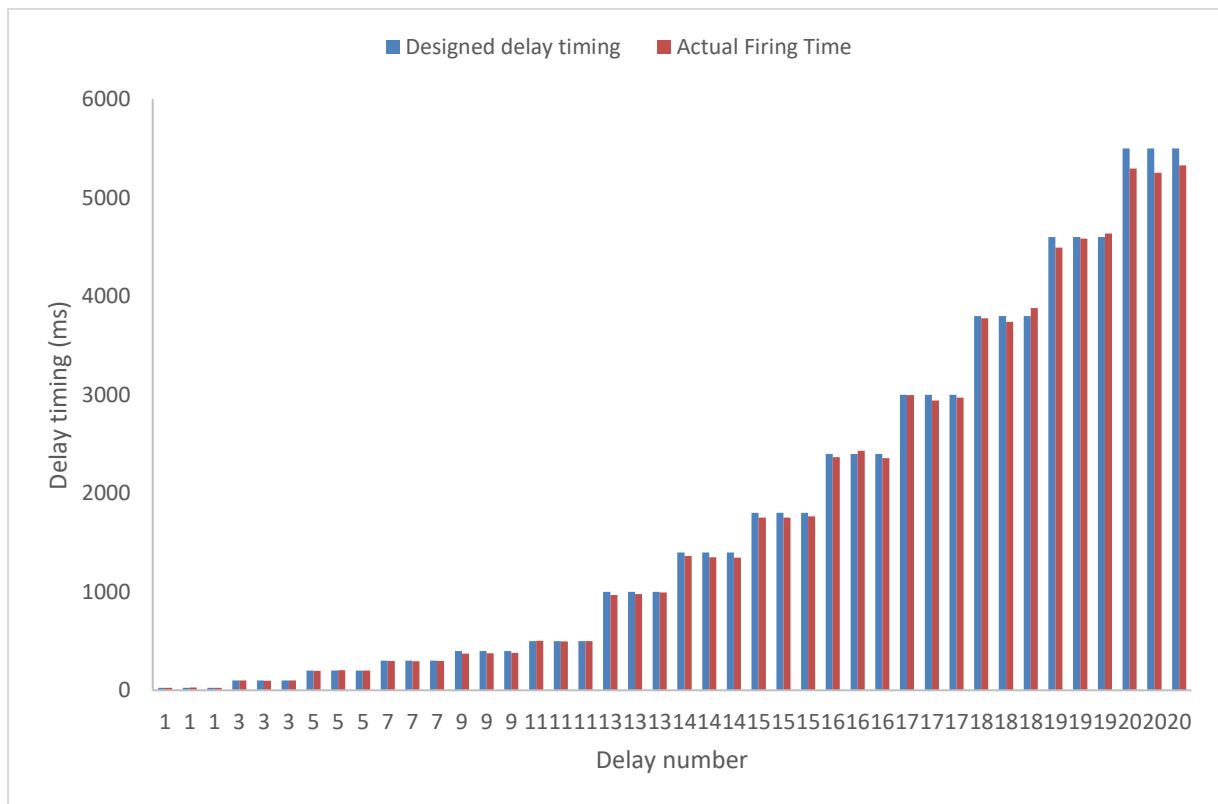


Figure 17. Graphical presentation of the design firing vs actual firing time of Nonel delay detonators used at development blast faces of Zawar group of mines tested during 6<sup>th</sup> visit.

## 12. Conclusions and recommendations

- ❖ Altogether, 31 blasts were conducted at different development and production blast faces of the mine. The blast vibrations were monitored around different underground structures located in the proximity of the blasting face. Most of the vibration were recorded at near field distances from the blast face.
- ❖ Maximum level of ground vibration recorded during experimental trial was 59.32 mm/s at peak dominant frequency of 110.2 Hz. The vibration was recorded at a distance of 57 m from the blast face CW0 stope on 15.03.2018. The location of seismograph was at the same level of the blast face. The blast was conducted for 8 numbers of hole having depth of about 10m. The total explosive charge of 250 kg was fired in this blast keeping explosive weight per delay of 31 kg.
- ❖ The maximum explosive charge weight per delay and total explosive charge for the mine has been computed considering different vibration limits based on RMR values of the roof rock. The suggested MCPD and total charge is given in Annexure of the report. The suggested charging pattern should be followed for day-to-day blasting at the mine with the aim to safeguard nearby underground structures.
- ❖ The frequencies of the recorded vibration were more than 43.25 Hz in all the blasting rounds. The most common recorded frequency ranges between 80.94 Hz and 223.3 Hz. The maximum recorded frequency was 248.6 Hz.
- ❖ The existing drilling pattern for the face blast at the mine has been reviewed. The suggested firing pattern have focused on increasing the impact of explosive energy in the cut portion. It has been suggested to take all the initial four cut holes at the same delay to enhance the pull with cumulative impact of the explosive energy. The minimum distribution of the energy has been done in the cut holes using this principle. However, the over-break control in the periphery holes demands the explosive energy distribution in the blast holes of the periphery portion. Accordingly, the focus was to reduce the total number of blast holes firing simultaneously in the periphery portion. The maximum number of blast holes to be fired simultaneously from the blast design is 8.
- ❖ The optimum burden for different blast hole diameter used at the mine has been computed using the empirical formulae suggested by Rustan. The differential charging pattern has been suggested to reduce the over-break. The delay sequence for day-to-day blasting at the production blast faces of the mine has been suggested.
- ❖ In-the-hole Velocity of detonation (VOD) of Powergel -801 explosives (390 gm of 40 mm dia) of M/s IEL-Orica was recorded on 20.07.2018 and 20.07.2019. The recorded VOD of the explosive was 3573 m/s and 3702m/s.
- ❖ The scattering tests of NONEL delay detonators were performed during 1<sup>st</sup> and 6<sup>th</sup> visits to the mine. The tests were conducted using High speed video camera. The test result reveals that the delay timing of the detonators is within acceptable limit for the test conducted during 6<sup>th</sup> visit.

- ❖ The scattering percentage should be restricted to maximum 10 % up to 10 no. delay and thereafter it should be within 5 % to get the optimum results from the blast.
- ❖ Selection of delay should be based on the face condition and actual availability of hole depth on the site. Proper information about delay timings of different delay numbers in case of NONEL initiation shall be well informed to the entire blasting concern engineer.
- ❖ It is recommended to maintain delay interval of at least 12-20 ms/m of burden. It is further recommended to use a minimum delay of 40ms between the holes.
- ❖ More delay interval towards hanging wall side (at an interval of 60ms) and lesser delay interval towards footwall (at an interval of 40ms) should be given to minimise the dilution of ore with optimal fragmentation.
- ❖ Larger delay timing should be given in the last (boundary) holes of a ring and it should be increased by 50 to 80% for minimisation of ore dilution.
- ❖ The delay timing of 300 to 500ms should be maintained between the rings. The subsequent increment in the delay intervals should be given in the consecutive rings for multi-ring blasting.
- ❖ Bottom portion of the hole must be charged with primer emulsion cartridges only to address the issues of ledge formation.
- ❖ Two additional blast holes at boundaries should be kept uncharged for minimising hanging wall and foot wall damages. These holes should be drilled as along the contact of the orebody or within 30 cm from the outer boundary of ore body and kept uncharged in order to reduce dilution.
- ❖ The optimum quantity of booster should be used in the blast holes. The quantity of emulsion/PETN cast booster should be 0.16% to 0.2% of the column charge and quantity of primer emulsion cartridges of appropriate diameter should be 15% - 25% of the explosive charge in the blast hole. Accordingly, the ANFO percentage will be of 75 % -85 %.
- ❖ Emulsion booster should be preferred in place of PETN cast booster from the safety point of view at the places where there is problem of misfire and chances of ignition of the misfired cast booster while loading & transportation.

## **Acknowledgements**

The research team is thankful to the mine management of Mochia underground mine, Hindustan Zinc Limited for sponsoring the study.



Table A1. Blast vibrations data recorded at different locations of Mochia underground mine, HZL.

Blast No.	Date of blast	Location of blast	No. of holes	Hole dia. [mm]	Hole depth [m]	Explosives			Distance of Vibration measuring location [m]	Peak particle velocity [PPV]	Dominant Frequency [Hz]
						Explosives per hole [kg]	Total explosives detonated [kg]	Max <sup>m</sup> explosive weight per delay [Kg]			
1.	15/03/2018	CW0 Stope	8	70	10	31	250	31	57	59.32	110.2
2.	28/03/2018	CW0 Stope	6	102	10	50	300	60	53 92	43.3 21.37	141.5 205.6
3.	29/03/2018	CW0 Stope	4	102	16	131	525	165	110 180	26.58 19.44	147.4 244.3
4.	31/03/2018	CW0 Stope	6	70	10	58	357	58	104	32.03	105.2
5.	12/07/2018	285 mRL R-38	13	102	4	27	350	28	56 94	29.77 21.4	125 223.1
6.	13/07/2018	285 mRL R-36	4	102	14	162	650	184	387 394	5.56 3.078	175.5 121
7.	18/07/2018	285 mRL R-42	7	64	7	21	150	22	127 161	4.4 2.27	153.1 83.07
8	27/09/2018	Stope at 285 mRL	8	64	3	16	125	16	127 161	8.04 2.32	180.6 84.81
9	28/09/2018	Stope at 285 mRL	3	64	7	42	125	43	132 165	7.265 1.285	179.2 132.8
10	29/09/2018	Stope at 285 mRL	8	64	8	21	175	25	133 167	3.677 2.225	167.3 120.8
11	01/10/2018	Stope at 285 mRL	5	64	7	22	110	25	134 168	3.755 1.934	219.8 86
12	02/10/2018	Stope at 285 mRL	3	64	12	38	114	40	150 180	10.2 8.185	180.9 134.8
13	03/10/2018	Stope at 285 mRL	7	64	6	21	150	23	128 150	5.72 3.769	145.9 215.3
14	21/01/2019	57 mRL Exploration Drive	3	70	14	108	315	112	250	9.672	223.3
15	21/01/2019	165 mRL Up Ramp	7	70	9	61	425	67	390	2.902	243.1

16	23/01/2019	57 mRL Exploration Drive	8	70	10	31	250	31	40	49.71	95.44
17	24/01/2019	57 mRL Exploration Drive	8	64	10	31	250	31	50	54.73	235.2
18	25/01/2019	57 mRL Exploration Drive	9	64	10	31	280	31	57	15.16	241.4
19	26/01/2019	57 mRL Exploration Drive	8	64	6	31	250	31	60	12.4	233.5
20	20/07/2019	165 mRL M-2 P1 stope	10	70;102	3-16	25	252.6	47	30	20.15	55.75
21	21/07/2019	165 mRL M-2 Ring-28	8	102	12-17	43	350	43	150	8.84	55
22	22/07/2019	151 mRL M-2 Ring-38	13	64	3-18	35	450	35	100	16.72	141.6
23	22/01/2020	221 mRL CWM2 Part 1 Ring 42	12	102	8-10	71	850	75	150	10.98	219.5
24	23/01/2020	221 mRL CWM2 Part 1 Ring 43	6	102	9	73	450	72	100	27.22	153.09
25	24/01/2020	57 mRL Exploration Drive	7	64	14	54	375	60	300	6.54	245.6
26	25/01/2020	57 mRL Approach Drive	20	64	22	30	600	30	40	55.1	94.63
27	27/01/2020	151 mRL Exploration Drive	6	102	8	67	400	75	200	7.77	176.6
28	19/07/2019	CWM2 Slope R 36	7	70	7	51	357	58	72	32.03	172.8
29	20/07/2019	CWM2 Slope R 37	4	102	4	75	300	86	200	7.0	168.6
30	21/07/2019	CWM2 Slope R 41	7	64	7	50	350	56	130	13.96	203.6
31	24/07/2019	CWM2 Slope R 38	5	64	6	35	175	40	50	12.39	43.25
									80	8.729	80.94

Table A2. Computed explosive weight per delay at various radial distances for different permissible level of vibration based on RMR of roof rock at Mochia underground Mine, HZL.

Radial distance [m]	Computed Maximum explosive weight per delay for different values of PPV for the safety of underground structure [kg]		
	100 mm/s [For RMR 50]	110 mm/s [For RMR 55]	120 mm/s [For RMR $\geq$ 60]
30	62	71	79
40	111	126	141
50	173	196	221
60	249	283	318
70	339	385	432
80	442	502	564
90	560	636	714
100	691	785	882
125	1080	1227	1378
150	1555	1767	1985
200	2765	3141	3528

Table A3. Predicted peak particle velocity levels for various distance taking explosive weight Per delay of 40, 60, 80, 100, 125 & 150 kg for blasting at Mochia underground Mine.

Distance from the blast face [m]	Predicted peak particle velocity levels for different explosive weight per delay for the safety of underground structure [mm/s]					
	40 kg	60 kg	80 kg	100 kg	125 kg	150 kg
30	71.9	97.3	120.7	142.6	168.5	193.2
40	46.7	63.3	78.5	92.7	109.6	125.6
50	33.5	45.3	56.2	66.4	78.5	90.0
60	25.5	34.5	42.8	50.6	59.8	68.5
70	20.2	27.4	34.0	40.2	47.4	54.4
80	16.6	22.4	27.8	32.9	38.9	44.5
90	13.9	18.8	23.3	27.6	32.6	37.3
100	11.9	16.1	19.9	23.5	27.8	31.9
125	8.5	11.5	14.3	16.9	19.9	22.8
150	6.5	8.8	10.9	12.8	15.2	17.4
200	4.2	5.7	7.1	8.3	9.9	11.3

Table A4. Computed total explosive weight in a round at various radial distances for different Permissible level of vibration based on the RMR of roof rock at Mochia underground Mine, HZL.

Radial distance [m]	Computed total explosive weight in a blasting round for different values of PPV for the safety of underground structure [kg]		
	100 mm/s [For RMR 50]	110 mm/s [For RMR 55]	120 mm/s [For RMR ≥ 60]
30	877	1039	1214
40	1558	1848	2159
50	2435	2887	3373
60	3506	4157	4857
70	4772	5658	6611
80	6233	7391	8634
90	7889	9354	10928
100	9739	11548	13491
125	15217	18044	21080
150	21913	25983	30355
200	38956	46191	53964

Table A5. Recommended explosives weight per delay and total explosives to be detonated in a round at Mochia underground Mine at varying distances from the houses/structures in the village considering 5 mm/s, 10 mm/s and 15 mm/s as threshold limits of vibration for the safety of surface houses/structures.

Radial Distance of houses/structure from the blast face [m]	Recommended explosives weight per delay considering 5 mm/s, 10 mm/s and 15 mm/s as threshold levels of vibration [kg]			Total explosives to be detonated in a blasting round considering 5 mm/s, 10 mm/s and 15 mm/s as threshold levels of vibration [kg]		
	5 mm/s	10 mm/s	15 mm/s	5 mm/s	10 mm/s	15 mm/s
200	50	127	219	184	636	1312
225	64	161	277	233	805	1661
250	79	199	342	288	993	2050
275	95	241	414	348	1202	2481
300	113	286	492	414	1430	2952
325	133	336	578	486	1679	3465
350	154	390	670	564	1947	4019
375	177	447	769	647	2235	4613
400	202	509	875	737	2543	5249
425	228	575	988	832	2871	5925
450	255	644	1108	932	3218	6643
475	284	718	1235	1039	3586	7402
500	315	796	1368	1151	3973	8201
550	381	963	1655	1393	4808	9923
600	453	1146	1970	1658	5722	11810
650	532	1344	2312	1945	6715	13860
700	617	1559	2681	2256	7788	16074
750	709	1790	3078	2590	8940	18453
800	806	2037	3502	2947	10172	20995



## Event Report

**Date/Time** Vert at 08:18:42 January 21, 2019  
**Trigger Source** Geo: 1.000 mm/s  
**Range** Geo: 254.0 mm/s  
**Record Time** 8.0 sec at 4096 sps  
**Operator/Setup:** Operator/factory.MMB

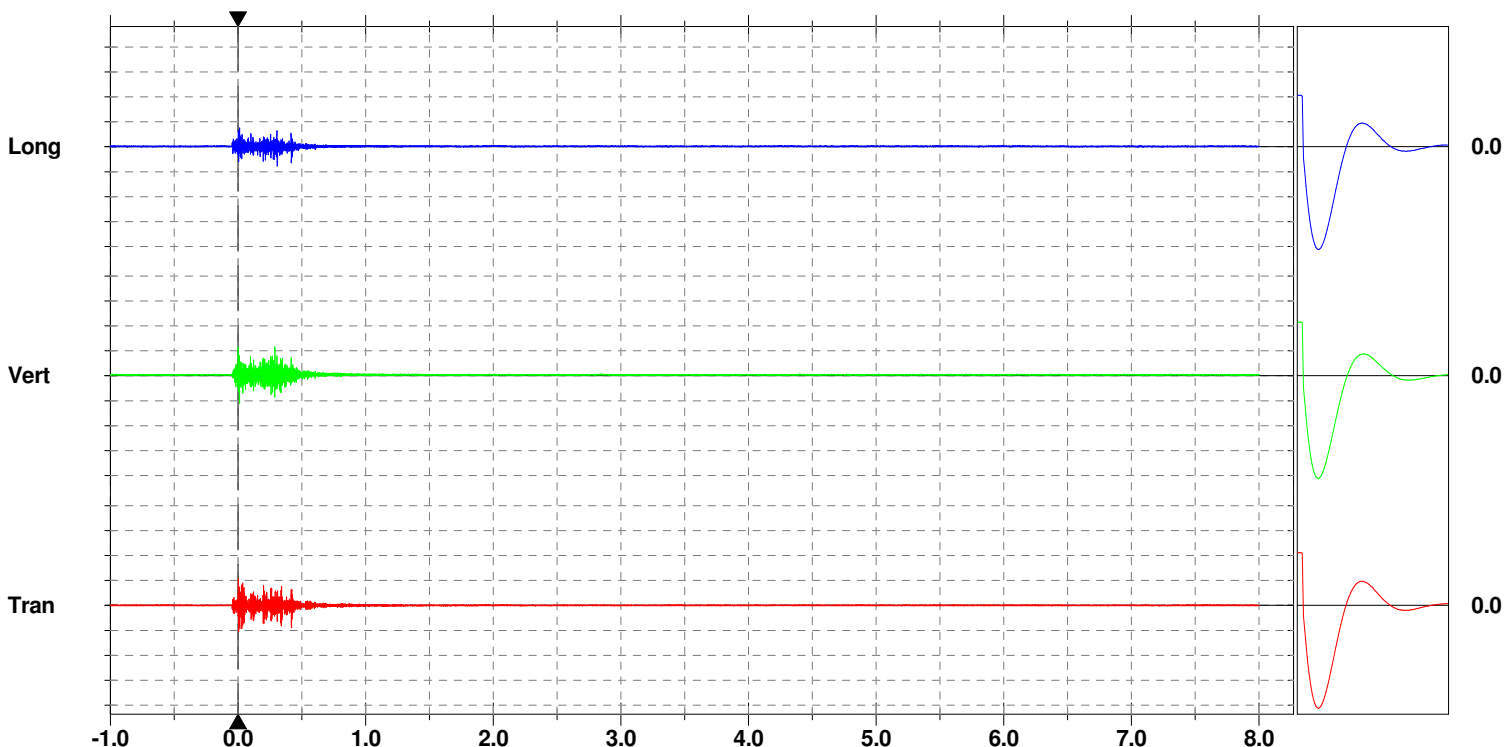
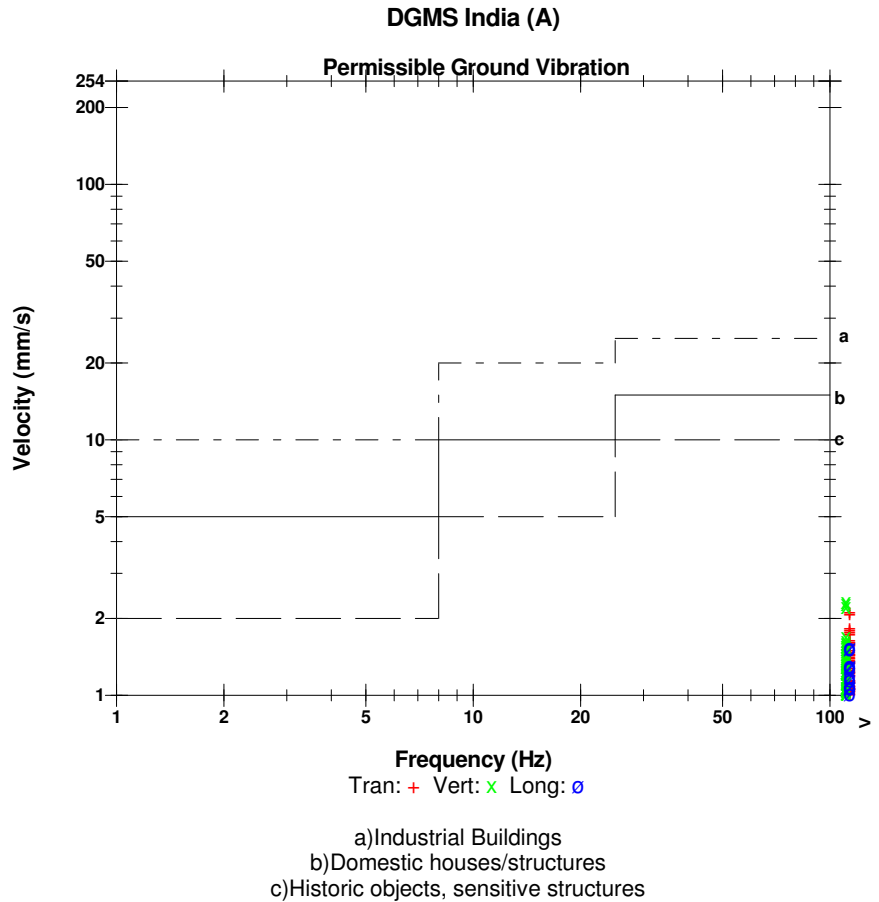
**Serial Number** UM13744 V 10-89 Micromate ISEE  
**Battery Level** 3.5 Volts  
**Unit Calibration** November 27, 2018 by UES New Delhi  
**File Name** UM13744\_20190121081842.IDFW

### Notes

**Location:** 165mRL Up Ramp  
**Client:** Mochia Mines  
**User Name:** HZL  
**General:** RING BLAST

	Tran	Vert	Long	
<b>PPV</b>	2.152	2.341	1.537	mm/s
<b>ZC Freq</b>	171	293	137	Hz
<b>Time (Rel. to Trig)</b>	0.002	0.289	0.307	sec
<b>Peak Acceleration</b>	0.323	0.474	0.270	g
<b>Peak Displacement</b>	0.002	0.042	0.003	mm
<b>Sensor Check</b>	Passed	Passed	Passed	
<b>Frequency</b>	7.3	7.1	7.3	Hz
<b>Overswing Ratio</b>	4.3	4.7	4.4	

**Peak Vector Sum** 2.902 mm/s at 0.005 sec



Sensor Check





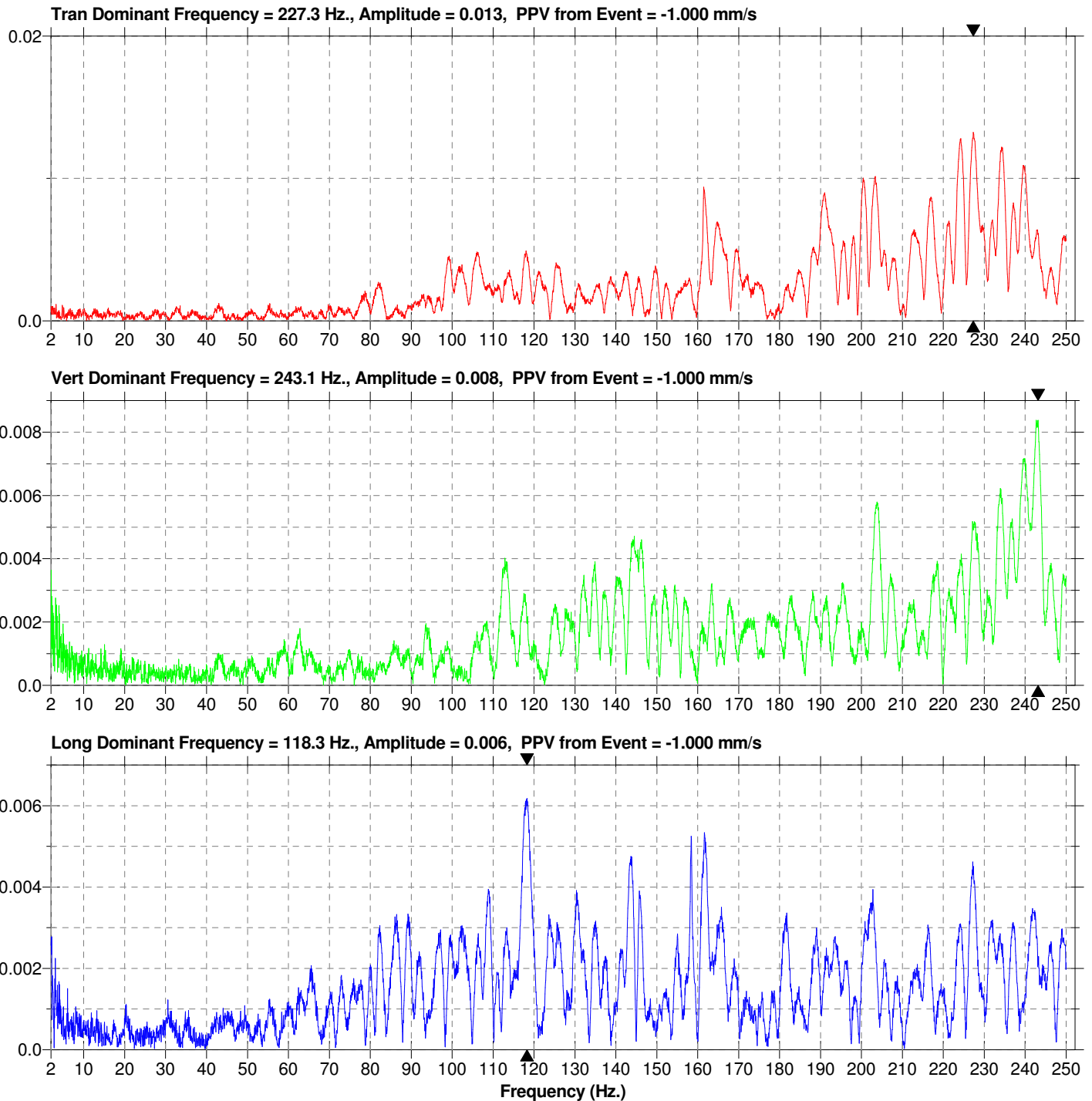
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**Trigger Source** Geo: 1.000 mm/s  
**Range** Geo: 254.0 mm/s  
**Record Time** 8.0 sec at 4096 sps  
**Operator/Setup:** Operator/factory.MMB

**Serial Number** UM13744 V 10-89 Micromate ISEE  
**Battery Level** 3.5 Volts  
**Unit Calibration** November 27, 2018 by UES New Delhi  
**File Name** UM13744\_20190121081842.IDFW

### Notes

**Location:** 165mRL Up Ramp  
**Client:** Mochia Mines  
**User Name:** HZL  
**General:** RING BLAST



**Date/Time** Vert at 23:44:06 July 12, 2018  
**Trigger Source** Geo: 1.000 mm/s  
**Range** Geo: 254.0 mm/s  
**Record Time** 8.0 sec at 4096 sps  
**Operator/Setup:** Operator/factory.MMB

**Serial Number** UM13744 V 10-89 Micromate ISEE  
**Battery Level** 3.5 Volts  
**Unit Calibration** November 25, 2017 by UES New Delhi  
**File Name** UM13744\_20180712234406.IDFW

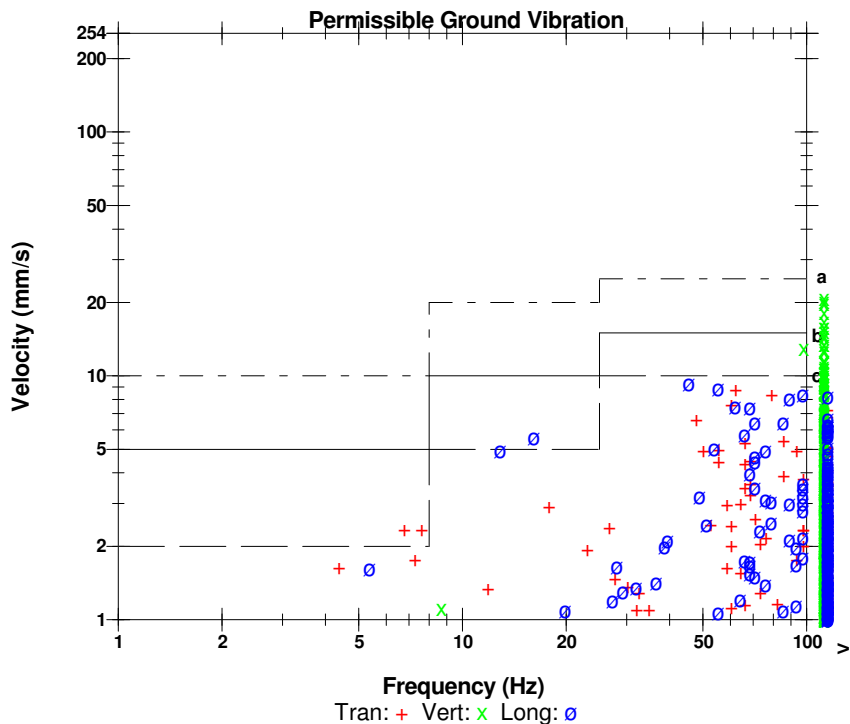
## Notes

**Location:** 285mRL X- Cut  
**Client:** Mochia Mines  
**User Name:** HZL  
**General:** RING BLAST

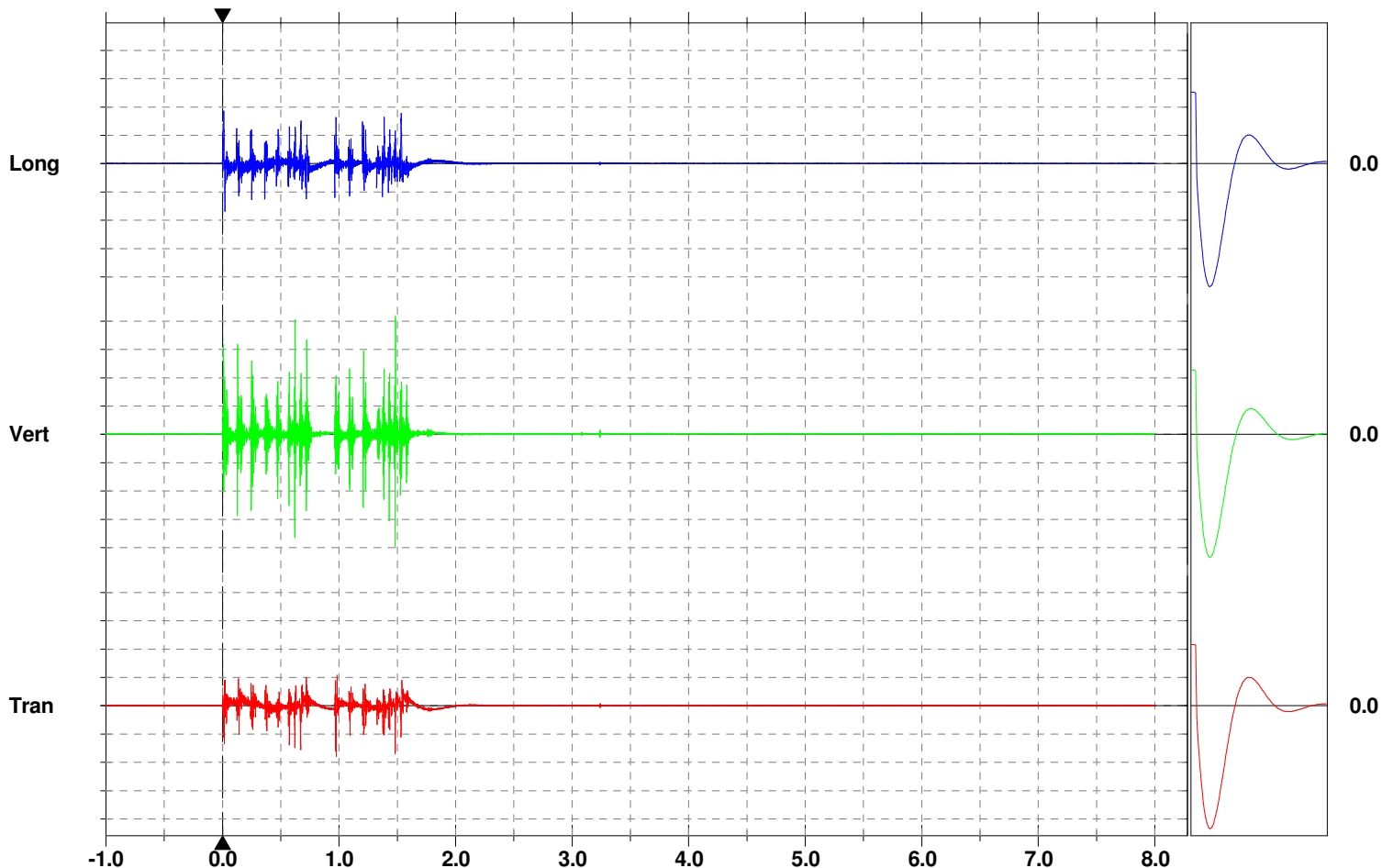
	Tran	Vert	Long	
PPV	8.922	20.86	9.308	mm/s
ZC Freq	62	146	46	Hz
Time (Rel. to Trig)	0.976	1.484	0.011	sec
Peak Acceleration	0.997	3.715	1.149	g
Peak Displacement	0.067	0.044	0.042	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.1	7.5	Hz
Overswing Ratio	4.3	4.8	4.3	

**Peak Vector Sum** 21.40 mm/s at 1.484 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: 5.000 mm/s/div

**Trigger =**

687

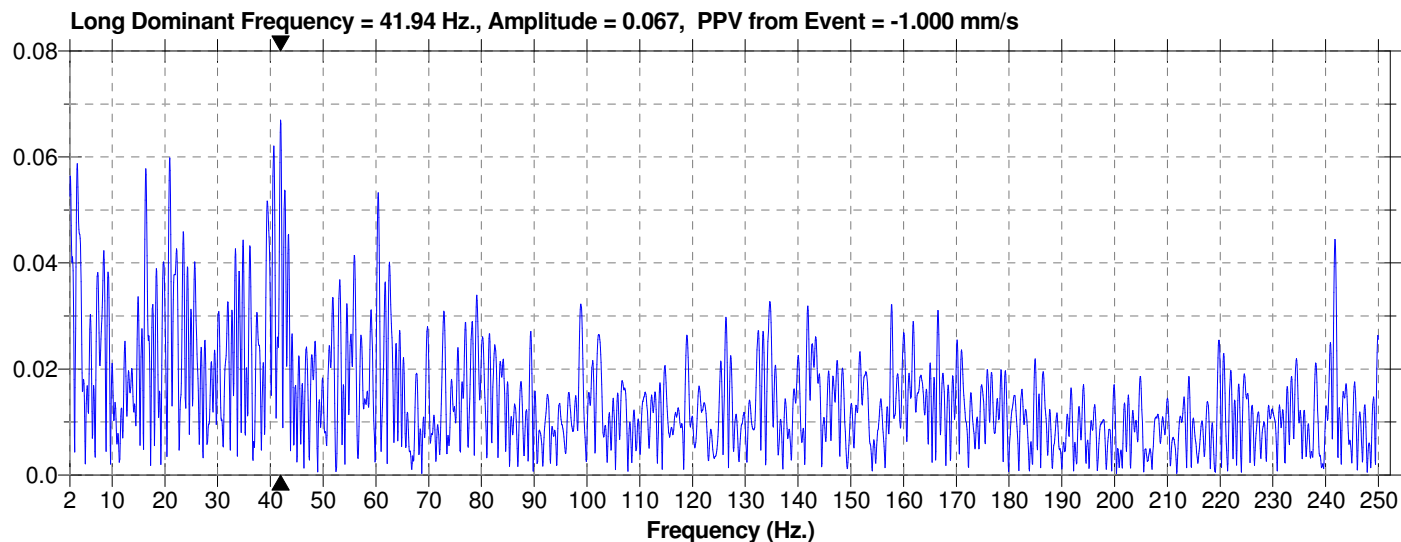
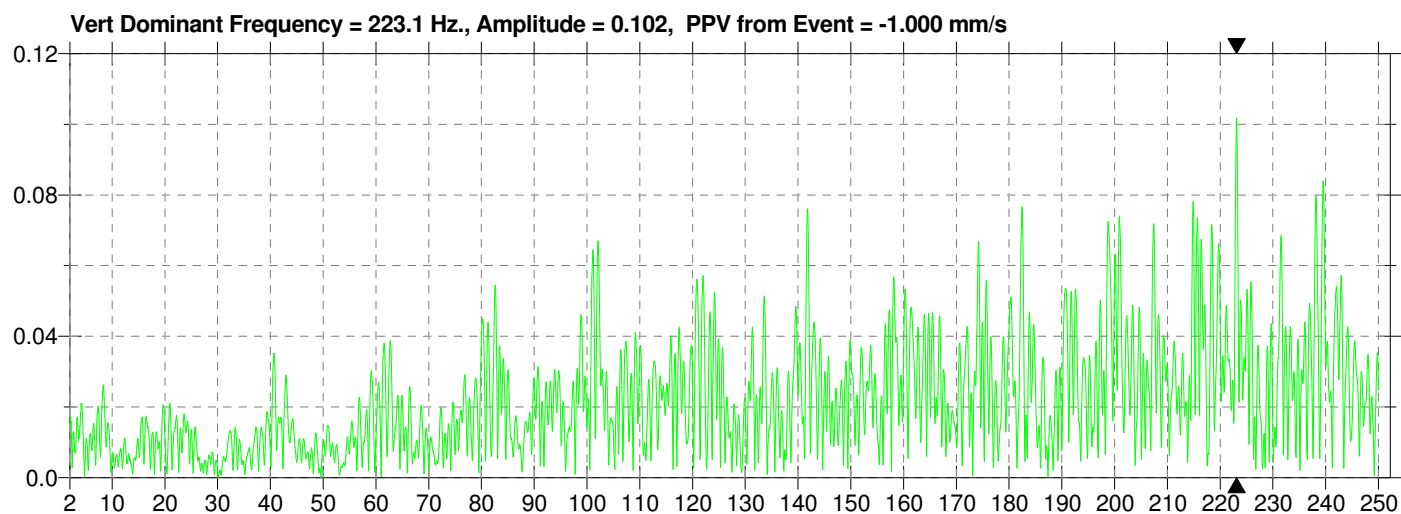
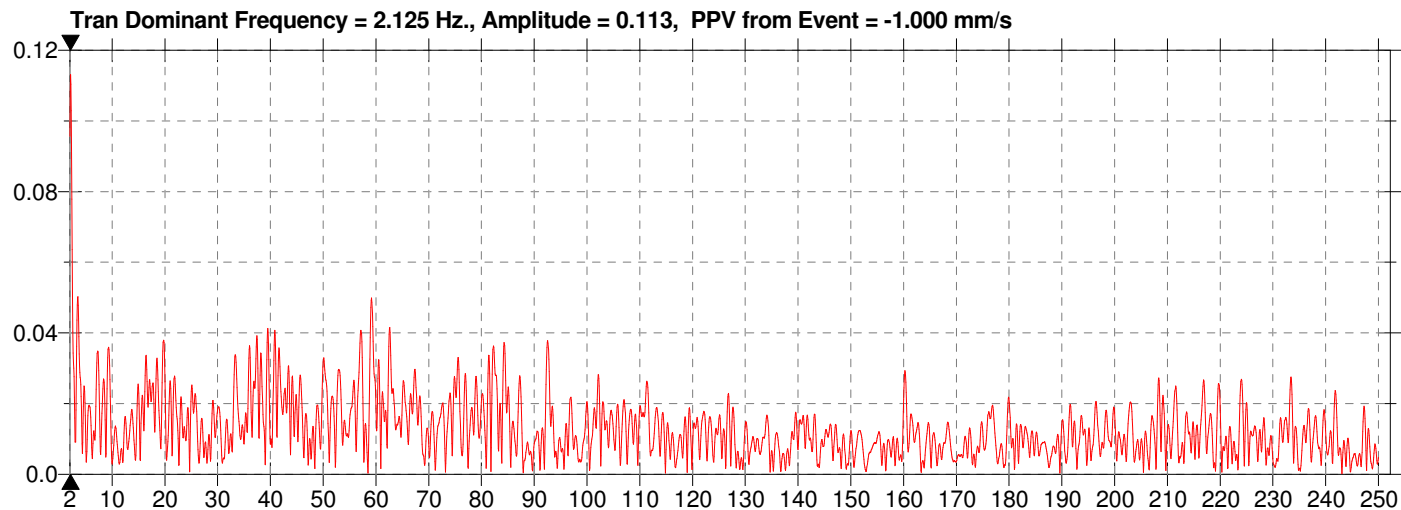
Sensor Check

**Date/Time** Vert at 23:44:06 July 12, 2018  
**Trigger Source** Geo: 1.000 mm/s  
**Range** Geo: 254.0 mm/s  
**Record Time** 8.0 sec at 4096 sps  
**Operator/Setup:** Operator/factory.MMB

**Serial Number** UM13744 V 10-89 Micromate ISEE  
**Battery Level** 3.5 Volts  
**Unit Calibration** November 25, 2017 by UES New Delhi  
**File Name** UM13744\_20180712234406.IDFW

## Notes

**Location:** 285mRL X- Cut  
**Client:** Mochia Mines  
**User Name:** HZL  
**General:** RING BLAST



**Date/Time** Vert at 16:32:09 January 25, 2020  
**Trigger Source** Geo: 1.000 mm/s  
**Range** Geo: 254.0 mm/s  
**Record Time** 8.0 sec at 4096 sps  
**Operator/Setup:** Operator/factory.MMB

**Serial Number** UM13744 V 10-89 Micromate ISEE  
**Battery Level** 3.8 Volts  
**Unit Calibration** November 27, 2019 by UES New Delhi  
**File Name** UM13744\_20200125163209.IDFW

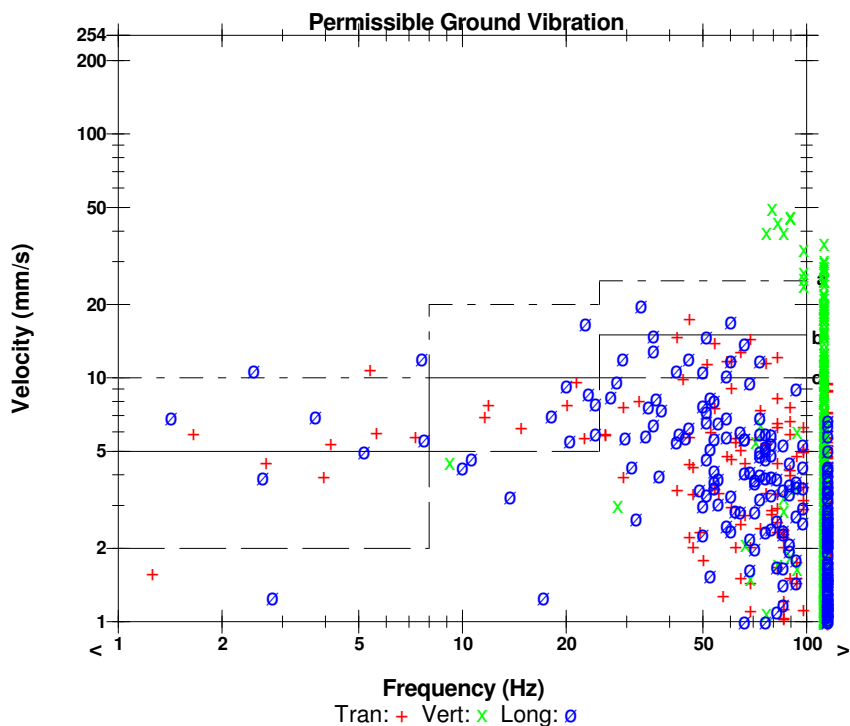
## Notes

**Location:** 57mRL Shaft  
**Client:** Mochia Mines  
**User Name:** HZL  
**General:** Ring Blast

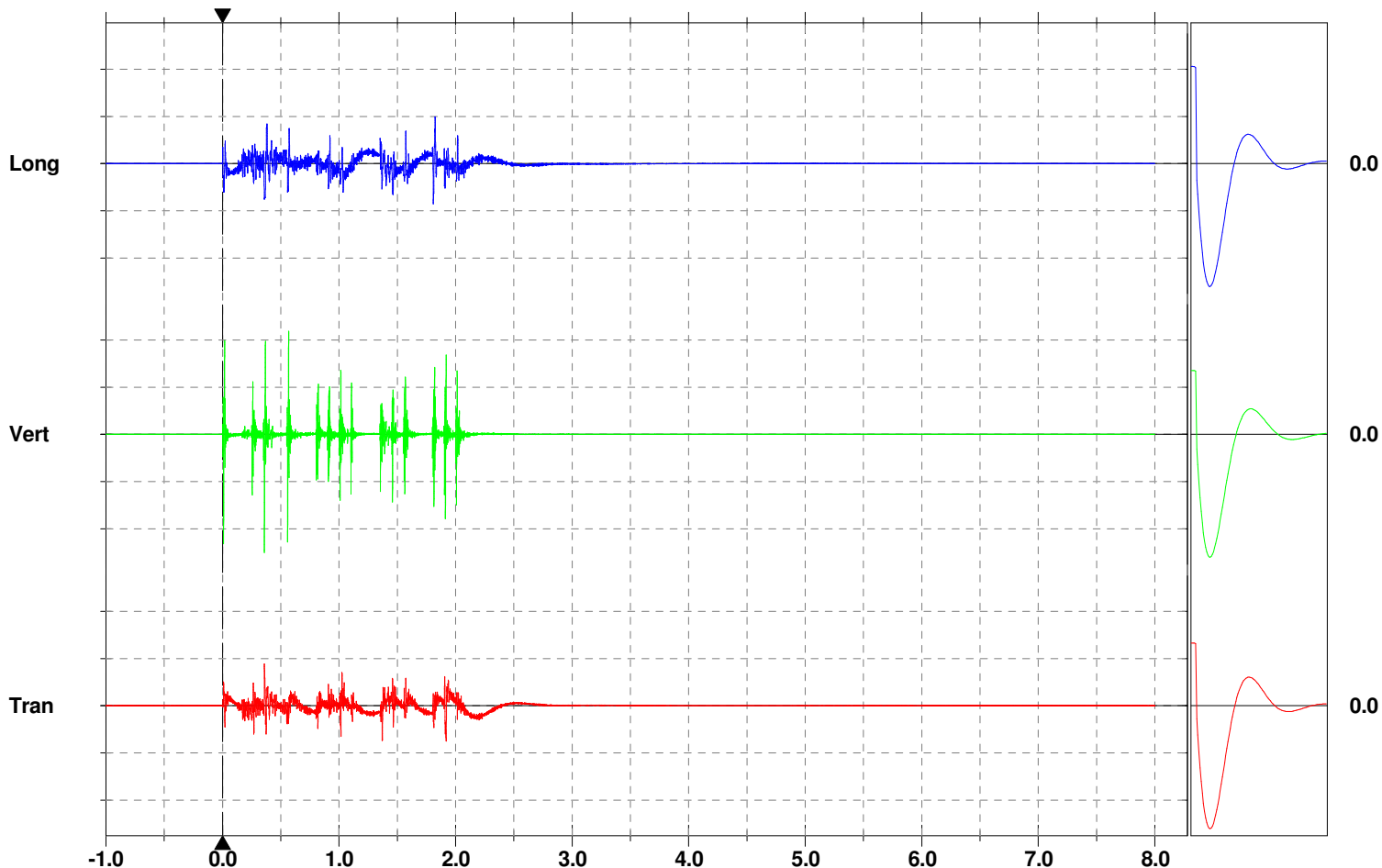
	Tran	Vert	Long	
PPV	17.77	49.99	19.83	mm/s
ZC Freq	46	79	33.0	Hz
Time (Rel. to Trig)	0.359	0.359	1.824	sec
Peak Acceleration	1.915	5.848	1.784	g
Peak Displacement	0.473	0.081	0.431	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.1	7.5	Hz
Overswing Ratio	4.3	4.8	4.2	

**Peak Vector Sum** 55.10 mm/s at 0.359 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: 20.00 mm/s/div  
**Trigger =**

689

Sensor Check

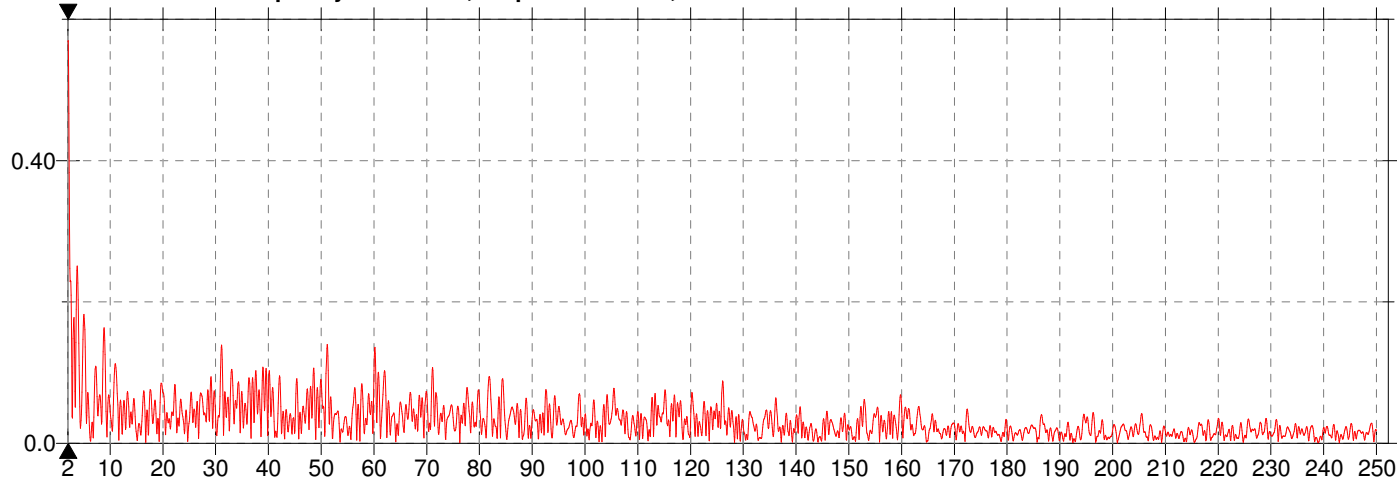
**Date/Time** Vert at 16:32:09 January 25, 2020  
**Trigger Source** Geo: 1.000 mm/s  
**Range** Geo: 254.0 mm/s  
**Record Time** 8.0 sec at 4096 sps  
**Operator/Setup:** Operator/factory.MMB

**Serial Number** UM13744 V 10-89 Micromate ISEE  
**Battery Level** 3.8 Volts  
**Unit Calibration** November 27, 2019 by UES New Delhi  
**File Name** UM13744\_20200125163209.IDFW

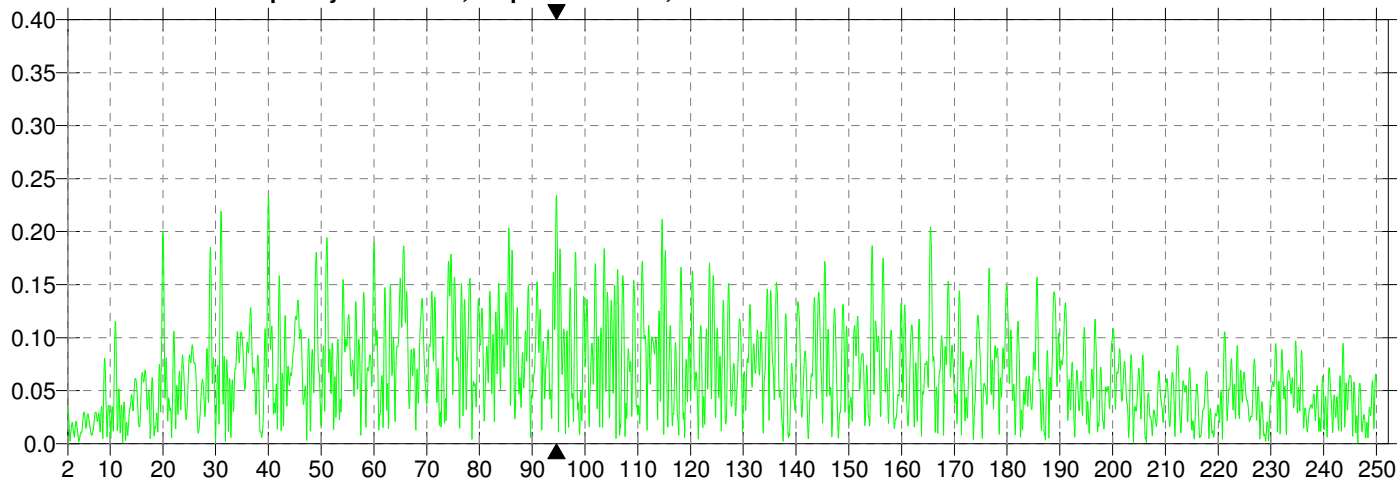
## Notes

**Location:** 57mRL Shaft  
**Client:** Mochia Mines  
**User Name:** HZL  
**General:** Ring Blast

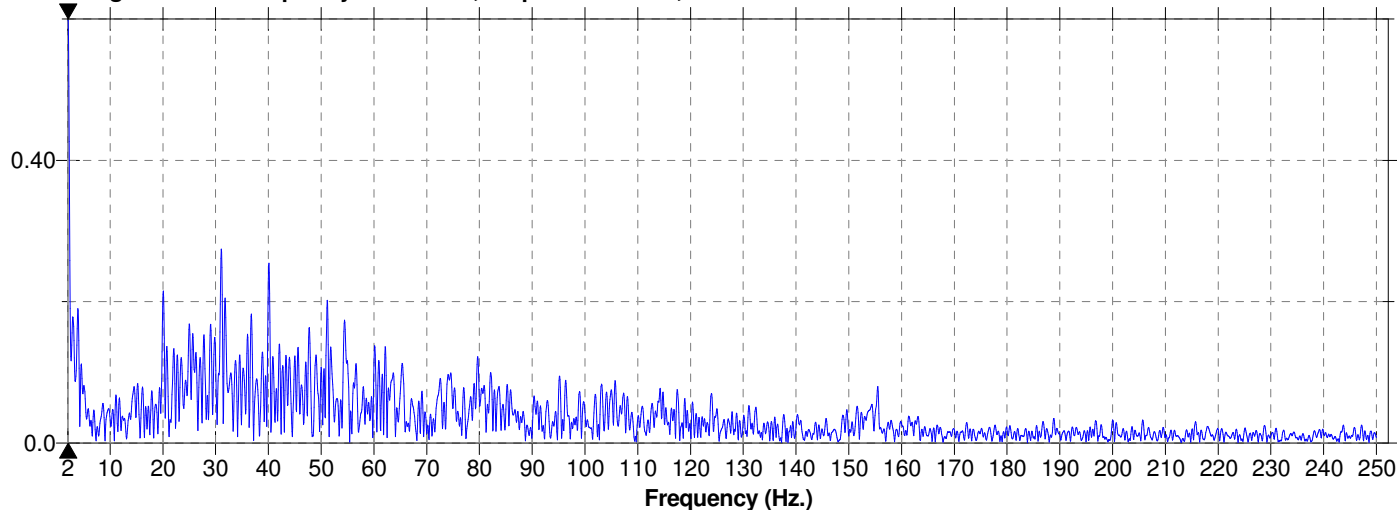
**Tran Dominant Frequency = 2.063 Hz., Amplitude = 0.570, PPV from Event = -1.000 mm/s**



**Vert Dominant Frequency = 94.63 Hz., Amplitude = 0.234, PPV from Event = -1.000 mm/s**



**Long Dominant Frequency = 2.063 Hz., Amplitude = 0.598, PPV from Event = -1.000 mm/s**





**Date/Time** Vert at 07:55:01 September 27, 2018  
**Trigger Source** Geo: 1.000 mm/s  
**Range** Geo: 254.0 mm/s  
**Record Time** 8.0 sec at 4096 sps  
**Operator/Setup:** Operator/factory.MMB

**Serial Number** UM13744 V 10-89 Micromate ISEE  
**Battery Level** 3.7 Volts  
**Unit Calibration** November 25, 2017 by UES New Delhi  
**File Name** UM13744\_20180927075501.IDFW

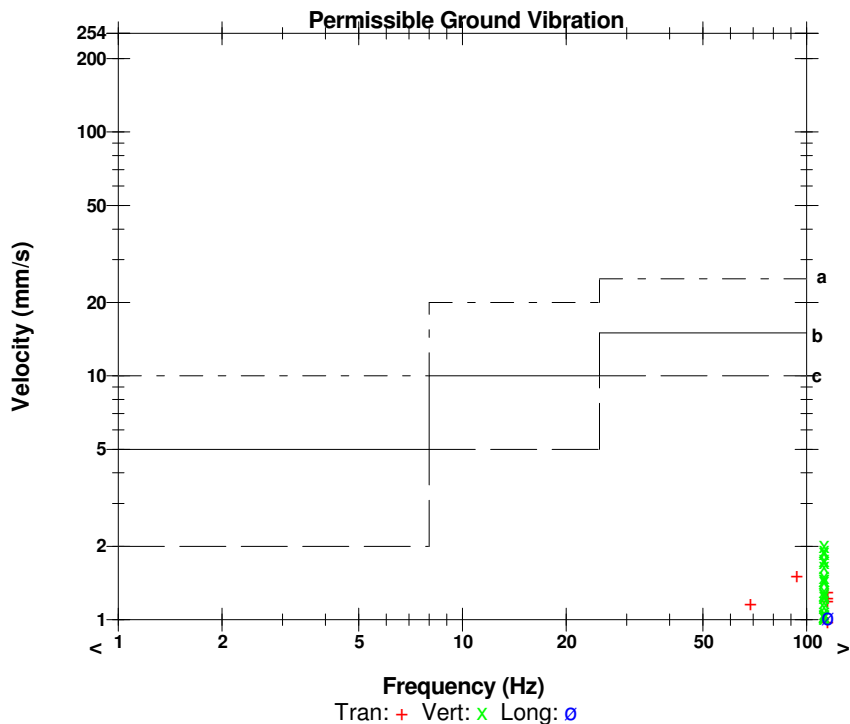
## Notes

**Location:** 285mRL Ore X- Cut  
**Client:** Mochia Mines  
**User Name:** HZL  
**General:** Slope Blast

	Tran	Vert	Long	
PPV	1.545	2.018	1.025	mm/s
ZC Freq	93	256	256	Hz
Time (Rel. to Trig)	0.110	0.181	0.180	sec
Peak Acceleration	0.214	0.434	0.188	g
Peak Displacement	0.002	0.044	0.021	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.1	7.5	Hz
Overswing Ratio	4.3	4.8	4.2	

**Peak Vector Sum** 2.329 mm/s at 0.110 sec

## DGMS India (A)

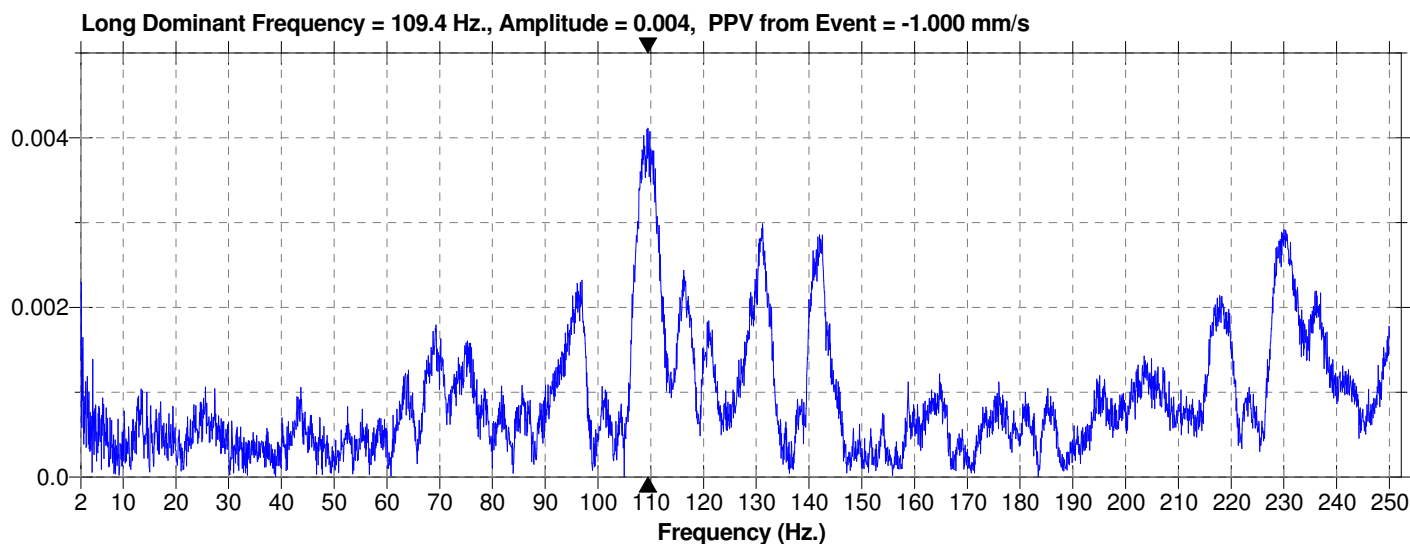
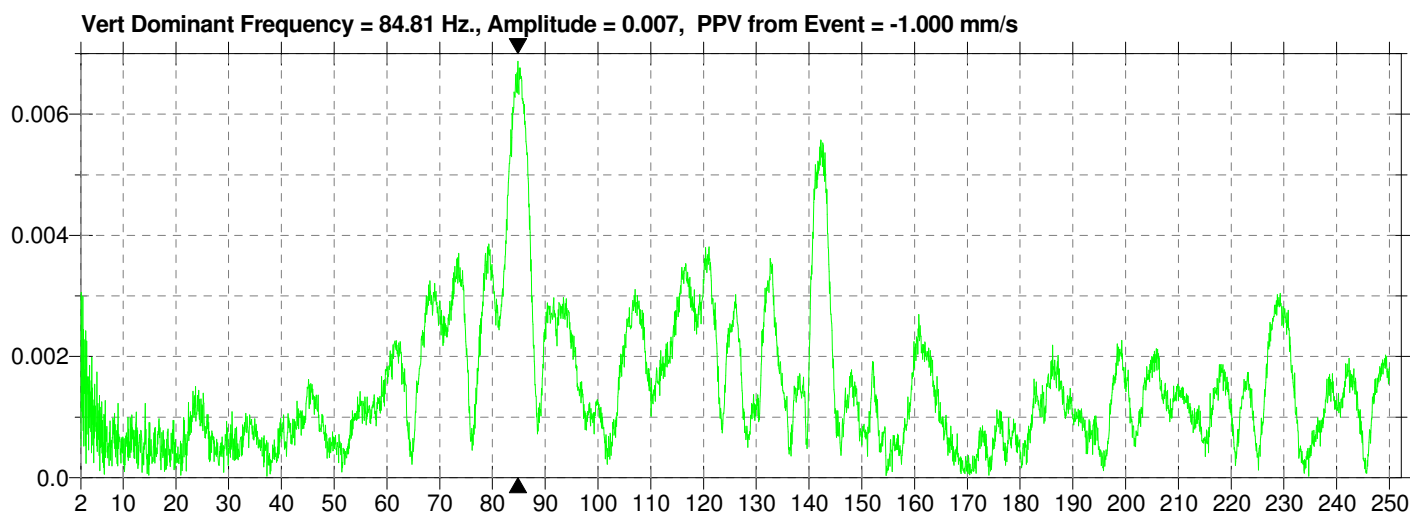
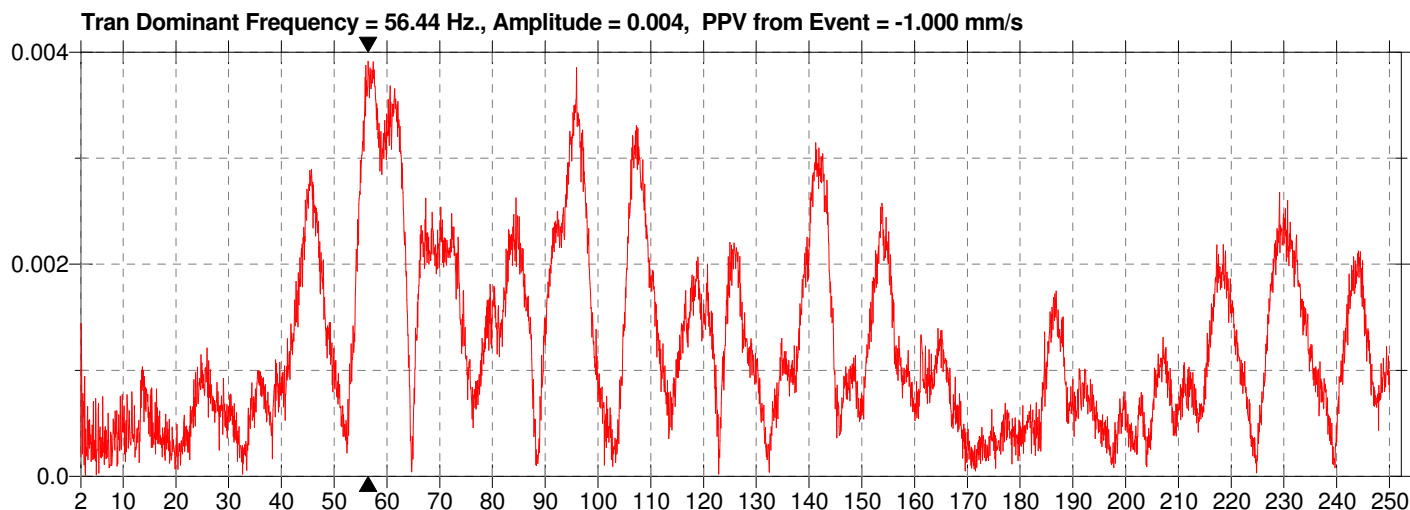


**Date/Time** Vert at 07:55:01 September 27, 2018  
**Trigger Source** Geo: 1.000 mm/s  
**Range** Geo: 254.0 mm/s  
**Record Time** 8.0 sec at 4096 sps  
**Operator/Setup:** Operator/factory.MMB

**Serial Number** UM13744 V 10-89 Micromate ISEE  
**Battery Level** 3.7 Volts  
**Unit Calibration** November 25, 2017 by UES New Delhi  
**File Name** UM13744\_20180927075501.IDFW

## Notes

**Location:** 285mRL Ore X- Cut  
**Client:** Mochia Mines  
**User Name:** HZL  
**General:** Stope Blast



**Confidential**

**CSIR-CENTRAL INSTITUTE OF MINING & FUEL RESEARCH  
(Council of Scientific & Industrial Research)**

**Barwa Road, Dhanbad – 826 001**



***Draft Report on***

**Study and advice for blasting optimization at  
Balaria underground mines of M/s HZL for safe  
and efficient exploitation of minerals**

**PROJECT No. SSP/306/2018-19**

**February 2021**

## **Project Title**

# **Study and advice for blasting optimization at Balaria underground mines of M/s HZL for safe and efficient exploitation of minerals**

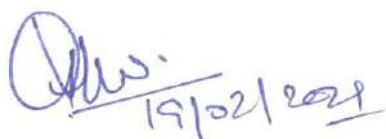
**Project No.: SSP/306/2018-19**

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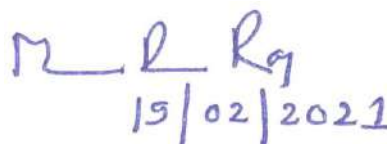
This report is meant for internal use of your organization only and it should not be published in full or part by your organization. It should not be communicated or circulated to outside parties except concerned departments. However, CSIR-CIMFR reserves the right to publish the results of the investigations 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.

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**(Vivek K Himanshu)**  
**Scientist**



**(Murari P Roy)**  
**Sr. Principal Scientist & Project Leader**

## **Contents**

S.No.		Page Nos.
	Executive Summary	1
1.	Introduction	3
2.	Location and Geology	3
3.	Instrumentation	4
4.	Experimental blast details	5
5.1	Frequency of blast vibration	7
5.2	Waveform analysis of blast	7
6.	Existing vibration standard and criteria to prevent damage	10
7.	Suggested blast design parameters for safety of underground structures	11
7.1	Suggested Blast Design Parameters for Safety of Surface Structures	12
7.2	Safety precautions while blasting	12
8.	Optimisation of blasting parameters	12
8.1	Optimisation of Burden- Spacing for the Mine	12
8.2	Optimization of delay sequence for production blasting	17
8.3	Drilling and blasting methodology for extraction of narrow vein ore deposits	18
9.	Monitoring of velocity of detonation (VOD) of explosives	20
10.	Quality test of delay detonators	22
10.1	Quality test of NONEL delay detonators during 1st visit	22
10.2	Quality test of NONEL delay detonators during 6th visit	27
11.	Conclusions and recommendations	30
	Acknowledgements	32





## EXECUTIVE SUMMARY

This report relates to the study conducted by CSIR-Central Institute of Mining and Fuel Research, Dhanbad on blast optimization study at development faces as well as at production blast (slot/ring) faces for safe and efficient exploitation of minerals at Balaria underground mine. The methodology adopted to reach at the recommendations under this study includes the experimental trials, instrumentation, data monitoring, and data analysis. The results of the study and recommendations, made thereof with the important observations and methodology, are summarised below:

- ❖ Altogether, 19 blast data gathered during the field study at the mine has been analysed. The blast vibrations were monitored around different underground structures located in the proximity of the blasting face. Most of the vibration were recorded at near field distances from the blast face.
- ❖ For development face blast, the number of holes detonated in a blast round were 54. The total explosives weight detonated in a blast round was 175 kg. The maximum explosives weight per delay accounted was 30 kg. The hole diameter of 45 mm were used in all the development blast faces. Blast holes were charged with emulsion cartridge explosives. Non-electric detonators (NONEL) was used for initiation of charged holes.
- ❖ Maximum level of ground vibration recorded from development face blast during experimental trial was 7.55 mm/s at peak dominant frequency of 222.9 Hz. The vibration was recorded at a distance of 45 m from the blast face -85 mRL 1NA on 24.01.2020. The location of seismograph was at the same level of the blast face. The blast was conducted for 54 numbers of hole. The total explosive charge of 175 kg was fired in this blast keeping explosive weight per delay of 30 kg.
- ❖ For production blast, the number of holes detonated in a blast round varied from 7 to 20. The total explosives weight detonated in a blast round were varied from 80 to 1250 kg. The maximum explosives weight per delay varied between 19 and 75 kg. The hole diameter of 70 mm, 89 mm and 115 mm were used for blast holes and uncharged reamer holes of the production blast faces. Blast holes were charged with emulsion cartridge explosives and Ammonium Nitrate Fuel Oil (ANFO) explosives.
- ❖ Maximum level of ground vibration recorded from production blast during experimental trial was 38.61 mm/s at peak dominant frequency of 91 Hz. The vibration was recorded at a distance of 20 m from the -55 mRL blast face for blast conducted on 22.01.2020. The blast was conducted for 07 numbers of hole. The total explosive charge of 80 kg was fired in this blast keeping explosive weight per delay of 19 kg.
- ❖ The blast induced vibration was also recorded for the blast conducted for excavation of ventilation raise. The maximum level of ground vibration recorded from the blast of ventilation raise during experimental trial was 46.80 mm/s at peak dominant frequency of 32 Hz. The vibration was recorded at a distance of 20 m from the +25 mRL 7W ventilation

raise face for blast conducted on 28.09.2018. In this blast, 275kg of explosives were distributed in 8 holes, keeping explosive weight per delay of 34 kg.

- ❖ The frequencies of the recorded vibration were more than 25 Hz in all the blasting rounds. The most common recorded frequency ranges between 25 Hz and 120 Hz. The maximum recorded frequency was 222.9 Hz.
- ❖ The statistical predictor equation has been developed for the safety of underground structures while conducting underground blasting. The Ground vibrations data recorded were grouped together for this purpose. Accordingly, the maximum explosive charge weight per delay and total explosive charge for the mine has been computed considering different vibration limits based on RMR values of the roof rock. The suggested MCPD and total charge is given in Annexure of the report. The suggested charging pattern should be followed for day-to-day blasting at the mine with the aim to safeguard nearby underground structures.
- ❖ The optimum burden for different blast hole diameter used at the mine has been computed using the empirical formulae suggested by Rustan as well as empirical Kuz-Ram model. The differential charging pattern has been suggested to reduce the over-break. The delay sequence for day-to-day blasting at the production blast faces of the mine has been suggested.
- ❖ The blasting methodology has been suggested for extraction of narrow width ore deposits under long hole stoping method as practised at the mine. Three different excavation technique for the extraction of narrow vein ore deposits consisting of Staggered/zig-zag, Dice-5 and Inline hole pattern have been discussed. The thorough review has been done for all the three methods and inline excavation method came as best suit in the outcome for Balaria underground mine.
- ❖ The in-the-hole velocity of detonation (VOD) of Powergel 2 cartridge explosives (2.08 kg of 76 mm dia.) of M/s IEPL-Orica was recorded at underground production blast face of Balaria Underground mine on 24.07.2019. The recorded VOD is 4993.12 m/s.
- ❖ The in-the-hole Velocity of detonation (VOD) of cartridge explosives (125gm of 25 mm dia) used at development faces of the mine was recorded on 22.01.2020. The explosive belongs to M/s IEPL Orica. The recorded magnitude of VOD is 4541.84 m/s.
- ❖ The scattering tests of NONEL delay detonators were performed during 1<sup>st</sup> and 6<sup>th</sup> visits to the mine. The tests were conducted using High speed video camera. The test result reveals that the delay timing of the detonators is within acceptable limit for the test conducted during 6<sup>th</sup> visit. The scattering percentage should be restricted to maximum 10 % up to 10 no. delay and thereafter it should be within 5 % to get the optimum results from the blast.

## **1. Introduction**

M/s Hindustan Zinc Limited entrusted CSIR-Central Institute of Mining and Fuel Research, Dhanbad PO No.: 2000046826/5100022254 dated 13.01.2018 (AMENDMENT NO: 2 Dated: 16.03.2018) for conducting blast optimization study at development faces as well as at production blast (slot/ring) faces for safe and efficient exploitation of minerals at Zawar group of mines.

Scientists of CSIR-Central Institute of Mining & Fuel Research (CIMFR), Dhanbad conducted Six visits to the mine during March 26-31, 2018; July 13-21, 2018; September 25 - October 05, 2018; January 16 – February 01, 2019; July 16-27, 2019 and January 20-30, 2020. Methodology of blast design optimization was discussed with HZL officials. Near field blast induced vibration were measured by placement of seismographs for trial blasts of development and production faces. Qualitative assessment of explosive and its accessories were performed by Velocity of detonation (VOD) and scattering tests.

Based on the discussion with mine management, the major objectives of the study were as follows:

1. Development of nearfield blast vibration predictor and suggestion on blast design parameters to prohibit damages of underground structures.
2. Optimisation of burden-spacing for production blast faces of the mine.
3. Optimisation of blast design for dilution control in excavation of narrow vein ore deposits.
4. Qualitative assessments of explosive and its accessories.

The above objectives were achieved by experimental trials at the mine. The statistical predictor equation has been developed on the basis of recorded vibration data. The data was gathered during the visits to the mine. The data gathered by the mine management were also taken together with the data from the experimental trial for the statistical analysis. The charging parameters for the blast at different distances from the underground structures has been suggested on the basis of the predictor. The necessary instrumentation was carried out during field visits for the assessment of explosive and its accessories.

## **2. Location and geology**

The region is one of the significant parts of the Aravalli Supergroup which have been deposited in a Paleoproterozoic rift setting. The Archean metamorphic sequences of the Banded Gneissic Complex form the basement of Aravalli Supergroup. The area in and around Udaipur constitutes the type area for Aravalli Supergroup. The economically noteworthy lower part of Aravalli Supergroup is best exposed in the vicinity of Zawar region. This area incorporates four separate Pb-Zn deposits namely, Balaria, Baroi, Mochia, Zawarmala. The mineralization in this region have been found to be around 1700 Ma old as evident from Pb-Pb model age. Further, the major lithologies of this region are dolomite (with varieties), phyllites, quartzite and conglomerates. The rocks of this area are steeply dipping and are in the form of ridge and valley topography. The ridges are of quartzite and dolomite whereas intervening basin comprises of different

categories of slate and phyllites. The rocks of this region have undergone three main phases of deformation and have undergone metamorphism up to greenschist facies. The mineralization has taken place in the form of fine bedding in carbonaceous phyllite lithologies and as structurally controlled, epigenetic form in different varieties of dolomites. The geological map of the mine is shown in Figure 1.

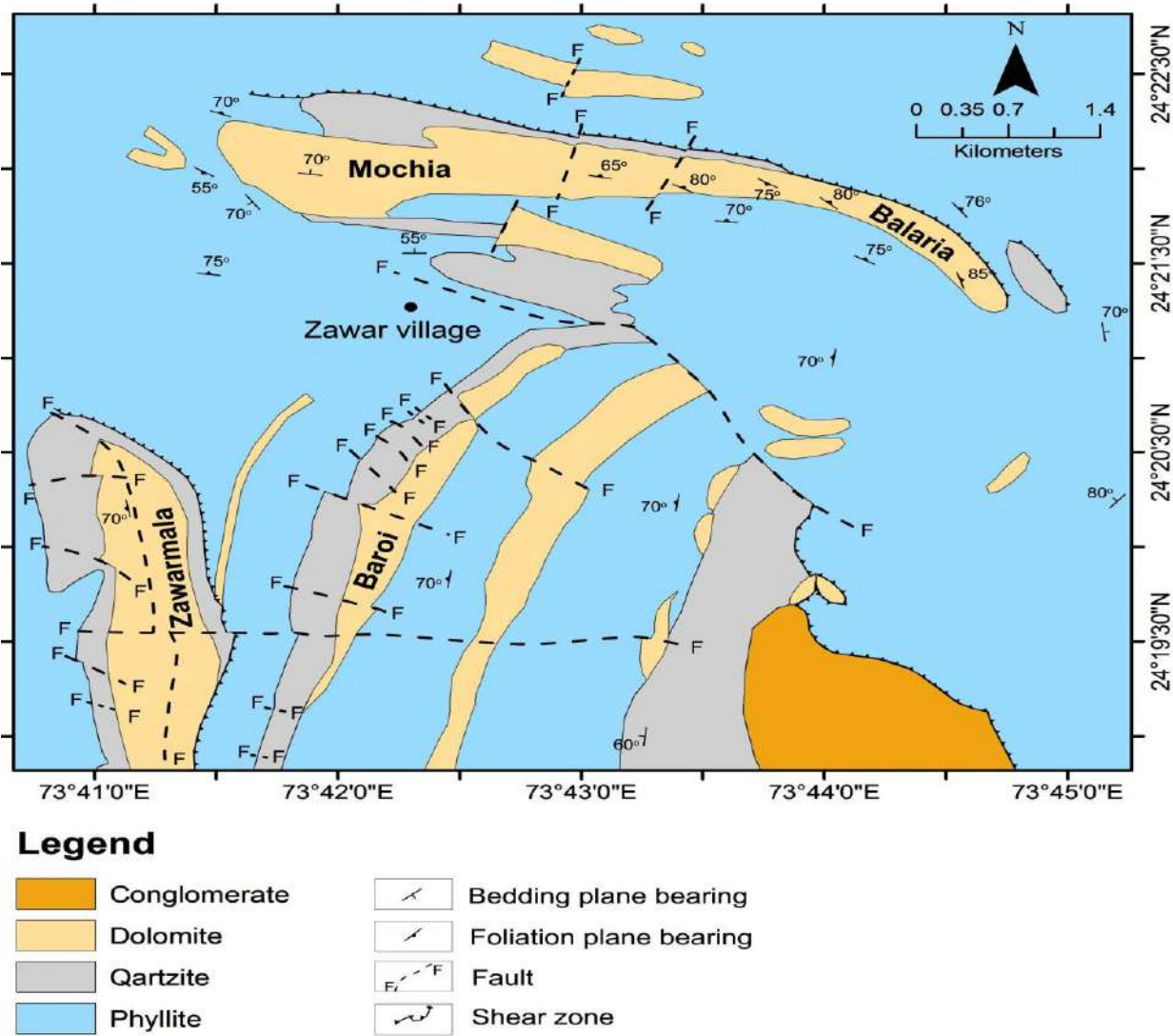


Figure 1. Geological map of Zavar Group of mines, HZL, Rajasthan

### 3. Instrumentations

Blast induced vibrations were monitored by seismographs namely MiniMate Plus and MiniMate DS-077 (Made in Canada by M/s Instantel Inc.). The MiniMate plus is an eight/four channel seismograph provided with two/one tri-axial transducer for monitoring vibration (in mm/s) and two/one channel for monitoring air over-pressure/noise in dB(L) or Pa. MiniMate DS-077 is a four channel seismograph provided with one tri-axial transducer for vibration monitoring (in mm/s) and one channel for monitoring of air over-pressure/noise in dB(L) or Pa . All the seismographs record vibration in three directions i.e. Longitudinal (L), Vertical (V) and Transverse (T). They also record peak frequency of vibration and compute the peak vector sum of the vibration.



The in-the-hole VOD of the explosives was recorded with the help of VOD-Mate of M/s Instantel Inc., Canada.

Blaster's Ranger II™ high speed digital video camera (made in Canada by M/s MREL Group of Companies Limited) was used for scattering tests of delay detonators.

#### **4. Experimental blast details**

Altogether, 19 blasts were conducted at different development and production blast faces of the mine. The blast vibrations were monitored around different underground structures located in the proximity of the blasting face. Most of the vibration were recorded at near field distances from the blast face. A view of blast vibration monitoring in underground by placement of seismograph is shown in Photograph 1. For development face blast, the number of holes detonated in a blast round were 54. The total explosives weight detonated in a blast round was 175 kg. The maximum explosives weight per delay was of 30 kg. The hole diameter of 45 mm was used in all the development blast faces. Blast holes were charged with emulsion cartridge explosives. Non-electric detonators (NONEL) was used for initiation of charged holes.



Photograph 1. A view of seismograph placement for measurement of blast induced vibration at Balaria underground mine.

For production blast, the number of holes detonated in a blast round varied from 7 to 20. The total explosives weight detonated in a blast round were varied from 80 to 1250 kg. The maximum explosives weight per delay varied between 19 and 75 kg. The hole diameter of 70 mm, 89 mm and 115 mm were used for blast holes and uncharged reamer holes of the production blast faces. Blast holes were charged with emulsion cartridge explosives and Ammonium Nitrate Fuel Oil (ANFO) explosives. NONEL and Electronic initiation system was used for initiation of charged holes. The production blast was conducted by downhole as well as up hole charging and blasting fashion.

The blast induced ground vibration was recorded at different underground locations by placement of seismographs. Maximum level of ground vibration recorded from development face blast during experimental trial was 7.55 mm/s at peak dominant frequency of 222.9 Hz. The vibration was recorded at a distance of 45 m from the blast face -85 mRL 1NA on 24.01.2020. The location of seismograph was at the same level of the blast face. The blast was conducted for 54 numbers of hole. The total explosive charge of 175 kg was fired in this blast keeping explosive weight per delay of 30 kg.

Maximum level of ground vibration recorded from production blast during experimental trial was 38.61 mm/s at peak dominant frequency of 91 Hz. The vibration was recorded at a distance of 20 m from the -55 mRL blast face for blast conducted on 22.01.2020. The blast was conducted for 07 numbers of hole. The total explosive charge of 80 kg was fired in this blast keeping explosive weight per delay of 19 kg.

The blast induced vibration was also recorded for the blast conducted for excavation of ventilation raise. The maximum level of ground vibration recorded from the blast of ventilation raise during experimental trial was 46.80 mm/s at peak dominant frequency of 32 Hz. The vibration was recorded at a radial distance of 20 m from the +25 mRL 7W ventilation raise face for blast conducted on 28.09.2018. The blast was conducted for 08 numbers of hole. The total explosive charge of 275 kg was fired in this blast keeping explosive weight per delay of 34 kg.

## 5. Analyses of recorded vibration data

Ground vibrations data recorded were grouped together for statistical analysis. Analysis was performed based on vibration data recorded at different underground locations due to underground blasting and the 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). The generalised established equation combining all the underground vibration data for Balaria Underground Mine is given in Equation 1.

$$v = 567.51 \times \left( \frac{R}{\sqrt{Q_{\max}}} \right)^{-1.389} \dots\dots\dots \text{Equation 1}$$

Correlation co-efficient ( $R$ ) = 88.69 %

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 predicting vibrations at underground locations of Balaria Underground Mine. It may be used to compute the maximum explosives weight to be detonated in a delay for distances of concerned in the mine. The regression plots of vibration data recorded at their respective scaled distances is shown in Figure 2.

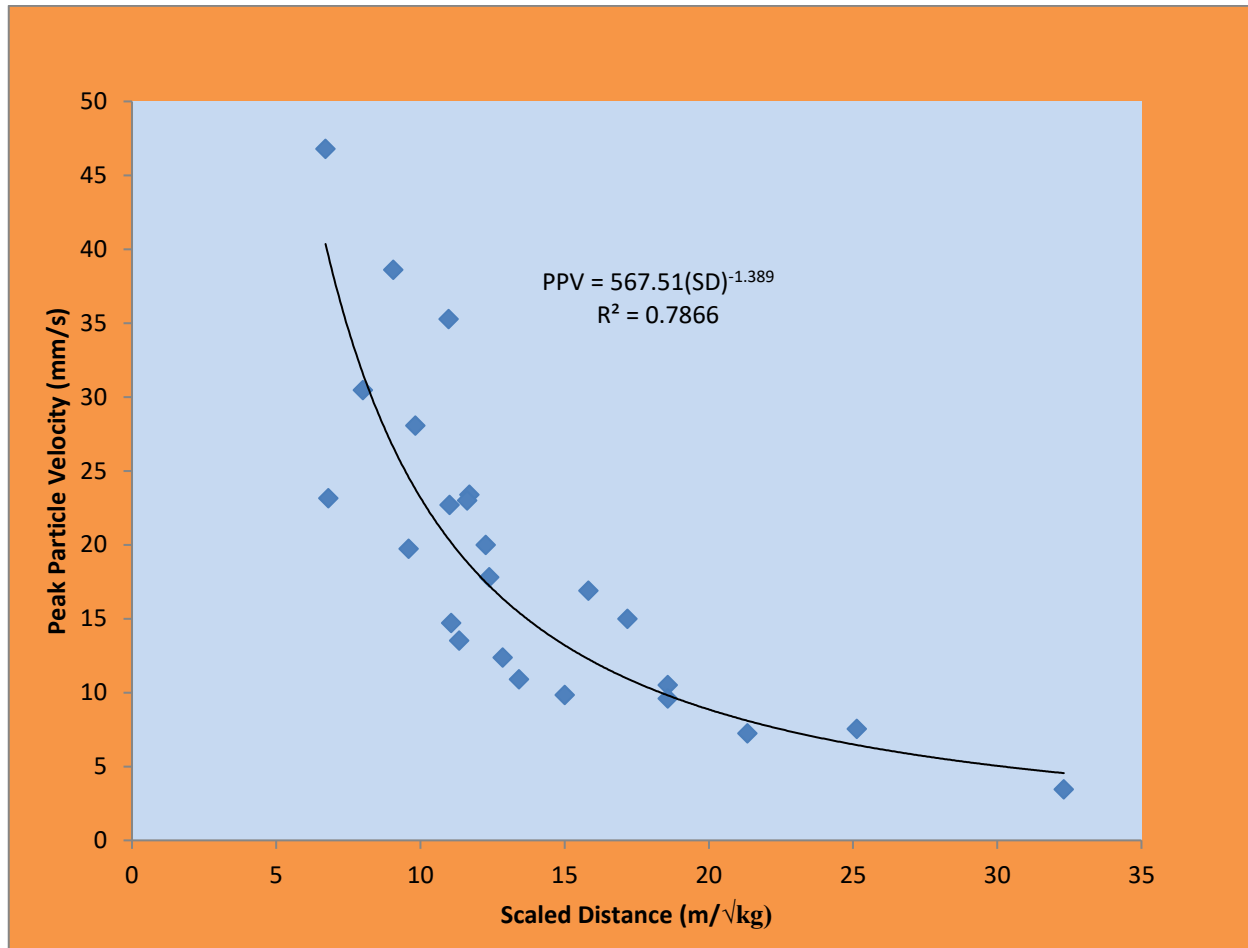


Figure 2. Regression plot of recorded PPV at different underground locations with their respective scaled distances for Balaria Underground Mine.

### 5.1 Frequency of blast vibration

The frequency of blast induced vibration wave is mainly controlled by geological conditions of transmitting media and meagrely by delay arrangements. The frequencies of the recorded vibration were more than 25 Hz in all the blasting rounds. The most common recorded frequency ranges between 25 Hz and 120 Hz. The maximum recorded frequency was 222.9 Hz. The dominant peak frequencies recorded at various radial distances are shown in Figure 3.

### 5.2 Waveform analysis of blast

The analysis of recorded waveform from different blasts has been carried out to know the blast vibration propagation characteristic under the respective charging conditions. Blast wave signature recorded for blast conducted at -85 mRL 5E ring blast on 24.01.2020 is shown in Figure 4. The waveform was recorded at a distance of 50 m from the blast face. FFT of recorded blast vibration is shown in Figure 5. The waveform and the FFT recorded of the blast conducted at -85 mRL on 23.01.2020 is shown in Figure 6 and Figure 7 respectively. The waveform was recorded at a distance of 40 m from the blast face.

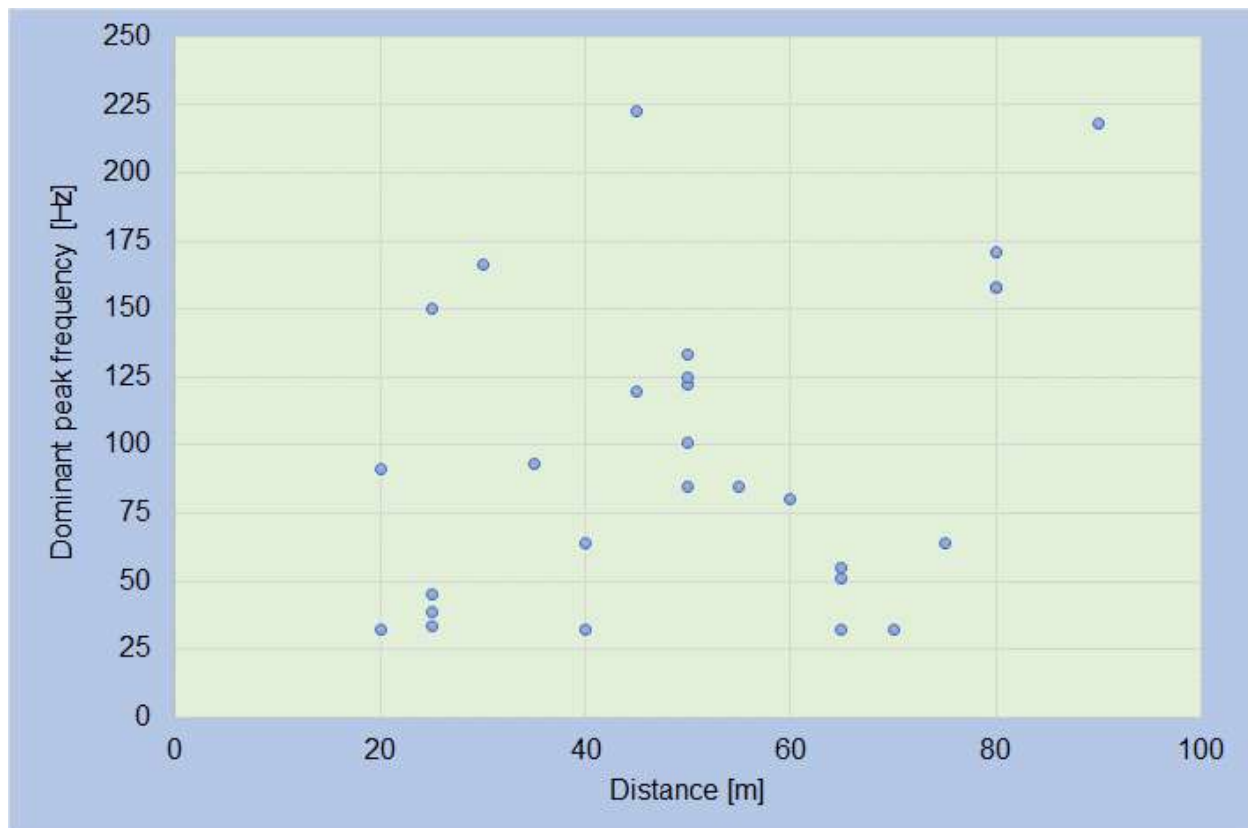


Figure 3. Plot of recorded dominant peak frequency of vibration at various radial distances in Balaria Underground Mine.

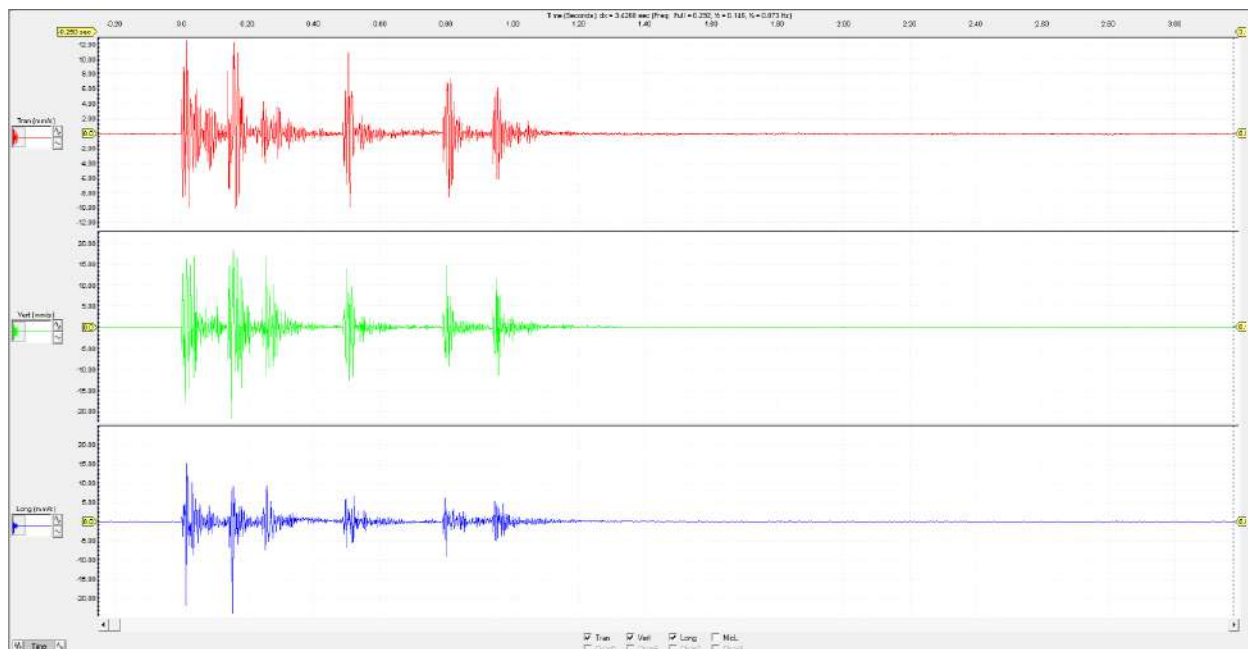


Figure 4. Blast wave signature recorded near -55 mRL (5E) bypass at a distance of 50m from production blasting face -85 mRL 5E Ring on 24.01.2020.

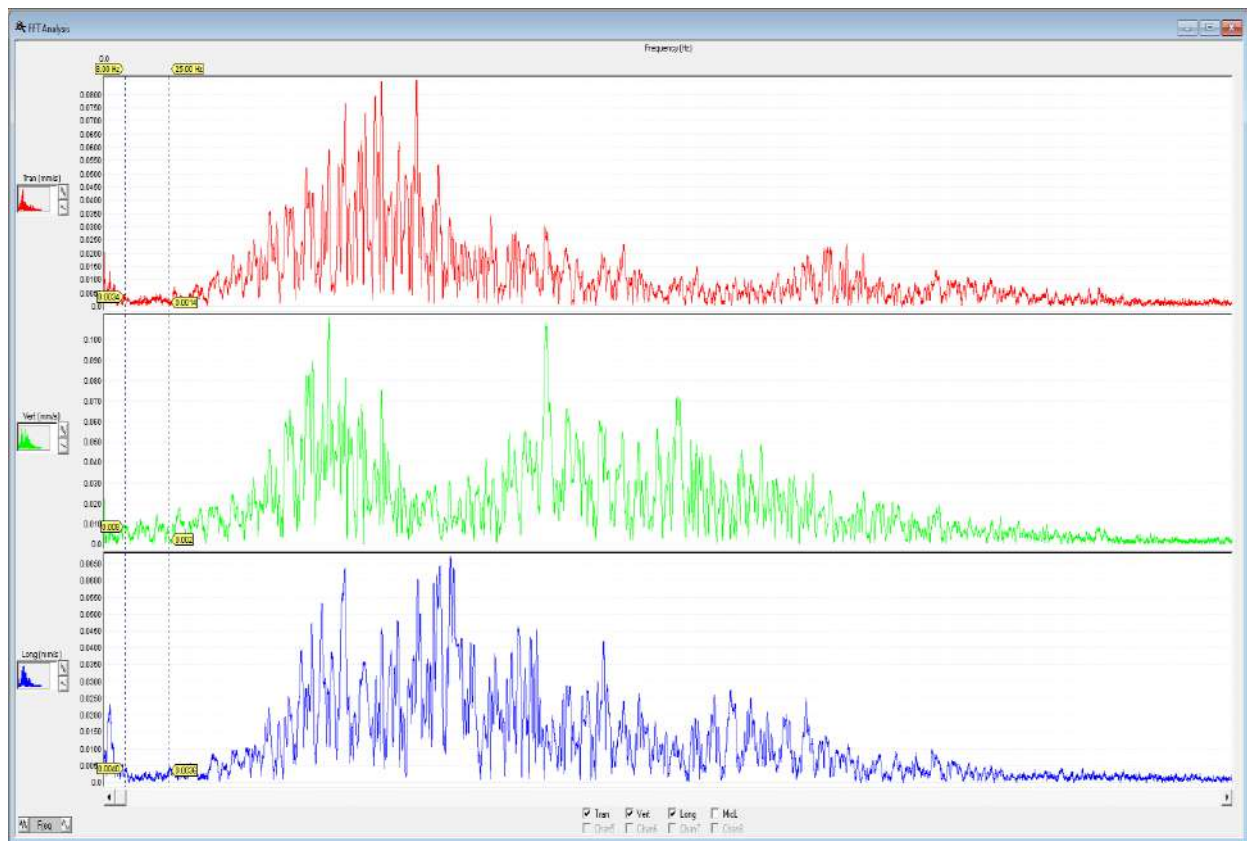


Figure 5. FFT of Blast vibration recorded near -55 mRL (5E) bypass at a distance of 50m from production blasting face -85 mRL 5E Ring on 24.01.2020.

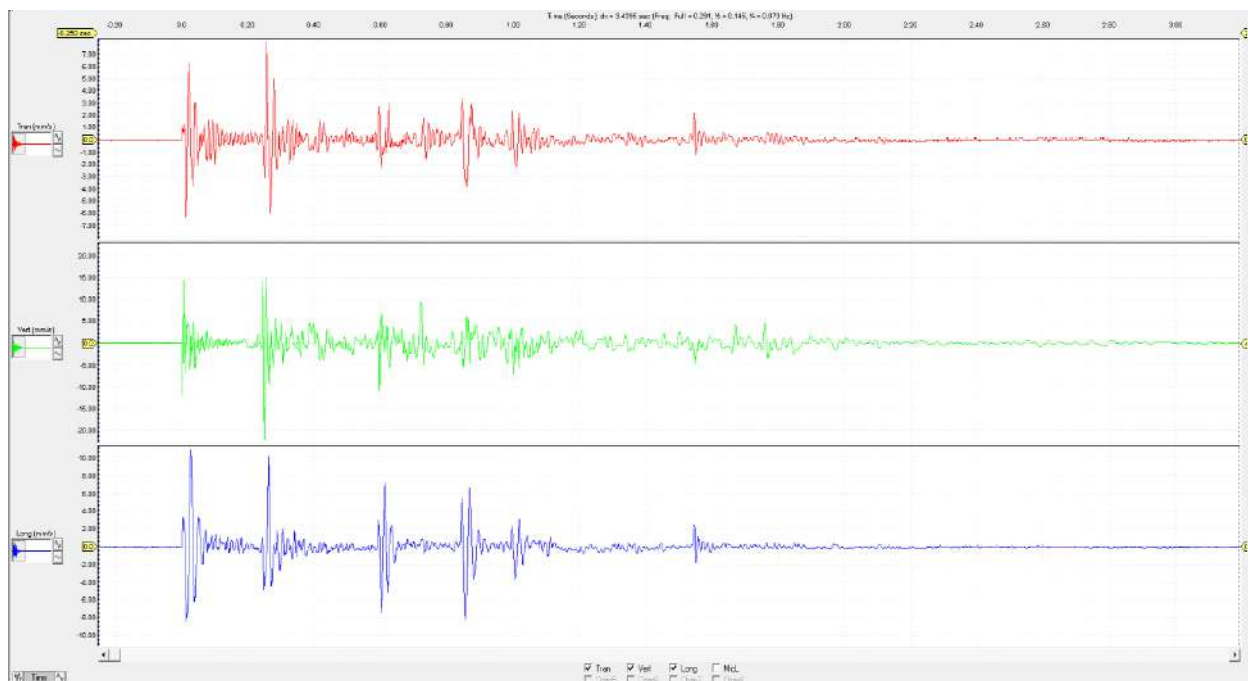


Figure 6. Blast wave signature recorded near -85 mRL bypass Junction at a distance of 40m from production blasting face -85 mRL on 23.01.2020.



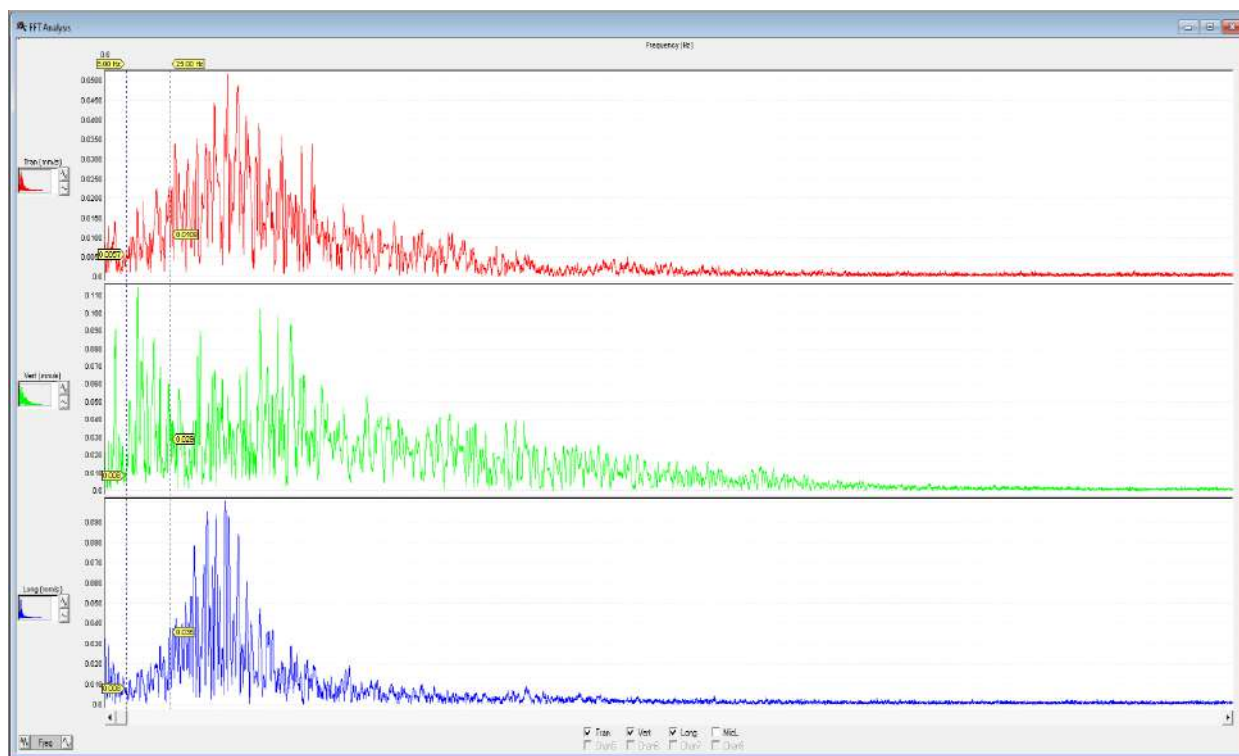


Figure 7. FFT of Blast vibration recorded near -85 mRL bypass Junction at a distance of 40 m from production blasting face -85 mRL on 23.01.2020.

## 6. Existing vibration standard and criteria to prevent damage

Peak particle velocity has been globally used in practice for assessment of blast-induced damage to structures. The degree of damage observed in the belowground openings is influenced by the RMR of roof rock. Thus, the damage criterion for below ground workings is based on RMR. Based on the extensive study conducted by the project proponents [CSIR- Central Institute of Mining & Fuel Research), Dhanbad, the DGMS issued a Tech (S&T) Circular no. 06 of 2007 for threshold value of vibration for the safety of roof and pillar in the belowground workings for different RMR. The DGMS standard for the safety of roof and pillar are given in Tables 1 and 2 respectively.

Table 1. Threshold values of vibration generated due to open-pit blasting for the safety of roof in the below ground working for different RMR.

<b>RMR of roof rock</b>	<b>Threshold value of vibration in terms of peak particle velocity [mm/s]</b>
20-30	50
30-40	50-70
40-50	70-100
50-60	100-120
60-80	120

Table 2. Threshold values of vibration generated due to open-pit blasting for the safety of pillars in the below ground workings for different RMR.

<b>RMR of the rock</b>	<b>Threshold value of vibration in terms of peak particle velocity [mm/s]</b>
20-30	20
30-40	20-30
40-50	30-40
50-60	40-50
60-80	50

The damages of surface structures by blast induced vibration are dependent on magnitude and frequency of ground vibration. The resonant frequency of structural vibration and blast vibration lead to cause maximum damage even at lower magnitude. Directorate General of Mines Safety (DGMS) have framed regulation under circular 7, 1997 to define limits of blast vibration near surface structures. The framed regulation has been presented in Table 3.

Table 3. DGMS standard (*Technical Circular Number 7 of 1997*)

<b>Type of structure</b>	<b>Dominant excitation frequency, Hz</b>		
	<b>&lt; 8 Hz</b>	<b>8-25 Hz</b>	<b>&gt; 25 Hz</b>
<b>(A) Buildings/structures not belonging to the owner</b>			
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>(B) Buildings with limited span of life and belonging to owner</b>			
1. Domestic houses/structures	10	15	25
2. Industrial buildings	15	25	50

## 7. Suggested blast design parameters for safety of underground structures

Based on Geotechnical data and geological disturbances at different locations of Balaria underground mine, the RMR of the roof rock lies in the range of 50 to 72. Thus, the threshold values of vibration for different RMR of the roof rock viz. 50, 55 and 60 may be taken as 100 mm/s, 110 mm/s & 120 mm/s. The threshold limits for the side wall for the same value of RMR are 40 mm/s, 45 mm/s and 50 mm/s respectively.

Accordingly, the explosives weight per delay and total explosive charge for a blasting round has been computed for different values of PPV depending on RMR of roof rock and has been presented as Table A2 & Table A4 respectively. Values of PPV have also been predicted for different explosive charge weight per delay at various distances. The predicted PPV values for different explosive weight per delay have been presented in Table A3. The magnitude of vibration can be reduced by separation of blast holes by longer delay interval. It is suggested to use 40ms delay between holes and 500ms as delay between rings for larger blast with increased explosive consumption.

## **7.1 Suggested Blast Design Parameters for Safety of Surface Structures**

The explosive weight per delay and total explosive charge for safety of surface residential/industrial structures has been computed from site specific predictor equation. The suggested explosive charge weight per delay and total explosive charge for safety of surface structures has been presented in Table A6. The mine management is suggested to decide minimum charging parameters i.e. explosive weight per delay and total explosive charge in a blasting round considering stability of underground structures as well as surface structures.

## **7.2 Safety precautions while blasting**

Following safety precautions need to be taken by Mine Management while planning and implementation of a blast:

- ✓ Charge weight per delay and total explosive charge in a blasting round should be followed considering the minimisation of blast vibration within stipulated standards for safety of nearfield underground structures, far filed underground structures as well as surface residential/industrial structures.
- ✓ The decision on maximum explosive weight per delay should be done on the basis of predictor equation for the blast faces having RMR of the roof rock lies in the range of 50 to 72. The threshold vibration limit in such case should be taken from DGMS Tech. Circular No. 06 of 2007.
- ✓ Hole deviation measurement should be done to ensure proper toe burden as well as collapsing of two holes. As the collapsing of holes may lead to increased charge weight per delay.
- ✓ Special precautions at permanent underground structures viz. shaft/decline, shaft pillars, crown pillar etc. should be taken to ensure proper support after blasting. The in-situ stresses are redistributed after blasting, which may lead to requirement of additional supports to regain rock strength.
- ✓ Loose rocks should be dressed properly before drilling/charging behind blasted face.
- ✓ Stope should be scanned after blasting to get actual view of void generated after blasting. Precautions should be taken while charging where additional cavity in toe of down-hole face have been observed in scan.

## **8. Optimisation of blasting parameters**

### **8.1 Optimisation of Burden- Spacing for the Mine**

The blasting pattern for ring blasting has been reviewed in terms of its geometry, delay sequence and delay timing. Optimised burden-spacing plays prime role to get desired fragmentation output from a blast. Researchers around the globe have established various relations for optimisation of burden-spacing. Sometimes, burden-spacing terminologies are also confusing for

underground ring blast. The terminology suggested by Dyno Nobel underground manual as hole to hole distance to be taken as spacing and ring to ring distance as burden. The toe spacing as per this manual is shown in Figure 8.

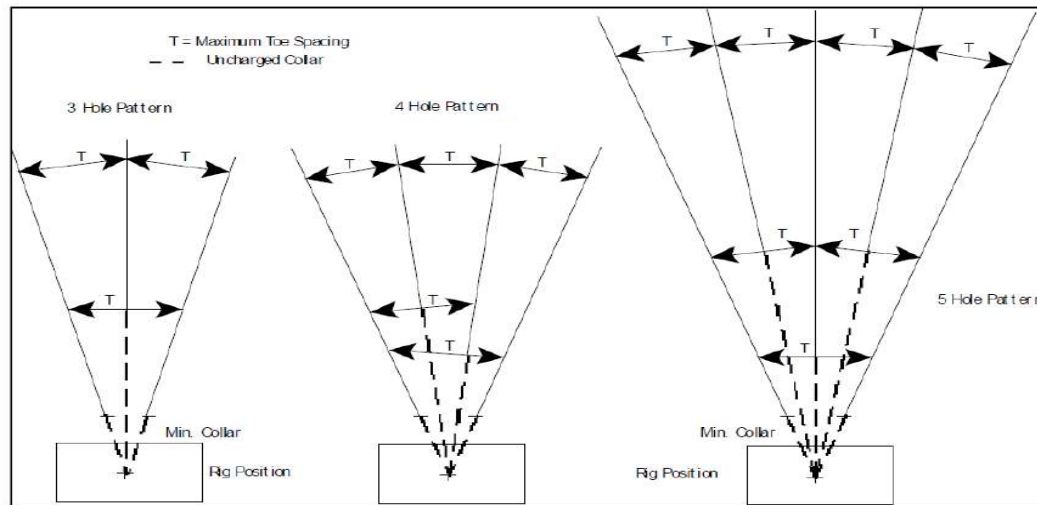


Figure 8. Ring drilling pattern showing toe spacing design (Dyno Nobel underground manual)

The thumb rule for computation of burden-spacing for underground stope blast has been suggested by Rustan. The suggested thumb rule is presented in Equation 2. Rustan has also suggested the maximum and minimum limits of the burden for this formula. The maximum burden should be kept 50% more than the computed burden and the minimum burden can be 35% less than the computed burden. Toe Spacing of the holes may be kept up to 1.2 times of burden/ring spacing as suggested by various researchers.

$$\text{Burden} = 11.8 \times \phi^{0.63} \quad (\text{Equation 2})$$

Where,

$\phi$  = Blast hole diameter

Based on the above equation, the optimum burden for different blast hole diameter has been computed. The computed burden is shown in Table 4. The variation in the suggested burden may be done based on the rock mass condition at the stoping site. The hard strata should be blasted with the reduced burden and soft strata with the increased burden in order to get the optimum output from the blast.

Table 4. Suggested burden-spacing for ring hole blasting to be conducted using different drill hole diameters at Blaria mine, HZL.

Blast Hole Diameter (mm)	Computed Burden (m)		
	Minimum	Optimum	Maximum
57	1.3	1.9	2.9
64	1.4	2.1	3.1
70	1.4	2.2	3.3
76	1.5	2.3	3.5
89	1.7	2.6	3.9

102	1.8	2.8	4.2
115	2.0	3.0	4.5

The suggested toe spacing of the holes, which varies at different depths between drill level and draw level. It is suggested to do differential charging or alternate hole charging in the portion where blast holes are closer.

Empirical equations under Kuz-Ram model suggests relations among rock parameters, charging parameters and blast geometry to get desired fragment size of the blasted rock. The back calculation from these equations can also give optimised burden-spacing for the mine site. The empirical relations in Kuz-Ram model are presented in three different equations as- Kuznetsov's equation, Rosin-Rammler equation and Uniformity index equation as shown below as Equation 3, Equation 4 and Equation 5 respectively:

#### Kuznetsov's Equation:

$$X_m = AK^{-0.8}Q^{\frac{1}{6}}\left[\frac{115}{RWS}\right]^{19/20} \quad (\text{Equation 3})$$

Where

$X_m$  = Mean particle size, cm

A = Rock Factor

K = Powder factor

Q = Quantity of explosive per hole, (Kg), Quantity of explosive in a ring for underground ring blasting

#### Rosin-Rammler Equation:

$$R_x = e^{[-0.693\left(\frac{x}{x_m}\right)^n]} \quad (\text{Equation 4})$$

Where,

$R_x$  = mass fraction retained on screen opening X.

$x_m$  = mean fragment size

n = uniformity index, normally lies between 0.7 and 2.

#### Uniformity index equation:

$$n = \left(2.2 - \frac{14B}{d}\right) \sqrt{\left(\frac{1+\frac{S}{B}}{2}\right) \left(1 - \frac{W}{B}\right) \left(\text{abs}\left(\frac{BCL-CCL}{L}\right) + 0.1\right)^{0.1} \frac{L}{H}} \quad (\text{Equation 5})$$

Where,

n = uniformity index

B = Burden (m)

S = Spacing (m)

d = Hole diameter (mm)

W = standard deviation of drilling precision (m)

L = Charge length (m)

BCL = Bottom charge length (m)

CCL = Column charge length (m)

H = bench height (m), Stope height/Level difference in underground ring blasting



Kuznetsov's equation suggests that mean fragment size of the blasted rock depends on rock parameters, explosive quality and charging parameters. Charging parameters for a blast can be decided based on through assessment of rock mass condition of the blasting site. The charging parameters in Kuznetsov's equation includes charge in a hole, which may be modified as charge in a ring for underground stope blasting. However, blasts of different holes of a ring assigned with delay sequence will need adjustments in prediction. Rock mass condition of one of the blasting face of Balaria underground mine has been assessed based on visual observation and data available with geotechnical department of the mine. Rock factors for fragmentation prediction using KUZ-RAM model follows Blastability Index of Lilly (Lilly, 1986). The rock rating for calculation of Lilly's Blastability Index is presented in Equation 6. Rating for different associated parameters is further calculated as per Table 5. Rating under Lilly's Blastability Index has been computed for Balaria underground mine and has been presented in Table 5.

$$A = 0.06 \times [RMD + RDI + HF] \quad (\text{Equation 6})$$

Where,

A = Rock Factor

RMD = Rock Mass Description

JF = Joint Factor

RDI = Rock Density Index

HF = Hardness Factor

Joint factor can be further represented as Equation 7.

$$JF = [JPS + JPA] \quad (\text{Equation 7})$$

Where,

JPS = Vertical Joint Spacing

JPA = Joint Plane Angle

Table 5. Computation of Lilly's blastability index for one of the stope of Balaria underground Mine (Lilly, 1986).

Parameters affecting rock fragmentation	Variants of parameters	Rating	Rating suggested for Balaria underground mine
Rock Mass Description (RMD)	Powdery/ Friable	10	JF
	Vertically Jointed	Joint Factor (JF)	
	Massive	50	
Vertical Joint Spacing (JPS)	< 0.1m	10	10
	0.1 m -1.0 m	20	
	1.0 m to Drill pattern size	50	
Joint Plane Angle (JPA)	Dip out of the face	20	40
	Strike perpendicular to face	30	
	Dip into face	40	
Rock Density Index (RDI)		$25 \times RD - 50$ RD- Rock Density	$25 \times 2.84 - 50 = 21$

			(tonne/cu-m)	
Hardness Factor (HF)	Factor	If $Y < 50$ GPa, $Y =$ Young's modulus	$Y/3$	$Y = 15$ GPa $UCS = 90$ MPa $Rating = 15/3 = 5$
		$Y > 50$ GPa $UCS =$ Uniaxial compressive strength (in MPa)	$UCS/5$	
Calculated Factor	Rock			4.56

Powder factor to achieve different fragment size has been computed from Kuznetsov's equation. The computed powder factor with ANFO and Emulsion explosive has been presented in Table 6.

Table 6. Computed Powder factor for the mine to achieve various mean fragment size.

Mean fragment size (in mm)	Powder factor (in $m^3/kg$ )	
	ANFO explosive	Emulsion explosive
200	1.37	1.62
250	1.81	2.14
300	2.27	2.69
350	2.76	3.26
400	3.26	3.85

Reduction of oversize boulder and maximising fragment size of the rock within a desired screen size is the main objective of a good blast. This can be achieved by optimisation of blast geometry. The blast geometry mainly includes- drill hole diameter, drill hole deviation, burden, spacing, deck charging etc. Rock fragment distribution from a blast has been shown in Rosin-Rammler equation and Uniformity index equation of Kuz-Ram model. Back calculation has been done to compute burden for a ring blast to get mean fragment size of 200 mm and screen fragment size of 500 mm with maximum allowable boulder size of 10%. Toe spacing for the ring has been suggested as 1.1 times of the toe burden. The computed burden for different drill hole diameter available at mine has been presented in Table 7.

Table 7. Computed burden for different drill hole diameter

Hole diameter (mm)	Burden (m)
57	1.9
64	2.1
70	2.3
76	2.5
89	3.0
102	3.4
115	3.9

Desired fragmentation can be achieved from the suggested burden-spacing and powder factor. However, control on drill hole deviation is necessary to achieve desired fragmentation.

## 8.2 Optimization of delay sequence for production blasting

Existing delay sequence for production blast at Balaria mine was reviewed. Initial suggestion was given to modify delay sequence. Accordingly, the delay timing of two holes (one hole in each side) after firing of first three holes in a ring was suggested to keep same. The suggested delay pattern for two rings is shown in Figure 9. Experimental blast was conducted using the suggested delay pattern and blast induced vibration was monitored at near field location. The recorded waveform in the direction of maximum vibration has been analysed (Presented in Figure 10), which reveals that maximum vibration due to blast was 28.32 mm/s at 193ms and 26.16 mm/s at 125ms. Comparing the result with charging and initiation pattern of blast holes, it can be drawn that 28.32 mm/s vibration has resulted due to blast of two simultaneous holes with total explosive charge of 32 kg. The blast vibration of 26.16 mm/s has resulted due to blast of one hole with total explosive charge of 24 kg. This means that vibration level was almost same in both the cases even if the explosive charge in first case is much higher than second case. This is due to movement of blast holes along free face created by blasting of first three holes. Considering the above results, the suggested blast pattern should be used for day-to-day ring blasting at Balaria mine. The suggested blast pattern will give better fragmentation due to interaction of blasted rocks from two holes in different directions.

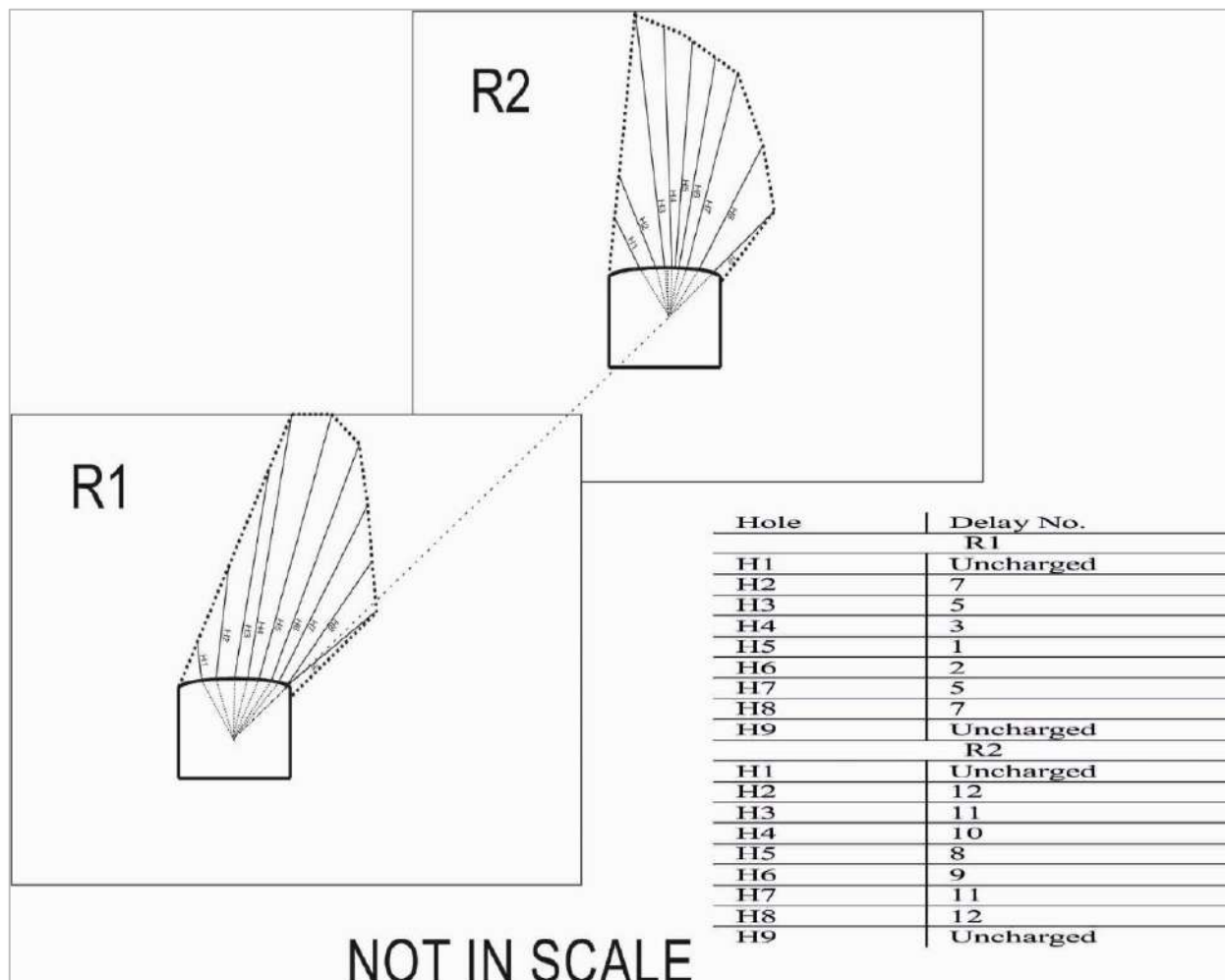


Figure 9. Suggested delay sequence for production blasting at Balaria underground mine.

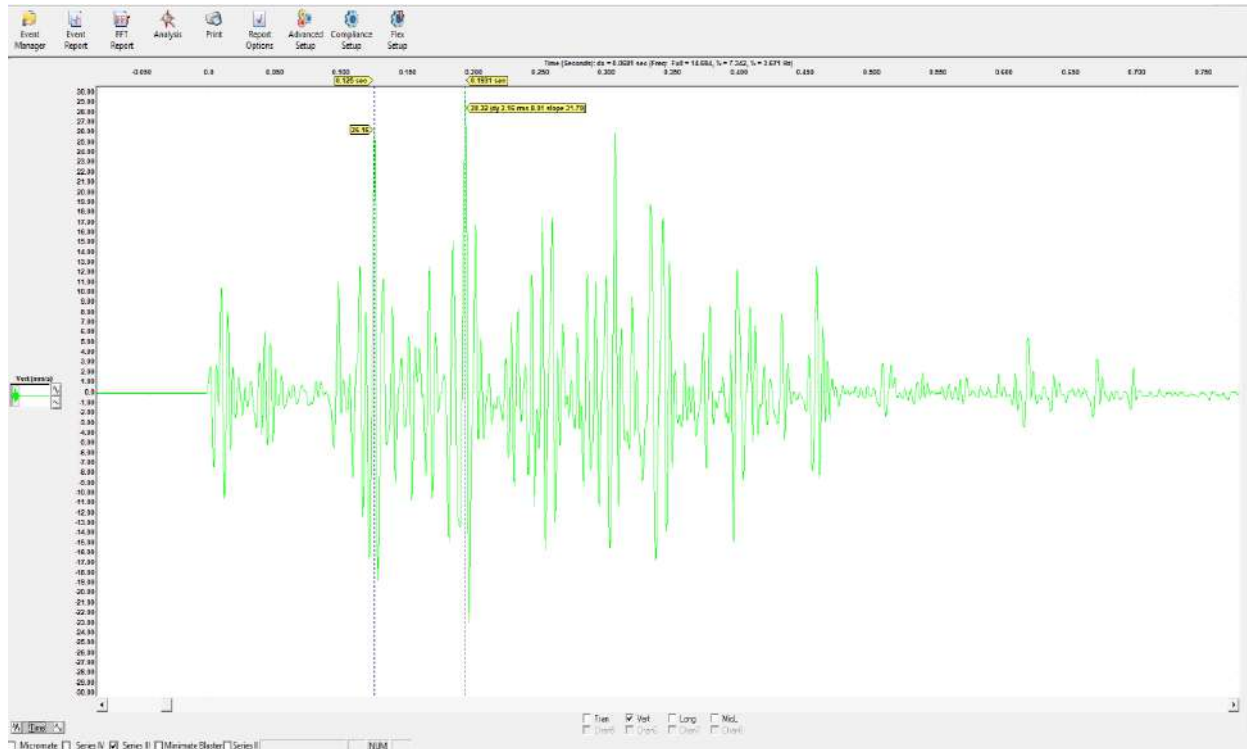


Figure 10. Analysis of recorded near filed vibration for Balaria underground mine.

### 8.3 Drilling and blasting methodology for extraction of narrow vein ore deposits

The possible methodology for excavation of narrow vein ore deposits has been investigated for Balaria underground mine. The literature search has been done to explore the methodology adopted under global scenario for excavation of such ore deposits. The possible ways of excavation of narrow vein deposits have been discussed for longhole stoping method by Stewart et al. (2008). Three different hole pattern for thin ore body have been suggested for Blaria UG Mine consisting of (i) Staggered/zig-zag, (ii) Dice-5 and (iii) Inline method. On the basis of the past experience of CSIR-CIMFR the Inline hole pattern for excavation was recommended. The charging pattern and delay sequence for excavation of such ore deposits is shown in Figure 11 and Figure 12 respectively. The initial blast design has been suggested based on the outcomes of our discussion, which are as follows:

- ✓ The blasthole diameter of 64 mm -76 mm should be used for excavation of such deposits.
- ✓ Single line of blast holes should be drilled along the strike direction of the orebody for excavation of such ore deposits.
- ✓ Toe burden from free face and between two rings should be kept between 1.5 m - 2.5 m depending on the rock mass properties of the stope to be excavated.
- ✓ Blast holes should be placed within the orebody and parallel to the orebody. If the width of the orebody is sufficient, the blast hole should be shifted towards footwall.

- ✓ First hole should be blasted along the slot raise and the consecutive movement of blast holes will take place along the strike of the orebody.
- ✓ Each blast hole should be divided into three different decks, suitable plugging arrangement for individual deck will be done. In a particular blast hole, the bottom deck of the hole will be blasted first and top deck at the last. The initiation of bottom deck of the second hole will start after completion of blast of middle deck and before blast of top deck of first hole. The initiation of the blast holes should be carried out using Electronic/Nonel detonators with suitable delay timing.
- ✓ Differential charging of blast holes should be done to utilize the combined impact of explosive energy on rock breakage.
- ✓ Each explosive deck should be separated by delay interval of 20-80ms.
- ✓ The maximum charge weight per delay should be minimized to reduce the nearfield vibration in the contact of the orebody.
- ✓ The blast holes should preferable be charged with low density (ANFO) explosives.
- ✓ Initially, blast for maximum ten holes in a blasting round should be planned.

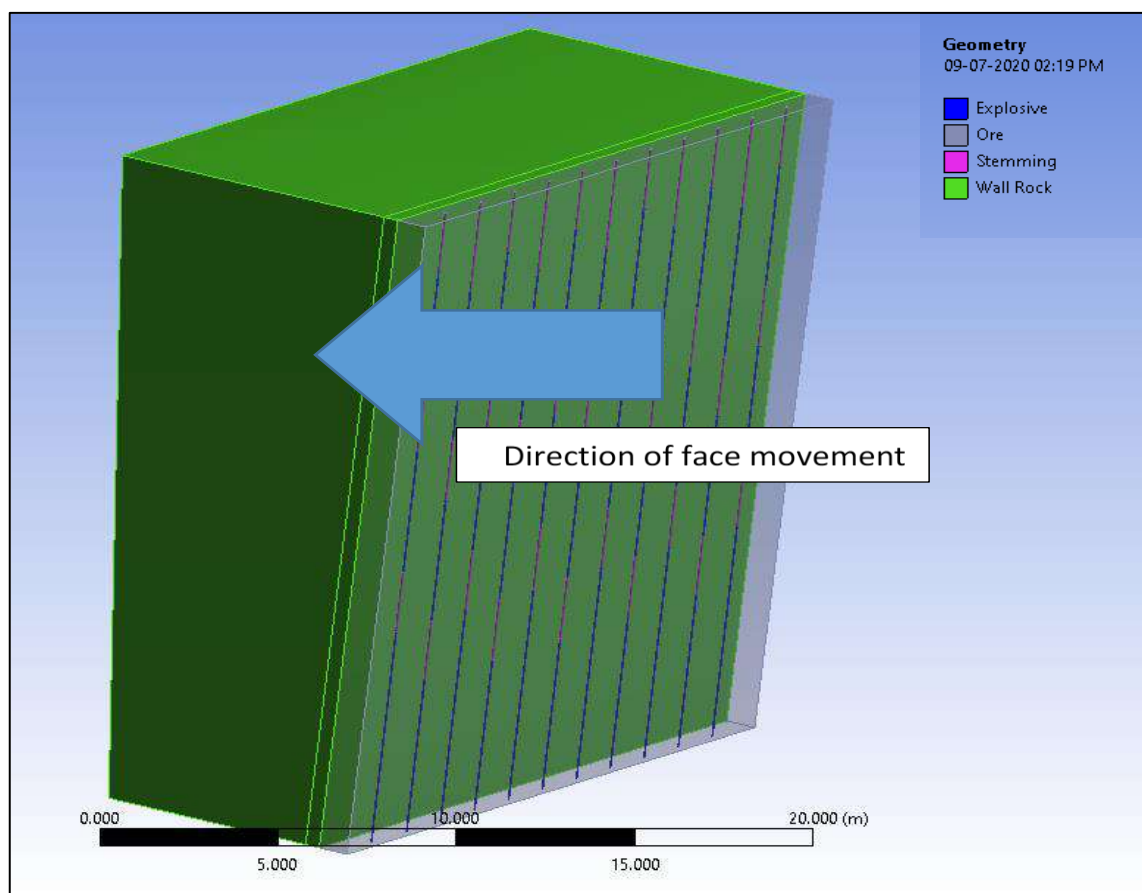


Figure 11. Position of blast holes for excavation of narrow vein deposits.



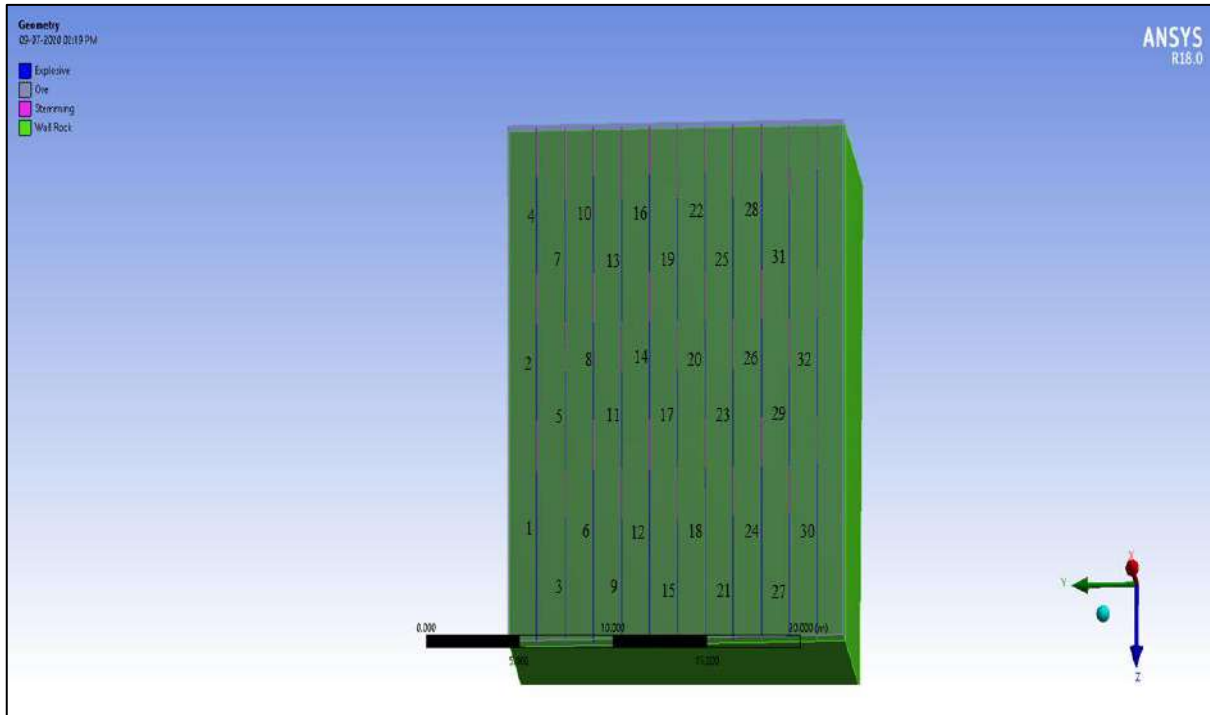


Figure 12. Arrangement for differential charging of blast holes.

## 9. Monitoring of velocity of detonation (VOD) of explosives

The performance of explosives depends upon a number of parameters and VOD is one of the important parameter. 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.

$$P_d = \frac{1}{4} \rho_e (VOD)^2 10^{-6}$$

Where,

$P_d$  = Detonation pressure (MPa)

$\rho_e$  = Density of explosive ( $\text{kg/m}^3$ )

VOD = Velocity of detonation (m/s)

Uniform VOD is essentially required throughout the blast holes in harder formations in order to produce sufficient detonation pressure to the blast hole walls. Velocity of detonation (VOD) of Powergel 2 cartridge explosives (2.08 kg of 54 mm dia.) of M/s IEPL-Orica recorded at underground production blast face of Balaria Underground mine on 24.07.2019 is 4993 m/s. The trace of recorded in-the-hole VOD of explosive is presented in Figure 13.

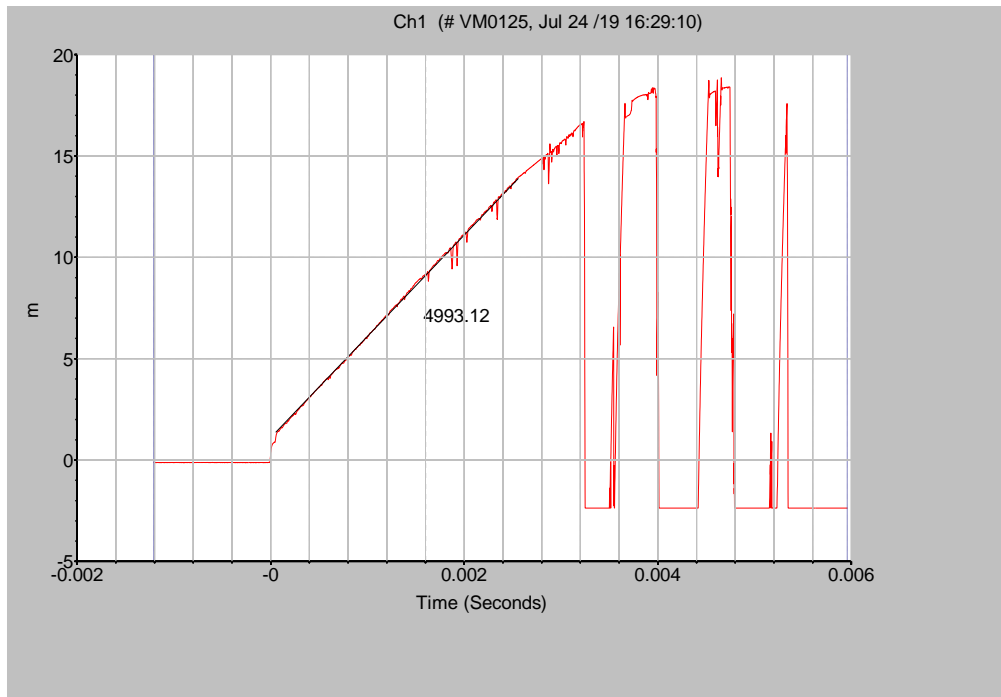


Figure 13. Recorded in-the-hole VOD trace of Powergel-2 (2.08 kg of 54 mm dia.) cartridge explosives of M/s IEPL, Orica.

The in-the-hole Velocity of detonation (VOD) of cartridge explosives (125gm of 25 mm dia) used at development faces of the mine was recorded on 22.01.2020. The explosive belong to M/s IEPL Orica. The recorded magnitude of VOD is 4542 m/s. The trace of recorded in-the-hole VOD of is presented in Figure 14.

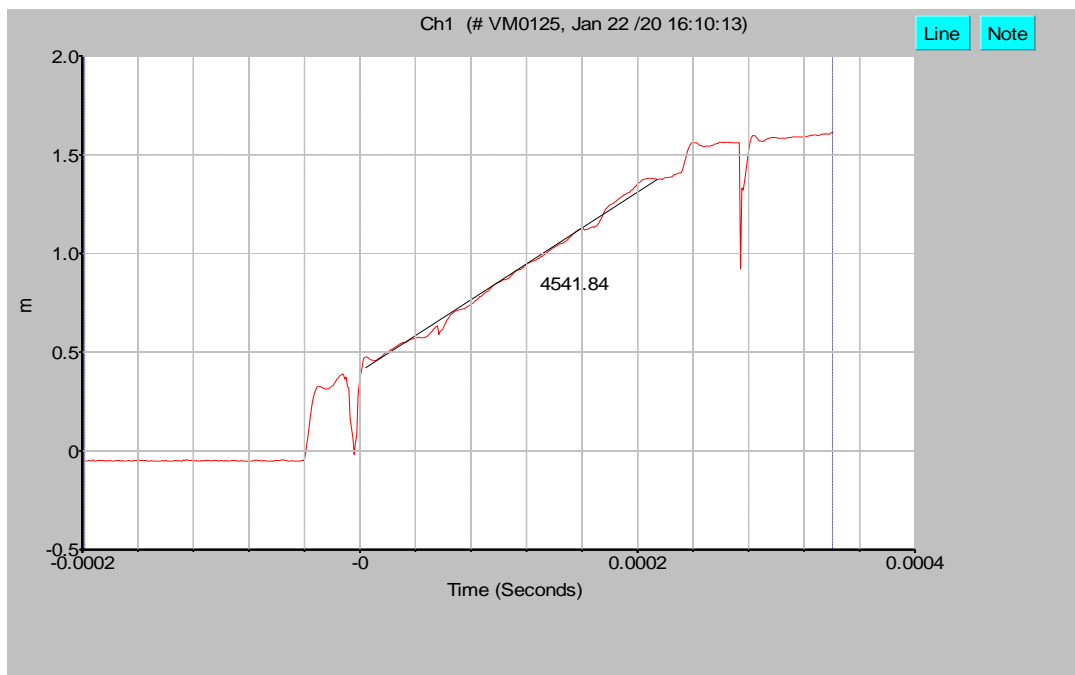


Figure 14. Recorded In-the-hole VOD trace of cartridge explosive (125 gm, 25 mm dia) of M/s IEPL, Orica.

## 10. Quality test of delay detonators

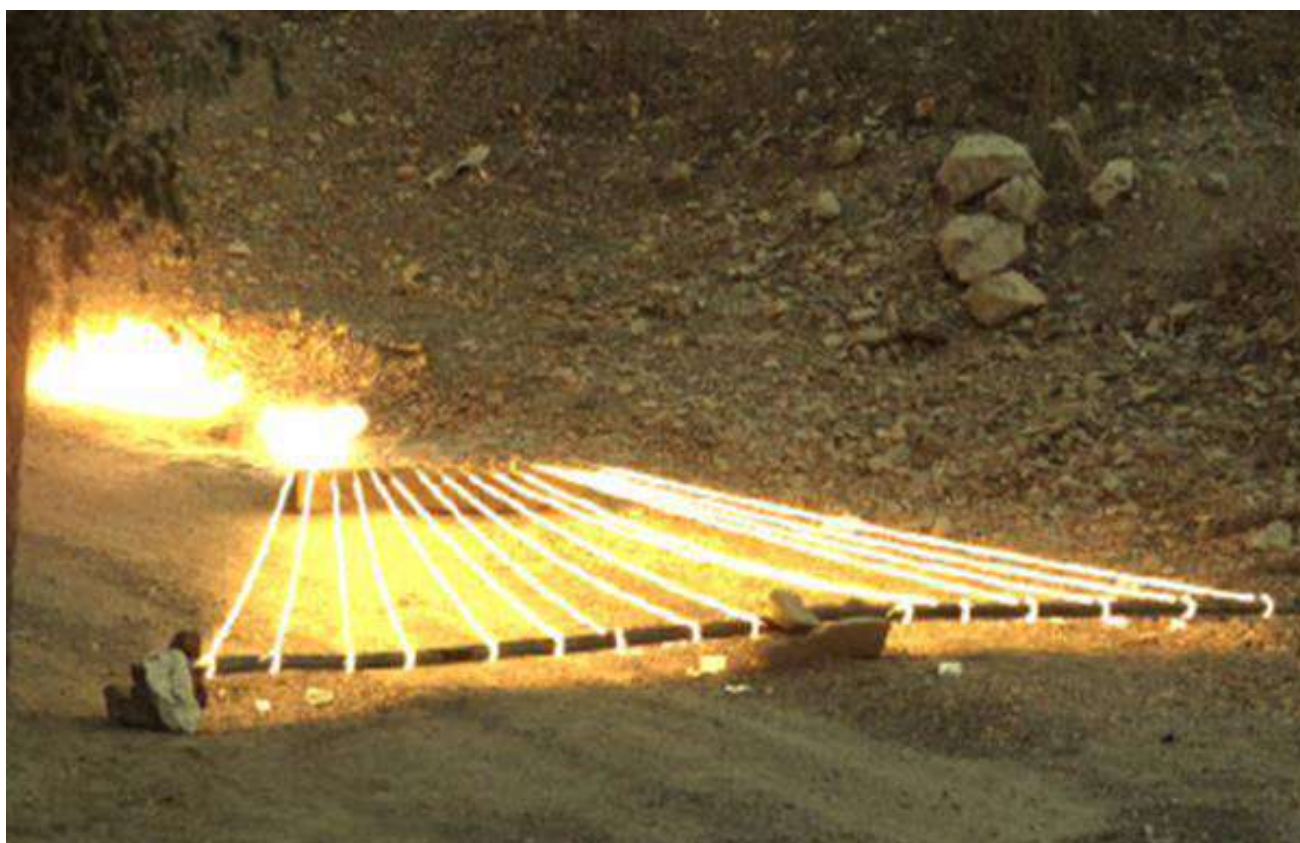
### 10.1 *Quality test of NONEL delay detonators during 1<sup>st</sup> visit*

The qualities of Nonel delay detonators of M/s Indian Explosive Private Limited (IEPL), Orica used to initiate the explosives at Production as well as development face of the mine , has been recorded with the help of Blaster Ranger II, High Speed Color Video camera. Tests were performed for 3 sets of Nonel delay detonators from 1 to 20 numbers used at production face as well as 3 sets of alternate delay detonators i.e. 1, 3, 5, 7, 9, 11 and 13-20 numbers, used at development face. View of NONEL delay detonators connection arrangements for delay scattering test is depicted in Photograph 2. After analysis of the video data, it was found that the sequence of detonations are in order for all the delay detonator but high scattering upto (-)75% is observed for delay detonator used at production face and up to (-) 38% for development face detonators. Photograph 3 depicts the analysis of actual firing time from video data for delay numbers 1 to 5 with the help of ProAnalyst software. The observed firing sequence of the NONEL detonators for production face and development face are presented in Table 8 and Table 9 respectively. The graphical presentation of the design firing vs actual firing time of Nonel delay detonators (1 to 20 delay numbers) used at production faces and Nonel delay detonator (1,3,5,7,9,11and 13-20 numbers) used at development face of Zawar group of mine is depicted in Figure 15 and Figure 16 respectively.

The scattering percentage should be restricted to maximum 10% up to 10 no. delay and thereafter it should be within 5 %.



Photograph 2. View of NONEL delay detonators (3 sets of delay number 1-5) connection for delay detonator scattering test.



Photograph 3. Analysis of actual firing time from video data with the help of ProAnalyst software for 1 to 5 numbers delay detonators.

Table 8. Analyzed firing time of the NONEL delay detonators 1 to 20 numbers (3 sets) used at Production blast face of Zawar group of mines tested during 1<sup>st</sup> visit.

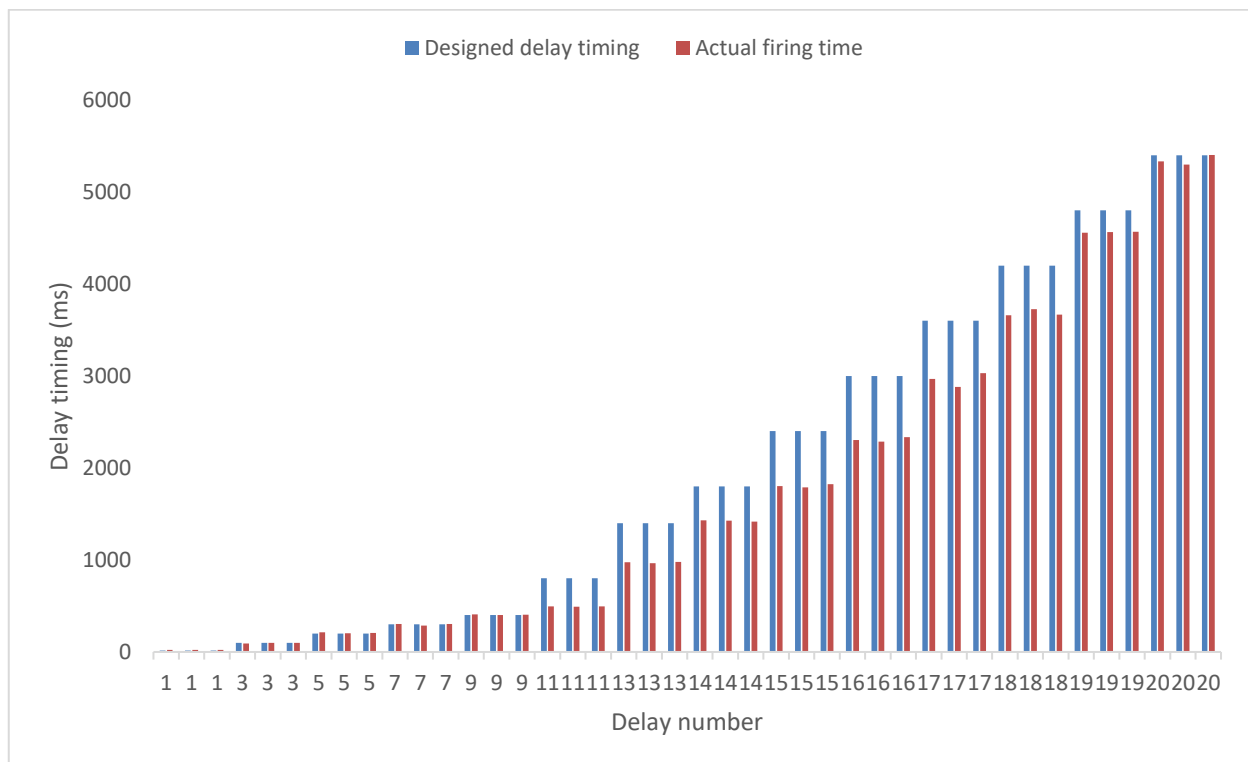
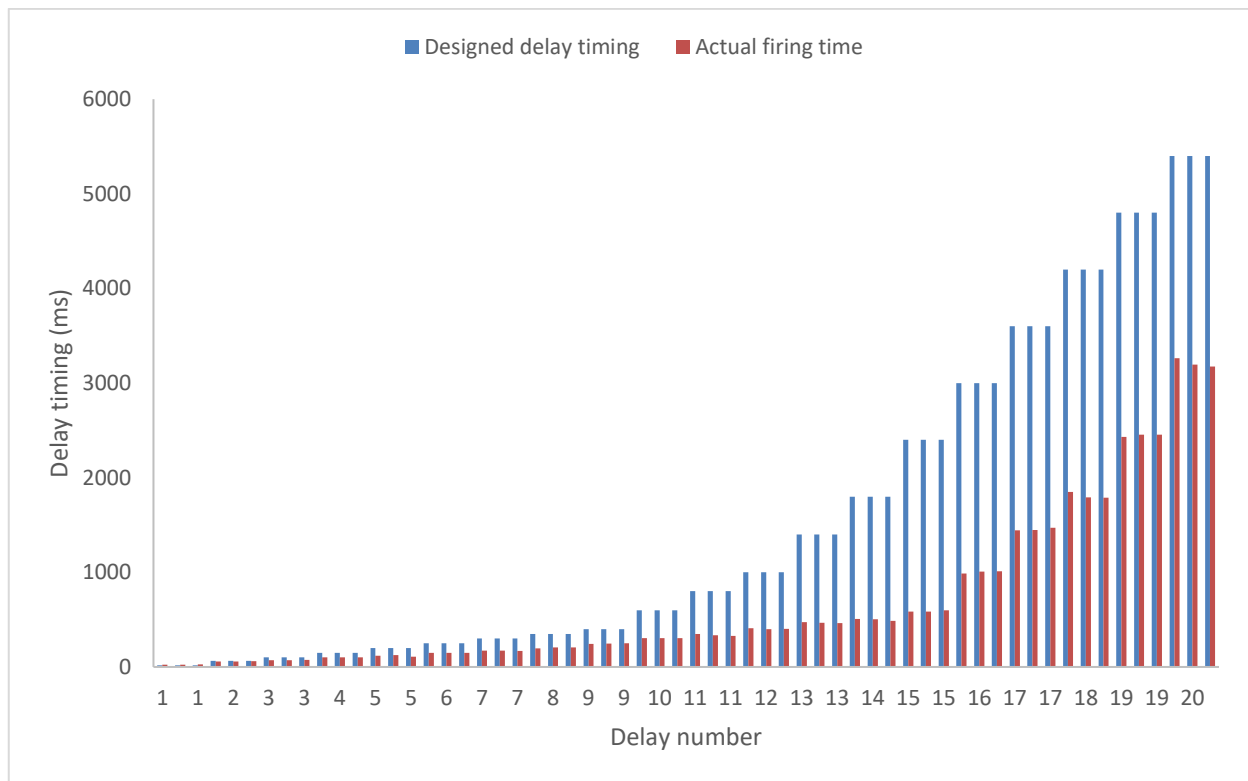
Delay No.	Design delay timing	Actual Firing timing	Scattering	% of scattering
	(ms)	(ms)	(ms)	
1	17	24	7	41.2
1	17	24	7	41.2
1	17	28	11	64.7
2	65	56	-9	-13.8
2	65	56	-9	-13.8
2	65	60	-5	-7.7
3	100	72	-28	-28
3	100	72	-28	-28
3	100	76	-24	-24
4	150	100	-50	-33.3
4	150	100	-50	-33.3
4	150	100	-50	-33.3
5	200	120	-80	-40
5	200	124	-76	-38
5	200	108	-92	-46

6	250	148	-102	-40.8
6	250	148	-102	-40.8
6	250	148	-102	-40.8
7	300	172	-128	-42.7
7	300	172	-128	-42.7
7	300	168	-132	-44
8	350	196	-154	-44
8	350	208	-142	-40.6
8	350	208	-142	-40.6
9	400	244	-156	-39
9	400	248	-152	-38
9	400	252	-148	-37
10	600	304	-296	-49.3
10	600	304	-296	-49.3
10	600	304	-296	-49.3
11	800	348	-452	-56.5
11	800	336	-464	-58
11	800	328	-472	-59
12	1000	408	-592	-59
12	1000	400	-600	-59
12	1000	404	-596	60
13	1400	472	-928	-66.3
13	1400	468	-932	-66.6
13	1400	464	-936	-66.9
14	1800	508	-1292	-71.8
14	1800	504	-1296	-72
14	1800	488	-1312	-72.9
15	2400	584	-1816	-75.7
15	2400	584	-1816	-75.7
15	2400	600	-1800	-75
16	3000	988	-2012	-67.1
16	3000	1008	-1992	-66.4
16	3000	1012	-1988	-66.3
17	3600	1444	-2156	-59.9
17	3600	1448	-2152	-59.8
17	3600	1472	-2128	-59.1
18	4200	1848	-2352	-56
18	4200	1792	-2408	-57.3
18	4200	1788	-2412	-57.4
19	4800	2432	-2368	-49.3
19	4800	2456	-2344	-48.8
19	4800	2456	-2344	-48.8
20	5400	3264	-2136	-39.6
20	5400	3196	-2204	-40.8
20	5400	3176	-2224	-41.2



Table 9. Analyzed firing time of the NONEL delay detonators 1,3,5,7,9,11 and 13 to 20 numbers (3 sets) used at development blast face at Zawar group of mines tested during 1<sup>st</sup> visit.

Delay no	delay timing	Actual firing time	Scattering	% of scattering
	(ms)	(ms)	(ms)	
1(5m)	17	24	7	41.18
1(5m)	17	24	7	41.18
1(5m)	17	24	7	41.18
3(5m)	100	92	-8	-8
3(5m)	100	100	0	0
3(5m)	100	100	0	0
5(5m)	200	212	12	6
5(5m)	200	204	4	2
5(5m)	200	208	8	4
7(5m)	300	304	4	1.33
7(5m)	300	288	-12	-4
7(5m)	300	304	4	1.33
9(5m)	400	408	8	2
9(5m)	400	400	0	0
9(5m)	400	404	4	1
11(5m)	800	496	-304	-38
11(5m)	800	492	-308	-38.5
11(5m)	800	496	-304	-38
13(5m)	1400	976	-424	-30.29
13(5m)	1400	964	-436	-31.14
13(5m)	1400	980	-420	-30.29
14(5m)	1800	1432	-368	-20.44
14(5m)	1800	1428	-372	-20.67
14(5m)	1800	1416	-384	-21.33
15(5m)	2400	1804	-596	-24.83
15(5m)	2400	1788	-612	-25.5
15(5m)	2400	1824	-576	-24
16(5m)	3000	2304	-696	-23.2
16(5m)	3000	2288	-712	-23.73
16(5m)	3000	2336	-664	-22.13
17(5m)	3600	2968	-632	-17.56
17(5m)	3600	2880	-720	-20
17(5m)	3600	3032	-568	-15.78
18(5m)	4200	3660	-540	-12.86
18(5m)	4200	3728	-472	-11.24
18(5m)	4200	3668	-532	-12.67
19(5m)	4800	4556	-244	-5.08
19(5m)	4800	4564	-236	-4.92
19(5m)	4800	4568	-232	-4.83
20(5m)	5400	5332	-68	-1.26
20(5m)	5400	5300	-100	-1.85
20(5m)	5400	5404	4	0.07



## 10.2 Quality test of NONEL delay detonators during 6<sup>th</sup> visit

The qualities of Nonel delay detonators of M/s Indian Explosive Private Limited (IEPL), Orica used to initiate the explosives at Production as well as development face of the mine, were again tested during 6<sup>th</sup> visit to the mine. The results of the scattering test for NONEL delay detonators used at production and development faces of the mine is shown in Table 10 and Table 11 respectively. The graphical representation of the scattering results is shown in Figure 17 and Figure 18. The analysis of the scattering test reveals that the maximum scattering in NONEL delay detonators used at production blast faces is 9.3 %. The maximum scattering in the NONEL delay detonators used at development blast faces is 12 %. The result of scattering is acceptable.

Table 10. Analyzed firing time of the NONEL delay detonators used at production blast face of Zawar group of mines tested during 6<sup>th</sup> visit.

Delay No.	Defined Delay time	Recorded delay time	Scattering	% scattering
1	25	26	1	4.0
1	25	24	-1	-4.0
1	25	24	-1	-4.0
2	50	46	-4	-8.0
2	50	46	-4	-8.0
2	50	46	-4	-8.0
3	75	80	5	6.7
3	75	76	1	1.3
3	75	82	7	9.3
4	100	94	-6	-6.0
4	100	92	-8	-8.0
4	100	92	-8	-8.0
5	125	132	7	5.6
5	125	128	3	2.4
5	125	130	5	4.0
6	150	152	2	1.3
6	150	148	-2	-1.3
6	150	150	0	0.0
7	175	178	3	1.7
7	175	178	3	1.7
7	175	174	-1	-0.6
8	200	198	-2	-1.0
8	200	200	0	0.0
8	200	194	-6	-3.0
9	250	252	2	0.8
9	250	254	4	1.6
9	250	252	2	0.8
10	300	272	-28	-9.3
10	300	272	-28	-9.3
10	300	278	-22	-7.3
11	350	356	6	1.7
11	350	356	6	1.7

11	350	364	14	4.0
12	400	382	-18	-4.5
12	400	388	-12	-3.0
12	400	410	10	2.5
13	450	452	2	0.4
13	450	460	10	2.2
13	450	440	-10	-2.2
14	500	476	-24	-4.8
14	500	486	-14	-2.8
14	500	484	-16	-3.2
15	600	634	34	5.7
15	600	594	-6	-1.0
15	600	630	30	5.0
16	1000	1024	24	2.4
16	1000	1008	8	0.8
16	1000	1008	8	0.8
17	1400	1396	-4	-0.3
17	1400	1412	12	0.9
17	1400	1412	12	0.9
18	1800	1844	44	2.4
18	1800	1892	92	5.1
18	1800	1860	60	3.3
19	2400	2376	-24	-1.0
19	2400	2384	-16	-0.7
19	2400	2328	-72	-3.0
20	3000	2920	-80	-2.7
20	3000	2972	-28	-0.9
20	3000	2948	-52	-1.7

Table 11. Analyzed firing time of the NONEL delay detonators used at development blast face of Zawar group of mines tested during 6<sup>th</sup> visit.

Delay No.	Designed delay timing (ms)	Actual firing time (ms)	Scattering (ms)	% of scattering
1	25	26	1	4.0
1	25	28	3	12.0
1	25	26	1	4.0
3	100	100	0	0.0
3	100	96	-4	-4.0
3	100	100	0	0.0
5	200	198	-2	-1.0
5	200	204	4	2.0
5	200	200	0	0.0
7	300	298	-2	-0.7
7	300	296	-4	-1.3
7	300	298	-2	-0.7
9	400	372	-28	-7.0
9	400	376	-24	-6.0

9	400	378	-22	-5.5
11	500	502	2	0.4
11	500	496	-4	-0.8
11	500	500	0	0.0
13	1000	968	-32	-3.2
13	1000	976	-24	-2.4
13	1000	992	-8	-0.8
14	1400	1364	-36	-2.6
14	1400	1350	-50	-3.6
14	1400	1346	-54	-3.9
15	1800	1752	-48	-2.7
15	1800	1752	-48	-2.7
15	1800	1766	-34	-1.9
16	2400	2368	-32	-1.3
16	2400	2430	30	1.3
16	2400	2356	-44	-1.8
17	3000	2996	-4	-0.1
17	3000	2940	-60	-2.0
17	3000	2972	-28	-0.9
18	3800	3776	-24	-0.6
18	3800	3740	-60	-1.6
18	3800	3880	80	2.1
19	4600	4492	-108	-2.3
19	4600	4584	-16	-0.3
19	4600	4636	36	0.8
20	5500	5296	-204	-3.7
20	5500	5252	-248	-4.5
20	5500	5328	-172	-3.1

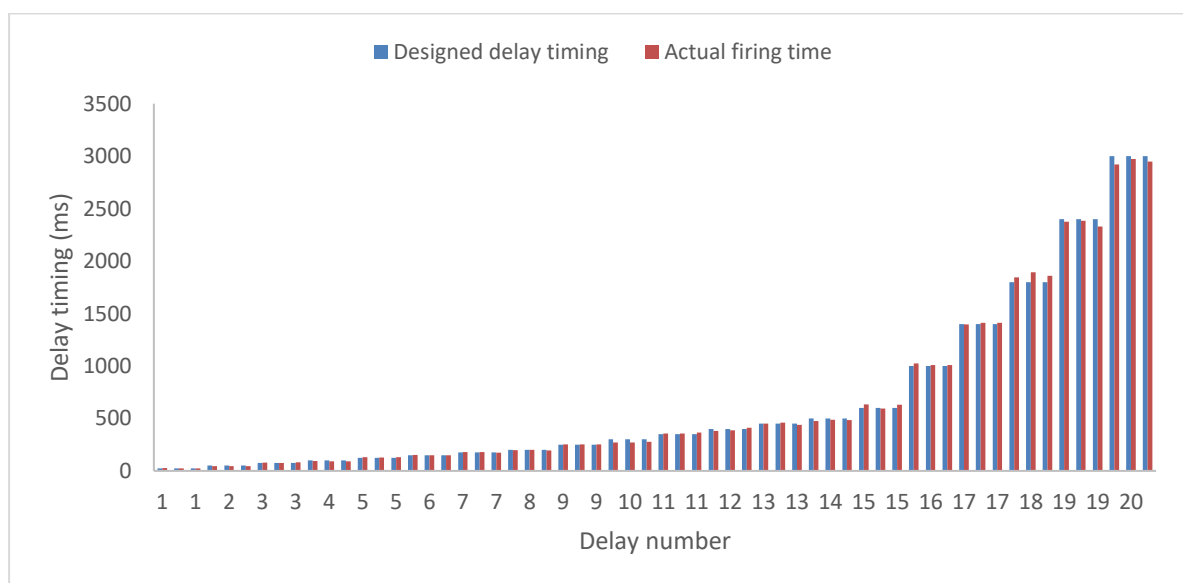


Figure 17. Graphical presentation of the design firing vs actual firing time of Nonel delay detonators used at production blast face of Zawar group of mines tested during 6<sup>th</sup> visit.



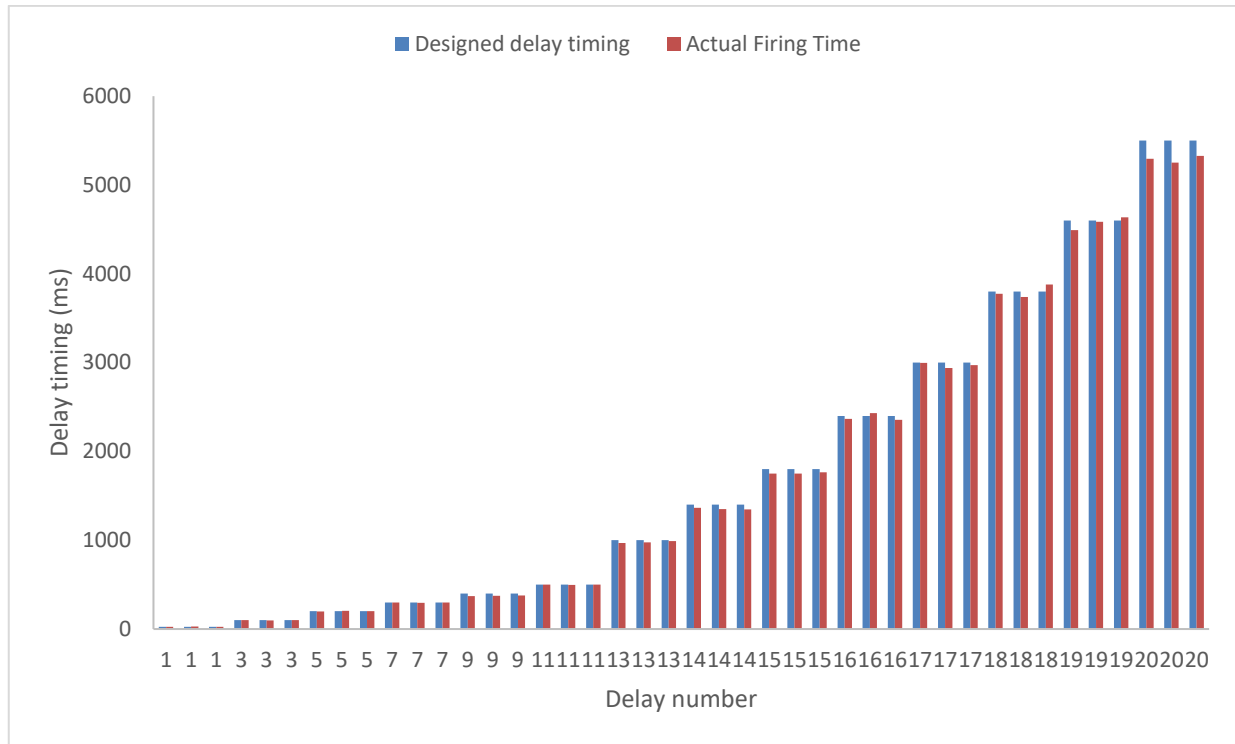


Figure 18. Graphical presentation of the design firing Vs actual firing time of Nonel delay detonators used at development blast faces of Zawar group of mines tested during 6<sup>th</sup> visit.

## 11. Conclusions and recommendations

- ❖ Altogether, 19 blast data gathered during the field study at the mine has been analysed. The blast vibrations were monitored around different underground structures located in the proximity of the blasting face. Most of the vibration were recorded at near field distances from the blast face.
- ❖ Maximum level of ground vibration recorded from development face blast during experimental trial was 7.55 mm/s at peak dominant frequency of 222.9 Hz. The vibration was recorded at a distance of 45 m from the blast face -85 mRL 1NA (Burn cut) on 24.01.2020. The location of seismograph was at the same level of the blast face. The blast was conducted for 54 numbers of hole. The total explosive charge of 175 kg was fired in this blast keeping explosive weight per delay of 30 kg.
- ❖ Maximum level of ground vibration recorded from production blast during experimental trial was 38.61 mm/s at peak dominant frequency of 91 Hz. The vibration was recorded at a radial distance of 20 m from the -55 mRL blast face for blast conducted on 22.01.2020. The blast was conducted for 07 numbers of hole. The total explosive charge of 80 kg was fired in this blast keeping explosive weight per delay of 19 kg.
- ❖ The blast induced vibration was also recorded for the blast conducted for excavation of ventilation raise. The maximum level of ground vibration recorded from the blast of ventilation raise during experimental trial was 46.80 mm/s at peak dominant frequency of 32 Hz. The vibration was recorded at a radial distance of 20 m from the +25 mRL 7W

ventilation raise face for blast conducted on 28.09.2018. The blast was conducted for 08 numbers of hole. The total explosive charge of 275 kg was fired in this blast keeping explosive weight per delay of 34 kg.

- ❖ The maximum explosive charge weight per delay and total explosive charge for the mine has been computed considering different vibration limits based on RMR values of the roof rock. The suggested MCPD and total charge is given in Annexure of the report. The suggested charging pattern should be followed for day-to-day blasting at the mine with the aim to safeguard nearby underground structures.
- ❖ The frequencies of the recorded vibration were more than 25 Hz in all the blasting rounds. The most common recorded frequency ranges between 25 Hz and 120 Hz. The maximum recorded frequency was 222.9 Hz.
- ❖ The optimum burden for different blast hole diameter (57 mm, 64 mm, 70 mm, 76 mm, 89 mm, 102 mm and 115 mm) used at the mine has been computed using the empirical formulae suggested by Rustan. The computation of optimum burden and powder factor for a stope of the mine has also been done using empirical Kuz-Ram model. The investigation of rock mass parameters of the stope has been done for this purpose.
- ❖ The differential charging pattern has been suggested to reduce the over-break. The delay sequence for day-to-day blasting at the production blast faces of the mine has been suggested.
- ❖ The in-the-hole velocity of detonation (VOD) of Powergel 2 cartridge explosives (2.08 kg of 54 mm dia.) of M/s IEPL-Orica was recorded at underground production blast face of Balaria Underground mine on 24.07.2019. The recorded VOD is 4993 m/s.
- ❖ The in-the-hole Velocity of detonation (VOD) of cartridge explosives (125gm of 25 mm dia) used at development faces of the mine was recorded on 22.01.2020. The explosive belongs to M/s IEPL Orica. The recorded magnitude of VOD is 4542 m/s.
- ❖ The scattering tests of NONEL delay detonators were performed during 1<sup>st</sup> and 6<sup>th</sup> visits to the mine. The tests were conducted using High speed video camera. The test result reveals that the delay timing of the detonators is within acceptable limit for the test conducted during 6<sup>th</sup> visit.
- ❖ The scattering percentage should be restricted to maximum 10% up to 10 no. delay and thereafter it should be within 5% to get the optimum results from the blast.
- ❖ Selection of delay should be based on the face condition and actual availability of hole depth on the site. Proper information about delay timings of different delay numbers in case of NONEL initiation shall be well informed to the entire blasting concern engineer.

- ❖ It is recommended to maintain delay interval of at least 12-20ms/m of burden. It is further recommended to use a minimum delay of 40ms between the two holes of a particular ring.
- ❖ More delay interval towards hanging wall side (at an interval of 60ms) and lesser delay interval towards footwall (at an interval of 40ms) should be given to minimise the dilution of ore with optimal fragmentation.
- ❖ Larger delay timing should be given in the last (boundary) holes of a ring and it should be increased by 50% for minimisation of ore dilution.
- ❖ The delay timing of 300 to 500ms should be maintained between the rings. The subsequent increment in the delay intervals should be given in the consecutive rings for multi-ring blasting.
- ❖ Bottom portion of the hole must be charged with primer emulsion cartridges only to address the issues of ledge formation.
- ❖ Two additional blast holes at boundaries should be kept uncharged for minimising hanging wall and foot wall damages. These holes should be drilled as along the contact of the orebody or within 30 cm from the outer boundary of ore body and kept uncharged in order to reduce dilution.
- ❖ The optimum quantity of booster should be used in the blast holes. The quantity of emulsion/PETN cast booster should be 0.16% to 0.2% of the column charge and quantity of primer emulsion cartridges of appropriate diameter should be 15% - 25% of the explosive charge in the blast hole. Accordingly, the ANFO percentage will be of 75% -85%.
- ❖ Emulsion booster should be preferred in place of PETN cast booster from the safety point of view at the places where there is problem of misfire and chances of ignition of the misfired cast booster while loading & transportation.

## **Acknowledgements**

The research team is thankful to the mine management of Balaria underground mine, Hindustan Zinc Limited for sponsoring the study.

Table A1. Blast vibrations data recorded at different locations of underground mine of Balaria underground mine, HZL.

Blast No.	Date and Shift of blast	Location of blast	No. of holes	Hole depth [m]	Explo-sives per hole [kg]	Total explosive fired in the round [kg]	Max <sup>m</sup> explosive weight per delay [kg]	Location of blast vibration monitoring transducers	Distance of Vibration measuring location [m]			Peak particle velocity (PPV) [mm/s]	Dominant Frequency [Hz]
									Verti-cal	Hori-zontal	Radial		
1.	19.07.2018	-25 mRL 5N	14	1.4-10.9	13	96	22	❖ -25 mRL (Side wall cross cut)	0	30	30	19.73	166.5
2.	20.07.2018	-25 mRL	14	1.4-10.9	13	100	25	❖ -25 mRL (Floor)	0	50	50	9.835	101
								❖ -25 mRL (Side wall)	0	25	25	30.48	149.9
3.	25.09.2018	+25 mRL 7 West (Ventilation raise)	08	02	34	275	34	❖ +25 mRL	0	65	65	13.73	32
4.	26.09.2018	+25 mRL 7 West (Ventilation raise)	06	02	21	125	21	❖ +25 mRL ❖ 0 mRL 5 West A cross cut	0 0	25 75	25 75	35.27 10.2	39 64
5.	28.09.2018	+25 mRL 7 West (Slot raise)	16	02	78	1250	50	❖ 5 WB 0 mRL ❖ 5 WB 0 mRL	0 0	25 35	25 35	15.10 14.70	45 93
6.	28.09.2018	+25 mRL 7 West (Ventilation raise)	08	02	34	275	34	❖ 5 WB 0 mRL ❖ 5 WB 0 mRL	0 0	20 25	20 25	46.80 10.90	32 33.6
7.	29.09.2018	+25 mRL 7 West (Slot extension)	07	6-20	29	200	66	❖ +25 mRL 7.8W	0	65	65	16.90	51
8.	30.09.2018	+25 mRL ventilation raise 7 West	08	2	56	450	56	❖ +25 mRL 7 West	0	65	65	15.0	55
9.	30.09.2018	+25 mRL 7 West slot	15	6-20	23	350	66	❖ +25 mRL 7 West	0	40	40	25.0	64

10.	01.10.2018	+25 mRL 7 West slot extension	20	6-20	30	600	66	❖ +25 mRL 7 West ❖ +25 mRL man pass X-cut	0	50	50	17.80	122
11.	02.10.2018	+25 mRL 7 West slot extension	16	6-20	53	850	66	❖ +25 mRL man- pass X-cut ventilation raise to 120	0	80	80	9.60	158
12.	02.10.2018	+25 mRL 7W slot	08	6-20	69	550	66	❖ +25 mRL 7 (Near get in box) ❖ +25 mRL man pass ventilation raise to 120	0	50	50	23.4	85
13.	03.10.2018	+25 mRL 7W slot	12	6-15	42	500	66	❖ +25 mRL 7 (Near get in box)	0	45	45	22.7	120
14.	05.10.2018	0 mRL 7W ring	16	8-26	36	585	75	❖ +25 mRL 7 (Near get in box)	25	45	50	23.00	125
15.	05.10.2018	0 mRL, stope 7-8 W, R-4	16	8-25	72	1150	75	❖ +25 mRL 7 (Near get in box)	25	50	55	20	85
16.	22.01.2020	-55 mRL 5P	07	11	11	80	19	❖ In (-) 55mRL	0	20	20	38.61	91
17.	23.01.2020	-85 mRL	8	6-15	43	350	43	❖ - 85 mRL Bypass Junction ❖ - 85 mRL Ventilation Raise	0	40	40	23.16	32.50
18.	24.01.2020	- 85 mRL 1 NA (Burn Cut)	54	3-4	3	175	30	❖ - 55mRL 5 E - Bypass ❖ - 25mRL, Near Shaft	35	30	45	7.55	222.9
19.	24.01.2020	-85 mRL (5 E) Ring	10	8-26	43	350	43	❖ - 55 mRL 5 E -Bypass ❖ - 25mRL Near Shaft	65	60	90	3.45	217.9
									40	30	50	28.07	133.6
									10	60	60	13.52	80



Table A2. Computed explosive weight per delay at various radial distances for different permissible level of vibration based on RMR of roof rock at Balaria underground mine, HZL.

Radial distance [m]	Computed Maximum explosive weight per delay for different values of PPV for the safety of underground structure [kg]				
	70 mm/s [For RMR 40]	85 mm/s [For RMR 45]	100 mm/s [For RMR 50]	110 mm/s [For RMR 55]	120 mm/s [For RMR ≥ 60]
30	43	57	73	83	95
40	77	102	129	148	168
50	120	160	202	232	263
60	173	230	291	334	379
70	236	313	396	454	516
80	308	408	517	594	673
90	390	517	654	751	852
100	482	638	808	927	1052
125	753	997	1262	1449	1644
150	1084	1436	1818	2087	2367
200	1927	2553	3231	3710	4208

Table A3. Predicted peak particle velocity levels for various distance taking explosive weight per delay of 40, 60, 80, 100, 125 & 150 kg for blasting at Balaria underground mine.

Distance from the blast face [m]	Predicted peak particle velocity levels for different explosive weight per delay for the safety of underground structure [mm/s]					
	40 kg	60 kg	80 kg	100 kg	125 kg	150 kg
30	66.2	87.6	106.8	124.6	145.3	164.8
40	44.5	58.9	71.8	83.8	97.7	110.8
50	32.7	43.3	52.8	61.6	71.8	81.4
60	25.4	33.7	41.0	47.9	55.8	63.3
70	20.6	27.2	33.2	38.7	45.1	51.2
80	17.1	22.6	27.6	32.2	37.5	42.6
90	14.5	19.2	23.5	27.4	31.9	36.2
100	12.6	16.6	20.3	23.7	27.6	31.3
125	9.2	12.2	14.9	17.4	20.3	23.0
150	7.2	9.5	11.6	13.5	15.8	17.9
200	4.8	6.4	7.8	9.1	10.6	12.0

Table A4. Computed total explosive weight in a round at various radial distances for different Permissible level of vibration based on the RMR of roof rock at Balaria underground Mine.

Radial distance [m]	Computed total explosive weight in a blasting round for different values of PPV for the safety of underground structure [kg]				
	70 mm/s [For RMR 40]	85 mm/s [For RMR 45]	100 mm/s [For RMR 50]	110 mm/s [For RMR 55]	120 mm/s [For RMR ≥ 60]
30	345	478	627	735	850
40	614	849	1114	1306	1511
50	959	1327	1741	2041	2360
60	1381	1910	2506	2939	3399
70	1880	2600	3411	4000	4626
80	2455	3396	4456	5225	6043
90	3107	4298	5639	6613	7648
100	3836	5306	6962	8164	9441
125	5994	8291	10878	12756	14752
150	8632	11940	15665	18369	21243
200	15345	21226	27848	32656	37766

Table A5. Predicted peak particle velocity levels for various distance taking total explosive charge in a blasting round 500, 1000, 1500, 2000, 3000 and 4000 kg for blasting at Balaria underground Mine.

Distance from the blast face [m]	Predicted peak particle velocity levels for different explosive weight per delay for the safety of underground structure [mm/s]					
	500 kg	1000 kg	1500 kg	2000 kg	3000 kg	4000 kg
30	9.0	13.7	17.4	20.7	26.4	31.3
40	7.8	11.9	15.1	18.0	22.9	27.2
50	6.9	10.5	13.3	15.8	20.2	24.0
60	6.2	9.3	11.9	14.1	18.0	21.4
70	5.6	8.4	10.7	12.7	16.2	19.3
80	5.0	7.6	9.7	11.6	14.7	17.5
90	4.6	7.0	8.9	10.6	13.5	16.0
100	4.2	6.4	8.2	9.7	12.4	14.8
125	3.9	6.0	7.6	9.0	11.5	13.7
150	3.4	5.2	6.6	7.8	10.0	11.9
200	3.0	4.6	5.8	6.9	8.8	10.5

Table A6. Recommended explosives weight per delay and total explosives to be detonated in a round at Balaria underground Mine at varying distances from the houses/structures in the village considering 5 mm/s, 10 mm/s and 15 mm/s as threshold limits of vibration for the safety of surface houses/structures.

Radial Distance of houses/structure from the blast face [m]	Recommended explosives weight per delay considering 5 mm/s, 10 mm/s and 15 mm/s as threshold levels of vibration [kg]			Total explosives to be detonated in a blasting round considering 5 mm/s, 10 mm/s and 15 mm/s as threshold levels of vibration [kg]		
	5 mm/s	10 mm/s	15 mm/s	5 mm/s	10 mm/s	15 mm/s
200	42	115	207	187	594	1170
225	53	145	262	236	752	1481
250	66	179	323	292	928	1828
275	80	217	391	353	1123	2212
300	95	258	465	420	1337	2632
325	111	303	546	493	1569	3089
350	129	352	633	572	1820	3583
375	148	404	727	656	2089	4113
400	168	459	827	747	2377	4680
425	190	519	933	843	2683	5283
450	213	581	1046	945	3008	5923
475	237	648	1166	1053	3352	6599
500	263	718	1292	1166	3714	7312
550	318	868	1563	1411	4494	8848
600	378	1034	1860	1680	5348	10530
650	444	1213	2183	1971	6277	12358
700	515	1407	2532	2286	7279	14332
750	591	1615	2906	2624	8356	16453
800	673	1837	3307	2986	9508	18720

Date/Time Vert at 16:58:02 September 28, 2018  
 Trigger Source Geo: 1.016 mm/s  
 Range Geo: 127.0 mm/s  
 Record Time 6.0 sec at 1024 sps

Serial Number 4710 V 2.61 MiniMate  
 Battery Level 6.6 Volts  
 Unit Calibration July 13, 2018 by CIMFR Dhanbad  
 File Name F710HLZJ.4Q0

## Notes

Location: On ground surface  
 Client: Zawar group of mines, HZL  
 User Name: REE Division, CSIR-CIMFR  
 Converted: October 1, 2018 20:38:22 (V10.30)

## Extended Notes

Blast optimisation study at Zawar group of mines, HZL.

Microphone Linear Weighting

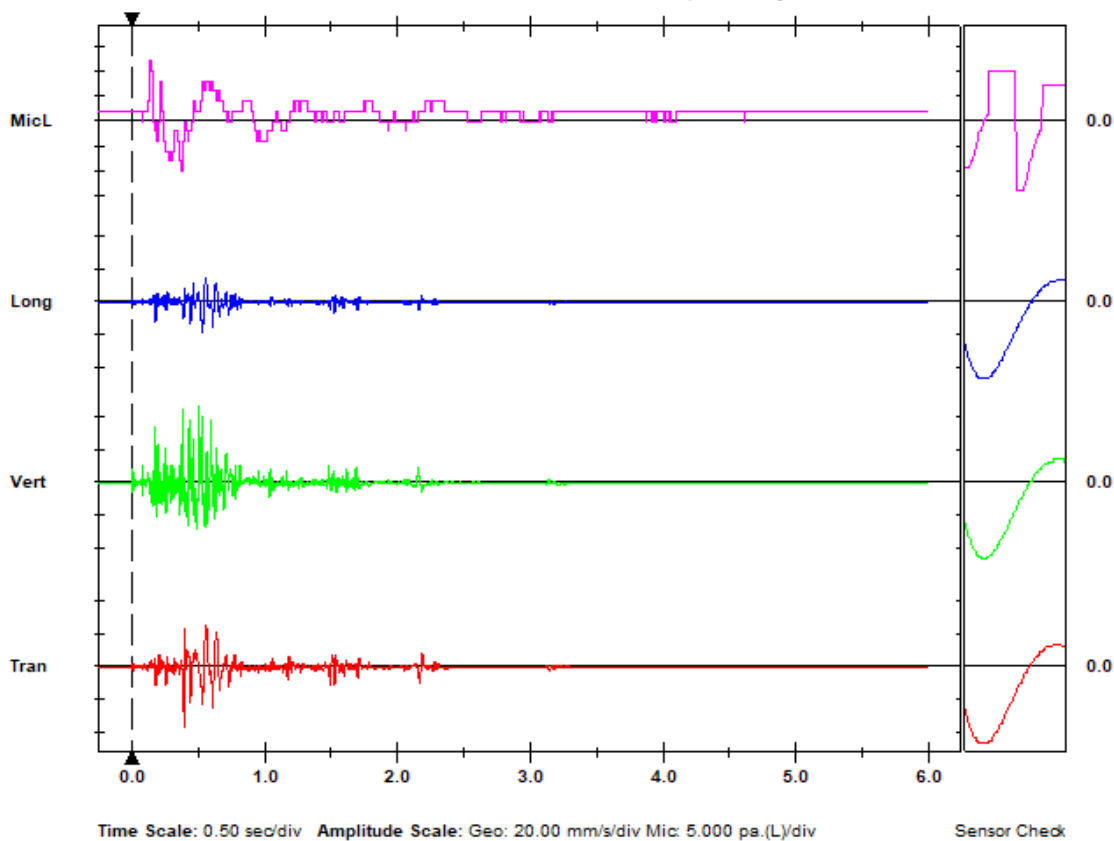
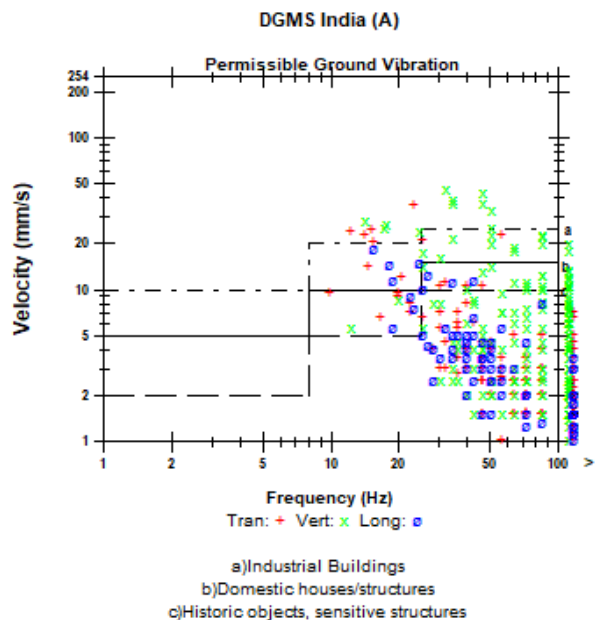
PSPL 115.6 dB(L) at 0.140 sec

ZC Freq 6.0 Hz

Channel Test Check (Freq = 0.0 Hz Amp = 22 mv )

	Tran	Vert	Long	
PPV	36.58	46.74	18.80	mm/s
PPV	82.26	84.39	76.48	dB
ZC Freq	23	32	16	Hz
Time (Rel. to Trig)	0.394	0.508	0.533	sec
Peak Acceleration	1.379	1.697	0.477	g
Peak Displacement	0.270	0.270	0.177	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.8	7.7	7.6	Hz
Overswing Ratio	3.7	3.5	3.9	

Peak Vector Sum 46.83 mm/s at 0.508 sec



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 Range Geo: 127.0 mm/s  
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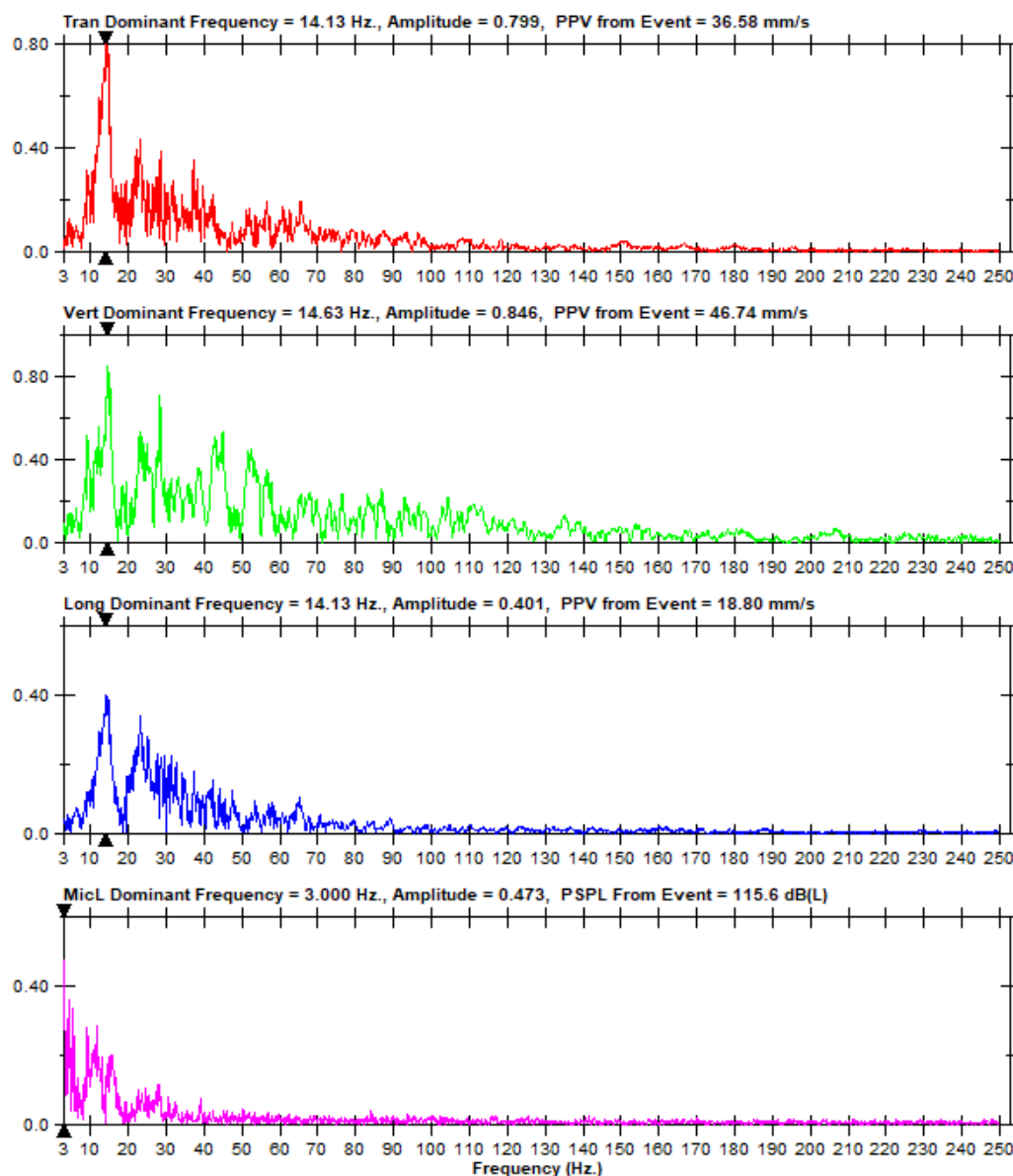
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 Battery Level 6.6 Volts  
 Unit Calibration July 13, 2018 by CIMFR Dhanbad  
 File Name F710HLZJ.4Q0

## Notes

Location: On ground surface  
 Client: Zavar group of mines, HZL  
 User Name: REE Division, CSIR-CIMFR  
 Converted: October 1, 2018 20:38:22 (V10.30)

## Extended Notes

Blast optimisation study at Zavar group of mines, HZL.





Date/Time Vert at 23:46:00 September 29, 2018  
 Trigger Source Geo: 1.016 mm/s  
 Range Geo: 127.0 mm/s  
 Record Time 6.0 sec at 1024 sps

Serial Number 4710 V 2.61 MiniMate  
 Battery Level 6.5 Volts  
 Unit Calibration July 13, 2018 by CIMFR Dhanbad  
 File Name F710HM1W.OO0

## Notes

Location: On ground surface  
 Client: Zawar group of mines, HZL  
 User Name: REE Division, CSIR-CIMFR  
 Converted: October 1, 2018 20:38:22 (V10.30)

## Extended Notes

Blast optimisation study at Zawar group of mines, HZL.

Microphone Linear Weighting

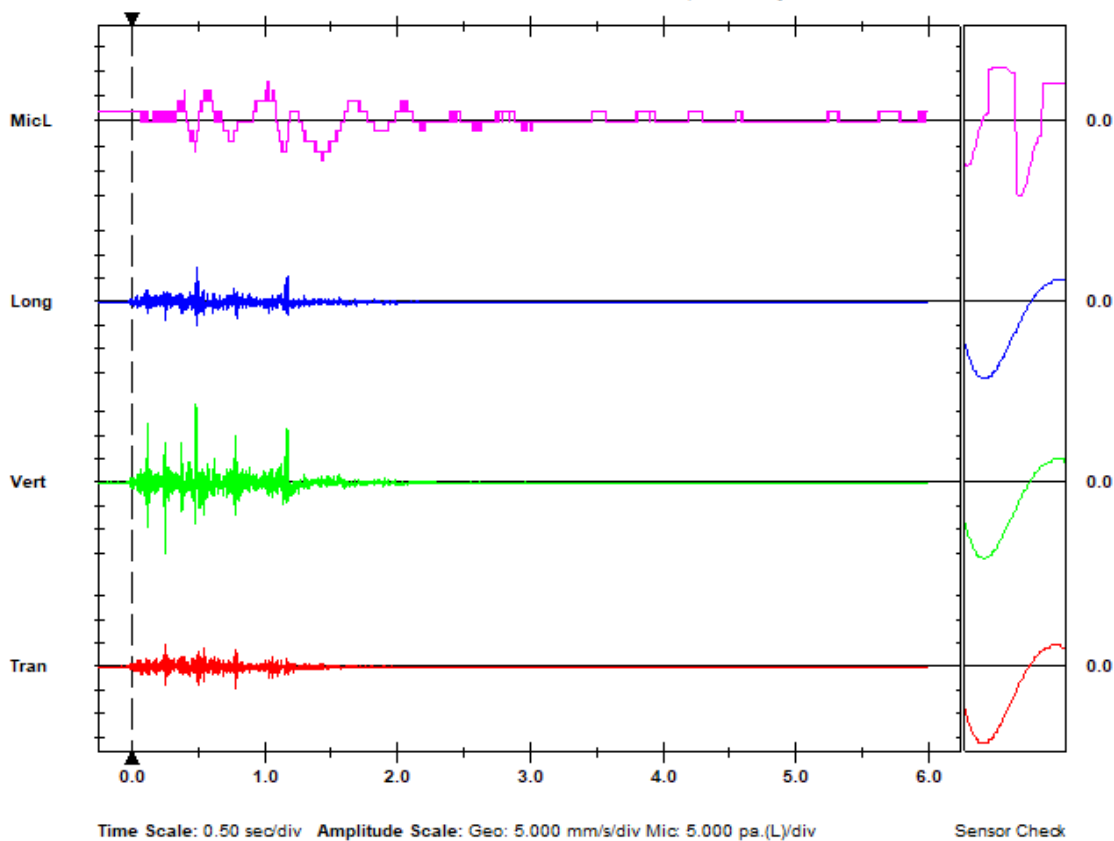
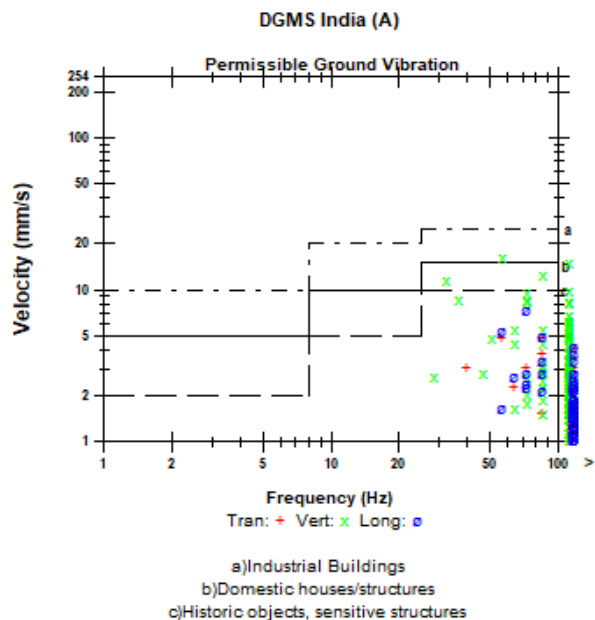
PSPL 112.0 dB(L) at 1.024 sec

ZC Freq 3.0 Hz

Channel Test Check (Freq = 0.0 Hz Amp = 66 mv)

	Tran	Vert	Long	
PPV	4.826	16.51	7.366	mm/s
PPV	64.67	75.35	68.34	dB
ZC Freq	51	51	64	Hz
Time (Rel. to Trig)	0.255	0.483	0.486	sec
Peak Acceleration	0.318	1.365	0.424	g
Peak Displacement	0.014	0.053	0.016	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.8	7.8	7.6	Hz
Overswing Ratio	3.6	3.5	3.6	

Peak Vector Sum 16.86 mm/s at 0.483 sec





## FFT Report

Date/Time Vert at 23:46:00 September 29, 2018  
Trigger Source Geo: 1.016 mm/s  
Range Geo: 127.0 mm/s  
Record Time 6.0 sec at 1024 sps

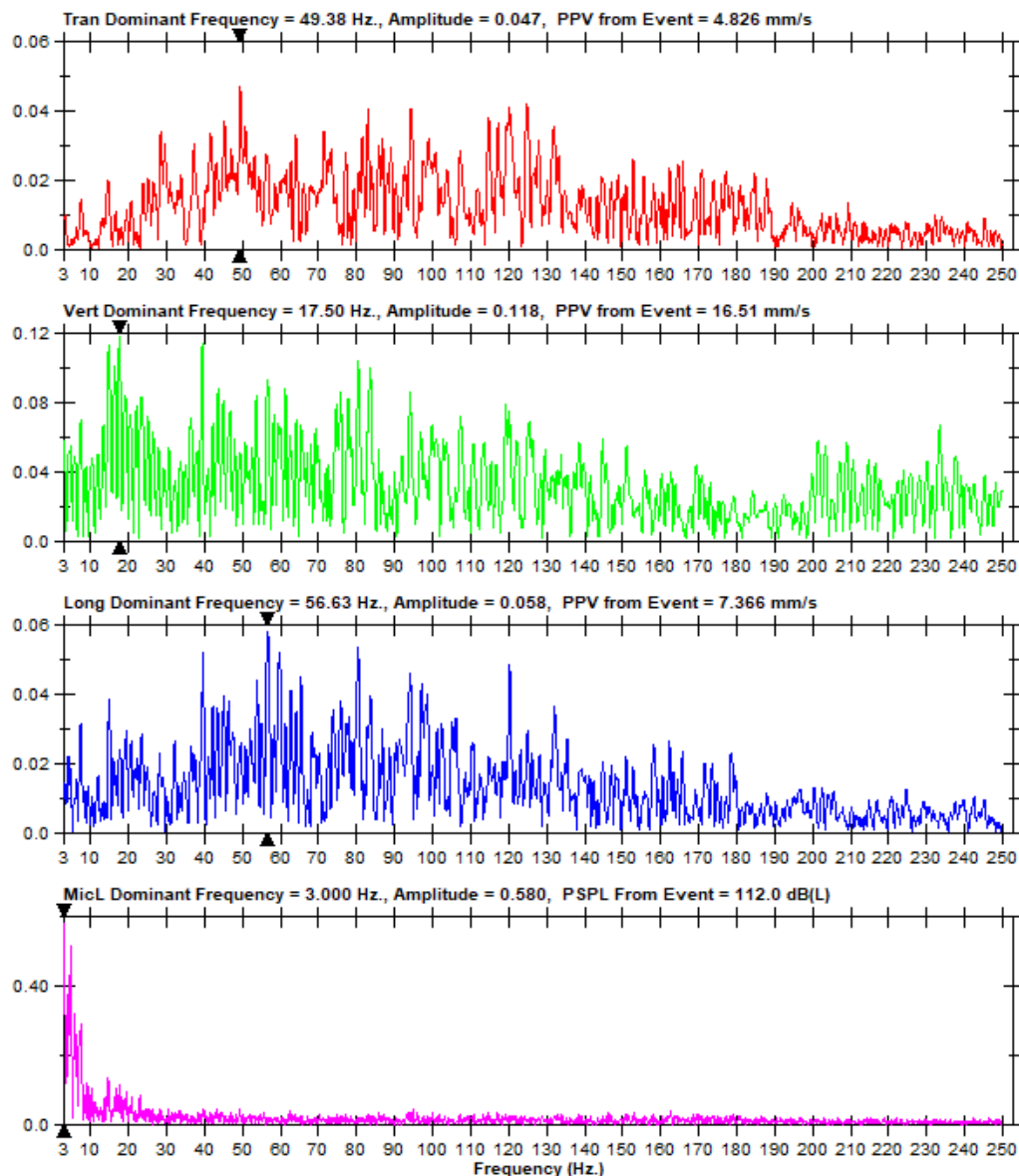
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Battery Level 6.5 Volts  
Unit Calibration July 13, 2018 by CIMFR Dhanbad  
File Name F710HM1W.OO0

### Notes

Location: On ground surface  
Client: Zawar group of mines, HZL  
User Name: REE Division, CSIR-CIMFR  
Converted: October 1, 2018 20:38:22 (V10.30)

### Extended Notes

Blast optimisation study at Zawar group of mines, HZL.



Date/Time Tran at 16:29:46 July 24, 2019  
 Trigger Source Geo: 2.510 mm/s  
 Range Geo: 254.0 mm/s  
 Record Time 10.0 sec at 4096 sps

Serial Number BE10010 V 10.30-1.1 Minimate Blaster  
 Battery Level 6.3 Volts  
 Unit Calibration July 16, 2019 by CIMFR Dhanbad  
 File Name L01011BC.HM0

## Notes

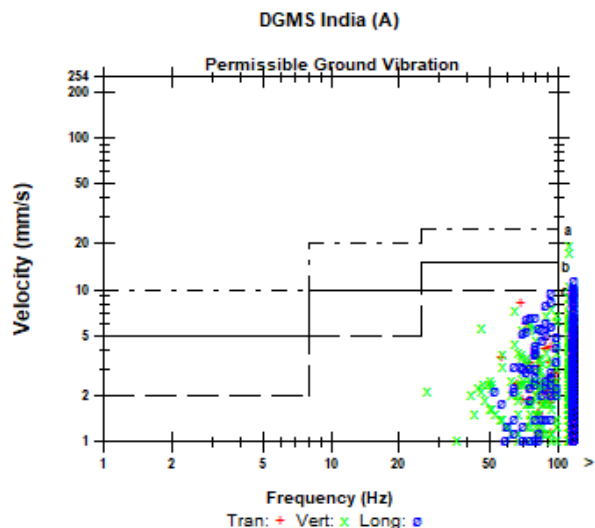
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 Client: Zawar Group of Mines, HZL  
 User Name: REE DIVISION, CSIR-CIMFR, DHANBAD  
 General:

## Extended Notes

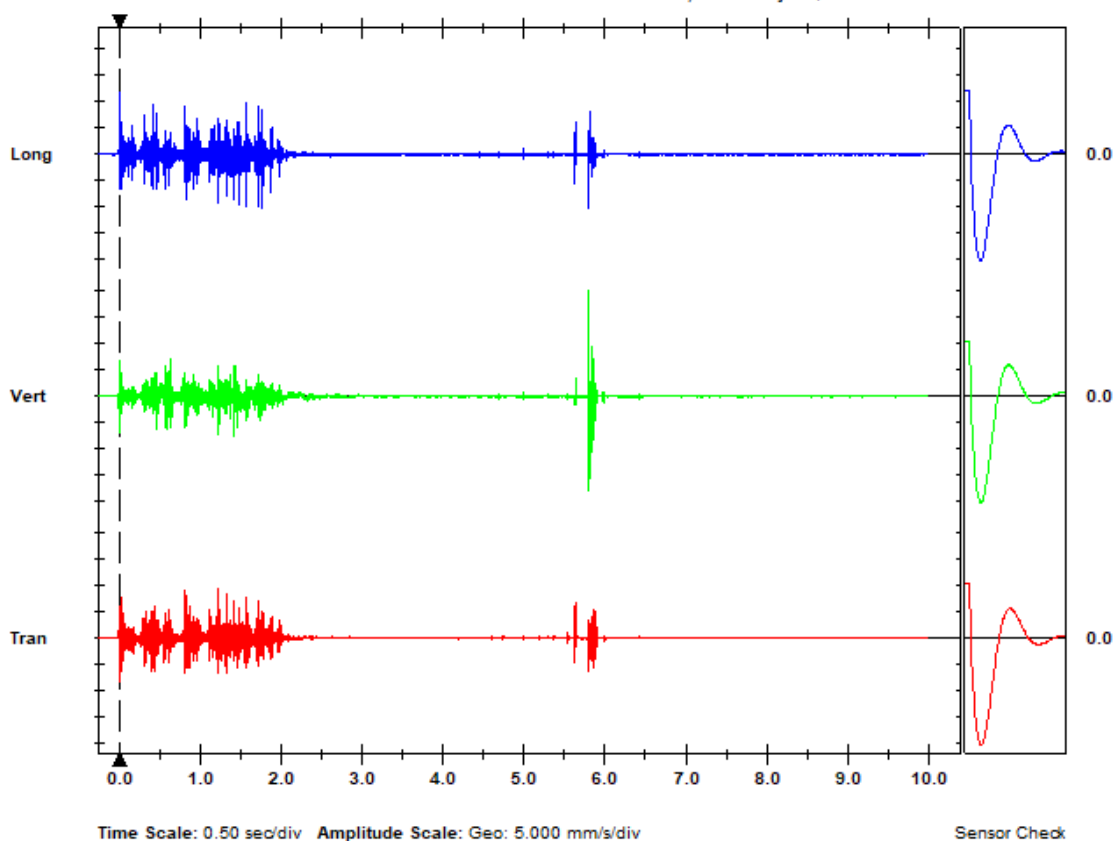
Blast optimisation study at Zawar Group of U/G Mine, HZL, Rajasthan

	Tran	Vert	Long	
PPV	9.398	19.94	11.68	mm/s
PPV	70.46	76.99	72.35	dB
ZC Freq	120	171	128	Hz
Time (Rel. to Trig)	1.223	5.804	0.018	sec
Peak Acceleration	0.795	2.704	1.114	g
Peak Displacement	0.013	0.016	0.016	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.2	7.5	7.6	Hz
Overswing Ratio	3.8	3.6	3.9	

Peak Vector Sum 21.81 mm/s at 5.804 sec



- a) Industrial Buildings
- b) Domestic houses/structures
- c) Historic objects, sensitive structures





## FFT Report

Date/Time Tran at 16:29:46 July 24, 2019  
Trigger Source Geo: 2.510 mm/s  
Range Geo: 254.0 mm/s  
Record Time 10.0 sec at 4096 sps

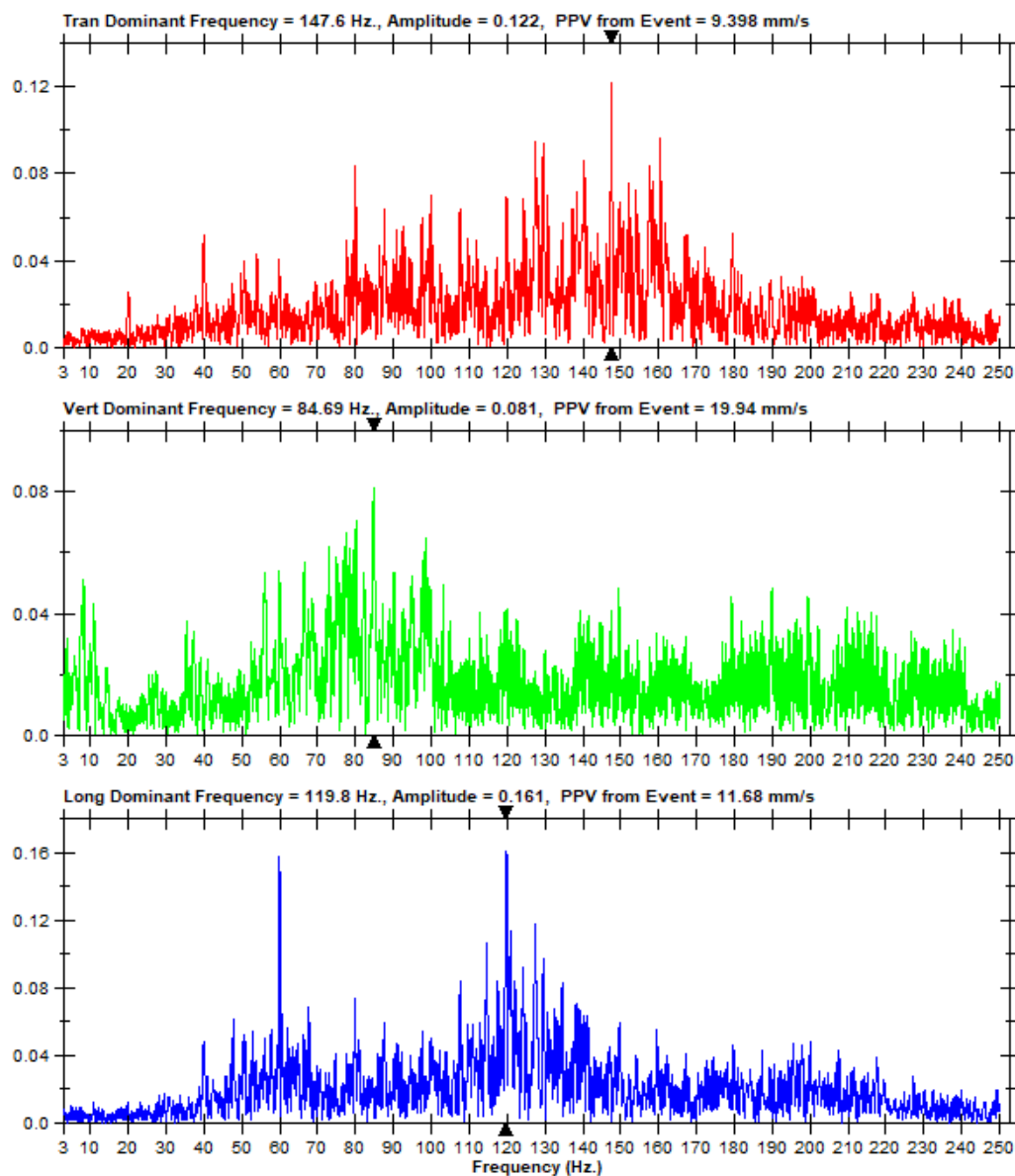
Serial Number BE10010 V 10.30-1.1 Minimate Blaster  
Battery Level 6.3 Volts  
Unit Calibration July 16, 2019 by CIMFR Dhanbad  
File Name L01011BC.HM0

### Notes

Location: On Ground Surface  
Client: Zawar Group of Mines, HZL  
User Name: REE DIVISION, CSIR-CIMFR, DHANBAD  
General:

### Extended Notes

Blast optimisation study at Zawar Group of U/G Mine, HZL, Rajasthan



Date/Time Long at 16:36:44 July 19, 2018  
 Trigger Source Geo: 5.000 mm/s  
 Range Geo: 254.0 mm/s  
 Record Time 4.0 sec at 4096 sps

Serial Number BE20375 V 10.60-8.17 MiniMate Plus  
 Battery Level 6.2 Volts  
 Unit Calibration January 17, 2018 by CIMFR Dhanbad  
 File Name V375HIA6.580

## Notes

Location: On Ground Surface  
 Client: Zawar Group of Mines  
 User Name: REE Division, CSIR- CIMFR, Dhanbad  
 General:

## Extended Notes

Blast optimisation study at Zawar Group of mines

Microphone Linear Weighting

PSPL \*\*\* dB(L) at 0.081 sec

ZC Freq 20.7 Hz

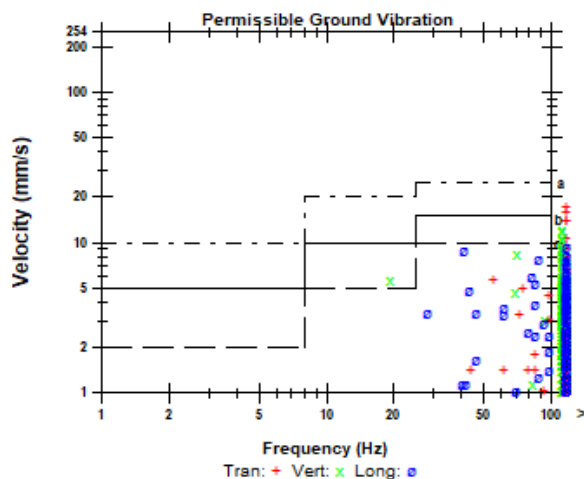
Channel Test Passed (Freq = 20.1 Hz Amp = 438 mv )

	Tran	Vert	Long	
PPV	17.14	12.06	9.271	mm/s
PPV	75.68	72.63	70.34	dB
ZC Freq	128	205	128	Hz
Time (Rel. to Trig)	0.347	0.010	0.292	sec
Peak Acceleration	1.538	1.803	0.848	g
Peak Displacement	0.021	0.022	0.024	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.6	7.2	Hz
Overswing Ratio	3.4	3.5	3.7	

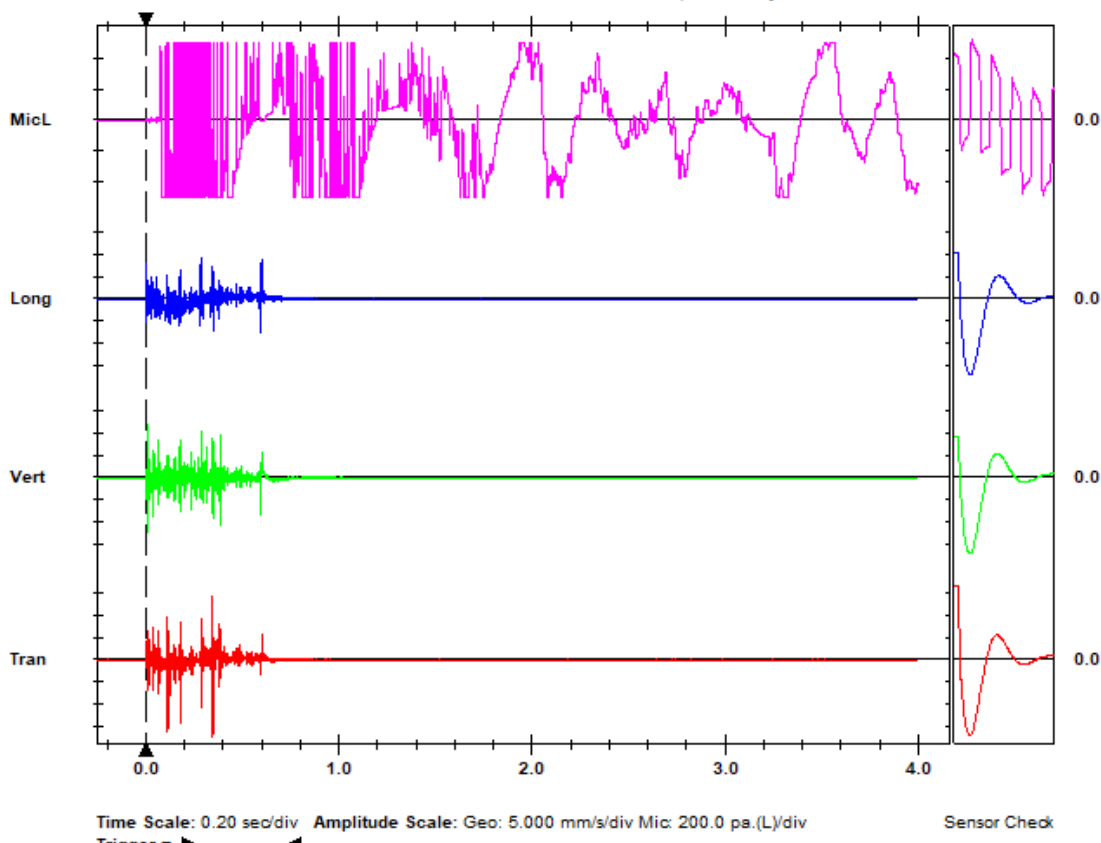
Peak Vector Sum 19.73 mm/s at 0.347 sec

\*\*\* : Out of Range

## DGMS India (A)



a) Industrial Buildings  
 b) Domestic houses/structures  
 c) Historic objects, sensitive structures





Date/Time Long at 16:36:44 July 19, 2018  
 Trigger Source Geo: 5.000 mm/s  
 Range Geo: 254.0 mm/s  
 Record Time 4.0 sec at 4096 sps

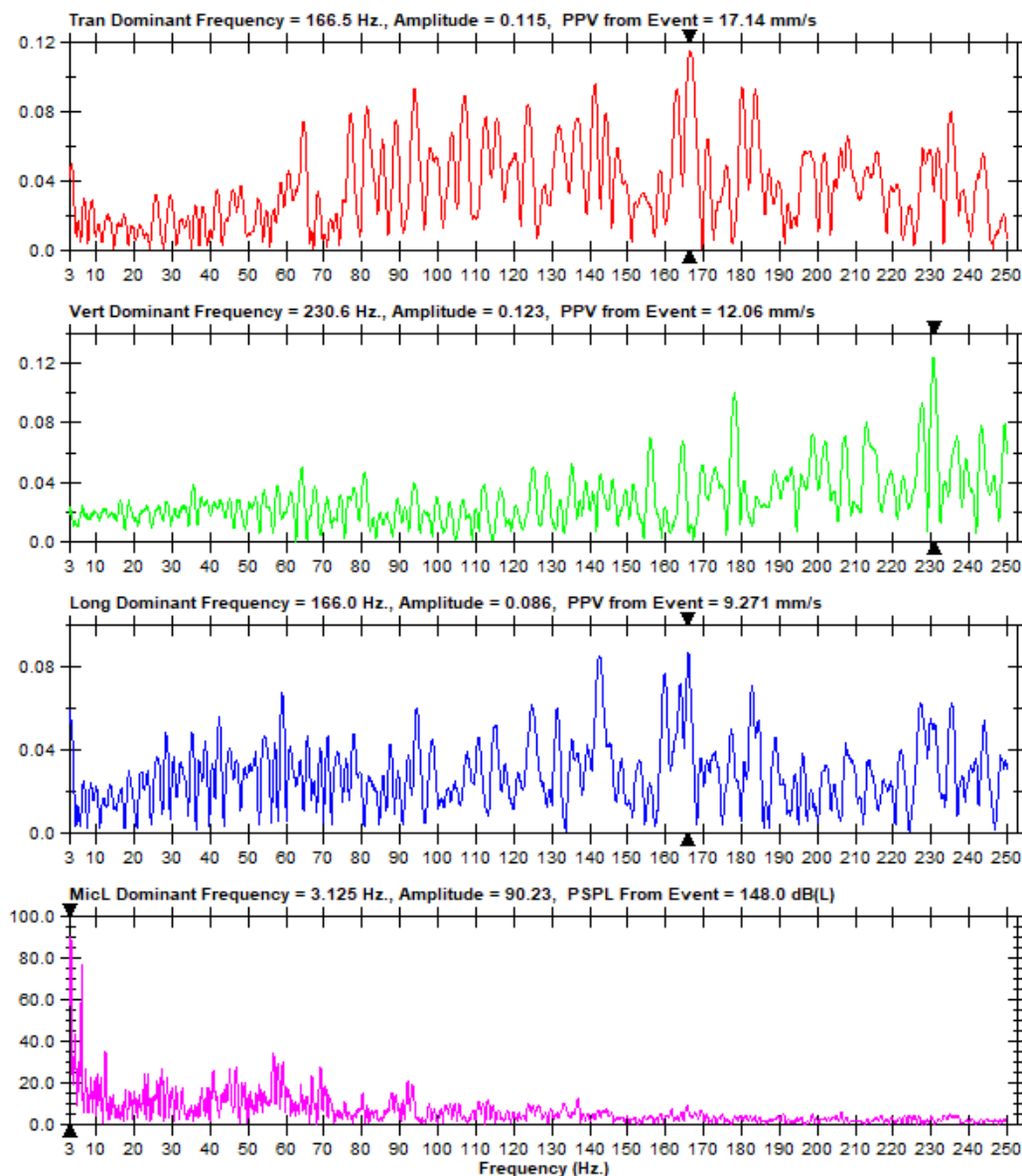
Serial Number BE20375 V 10.60-8.17 MiniMate Plus  
 Battery Level 6.2 Volts  
 Unit Calibration January 17, 2018 by CIMFR Dhanbad  
 File Name V375HIA6.580

## Notes

Location: On Ground Surface  
 Client: Zawar Group of Mines  
 User Name: REE Division, CSIR- CIMFR, Dhanbad  
 General:

## Extended Notes

Blast optimisation study at Zawar Group of mines



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**CSIR-CENTRAL INSTITUTE OF MINING & FUEL RESEARCH  
(Council of Scientific & Industrial Research)**

**Barwa Road, Dhanbad – 826 001**



***Draft Report on***

**Study and advice for blasting optimization at  
Baroi underground mines of M/s HZL for safe and  
efficient exploitation of minerals**

**PROJECT No. SSP/306/2018-19**

**February 2021**

## **Project Title**

# **Study and advice for blasting optimization at Baroi underground mines of M/s HZL for safe and efficient exploitation of minerals**

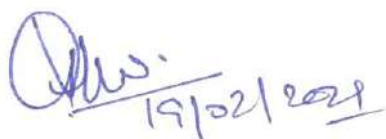
**Project No.: SSP/306/2018-19**

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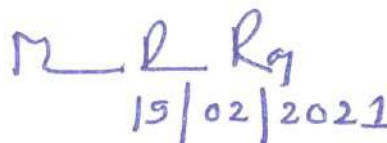
This report is meant for internal use of your organization only and it should not be published in full or part by your organization. It should not be communicated or circulated to outside parties except concerned departments. However, CSIR-CIMFR reserves the right to publish the results of the investigations 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.

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**(Vivek K Himanshu)**  
**Scientist**



**(Murari P Roy)**  
**Sr. Principal Scientist & Project Leader**

## **Contents**

S.No.		Page Nos.
	Executive Summary	1
1.	Introduction	3
2.	Location and Geology	3
3.	Instrumentation	4
4.	Experimental blast details	5
5.	Analysis of Data	6
5.1	Frequency of blast vibration	7
5.2	Waveform analysis of blast	8
6.	Existing vibration standard and criteria to prevent damage	9
7.	Suggested blast design parameters for safety of underground structures	10
7.1	Suggested Blast Design Parameters for Safety of Surface Structures	10
7.2	Monitoring of blast vibration at Jain temple	11
7.3	Safety precautions while blasting	13
8.	Rock fragmentation analyses	13
9.	Blast Optimization for development faces	15
10.	Review of ring blasting pattern	17
10.1	Drilling and blasting methodology for extraction of narrow vein ore deposits	17
11.	Monitoring of velocity of detonation (VOD) of explosives	19
12.	Quality test of delay detonators	21
12.1	Quality test of NONEL delay detonators during 1st visit	21
12.2	Quality test of NONEL delay detonators during 6th visit	26
13.	Conclusions and recommendations	29

	Acknowledgements	31
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## EXECUTIVE SUMMARY

This report relates to the study conducted by CSIR-Central Institute of Mining and Fuel Research, Dhanbad on blast optimization of development faces as well as at production blast (slot/ring) faces for safe and efficient exploitation of minerals at Baroi underground Mine of Zawar Group. The methodology adopted to reach at the recommendations under this study includes the experimental trials, instrumentation and data monitoring, and data analysis. The results of the study and recommendations, made thereof with the important observations and methodology, are summarised below:

- ❖ The major objectives of the study were – suggesting blast design parameters to prohibit damages around important underground structures, review of development face, production face blasting patterns and qualitative assessments of explosives and its accessories. These objectives were achieved by experimental trials at the mine, generation of data for development of blast vibration predictors, data analysis etc. The blast designs to address the major concerns has been suggested in the report on the basis of results of the experimental trials.
- ❖ Altogether, 16 blasts were conducted at different development and production blast faces of the mine. The blast vibrations were monitored around different underground structures located in the proximity of the blasting face. Most of the vibration were recorded at near field distances from the blast face.
- ❖ The number of holes detonated in a blast round varied from 10 to 33. The total explosives weight detonated in a blast round were varied from 300 to 983 kg. The maximum explosives weight per delay varied between 25 to 134 kg. The hole diameter of 89 mm and 152 mm were used for blast holes and uncharged reamer holes of the production blast faces. The hole diameter of 45 mm were used in all the development blast faces. Blast holes were charged with site mixed emulsion explosives and emulsion cartridge explosives. Electronic and NONEL initiation system was used for initiation of charged holes. The production blast was conducted by downhole as well as uphole charging and blasting fashion.
- ❖ Maximum level of ground vibration recorded from experimental trial was 74.07 mm/s at peak dominant frequency of 105.4 Hz. The vibration was recorded at a radial distance of 40 m from the K3a 448 mRL R1, R2 production blast face for blast conducted on 15.03.2019. The blast was conducted for 33 numbers of hole. The total explosive charge of 983 kg was fired in this blast keeping explosive weight per delay of 105 kg.
- ❖ The statistical predictor equation has been developed for the safety of underground structures while underground blasting. The Ground vibrations data recorded were grouped together for this purpose. The data recorded by mine management has also been taken together with the data generated during the four visits under this study.

- ❖ The maximum explosive charge weight per delay and total explosive charge for the mine has been computed considering different vibration limits based on RMR values of the roof rock. The suggested MCPD and total charge is given in Annexure of the report. The suggested charging pattern should be followed for day-to-day blasting at the mine with the aim to safeguard nearby underground structures.
- ❖ The frequencies of the recorded vibration were more than 22 Hz in all the blasting rounds. The most common recorded frequency ranges between 50 Hz and 150 Hz. The maximum recorded frequency was 248.4 Hz.
- ❖ The fragmentation output from the blast has been assessed. The analyses result shows that the size of fragmented rock varies between 2.798 mm and 435.560 mm. The mean size of the blasted rock is 72.485 mm. The maximum rock fragments of 150 mm size are present in blasted muck pile. The sieving analysis shows that 90% of the rock sample passes through sieve opening of size 360.947 mm. The output fragment size is excellent as per the loading requirement of excavators.
- ❖ The existing drilling pattern for the face blast at the mine has been reviewed. The firing pattern has been suggested for day-to-day face blasting at the mine.
- ❖ The ring blasting pattern has been suggested for day-to-day blasting at the mine. The blast design has also been suggested for excavation of narrow vein ore deposits of the mine.
- ❖ The in-the-hole velocity of detonation (VOD) of Powergel-801 cartridge explosives (390 gm of 40 mm dia.) of M/s IEPL-Orica was recorded at underground production blast face of Baroi UG Mine on 27.03.2018. The recorded VOD is 4670 m/s. The Velocity of detonation (VOD) of cartridge explosives (390 gm of 40 mm dia.) used at development faces of the mine was also recorded on 17.07.2018. The explosive belongs to M/s IEPL Orica. The recorded magnitude of VOD is 4798 m/s.
- ❖ The scattering tests of NONEL delay detonators were performed during 1<sup>st</sup> and 6<sup>th</sup> visits to the mine. The tests were conducted using High speed video camera. The test result reveals that the delay timing of the detonators is within acceptable limit for the test conducted during 6<sup>th</sup> visit.
- ❖ The scattering percentage should be restricted to maximum 10 % up to 10 no. delay and thereafter it should be within 5 % to get the optimum results from the blast.
- ❖ Selection of delay should be based on the face condition and actual availability of hole depth on the site. Proper information about delay timings of different delay numbers in case of NONEL initiation shall be well informed to the entire blasting concern engineer.

## **1. Introduction**

M/s Hindustan Zinc Limited entrusted CSIR-Central Institute of Mining and Fuel Research, Dhanbad PO No.: 2000046826/5100022254 dated 13.01.2018 for conducting blast optimization study at development faces as well as at production blast (slot/ring) faces for safe and efficient exploitation of minerals at Zawar group of mines.

Scientists of CSIR-Central Institute of Mining & Fuel Research (CIMFR), Dhanbad conducted Six visits to the mine during March 26-31, 2018; July 13-21, 2018; September 25-October 05, 2018; January 16 – February 01, 2019; July 16-27, 2019 and January 20- 30, 2020. Methodology of blast design optimization was discussed with HZL officials. Near field blast induced vibration were measured by placement of seismographs for trial blasts of development and production faces. Qualitative assessment of explosive and its accessories were performed by Velocity of detonation (VOD) and scattering tests.

Based on the discussion with mine management, the major objectives of the study were as follows:

1. Development of nearfield blast vibration predictor and suggestion on blast design parameters to prohibit damages of underground structures.
2. Review of blasting pattern for excavation of development faces.
3. Review of blasting pattern followed for production blast faces of the mine.
4. Qualitative assessments of explosive and its accessories.

The above objectives were achieved by experimental trials at the mine. The statistical predictor equation has been developed on the basis of recorded vibration data. The data was gathered during the visits to the mine. The data gathered by the mine management were also taken together with the data from the experimental trial for the statistical analysis. The charging parameters for the blast at different distances from the underground structures has been suggested on the basis of the predictor. The necessary instrumentation was carried out during field visits for the assessment of explosive and its accessories.

## **2. Location and geology**

The region is one of the significant parts of the Aravalli Supergroup which have been deposited in a Paleoproterozoic rift setting. The Archean metamorphic sequences of the Banded Gneissic Complex form the basement of Aravalli Supergroup. The area in and around Udaipur constitutes the type area for Aravalli Supergroup. The economically noteworthy lower part of Aravalli Supergroup is best exposed in the vicinity of Zawar region. This area incorporates four separate Pb-Zn deposits namely, Balaria, Baroi, Mochia, Zawarmala. The mineralization in this region have been found to be around 1700 Ma old as evident from Pb-Pb model age. Further, the major lithologies of this region are dolomite (with varieties), phyllites, quartzite and conglomerates. The rocks of this area are steeply dipping and are in the form of ridge and valley topography.

The ridges are of quartzite and dolomite whereas intervening basin comprises of different categories of slate and phyllites. The rocks of this region have undergone three main phases of deformation and have undergone metamorphism up to greenschist facies. The mineralization has taken place in the form of fine bedding in carbonaceous phyllite lithologies and as structurally controlled, epigenetic form in different varieties of dolomites.

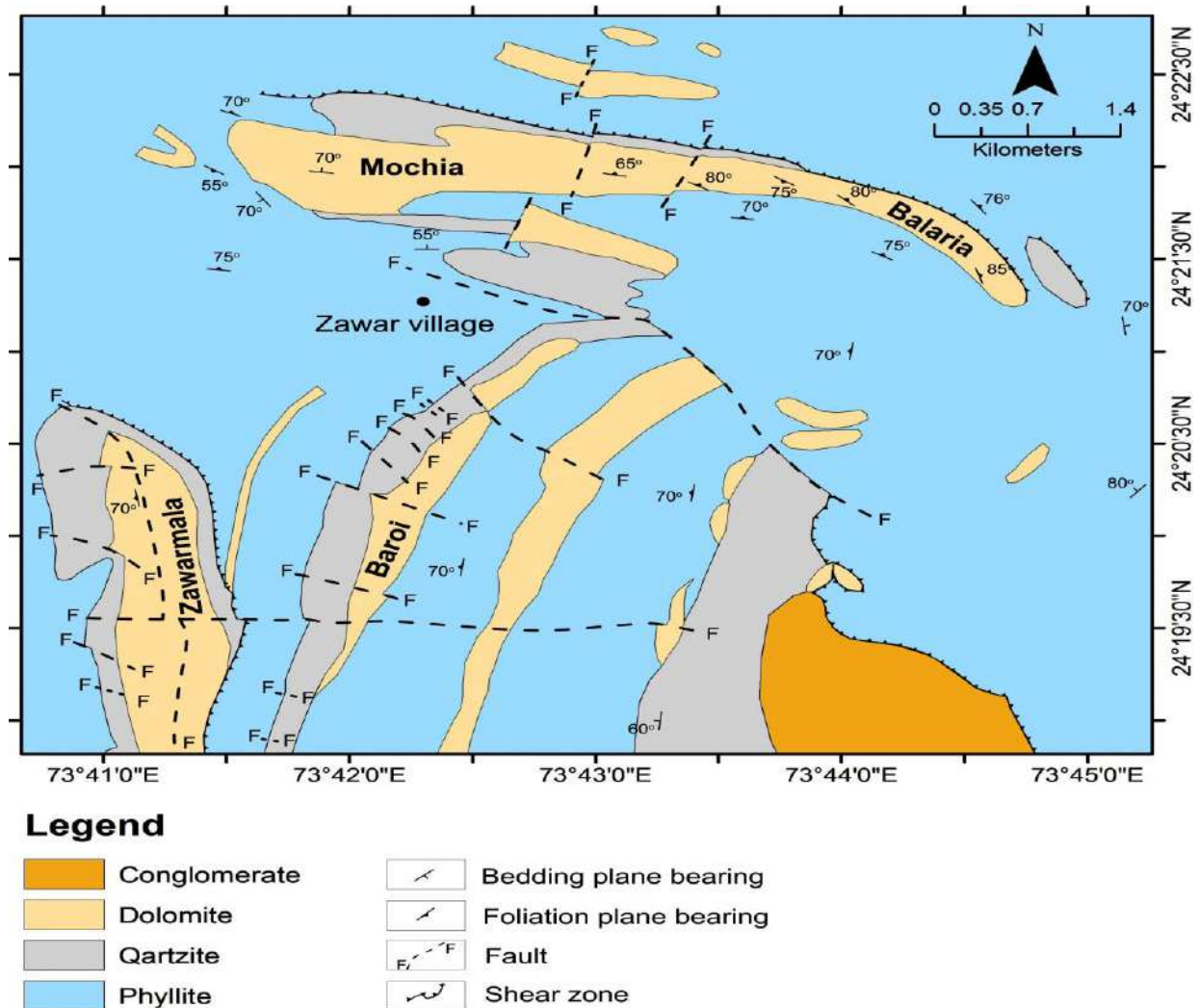


Figure 1. Geological map of Baroi Mine of Zawar Group, HZL, Rajasthan

### 3. Instrumentations

Blast induced vibrations were monitored by seismographs namely MiniMate Plus and MiniMate DS-077 (Made in Canada by M/s Instantel Inc.). The MiniMate plus is an eight/four channel seismograph provided with two/one tri-axial transducer for monitoring vibration (in mm/s) and two/one channel for monitoring air over-pressure/noise in dB(L) or Pa. MiniMate DS-077 is a four channel seismograph provided with one tri-axial transducer for vibration monitoring (in mm/s) and one channel for monitoring of air over-pressure/noise in dB(L) or Pa. All the seismographs record vibration in three directions i.e. Longitudinal (L), Vertical (V) and Transverse (T). They also record peak frequency of vibration and compute the peak vector sum of the vibration.

The in-the-hole VOD of the explosives was recorded with the help of VOD-Mate of M/s InstanTel Inc., Canada.

Blaster's Ranger II™ high speed digital video camera (made in Canada by M/s MREL Group of Companies Limited) was used for scattering tests of delay detonators.

#### **4. Experimental blast details**

Altogether, 16 blasts were conducted at different development and production blast faces of the mine. The blast vibrations were monitored around different underground structures located in the proximity of the blasting face. Most of the vibration were recorded at near field distances from the blast face. The number of holes detonated in a blast round varied from 10 to 33. The total explosives weight detonated in a blast round were varied from 300 to 983 kg. The maximum explosives weight per delay varied between 25 to 134 kg. The hole diameter of 89 mm and 152 mm were used for blast holes and uncharged reamer holes of the production blast faces. The hole diameter of 45 mm were used in all the development blast faces. Blast holes were charged with site mixed emulsion explosives and emulsion cartridge explosives. Electronic and NONEL initiation system was used for initiation of charged holes. The production blast was conducted by downhole as well as uphole charging and blasting fashion. View of a production face during experimental trial is shown in Photograph 1.

The blast induced ground vibration was recorded at different underground locations by placement of seismographs. A view of monitoring of blast vibration is shown in Photograph 2. Maximum level of ground vibration recorded during experimental trial was 74.07 mm/s at peak dominant frequency of 105.4 Hz. The vibration was recorded at a radial distance of 40 m from the K3a 448 mRL R1, R2 production blast face for blast conducted on 15.03.2019. The blast was conducted for 33 numbers of hole. The total explosive charge of 983 kg was fired in this blast keeping explosive weight per delay of 105 kg.



Photograph 1. View of charging and connection for Production (Ring) blast at 430 mRL of K2-stope.





Photograph 2. View of Installation of seismograph & VOD-Mate for monitoring blast Induced ground vibration & Velocity of Detonation (VOD) at Baroi Underground mine.

## 5. Analyses of recorded vibration data

Ground vibrations data recorded were grouped together for statistical analysis. The data gathered by the mine officials has also been taken together with the recorded data for the analysis. Analysis was performed based on vibration data recorded at different underground locations due to underground blasting and the 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). The generalised established equation combining all the underground vibration data for Baroi underground mine is:

$$PPV = 720 \times \left( \frac{R}{\sqrt{Q_{\max}}} \right)^{-1.534} \dots\dots\dots \text{Equation 1}$$

Correlation co-efficient ( $R$ ) = 95.33 %

Where, PPV = 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 predicting vibrations at underground locations of Baroi underground mine. It may be used to compute the maximum explosives weight to be detonated in a delay for distances of concerned in the mine. The regression plots of vibration data recorded at their respective scaled distances is shown in Figure 2.

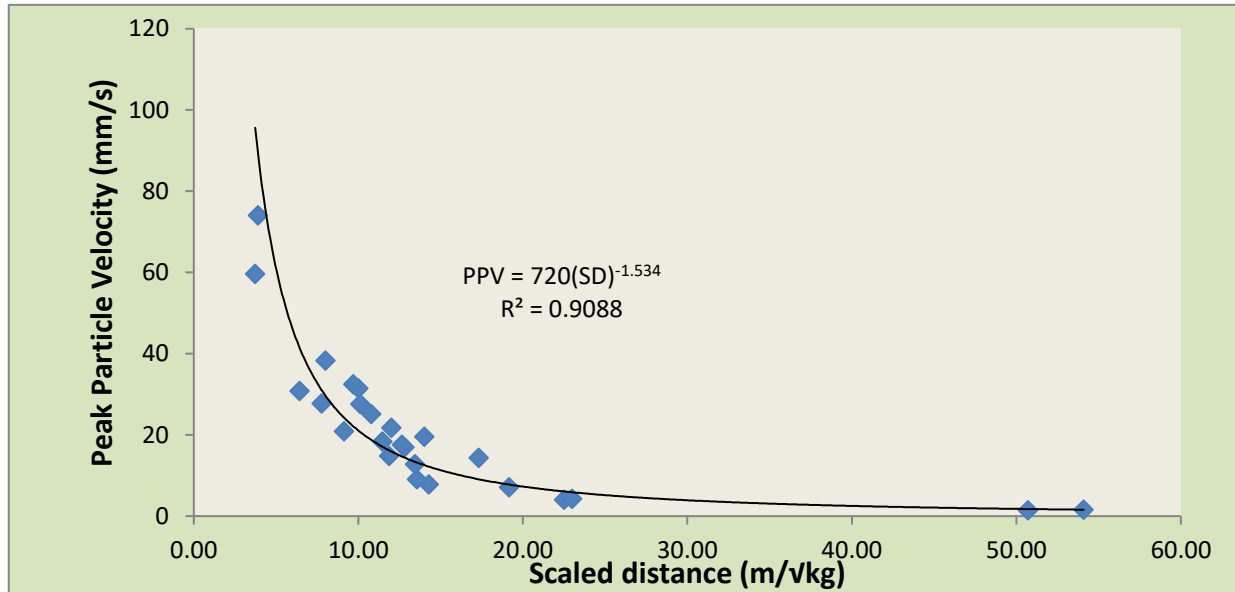


Figure 2. Regression plot of recorded PPV at different underground locations with their respective scaled distances for Baroi underground mine.

### 5.1 Frequency of blast vibration

The frequency of blast induced vibration wave is mainly controlled by geological conditions of transmitting media and meagrely by delay arrangements. There are geological forms and structures that are favourable for formation of low frequency waves. The frequencies of the recorded vibration were more than 22 Hz in all the blasting rounds. The most common recorded frequency ranges between 50 Hz and 150 Hz. The maximum recorded frequency was 248.4 Hz. The dominant peak frequencies recorded at various radial distances are shown in Figure 3.

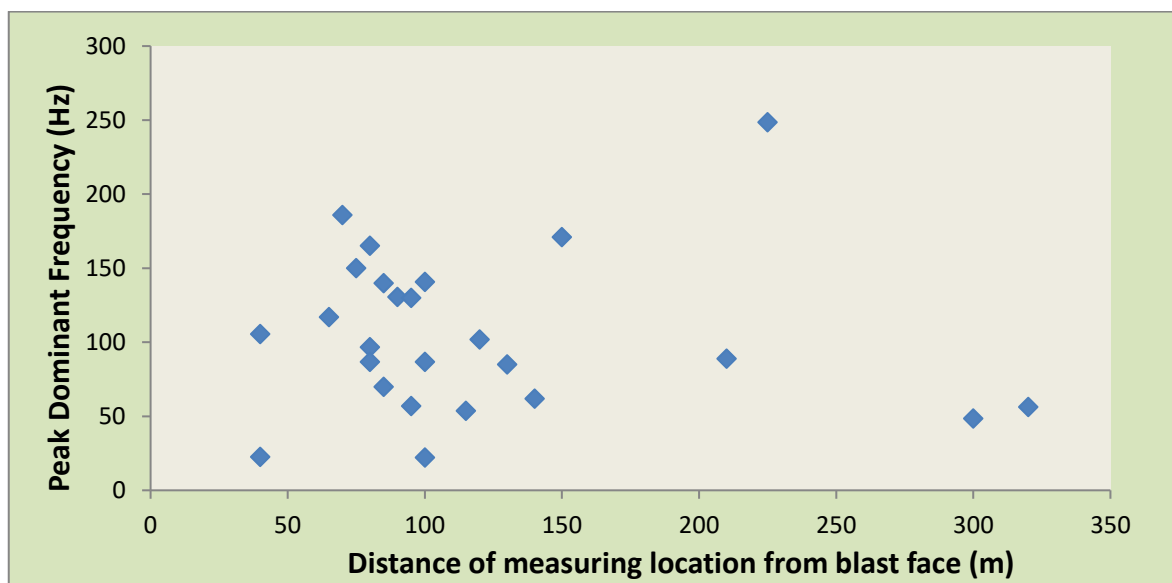


Figure 3. Plot of recorded dominant peak frequency of vibration at various radial distances in Baroi underground mine for blast conducted at different stopes.

## 5.2 Waveform analysis of blast

The analysis of recorded waveform from different blasts has been carried out to know the blast vibration propagation characteristic under the respective charging conditions. Blast wave signature recorded for blast conducted at 430mRL K2 stope on 29.03.2018 is shown in Figure 4. FFT of recorded blast vibration is shown in Figure 5.

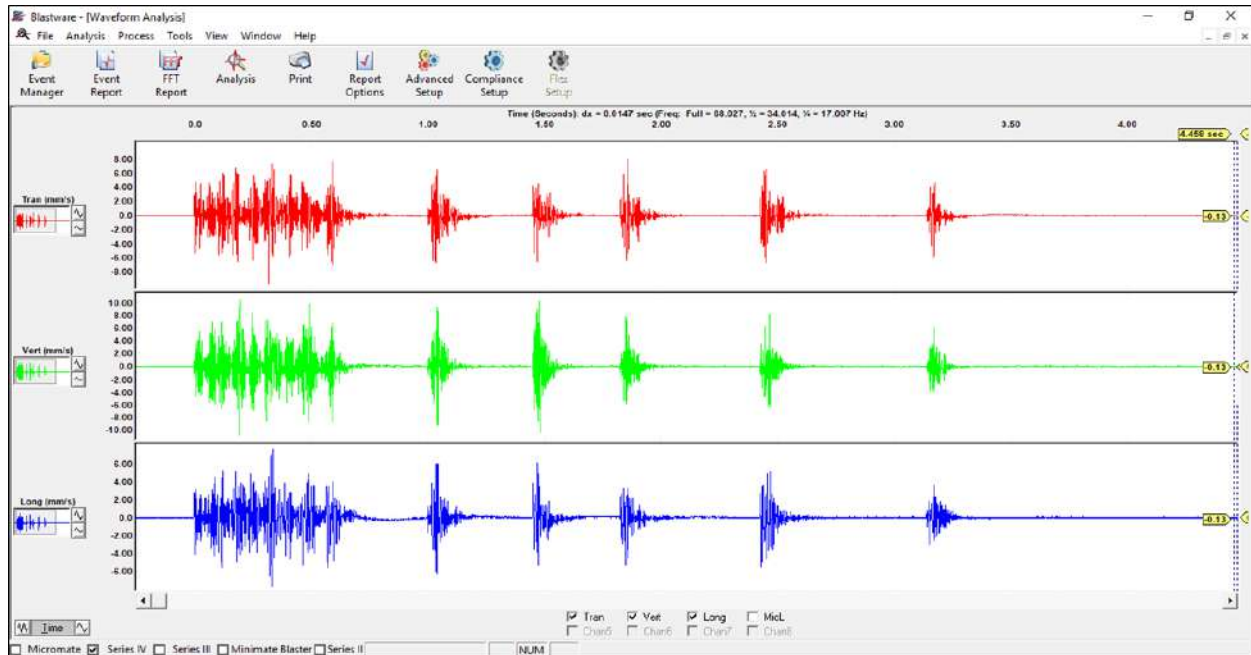


Figure 4. Blast wave signature recorded for production blasts of two rings at 430mRL K2 stope on 29.03.2018.

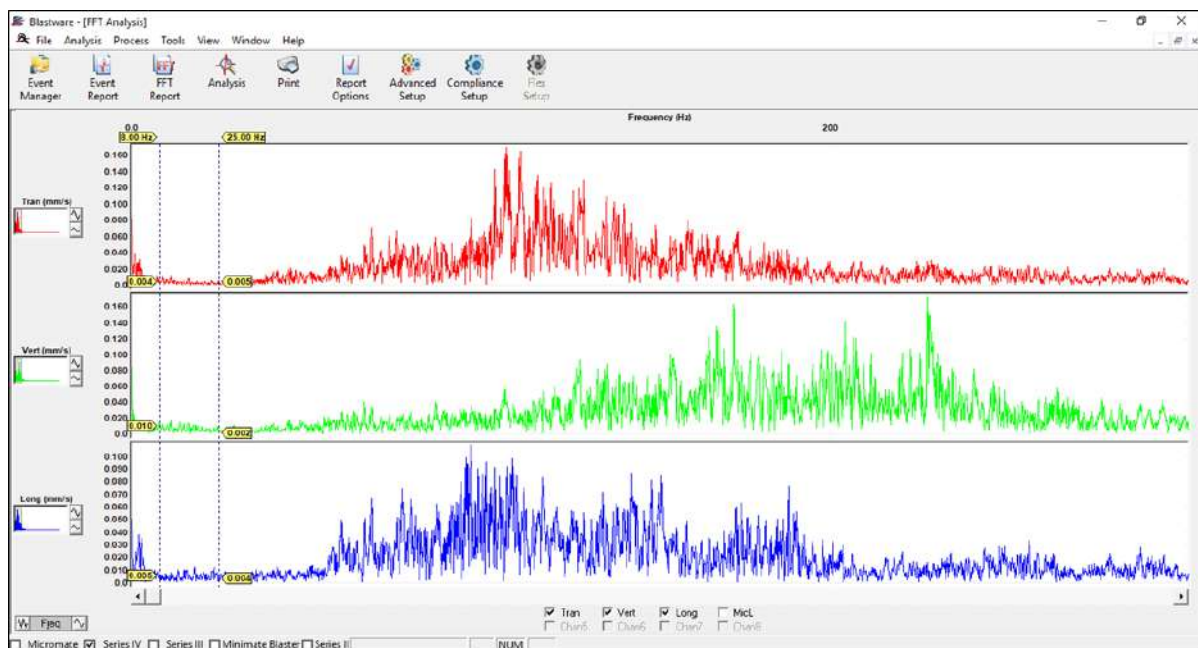


Figure 5. FFT analysis of recorded blast vibration for production blasts of two rings at 430mRL K2 stope on 29.03.2018.

## 6. Existing vibration standard and criteria to prevent damage

Peak particle velocity has been globally used in practice for assessment of blast-induced damage to structures. The degree of damage observed in the belowground openings is influenced by the RMR of roof rock. Thus, the damage criterion for below ground workings is based on RMR. Based on the extensive study conducted by the project proponents [erstwhile Central Mining Research Institute (Currently, CSIR- Central Institute of Mining & Fuel Research), Dhanbad], the DGMS issued an Tech (S&T) Circular no. 06 of 2007 for threshold value of vibration for the safety of roof and pillar in the belowground workings for different RMR. The DGMS standard for the safety of roof and pillar are given in Tables 1 and 2 respectively.

Table 1. Threshold values of vibration generated due to open-pit blasting for the safety of roof in the below ground working for different RMR.

<b>RMR of roof rock</b>	<b>Threshold value of vibration in terms of peak particle velocity [mm/s]</b>
20-30	50
30-40	50-70
40-50	70-100
50-60	100-120
60-80	120

Table 2. Threshold values of vibration generated due to open-pit blasting for the safety of pillars in the below ground workings for different RMR.

<b>RMR of the rock</b>	<b>Threshold value of vibration in terms of peak particle velocity [mm/s]</b>
20-30	20
30-40	20-30
40-50	30-40
50-60	40-50
60-80	50

The damages of surface structures by blast induced vibration are dependent on magnitude and frequency of ground vibration. The resonant frequency of structural vibration and blast vibration lead to cause maximum damage even at lower magnitude. Directorate General of Mines Safety (DGMS) have framed regulation under circular 7, 1997 to define limits of blast vibration near surface structures. The framed regulation has been presented in Table 3.

Table 3. DGMS standard (*Technical Circular Number 7 of 1997*)

Type of structure	Dominant excitation frequency, Hz		
	< 8 Hz	8-25 Hz	> 25 Hz
<b>(A) Buildings/structures not belonging to the owner</b>			
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>(B) Buildings with limited span of life and belonging to owner</b>			
1. Domestic houses/structures	10	15	25
2. Industrial buildings	15	25	50

## 7. Suggested blast design parameters for safety of underground structures

Based on Geotechnical data and geological disturbances at different locations of Baroi underground mine, the RMR of the roof rock lies in the range of 50 to 72. Thus the threshold values of vibration for different RMR of the roof rock viz. 50, 55 &  $\geq 60$  may be taken as 100 mm/s, 110 mm/s & 120 mm/s respectively.

Accordingly, the explosives weight per delay and total explosive charge for a blasting round has been computed for different values of PPV depending on RMR of roof rock and has been presented in Annexure as Table A2 & Table A4 respectively. Values of PPV have also been predicted for different explosive charge weight per delay at various distances. The predicted PPV values for different explosive weight per delay has been presented in Table A3. The predicted level of vibration under different conditions of total explosive charge is given in Table A5. The magnitude of vibration can be reduced by separation of blast holes by longer delay interval. It is suggested to use 40 ms delay between holes and 500 ms as delay between rings for larger blast with increased explosive consumption.

### 7.1 Suggested Blast Design Parameters for Safety of Surface Structures

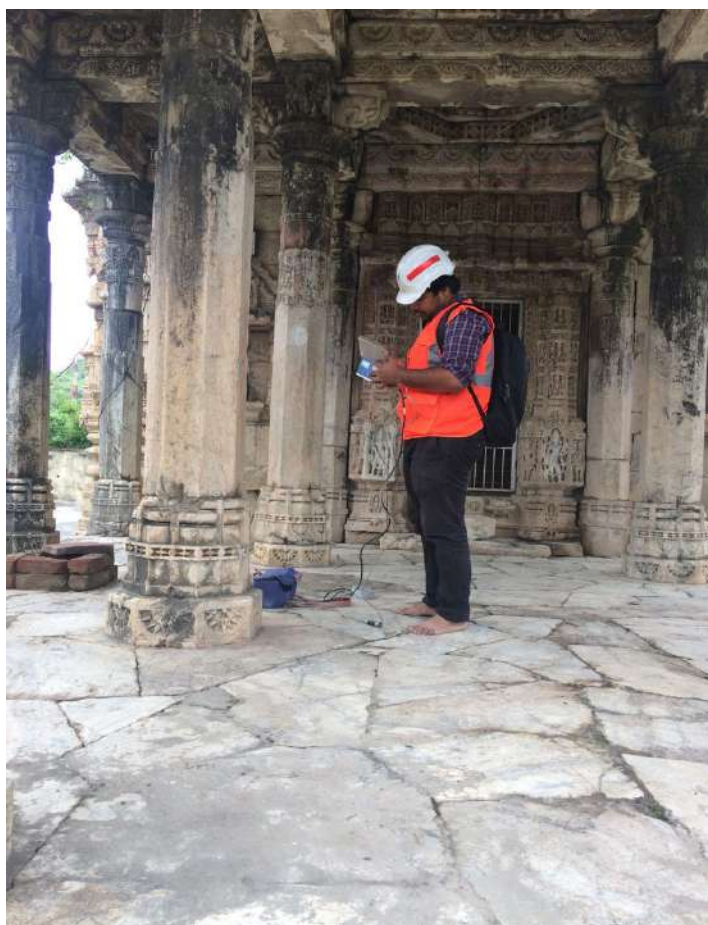
The explosive weight per delay and total explosive charge for safety of surface residential/industrial structures has been computed from site specific predictor equation. The suggested explosive charge weight per delay and total explosive charge for safety of surface structures has been presented in Annexure as Table A6. The mine management is suggested to decide minimum charging parameters (i.e. explosive weight per delay and total explosive charge in a blasting round) for stability of underground structures as well as surface structures.



## 7.2 Monitoring of blast vibration at Jain temple

The mine management of Baroi underground mine requested CSIR-CIMFR for assessment of blast vibration at Jain temple due to blasting at Baroi underground mine. The temple is located at a radial distance of more than 800 m from the existing stopes of Baroi underground mine. Accordingly, CSIR-CIMFR representative visited Baroi mine on 10.09.2018 and monitored blast induced vibration at Jain temple along with associated blasting parameters.

Blast vibration was monitored by CIMFR representative at Jain temple on 10.09.2018. The blast was conducted at 302 mRL K2 B stope of North Baroi mine. Total 36 numbers of blast holes with hole diameter 70 mm and hole depth of 20 m -30 m was charged with ANFO explosive. Total 1620 kg explosive was distributed in the blast holes keeping maximum explosive charge per delay of 60 kg. The charged holes were initiated with electronic detonators (IKON, M/s ORICA) of delay gap in the range of 0 to 1100ms. Blast vibration was monitored at Jain temple at a radial distance of 902 m from blasting face. A view of blast vibration monitoring at Jain temple is shown in Photograph 3. The trigger level of vibration monitoring transducer was set at 0.5 mm/s. The seismograph didn't trigger due to blast, which shows that the vibration level was less than 0.5 mm/s.



Photograph 3. View of Installation of seismograph by CIMFR representative for monitoring blast induced ground vibration at Jain temple on 10.09.2018.

The blast vibration was measured by HZL officials during 10.09.2018 to 22.09.2018 under the guidance of CIMFR scientist. The vibration was monitored in sensitive mode for few blasts keeping trigger level of seismograph as 0.2 mm/s. The only vibration data recorded due to blast during this period was 0.599 mm/s at peak dominant frequency of 64 Hz. The blast was conducted at 373 mRL ring blast face keeping maximum charge per delay of 60 kg. Jain temple was situated at a radial distance of 900 m from this blast. Development face blast and drop raise blast was also conducted during this period keeping maximum explosive charge per delay of 5 kg and 35 kg in respective cases. Seismograph didn't trigger in any blast of development face and drop raise. Details of blast vibration monitored at Jain temple for blast conducted at different locations during September 10-22, 2018 is shown in Table 4.

Table 4. Details of blast vibration recorded at Jain temple due to blast conducted at different locations of Baroi underground mine during 10.09.2018 to 22.09.2018.

Date	Blast location	Record time/blast time	MCPD (Kg)	Radial distance (m)	Trigger level set (mm/s)	measured PVS (mm/s)	Frequency (Hz)	Remarks
10.09.18	K2B 302 mRLRing	3:30 PM	60	902	0.5	< 0.5	N/A	Seismograph not triggered
10.09.18	K2B 302 mRLRing	3:30 PM	60	902	0.5	< 0.5	N/A	Seismograph not triggered
11.09.18	288 mRL OD face	3:27 PM	5	902	0.2	< 0.2	N/A	Seismograph not triggered
11.09.18	289 mRL OD face	3:32 PM	5	902	0.2	< 0.2	N/A	Seismograph not triggered
11.09.18	290 mRL OD face	3:36 PM	5	902	0.2	< 0.2	N/A	Seismograph not triggered
12.09.18	K3 370 mRL drop raise	4:30 PM	35	900	0.5	< 0.5	N/A	Seismograph not triggered
13.09.18	288 mRL sump face	3:30 PM	5	902	0.5	< 0.5	N/A	Seismograph not triggered
14.09.18	K3 370 mRL drop raise	3:30 PM	35	900	0.5	< 0.5	N/A	Seismograph not triggered
15.09.18	288 mRL sump face	3:30 PM	5	900	0.5	< 0.5	N/A	Seismograph not triggered
16.09.18	288 mRL sump face	3:30 PM	5	900	0.5	< 0.5	N/A	Seismograph not triggered
17.09.18	302 mRL ring blast	3:30 PM	45	900	0.2	< 0.2	N/A	Seismograph not triggered
18.09.18	288 mRL sump face	3:30 PM	5	900	0.5	< 0.5	N/A	Seismograph not triggered
20.09.18	302 mRL ring blast	3:30 PM	45	900	0.5	< 0.5	N/A	Seismograph not triggered
21.09.18	390 HD face blast	3:30 PM	5	900	0.5	< 0.5	N/A	Seismograph not triggered
22.09.18	337 mRL ring blast	4:10 PM	60	900	0.2	0.599	64 Hz	Seismograph triggered

### 7.3 Safety precautions while blasting

Following safety precautions need to be taken by Mine Management while planning and implementation of a blast:

- ✓ Charge weight per delay and total explosive charge in a blasting round should be followed considering the minimisation of blast vibration within stipulated standards for safety of nearfield underground structures, far field underground structures as well as surface residential/industrial structures.
- ✓ Hole deviation measurement should be done to ensure proper toe burden as well as collapsing of two holes. As the collapsing of holes may lead to increased charge weight per delay.
- ✓ Special precautions at permanent underground structures viz. shaft/decline, shaft pillars, crown pillar etc. should be taken to ensure proper support after blasting. The in-situ stresses are redistributed after blasting, which may lead to requirement of additional supports to regain rock strength.
- ✓ Loose rocks should be dressed properly before drilling/charging behind blasted face.
- ✓ Stope should be scanned after blasting to get actual view of void generated after blasting. Precautions should be taken while charging where additional cavity in toe of down-hole face have been observed in scan.

## 8 Rock fragmentation analyses

Fragmentation analysis of the blasted muck pile has been performed using Digital Image Analysis Technique. Photograph of fragmented rock has been analyzed by WipFrag software. The fragmentation resulted from a blast conducted at 246 mRL N2 western drive is shown in Photograph 4. This photograph was analyzed and the output of the analyses has been recorded in the forms of number of exposed fragmented blocks, maximum, minimum and mean size of the fragmented blocks and sieve analysis as per the requirement i.e. at different percentile size viz. D<sub>10</sub>, D<sub>25</sub>, D<sub>50</sub>, D<sub>75</sub> & D<sub>90</sub>. (Percentile sizes: for example, D<sub>10</sub> is the ten-percentile, the value for which 10% by weight of the sample is finer and 90% coarser). In terms of sieving, D<sub>10</sub> is the size of sieve opening through which 10% by weight of the sample would pass. The details of Netting and contouring of block sizes and fragment size analysis for the blast is depicted in Figures 6 and Figure 7. The analyses result shows that the size of fragmented rock varies between 2.798 mm and 435.560 mm. The mean size of the blasted rock is 72.485 mm. The maximum rock fragments of 150 mm size are present in blasted muck pile. The sieving analysis shows that 90% of the rock sample passes through sieve opening of size 360.947 mm.



Photograph 4. Fragmentation resulted at 246 mRL N2 western drive.

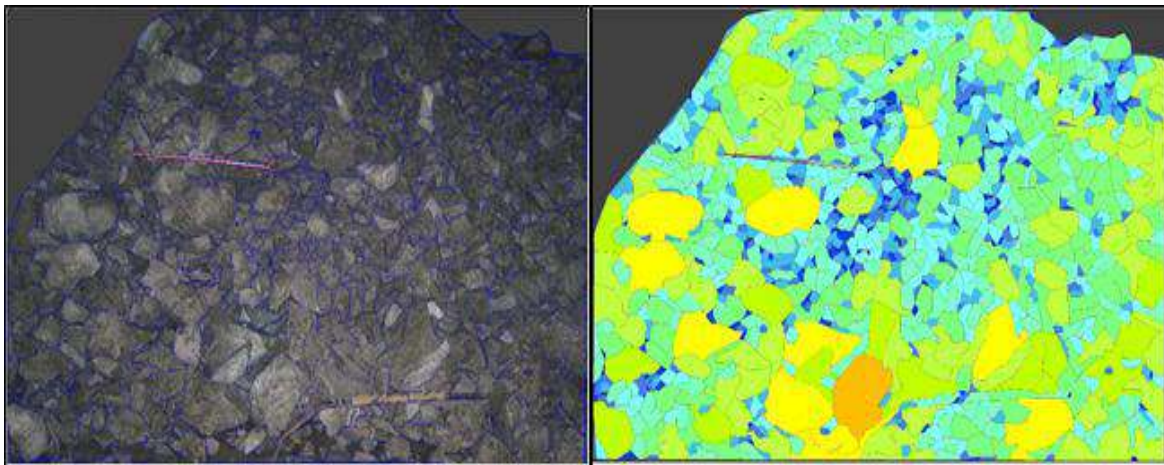


Figure 6. Netting and counterimg of block sizes of fragments at 246 mRL N2 western drive.

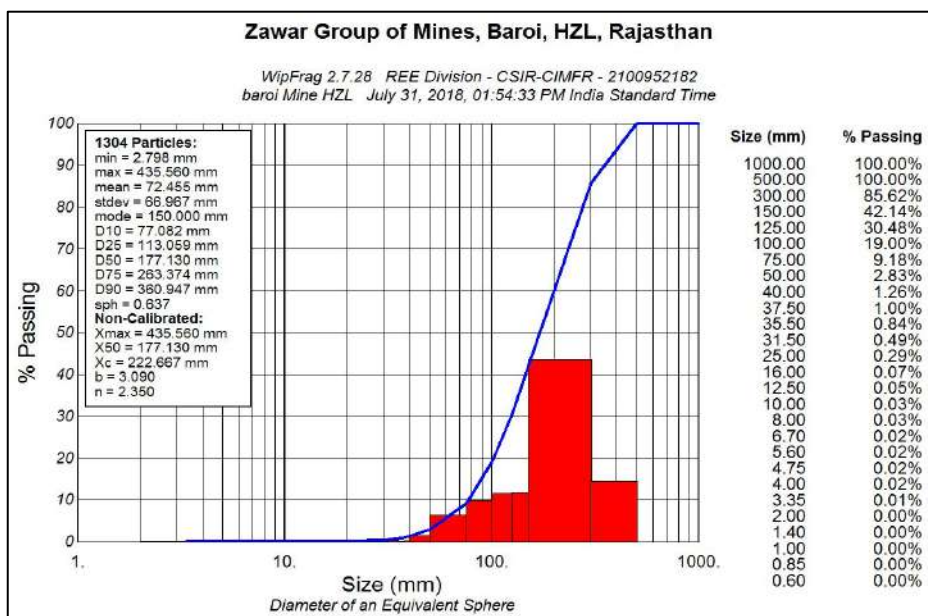


Figure 7. Histogram and cumulative size curve view of fragmented block sizes at 246 mRL N2 western drive.

## 9. Blast Optimisation for development faces

Initially, the existing blasts design patterns for development face has been reviewed. The blast design patterns used for development face blasting at Baroi mine is shown in Figure 8 and Figure 9. The initial analysis reveals that the simultaneous detonation of four holes surrounded over 1st centre hole of the cut hole will lead to better results in terms of fragmentation and pull. Accordingly, the suggested blast design pattern for development faces of Baroi mine is shown in Figure 10.

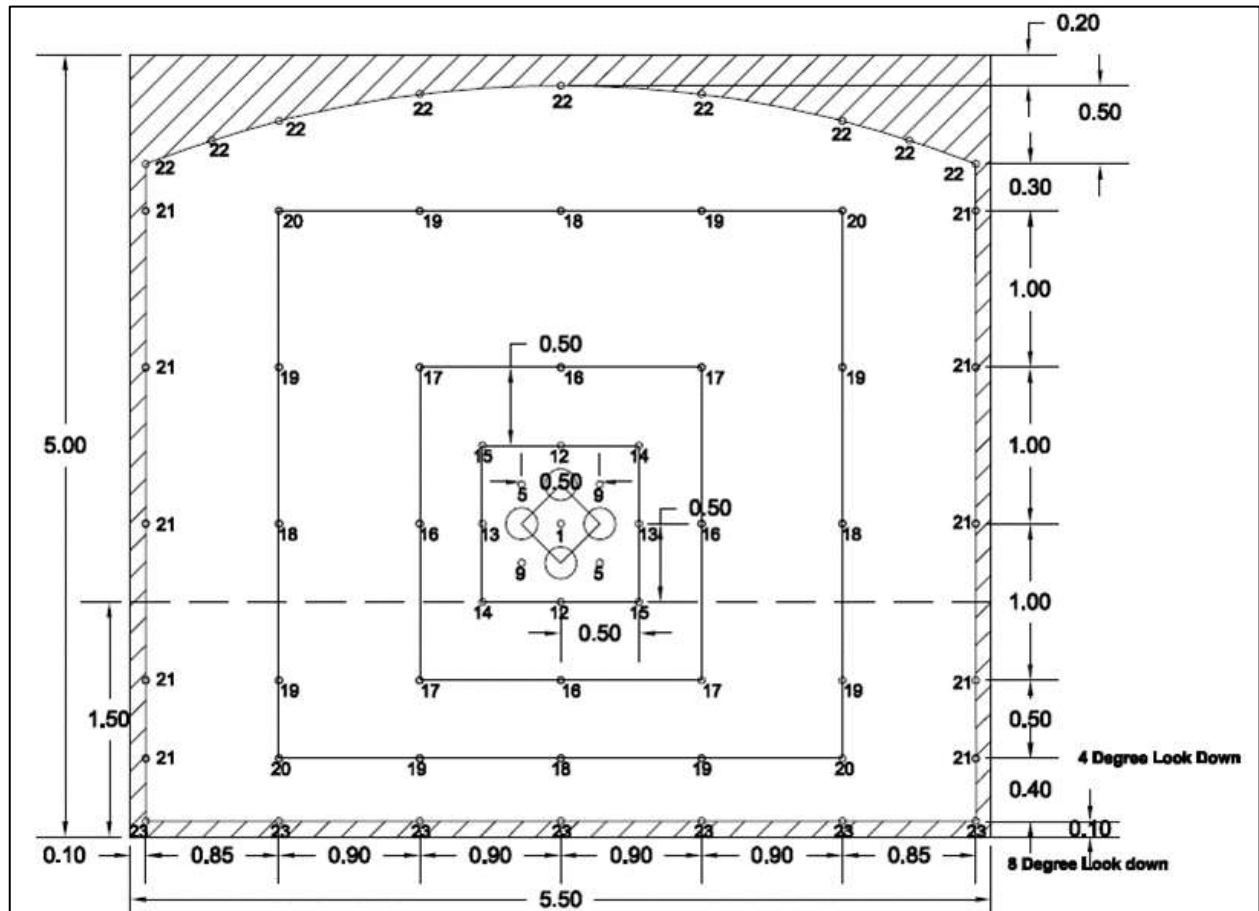


Figure 8. Existing blast design pattern of 5.5m x 5.0 m used at Baroi underground mine, HZL.



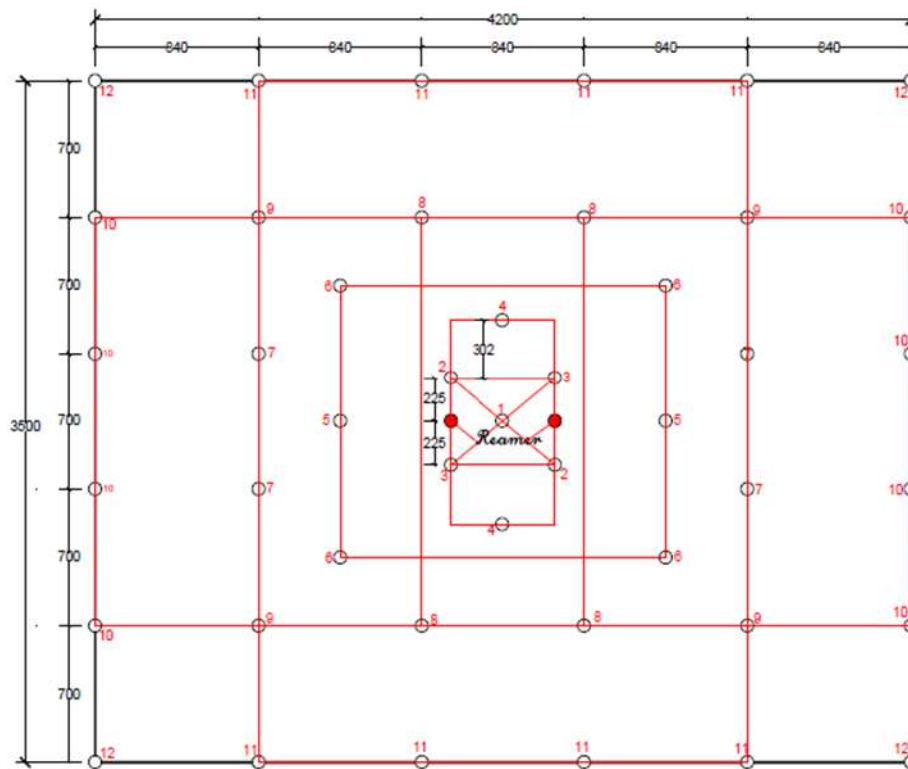


Figure 9. Existing blast design pattern of 4.2 m  $\times$  3.5 m used at Baroi underground mine, HZL.

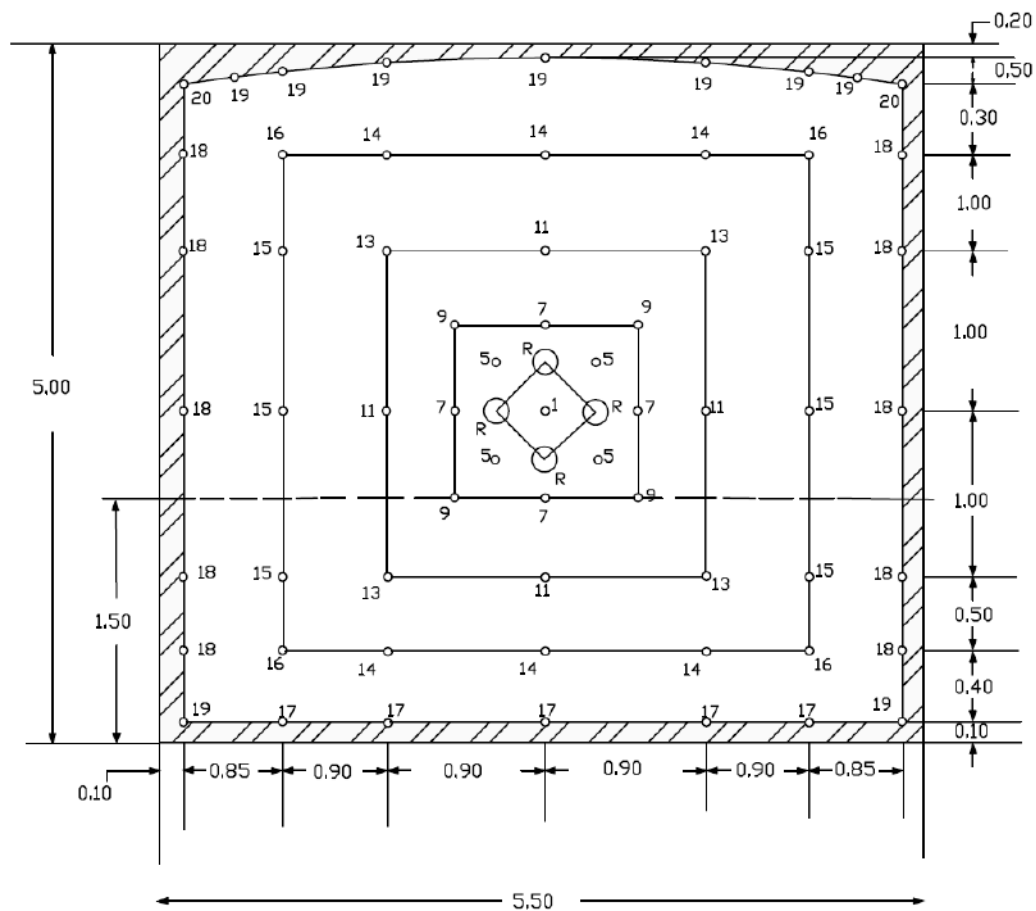


Figure 10. Recommended blast delay pattern for development faces of Baroi underground mine, HZL.

10. Review of ring blasting pattern

The delay sequence for production blasts at Baroi underground mine has been suggested. The suggestion has been made to keep the delay timing of two holes after firing of first three holes in a ring as same. The suggested delay pattern for two rings is shown in Figure 11. The suggested pattern will give the blast designer a freedom to choose higher delay between the initial holes. However, the vibration level will also be controlled as the blast holes firing at same delay are distant and in opposite directions.

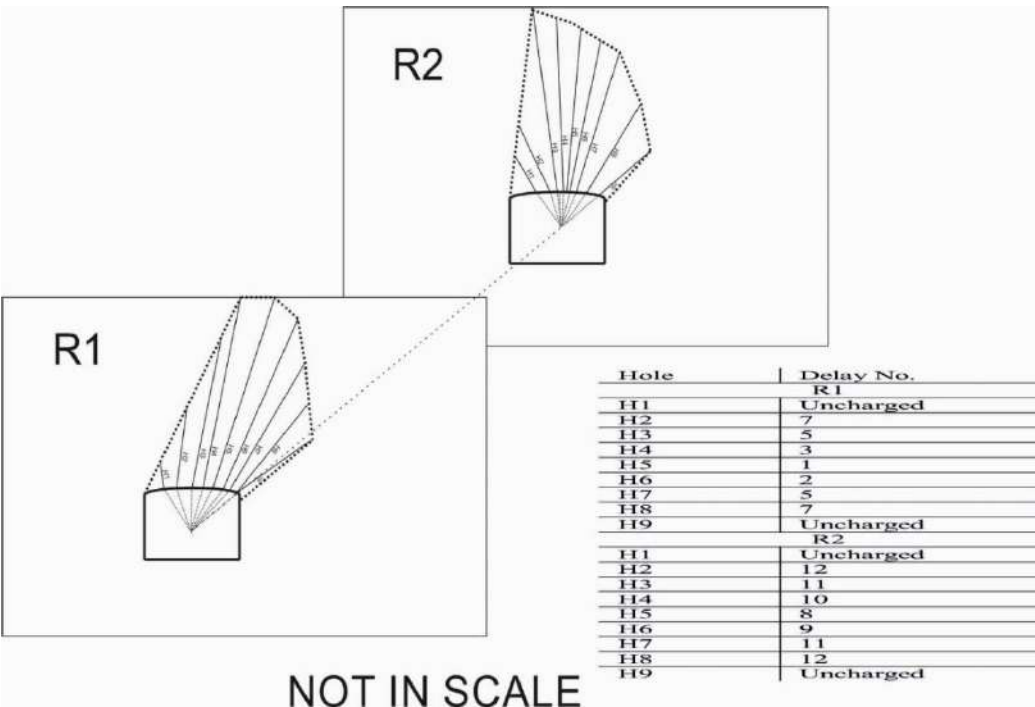


Figure 11. Suggested delay sequence for production blasting at Baroi underground mine.

10.1 Drilling and blasting methodology for extraction of narrow vein ore deposits

The possible methodology for excavation of narrow vein ore deposits has been investigated for Baroi underground mine. The literature search has been done to explore the methodology adopted under global scenario for excavation of such ore deposits. The possible ways of excavation of narrow vein deposits has been discussed for longhole stoping method by Stewart et al. (2008). Three different methods have been suggested in this paper consisting of – staggered/zig-zag, dice 5 and inline method. The inline excavation method would be a best suit for the geo-mining condition of Baroi underground mine. The charging pattern and delay - sequence for excavation of such ore deposits is shown in Figure 12 and Figure 13 respectively. The initial blast design has been suggested based on the outcomes of our discussion, which are as follows:

- (1) The blasthole diameter of 64 mm -76 mm should be used for excavation of such deposits.
- (2) Single line of blast holes should be drilled along the strike direction of the orebody for excavation of such ore deposits.
- (3) Toe burden from free face and between two rings should be kept between 1.5 m- 2.5 m depending on the rock mass properties of the stope to be excavated.
- (4) Blast holes should be placed within the orebody and parallel to the orebody. If the width of the orebody is sufficient, the blast hole should be shifted towards footwall.
- (5) First hole should be blasted along the slot raise and the consecutive movement of blast holes will take place along the strike of the orebody.
- (6) Each blast hole should be divided into three different decks, suitable plugging arrangement for individual deck will be done. In a particular blast hole, the bottom deck of the hole will be blasted first and top deck at the last. The initiation of bottom deck of the second hole will start after completion of blast of middle deck and before blast of top deck of first hole. The initiation of the blast holes should be carried out using Electronic/Nonel detonators with suitable delay timing.
- (7) Differential charging of blast holes should be done to utilize the combined impact of explosive energy on rock breakage.
- (8) Each explosive deck should be separated by delay interval of 20-80 ms.
- (9) The maximum charge weight per delay should be minimized to reduce the nearfield vibration in the contact of the orebody.
- (10) The blast holes should preferable be charged with low density (ANFO) explosives.
- (11) Initially, blast for maximum ten holes in a blasting round should be planned.

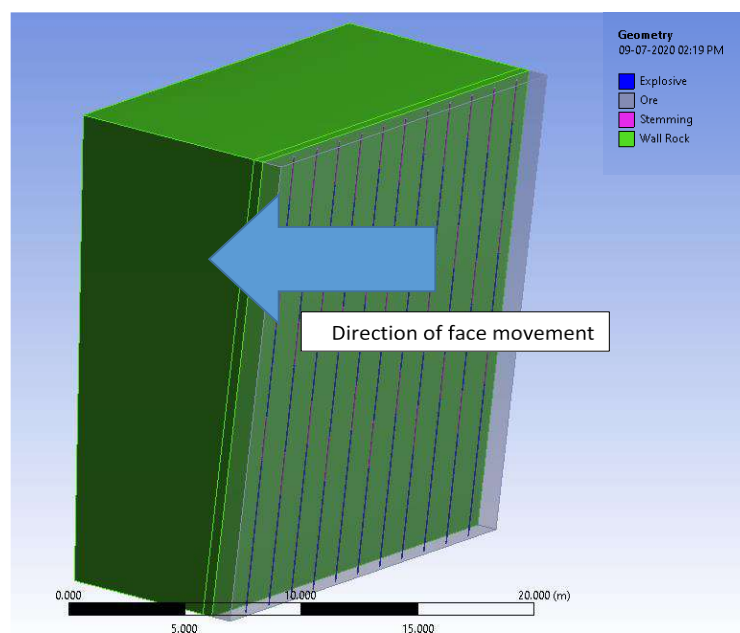


Figure 12. Position of blast holes for excavation of narrow vein deposits.

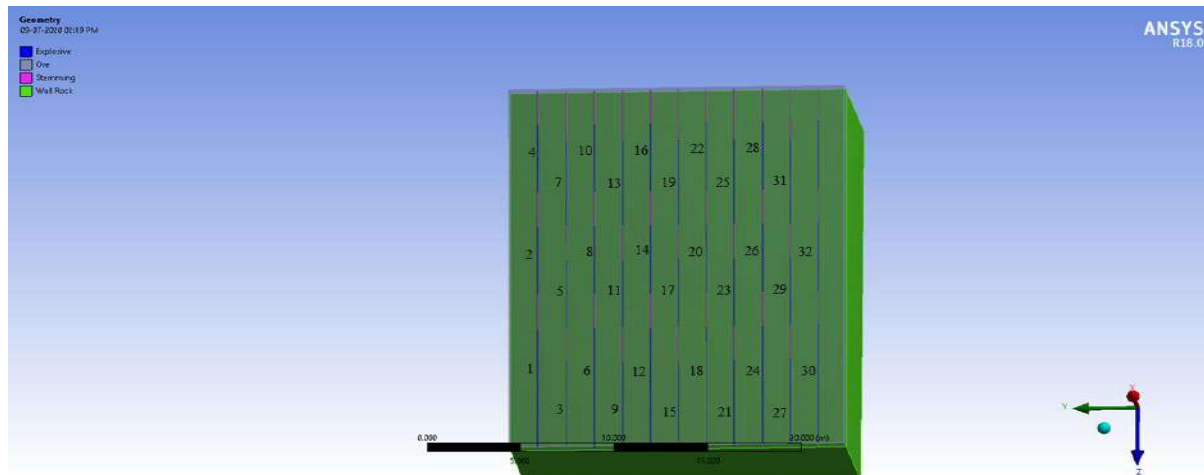


Figure 13. Arrangement for differential charging of blast holes.

## 11. Monitoring of 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.

$$P_d = \frac{1}{2} \rho_e (VOD)^2 10^{-6}$$

Where,

- $P_d$  = Detonation pressure (MPa)
- $\rho_e$  = Density of explosive ( $\text{kg/m}^3$ )
- VOD = Velocity of detonation (m/s)

Uniform VOD is essentially required throughout the blast holes in harder formations in order to produce sufficient detonation pressure to the blast hole walls.

Velocity of detonation (VOD) of explosives which are being used in underground blasting such as, Powergel -801 explosives (390 gm of 40 mm dia) of M/s IEL-Orica were recorded on 27.03.2018 and 17.07.2018. The recorded VOD of the explosive was 4670 m/s and 4798 m/s. The trace of recorded in-the-hole VOD of Powergel-801 explosives (390 gm of 40 mm dia.) is presented in Figure 14 and Figure 15.

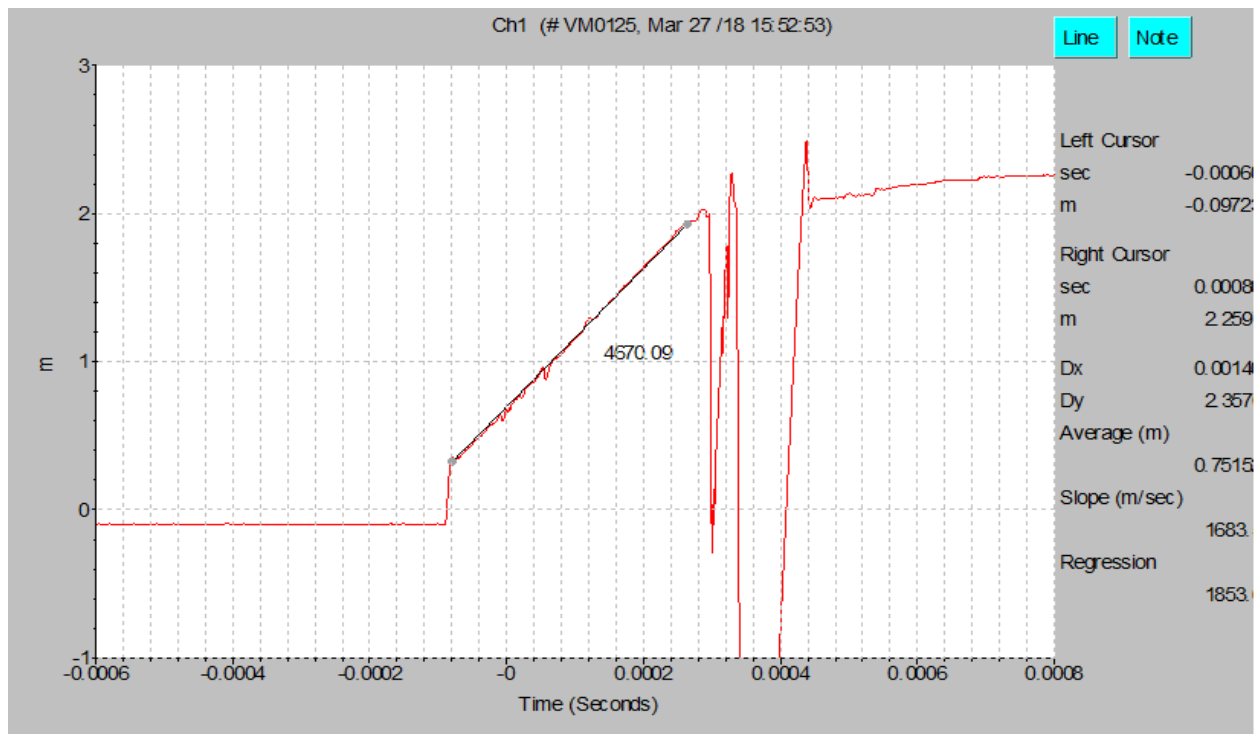


Figure 14. In-the-hole VOD trace of Powergel-801 (390 gm of 40 mm dia.) cartridge explosives of M/s IEL, Orica recorded on 27.03.2018 at Baroi Mine.

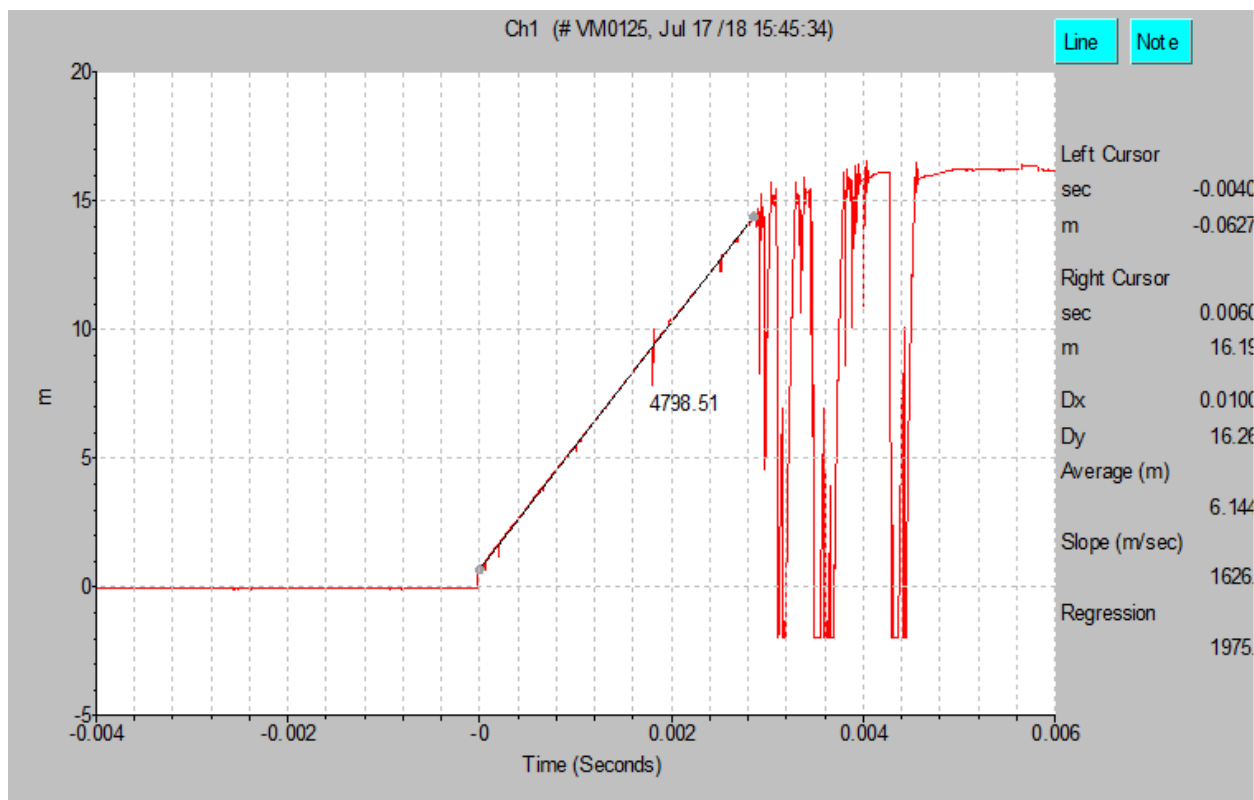


Figure 15. In-the-hole VOD trace of Powergel-801 (390 gm of 40 mm dia.) cartridge explosives of M/s IEL, Orica recorded at 220mRL South on 17.07.2018.



## 12. Quality test of delay detonator

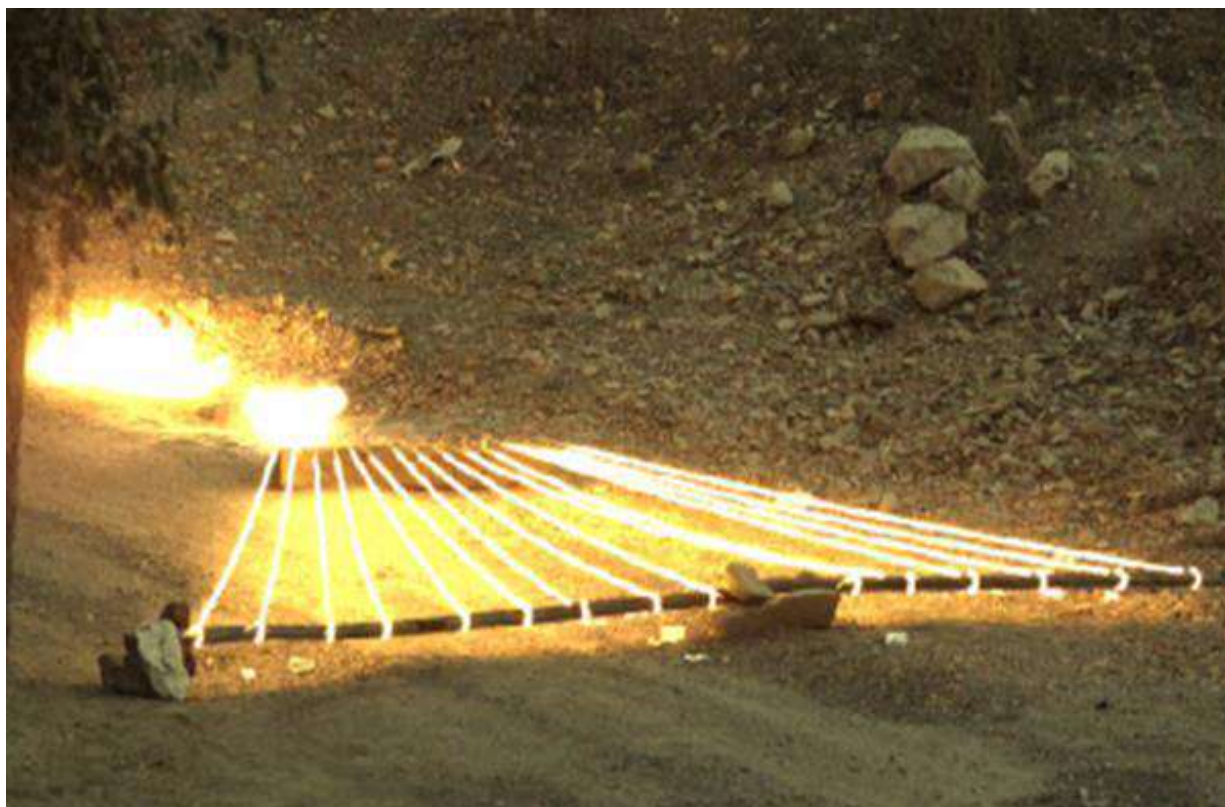
### 12.1 *Quality test of NONEL delay detonators during 1<sup>st</sup> visit*

The qualities of Nonel delay detonators of M/s Indian Explosive Private Limited (IEPL), Orica used to initiate the explosives at Production as well as development face of the mine, has been recorded with the help of Blaster Ranger II, High Speed Color Video camera. Tests were performed for 3 sets of Nonel delay detonators from 1 to 20 numbers used at production face as well as 3 sets of alternate delay detonators i.e 1,3,5,7,9,11 and 13-20 numbers, used at development face. View of NONEL delay detonators connection arrangements for delay scattering test is depicted in Photograph 5. After analysis of the video data, it was found that the sequence of detonations is in order for all the delay detonator but high scattering upto (-)75% is observed for delay detonator used at production face and up to (-) 38% for development face detonators. Photograph 6 depicts the analysis of actual firing time from video data for delay numbers 1 to 5 with the help of ProAnalyst software. The observed firing sequence of the NONEL detonators for production face and development face are presented in Table 5 and Table 6 respectively. The graphical presentation of the design firing vs actual firing time of Nonel delay detonators (1 to 20 delay numbers) used at production faces and Nonel delay detonator (1,3,5,7,9,11 and 13-20 numbers) used at development face of Zawar group of mine is depicted in Figure 16 and Figure 17 respectively.

The scattering percentage should be restricted to maximum 10% up to 10 no. delay and thereafter it should be within 5 %.



Photograph 5. View of NONEL delay detonators (3 sets of delay number 1-5) connection for delay detonator scattering test.



Photograph 6. Analysis of actual firing time from video data with the help of Pro-Analyst software for 1 to 5 numbers delay detonators.

Table 5. Analyzed firing time of the NONEL delay detonators 1 to 20 numbers (3 sets) used at Production blast face of Zawar group of mines tested during 1<sup>st</sup> visit.

Delay No.	Design delay timing	Actual Firing timing	Scattering	% of scattering
	(ms)	(ms)	(ms)	
1	17	24	7	41.2
1	17	24	7	41.2
1	17	28	11	64.7
2	65	56	-9	-13.8
2	65	56	-9	-13.8
2	65	60	-5	-7.7
3	100	72	-28	-28
3	100	72	-28	-28
3	100	76	-24	-24
4	150	100	-50	-33.3
4	150	100	-50	-33.3
4	150	100	-50	-33.3
5	200	120	-80	-40
5	200	124	-76	-38
5	200	108	-92	-46
6	250	148	-102	-40.8
6	250	148	-102	-40.8
6	250	148	-102	-40.8

7	300	172	-128	-42.7
7	300	172	-128	-42.7
7	300	168	-132	-44
8	350	196	-154	-44
8	350	208	-142	-40.6
8	350	208	-142	-40.6
9	400	244	-156	-39
9	400	248	-152	-38
9	400	252	-148	-37
10	600	304	-296	-49.3
10	600	304	-296	-49.3
10	600	304	-296	-49.3
11	800	348	-452	-56.5
11	800	336	-464	-58
11	800	328	-472	-59
12	1000	408	-592	-59
12	1000	400	-600	-59
12	1000	404	-596	60
13	1400	472	-928	-66.3
13	1400	468	-932	-66.6
13	1400	464	-936	-66.9
14	1800	508	-1292	-71.8
14	1800	504	-1296	-72
14	1800	488	-1312	-72.9
15	2400	584	-1816	-75.7
15	2400	584	-1816	-75.7
15	2400	600	-1800	-75
16	3000	988	-2012	-67.1
16	3000	1008	-1992	-66.4
16	3000	1012	-1988	-66.3
17	3600	1444	-2156	-59.9
17	3600	1448	-2152	-59.8
17	3600	1472	-2128	-59.1
18	4200	1848	-2352	-56
18	4200	1792	-2408	-57.3
18	4200	1788	-2412	-57.4
19	4800	2432	-2368	-49.3
19	4800	2456	-2344	-48.8
19	4800	2456	-2344	-48.8
20	5400	3264	-2136	-39.6
20	5400	3196	-2204	-40.8
20	5400	3176	-2224	-41.2

Table 6. Analyzed firing time of the NONEL delay detonators 1,3,5,7,9,11 and 13 to 20 numbers (3 sets) used at development blast face at Zawar group of mines tested during 1<sup>st</sup> visit.

Delay no	delay timing	Actual firing time	Scattering	% of scattering
	(ms)	(ms)	(ms)	
1(5m)	17	24	7	41.18
1(5m)	17	24	7	41.18
1(5m)	17	24	7	41.18
3(5m)	100	92	-8	-8
3(5m)	100	100	0	0
3(5m)	100	100	0	0
5(5m)	200	212	12	6
5(5m)	200	204	4	2
5(5m)	200	208	8	4
7(5m)	300	304	4	1.33
7(5m)	300	288	-12	-4
7(5m)	300	304	4	1.33
9(5m)	400	408	8	2
9(5m)	400	400	0	0
9(5m)	400	404	4	1
11(5m)	800	496	-304	-38
11(5m)	800	492	-308	-38.5
11(5m)	800	496	-304	-38
13(5m)	1400	976	-424	-30.29
13(5m)	1400	964	-436	-31.14
13(5m)	1400	980	-420	-30.29
14(5m)	1800	1432	-368	-20.44
14(5m)	1800	1428	-372	-20.67
14(5m)	1800	1416	-384	-21.33
15(5m)	2400	1804	-596	-24.83
15(5m)	2400	1788	-612	-25.5
15(5m)	2400	1824	-576	-24
16(5m)	3000	2304	-696	-23.2
16(5m)	3000	2288	-712	-23.73
16(5m)	3000	2336	-664	-22.13
17(5m)	3600	2968	-632	-17.56
17(5m)	3600	2880	-720	-20
17(5m)	3600	3032	-568	-15.78
18(5m)	4200	3660	-540	-12.86
18(5m)	4200	3728	-472	-11.24
18(5m)	4200	3668	-532	-12.67
19(5m)	4800	4556	-244	-5.08
19(5m)	4800	4564	-236	-4.92
19(5m)	4800	4568	-232	-4.83
20(5m)	5400	5332	-68	-1.26
20(5m)	5400	5300	-100	-1.85
20(5m)	5400	5404	4	0.07

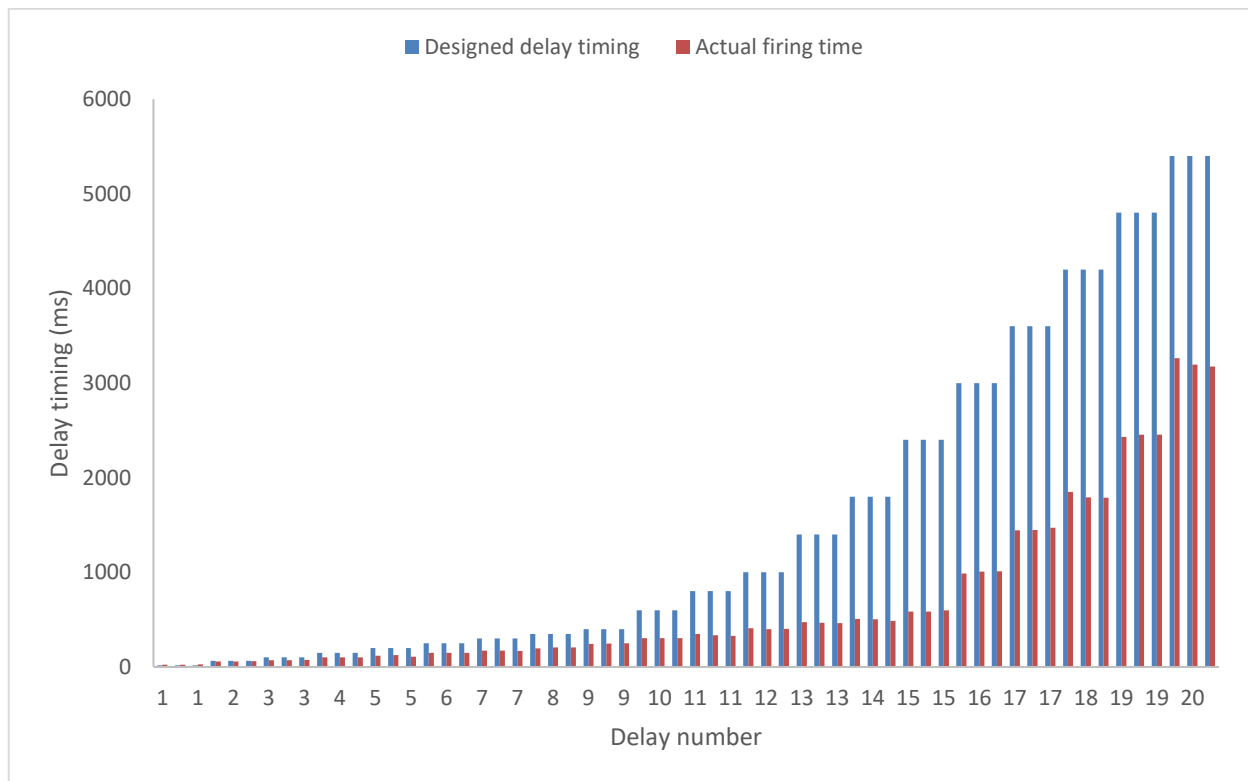


Figure 16. Graphical presentation of the design firing vs actual firing time of Nonel delay detonators (1 to 20 numbers) used at Production blast face at Zawar group of mines tested during 1<sup>st</sup> visit.

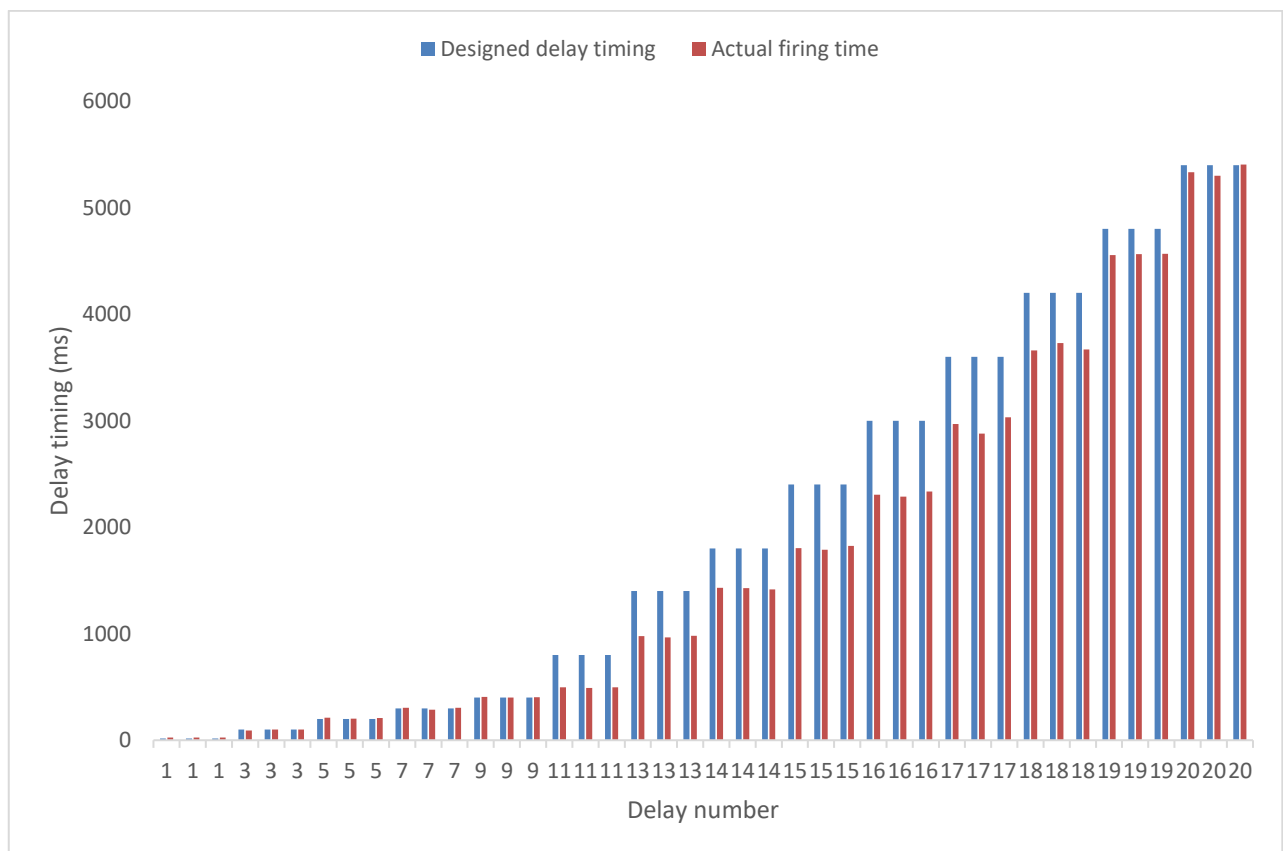


Figure 17. Graphical presentation of the design firing vs actual firing time of Nonel delay detonators used at development blast face at Zawar group of mines tested during 1<sup>st</sup> visit.



## 12.2 Quality test of NONEL delay detonators during 6<sup>th</sup> visit

The qualities of Nonel delay detonators of M/s Indian Explosive Private Limited (IEPL), Orica used to initiate the explosives at Production as well as development face of the mine, were again tested during 6<sup>th</sup> visit to the mine. The results of the scattering test for NONEL delay detonators used at production and development faces of the mine is shown in Table 7 and Table 8 respectively. The graphical representation of the scattering results is shown in Figure 18 and Figure 19. The analysis of the scattering test reveals that the maximum scattering in NONEL delay detonators used at production blast faces is 9.3 %. The maximum scattering in the NONEL delay detonators used at development blast faces is 12 %. The result of scattering is acceptable.

Table 7. Analyzed firing time of the NONEL delay detonators used at production blast face of Zawar group of mines tested during 6<sup>th</sup> visit.

Delay No.	Defined Delay time	Recorded delay time	Scattering	% scattering
1	25	26	1	4.0
1	25	24	-1	-4.0
1	25	24	-1	-4.0
2	50	46	-4	-8.0
2	50	46	-4	-8.0
2	50	46	-4	-8.0
3	75	80	5	6.7
3	75	76	1	1.3
3	75	82	7	9.3
4	100	94	-6	-6.0
4	100	92	-8	-8.0
4	100	92	-8	-8.0
5	125	132	7	5.6
5	125	128	3	2.4
5	125	130	5	4.0
6	150	152	2	1.3
6	150	148	-2	-1.3
6	150	150	0	0.0
7	175	178	3	1.7
7	175	178	3	1.7
7	175	174	-1	-0.6
8	200	198	-2	-1.0
8	200	200	0	0.0
8	200	194	-6	-3.0
9	250	252	2	0.8
9	250	254	4	1.6
9	250	252	2	0.8
10	300	272	-28	-9.3
10	300	272	-28	-9.3
10	300	278	-22	-7.3
11	350	356	6	1.7
11	350	356	6	1.7

11	350	364	14	4.0
12	400	382	-18	-4.5
12	400	388	-12	-3.0
12	400	410	10	2.5
13	450	452	2	0.4
13	450	460	10	2.2
13	450	440	-10	-2.2
14	500	476	-24	-4.8
14	500	486	-14	-2.8
14	500	484	-16	-3.2
15	600	634	34	5.7
15	600	594	-6	-1.0
15	600	630	30	5.0
16	1000	1024	24	2.4
16	1000	1008	8	0.8
16	1000	1008	8	0.8
17	1400	1396	-4	-0.3
17	1400	1412	12	0.9
17	1400	1412	12	0.9
18	1800	1844	44	2.4
18	1800	1892	92	5.1
18	1800	1860	60	3.3
19	2400	2376	-24	-1.0
19	2400	2384	-16	-0.7
19	2400	2328	-72	-3.0
20	3000	2920	-80	-2.7
20	3000	2972	-28	-0.9
20	3000	2948	-52	-1.7

Table 8. Analyzed firing time of the NONEL delay detonators used at development blast face of Zawar group of mines tested during 6<sup>th</sup> visit.

Delay No.	Designed delay timing (ms)	Actual firing time (ms)	Scattering (ms)	% of scattering
1	25	26	1	4.0
1	25	28	3	12.0
1	25	26	1	4.0
3	100	100	0	0.0
3	100	96	-4	-4.0
3	100	100	0	0.0
5	200	198	-2	-1.0
5	200	204	4	2.0
5	200	200	0	0.0
7	300	298	-2	-0.7
7	300	296	-4	-1.3
7	300	298	-2	-0.7
9	400	372	-28	-7.0
9	400	376	-24	-6.0

9	400	378	-22	-5.5
11	500	502	2	0.4
11	500	496	-4	-0.8
11	500	500	0	0.0
13	1000	968	-32	-3.2
13	1000	976	-24	-2.4
13	1000	992	-8	-0.8
14	1400	1364	-36	-2.6
14	1400	1350	-50	-3.6
14	1400	1346	-54	-3.9
15	1800	1752	-48	-2.7
15	1800	1752	-48	-2.7
15	1800	1766	-34	-1.9
16	2400	2368	-32	-1.3
16	2400	2430	30	1.3
16	2400	2356	-44	-1.8
17	3000	2996	-4	-0.1
17	3000	2940	-60	-2.0
17	3000	2972	-28	-0.9
18	3800	3776	-24	-0.6
18	3800	3740	-60	-1.6
18	3800	3880	80	2.1
19	4600	4492	-108	-2.3
19	4600	4584	-16	-0.3
19	4600	4636	36	0.8
20	5500	5296	-204	-3.7
20	5500	5252	-248	-4.5
20	5500	5328	-172	-3.1

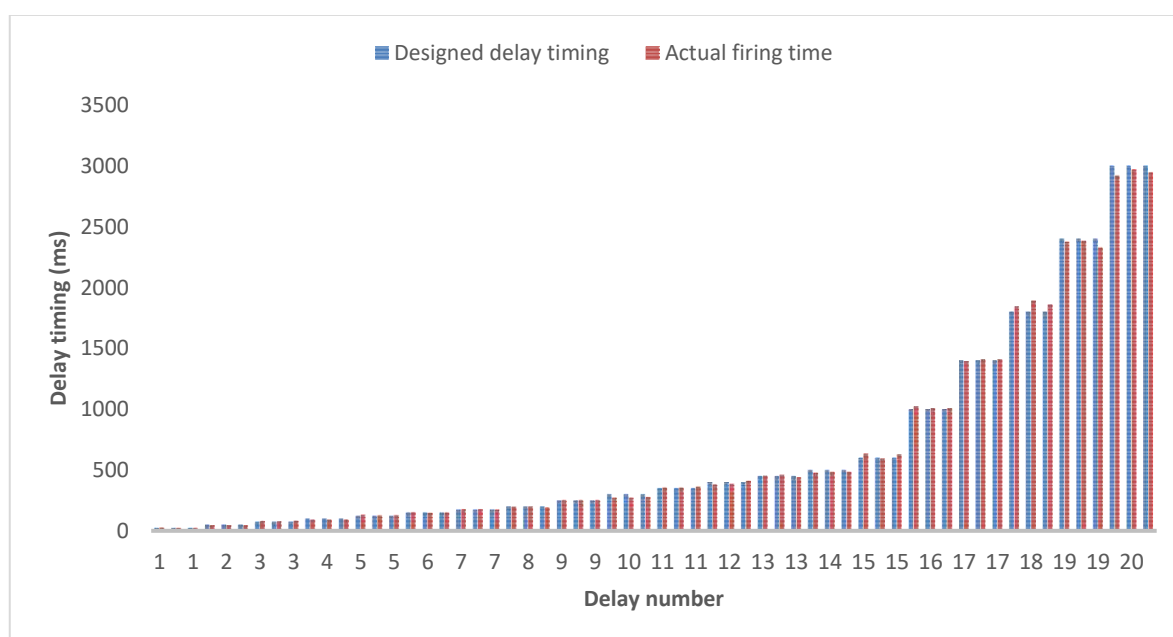


Figure 18. Graphical presentation of the design firing vs actual firing time of Nonel delay detonators used at production blast face of Zawar group of mines tested during 6<sup>th</sup> visit.

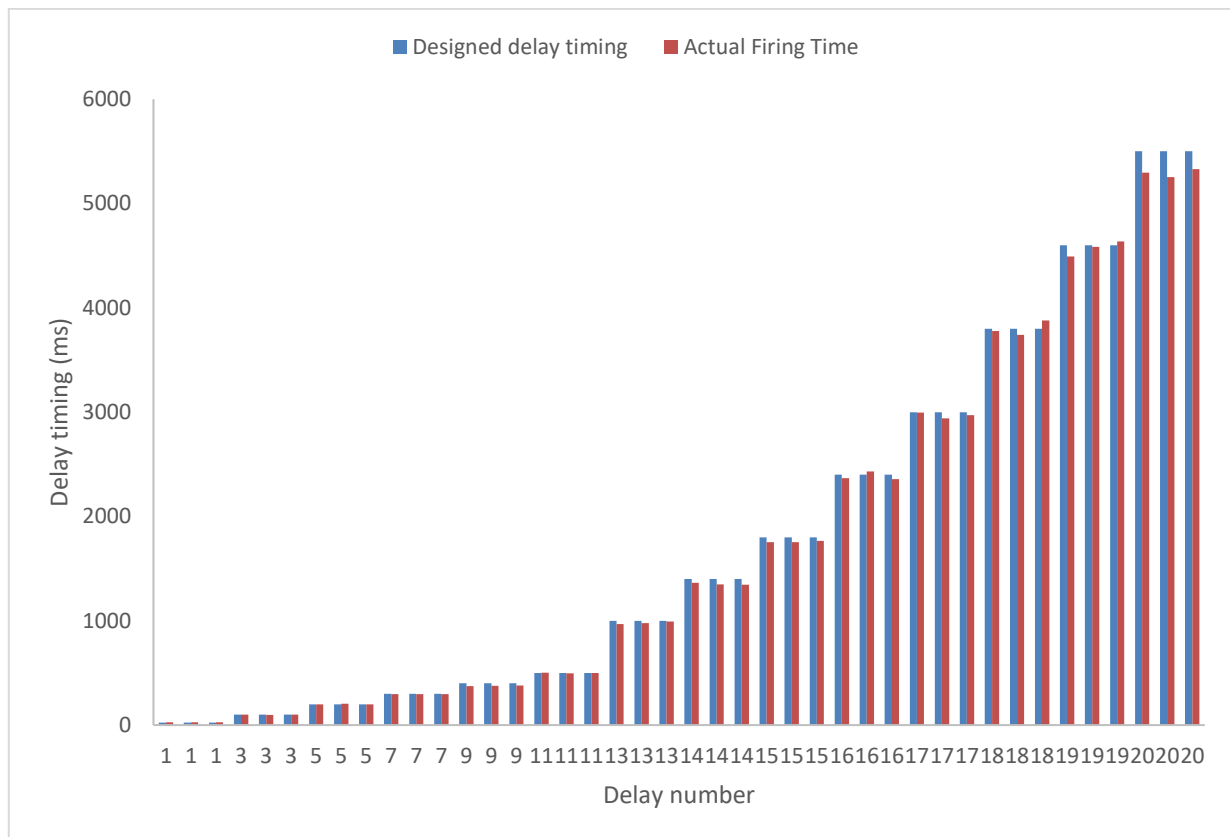


Figure 19. Graphical presentation of the design firing vs actual firing time of Nonel delay detonators used at development blast faces of Zawar group of mines tested during 6<sup>th</sup> visit.

### 13. Conclusions and recommendations

- ❖ Altogether, 16 blasts were conducted at different development and production blast faces of the mine. The blast vibrations were monitored around different underground structures located in the proximity of the blasting face. Most of the vibration were recorded at near field distances from the blast face.
- ❖ The number of holes detonated in a blast round varied from 10 to 33. The total explosives weight detonated in a blast round were varied from 300 to 983 kg. The maximum explosives weight per delay varied between 25 to 134 kg. The hole diameter of 89 mm and 152 mm were used for blast holes and uncharged reamer holes of the production blast faces. The hole diameter of 45 mm were used in all the development blast faces. Blast holes were charged with site mixed emulsion explosives and emulsion cartridge explosives. Electronic and NONEL initiation system was used for initiation of charged holes. The production blast was conducted by downhole as well as uphole charging and blasting fashion.
- ❖ Maximum level of ground vibration recorded from experimental trial was 74.07 mm/s at peak dominant frequency of 105.4 Hz. The vibration was recorded at a radial distance of 40 m from the K3a 448 mRL R1, R2 production blast face for blast conducted on 15.03.2019. The blast was conducted for 33 numbers of hole. The total explosive charge of 983 kg was fired in this blast keeping explosive weight per delay of 105 kg.

- ❖ The statistical predictor equation has been developed for the safety of underground structures while underground blasting. The Ground vibrations data recorded were grouped together for this purpose. The data recorded by mine management has also been taken together with the data generated during the four visits under this study.
- ❖ The maximum explosive charge weight per delay and total explosive charge for the mine has been computed considering different vibration limits based on RMR values of the roof rock. The suggested MCPD and total charge is given in Annexure of the report. The suggested charging pattern should be followed for day-to-day blasting at the mine with the aim to safeguard nearby underground structures.
- ❖ The frequencies of the recorded vibration were more than 22 Hz in all the blasting rounds. The most common recorded frequency ranges between 50 Hz and 150 Hz. The maximum recorded frequency was 248.4 Hz.
- ❖ The fragmentation output from the blast has been assessed. The analyses result shows that the size of fragmented rock varies between 2.798mm and 435.560mm. The mean size of the blasted rock is 72.485 mm. The maximum rock fragments of 150 mm size are present in blasted muck pile. The sieving analysis shows that 90% of the rock sample passes through sieve opening of size 360.947 mm. The output fragment size is excellent as per the loading requirement of excavators.
- ❖ The existing drilling pattern for the face blast at the mine has been reviewed. The firing pattern has been suggested for day-to-day face blasting at the mine.
- ❖ The ring blasting pattern has been suggested for day-to-day blasting at the mine. The blast design has also been suggested for excavation of narrow vein ore deposits of the mine.
- ❖ The in-the-hole velocity of detonation (VOD) of Powergel-801 cartridge explosives (390 gm of 40 mm dia.) of M/s IEPL-Orica was recorded at underground production blast face of Baroi UG Mine on 27.03.2018. The recorded VOD is 4670 m/s. The Velocity of detonation (VOD) of cartridge explosives (390 gm of 40 mm dia.) used at development faces of the mine was also recorded on 17.07.2018. The explosive belongs to M/s IEPL Orica. The recorded magnitude of VOD is 4798 m/s.
- ❖ The scattering tests of NONEL delay detonators were performed during 1<sup>st</sup> and 6<sup>th</sup> visits to the mine. The tests were conducted using High speed video camera. The test result reveals that the delay timing of the detonators is within acceptable limit for the test conducted during 6<sup>th</sup> visit.
- ❖ The scattering percentage should be restricted to maximum 10 % up to 10 no. delay and thereafter it should be within 5 % to get the optimum results from the blast.



- ❖ Selection of delay should be based on the face condition and actual availability of hole depth on the site. Proper information about delay timings of different delay numbers in case of NONEL initiation shall be well informed to the entire blasting concern engineer.
- ❖ It is recommended to maintain delay interval of at least 12-20 ms/m of burden. It is further recommended to use a minimum delay of 40 ms between the holes.
- ❖ More delay interval towards hanging wall side (at an interval of 60ms) and lesser delay interval towards footwall (at an interval of 40ms) should be given to minimise the dilution of ore with optimal fragmentation.
- ❖ Larger delay timing should be given in the last (boundary) holes of a ring and it should be increased by 50 to 80% for minimisation of ore dilution.
- ❖ The delay timing of 300 to 500 ms should be maintained between the rings. The subsequent increment in the delay intervals should be given in the consecutive rings for multi-ring blasting.
- ❖ Bottom portion of the hole must be charged with primer emulsion cartridges only to address the issues of ledge formation.
- ❖ Two additional blast holes at boundaries should be kept uncharged for minimising hanging wall and foot wall damages. These holes should be drilled as along the contact of the orebody or within 30 cm from the outer boundary of ore body and kept uncharged in order to reduce dilution.
- ❖ The optimum quantity of booster should be used in the blast holes. The quantity of emulsion/PETN cast booster should be 0.16% to 0.2% of the column charge and quantity of primer emulsion cartridges of appropriate diameter should be 15% - 25% of the explosive charge in the blast hole. Accordingly, the ANFO percentage will be of 75 % -85 %.
- ❖ Emulsion booster should be preferred in place of PETN cast booster from the safety point of view at the places where there is problem of misfire and chances of ignition of the misfired cast booster while loading & transportation.

## **Acknowledgements**

The research team is thankful to the mine management of Baroi underground mine, Hindustan Zinc Limited for sponsoring the study and providing necessary support during field visit.

Table A1. Summary of blasts conducted at Baroi underground Mine, HZL, Rajasthan.

Blast No.	Date of blast	Location of blast	No. of holes	Explosives /Hole	Total explosives	MCPD	Location of seismograph	Distance of measuring location			PPV mm/s	Dominant Frequency (Hz)
								Horizontal (m)	Vertical (m)	Radial (m)		
1.	23.01.2019	373 mRL, near electric panel x-cut	12	50	550	100	373 mRL near electric panel	80	0	80	38.24	96.5
							373 mRL near Pump	100	0	100	31.39	140.7
							373 mRL near up ramp	120	0	120	21.77	101.8
							373 mRL near up ramp	140	0	140	19.49	61.81
							373 mRL near ore pass	100	0	100	20.84	22
2.	25.01.2019	373 mRL, near electric panel x-cut ring 16	28	55	840	120	373 mRL near raise	130	0	130	14.83	84.94
							373 mRL near X-cut drive	146	0	146	7.101	88.88
							302 mRL main decline	160	0	160	14.29	170.9
3.	29.01.2019	302 mRL K2 ring	26	30	750	75	448 mRL K3 CB	40	0	40	74.07	105.4
4.	15.03.2019	448 mRL K3a, R1, R2	33	30	983	105	448 mRL K3 CB	145	0	145	4.049	248.4
5.	16.03.2019	448 mRL K3a, R3	26	27	681	100	448 mRL K3 CB	48	0	48	27.74	130.6
6.	19.03.2019	448 mRL K3a R4	28	25	682	134	448 mRL K3 CB	50	0	50	59.65	22.438
7.	20.03.2019	448 mRL K3a R5	24	27	631	115	448 mRL K3 CB	50	0	50	30.78	185.9
8.	23.03.2019	448 mRL K3a R6	24	31	731	119	448 mRL K3 CB	50	0	50		

9.	25.04.2019	220 mRL Bk1S Slot South Eastern Drive	28	20	532	45	220 mRL South ramp	40	0	40	32.46	117
10.	19/07/2019	190 mRL BK- 2 stope Ring 1	17	35	600	55	220 mRL ramp	63.2	30	70	27.6	150
11.	20/07/2019	190 mRL BK- 2 stope Ring 1	14	50	700	55	190 mRL Drive	50	0	50	18.35	69.81
12.	21/07/2019	220mRL BK-2 stope sub-level	18	39	704	49	220 mRL BK-2 N1	100	0	100	7.77	86.69
13.	23/07/2019	193 mRL BK-2	15	30	450	40	190 mRL Drive	49.9	3	50	17.59	86.69
14.	25/07/2019	190 mRL BK-2 Eastern OD-2	10	37.5	375	49	190 mRL Drive	69.9	3	70	12.73	139.8
							190 mRL near water tank	70	0	70	9.03	56.88
15.	25.01.2020	220 MRL BK2 Stope	12	25	300	25	Near X-cut of BK2 stope	30	0	30	37.88	116.7
							Near X-cut of BK2 stope	50	0	50	4.23	53.58
16.	27.01.2020	Stope near Harammagra	17	35	600	35	Near Thickenner plant	50	295	300	1.55	56.19
							Near Thickenner plant	54	295	350	1.44	48.38

Table A2. Computed explosive weight per delay at various radial distances for different permissible level of vibration based on RMR of roof rock at Baroi underground Mine, HZL.

Radial distance [m]	Computed Maximum explosive weight per delay for different values of PPV for the safety of underground structure [kg]				
	70 mm/s [For RMR 40]	85 mm/s [For RMR 45]	100 mm/s [For RMR 50]	110 mm/s [For RMR 55]	120 mm/s [For RMR ≥ 60]
30	43	56	69	78	87
40	77	99	122	138	155
50	120	154	191	216	242
60	172	222	274	311	348
70	235	302	374	423	474
80	307	395	488	553	619
90	388	500	618	699	783
100	479	617	762	863	967
125	748	964	1191	1349	1511
150	1078	1388	1716	1943	2176
200	1916	2468	3050	3453	3868

Table A3. Predicted peak particle velocity levels for various distance taking explosive weight Per delay of 40, 60, 80, 100, 125 & 150 kg for blasting at Baroi underground mine.

Distance from the blast face [m]	Predicted peak particle velocity levels for different explosive weight per delay for the safety of underground structure [mm/s]					
	40 kg	60 kg	80 kg	100 kg	125 kg	150 kg
30	66.1	90.2	112.5	133.5	158.4	182.2
40	42.5	58.0	72.4	85.9	101.9	117.2
50	30.2	41.2	51.4	61.0	72.4	83.2
60	22.8	31.2	38.8	46.1	54.7	62.9
70	18.0	24.6	30.7	36.4	43.2	49.7
80	14.7	20.0	25.0	29.6	35.2	40.5
90	12.3	16.7	20.9	24.7	29.4	33.8
100	10.4	14.2	17.7	21.1	25.0	28.7
125	7.4	10.1	12.6	15.0	17.7	20.4
150	5.6	7.6	9.5	11.3	13.4	15.4
200	3.6	4.9	6.1	7.3	8.6	9.9

Table A4. Computed total explosive weight in a round at various radial distances for different Permissible level of vibration based on the RMR of roof rock at Baroi underground Mine.

<b>Radial distance</b>  <b>[m]</b>	<b>Computed total explosive weight in a blasting round for different values of PPV for the safety of underground structure</b> <b>[kg]</b>				
	<b>70 mm/s</b> <b>[For RMR 40]</b>	<b>85 mm/s</b> <b>[For RMR 45]</b>	<b>100 mm/s</b> <b>[For RMR 50]</b>	<b>110 mm/s</b> <b>[For RMR 55]</b>	<b>120 mm/s</b> <b>[For RMR ≥ 60]</b>
30	318	401	487	545	605
40	566	713	865	969	1075
50	884	1114	1352	1515	1680
60	1273	1604	1947	2181	2420
70	1732	2184	2650	2969	3294
80	2263	2852	3462	3878	4302
90	2864	3610	4381	4908	5444
100	3536	4456	5409	6059	6722
125	5524	6963	8451	9468	10502
150	7955	10026	12170	13634	15123
200	14142	17825	21635	24237	26886

Table A5. Predicted peak particle velocity levels for various distance taking total explosive charge in a blasting round 500, 1000, 1500, 2000, 3000 and 4000 kg for blasting at Baroi underground Mine.

<b>Distance from the blast face</b> <b>[m]</b>	<b>Predicted peak particle velocity levels for different explosive weight per delay for the safety of underground structure</b> <b>[mm/s]</b>					
	<b>500 kg</b>	<b>1000 kg</b>	<b>1500 kg</b>	<b>2000 kg</b>	<b>3000 kg</b>	<b>4000 kg</b>
30	102.3	182.9	257.1	327.3	459.9	585.4
40	63.1	112.9	158.6	202.0	283.8	361.3
50	43.4	77.6	109.1	138.9	195.2	248.4
60	32.0	57.2	80.3	102.3	143.7	182.9
70	24.7	44.1	62.0	79.0	111.0	141.3
80	19.7	35.3	49.6	63.1	88.7	112.9
90	16.2	29.0	40.7	51.8	72.8	92.7
100	13.6	24.3	34.1	43.4	61.0	77.6
125	9.3	16.7	23.4	29.8	41.9	53.4
150	6.9	12.3	17.3	22.0	30.9	39.3
200	4.2	7.6	10.7	13.6	19.1	24.3



Table A6. Recommended explosives weight per delay and total explosives to be detonated in a round at Baroi underground Mine at varying distances from the houses/structures in the village considering 5mm/s, 10 mm/s and 15 mm/s as threshold limits of vibration for the safety of surface houses/structures.

Radial Distance of houses/ structure from the blast face  [m]	Recommended explosives weight per delay considering 5 mm/s, 10 mm/s and 15 mm/s as threshold levels of vibration [kg]			Total explosives to be detonated in a blasting round considering 5 mm/s, 10 mm/s and 15 mm/s as threshold levels of vibration [kg]		
	5 mm/s	10 mm/s	15 mm/s	5 mm/s	10 mm/s	15 mm/s
200	61	152	257	609	1391	2255
225	78	192	325	770	1760	2854
250	96	237	402	951	2173	3523
275	116	286	486	1151	2629	4263
300	138	341	578	1370	3129	5074
325	162	400	679	1608	3673	5954
350	188	464	787	1864	4259	6906
375	216	533	904	2140	4889	7928
400	246	606	1028	2435	5563	9020
425	277	684	1161	2749	6280	10183
450	311	767	1302	3082	7041	11416
475	346	855	1450	3434	7845	12719
500	384	947	1607	3805	8692	14093
550	464	1146	1944	4604	10518	17053
600	552	1364	2314	5479	12517	20295
650	648	1601	2716	6430	14690	23818
700	752	1856	3149	7458	17037	27623
750	863	2131	3615	8561	19558	31710
800	982	2425	4113	9740	22252	36079



## Event Report

Date/Time Tran at 15:58:53 March 29, 2018  
Trigger Source Geo: 3.000 mm/s  
Range Geo: 254.0 mm/s  
Record Time 6.0 sec at 4096 sps

Serial Number BE18249 V 10.10-1.1 Minimate Blaster  
Battery Level 6.1 Volts  
Unit Calibration February 21, 2017 by CIMFR Dhanbad  
File Name T249HCIP.Q50

### Notes

Location: On Ground Surface  
Client: Zawar Group of Mines, HZL  
User Name: REE Division, CSIR-CIMFR Dhanbad  
General:

### Extended Notes

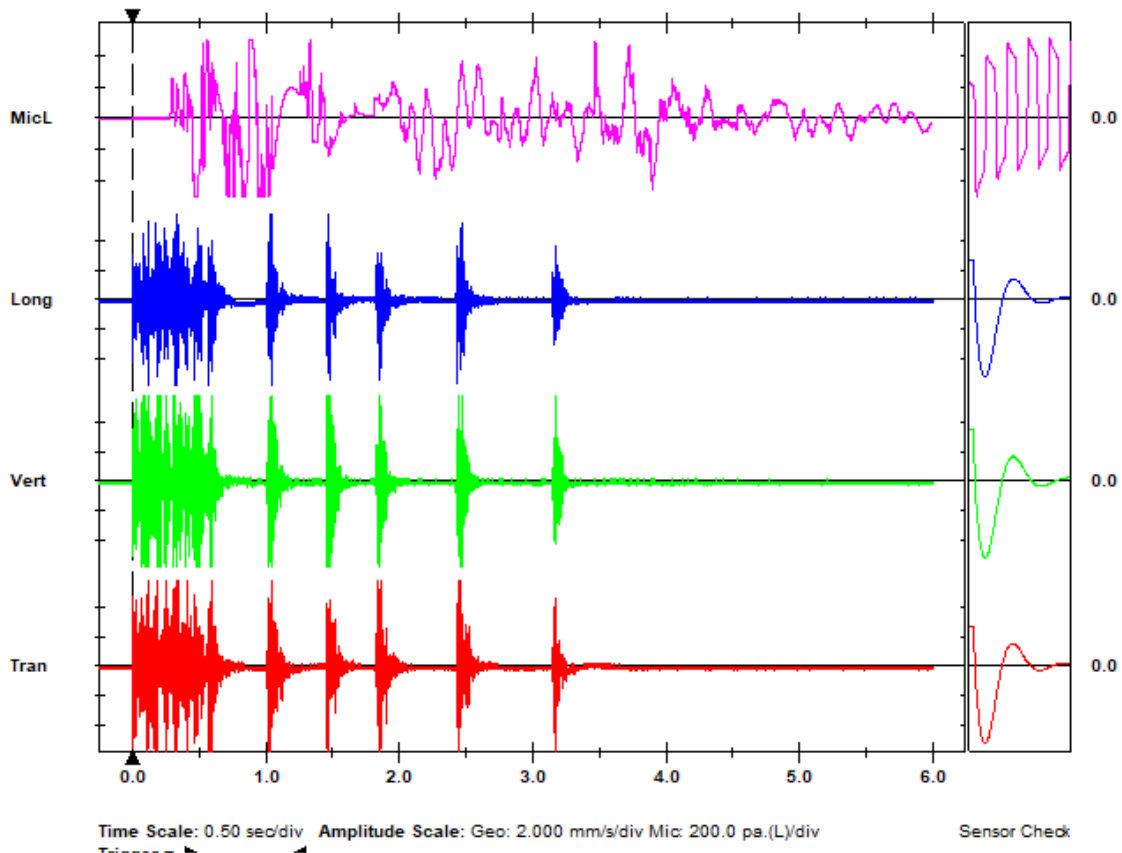
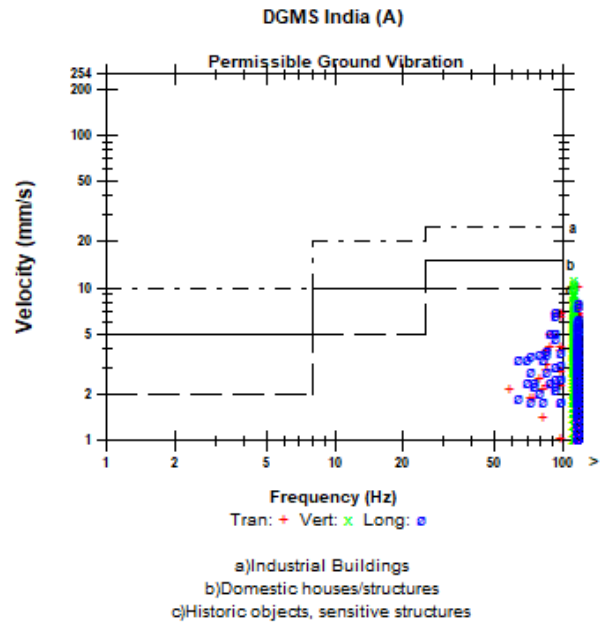
Blast optimisation study at Baroi UG Mines, HZL

Microphone Linear Weighting  
PSPL \*\*\* dB(L) at 0.460 sec  
ZC Freq 7.2 Hz  
Channel Test Passed (Freq = 19.7 Hz Amp = 542 mv )

	Tran	Vert	Long	
PPV	10.03	11.18	7.874	mm/s
ZC Freq	128	186	108	Hz
Time (Rel. to Trig)	0.318	0.193	0.333	sec
Peak Acceleration	0.742	1.485	0.742	g
Peak Displacement	0.012	0.009	0.012	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.6	7.4	Hz
Overswing Ratio	3.8	3.4	4.1	

Peak Vector Sum 11.59 mm/s at 1.043 sec

\*\*\* : Out of Range





## FFT Report

Date/Time Tran at 15:58:53 March 29, 2018  
Trigger Source Geo: 3.000 mm/s  
Range Geo: 254.0 mm/s  
Record Time 6.0 sec at 4096 sps

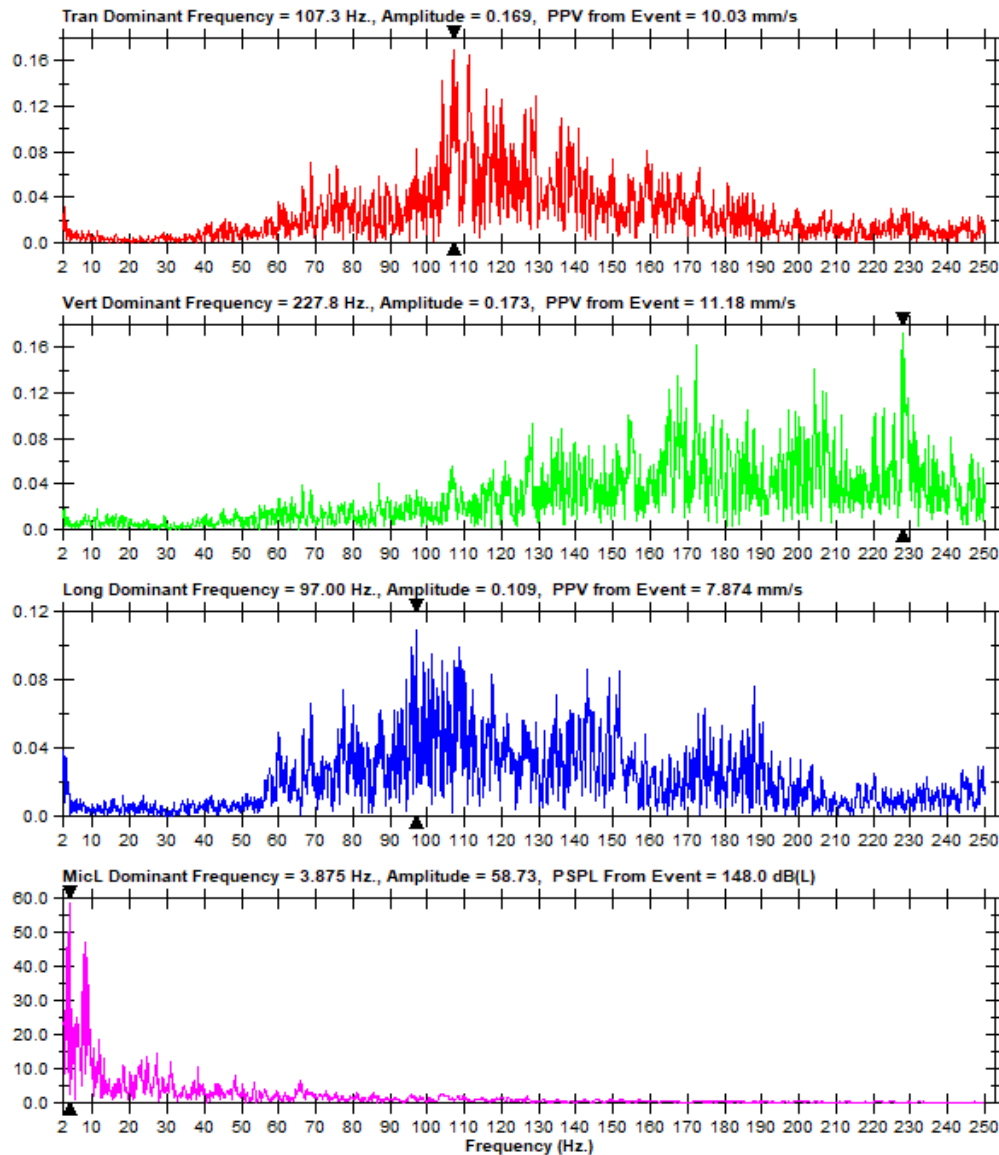
Serial Number BE18249 V 10.10-1.1 Minimate Blaster  
Battery Level 6.1 Volts  
Unit Calibration February 21, 2017 by CIMFR Dhanbad  
File Name T249HCIP.Q50

### Notes

Location: On Ground Surface  
Client: Zawar Group of Mines, HZL  
User Name: REE Division, CSIR-CIMFR Dhanbad  
General:

### Extended Notes

Blast optimisation study at Baroi UG Mines, HZL



Date/Time Vert at 15:21:45 July 14, 2018  
 Trigger Source Geo: 0.510 mm/s  
 Range Geo: 254.0 mm/s  
 Record Time 8.0 sec at 1024 sps

Serial Number BE8183 V 10.30-8.17 MiniMate Plus/8  
 Battery Level 6.1 Volts  
 Unit Calibration January 17, 2018 by CIMFR Dhanbad  
 File Name J183HI0T.C90

## Notes

Location: On ground surface  
 Client: Zawar Group of Mines  
 User Name: REE DIVISION, CSIR-CIMFR, DHANBAD  
 General:

## Extended Notes

Blast optimisation study at Zawar Group of Mines.

Microphone Linear Weighting

P SPL \*\*\* dB(L) at 0.395 sec

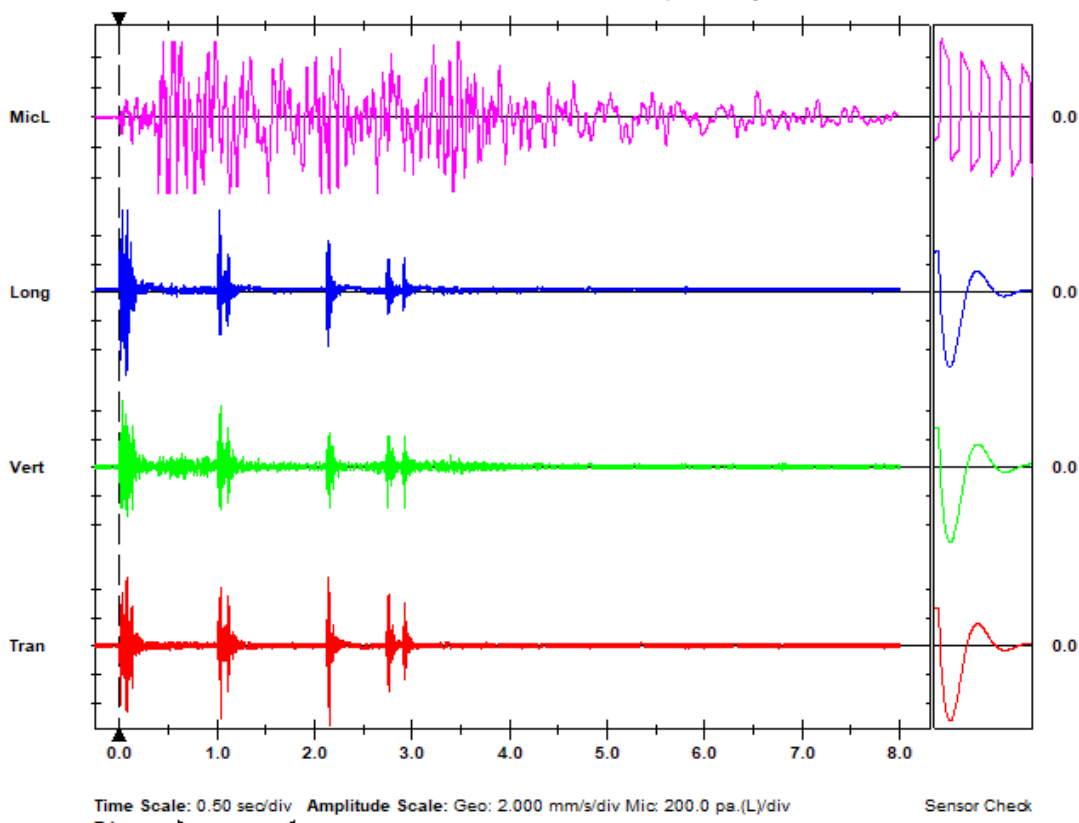
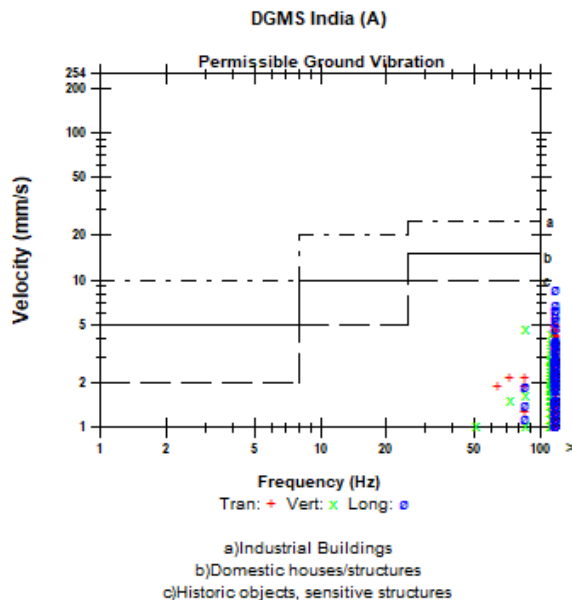
ZC Freq 13 Hz

Channel Test Passed (Freq = 20.1 Hz Amp = 455 mv )

	Tran	Vert	Long	
PPV	5.461	4.699	8.636	mm/s
ZC Freq	>100	85	>100	Hz
Time (Rel. to Trig)	2.148	0.023	0.073	sec
Peak Acceleration	0.504	0.384	0.636	g
Peak Displacement	0.006	0.006	0.016	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.4	7.4	Hz
Overswing Ratio	3.7	3.5	3.8	

Peak Vector Sum 9.347 mm/s at 0.073 sec

\*\*\* : Out of Range



Date/Time Vert at 15:21:45 July 14, 2018  
 Trigger Source Geo: 0.510 mm/s  
 Range Geo: 254.0 mm/s  
 Record Time 8.0 sec at 1024 sps

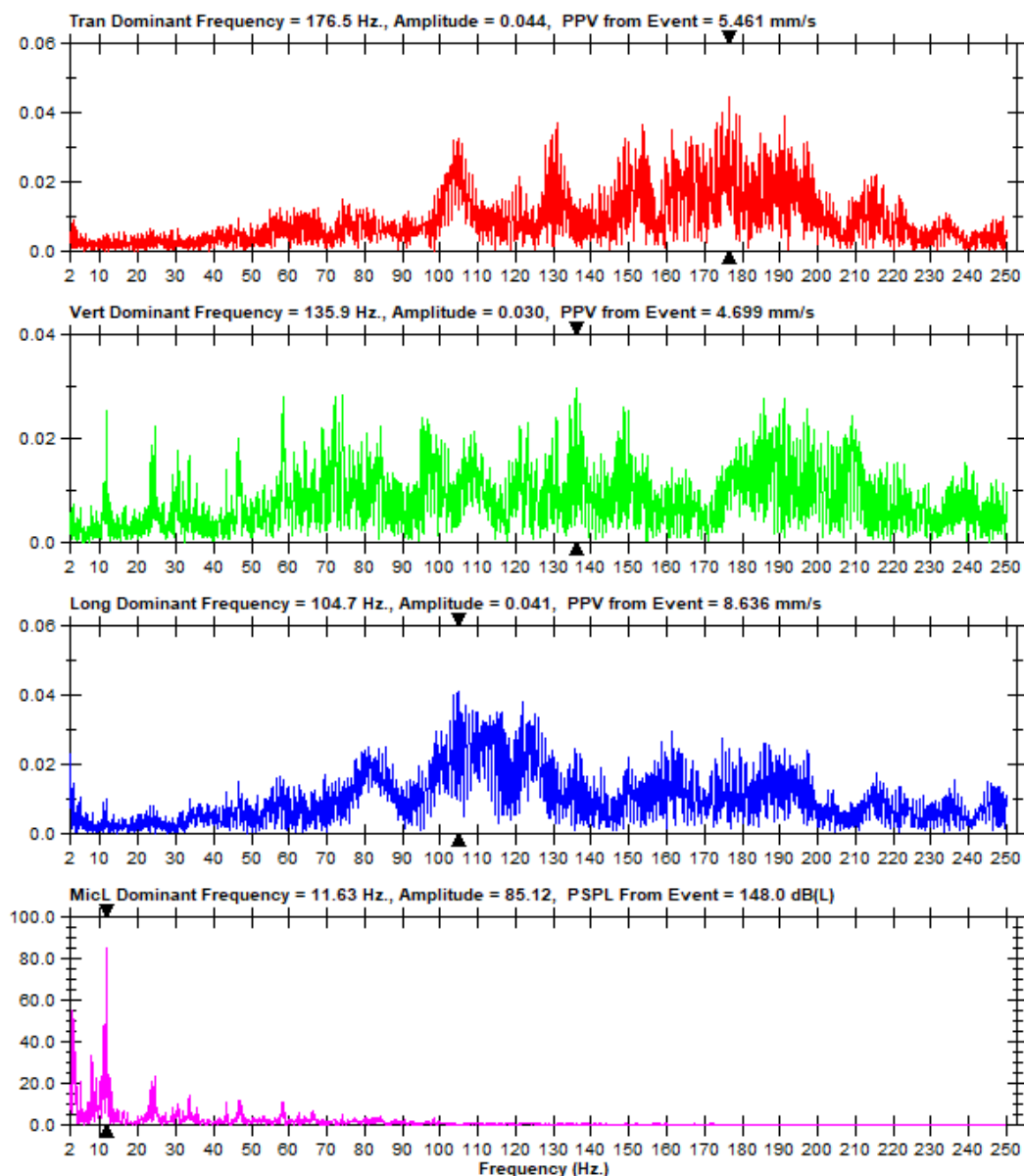
Serial Number BE8183 V 10.30-8.17 MiniMate Plus/8  
 Battery Level 6.1 Volts  
 Unit Calibration January 17, 2018 by CIMFR Dhanbad  
 File Name J183HI0T.C90

## Notes

Location: On ground surface  
 Client: Zawar Group of Mines  
 User Name: REE DIVISION, CSIR-CIMFR, DHANBAD  
 General:

## Extended Notes

Blast optimisation study at Zawar Group of Mines.





Date/Time Vert at 15:53:08 March 27, 2018  
 Trigger Source Geo: 3.000 mm/s  
 Range Geo: 254.0 mm/s  
 Record Time 10.0 sec at 1024 sps

Serial Number BE18249 V 10.10-1.1 Minimate Blaster  
 Battery Level 6.2 Volts  
 Unit Calibration February 21, 2017 by CIMFR Dhanbad  
 File Name T249HCF0.4K0

## Notes

Location: On Ground Surface  
 Client: Sindesar Khurd Mine, HZL  
 User Name: REE Division, CSIR-CIMFR Dhanbad  
 General:

## Extended Notes

Blast optimisation study at Sindesar Khurd Mine, HZL.

Microphone Linear Weighting

PSPL \*\*\* dB(L) at 0.068 sec

ZC Freq 57 Hz

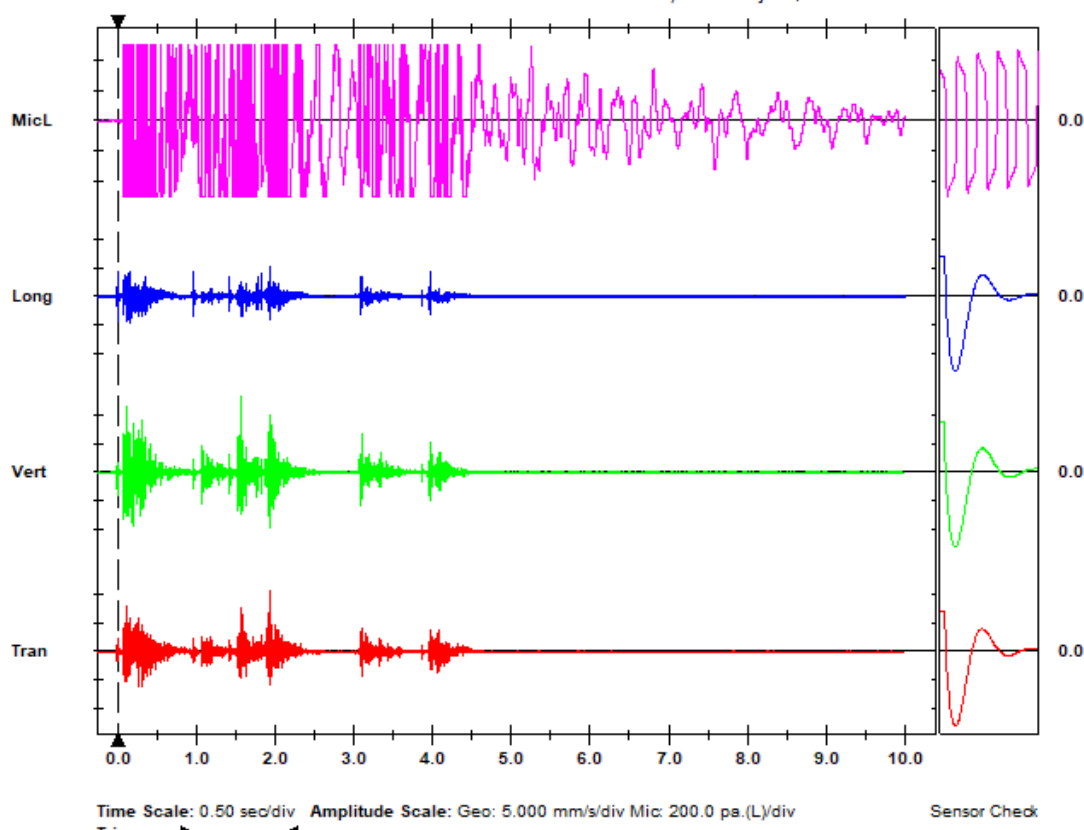
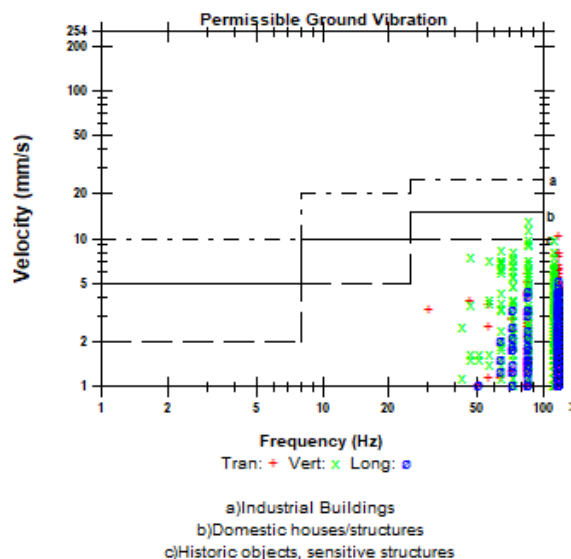
Channel Test Passed (Freq = 20.1 Hz Amp = 513 mv )

	Tran	Vert	Long	
PPV	10.54	13.21	5.207	mm/s
PPV	71.46	73.42	65.33	dB
ZC Freq	>100	85	>100	Hz
Time (Rel. to Trig)	1.936	1.564	1.931	sec
Peak Acceleration	0.782	0.716	0.490	g
Peak Displacement	0.014	0.025	0.009	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.6	7.5	Hz
Overswing Ratio	3.7	3.4	4.0	

Peak Vector Sum 14.14 mm/s at 1.564 sec

\*\*\* : Out of Range

## DGMS India (A)





## FFT Report

Date/Time Vert at 15:53:08 March 27, 2018  
Trigger Source Geo: 3.000 mm/s  
Range Geo: 254.0 mm/s  
Record Time 10.0 sec at 1024 sps

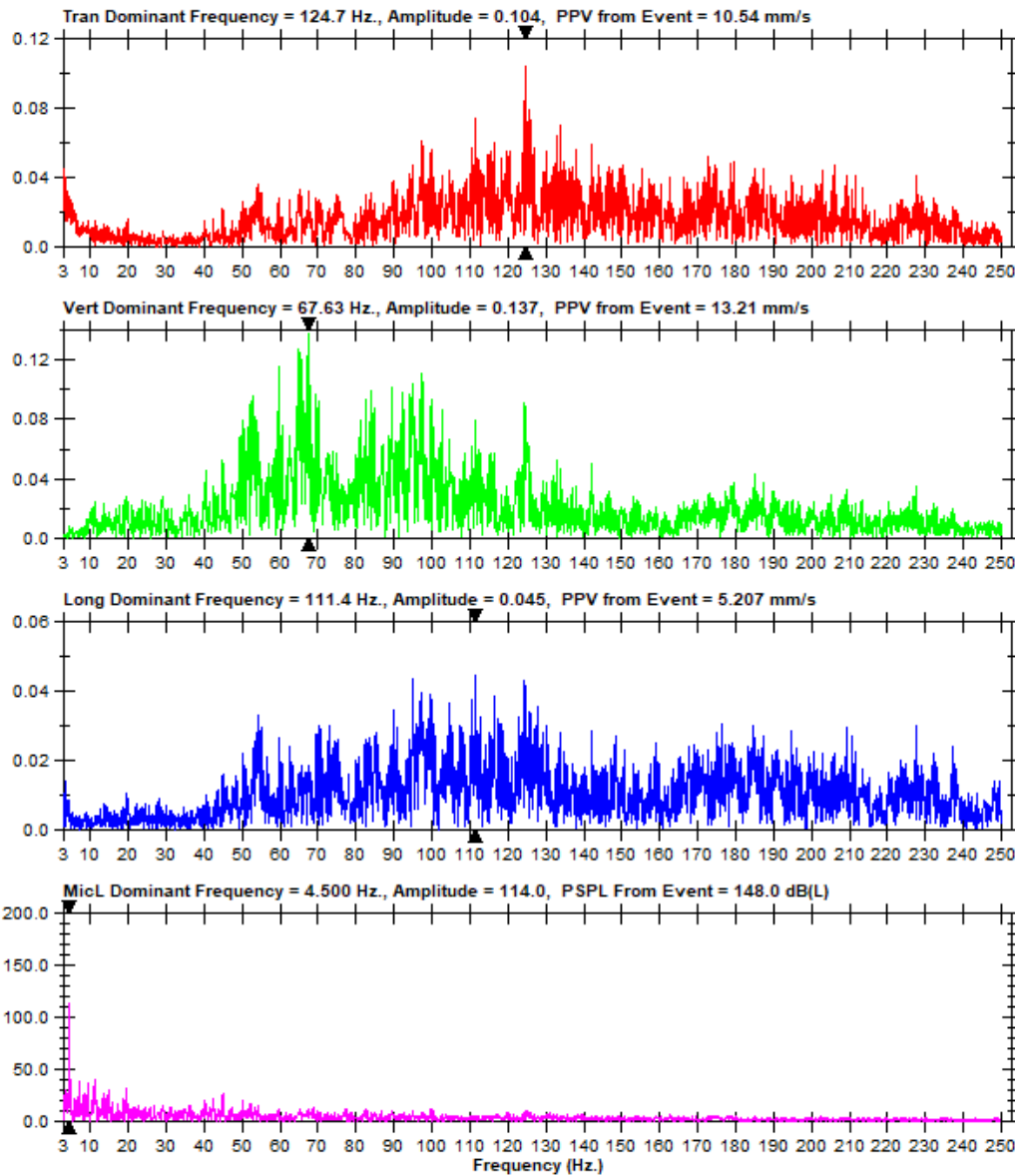
Serial Number BE18249 V 10.10-1.1 Minimate Blaster  
Battery Level 6.2 Volts  
Unit Calibration February 21, 2017 by CIMFR Dhanbad  
File Name T249HCF0.4K0

### Notes

Location: On Ground Surface  
Client: Sindesar Khurd Mine, HZL  
User Name: REE Division, CSIR-CIMFR Dhanbad  
General:

### Extended Notes

Blast optimisation study at Sindesar Khurd Mine, HZL.



**Date/Time** Vert at 15:13:00 July 14, 2018  
**Trigger Source** Geo: 0.510 mm/s  
**Range** Geo: 254.0 mm/s  
**Record Time** 8.0 sec at 1024 sps

**Serial Number** BE8183 V 10.30-8.17 MiniMate Plus/8  
**Battery Level** 6.1 Volts  
**Unit Calibration** January 17, 2018 by CIMFR Dhanbad  
**File Name** J183HI0S.X00

## Notes

**Location:** On ground surface  
**Client:** Zawar Group of Mines  
**User Name:** REE DIVISION, CSIR-CIMFR, DHANBAD  
**General:**

## Extended Notes

Blast optimisation study at Zawar Group of Mines.

**Microphone** Linear Weighting

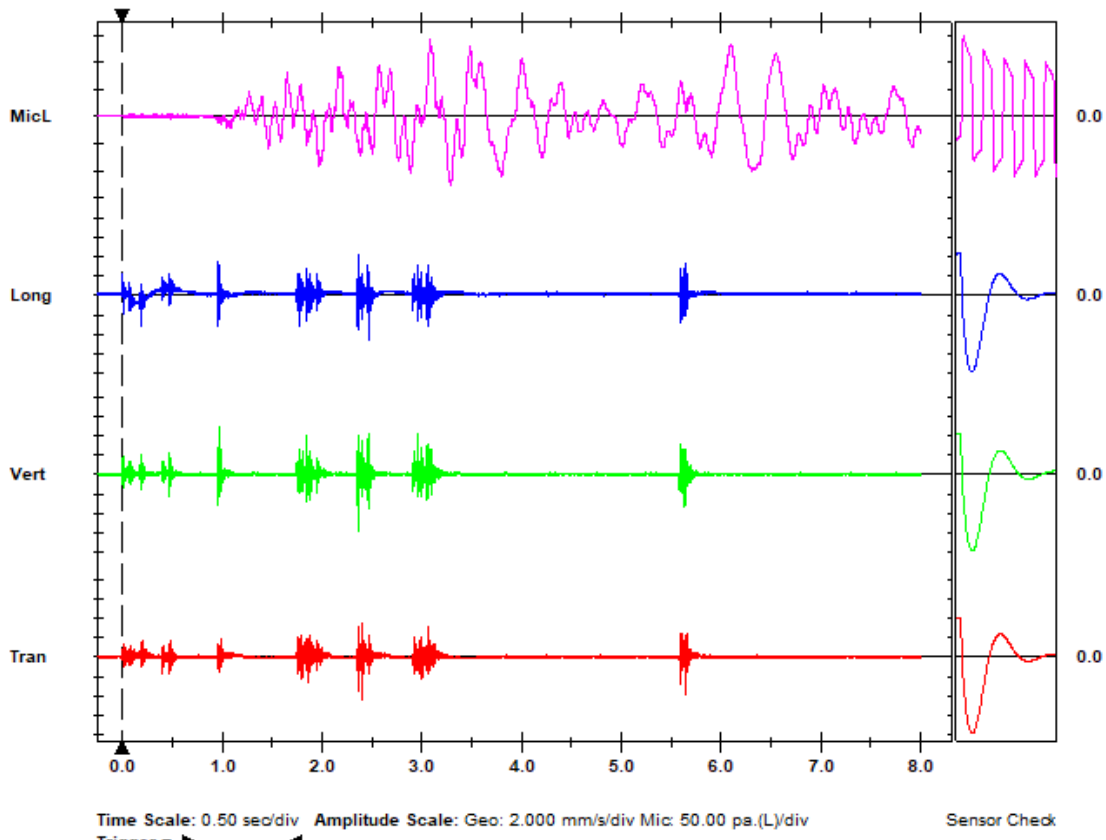
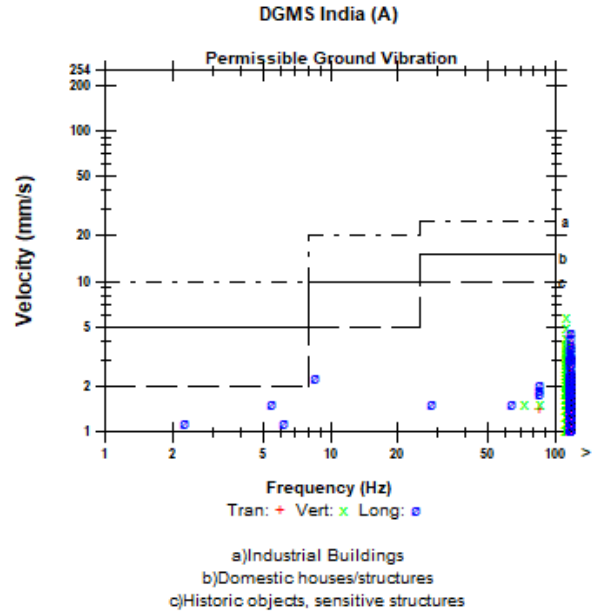
**PSPL** 137.0 dB(L) at 3.087 sec

**ZC Freq** 3.4 Hz

**Channel Test** Passed (Freq = 20.1 Hz Amp = 455 mv )

	Tran	Vert	Long	
PPV	4.318	5.842	4.572	mm/s
PPV	63.71	66.33	64.20	dB
ZC Freq	>100	>100	>100	Hz
Time (Rel. to Trig)	2.402	2.362	2.465	sec
Peak Acceleration	0.437	0.676	0.451	g
Peak Displacement	0.004	0.004	0.052	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.4	7.4	Hz
Overswing Ratio	3.7	3.5	3.8	

**Peak Vector Sum** 6.708 mm/s at 2.362 sec





## FFT Report

Date/Time Vert at 15:13:00 July 14, 2018  
Trigger Source Geo: 0.510 mm/s  
Range Geo: 254.0 mm/s  
Record Time 8.0 sec at 1024 sps

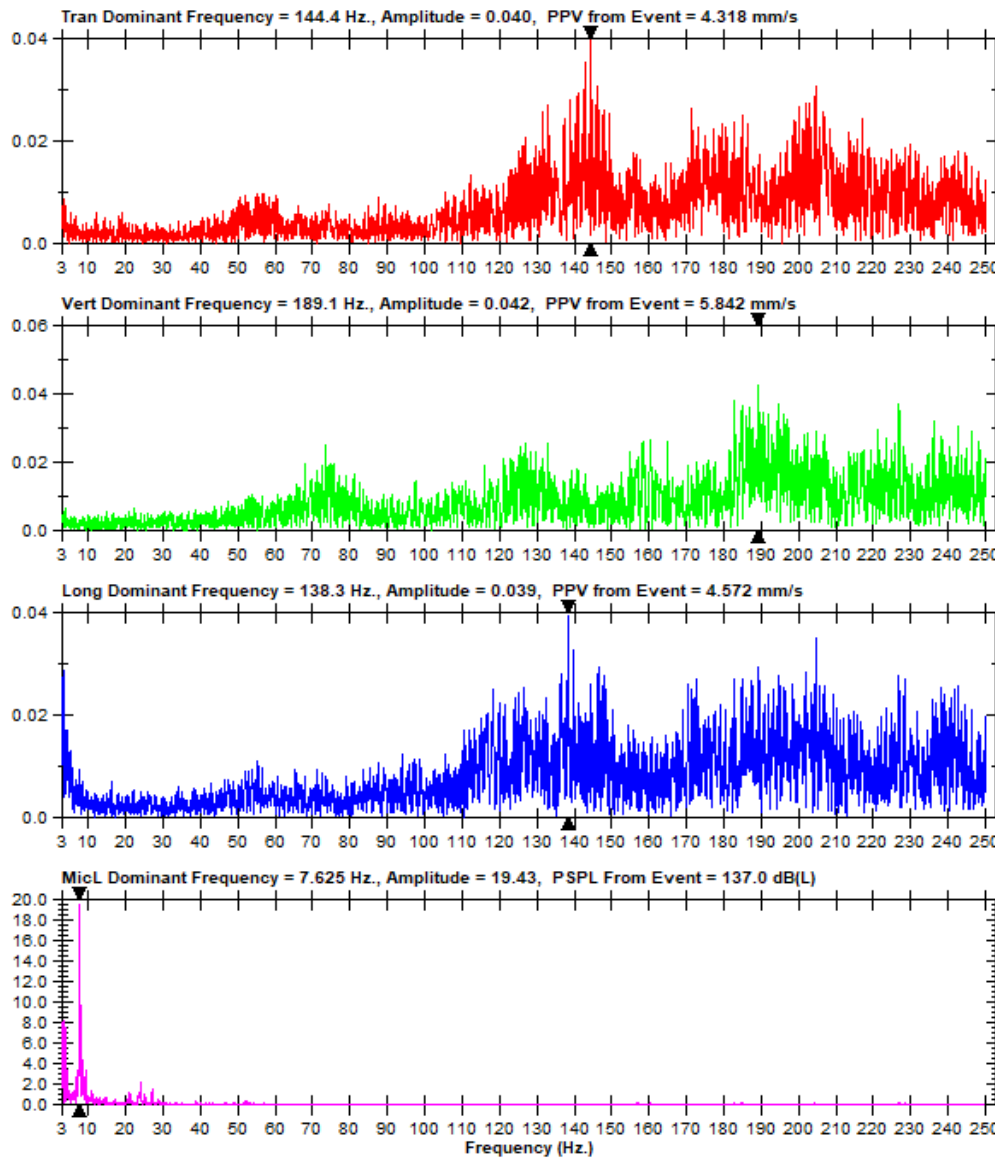
Serial Number BE8183 V 10.30-8.17 MiniMate Plus/8  
Battery Level 6.1 Volts  
Unit Calibration January 17, 2018 by CIMFR Dhanbad  
File Name J183HI0S.X00

### Notes

Location: On ground surface  
Client: Zawar Group of Mines  
User Name: REE DIVISION, CSIR-CIMFR, DHANBAD  
General:

### Extended Notes

Blast optimisation study at Zawar Group of Mines.



Date/Time Vert at 15:59:34 July 17, 2018  
 Trigger Source Geo: 0.510 mm/s  
 Range Geo: 254.0 mm/s  
 Record Time 8.0 sec at 1024 sps

Serial Number BE8183 V 10.30-8.17 MiniMate Plus/8  
 Battery Level 6.2 Volts  
 Unit Calibration January 17, 2018 by CIMFR Dhanbad  
 File Name J183HI0F.3A0

## Notes

Location: On ground surface  
 Client: Zawar Group of Mines  
 User Name: REE DIVISION, CSIR-CIMFR, DHANBAD  
 General:

## Extended Notes

Blast optimisation study at Zawar Group of Mines.

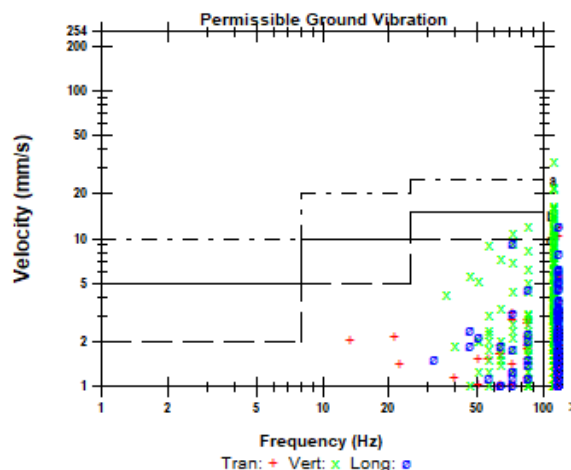
Microphone Linear Weighting  
 PSPL \*\*\* dB(L) at 0.000 sec  
 ZC Freq 37 Hz  
 Channel Test Passed (Freq = 20.1 Hz Amp = 416 mv )

	Tran	Vert	Long	
PPV	11.94	33.27	12.19	mm/s
PPV	72.54	81.44	72.72	dB
ZC Freq	>100	>100	>100	Hz
Time (Rel. to Trig)	0.300	0.300	0.293	sec
Peak Acceleration	1.259	3.009	0.901	g
Peak Displacement	0.020	0.031	0.018	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.5	7.4	Hz
Overswing Ratio	3.7	3.5	3.8	

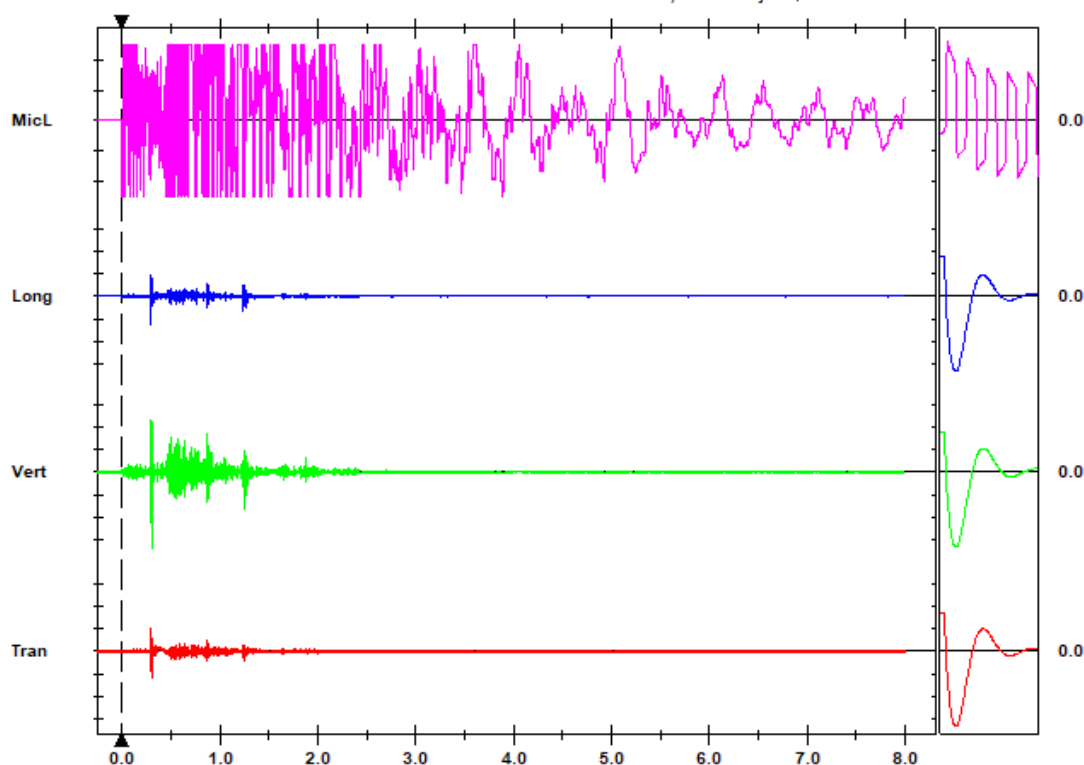
Peak Vector Sum 35.42 mm/s at 0.300 sec

\*\*\* : Out of Range

## DGMS India (A)



a) Industrial Buildings  
 b) Domestic houses/structures  
 c) Historic objects, sensitive structures



Sensor Check



Date/Time Vert at 15:59:34 July 17, 2018  
 Trigger Source Geo: 0.510 mm/s  
 Range Geo: 254.0 mm/s  
 Record Time 8.0 sec at 1024 sps

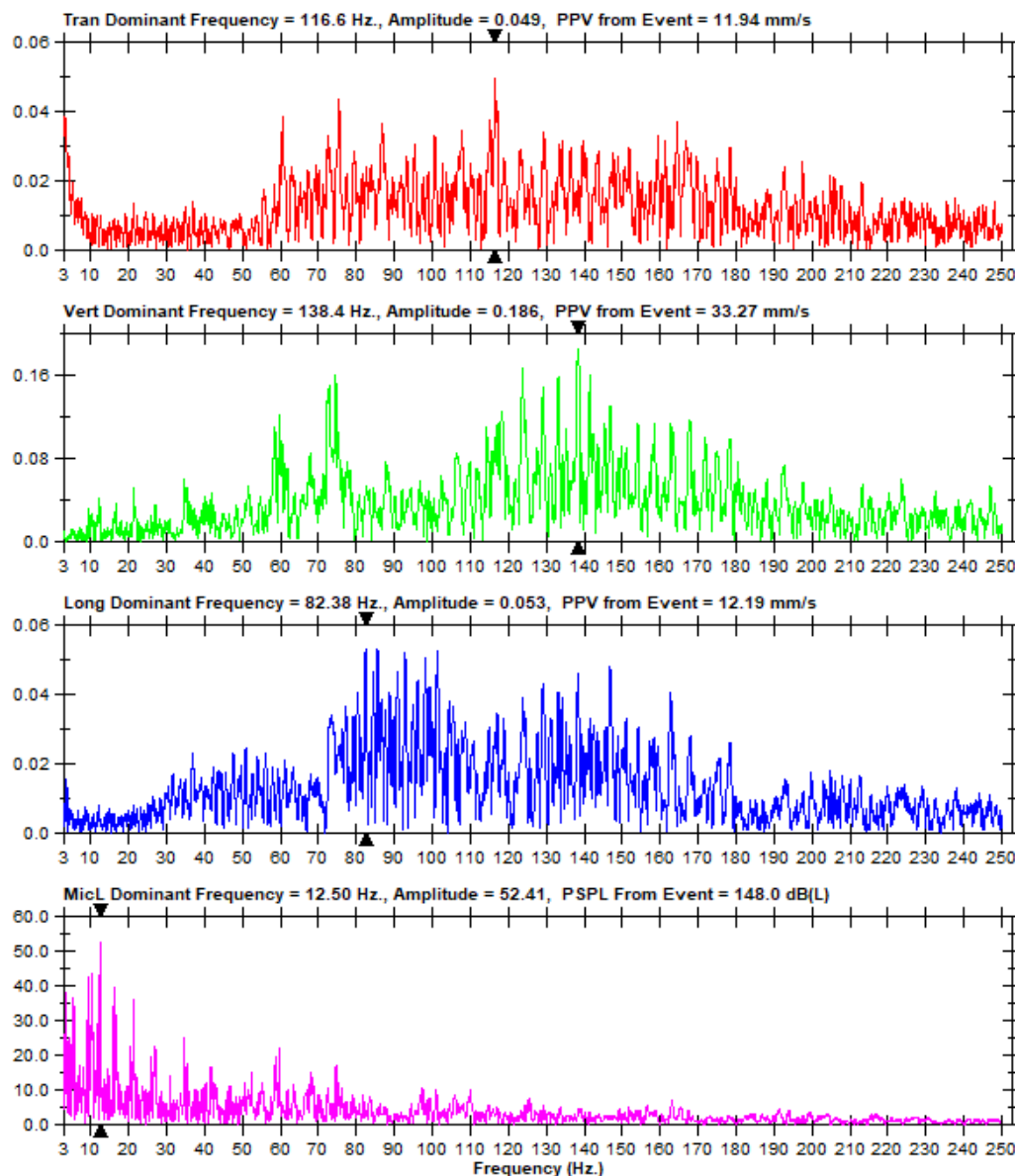
Serial Number BE8183 V 10.30-8.17 MiniMate Plus/8  
 Battery Level 6.2 Volts  
 Unit Calibration January 17, 2018 by CIMFR Dhanbad  
 File Name J183HI6F.3A0

## Notes

Location: On ground surface  
 Client: Zawar Group of Mines  
 User Name: REE DIVISION, CSIR-CIMFR, DHANBAD  
 General:

## Extended Notes

Blast optimisation study at Zawar Group of Mines.





## Event Report

Date/Time Long at 16:10:46 July 19, 2019  
Trigger Source Geo: 2.510 mm/s  
Range Geo: 254.0 mm/s  
Record Time 10.0 sec at 4096 sps

Serial Number BE10010 V 10.30-1.1 Minimate Blaster  
Battery Level 6.3 Volts  
Unit Calibration July 16, 2019 by CIMFR Dhanbad  
File Name L0101122.9Y0

### Notes

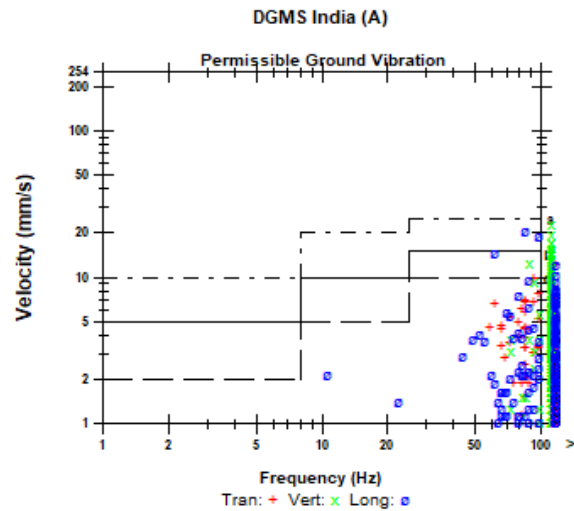
Location: On Ground Surface  
Client: Zawar Group of Mines, HZL  
User Name: REE DIVISION, CSIR-CIMFR, DHANBAD  
General:

### Extended Notes

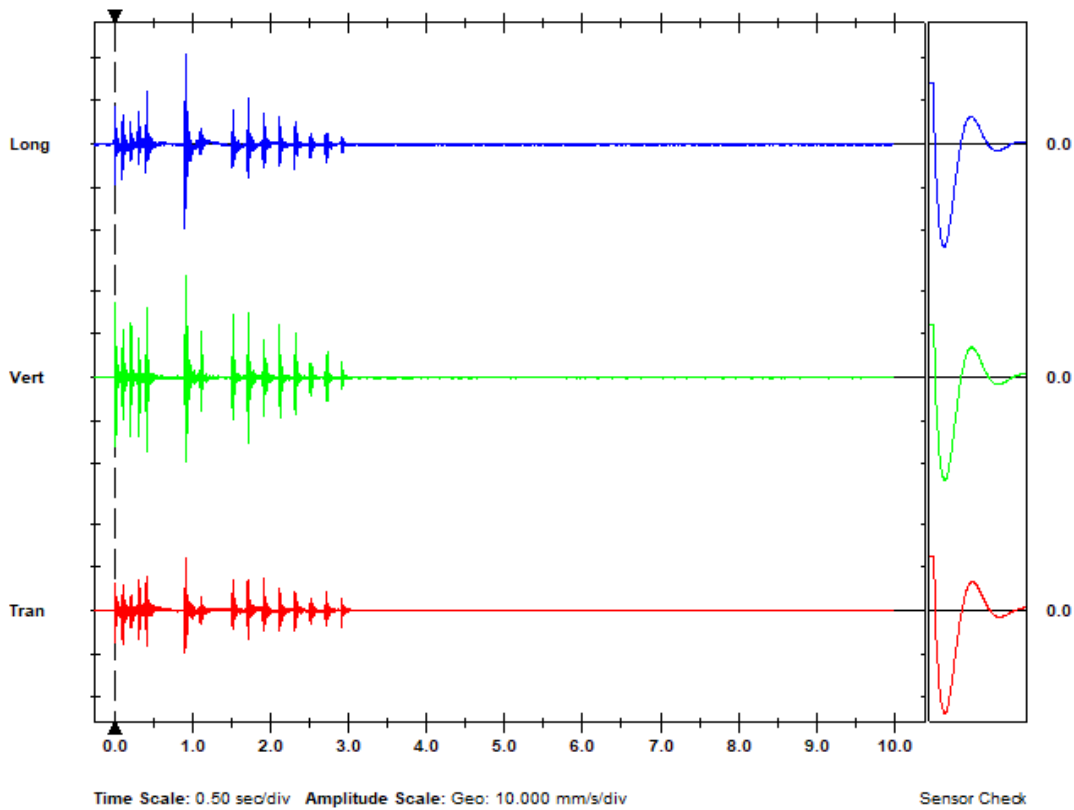
Blast optimisation study at Zawar Group of U/G Mine, HZL, Rajasthan

	Tran	Vert	Long	
PPV	12.19	23.37	20.70	mm/s
PPV	72.72	78.37	77.32	dB
ZC Freq	102	128	85	Hz
Time (Rel. to Trig)	0.912	0.922	0.919	sec
Peak Acceleration	1.007	2.227	1.485	g
Peak Displacement	0.019	0.028	0.032	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.6	7.6	Hz
Overswing Ratio	3.8	3.6	3.9	

Peak Vector Sum 27.57 mm/s at 0.922 sec



- a) Industrial Buildings
- b) Domestic houses/structures
- c) Historic objects, sensitive structures





## FFT Report

Date/Time Long at 16:10:46 July 19, 2019  
Trigger Source Geo: 2.510 mm/s  
Range Geo: 254.0 mm/s  
Record Time 10.0 sec at 4096 sps

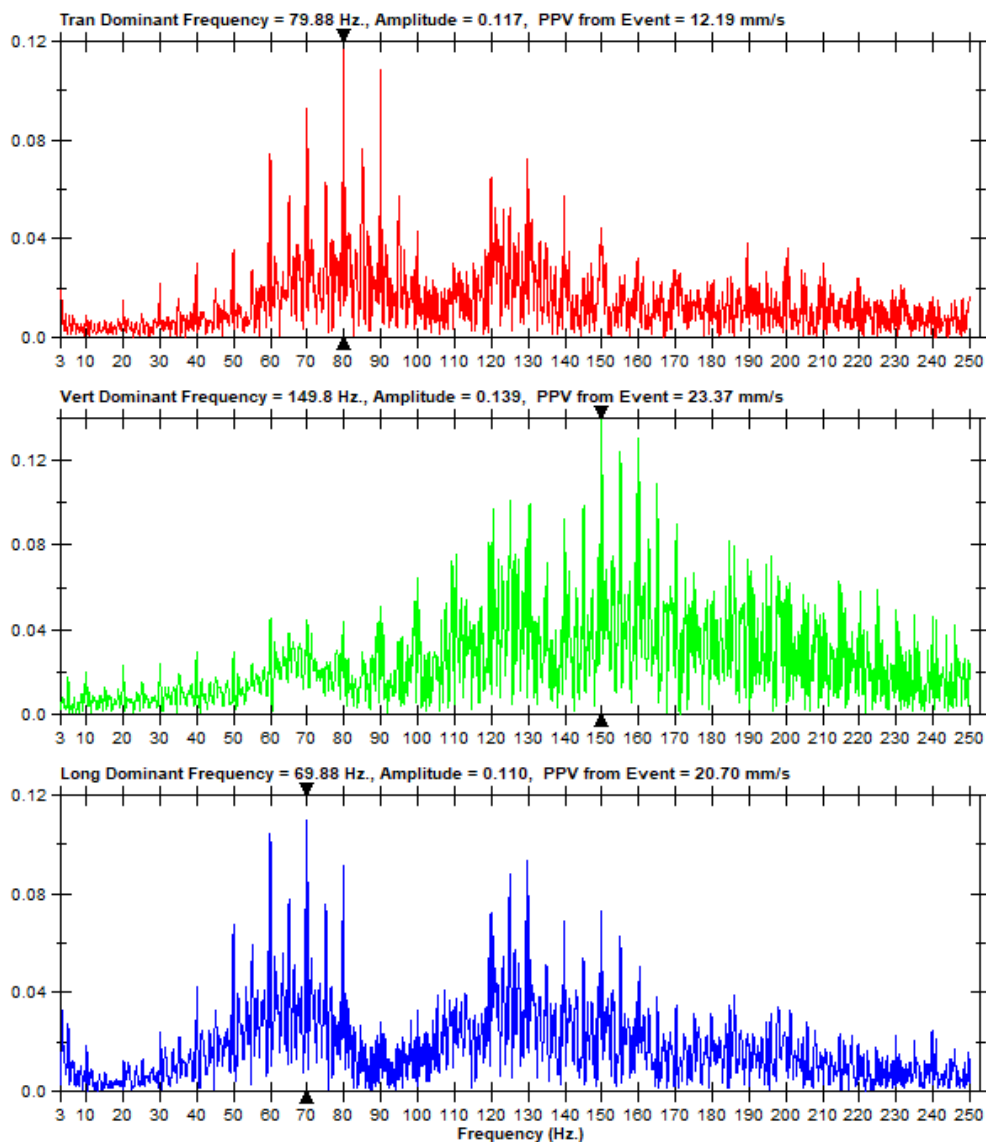
Serial Number BE10010 V 10.30-1.1 Minimate Blaster  
Battery Level 6.3 Volts  
Unit Calibration July 16, 2019 by CIMFR Dhanbad  
File Name L0101122.9Y0

### Notes

Location: On Ground Surface  
Client: Zavar Group of Mines, HZL  
User Name: REE DIVISION, CSIR-CIMFR, DHANBAD  
General:

### Extended Notes

Blast optimisation study at Zavar Group of U/G Mine, HZL, Rajasthan



Date/Time Long at 16:14:00 July 20, 2019  
 Trigger Source Geo: 2.510 mm/s  
 Range Geo: 254.0 mm/s  
 Record Time 10.0 sec at 4096 sps

Serial Number BE10010 V 10.30-1.1 Minimate Blaster  
 Battery Level 6.3 Volts  
 Unit Calibration July 16, 2019 by CIMFR Dhanbad  
 File Name L010113X.3C0

## Notes

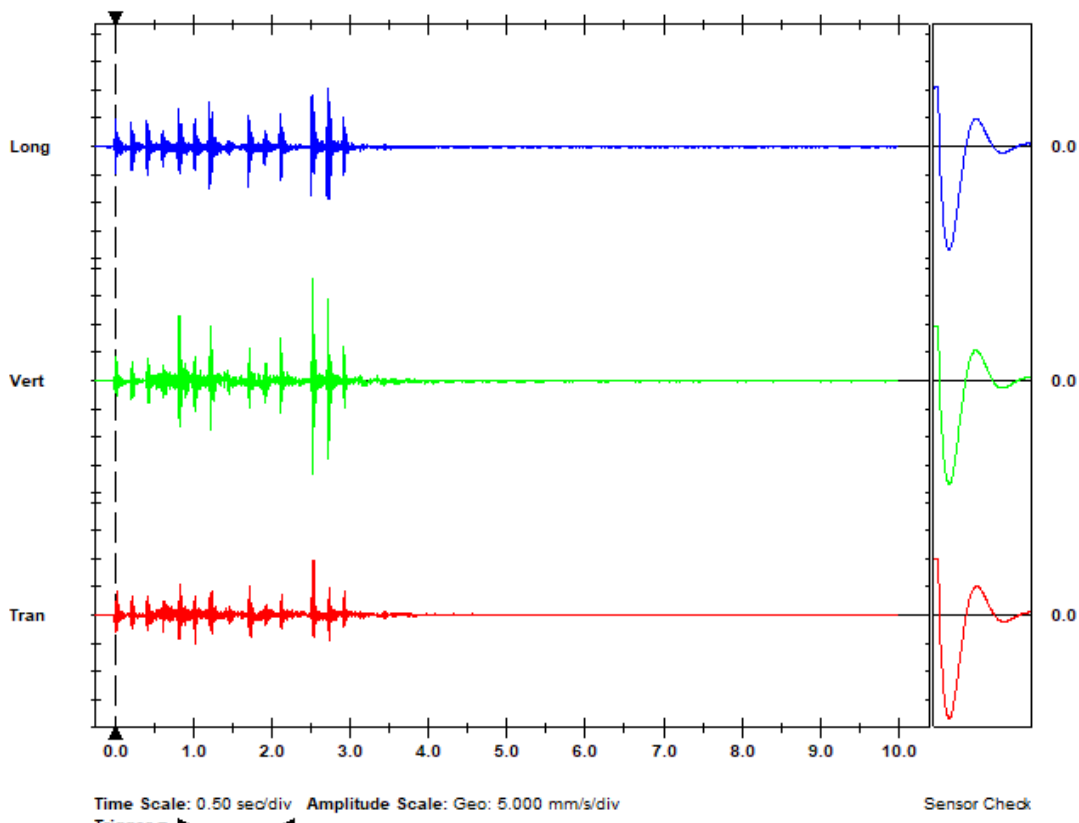
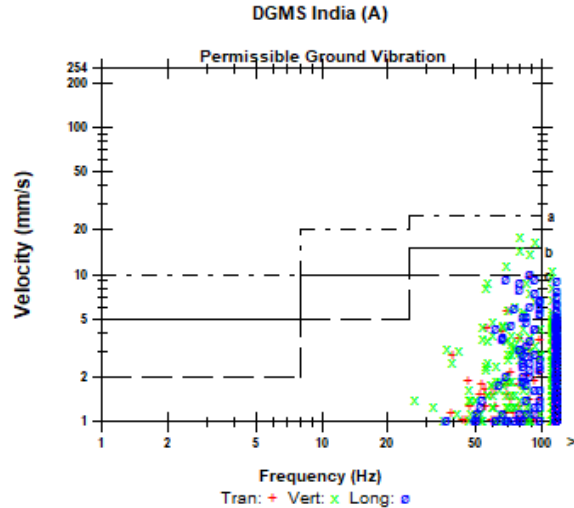
Location: On Ground Surface  
 Client: Zawar Group of Mines, HZL  
 User Name: REE DIVISION, CSIR-CIMFR, DHANBAD  
 General:

## Extended Notes

Blast optimisation study at Zawar Group of U/G Mine, HZL, Rajasthan

	Tran	Vert	Long	
PPV	9.652	18.16	10.16	mm/s
PPV	70.69	76.18	71.14	dB
ZC Freq	89	79	89	Hz
Time (Rel. to Trig)	2.534	2.525	2.714	sec
Peak Acceleration	0.530	1.061	0.583	g
Peak Displacement	0.016	0.036	0.022	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.7	7.6	Hz
Overswing Ratio	3.8	3.6	3.9	

Peak Vector Sum 18.35 mm/s at 2.525 sec



**Date/Time** Long at 16:14:00 July 20, 2019  
**Trigger Source** Geo: 2.510 mm/s  
**Range** Geo: 254.0 mm/s  
**Record Time** 10.0 sec at 4096 sps

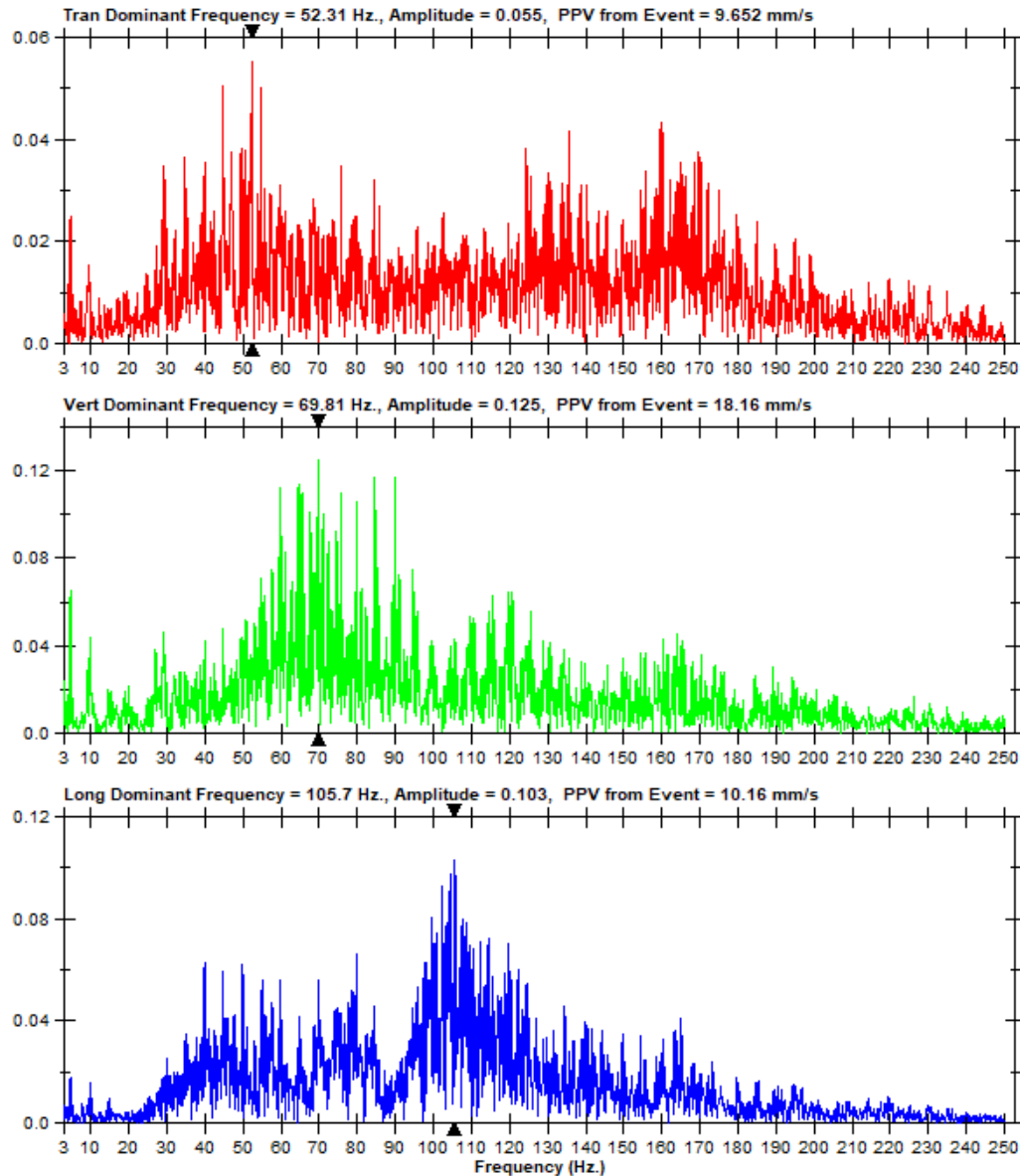
**Serial Number** BE10010 V 10.30-1.1 Minimate Blaster  
**Battery Level** 6.3 Volts  
**Unit Calibration** July 16, 2019 by CIMFR Dhanbad  
**File Name** L010113X.3C0

## Notes

**Location:** On Ground Surface  
**Client:** Zawar Group of Mines, HZL  
**User Name:** REE DIVISION, CSIR-CIMFR, DHANBAD  
**General:**

## Extended Notes

Blast optimisation study at Zawar Group of U/G Mine, HZL, Rajasthan







## Event Report

Date/Time Vert at 16:06:35 July 23, 2019  
Trigger Source Geo: 2.510 mm/s  
Range Geo: 254.0 mm/s  
Record Time 10.0 sec at 4096 sps

Serial Number BE10010 V 10.30-1.1 Minimate Blaster  
Battery Level 6.3 Volts  
Unit Calibration July 16, 2019 by CIMFR Dhanbad  
File Name L010119G.QZ0

### Notes

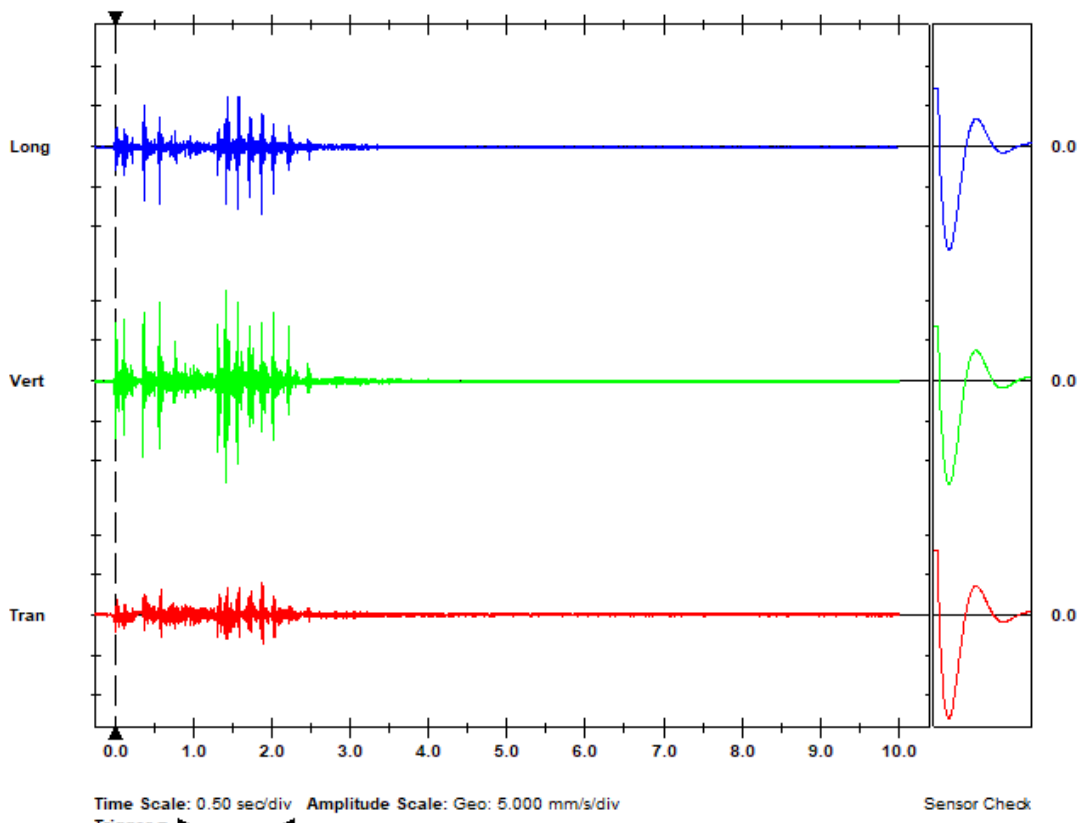
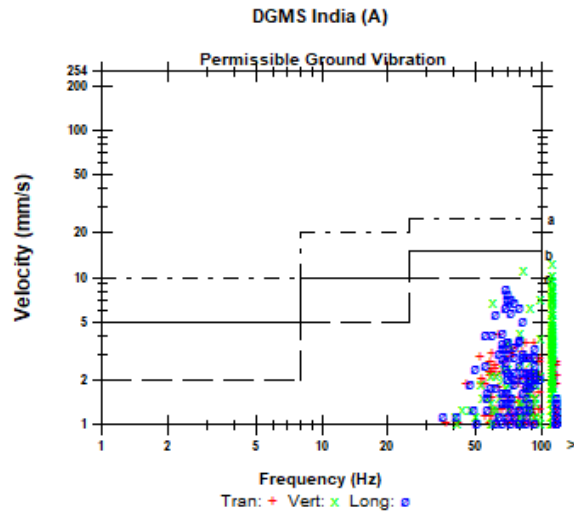
Location: On Ground Surface  
Client: Zawar Group of Mines, HZL  
User Name: REE DIVISION, CSIR-CIMFR, DHANBAD  
General:

### Extended Notes

Blast optimisation study at Zawar Group of U/G Mine, HZL, Rajasthan

	Tran	Vert	Long	
PPV	4.064	12.70	8.382	mm/s
PPV	63.18	73.08	69.47	dB
ZC Freq	64	120	68	Hz
Time (Rel. to Trig)	1.883	1.416	1.876	sec
Peak Acceleration	0.265	1.007	0.424	g
Peak Displacement	0.010	0.019	0.019	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.6	7.4	Hz
Overswing Ratio	3.7	3.6	4.0	

Peak Vector Sum 12.73 mm/s at 1.416 sec



Printed: February 15, 2021 (V 10.72 - 10.72)

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## FFT Report

Date/Time Vert at 16:06:35 July 23, 2019  
Trigger Source Geo: 2.510 mm/s  
Range Geo: 254.0 mm/s  
Record Time 10.0 sec at 4096 sps

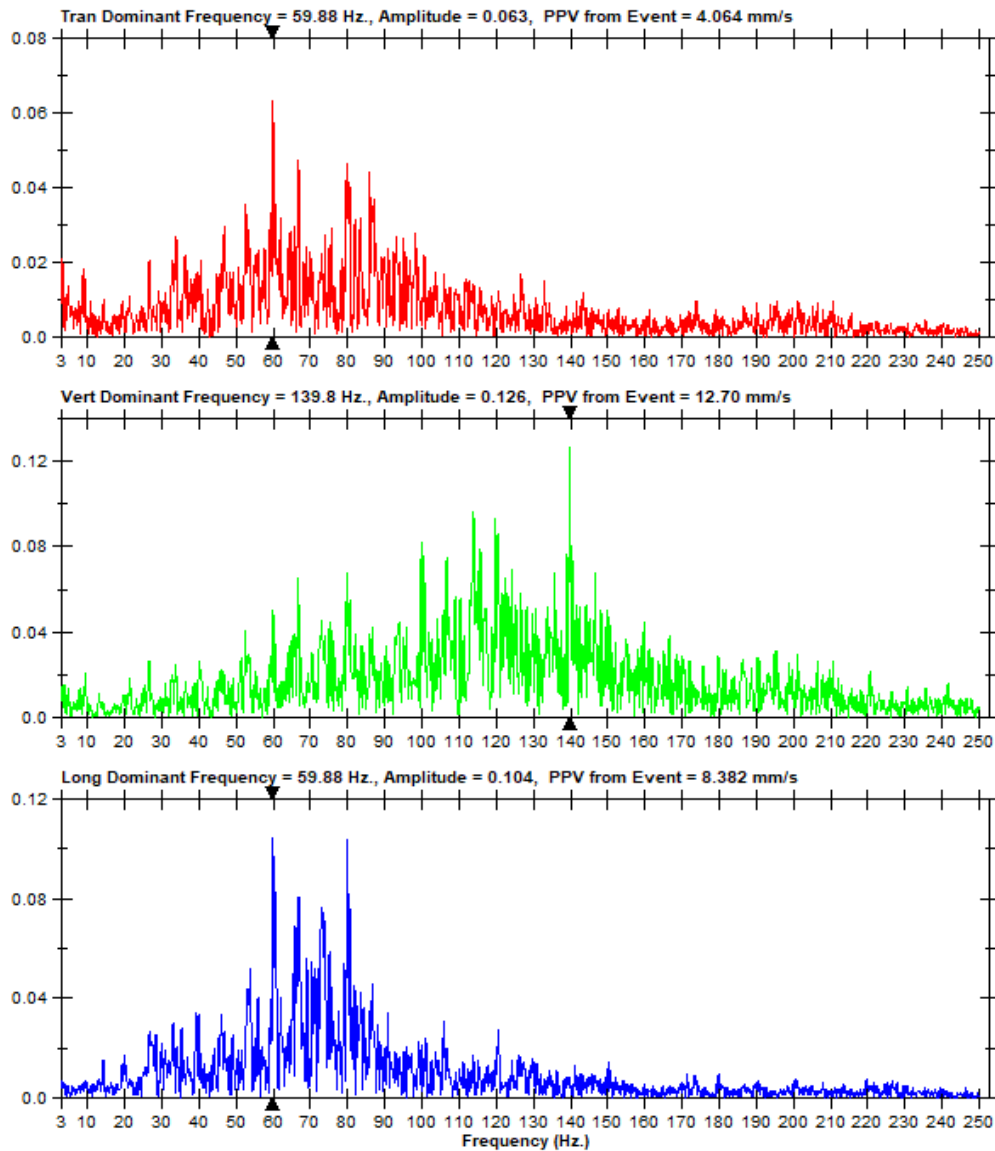
Serial Number BE10010 V 10.30-1.1 Minimate Blaster  
Battery Level 6.3 Volts  
Unit Calibration July 16, 2019 by CIMFR Dhanbad  
File Name L010119G.QZ0

### Notes

Location: On Ground Surface  
Client: Zawar Group of Mines, HZL  
User Name: REE DIVISION, CSIR-CIMFR, DHANBAD  
General:

### Extended Notes

Blast optimisation study at Zawar Group of U/G Mine, HZL, Rajasthan



**Confidential**

**CSIR-CENTRAL INSTITUTE OF MINING & FUEL RESEARCH**  
**(Council of Scientific & Industrial Research)**  
**Barwa Road, Dhanbad – 826 001**



***Draft Report on***

**Study and advice for blasting optimization at  
Zawarmala underground mines of M/s HZL for  
safe and efficient exploitation of minerals**

**PROJECT No. SSP/306/2018-19**

**February 2021**

## **Project Title**

### **Study and advice for blasting optimization at Zawarmala underground mines of M/s HZL for safe and efficient exploitation of minerals**

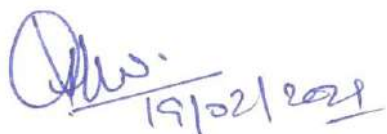
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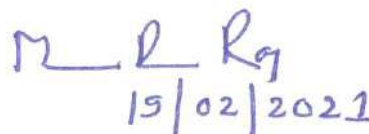
This report is meant for internal use of your organization only and it should not be published in full or part by your organization. It should not be communicated or circulated to outside parties except concerned departments. However, CSIR-CIMFR reserves the right to publish the results of the investigations 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.

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## **Contents**

S.No.		Page Nos.
	Executive Summary	1
1.	Introduction	3
2.	Location and Geology	3
3.	Instrumentation	5
4.	Experimental blast details	5
5.	Analyses of recorded vibration data	6
5.1	Frequency of blast vibration	7
5.2	Waveform analysis of blast	8
6.	Existing vibration standard and criteria to prevent damage	9
7.	Suggested blast design parameters for safety of underground Structures	10
7.1	Suggested Blast Design Parameters for Safety of Surface Structures	11
7.2	Safety precautions while blasting	11
8.	Review of development face blasting pattern	12
9.	Review of ring blasting pattern	13
10.	Monitoring of velocity of detonation (VOD) of explosives	15
11.	Quality test of delay detonators	16
11.1	Quality test of NONEL delay detonators during 1st visit	16
11.2	Quality test of NONEL delay detonators during 6th visit	21
12.	Conclusions and Recommendations	24
	Acknowledgements	26



## EXECUTIVE SUMMARY

This report relates to the study conducted by CSIR-Central Institute of Mining and Fuel Research, Dhanbad on blast optimization study at development faces as well as at production blast (slot/ring) faces for safe and efficient exploitation of minerals at Zawarmala underground mine. The methodology adopted to reach at the recommendations under this study includes the experimental trials, instrumentation, data monitoring, and data analysis. The results of the study and recommendations, made thereof with the important observations and methodology, are summarised below:

- ❖ The major objectives of the study were suggesting blast design parameters to prohibit damages around important underground structures, review of development face, production face blast pattern and qualitative assessments of explosives and its accessories. These objectives were achieved by experimental trials at the mine, generation of data for development of blast vibration predictors, and data analysis etc. The blast designs to address the major concerns has been suggested in the report on the basis of results of the data analysis and experimental trials. The experimental trials were carried out during the six visits to the mine.
- ❖ Altogether, 19 blast data gathered during the field study at the mine has been analysed. The blast vibrations were monitored around different underground structures located in the proximity of the blasting face. Most of the vibration were recorded at near field distances from the blast face.
- ❖ For development face blast, the number of holes detonated in a blast round varied from 33 to 52. The total explosives weight detonated in a blast round were varied from 175 to 190 kg. The maximum explosives weight per delay varied between 20 to 30 kg. The hole diameter of 45 mm were used in all the development blast faces. Blast holes were charged with emulsion cartridge explosives. Non-electric detonators (NONEL) was used for initiation of charged holes.
- ❖ Maximum level of ground vibration recorded from development face blast during experimental trial was 25.28 mm/s at peak dominant frequency of 39.81 Hz. The vibration was recorded at a distance of 50 m from the blast face 394 mRL development face on 21.07.2019. The location of seismograph was at the same level of the blast face. The blast was conducted for 50 numbers of hole. The total explosive charge of 175 kg was fired in this blast keeping explosive weight per delay of 20 kg.
- ❖ For production blast, the number of holes detonated in a blast round varied from 7 to 30. The total explosives weight detonated in a blast round were varied from 140 to 1200 kg. The maximum explosives weight per delay varied between 55 to 125 kg. The hole diameter of 70 mm, 102 mm and 115 mm were used for blast holes and uncharged reamer holes of the production blast faces. Blast holes were charged with emulsion cartridge explosives and Ammonium Nitrate Fuel Oil (ANFO) explosives. Electronic and NONEL initiation system was used for initiation of charged holes. The production blast was conducted by downhole as well as up hole charging and blasting fashion.

- ❖ Maximum level of ground vibration recorded from production blast during experimental trial was 48.28 mm/s at peak dominant frequency of 107.6 Hz. The vibration was recorded at a radial distance of 80 m from the -30 mRL Slot raise production blast conducted on 21.01.2019. The blast was conducted for 8 numbers of hole. The total explosive charge of 400 kg was fired in this blast keeping explosive weight per delay of 60 kg. The magnitude of vibration recorded at a radial distance of 100 m from the same blast was 25.92 mm/s having peak dominant frequency of 175.1 Hz. The trend shows very fast dampening of the blast vibration wave.
- ❖ The statistical predictor equation has been developed for the safety of underground structures while underground blasting. The Ground vibrations data recorded were grouped together for this purpose.
- ❖ The maximum explosive charge weight per delay and total explosive charge for the mine has been computed considering different vibration limits based on RMR values of the roof rock. The suggested MCPD and total charge is given in Annexure of the report. The suggested charging pattern should be followed for day-to-day blasting at the mine with the aim to safeguard nearby underground structures.
- ❖ The frequencies of the recorded vibration were more than 20.38 Hz in all the blasting rounds. The most common recorded frequency ranges between 50 Hz and 150 Hz. The maximum recorded frequency was 237.6 Hz.
- ❖ The existing drilling pattern for the face blast at the mine has been reviewed. The suggested firing pattern have focused on increasing the impact of explosive energy in the cut portion. It has been suggested to take all the initial four cut holes at the same delay to enhance the pull with cumulative impact of the explosive energy. The minimum distribution of the energy has been done in the cut holes using this principle. However, the over-break control in the periphery holes demands the explosive energy distribution in the blast holes of the periphery portion. Accordingly, the focus was to reduce the total number of blast holes firing simultaneously in the periphery portion. The maximum number of blast holes to be fired simultaneously from the blast design is 8.
- ❖ The the optimum burden for different blast hole diameter used at the mine has been computed using the empirical formulae suggested by Rustan. The differential charging pattern has been suggested to reduce the over-break. The delay sequence for day-to-day blasting at the production blast faces of the mine has been suggested.
- ❖ The in-the-hole velocity of detonation (VOD) of Powergel 2 cartridge explosives (2.08 kg of 54 mm dia) of M/s IEPL-Orica was recorded at underground production blast face of Zawarmala Underground Mines. The recorded VOD is 4780 m/s.
- ❖ The scattering tests of NONEL delay detonators were performed during 1<sup>st</sup> and 6<sup>th</sup> visits to the mine. The tests were conducted using High speed video camera. The test result reveals that the delay timing of the detonators is within acceptable limit for the test conducted during 6<sup>th</sup> visit.
- ❖ The scattering percentage should be restricted to maximum 10% up to 10 no. delay and thereafter it should be within 5% to get the optimum results from the blast.

## **1. Introduction**

M/s Hindustan Zinc Limited entrusted CSIR-Central Institute of Mining and Fuel Research, Dhanbad PO No.: 2000046826/5100022254 dated 13.01.2018 for conducting blast optimization study at development faces as well as at production blast (slot/ring) faces for safe and efficient exploitation of minerals at Zawar group of mines.

Scientists of CSIR-Central Institute of Mining & Fuel Research (CIMFR), Dhanbad conducted Six visits to the mine during March 26-31, 2018; July 13-21, 2018; September 25 – October 05, 2018; January 16 – February 01, 2019; July 16-27, 2019 and January 20 - 30, 2020. Methodology of blast design optimization was discussed with HZL officials. Near field blast induced vibration were measured by placement of seismographs for trial blasts of development and production faces. Qualitative assessment of explosive and its accessories were performed by Velocity of detonation (VOD) and scattering tests.

Based on the discussion with mine management, the major objectives of the study were as follows:

1. Development of nearfield blast vibration predictor and suggestion on blast design parameters to prohibit damages of underground structures.
2. Review of blasting pattern for excavation of development faces.
3. Review of blasting pattern followed for production blast faces of the mine.
4. Qualitative assessments of explosive and its accessories.

The above objectives were achieved by experimental trials at the mine. The statistical predictor equation has been developed on the basis of recorded vibration data. The data was gathered during the visits to the mine. The data gathered by the mine management were also taken together with the data from the experimental trial for the statistical analysis. The charging parameters for the blast at different distances from the underground structures has been suggested on the basis of the predictor. The necessary instrumentation was carried out during field visits for the assessment of explosive and its accessories.

## **2. Location and geology**

The region is one of the significant parts of the Aravalli Supergroup which have been deposited in a Paleoproterozoic rift setting. The Archean metamorphic sequences of the Banded Gneissic Complex form the basement of Aravalli Supergroup. The area in and around Udaipur constitutes the type area for Aravalli Supergroup. The economically noteworthy lower part of Aravalli Supergroup is best exposed in the vicinity of Zawar region. This area incorporates four separate Pb-Zn deposits namely, Balaria, Baroi, Mochia, Zawarmala. The mineralization in this region have been found to be around 1700 Ma old as evident from Pb-Pb model age. Further, the major lithologies of this region are dolomite (with varieties), phyllites, quartzite and conglomerates. The rocks of this area are steeply dipping and are in the form of ridge and

valley topography. The ridges are of quartzite and dolomite whereas intervening basin comprises of different categories of slate and phyllites. The rocks of this region have undergone three main phases of deformation and have undergone metamorphism up to greenschist facies. The mineralization has taken place in the form of fine bedding in carbonaceous phyllite lithologies and as structurally controlled, epigenetic form in different varieties of dolomites. The geological map of the mine is shown in Figure 1.

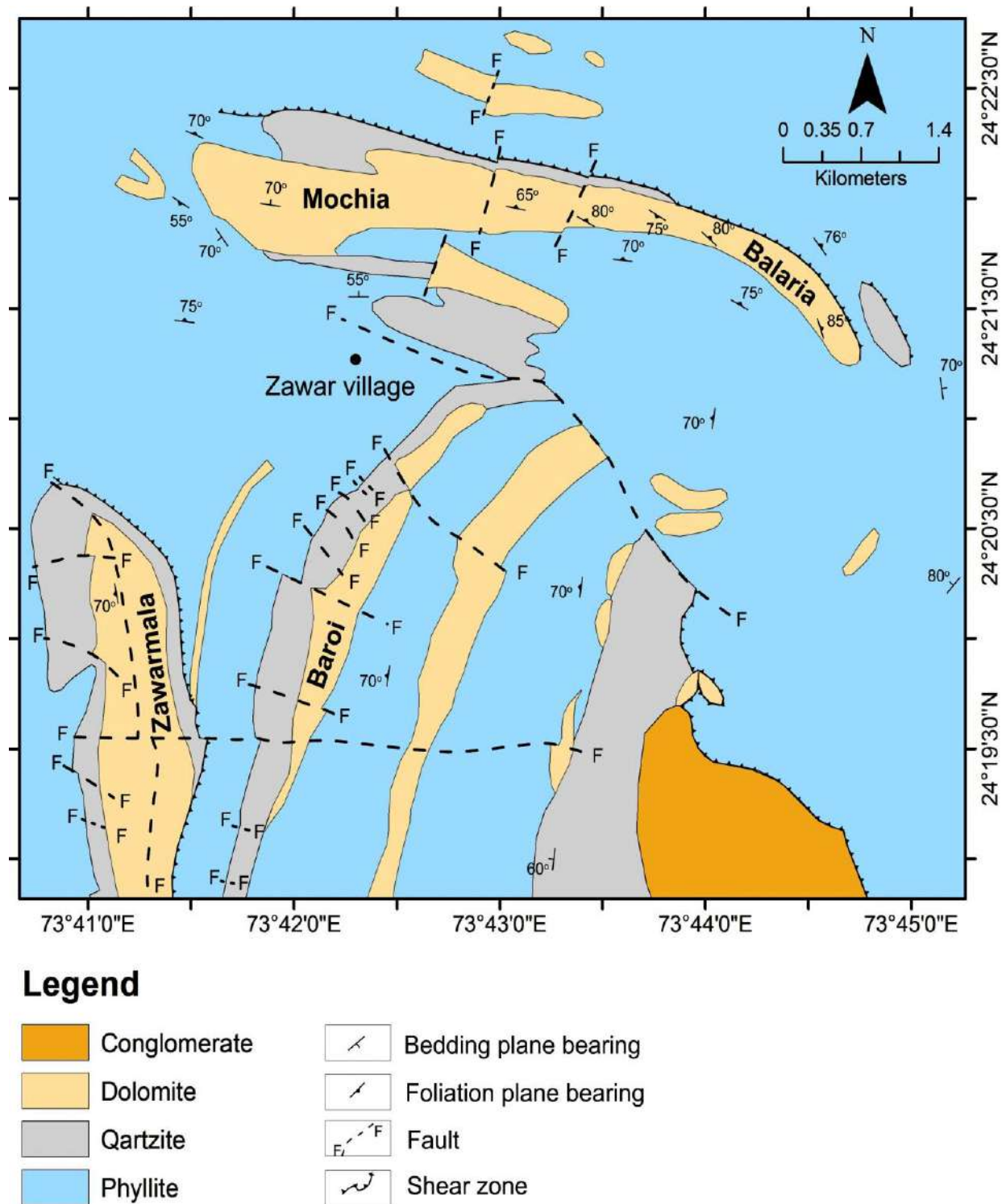


Figure 1. Geological map of Zawar Group of mines, HZL, Rajasthan

### **3. Instrumentations**

Blast induced vibrations were monitored by seismographs namely MiniMate Plus and MiniMate DS-077 (Made in Canada by M/s Instantel Inc.). The MiniMate plus is an eight/four channel seismograph provided with two/one tri-axial transducer for monitoring vibration (in mm/s) and two/one channel for monitoring air over-pressure/noise in dB(L) or Pa. MiniMate DS-077 is a four channel seismograph provided with one tri-axial transducer for vibration monitoring (in mm/s) and one channel for monitoring of air over-pressure/noise in dB(L) or Pa. All the seismographs record vibration in three directions i.e. Longitudinal (L), Vertical (V) and Transverse (T). They also record peak frequency of vibration and compute the peak vector sum of the vibration.

The in-the-hole VOD of the explosives was recorded with the help of VOD-Mate of M/s Instantel Inc., Canada.

Blaster's Ranger II™ high speed digital video camera (made in Canada by M/s MREL Group of Companies Limited) was used for scattering tests of delay detonators.

### **4. Experimental blast details**

Altogether, 19 blast data gathered during the field study at the mine has been analysed. The data are from blast conducted at different development and production blast faces of the mine. The blast vibrations were monitored around different underground structures located in the proximity of the blasting face. Most of the vibration were recorded at near field distances from the blast face. For development face blast, the number of holes detonated in a blast round varied from 33 to 52. The total explosives weight detonated in a blast round were varied from 175 to 190 kg. The maximum explosives weight per delay varied between 20 to 30 kg. The hole diameter of 45 mm were used in all the development blast faces. Blast holes were charged with emulsion cartridge explosives. Non-electric detonators (NONEL) was used for initiation of charged holes.

For production blast, the number of holes detonated in a blast round varied from 7 to 30. The total explosives weight detonated in a blast round were varied from 140 to 1200 kg. The maximum explosives weight per delay varied between 55 to 125 kg. The hole diameter of 70 mm, 102 mm and 115 mm were used for blast holes and uncharged reamer holes of the production blast faces. Blast holes were charged with emulsion cartridge explosives and Ammonium Nitrate Fuel Oil (ANFO) explosives. Electronic and NONEL initiation system was used for initiation of charged holes. The production blast was conducted by downhole as well as uphole charging and blasting fashion.

The blast induced ground vibration was recorded at different underground locations by placement of seismographs. A view of monitoring of blast vibration is shown in Photograph 1.



Maximum level of ground vibration recorded from development face blast during experimental trial was 25.28 mm/s at peak dominant frequency of 39.81 Hz. The vibration was recorded at a distance of 50 m from the blast face 394 mRL development face on 21.07.2019. The location of seismograph was at the same level of the blast face. The blast was conducted for 50 numbers of hole. The total explosive charge of 175 kg was fired in this blast keeping explosive weight per delay of 20 kg.

Maximum level of ground vibration recorded from production blast during experimental trial was 48.28 mm/s at peak dominant frequency of 107.6 Hz. The vibration was recorded at a radial distance of 80 m from the -30 mRL Slot raise production blast conducted on 21.01.2019. The blast was conducted for 8 numbers of hole. The total explosive charge of 400 kg was fired in this blast keeping explosive weight per delay of 60 kg. The magnitude of vibration recorded at a radial distance of 100 m from the same blast was 25.92 mm/s having peak dominant frequency of 175.1 Hz. The trend shows very fast dampening of the blast vibration wave.

The blast induced ground vibration was also recorded for the blast of a drop raise conducted on 01.01.2019. The magnitude of vibration recorded at a distance of 30 m from the blast face was 86.2 mm/s at peak dominant frequency of 22 Hz.



Photograph 1. View of the monitoring of blast induced vibration at different locations of Zawarmala Mine, HZL.

## 5. Analyses of recorded vibration data

Ground vibrations data recorded were grouped together for statistical analysis. The data taken from the mine management has also been taken together with the data generated during the experimental trials for the analysis. Analysis was performed based on vibration data recorded at different underground locations due to underground blasting and the 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). The generalised established equation combining all the underground vibration data for Zawarmala underground Mine is:

$$v = 650.63 \times \left( \frac{R}{\sqrt{Q_{\max}}} \right)^{-1.563} \dots\dots\dots \text{Equation 1}$$

Correlation co-efficient (R) = 83.90 %

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 predicting vibrations at underground locations of Zawarmala underground Mine. It may be used to compute the maximum explosives weight to be detonated in a delay for distances of concerned in the mine. The regression plots of vibration data recorded at their respective scaled distances is shown in Figure 2.

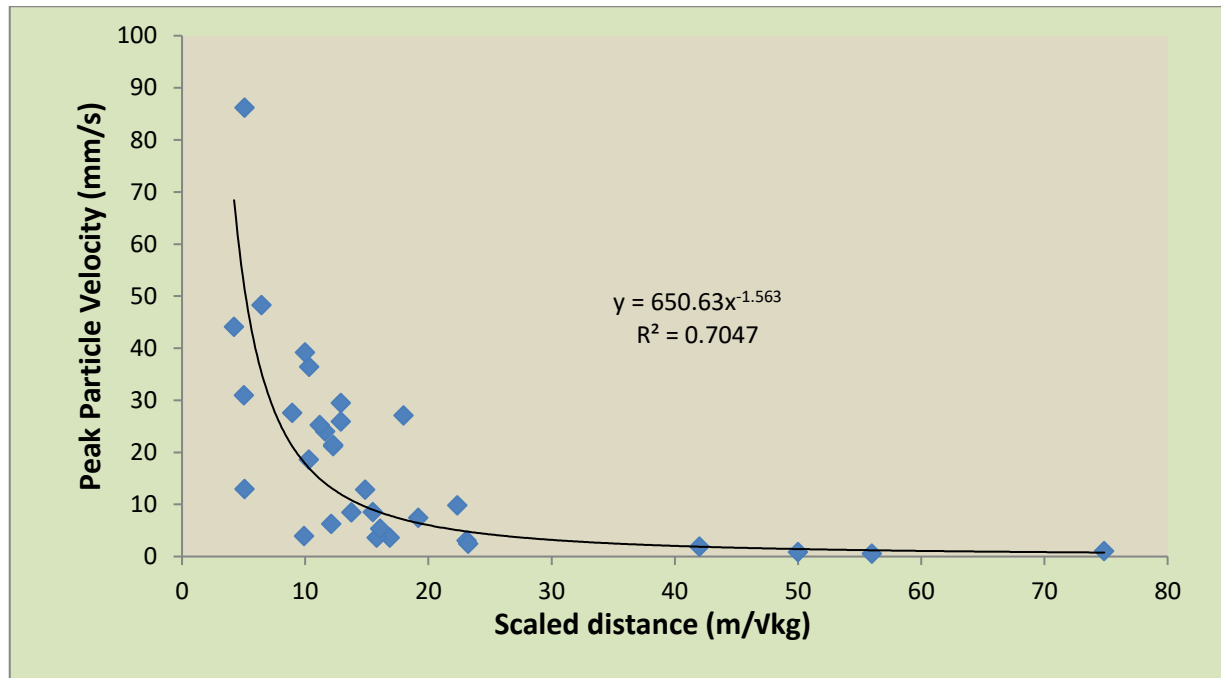


Figure 2. Regression plot of recorded PPV at different underground locations with their respective scaled distances for Zawarmala underground Mine.

## 5.1 Frequency of blast vibration

The frequency of blast induced vibration wave is mainly controlled by geological conditions of transmitting media and meagrely by delay arrangements. There are geological forms and structures that are favourable for formation of low frequency waves. The frequencies of the recorded vibration were more than 20.38 Hz in all the blasting rounds. The most common recorded frequency ranges between 50 Hz and 150 Hz. The maximum recorded frequency was 237.6 Hz. The dominant peak frequencies recorded at various radial distances are shown in Figure 3.

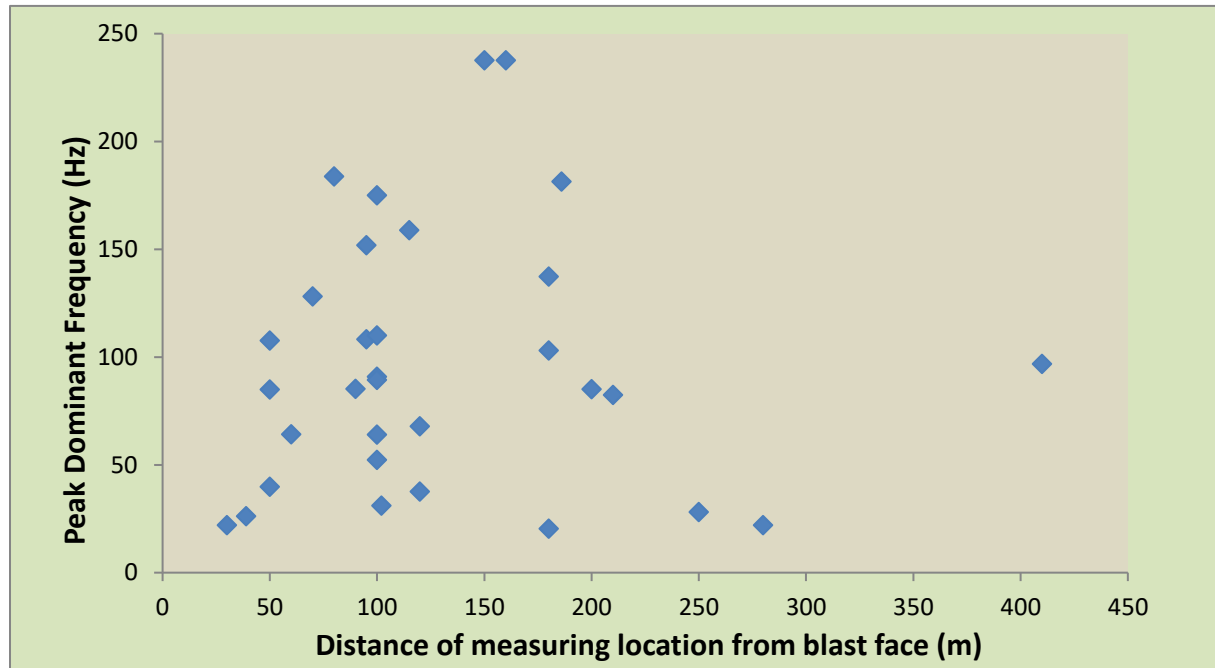


Figure 3. Plot of recorded dominant peak frequency of vibration at various radial distances in Zawarmala underground Mine.

## 5.2 Waveform analysis of blast

The analysis of recorded waveform from different blasts has been carried out to know the blast vibration propagation characteristic under the respective charging conditions. Blast wave signature recorded for blast conducted at 418 mRL production blast on 20.07.2019 is shown in Figure 4. The waveform was recorded at a distance of 75 m from the blast. FFT of recorded blast vibration is shown in Figure 5.

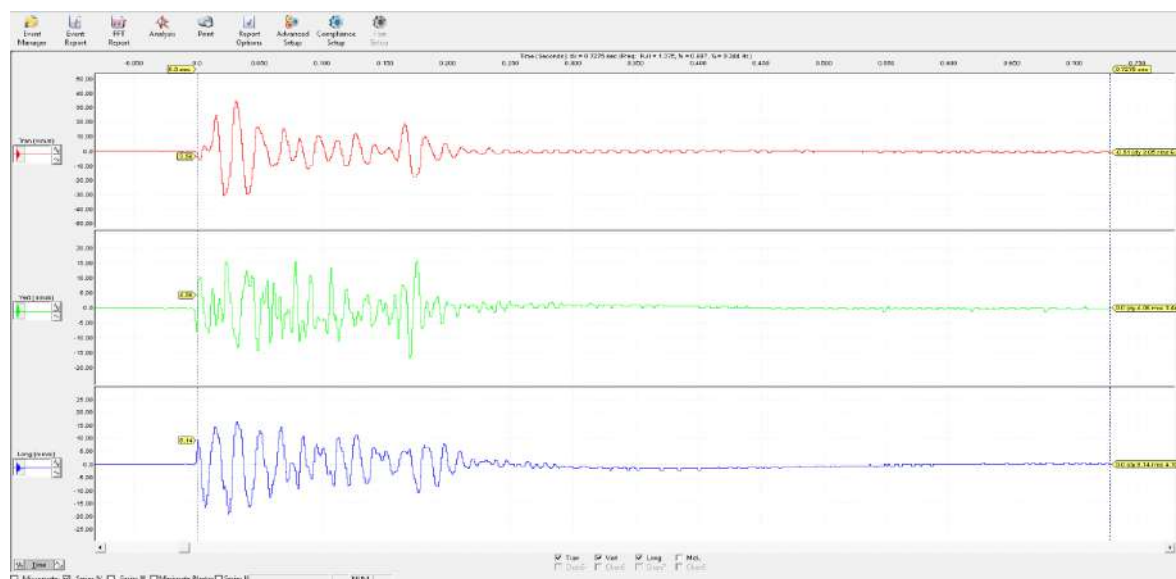


Figure 4. Blast time history recorded at a distance of 75m (at same level) due to blast conducted at 418 mRL production blast on 20.07.2019.

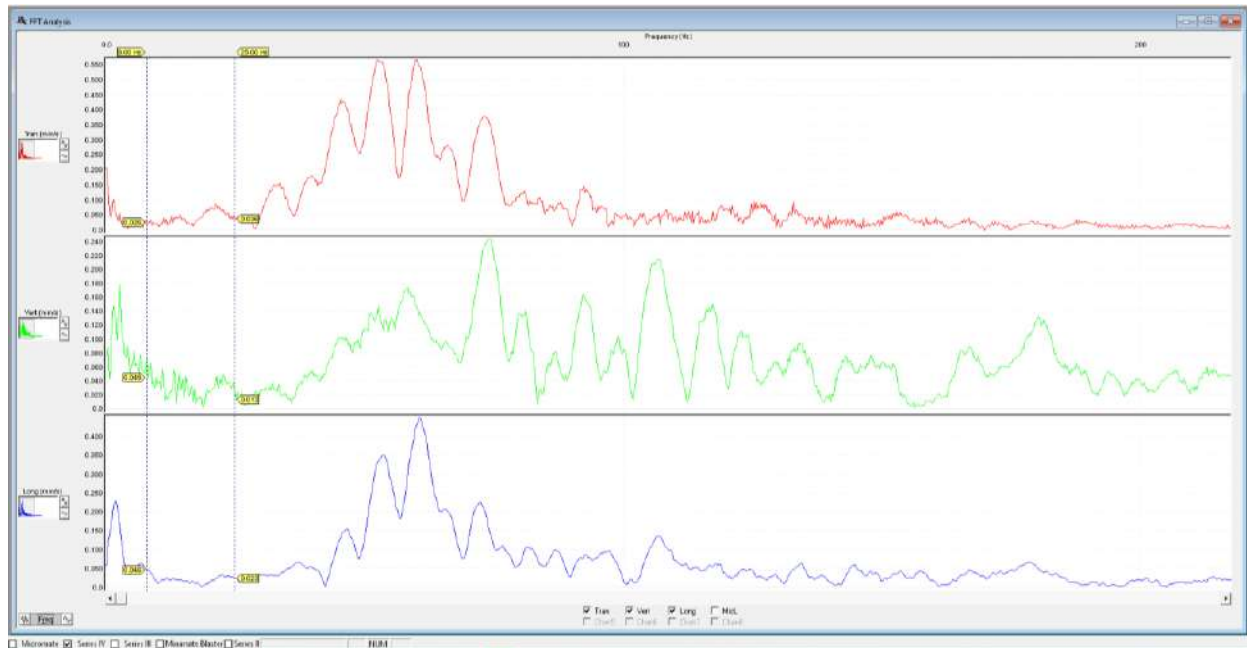


Figure 5. FFT of Blast vibration recorded at a distance of 75m (at same level) due to blast conducted at 418 mRL production blast on 20.07.2019

## 6. Existing vibration standard and criteria to prevent damage

Peak particle velocity has been globally used in practice for assessment of blast-induced damage to structures. The degree of damage observed in the belowground openings is influenced by the RMR of roof rock. Thus, the damage criterion for below ground workings is based on RMR. Based on the extensive study conducted by the project proponents [erstwhile Central Mining Research Institute (Currently, CSIR- Central Institute of Mining & Fuel Research), Dhanbad], the DGMS issued a Tech (S&T) Circular no. 06 of 2007 for threshold value of vibration for the safety of roof and pillar in the belowground workings for different RMR. The DGMS standard for the safety of roof and pillar are given in Tables 1 and 2 respectively.

Table 1. Threshold values of vibration generated due to open-pit blasting for the safety of roof in the below ground working for different RMR.

RMR of roof rock	Threshold value of vibration in terms of peak particle velocity [mm/s]
20-30	50
30-40	50-70
40-50	70-100
50-60	100-120
60-80	120

Table 2. Threshold values of vibration generated due to open-pit blasting for the safety of pillars in the below ground workings for different RMR.

RMR of the rock	Threshold value of vibration in terms of peak particle velocity [mm/s]
20-30	20
30-40	20-30
40-50	30-40
50-60	40-50
60-80	50

The damages of surface structures by blast induced vibration are dependent on magnitude and frequency of ground vibration. The resonant frequency of structural vibration and blast vibration lead to cause maximum damage even at lower magnitude. Directorate General of Mines Safety (DGMS) have framed regulation under circular 7, 1997 to define limits of blast vibration near surface structures. The framed regulation has been presented in Table 3.

Table 3. DGMS standard (*Technical Circular Number 7 of 1997*)

Type of structure	Dominant excitation frequency, Hz		
	< 8 Hz	8-25 Hz	> 25 Hz
<b>(A) Buildings/structures not belonging to the owner</b>			
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>(B) Buildings with limited span of life and belonging to owner</b>			
1. Domestic houses/structures	10	15	25
2. Industrial buildings	15	25	50

## 7. Suggested blast design parameters for safety of underground structures

Geotechnical studies at Zawarmala underground Mine suggest that RMR of the roof rock is dominantly in the range of 50 to 65. So the threshold values of vibration have been suggested based on the existing RMR of the mine. The threshold values of vibration for RMR of the roof rock 50, 55 &  $\geq 60$  may be taken as 100 mm/s, 110 mm/s & 120 mm/s respectively. The suggested threshold vibration limit is as per DGMS circular No. 06 of 2007. The formulated standard is based on impact of surface blasting on stability of underground structures. The same circular is also being referred in this case i.e. impact of underground blasting on underground structures as no specific guideline has been framed in DGMS Circular for the blast vibration limits for safety of underground structures from underground blasting. However, the blasting at underground metal mine along with monitoring of nearfield vibration in same working level represents propagation of vibration wave through homogeneous media.



The vibration limit in such case will certainly be increased considering the high values of RMR and high dominant frequency (recorded dominant frequency for Zawarmala underground Mine are in the range of 20.38 to 237.6 Hz).

The maximum explosive charge weight per delay and total explosive charge for the mine has been computed considering different vibration limits based on RMR values of the roof rock. The suggested MCPD for safety of underground structures at different distances from the blast face is shown in Annexure as Table A2. The predicted level of vibration under different MCPD is shown in Annexure as Table A3. The suggested total explosive charge for blast at different distances from the underground structures is shown in Annexure as Table A4. The predicted level of vibration under different total explosive charge is shown in Annexure as Table A5. The magnitude of vibration can be reduced by separation of blast holes by longer delay interval. It is suggested to use 40ms delay between holes and 500ms as delay between rings for larger blast with increased explosive consumption.

## **7.1 Suggested Blast Design Parameters for Safety of Surface Structures**

The explosive weight per delay and total explosive charge for safety of surface residential/industrial structures has been computed from site specific predictor equation. The suggested explosive charge weight per delay and total explosive charge for safety of surface structures has been presented in Annexure as Table A6. The mine management is suggested to decide minimum charging parameters (i.e. explosive weight per delay and total explosive charge in a blasting round) for stability of underground structures as well as surface structures.

## **7.2 Safety precautions while blasting**

Following safety precautions need to be taken by Mine Management while planning and implementation of a blast:

- ✓ Charge weight per delay and total explosive charge in a blasting round should be followed considering the minimisation of blast vibration within stipulated standards for safety of nearfield underground structures, far filed underground structures as well as surface residential/industrial structures.
- ✓ The decision on maximum explosive weight per delay should be done on the basis of predictor equation for the blast faces having RMR of the roof rock is less than 50. The threshold vibration limit in such case should be taken from DGMS Tech. Circular No. 06 of 2007.
- ✓ Hole deviation measurement should be done to ensure proper toe burden as well as collapsing of two holes. As the collapsing of holes may lead to increased charge weight per delay.
- ✓ Special precautions at permanent underground structures viz. shaft/decline, shaft pillars, crown pillar etc. should be taken to ensure proper support after blasting. The in-situ

stresses are redistributed after blasting, which may lead to requirement of additional supports to regain rock strength.

- ✓ Loose rocks should be dressed properly before drilling/charging behind blasted face.
- ✓ Stope should be scanned after blasting to get actual view of void generated after blasting. Precautions should be taken while charging where additional cavity in toe of down-hole face have been observed in scan.

## 8. Review of development face blasting pattern

The existing drilling and blasting pattern for the face blast at the mine has been reviewed. The firing pattern has been suggested for day-to-day face blasting at the mine. The suggested firing pattern is shown in Figure 6. The suggested firing pattern have focused on increasing the impact of explosive energy in the cut portion. It has been suggested to take all the initial four cut holes at the same delay to enhance the pull with cumulative impact of the explosive energy. The minimum distribution of the energy has been done in the cut holes using this principle. However, the over-break control in the periphery holes demands the explosive energy distribution in the blast holes of the periphery portion. Accordingly, the focus was to reduce the total number of blast holes firing simultaneously in the periphery portion. The maximum number of blast holes to be fired simultaneously from the blast design is 8. The reduced number of holes will reduce the maximum charge weight per delay and thereby will help in minimizing the over-break.

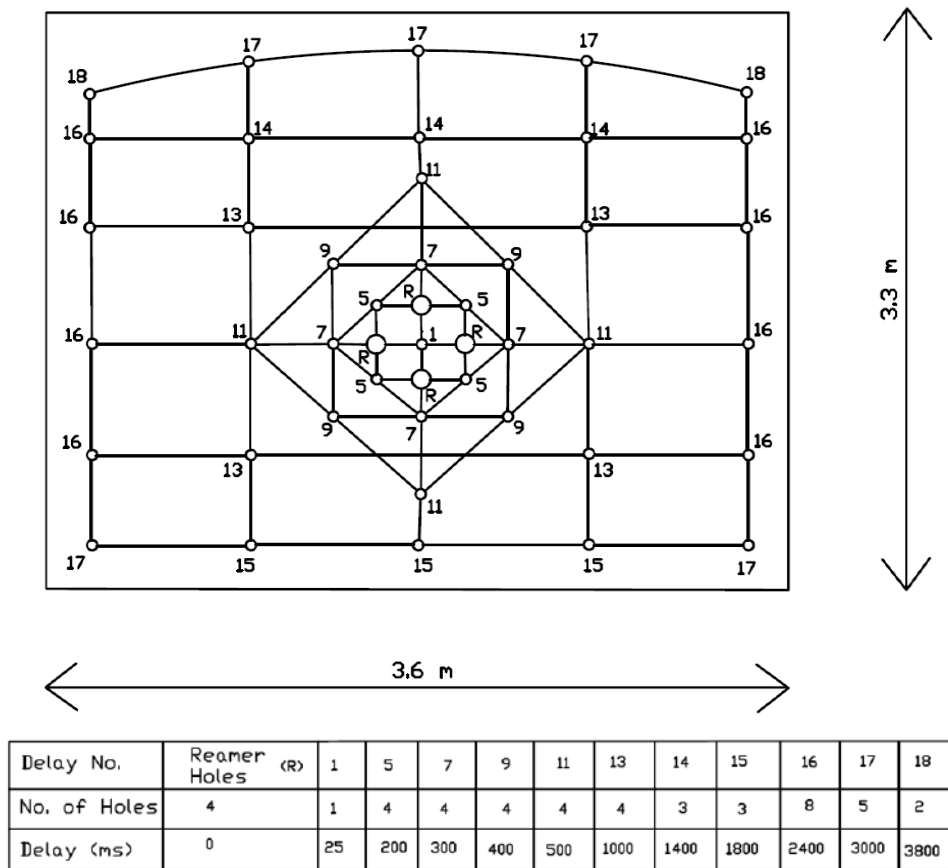


Figure 6. Suggested blast design pattern for face blasting at Zawarmala Underground Mine.

## 9. Review of ring blasting pattern

The blasting pattern for ring blasting has been reviewed in terms of its geometry, delay sequence and delay timing. Optimised burden-spacing plays prime role to get desired fragmentation output from a blast. Researchers around the globe have established various relations for optimisation of burden-spacing. Sometimes, burden-spacing terminologies are also confusing for underground ring blast. The terminology suggested by Dyno Nobel underground manual as- hole to hole distance to be taken as spacing and ring to ring distance as burden. The toe spacing as per this manual is shown in Figure 7.

The thumb rule for computation of burden-spacing for underground stope blast has been suggested by Rustan. The suggested thumb rule is presented in Equation 2. Rustan has also suggested the maximum and minimum limits of the burden for this formula. The maximum burden should be kept 50 % more than the computed burden and the minimum burden can be 35 % less than the computed burden. Toe Spacing of the holes may be kept up to 1.2 times of burden/ring spacing as suggested by various researchers.

$$\text{Burden} = 11.8 \times \Phi^{0.63} \quad (\text{Equation 2})$$

Where,

$\Phi$  = Blast hole diameter

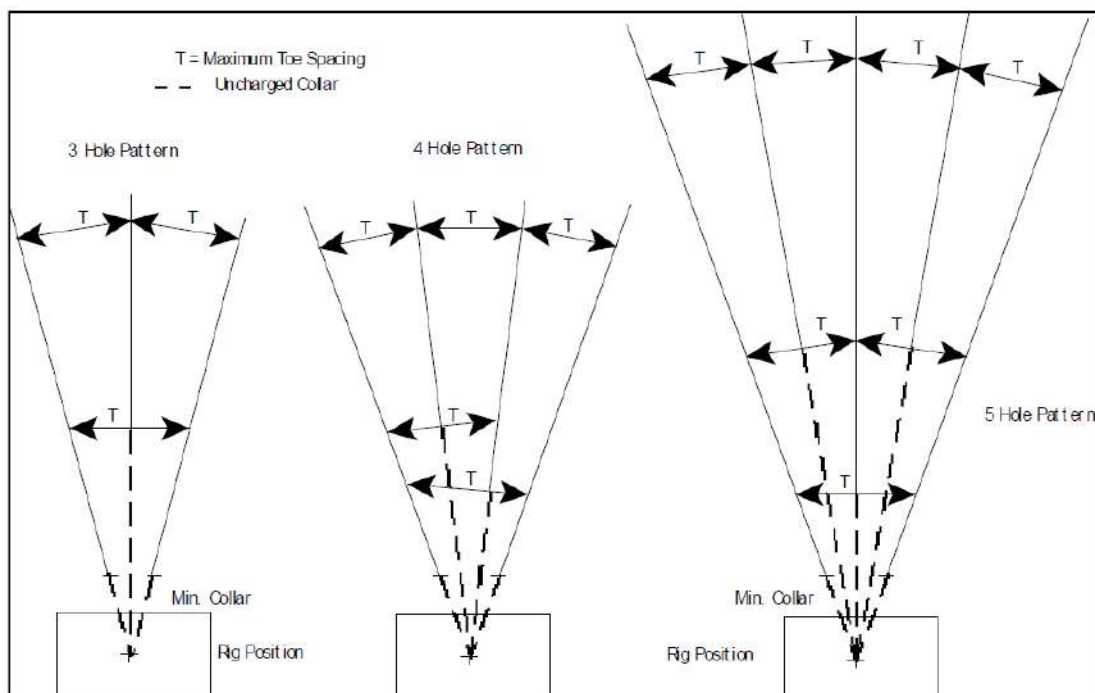


Figure 7. Ring drilling pattern showing toe spacing design (Dyno Nobel underground manual)

Based on the above equation, the optimum burden for different blast hole diameter has been computed. The computed burden is shown in Table 4. The variation in the suggested burden may be done based on the rock mass condition at the stoping site. The hard strata should be

blasted with the reduced burden and soft strata with the increased burden in order to get the optimum output from the blast.

Table 4. Suggested burden-spacing for ring hole blasting to be conducted using different drill hole diameters at Zawarmala UG Mine, HZL.

Blast Hole Diameter (mm)	Computed Burden (m)		
	Minimum	Optimum	Maximum
57	1.3	1.9	2.9
64	1.4	2.1	3.1
70	1.4	2.2	3.3
76	1.5	2.3	3.5
89	1.7	2.6	3.9
102	1.8	2.8	4.2
115	2.0	3.0	4.5

The suggested toe spacing of the holes, which varies at different depths between drill level and draw level. It is suggested to do differential charging or alternate hole charging in the portion where blast holes are closer. A view of suggested differential charging is shown in Figure 8.

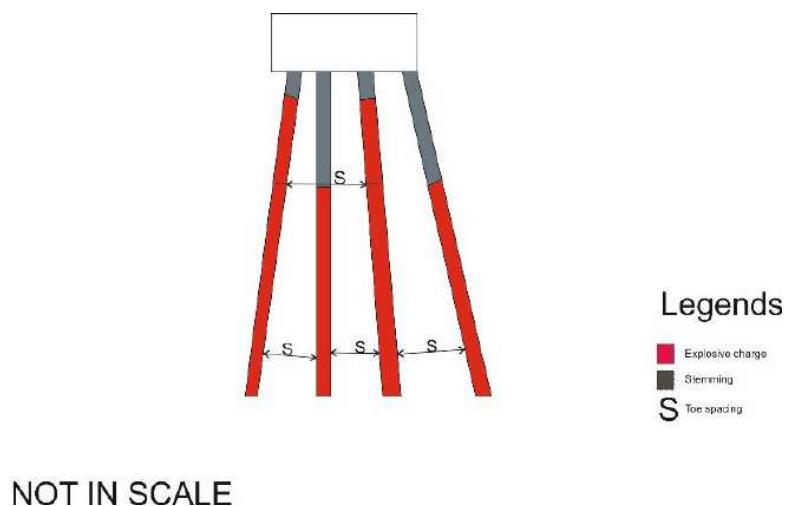


Figure 8. The suggested differential charging pattern for ring blasting.

The delay sequence for ring blasting at the mine has been suggested to get the optimum result. The common ring blasting pattern practiced at Zawarmala mine includes the simultaneous excavation of up hole and downhole rings. The delay sequence for a ring with up and down-blast holes is shown in Figure 9.

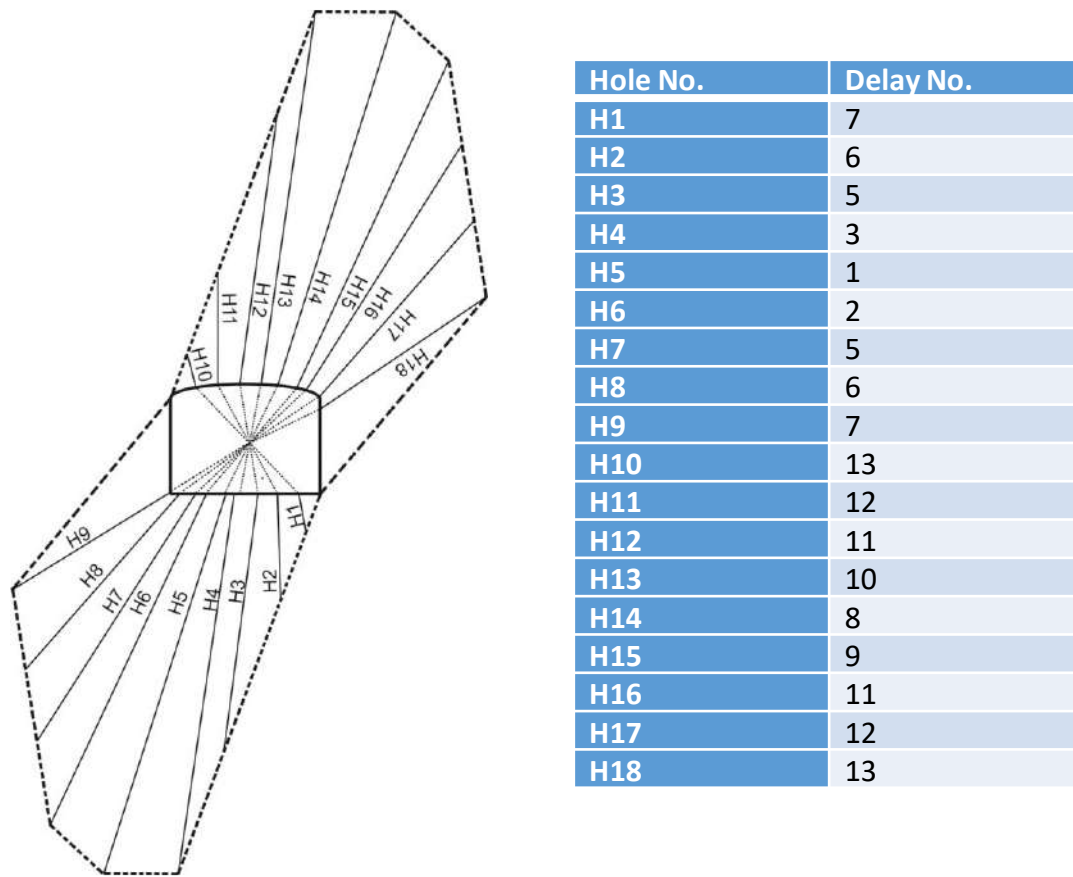


Figure 9. Suggested delay pattern for day-to-day stope blasting at the mine.

## 10. Monitoring of velocity of detonation (VOD) of explosives

The performance of explosives depends upon a number of parameters and VOD is one of the important parameter. 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.

$$P_d = \frac{1}{4} \rho_e (VOD)^2 10^{-6}$$

Where,

- $P_d$  = Detonation pressure (MPa)
- $\rho_e$  = Density of explosive ( $\text{kg/m}^3$ )
- VOD = Velocity of detonation (m/s)

Uniform VOD is essentially required throughout the blast holes in harder formations in order to produce sufficient detonation pressure to the blast hole walls. Velocity of detonation (VOD) of Powergel 2 cartridge explosives (2.08 kg of 54 mm dia) of M/s IEPL-Orica recorded at underground production blast face of Zawarmala underground mine on 29.03.2018 is 4780 m/s. The trace of recorded in-the-hole VOD of explosive is presented in Figure 10.



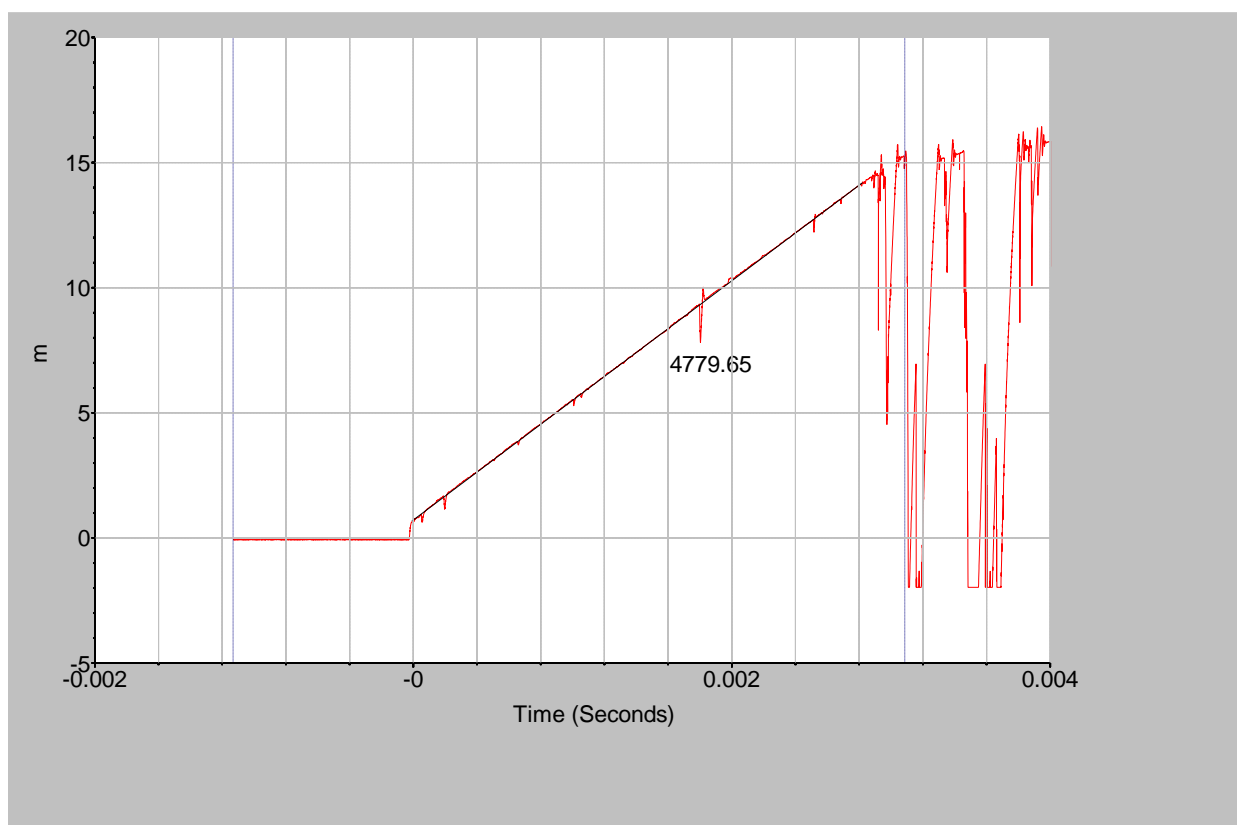


Figure 10. Recorded in-the-hole VOD trace of Powergel-2 (2.08 kg of 54 mm dia.) cartridge explosives of M/s IEPL, Orica.

## 11. Quality test of delay detonators

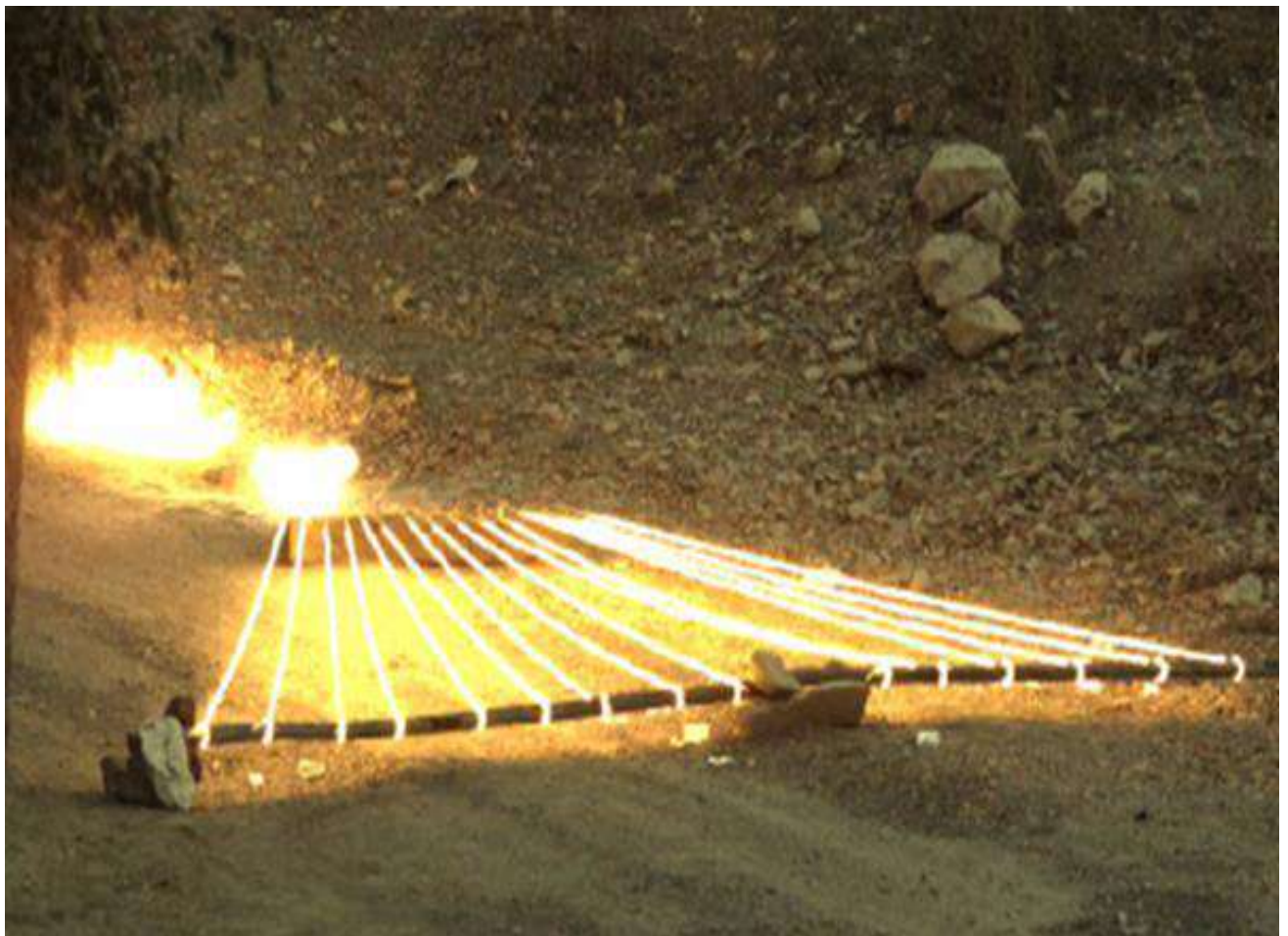
### 11.1 Quality test of NONEL delay detonators during 1<sup>st</sup> visit

The qualities of Nonel delay detonators of M/s Indian Explosive Private Limited (IEPL), Orica used to initiate the explosives at Production as well as development face of the mine, has been recorded with the help of Blaster Ranger II, High Speed Color Video camera. Tests were performed for 3 sets of Nonel delay detonators from 1 to 20 numbers used at production face as well as 3 sets of alternate delay detonators i.e 1,3,5,7,9,11 and 13-20 numbers, used at development face. View of NONEL delay detonators connection arrangements for delay scattering test is depicted in Photograph 2. After analysis of the video data, it was found that the sequence of detonations are in order for all the delay detonator but high scattering upto (-) 75% is observed for delay detonator used at production face and up to (-) 38% for development face detonators. Photograph 3 depicts the analysis of actual firing time from video data for delay numbers 1 to 5 with the help of ProAnalyst software. The observed firing sequence of the NONEL detonators for production face and development face are presented in Table 5 and Table 6 respectively. The graphical presentation of the design firing vs actual firing time of Nonel delay detonators (1 to 20 delay numbers) used at production faces and Nonel delay detonator (1,3,5,7,9,11 and 13-20 numbers) used at development face of Zawar group of mine is depicted in Figure 11 and Figure 12 respectively.

The scattering percentage should be restricted to maximum 10 % up to 10 no. delay and thereafter it should be within 5 %.



Photograph 2. View of NONEL delay detonators (3 sets of delay number 1-5) connection for delay detonator scattering test.



Photograph 3. Analysis of actual firing time from video data with the help of ProAnalyst software for 1 to 5 numbers delay detonators.

Table 5. Analyzed firing time of the NONEL delay detonators 1 to 20 numbers (3 sets) used at Production blast face of Zawar group of mines tested during 1<sup>st</sup> visit.

Delay No.	Design delay timing	Actual Firing timing	Scattering	% of scattering
	(ms)	(ms)	(ms)	
1	17	24	7	41.2
1	17	24	7	41.2
1	17	28	11	64.7
2	65	56	-9	-13.8
2	65	56	-9	-13.8
2	65	60	-5	-7.7
3	100	72	-28	-28
3	100	72	-28	-28
3	100	76	-24	-24
4	150	100	-50	-33.3
4	150	100	-50	-33.3
4	150	100	-50	-33.3
5	200	120	-80	-40
5	200	124	-76	-38
5	200	108	-92	-46
6	250	148	-102	-40.8
6	250	148	-102	-40.8
6	250	148	-102	-40.8
7	300	172	-128	-42.7
7	300	172	-128	-42.7
7	300	168	-132	-44
8	350	196	-154	-44
8	350	208	-142	-40.6
8	350	208	-142	-40.6
9	400	244	-156	-39
9	400	248	-152	-38
9	400	252	-148	-37
10	600	304	-296	-49.3
10	600	304	-296	-49.3
10	600	304	-296	-49.3
11	800	348	-452	-56.5
11	800	336	-464	-58
11	800	328	-472	-59
12	1000	408	-592	-59
12	1000	400	-600	-59
12	1000	404	-596	60
13	1400	472	-928	-66.3
13	1400	468	-932	-66.6
13	1400	464	-936	-66.9
14	1800	508	-1292	-71.8
14	1800	504	-1296	-72
14	1800	488	-1312	-72.9

15	2400	584	-1816	-75.7
15	2400	584	-1816	-75.7
15	2400	600	-1800	-75
16	3000	988	-2012	-67.1
16	3000	1008	-1992	-66.4
16	3000	1012	-1988	-66.3
17	3600	1444	-2156	-59.9
17	3600	1448	-2152	-59.8
17	3600	1472	-2128	-59.1
18	4200	1848	-2352	-56
18	4200	1792	-2408	-57.3
18	4200	1788	-2412	-57.4
19	4800	2432	-2368	-49.3
19	4800	2456	-2344	-48.8
19	4800	2456	-2344	-48.8
20	5400	3264	-2136	-39.6
20	5400	3196	-2204	-40.8
20	5400	3176	-2224	-41.2

Table 6. Analyzed firing time of the NONEL delay detonators 1,3,5,7,9,11 and 13 to 20 numbers (3 sets) used at development blast face at Zawar group of mines tested during 1<sup>st</sup> visit.

Delay no	delay timing	Actual firing time	Scattering	% of scattering
	(ms)	(ms)	(ms)	
1(5m)	17	24	7	41.18
1(5m)	17	24	7	41.18
1(5m)	17	24	7	41.18
3(5m)	100	92	-8	-8
3(5m)	100	100	0	0
3(5m)	100	100	0	0
5(5m)	200	212	12	6
5(5m)	200	204	4	2
5(5m)	200	208	8	4
7(5m)	300	304	4	1.33
7(5m)	300	288	-12	-4
7(5m)	300	304	4	1.33
9(5m)	400	408	8	2
9(5m)	400	400	0	0
9(5m)	400	404	4	1
11(5m)	800	496	-304	-38
11(5m)	800	492	-308	-38.5
11(5m)	800	496	-304	-38
13(5m)	1400	976	-424	-30.29
13(5m)	1400	964	-436	-31.14
13(5m)	1400	980	-420	-30.29
14(5m)	1800	1432	-368	-20.44
14(5m)	1800	1428	-372	-20.67
14(5m)	1800	1416	-384	-21.33

15(5m)	2400	1804	-596	-24.83
15(5m)	2400	1788	-612	-25.5
15(5m)	2400	1824	-576	-24
16(5m)	3000	2304	-696	-23.2
16(5m)	3000	2288	-712	-23.73
16(5m)	3000	2336	-664	-22.13
17(5m)	3600	2968	-632	-17.56
17(5m)	3600	2880	-720	-20
17(5m)	3600	3032	-568	-15.78
18(5m)	4200	3660	-540	-12.86
18(5m)	4200	3728	-472	-11.24
18(5m)	4200	3668	-532	-12.67
19(5m)	4800	4556	-244	-5.08
19(5m)	4800	4564	-236	-4.92
19(5m)	4800	4568	-232	-4.83
20(5m)	5400	5332	-68	-1.26
20(5m)	5400	5300	-100	-1.85
20(5m)	5400	5404	4	0.07

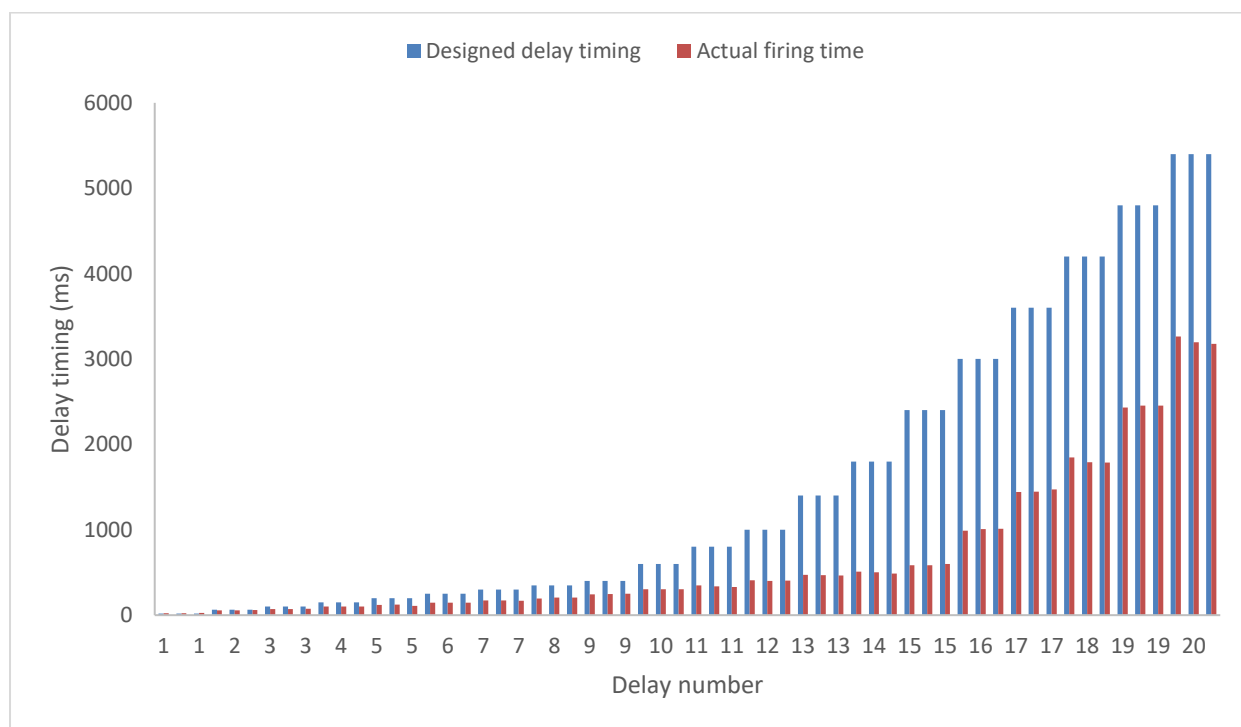


Figure 11. Graphical presentation of the design firing vs actual firing time of Nonel delay detonators (1 to 20 numbers) used at Production blast face at Zawar group of mines tested during 1<sup>st</sup> visit.

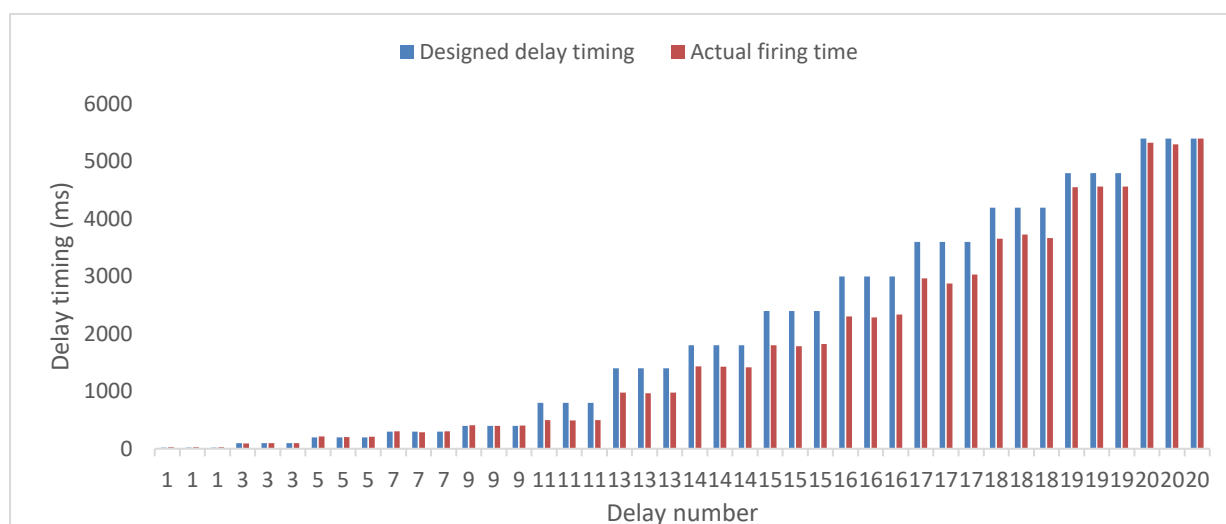


Figure 12. Graphical presentation of the design firing vs actual firing time of Nonel delay detonators used at development blast face at Zawar group of mines tested during 1<sup>st</sup> visit.

## 11.2 Quality test of NONEL delay detonators during 6<sup>th</sup> visit

The qualities of Nonel delay detonators of M/s Indian Explosive Private Limited (IEPL), Orica used to initiate the explosives at Production as well as development face of the mine, were again tested during 6<sup>th</sup> visit to the mine. The results of the scattering test for NONEL delay detonators used at production and development faces of the mine is shown in Table 7 and Table 8 respectively. The graphical representation of the scattering results is shown in Figure 13 and Figure 14. The analysis of the scattering test reveals that the maximum scattering in NONEL delay detonators used at production blast faces is 9.3 %. The maximum scattering in the NONEL delay detonators used at development blast faces is 12 %. The result of scattering is acceptable.

Table 7. Analyzed firing time of the NONEL delay detonators used at production blast face of Zawar group of mines tested during 6<sup>th</sup> visit.

Delay No.	Defined Delay time [ms]	Recorded delay time [ms]	Scattering [ms]	% scattering
1	25	26	1	4.0
1	25	24	-1	-4.0
1	25	24	-1	-4.0
2	50	46	-4	-8.0
2	50	46	-4	-8.0
2	50	46	-4	-8.0
3	75	80	5	6.7
3	75	76	1	1.3
3	75	82	7	9.3
4	100	94	-6	-6.0
4	100	92	-8	-8.0
4	100	92	-8	-8.0



5	125	132	7	5.6
5	125	128	3	2.4
5	125	130	5	4.0
6	150	152	2	1.3
6	150	148	-2	-1.3
6	150	150	0	0.0
7	175	178	3	1.7
7	175	178	3	1.7
7	175	174	-1	-0.6
8	200	198	-2	-1.0
8	200	200	0	0.0
8	200	194	-6	-3.0
9	250	252	2	0.8
9	250	254	4	1.6
9	250	252	2	0.8
10	300	272	-28	-9.3
10	300	272	-28	-9.3
10	300	278	-22	-7.3
11	350	356	6	1.7
11	350	356	6	1.7
11	350	364	14	4.0
12	400	382	-18	-4.5
12	400	388	-12	-3.0
12	400	410	10	2.5
13	450	452	2	0.4
13	450	460	10	2.2
13	450	440	-10	-2.2
14	500	476	-24	-4.8
14	500	486	-14	-2.8
14	500	484	-16	-3.2
15	600	634	34	5.7
15	600	594	-6	-1.0
15	600	630	30	5.0
16	1000	1024	24	2.4
16	1000	1008	8	0.8
16	1000	1008	8	0.8
17	1400	1396	-4	-0.3
17	1400	1412	12	0.9
17	1400	1412	12	0.9
18	1800	1844	44	2.4
18	1800	1892	92	5.1
18	1800	1860	60	3.3
19	2400	2376	-24	-1.0
19	2400	2384	-16	-0.7
19	2400	2328	-72	-3.0
20	3000	2920	-80	-2.7
20	3000	2972	-28	-0.9
20	3000	2948	-52	-1.7

Table 8. Analyzed firing time of the NONEL delay detonators used at development blast face of Zawar group of mines tested during 6<sup>th</sup> visit.

Delay No.	Designed delay timing (ms)	Actual firing time (ms)	Scattering (ms)	% of scattering
1	25	26	1	4.0
1	25	28	3	12.0
1	25	26	1	4.0
3	100	100	0	0.0
3	100	96	-4	-4.0
3	100	100	0	0.0
5	200	198	-2	-1.0
5	200	204	4	2.0
5	200	200	0	0.0
7	300	298	-2	-0.7
7	300	296	-4	-1.3
7	300	298	-2	-0.7
9	400	372	-28	-7.0
9	400	376	-24	-6.0
9	400	378	-22	-5.5
11	500	502	2	0.4
11	500	496	-4	-0.8
11	500	500	0	0.0
13	1000	968	-32	-3.2
13	1000	976	-24	-2.4
13	1000	992	-8	-0.8
14	1400	1364	-36	-2.6
14	1400	1350	-50	-3.6
14	1400	1346	-54	-3.9
15	1800	1752	-48	-2.7
15	1800	1752	-48	-2.7
15	1800	1766	-34	-1.9
16	2400	2368	-32	-1.3
16	2400	2430	30	1.3
16	2400	2356	-44	-1.8
17	3000	2996	-4	-0.1
17	3000	2940	-60	-2.0
17	3000	2972	-28	-0.9
18	3800	3776	-24	-0.6
18	3800	3740	-60	-1.6
18	3800	3880	80	2.1
19	4600	4492	-108	-2.3
19	4600	4584	-16	-0.3
19	4600	4636	36	0.8
20	5500	5296	-204	-3.7
20	5500	5252	-248	-4.5
20	5500	5328	-172	-3.1

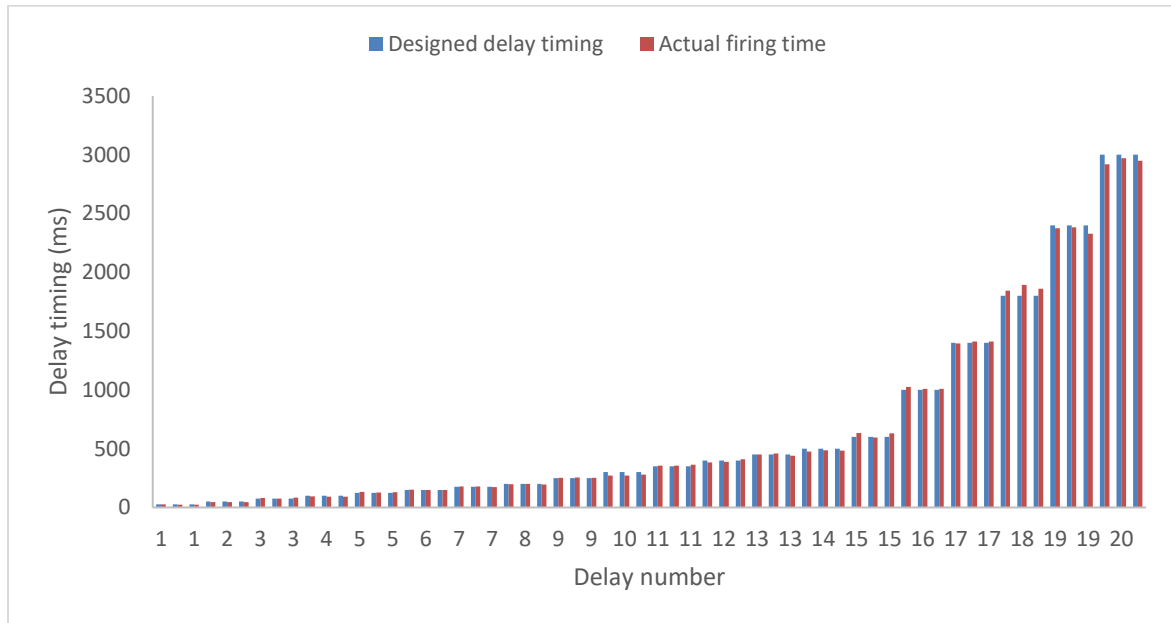


Figure 13. Graphical presentation of the design firing vs actual firing time of Nonel delay detonators used at production blast face of Zawar group of mines tested during 6<sup>th</sup> visit.

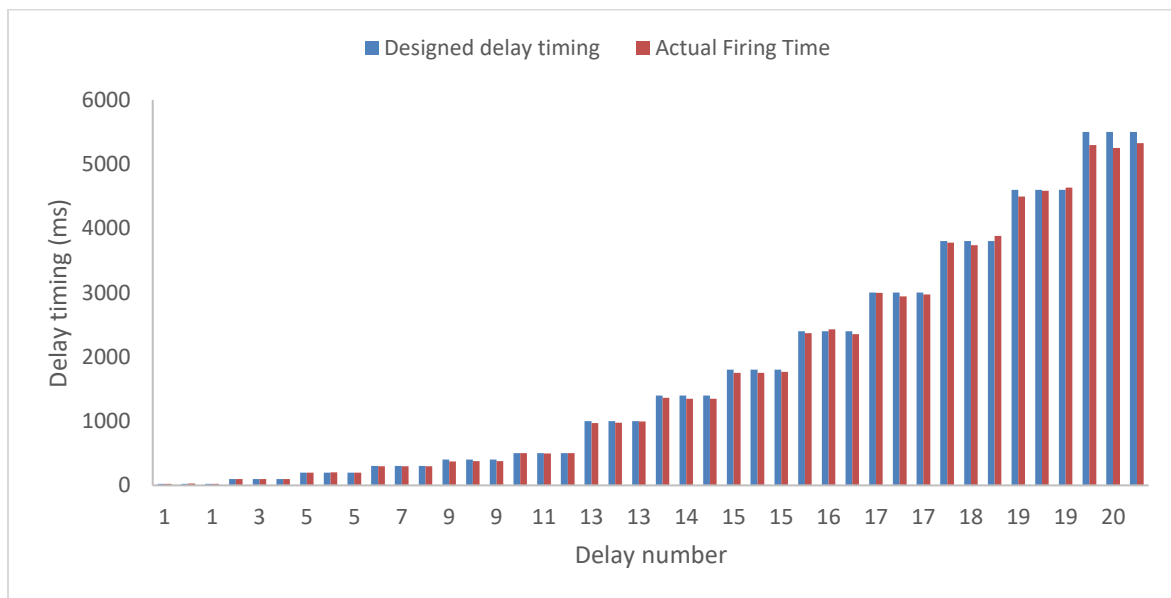


Figure 14. Graphical presentation of the design firing vs actual firing time of Nonel delay detonators used at development blast faces of Zawar group of mines tested during 6<sup>th</sup> visit.

## 12. Conclusions and recommendations

- ❖ Altogether, 19 blast data gathered during the field study at the mine has been analysed. The blast vibrations were monitored around different underground structures located in the proximity of the blasting face. Most of the vibration were recorded at near field distances from the blast face.

- ❖ Maximum level of ground vibration recorded from development face blast during experimental trial was 25.28 mm/s at peak dominant frequency of 39.81 Hz. The vibration was recorded at a distance of 50 m from the blast face 394 mRL development face on 21.07.2019. The location of seismograph was at the same level of the blast face. The blast was conducted for 50 numbers of hole. The total explosive charge of 175 kg was fired in this blast keeping explosive weight per delay of 20 kg.
- ❖ Maximum level of ground vibration recorded from production blast during experimental trial was 48.28 mm/s at peak dominant frequency of 107.6 Hz. The vibration was recorded at a radial distance of 80 m from the -30 mRL Slot raise production blast conducted on 21.01.2019. The blast was conducted for 8 numbers of hole. The total explosive charge of 400 kg was fired in this blast keeping explosive weight per delay of 60 kg. The magnitude of vibration recorded at a radial distance of 100 m from the same blast was 25.92 mm/s having peak dominant frequency of 175.1 Hz. The trend shows very fast dampening of the blast vibration wave.
- ❖ The maximum explosive charge weight per delay and total explosive charge for the mine has been computed considering different vibration limits based on RMR values of the roof rock. The suggested MCPD and total charge is given in Annexure of the report. The suggested charging pattern should be followed for day-to-day blasting at the mine with the aim to safeguard nearby underground structures.
- ❖ The frequencies of the recorded vibration were more than 20.38 Hz in all the blasting rounds. The most common recorded frequency ranges between 50 Hz and 150 Hz. The maximum recorded frequency was 237.6 Hz.
- ❖ The existing drilling pattern for the face blast at the mine has been reviewed. The suggested firing pattern have focused on increasing the impact of explosive energy in the cut portion. It has been suggested to take all the initial four cut holes at the same delay to enhance the pull with cumulative impact of the explosive energy. The minimum distribution of the energy has been done in the cut holes using this principle. However, the over-break control in the periphery holes demands the explosive energy distribution in the blast holes of the periphery portion. Accordingly, the focus was to reduce the total number of blast holes firing simultaneously in the periphery portion. The maximum number of blast holes to be fired simultaneously from the blast design is 8.
- ❖ The optimum burden for different blast hole diameter (57 mm, 64 mm, 70 mm, 76 mm, 89 mm, 102 mm and 115 mm) used at the mine has been computed using the empirical formulae suggested by Rustan. The differential charging pattern has been suggested to reduce the over-break. The delay sequence for day-to-day blasting at the production blast faces of the mine has been suggested.
- ❖ The in-the-hole velocity of detonation (VOD) of Powergel 2 cartridge explosives (2.08 kg of 54 mm dia) of M/s IEPL-Orica was recorded at underground production blast face of Zawarmala Underground Mines. The recorded VOD is 4780 m/s.

- ❖ The scattering tests of NONEL delay detonators were performed during 1<sup>st</sup> and 6<sup>th</sup> visits to the mine. The tests were conducted using High speed video camera. The test result reveals that the delay timing of the detonators is within acceptable limit for the test conducted during 6<sup>th</sup> visit.
- ❖ The scattering percentage should be restricted to maximum 10 % up to 10 no. delay and thereafter it should be within 5 % to get the optimum results from the blast.
- ❖ Selection of delay should be based on the face condition and actual availability of hole depth on the site. Proper information about delay timings of different delay numbers in case of NONEL initiation shall be well informed to the entire blasting concern engineer.
- ❖ It is recommended to maintain delay interval of at least 12-20ms/m of burden. It is further recommended to use a minimum delay of 40ms between the holes.
- ❖ More delay interval towards hanging wall side (at an interval of 60ms) and lesser delay interval towards footwall (at an interval of 40ms) should be given to minimise the dilution of ore with optimal fragmentation.
- ❖ Larger delay timing should be given in the last (boundary) holes of a ring and it should be increased by 50% for minimisation of ore dilution.
- ❖ The delay timing of 300 to 500ms should be maintained between the rings. The subsequent increment in the delay intervals should be given in the consecutive rings for multi-ring blasting.
- ❖ Bottom portion of the hole must be charged with primer emulsion cartridges only to address the issues of ledge formation.
- ❖ Two additional blast holes at boundaries should be kept uncharged for minimising hanging wall and foot wall damages. These holes should be drilled as along the contact of the orebody or within 30 cm from the outer boundary of ore body and kept uncharged in order to reduce dilution.
- ❖ The optimum quantity of booster should be used in the blast holes. The quantity of emulsion/PETN cast booster should be 0.16% to 0.2% of the column charge and quantity of primer emulsion cartridges of appropriate diameter should be 15% - 25% of the explosive charge in the blast hole. Accordingly, the ANFO percentage will be of 75% - 85 %.
- ❖ Emulsion booster should be preferred in place of PETN cast booster from the safety point of view at the places where there is problem of misfire and chances of ignition of the misfired cast booster while loading & transportation.

## **Acknowledgements**

The research team is thankful to the mine management of Zawarmala underground mine, Hindustan Zinc Limited for sponsoring the study.

Table A1. Blast vibrations data recorded at different locations of Zawarnala underground mine of HZL.

Blast No.	Date and time of blast	Location of blast	No. of holes	Hole dia. (mm)	Explo sives per hole (kg)	Total explosive fired in the round (kg)	Max <sup>m</sup> explosive weight per delay (Kg)	Location of blast vibration monitoring transducers	Distance of Vibration measuring location [m]			Peak particle velocity (PPV) [mm/s]	Dominant Frequency [Hz]
									Horizontal	Vertical	Radial		
1	01.01.2019	0 mRL drop raise	13	115	28	375	35	0 mRL Substation	30	0	30	86.2	22
2	13.01.2019	-5 mRL ring blast	30	70	40	1200	75	0 mRL substation	103	0	103	3.09	85.06
3	14.01.2019	- 30 mRL x cut 7	50	45	4	190	30	-30 mRL substation	410	0	410	1.064	96.81
4	13.01.2019	-5 mRL S15 raise blast	10	115	80	800	90	17 mRL raise	158	22	160	3.653	237.6
5	18.01.2019 (A shift)	-5 mRL slot raise	11	115	55	600	60	-5 mRL X-Cut Junction S-15	39	0	39	31	26.13
6	18.01.2019	Development face	52	45	3.5	190	25	-5 mRL near vent raise	120	0	120	8.586	37.69
								-5 mRL ore drive S-15	114	0	114	1.926	182.4
								-5 mRL X-Cut Junction S-15	135	0	135	0.88	22.813
								-5 mRL near vent raise	150	0	150	0.596	22
7	21.01.2019	-30 mRL Slot raise	8	115	50	400	60	-30 mRL X-Cut	80	0	80	48.28	107.6
								-30 mRL near telephone	100	0	100	25.92	175.1
								-30 mRL in drive	120	0	120	24.04	85.19
								-30 mRL in drive	140	0	140	21.22	108.3
8	24.01.2019	-30 mRL Slot raise	15	70	46	700	60	-30 mRL X-Cut	80	0	80	36.42	183.8
								-30 mRL near water sump	100	0	100	29.52	90.88
								-30 mRL Manhole	120	0	120	21.46	151.9
9	13.01.2019	-5 mRL	10	115	80	800	90	17 mRL raise	100	22	110	3.653	237.6



10	20.01.2019	S15 raise blast	14	115	75	1050	90	17 mRL blast monitoring station	115	0	115	6.305	158.8
11	21.01.2019	- 30 mRL raise	8	70	50	400	60	17 mRL blast monitoring station	90	47	102	2.463	20.38
12	29.01.2019	- 30 mRL ring blast	12	70	45	550	55	17 mRL blast monitoring station	90	47	102	8.525	31.13
13	30.01.2019	- 30 mRL ring blast	18	70	45	800	65	0 mRL substation	400	0	400	12.84	67.92
14	20/07/2019	418 mRL slot widening	11	115	54	600	100	Diamond drilling	75	0	75	39.21	52.25
15	21/07/2019	394 mRL develop- ment face	33	45	5	175	20	Near junction of 418 mRL and 394 mRL	150	0	150	27.08	>100
16	22/07/2019	418 mRL T- 2 stope	7	70	71	500	125	394 mRL main drive	50	0	50	25.28	39.81
17	24/07/2019	418 mRL T- 2 stope	7	70	47	330	94	394 mRL main drive	85	0	85	9.82	>100
18	22.01.2020	-59 mRL P1 Stope	3	102	46	140	67	418 mRL drive manhole	75	0	75	27.57	64
19	22.01.2020	-35 mRL Drop Raise	12	102	16	200	50	418 mRL decline junction	150	0	150	5.34	137.3
								418 mRL decline manhole	80	0	80	18.65	89.44
								418 mRL decline junction	155	0	155	7.45	181.4
								-25mRL, Near E Fan	21	34	40	44.11	85
								Near -55mRL sign board	50	04	50	12.98	64.19
								-32mRL	60	03	60	3.94	128.1

Table A2. Computed explosive weight per delay at various radial distances for different permissible level of vibration based on RMR of roof rock at Zawarmala underground Mine, HZL.

Radial distance [m]	Computed Maximum explosive weight per delay for different values of PPV for the safety of underground structure [kg]		
	100 mm/s [For RMR 50]	110 mm/s [For RMR 55]	120 mm/s [For RMR ≥ 60]
30	82	93	103
40	146	165	184
50	228	257	287
60	328	370	414
70	446	504	563
80	583	658	736
90	737	833	931
100	910	1028	1150
125	1422	1607	1796
150	2048	2314	2587
200	3642	4114	4598

Table A3. Predicted peak particle velocity levels for various distance taking explosive weight Per delay of 40, 60, 80, 100, 125 & 150 kg for blasting at Zawarmala underground Mine.

Distance from the blast face [m]	Predicted peak particle velocity levels for different explosive weight per delay for the safety of underground structure [mm/s]					
	40 kg	60 kg	80 kg	100 kg	125 kg	150 kg
30	57.1	78.4	98.1	116.8	139.1	160.4
40	36.4	50.0	62.6	74.5	88.7	102.3
50	25.7	35.3	44.2	52.6	62.6	72.2
60	19.3	26.5	33.2	39.5	47.1	54.3
70	15.2	20.8	26.1	31.1	37.0	42.7
80	12.3	16.9	21.2	25.2	30.0	34.6
90	10.3	14.1	17.6	21.0	25.0	28.8
100	8.7	11.9	14.9	17.8	21.2	24.4
125	6.1	8.4	10.5	12.6	14.9	17.2
150	4.6	6.3	7.9	9.4	11.2	13.0
200	2.9	4.0	5.1	6.0	7.2	8.3

Table A4. Computed total explosive weight in a round at various radial distances for different Permissible level of vibration based on the RMR of roof rock at Zawarmala underground Mine.

Radial distance [m]	Computed total explosive weight in a blasting round for different values of PPV for the safety of underground structure [kg]		
	100 mm/s [For RMR 50]	110 mm/s [For RMR 55]	120 mm/s [For RMR ≥ 60]
30	662	753	845
40	1178	1338	1503
50	1840	2090	2349
60	2650	3010	3382
70	3607	4097	4603
80	4711	5352	6012
90	5962	6773	7609
100	7361	8362	9394
125	11501	13065	14678
150	16562	18814	21137
200	29443	33447	37576

Table A5. Predicted peak particle velocity levels for various distance taking total explosive charge in a blasting round 500, 1000, 1500, 2000, 3000 and 4000 kg for blasting at Zawarmala underground Mine.

Distance from the blast face [m]	Predicted peak particle velocity levels for different explosive weight per delay for the safety of underground structure [mm/s]					
	500 kg	1000 kg	1500 kg	2000 kg	3000 kg	4000 kg
30	81.0	136.0	184.2	228.4	309.3	383.5
40	52.7	88.5	119.8	148.6	201.2	249.4
50	37.8	63.4	85.8	106.4	144.1	178.7
60	28.7	48.3	65.4	81.0	109.7	136.0
70	22.8	38.3	51.9	64.4	87.1	108.0
80	18.7	31.4	42.5	52.7	71.4	88.5
90	15.7	26.3	35.6	44.2	59.8	74.2
100	13.4	22.5	30.5	37.8	51.1	63.4
125	9.6	16.1	21.8	27.0	36.6	45.4
150	7.3	12.3	16.6	20.6	27.9	34.6
200	4.8	8.0	10.8	13.4	18.1	22.5

Table A6. Recommended explosives weight per delay and total explosives to be detonated in a round at **Zawarmala underground** Mine at varying distances from the houses/structures in the village considering 5mm/s, 10 mm/s and 15 mm/s as threshold limits of vibration for the safety of surface houses/structures.

Radial Distance of houses/structure from the blast face [m]	Recommended explosives weight per delay considering 5 mm/s, 10 mm/s and 15 mm/s as threshold levels of vibration [kg]			Total explosives to be detonated in a blasting round considering 5 mm/s, 10 mm/s and 15 mm/s as threshold levels of vibration [kg]		
	5 mm/s	10 mm/s	15 mm/s	5 mm/s	10 mm/s	15 mm/s
200	79	191	321	535	1353	2327
225	100	242	407	677	1712	2945
250	123	299	502	836	2114	3636
275	149	362	608	1012	2557	4399
300	177	430	723	1204	3044	5235
325	208	505	849	1413	3572	6144
350	241	586	984	1639	4143	7126
375	277	673	1130	1881	4755	8180
400	315	765	1286	2141	5411	9307
425	356	864	1451	2417	6108	10507
450	399	968	1627	2709	6848	11780
475	444	1079	1813	3019	7630	13125
500	492	1196	2009	3345	8454	14543
550	596	1447	2430	4047	10230	17597
600	709	1722	2892	4816	12174	20942
650	832	2021	3395	5653	14288	24577
700	965	2343	3937	6556	16570	28504
750	1108	2690	4519	7526	19022	32721
800	1261	3061	5142	8562	21643	37229

Date/Time Vert at 15:58:03 March 31, 2018  
 Trigger Source Geo: 1.000 mm/s  
 Range Geo: 254.0 mm/s  
 Record Time 6.0 sec at 4096 sps

Serial Number BE13782 V 10.30-8.17 MiniMate Plus  
 Battery Level 6.3 Volts  
 Unit Calibration July 14, 2016 by CIMFR, Dhanbad  
 File Name O782HCME.XF0

## Notes

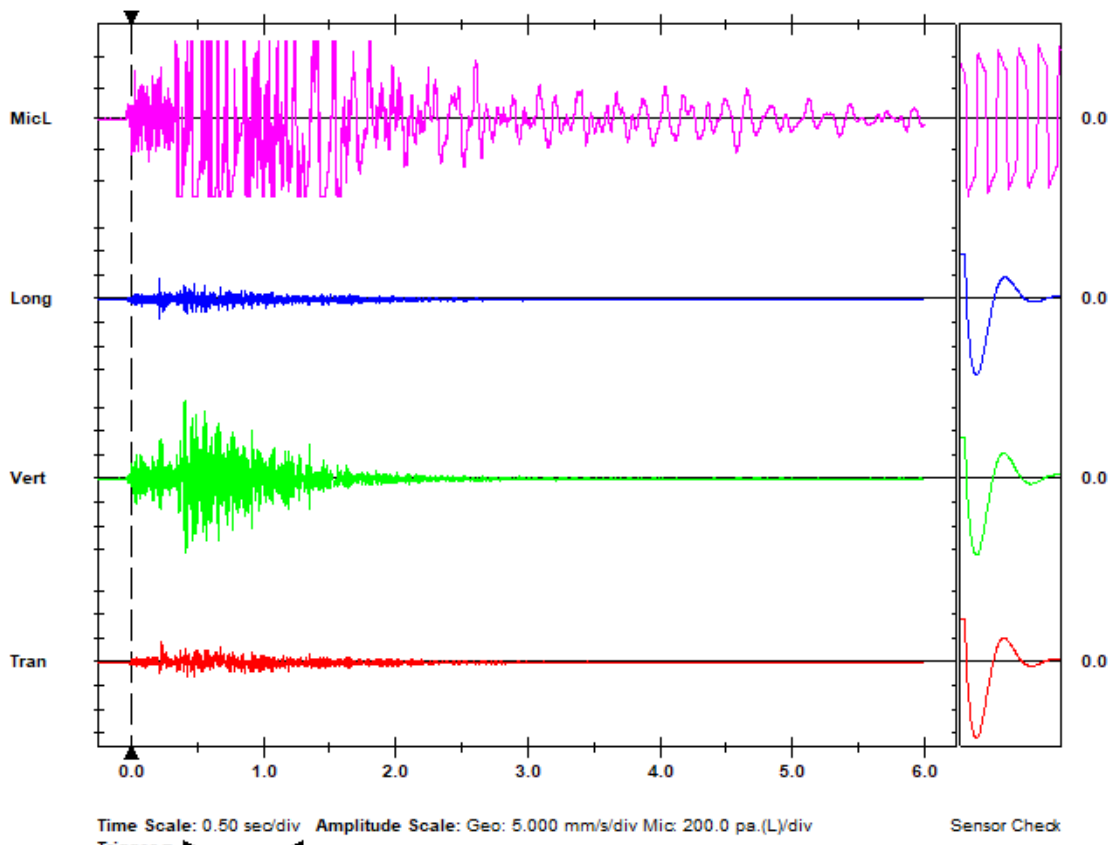
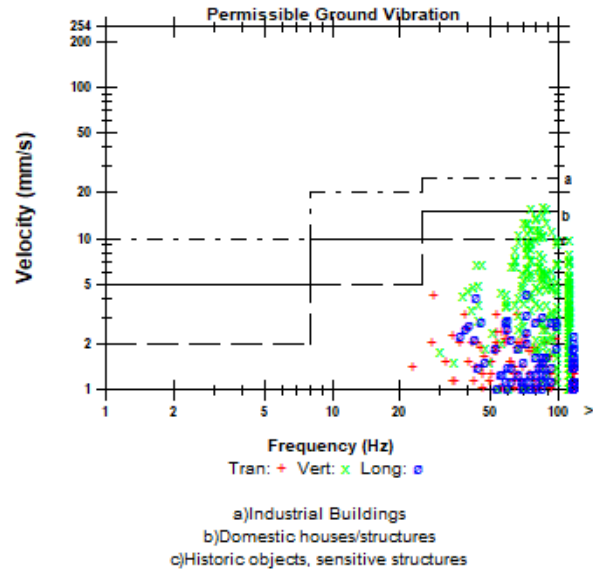
Microphone Linear Weighting  
 PSPL \*\*\* dB(L) at 0.332 sec  
 ZC Freq 28.8 Hz  
 Channel Test Passed (Freq = 20.1 Hz Amp = 479 mv )

	Tran	Vert	Long	
PPV	4.191	16.38	4.318	mm/s
PPV	63.45	75.29	63.71	dB
ZC Freq	28.4	85	73	Hz
Time (Rel. to Trig)	0.229	0.414	0.208	sec
Peak Acceleration	0.212	1.061	0.265	g
Peak Displacement	0.022	0.034	0.010	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.6	7.3	Hz
Overswing Ratio	3.6	3.3	4.0	

Peak Vector Sum 16.62 mm/s at 0.414 sec

\*\*\* : Out of Range

## DGMS India (A)



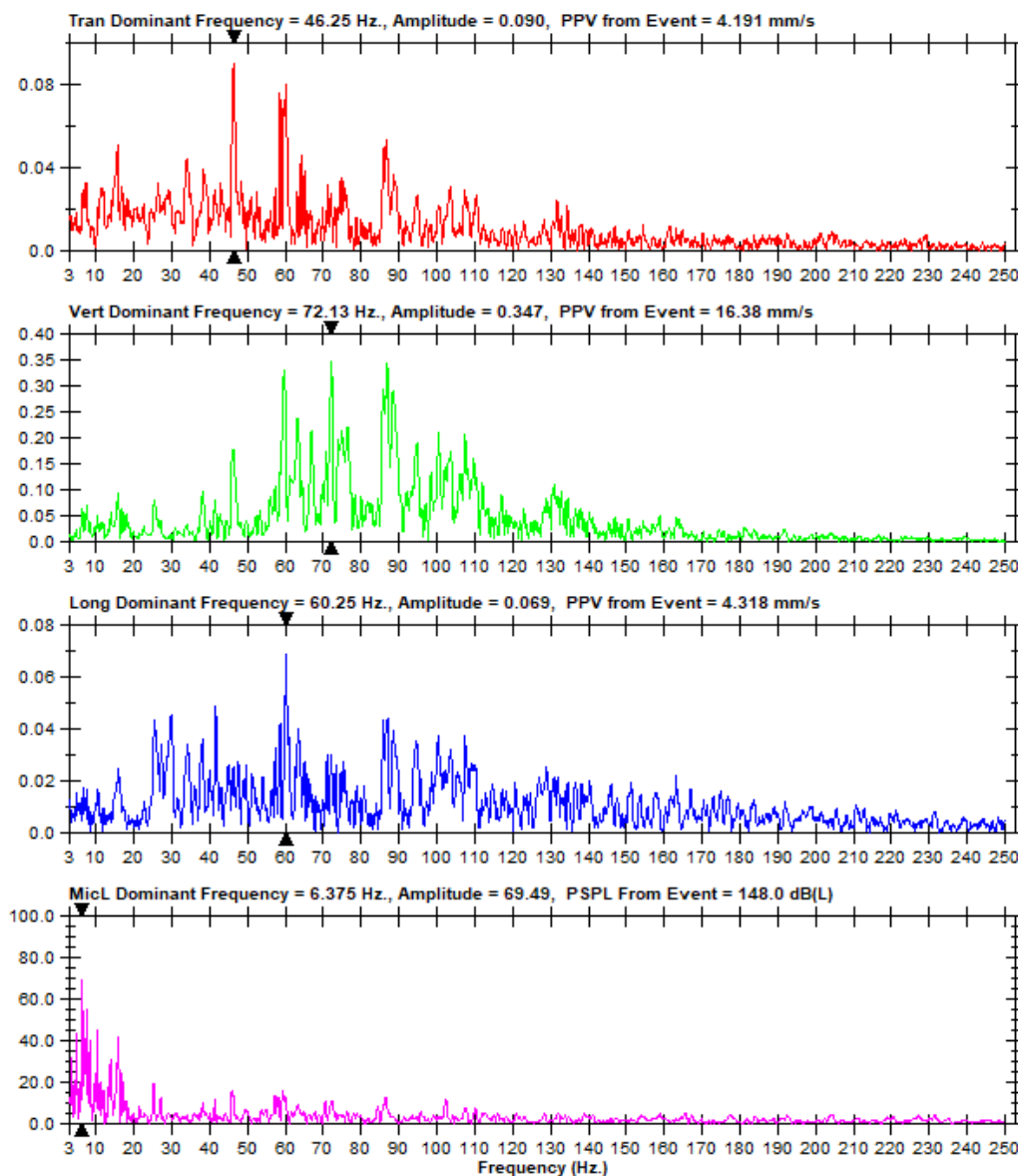


## FFT Report

Date/Time Vert at 15:58:03 March 31, 2018  
Trigger Source Geo: 1.000 mm/s  
Range Geo: 254.0 mm/s  
Record Time 6.0 sec at 4096 sps

Serial Number BE13782 V 10.30-8.17 MiniMate Plus  
Battery Level 6.3 Volts  
Unit Calibration July 14, 2016 by CIMFR, Dhanbad  
File Name O782HCME.XF0

### Notes





Date/Time Long at 16:05:36 July 24, 2019  
 Trigger Source Geo: 2.492 mm/s  
 Range Geo: 127.0 mm/s  
 Record Time 7.0 sec at 1024 sps

Serial Number 5370 V 2.61 MiniMate  
 Battery Level 6.3 Volts  
 Unit Calibration October 5, 2018 by CIMFR Dhanbad  
 File Name G3701D6.1C0

## Notes

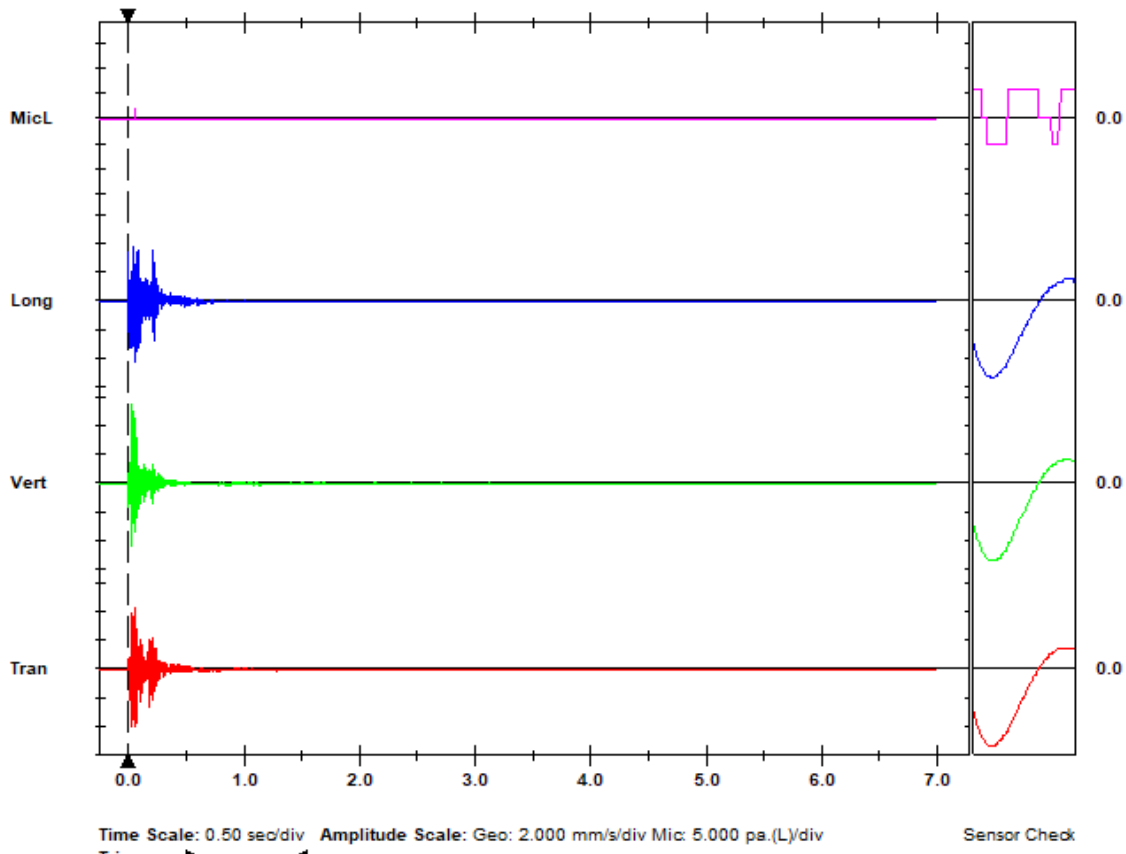
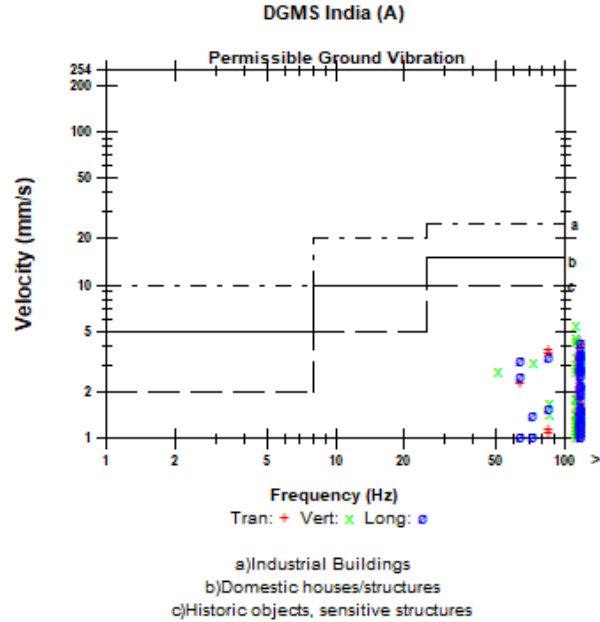
Location:  
 Client:  
 User Name:  
 Converted: July 24, 2019 22:18:16 (V10.72)

## Extended Notes

Microphone Linear Weighting  
 PSPL 100.00 dB(L) at 0.051 sec  
 ZC Freq N/A  
 Channel Test Check (Freq = 0.0 Hz Amp = 0 mv)

	Tran	Vert	Long	
PPV	4.318	5.461	4.255	mm/s
PPV	63.71	65.75	63.58	dB
ZC Freq	N/A	N/A	N/A	Hz
Time (Rel. to Trig)	0.054	0.034	0.051	sec
Peak Acceleration	0.411	0.477	0.385	g
Peak Displacement	0.007	0.007	0.007	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.8	7.8	7.7	Hz
Overswing Ratio	3.8	3.4	3.8	

Peak Vector Sum 7.445 mm/s at 0.051 sec  
 N/A: Not Applicable





## FFT Report

Date/Time Long at 16:05:36 July 24, 2019  
Trigger Source Geo: 2.492 mm/s  
Range Geo: 127.0 mm/s  
Record Time 7.0 sec at 1024 sps

Serial Number 5370 V 2.61 MiniMate  
Battery Level 6.3 Volts  
Unit Calibration October 5, 2018 by CIMFR Dhanbad  
File Name G37011D6.1C0

### Notes

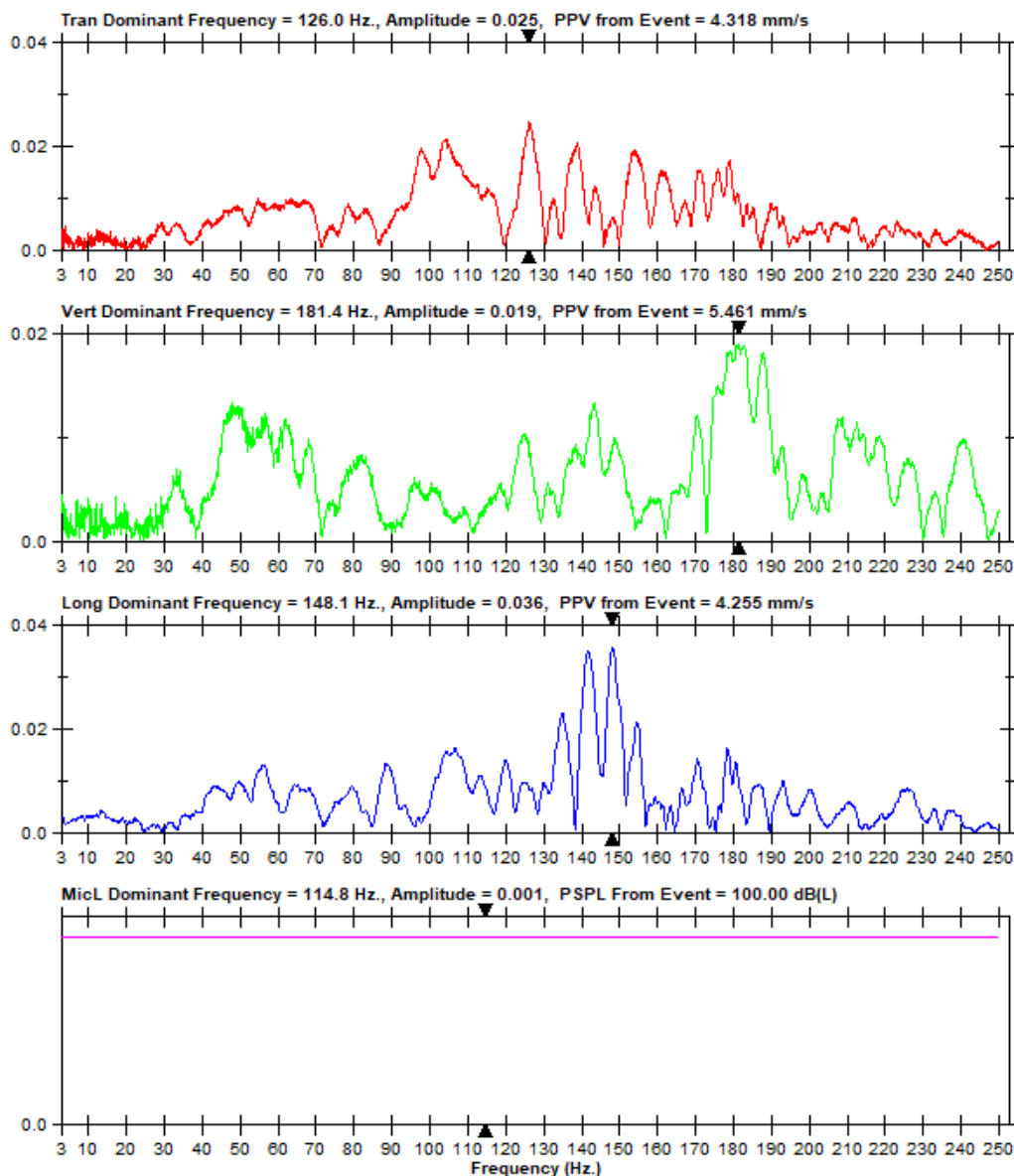
Location:

Client:

User Name:

Converted: July 24, 2019 22:18:16 (V10.72)

### Extended Notes



### 10.0 Evaluation of any possibility of subsidence

Stoping in the bottom levels shall be continued beyond S12 stope abutting at the acquired mine boundary. Further stopes below and towards the Northern side shall be extracted up to S19 in the current planning. The stopes S13 to S19 falls within the mine lease boundary. The stopes will have very limited span (maximum of 100m) in the direction across the strike (plunge), and will be exiting at a depth more than 500m from the surface. Hence the impact of extraction of these stopes falling below the lease boundary is anticipated to be negligible. A longitudinal vertical section showing the proposed stopes S13 to S19 beyond the acquired mine boundary and within the lease boundary is shown in Fig. 29. The projection of these stopes along with the approximate orebody boundary on a plan is shown in Fig. 30. The LVS (Fig. 29) clearly shows that these stopes exist at a depth beyond 500m from the surface and goes beyond 750m depth from the surface. The span of the stopes (orebody) as seen in plan (Fig. 30) is not more than 75~80m.

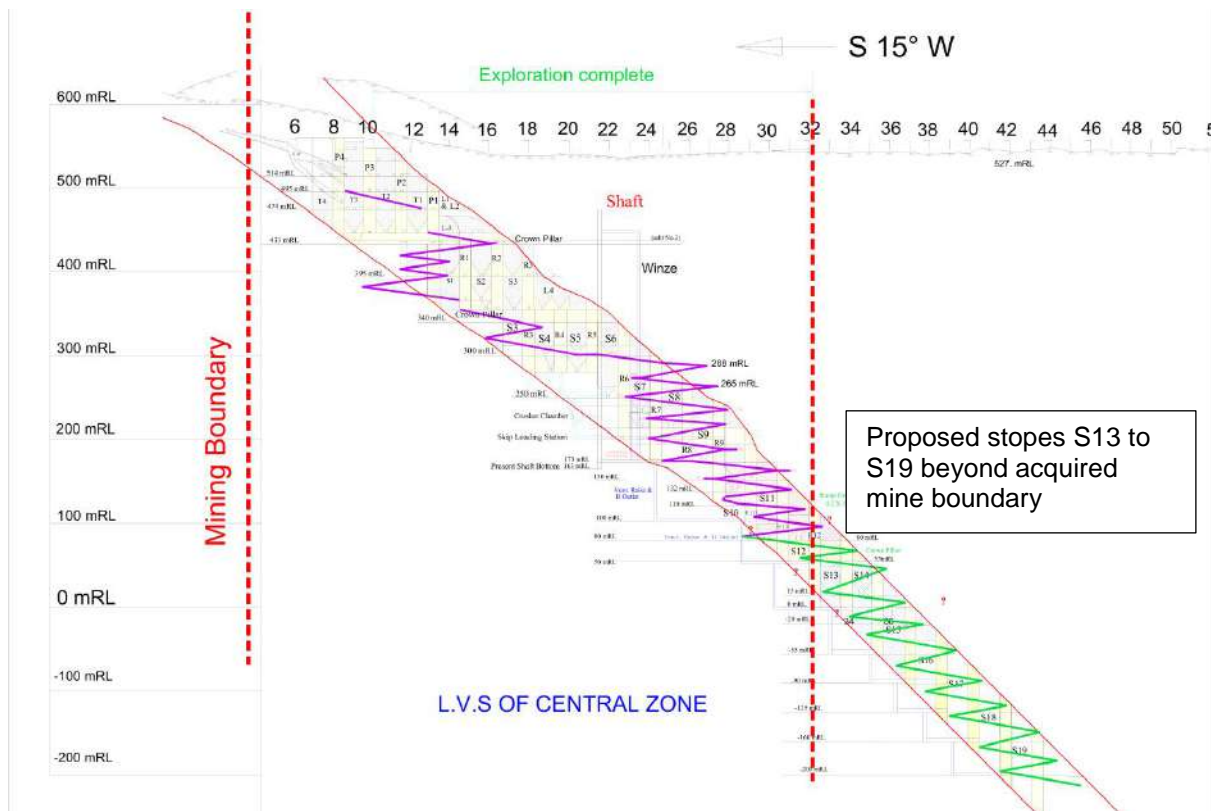


Fig. 29 A longitudinal vertical section showing the proposed stopes beyond acquired mine boundary

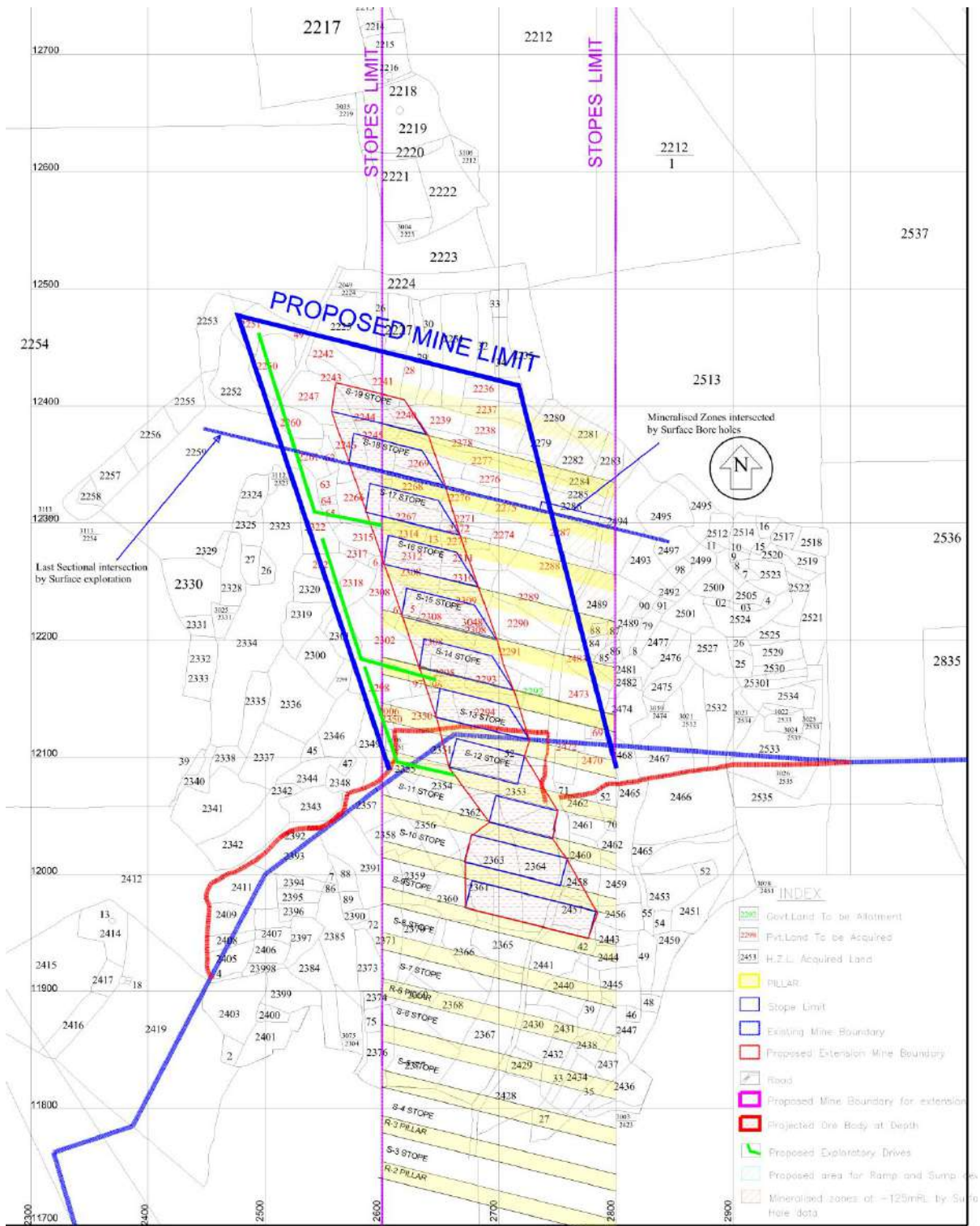


Fig. 30 A surface plan showing the mine boundary, ore limit and the proposed stopes

## 10.1 Allowable limits of subsidence

The vertical displacements on the surface are termed as subsidence. The horizontal differential displacements results in horizontal strain on the surface. Large horizontal strains of tensile nature manifest in cracks on the surface. Mostly damages to the surface structures are caused due to horizontal strains.

As per statutory guidelines, the subsidence and associated slope and strains over any extraction panel should be limited to certain recommended values for the protection of various surface features. Some of the recommended maximum values for various surface features are as follows:

**Multy-storeyed buildings:** Strain - 2mm/m, total elongation or compression – 60mm

**Single-storeyed and kutcha buildings:** Strain - 3mm/m

**Railway lines:** Strain - 2mm/m, slope - 1 in 100 (10mm/m)

**Water body and Farm land:** Tensile Strain - 3mm/m

**Tilt of transmission line poles:** Maximum displacement of the tip due to slope -  $\frac{1}{3}^{\text{rd}}$  of the base

**Forestland:** Maximum tensile strain of 10mm/m, width of tensile crack of 200-300mm

In the context of Zawarmala Mine, the important surface features will be some sheds and houses and farming land. Therefore it may be considered that the horizontal strains be limited to +/- 2mm/m for ensuring safety of these surface features. In general, when the anticipated subsidence is less than 10~20mm, it is considered negligible and below the minimum threshold value. As the subsidence trough exist in a large area, the experience shows that to have any surface impact, a minimum of 100~200mm subsidence (vertical displacement) is needed to generate horizontal strains more than 2mm/m.

## 10.2 Numerical modelling for subsidence prediction

All the rock properties tested in the laboratory, rock mass parameters, insitu stress regime and the geometrical aspects are incorporated into the numerical models to predict the displacements in the vicinity of the proposed stopes and its effect on the surface. The same model used for designing the stope parameters has been used for the purpose for subsidence prediction, with the following modifications:

- a) The stopes S13 to S19 are also modelled along with all the extracted stopes and those under extraction.
- b) The limits of the grid in all the three directions have been extended to cover larger surface cover.
- c) The mesh size has been altered to accommodate complete mine model including wider surface extend and depth till 900m.

Numerical modelling using FLAC3D has been conducted representing the entire orebody in the following stages.

Stage 1: Construction of grid as given above. Volume generation for modeling the older and proposed stopes.

Stage 2: Run the virgin model loaded with elastic material properties and the *in-situ* stresses.

Stage 4: Extraction of all the older stopes and all the proposed stopes

Stage 5: Analysis of displacements and strains on the surface using profiles along sections and surface contours

The grid constructed for this model is shown in Fig. 31. Three-dimensional view of the modelled stopes is given in Fig. 32. The simulation is representative of the maximum possible subsidence due to the planned extractions in Zawarmala mine.



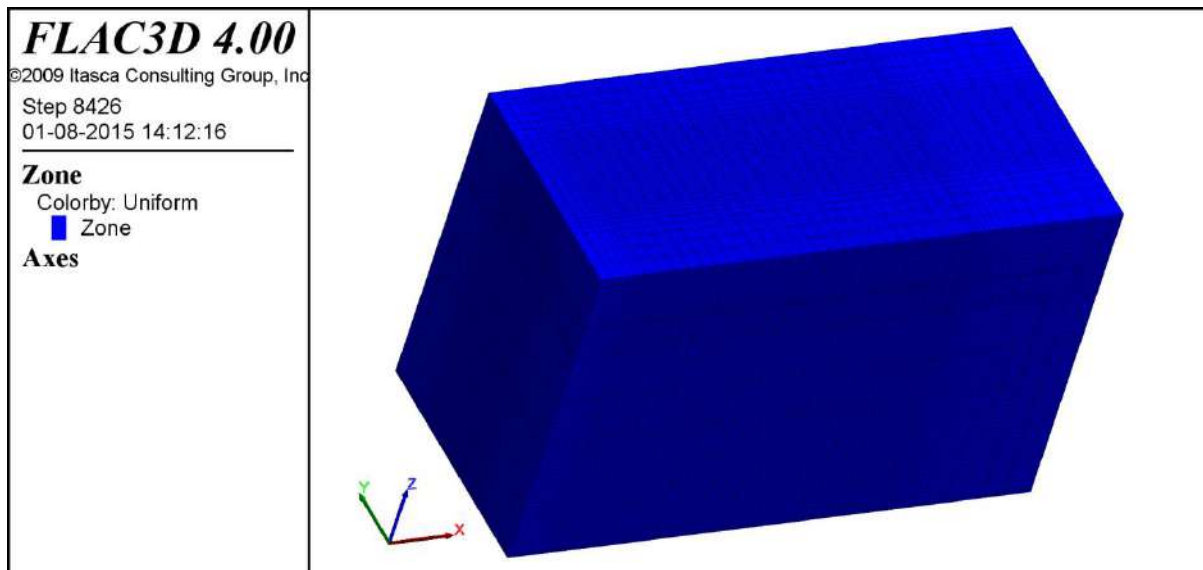


Fig. 31: Finite-difference grid used for modelling subsidence

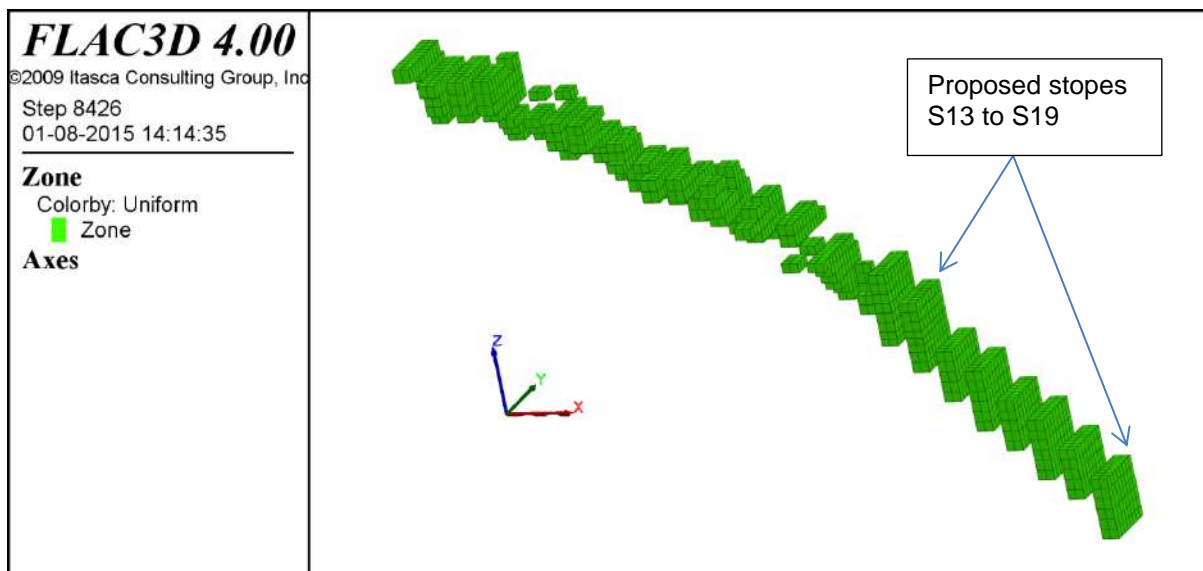


Fig. 32: Three-dimensional view of the extracted stopes

### 10.3 Subsidence prediction results

The numerical modeling outputs are analysed in terms of displacements. The displacements such as vertical, horizontal and resultant displacements are obtained directly from the numerical models, and can be plotted from FLAC3D graphics interface.

The anticipated vertical displacements are analysed from the model results on the surface and also along a representative cross section passing through the proposed stopes S13 to S19. The predicted subsidence (vertical displacements) on the surface due to the proposed stoping operations is contoured as given in Fig. 33. The maximum vertical displacement anticipated on the surface is only about 2mm, which is less than the threshold to be considered as noticeable subsidence. As the subsidence values are so low, no proper subsidence trough formation can be visualized from the contours. Hence it can be clearly stated that there is zero influence of stoping on the surface. The differential displacement such as strains and slopes are almost nil and they round off to zero.

The absolute displacements within the rock mass have been contoured along a representative longitudinal section passing through the proposed stopes, as shown in Fig. 34. From the contours it can be seen that the displacements are higher near the stopes, which reduces to less than 10mm within 50~100m of the rock mass, and are contained within the rock mass itself, and also do not transmit to the surface.

In this regard it should be stated that the stopes have a span of only 24m at a depth of over 500m. The width to depth ratio becomes very small and thus the excavations become “non-effective” in nature. World-wide observations on subsidence has indicated that the subsidence on surface becomes effective only if the width (span) of the extraction is at least 0.4~0.5 times the depth of cover. When the Width/Depth ratio is less than 0.4, the excavations are considered “Non-effective Width” excavations. As shown in the previous sections, the stoping parameters are designed in such a way to have stable rib pillars between the stopes, hence collapse of the rib pillars is not anticipated. Even in the event of collapse of rib pillars, the total span of the excavations will not be more than 100m, and hence will remain non-effective, and will not result in any significant subsidence on the surface.

It should also be noted that the mine management is already monitoring surface movements for the past several years and has not got any noticeable surface subsidence over extracted stopes at Zawarmala mine.

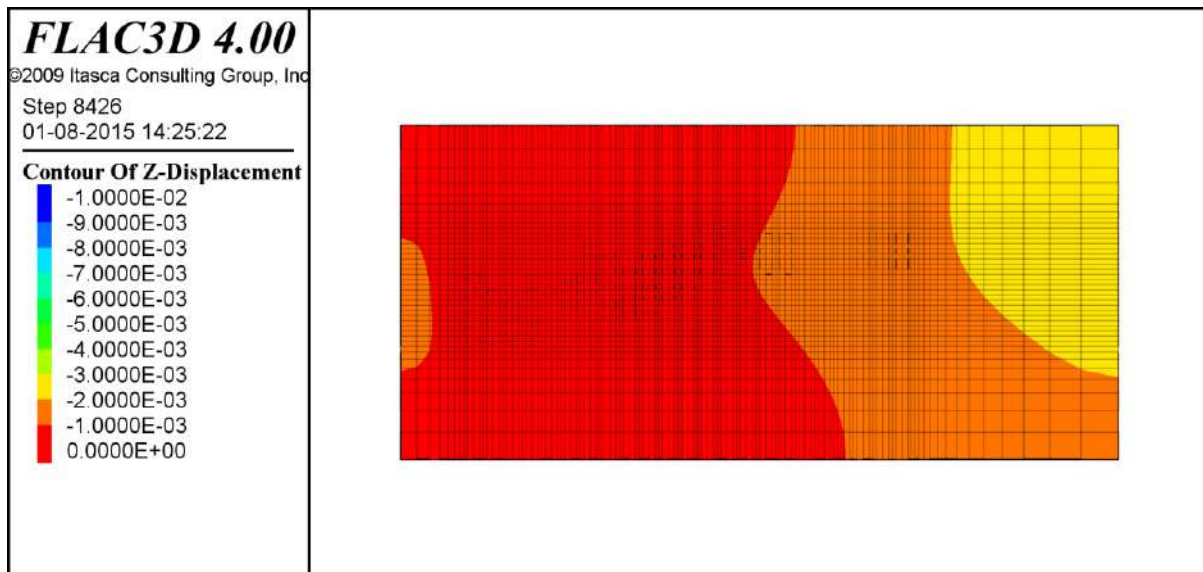


Fig. 33 Predicted subsidence (vertical displacements) contours on the surface

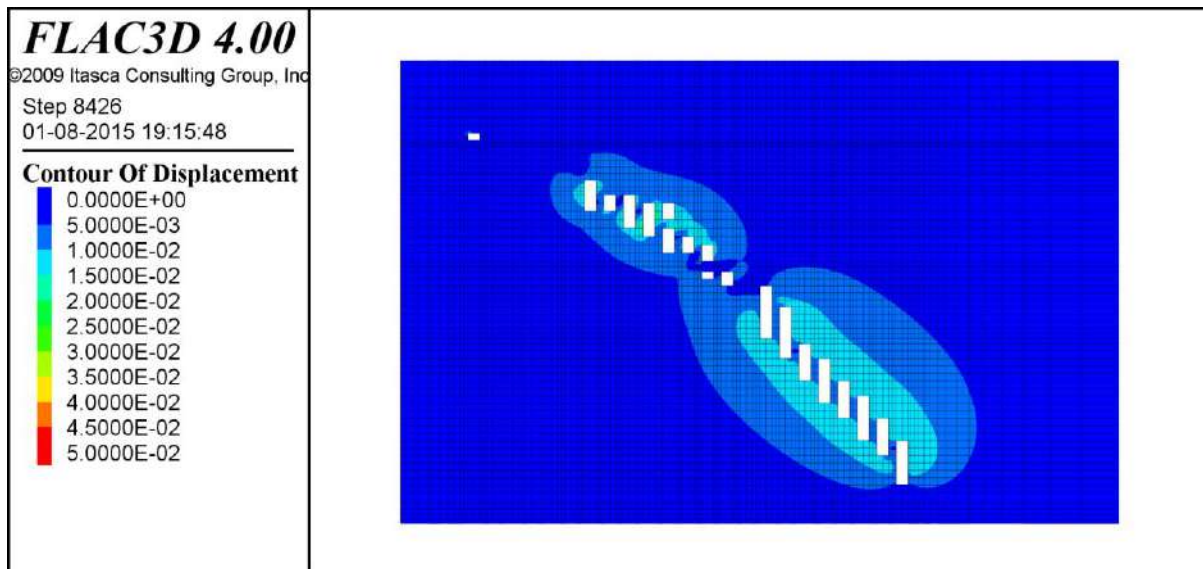


Fig. 34 The anticipated displacement contours in rock mass shown along a representative cross section

#### 10.4 Subsidence monitoring scheme

The location of the monitoring stations already installed by the mine management over the earlier extracted stopes is shown in Fig. 35. However it is also recommended to construct further subsidence monitoring stations along the proposed survey lines (Fig. 35), wherever practically possible, at an approximate distance of 40~50m with each other. These monitoring stations may be placed at

accessible locations without disturbing the existing surface features of private land owners.

The recommended dimension of the monitoring station is given in Fig. 36. The RCC concrete pillar should be projected at least 5 cm above the ground and the centrally fixed rod projected out by at least 2 cm made of steel or fiber rock bolt material. Vertical and horizontal ground movements may be monitored by Auto Level or a Total Station, the least count of the instrument being 0.1 mm. The accuracy of the instrument may be  $\pm 1$  mm.

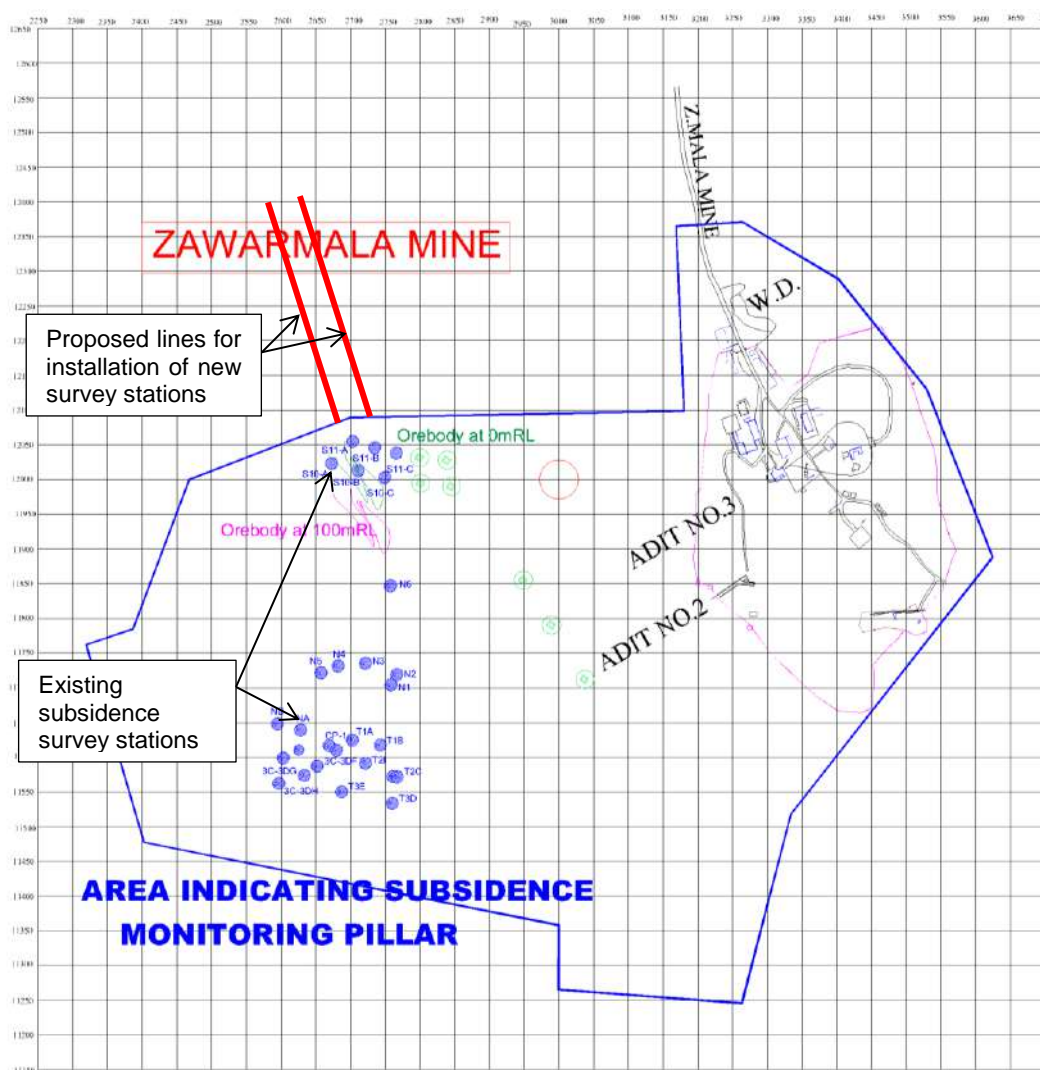


Fig. 35 Subsidence survey points over the earlier extracted stopes and proposed stopes of Zawarmala mine

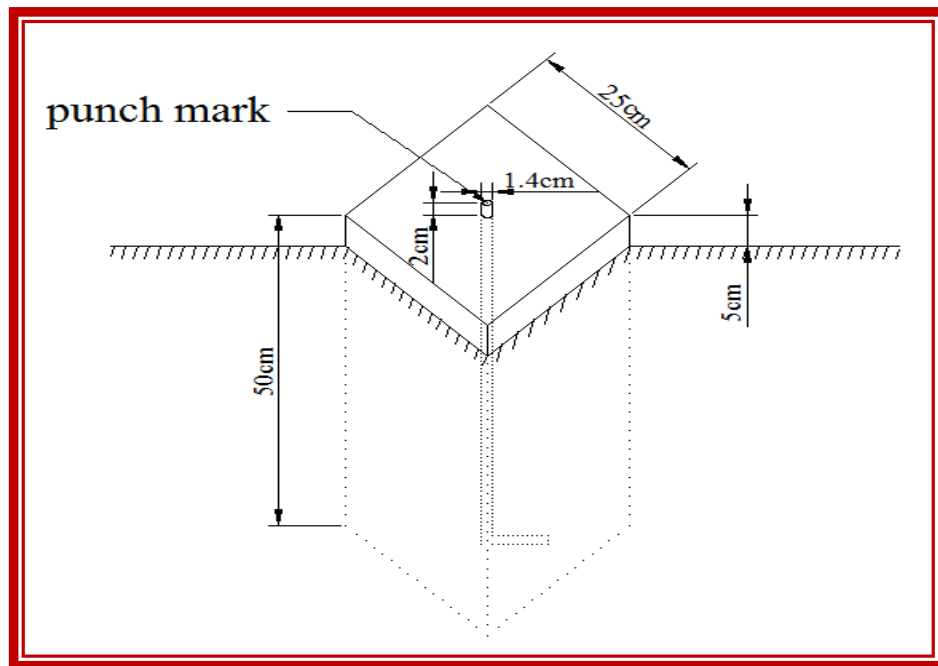


Fig. 36 Design of subsidence survey pillar

## 11.0 Conclusions (pertaining to subsidence study)

1. Subsidence prediction incorporated open stoping in all the previously extracted stopes and also the proposed stopes S13 to S19, down to a depth of about 800m from the surface.
2. The subsidence predictions revealed negligible subsidence (maximum ~2mm), less than the threshold value of 10~20mm to be considered as minimum noticeable subsidence.
3. The anticipated subsidence is so low that the calculated strain and slope values rounds off to zero. Hence it can be said that the proposed stoping will not have any significant surface impact to the existing surface features.
4. However, it is recommended to monitor the surface displacements over the proposed stoping region at Zawarmala mine at regular intervals.

## **Annexure 20 \_Corporate Environment Policy**

### **Environmental Policy HZL – Zawar Group of Mines**

At HZL-Zawar Group of underground Mines, we believe in sustainable development and are committed to effective environmental management as an integral part of our business. HZL-Zawar mines will comply with all environmental laws and regulations applicable to our activities i.e. mining, beneficiation, storage and transportation of Lead & Zinc concentrate and will continue to work for reducing negative footprint on environment and will fulfil the requirements of ISO 14001.

To achieve this we will:

- Conserve natural resources, through adopting environmentally friendly & energy efficient technology and process improvements for reducing and preventive pollution.
- Adopt and maintain global best practices on Carbon and energy management;
- Prevent wherever possible, minimize and mitigate Biodiversity risks throughout our operations;
- Maintain a water balance that minimize the amount of fresh water consumed by beneficiation process by reutilizing the tailing water as much as possible and will also encourage Rain water harvesting;
- Improve and enhance environmental conditions and avoid, reduce or mitigate the environmental impacts of lead & zinc mining & beneficiation operations to neighbouring communities and aquatic lives in areas where we operate including air, water, land and noise. We will ensure to abide by the following at our Zawar Mines SBU:
  - We will ensure that all environmental impact during the blasting, drilling, crushing and beneficiation operations will be minimised by taking proper mitigation measures.
  - Apply a zero discharge philosophy wherever possible.
  - Fugitive emissions will be controlled by regular water spraying on waste dump, roads & ore storage at mines site.
  - Adequate Dust controlling equipment's will be provided at Beneficiation plant.
  - The lead and Zinc concentrate will be transported in trucks covered by tarpaulin.
- Address employee concerns about environmental performance fairly and seriously;
- Influence our contractors and suppliers to adopt principles and practices adopted by us and work in accordance with our policies;
- Communicate with all our stakeholders on the progress and performance of our Environmental management System.

We will measure and report progress against this policy and review performance on a periodic basis to ensure on-going management of environment. The content and implementation of this policy will be reviewed periodically, and actions taken accordingly including the sharing of good practices throughout the HZL-Zawar Group of Mines.



Kishore Kumar S

Date- 01<sup>st</sup> March 2021

Director- Zawar Mines SBU  
Zawar Group of Mines, Hindustan Zinc Ltd.



## Annexure 21a\_Surface Plan

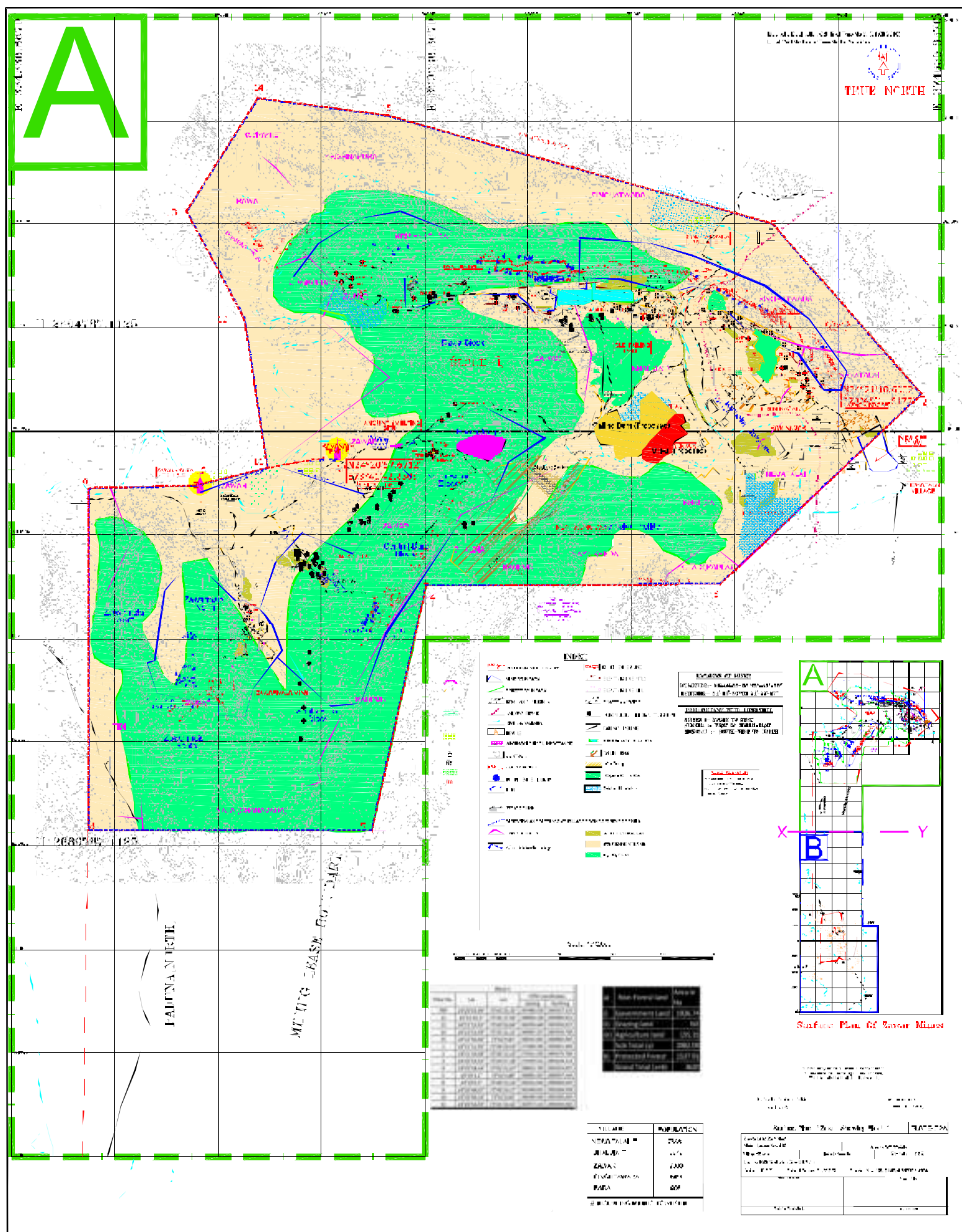
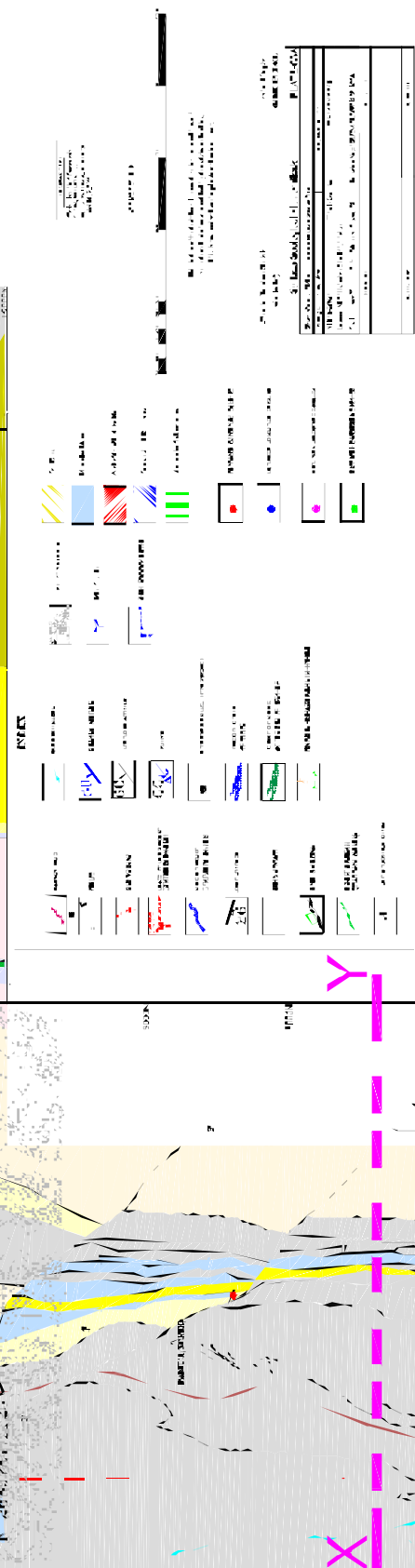
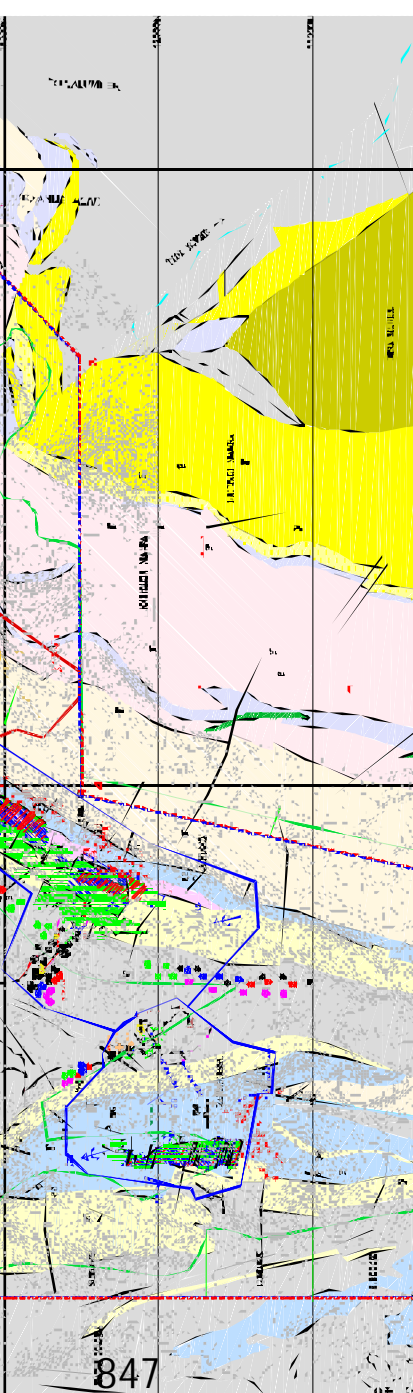
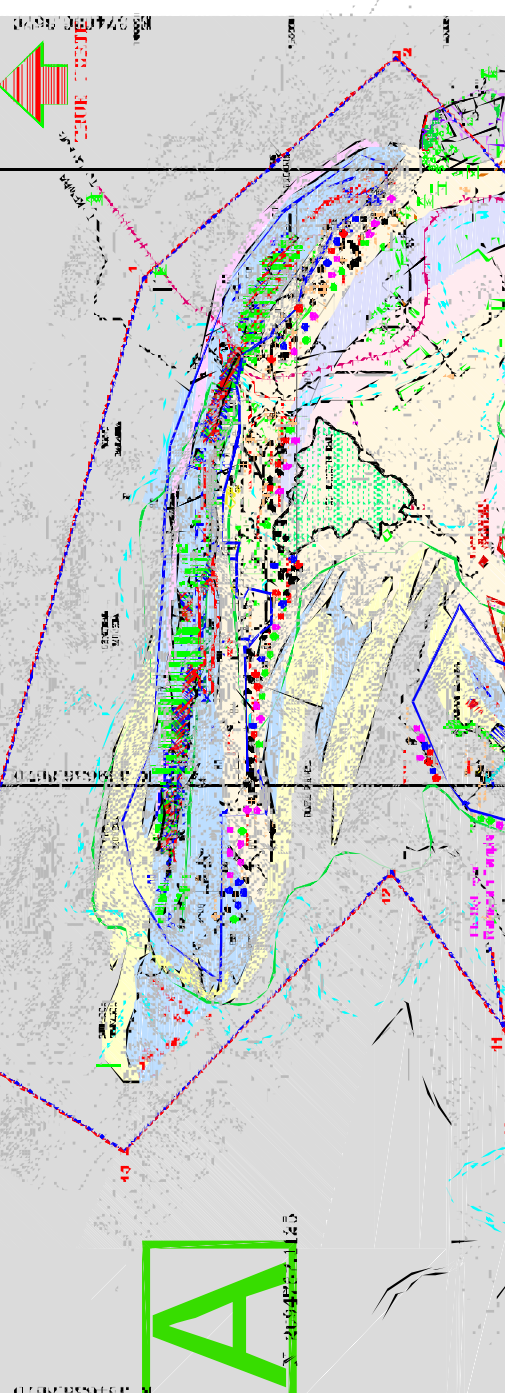
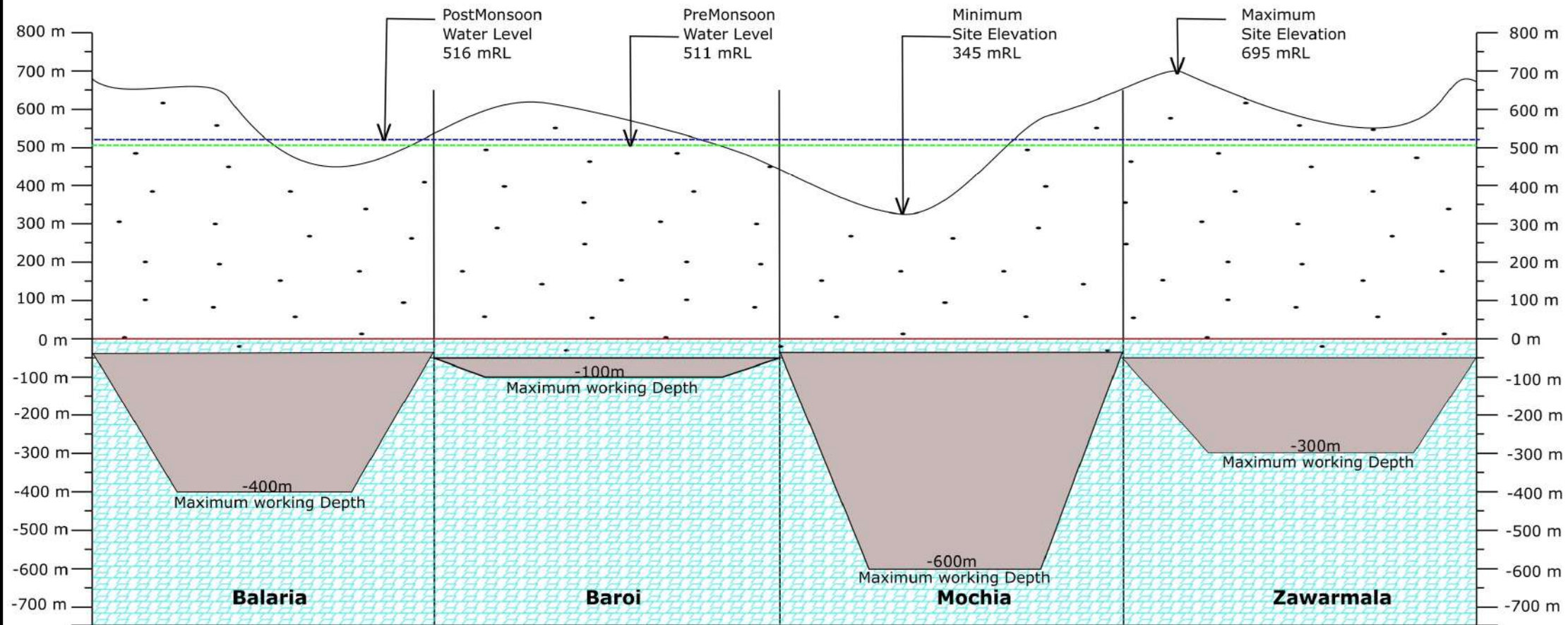


Figure 1: Map of the study area in the northern part of the Iberian Peninsula. The map shows the coastline of the Bay of Biscay and the Atlantic Ocean. The study area is marked with a red box and labeled 'Study area'. The map includes a scale bar (0 to 100 km) and a north arrow.







### Legend

	Pre Monsoon Water Level
	Post Monsoon Water Level
	Mean Sea Level
	Underground Mine
	Host Rock
	Surface rocks

### Schematic Diagram

Zawar Lead Zinc Underground Mine  
(ML Area- 3620 Ha)

**M/S HINDUSTAN ZINC LTD.**

At

Village :Zawar Tehsil Sarada & Girwa,  
District Udaipur (Rajasthan)



Regional office

**Rajasthan State Pollution Control Board**

Address : F-470, Near UCCI Building, M.I.A, Udaipur (Raj.)

Email : [rorpcbudaipur@gmail.com](mailto:rorpcbudaipur@gmail.com) Phone no : 0294-2491269

No.: RPCB/RO U/UDR/ 1395

Dated : 12.01.22

To,  
Ministry of Environment, Forest and Climate change,  
Prithvi Wing, 2<sup>nd</sup> Floor India Paravaran Bhawan,  
Jor Bagh Road, Aliganj,  
New Delhi -110 003

Sub:- Regarding minutes of public hearing dtd. 22-12-2021 for Environmental Clearance for proposed expansion of Zawar Group of Underground Lead-Zinc Mines from 4.8 Million to 6.5 Million TPA Ore Production with total excavation 7.78 Million TPA including Waste rock generation of 1.28 MTPA and Benification from 4.8 Million TPA to 7.3 Million TPA within ML area 3620 Ha. (ML no. 03/89) by M/s Hindustan Zinc Limited, Located at village-Zawar, Teh.- Girwa and Sarada, District : Udaipur.

Ref:- Distt. Collector, Udaipur letter no. प. 39/2( )राज./खनन/2021/1984 दिनांक 29/10/2021

Sir,

With reference to above, kindly find enclosed herewith a copy of Minutes of Public Hearing Meeting held on 22-12-2021 for proposed production of M/s Hindustan Zinc Limited, Zawar Mines (M.L. No.- 03/89) ML area-3620 Hect., N/v Zawar, Tehsil: Girwa & Sarada, District: Udaipur.

A copy of attendance sheet, CD and album are also enclosed for ready reference.

Submitted for information & further necessary action.

Yours Faithfully

(Vinay Katta)

Regional Officer

Copy to:- (1) The Member Secretary, RSPCB, Jaipur for information please.

(2) District Collector, Udaipur

(3) Incharge, I.T. Cell, RSPCB, Jaipur

(4) M/s Hindustan Zinc Limited (Zawar Mines), N/v Zawar, Tehsil: Girwa & Sarada, District: Udaipur.

Regional Officer

मैसर्स हिन्दुस्तान जिंक लि०, जावर माइन्स एम०एल० नं० ०३/८९ (खनन पट्टा क्षेत्र ३६२० हेक्टेयर ) गॉव जावर तहसील गिर्वा एवं सराड़ा जिला उदयपुर (राज०) के उत्पादन विस्तार हेतु पर्यावरणीय स्वीकृति दिये जाने के सम्बन्ध में आयोजित जन सुनवाई दिनांक २२.१२.२०२१ का कार्यवाही विवरण


पर्यावरण एवं वन मंत्रालय, भारत सरकार द्वारा जारी पर्यावरणीय प्रभाव आंकलन अधिसूचना दिनांक १४.०९.२००६ के तहत मैसर्स हिन्दुस्तान जिंक लि० द्वारा गॉव जावर तहसील गिर्वा एवं सराड़ा जिला उदयपुर (राज०) की जावर ग्रुप ऑफ अण्डरग्राउण्ड सीरा (लेड), जस्ता (जिंक) माइन्स का उत्पादन क्षमता विस्तार ४.८ मिलियन टन प्रति वर्ष से ६.५ मिलियन प्रति वर्ष अयस्क उत्पादन, कुल उत्खनन ७.७८ मिलियन टन प्रति वर्ष (सम्मिलित वेस्ट रॉक १.२८ मिलियन टन प्रति वर्ष ) और अयस्क सज्जीकरण (बेनिफिसियल) ४.८ मिलियन टन प्रति वर्ष से ७.३ मिलियन टन प्रति वर्ष (खनन पट्टा क्षेत्र ३६२० हेक्टेयर, एम०एल० नं० ०३/८९) करने हेतु जन सुनवाई आयोजित कराने हेतु परियोजना की पर्यावरणीय स्वीकृति के संबंध में श्रीमान् ओ०पी० बुनकर, अतिरिक्त जिला कलक्टर एवं अतिरिक्त जिला मजिस्ट्रेट (प्रशासन) महोदय, उदयपुर की अध्यक्षता में दिनांक २२.१२.२०२१ को प्रातः ११:०० बजे, स्थान— ग्राम पंचायत भवन भालाडिया तहसील सराड़ा जिला उदयपुर पर, जन सुनवाई आयोजित की गई।


जन सुनवाई में उपस्थित व्यक्तियों का विवरण मध्य हस्ताक्षर परिशिष्ट—‘अ’ पर संलग्न है। उक्त पर्यावरणीय जनसुनवाई की आम जन सूचना दैनिक राजस्थान पत्रिका के राजस्थान संस्करण दिनांक २१.१२.२०२१ एवं टाइम्स ऑफ इण्डिया दिनांक २१.१२.२०२१ में प्रकाशित की गई है, जिसकी प्रति परिशिष्ट “ ब ” पर संलग्न है।

पर्यावरणीय जनसुनवाई निम्न अधिकारियों की उपस्थिति में आयोजित की गयी:—

१. श्रीमान् ओ०पी० बुनकर, अतिरिक्त जिला कलक्टर एवं अतिरिक्त जिला मजिस्ट्रेट (प्रशासन) महोदय, उदयपुर
२. श्री विनय कट्टा, क्षेत्रीय अधिकारी, राजस्थान राज्य प्रदूषण नियंत्रण मण्डल, उदयपुर

बैठक की कार्यवाही प्रारम्भ करते हुये श्री विनय कट्टा, क्षेत्रीय अधिकारी, राजस्थान प्रदूषण नियंत्रण मण्डल, क्षेत्रीय अधिकारी उदयपुर, ने सभी आगन्तुकों का स्वागत करते हुये वन एवं पर्यावरण मंत्रालय, भारत सरकार द्वारा जारी अधिसूचना दिनांक १४.०९.२००६

  
क्षेत्रीय अधिकारी  
राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
उदयपुर (राज.)

  
अति. जिला कलक्टर  
उदयपुर





के अन्तर्गत जन सुनवाई की आवश्यकता/प्रक्रिया के बारे में अवगत करवाया एवं अध्यक्ष महोदय की अनुमति से मैसर्स हिन्दुस्तान जिंक लि० गॉव जावर तहसील गिर्वा एवं सराड़ा जिला उदयपुर (राज०), को प्रस्तावित परियोजना के संबंध में विस्तृत रूप से प्रस्तुतीकरण हेतु आमंत्रित किया।

श्री किशोर कुमार एस०, निदेशक, मैसर्स हिन्दुस्तान जिंक लि०, एसबीयू, जावर माईन्स द्वारा संचालित की जा रही गतिविधियों मय सी.एस.आर.प्रोग्राम का संक्षिप्त विवरण प्रस्तुत किया।

इसके बाद हिन्दुस्तान जिंक लि० के पर्यावरणीय सलाहकार मैसर्स जे.एम. एनवायरनमेण्ट प्रा. लि. के डॉ० चौधरी ने पर्यावरणीय प्रभाव आंकलन के सम्बन्ध में प्रजेण्टेशन के माध्यम से संक्षिप्त विवरण प्रस्तुत किया। मैसर्स जे.एम. एनवायरनमेण्ट प्रा. लि. द्वारा 10 किमी के परिधि क्षेत्र में विभिन्न स्तर पर अध्ययन किया गया है जिसके तहत परियोजना से पहले एवं परियोजना के बाद में विभिन्न बिन्दुओं की क्या स्थिति रहेगी, का आंकलन मार्च, 2021 में मई 2021 तक किया गया है। इस परियोजना का कार्य क्षेत्र दो तहसीलों गिर्वा एवं सराड़ा में आता है। उन्होंने बताया कि हमने क्षेत्र के विभिन्न बिन्दुओं (भूमि उपयोग, जल गुणवत्ता, मौसम विज्ञान, परिवेशी वायु प्रदूषण, ध्वनि प्रदूषण, परिस्थिती पर्यावरण, सामाजिक पर्यावरण, टोश अपशिष्ट, भूमि कंपन, वनस्पति एवं जीव जन्तु, वन्य प्राणी, यातायात गुणवत्ता, पर्यावरणीय अनुवीक्षण कार्यक्रम, जोखिम आंकलन एवं आपदा कार्यक्रम आदि) का व्यापक अध्ययन किया गया। एवं पर्यावरण प्रभाव आंकलन के सारांश प्रतिवेदन के बारे में बताते हुये स्पष्ट किया कि पर्यावरण के विभिन्न पहलुओं को ध्यान में रखते हुये मैसर्स हिन्दुस्तान जिंक लि० द्वारा गॉव जावर तहसील गिर्वा एवं सराड़ा जिला उदयपुर (राज०) की जावर ग्रुप ऑफ अण्डरग्राउण्ड सीसा (लेड), जस्ता (जिंक) माईन्स का उत्पादन क्षमता विस्तार किया जावेगा जिसमें लिज क्षेत्र से कोई विस्तार नहीं किया जाएगा तथा 68.95 हेक्टर वन भूमि के सर्फेस राइट्स के लिये आवेदन किया है।

तत्पश्चात् जनसुनवाई कार्यक्रम प्रारम्भ करते हुये क्षेत्रीय अधिकारी, राजस्थान राज्य प्रदूषण नियन्त्रण मण्डल, उदयपुर ने उपस्थित आमजन को इस परियोजना के सम्बन्ध में अपने विचार, शिकायत एवं सुझाव मौखिक अथवा लिखित रूप से व्यक्त करने/प्रस्तुत करने के लिये आमंत्रित किया, जिसका विस्तृत विवरण इस प्रकार है:-

  
क्षेत्रीय अधिकारी  
राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
उदयपुर (राज.)

  
अति. जिला कलक्टर  
उदयपुर



1. श्रीमती मंजु भीणा, ग्राम नेवातलाई :


श्रीमती मंजु भीणा, ग्राम नेवातलाई ने बताया कि वे पिछले 5-6 साल से हिन्दुस्तान जिंक लि0 द्वारा चलाई जा रही सखी परियोजना से जुड़ी हुई हैं। कम्पनी द्वारा उन्हें 36 लाख रु0 का फण्ड दिया गया था जिसे हमने आज 4 गुना कर दिया है। कम्पनी द्वारा स्वामी विवेकानन्द विद्यालय में भी मरम्मत का अच्छा कार्य किया गया है। मैं चाहती हूँ कि आगे भी कम्पनी वाले इस तरह के अच्छे कार्य करते रहें और क्षेत्र के लोगों को अच्छा रोजगार मिले।

2. श्री अशोक पटवा, न्यू मार्केट, ग्राम जावर माईन्स:

श्री अशोक पटवा निवासी जावर माईन्स ने आज की जन सुनवाई में उपस्थित विधायक महोदय, सभी अधिकारियों, जनप्रतिनिधियों एवं क्षेत्र की जनता का स्वागत किया। उसके बाद उन्होंने कहा कि आज हमारे क्षेत्र की प्रगति में एक कदम और आगे बढ़ने का अवसर मिला है। हिन्दुस्तान जिंक वाले अपनी उत्पादन क्षमता बढ़ाना चाहते हैं जिससे यहाँ के स्थानीय लोगों को रोजगार मिलेगा एवं आगे बढ़ने का अवसर मिलेगा। इस हेतु स्थानीय बेरोजगारों को प्रशिक्षण देना आवश्यक है। मेरा यहाँ के मैनेजमेण्ट से यह कहना है कि यहाँ पर कौशल विकास के प्रशिक्षण केन्द्र खोले जाएँ ताकि प्रशिक्षित लोगों के कार्य करने से यहाँ पर गुणवत्तापूर्ण उत्पादन हो सके। हम देश की प्रगति को बढ़ाकर विकास की गति को आगे बढ़ाना चाहते हैं।

3. श्रीमती राज श्री जैन, अध्यापिका, स्वामी विवेकानन्द विद्यालय जावर माईन्स :

श्रीमती राज श्री जैन, अध्यापिका, स्वामी विवेकानन्द विद्यालय ने कहा कि हमारा विद्यालय एकदम जीर्ण-क्षीर्ण स्थिति में था, जिसका जीर्णोद्धार एवं मरम्मत कार्य वर्ष 2021-22 में हिन्दुस्तान जिंक लि0 द्वारा करवाया गया है। इससे पहले हमारे यहाँ पर पढ़ने वाले छात्र डरते थे कि कहीं भवन के पत्थर उनके सिर पर आकर नहीं गिर जाए। अब विद्यालय भवन का जीर्णोद्धार हो जाने से हमारे बच्चों की परेशानी दूर हो गयी है और अच्छी तरह से बैठकर पढ़ाई कर रहे हैं। इसके साथ ही हिन्दुस्तान जिंक लि0 द्वारा यहाँ पर स्टेडियम का कार्य करवाया गया है, बच्चों को नृत्य सीखने में सहयोग दिया गया है, समय-समय पर अल्पाहार की व्यवस्था की गयी है। इसके अलावा जब भी हमारे द्वारा विद्यालय के लिये कोई सहयोग की माँग की जाती है, पूरा सहयोग देकर सभी तरह के कार्य जिंक वालों द्वारा करवाये जाते हैं। इन सबके लिये मैं विद्यालय परिवार की ओर से जिंक प्रशासन का आभार एवं धन्यवाद ज्ञापित करती हूँ।

  
क्षेत्रीय अधिकारी  
राजस्थान राज्य पटवर्ग नियंत्रण मण्डल  
उदयपुर (रा.)


3111  
अति. जिला कलक्टर  
उदयपुर


4. श्री शिवसिंह सिसोदिया, एक्स कर्मचारी हि.जि.लि.जा.मा. :

श्री शिवसिंह सिसोदिया, एक्स कर्मचारी ने कहा कि मैं सन् 1975 से हिन्दुस्तान जिंक लि० में कार्य करते हुये सन् 2014 में सेवानिवृत्त हुआ हूँ। हिन्दुस्तान जिंक लि० का अपने क्षेत्र में बहुत बड़ा योगदान है। जितना विकास इस एरिये में हुआ है, उतना विकास अन्य किसी भी एरिये में नहीं हुआ है। इन सभी तरह के कार्य के लिये मैं स्थानीय विधायक, जनप्रतिनिधिगण, हिन्दुस्तान जिंक प्रशासन, मजदूर संघ के पदाधिकारी आदि सभी का धन्यवाद ज्ञापित करता हूँ। हमारे क्षेत्र में कारखाना आना चाहिये, मोदीजी कारखाने को कलकत्ता से गुजरात ले गये। हमारे यहाँ पर भी कारखाना लगने से क्षेत्र के लोगों को रोजगार मिलेगा, इसके लिये इनको सहयोग देना चाहिये। हिन्दुस्तान जिंक प्रशासन शिक्षा, स्वास्थ्य एवं अन्य सामाजिक कल्याण के क्षेत्र में भी अच्छा कार्य कर रहा है, एनजीओ के माध्यम से भी कार्य किया जा रहा है जिसके तहत प्रथम चरण में क्षेत्र के 500 किसानों को जोड़ा गया है तथा आगे आने वाले समय में और भी किसानों को जोड़ा जायेगा। इनके द्वारा क्षेत्र में पेड़-पौधे भी लगाये जा रहे हैं, प्रत्येक किसान को 2-2 लाख रु० के काम दिये जा रहे हैं जिसमें किसान द्वारा मात्र 25 प्रतिशत राशि जमा करवाई जाती है बाकी पैसा जिंक प्रशासन द्वारा दिया जा रहा है। गेरा अतिरिक्त जिला कलक्टर महोदय से निवेदन है कि क्षेत्र में कारखाना आना चाहिये लेकिन इसके साथ-साथ स्थानीय बेरोजगारों को प्रशिक्षण देने की व्यवस्था की जागी चाहिये। हमने इससे पूर्व भी मजदूर संघ के पदाधिकारियों से आग्रह किया था कि इस क्षेत्र में टेक्नीकल कॉलेज खोला जावे, जिससे कि स्थानीय छात्र अच्छा प्रशिक्षण प्राप्त कर रोजगार प्राप्त कर सकें। इसके लिये हिन्दुस्तान जिंक प्रशासन द्वारा समय-समय पर कैंप भी आयोजित किये जाते हैं तथा क्षेत्र के पर्यावरण प्रदूषण को कैसे रोका जाये, इसके लिये भी समय-समय पर प्रयास किये जाते हैं जिसकी वजह से यदि बाहर से कभी कोई टीम निरीक्षण के लिये आती है तो उसे प्रदूषण नजर नहीं आता है। कुल मिलाकर हमारे एरिये में सभी प्रकार की जागृति आई है लेकिन फिर भी जितना विकास होना चाहिये था, उतना नहीं हो पाया है। सीएसआर के तहत सामाजिक सरोकार के भी काफी कार्य करवाये जा रहे हैं। पिछले दिनों 13 करोड़ रु० का जो सीएसआर का फण्ड आया, उसमें से काफी कम पैसा यहाँ पर खर्च किया गया, अतः इस फण्ड को और बढ़ाया जाये और हमारे क्षेत्र में एक आईटीआई खोला जाना चाहिये।

5. श्री दीपक कुमार मीणा निवासी टीडी:

श्री दीपक कुमार मीणा निवासी टीडी ने कहा कि उन्होंने सन् 2020 तक खेती-बाड़ी की है लेकिन नई तकनिक से स्ट्रॉबेरी की खेती उनके द्वारा पहली बार हिन्दुस्तान जिंक के माध्यम से की गयी है जिसमें अच्छी पैदावार हुई है। नई

  
क्षेत्रीय अधिकारी  
राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
उदयपुर (राज.)

  
अति. जिला कलक्टर  
उदयपुर

तकनिक से खेती करने से मेरे खेत में 80-90 क्विण्टल टमाटर हुऐ हैं तथा मुझे खेती करने का नया तरीका सीखने को मिला है। समाधान परियोजना के तहत भी जिक्र प्रशासन द्वारा अच्छा कार्य किया जा रहा है। इसके लिये मैं हमारे सरपंच सा०, श्री लालूरामजी का आभार व्यक्त करता हूँ कि उन्होंने स्थानीय लोगों को रोजगार दिलाने में अच्छा कार्य किया लेकिन आगे भी स्थानीय लोगों को अधिक से अधिक रोजगार मिलना चाहिये ताकि कोई बेरोजगार नहीं रहे। आगे यदि कारखाना लगेगा तो क्षेत्र के लोगों को रोजगार भी मिलेगा। इस हेतु इस क्षेत्र में आईटीआई भी खोली जानी चाहिये।

**6. श्रीमती यशोदा चौधरी, निवासी ग्राम जावर माता:**


श्रीमती यशोदा चौधरी निवासी ग्राम जावर माता ने बताया कि मैं सन् 2006 से हिन्दुस्तान जिक्र द्वारा चलाई जा रही खुशी परियोजना से जुड़ी हुई हूँ। इसके तहत बच्चों को शाला पूर्व शिक्षा दी जा रही है एवं बच्चों को खेल के माध्यम से पढ़ाया जा रहा है। मेरा हिन्दुस्तान जिक्र प्रशासन से निवेदन है कि वे आगे भी इस तरह के और नये केन्द्र खोलकर बच्चों के विकास के कार्य करते रहें।


**7. श्रीमती सीमा मीणा, ग्राम जावर ऑगनबाड़ी कार्यकर्ता :**

श्रीमती सीमा मीणा, ऑगनबाड़ी कार्यकर्ता ने सबसे पहले आज की जन सुनवाई में उपस्थित अधिकारियों एवं क्षेत्र की जनता का स्वागत किया। उसके बाद उन्होंने कहा कि मैं हिन्दुस्तान जिक्र लि० द्वारा चलाई जा रही खुशी परियोजना के बारे में कुछ जानकारी देना चाहती हूँ कि इसके तहत महिलायें गर्भधारण करने से लेकर अपने बच्चे की बाल्यवस्था तक जुड़ी रहती है। इस दौरान महिलाओं एवं बच्चों को सभी तरह की सुविधायें उपलब्ध करवाई जाती है। जैसे बच्चों के लिये खिलौने, रंगस पट्टी, ड्रेस, कई तरह के किट आदि। इन सुविधाओं की वजह से हमारे केन्द्र में बहुत बच्चे आ रहे हैं। जिक्र प्रशासन द्वारा लोकडाउन के दौरान भी बच्चों को शाला पूर्व शिक्षा के किट घर-घर जाकर वितरित किये गये थे। जिक्र प्रशासन द्वारा हमें कीचन एवं बगीचों के लिये भी सहायता दी जाती है। आगे भी हम चाहते हैं कि खुशी परिवार वाले हमारे से आगे भी जुड़े रहें।

**8. श्रीमती रुकमणी: ग्राम नालागोव:**

श्रीमती रुकमणी ने बताया कि वह हिन्दुस्तान जिक्र लि० द्वारा संचालित सखी परियोजना से जुड़ी हुई है जिसके तहत उनके द्वारा 58 समूहों को जेण्डर का प्रशिक्षण देकर यह जानकारी दी जाती है कि महिलायें सरकारी सुविधायें कैसे प्राप्त कर सकती हैं। इसके तहत लगभग 5000 महिलायें हमारे से जुड़ी हुई हैं।

  
क्षेत्रीय अधिकारी  
समाधान राज्य प्रदूषण नियंत्रण नण्डल  
उदयपुर (राज.)

  
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उदयपुर

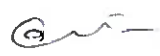
इस परियोजना की वजह से कई महिलाओं ने अपने यहाँ पर सिलाई, आटा चक्की, डेयरी आदि का प्रशिक्षण प्राप्त कर स्वयं का रोजगार कर रही है।


9. श्री धर्मेन्द्रसिंह राजोरिया ग्राम जावर:

श्री धर्मेन्द्र सिंह राजोरिया ने कहा कि डीएमएफटी मद में खनन कम्पनीयों द्वारा जो करोड़ों रुपये जमा करवाये जाते हैं, उसके लिये मेरा जिक्र प्रशासन, जिला प्रशासन एवं मजदूर यूनियन के पदाधिकारियों से निवेदन है कि इस मद के ज्यादा से ज्यादा पैसों का उपयोग स्थानीय विकास के कार्यों में किया जाये।

10. श्री बंशीलाल, सरपंच ग्राम पंचायत टीडी:

श्री बंशीलाल, सरपंच ग्राम पंचायत टीडी ने कहा कि जैसाकि मेरे से पूर्व वक्ताओं ने कहा है कि हिन्दुस्तान जिक्र हमारे क्षेत्र में अच्छा कार्य रहा है लेकिन फिर भी भौतिक सुविधायें हमारे क्षेत्र में बहुत कम हैं। हमारे कई मुद्दे ऐसे हैं जो कि आज भी धरातल पर नहीं हैं। जब हिन्दुस्तान जिक्र वालों को इससे पूर्व पर्यावरण रवीकृति लेनी थी तब इनके द्वारा ऐसे कई वादे किये गये थे जिन पर आज भी ये खरे नहीं उतर पाये हैं। मेरा निवेदन है कि हिन्दुस्तान जिक्र प्रशासन इस क्षेत्र में आईटीआई खोलकर ऐसे विषय में प्रशिक्षण उपलब्ध करवावे जिससे कि स्थानीय लोगों को अधिक से अधिक रोजगार मिल सके। डीएमएफटी मद के पैसे को भी खनन से प्रभावित ग्राम पंचायतों में विभिन्न विकास कार्यों में खर्च किया जाना चाहिये। हमारे यहाँ से कुछ घरों में खनन ब्लास्टिंग की वजह से दरारें आई हैं जिसका समाधान किया जाना चाहिये। हमारे क्षेत्र के कुओं, नलकूपों एवं तालाबों का पानी सूख गया है, अतः ऐसे क्षेत्रों में खेती एवं पेयजल के पानी की व्यवस्था की जानी चाहिये। खनन क्षेत्र में हमारे जो श्रमिक कार्य करते हैं, उनकी कटेगिरी बढ़ाई जानी चाहिये, क्योंकि यदि किसी श्रमिक की कटेगिरी बढ़ेगी तो उसका वेतन भी बढ़ेगा जिससे उसको आर्थिक लाभ मिल सकेगा। खनन प्रभावित क्षेत्र की 7-8 पंचायतों में एनीकट बनाकर बरसात के पानी को रोका जाना चाहिये। चिकित्सा एवं स्वास्थ्य के क्षेत्र में भी हिन्दुस्तान जिक्र प्रशासन को चाहिये कि वे ग्राम जावर माईन्स के अस्पताल में अच्छा डाक्टर बिठाकर आस-पास की जनता का निःशुल्क इलाज करवावे। क्योंकि इनके द्वारा लगाई गयी एम्बुलेंस गाँवों में कब जाती है, इसका लोगों को पता नहीं रहता है जिसकी वजह से वे इलाज से वंचित रह जाते हैं। शिक्षा के क्षेत्र में भी अच्छा कार्य करना चाहिये। हम चाहते हैं कि हमारे क्षेत्र में एक नहीं बल्कि दस कारखाने और खुले लेकिन उनमें बाहरी व्यक्ति को नहीं लगाकर स्थानीय लोगों को प्राथमिकता से रोजगार उपलब्ध करवाया जावे।

  
क्षेत्रीय अधिकारी  
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**11. श्री मोहम्मद आरिफ, एडवोकेट:**


श्री मोहम्मद आरिफ, एडवोकेट ने कहा कि जैसा कि हमारे सरपंच साहब ने कहा कि लोगों को रोजगार दिया जाना चाहिये। मैं भी चाहता हूँ कि कम से कम 50 प्रतिशत स्थानीय लोगों को रोजगार दिया जाना चाहिये। पिछली बार जब जिनक प्रशासन द्वारा पर्यावरण क्लीयरेंस ली गयी थी तब उनके द्वारा वादा किया गया था कि बायोगैस का प्लाण्ट लगाया जायेगा। लेकिन 4-5 साल में भी यह प्लाण्ट नहीं लग पाया है जिसे अब आगे लगाया जाना चाहिये। जैसा कि जिनक प्रशासन द्वारा मुझे जवाब दिया गया है कि उनके द्वारा जुलाई, 2021 में टोर के लिये आवेदन किया गया है जबकि सच यह है कि उनके द्वारा मार्च माह से कार्य आरम्भ कर दिया गया है, जिसका जवाब दिया जाना चाहिये।


**12. सुश्री रेशमा मीणा ग्राम जावर:**

सुश्री रेशमा मीणा ने कहा कि वे हिन्दुस्तान जिनक लि० द्वारा संचालित उँची उड़ान परियोजना का हिस्सा रही है। जिनक प्रशासन द्वारा इसके तहत उन्हें आईआईटी की कोचिंग करवाई गयी है जिसकी बदौलत आज वे जमशेदपुर में एनआईटी में प्रवेश लेकर प्रशिक्षण प्राप्त कर रही है। मेरा आग्रह है कि हिन्दुस्तान जिनक लि० प्रशासन आगे भी जरूरतमंद बच्चों को उच्च शिक्षा के लिये सहयोग करता रहे।

**13. श्री शम्भूलाल निवासी जावर:**

श्री शम्भूलाल निवासी जावर ने कहा कि हिन्दुस्तान जिनक द्वारा किये जा रहे खनन ब्लास्टिंग कार्य की वजह से क्षेत्र के कई मकानों में दरारें आ रही है। मेरे घर में भी दरारें आ रही है। क्षेत्र के कुओं का जल स्तर काफी नीचे चला गया है। मेरे घर में दो व्यक्ति पागल है जिसकी वजह क्या है ? ध्वनी प्रदूषण, वायु प्रदूषण या जल प्रदूषण। हिन्दुस्तान जिनक वालों ने हमेशा हमें ठगा है, उनके द्वारा कितनी राशि यहाँ से कमाकर ली जाती है लेकिन उसकी एवज में यहाँ पर कोई कार्य नहीं करवाया जाता है। पहले जब यह भारत सरकार का उपक्रम था तब इसमें हमारे वाहन चलते थे लेकिन आज के समय में वेदांता वालों ने हमें पंगु बना दिया है। जब तक यहाँ पर शिक्षा की कमी रहेगी तब तक यहाँ पर रोजगार एवं विकास की कोरी कल्पना रहेगी। जिन लोगों के पास कोई सर्टिफिकेट नहीं है, ऐसे लोग भी यहाँ पर बाहर से आकर काम कर रहे हैं जो कि चैक कर सकते हैं। बाद में जिनक प्रशासन कहता है कि यहाँ के लोग विरोध करते हैं, जो कि गलत है। हम यहाँ के मूल निवासी हैं, हमारा आर्थिक विकास होना चाहिये, जो कि नहीं हो पा रहा है, अब ऐसा नहीं चलेगा। यहाँ पर जो विस्फोटक सामग्री ब्लास्टिंग के लिये उपयोग में ली जाती है उसे देखा जाये तो ऐसा लगता है कि जिनक प्रशासन द्वारा पर्यावरण प्रदूषण रोकने के क्षेत्र में कुछ भी प्रयास नहीं किया गया है। यहाँ से

  
क्षेत्रीय अधिकारी  
राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
उदयपुर (राज.)

  
अति. जिला कलक्टर  
उदयपुर

निकलने वाले धुंवे की वजह से लोग बहरे हो रहे हैं, स्थानीय लोगों को बराबर रोजगार नहीं मिल पा रहा है जबकि खनन प्रभावित क्षेत्र के लोगों को पर्याप्त रोजगार दिया जाना चाहिये। इसके अलावा और भी कई बातें हैं लेकिन हम यहाँ पर बैठे हुये हमारे नेताजी, अधिकारीजी एवं अन्य भाई सा० की वजह से झिझक रहे हैं और ज्यादा नहीं कह पा रहे हैं।

**14. श्री मांगीलाल भीणा निवासी जावर माला:**

श्री मांगीलाल भीणा निवासी जावर माला ने कहा कि जैसा कि मेरे पूर्व वक्ताओं ने कहा कि यहाँ पर चलने वाले पंखे की आवाज की वजह से हम पागल हो रहे हैं तो यह बात सरासर गलत है। क्योंकि पंखे के एकदम सामने मेरा स्वयं का मकान है हमें इससे कोई नुकसान नहीं हुआ है। यह तो कहने वाले लोगों के परिवार का मागला है जिसे अपने परिवार के बीच बैठकर ही निपटाया जाना चाहिये।

**15. श्रीमती अरुणा कंवर निवासी सिंघटवाड़ा:**

श्रीमती अरुणा कंवर निवासी सिंघटवाड़ा ने कहा कि हिन्दुस्तान जिनक प्रशासन द्वारा हमारे कहने पर स्कूल में शौचालय बनवाया गया, स्कूल में खेल मैदान नहीं था जो बनवाया गया, पानी की टंकी बनवाई गयी। गाँव की महिलाओं को सखी परियोजना के माध्यम से एक-एक लाख रु० का लोन दिया गया जिसकी वजह से आज महिलायें सिलाई, आटा चक्की, डेयरी आदि क्षेत्र में कार्य करते हुये अपने घर का खर्च स्वयं उठा रही है।

**16. श्री अमित खराड़ी निवासी जावर:**

श्री अमित खराड़ी निवासी जावर ने कहा कि सखी परियोजना एवं उँची उड़ान जैसे कार्यक्रम राज्य सरकार द्वारा भी चलाये जा रहे हैं। राज्य के अन्य जिलों में भी इस प्रकार के लाभ के कार्य सरकार द्वारा करवाये जा रहे हैं। लेकिन यहाँ पर जिनक वाले इस तरह के कार्य कर रहे हैं जिनके बदले क्या हमें अपनी जमीन देनी पड़ेगी ? इस प्रकार के छोटे-छोटे कार्यों के बदले हम अपनी जमीन देने वाले नहीं हैं। जिनक वालों द्वारा रात के समय जब ब्लास्ट किया जाता है उस समय भूकम्प सा झटका महसूस होता है। इस तरह की छोटी सुविधाओं के लिये क्या हमें भूकम्प का झटका सहन करना पड़ेगा। हमारा निवेदन है कि छोटे कार्यों एवं लाभ के लिये जनता को गुमराह नहीं करें। हमारी माँग है कि वेदांता को पुनः भारत सरकार के उपक्रम के रूप में चलाया जाये। यहाँ पर जिनक प्रशासन द्वारा जो स्पोर्ट्स एकेडमी (फुटबाल) खोली गयी है उसमें 80 सीटें आदिवासी बच्चों के लिये आरक्षित की जानी चाहिये। यहाँ पर कालेज या आईटीआई खोलने से कोई फायदा होने वाला नहीं है, इससे तो कुए का मेंढक कुए में ही रह जायेगा। हम चाहते हैं

क्षेत्रीय अधिकारी  
राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
उदयपुर (राज.)

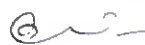
३००  
अति. जिला कलक्टर  
उदयपुर




कि यहाँ के पढ़ने वाले छात्रों को छात्रवृत्ति देकर आगे पढ़ने के लिये प्रेरित किया जाये ताकि वे जिनक वालों के भरोसे नहीं रहकर आगे अच्छा रोजगार प्राप्त कर सकें। वर्ष 2017 में भी हमने जिनक प्रशासन की सीएसआर टीम को टेलिंग डेम, पेयजल, शिक्षा एवं स्वास्थ्य आदि के बारे में अवगत करवाया था लेकिन आज दिन तक कोई सुनवाई नहीं हुई है। बेरोजगारों की भर्ती के बारे में भी कोई काम नहीं किया गया है, यहाँ के काफी लोग बेरोजगार बैठे हैं। सब लोगों की मॉंग है कि स्थानीय लोगों को ज्यादा से ज्यादा रोजगार मिलना चाहिये। जब यहाँ पर पावर प्लांट बन रहा था तब जिनक प्रशासन द्वारा आश्वासन दिया गया था कि स्थानीय लोगों को निःशुल्क बिजली उपलब्ध करवाई जायेगी, यह बात आप सभी लोगों को याद है या भूल गये। सन! 2012 में वेदांता ग्रुप द्वारा स्थानीय मॉंगों को पूरी करने के लिये आश्वासन दिया गया था, जिसकी प्रति मैं आपको उपलब्ध करवा दूंगा। इन मॉंगों में से कोई भी मॉंग जिनक प्रशासन द्वारा पूरी नहीं की गयी है।

**17. श्री अमृतलाल भीणा, विधायक महोदय सलूमबर:**

श्री अमृतलाल भीणा, विधायक महोदय सलूमबर ने सबसे पहले आज की लोक जन सुनवाई में उपस्थित अतिरिक्त जिला कलक्टर महोदय, अन्य अधिकारियों एवं क्षेत्र की जनता का स्वागत किया। उसके बाद उन्होंने कहा कि सबकी मॉंग है कि इस क्षेत्र में कारखाना खुलना चाहिये लेकिन इसके साथ-साथ यह बात भी सत्य है कि यहाँ के लोगों को प्राथमिकता से रोजगार मुहैया करवाया जावे। आज जो पर्यावरण स्वीकृति के लिये जन सुनवाई रखी गयी है, वैसी ही सन् 2018 में भी आयोजित की गयी थी लेकिन यहाँ का कारखाना आगूचा चला गया जिससे यहाँ के लोगों को खामियाजा भुगतना पड़ा। जिनक प्रशासन से भी आग्रह है कि वे क्षेत्र की सभी ग्राम पंचायतों के सरपंच एवं अन्य जनप्रतिनिधियों से समन्वय स्थापित कर उनके यहाँ पर शिक्षा, स्वास्थ्य, पर्यावरण के क्षेत्र में करवाये जाने वाले कार्यों की सूची बनाकर उनकी प्राथमिकता तय कर समय-समय पर कार्य करवाये जावें। डीएमएफटी मद के जिला कलक्टर महोदय अध्यक्ष, खनि अभियंता सदस्य सचिव एवं जिले के सभी विधायक सदस्य होते हैं। जावर माईन्स क्षेत्र की सभी ग्राम पंचायतें मेरी विधान सभा क्षेत्र में आती हैं। अभी हमें डीएमएफटी मद में 7 करोड़ रु० का फण्ड मिला है, मैं चाहता हूँ कि जावर से ओडा सड़क की इस मद से स्वीकृति जारी की जाये। मेरा निवेदन है कि लोहे की खानों की तरह सोप स्टोन की खानों को भी इसमें जोड़ा जाना चाहिये। जहाँ तक आईटीआई खोलने का मामला है, मैं यहाँ के 5-7 लोगों के साथ माननीय मुख्य मंत्री महोदय से मिलकर हाथों-हाथ स्वीकृति जारी करवा दूंगा। मेरा जिनक प्रशासन से आग्रह है कि जो सीमा मैनेजमेंट ने तय की है, उसमें स्थानीय जनप्रतिनिधियों को साथ लेकर क्षेत्र की समस्याओं का समाधान करना सुनिश्चित करें।

  
क्षेत्रीय अधिकारी  
राजस्थान राज्य पर्यावरण नियंत्रण मण्डल  
उदयपुर (राज.)

  
अति. जिला कलक्टर  
उदयपुर

18. श्री मोहनलाल खराड़ी, पूर्व प्रधान पंचायत समिति सराड़ा:

श्री मोहन लाल खराड़ी, पूर्व प्रधान पंचायत समिति सराड़ा ने सबसे पहले आज की जन सुनवाई में उपस्थित अधिकारियों एवं क्षेत्र की जनता का स्वागत किया। उराके बाद उन्होंने कहा कि मैं सबसे पहले हमारे विधायक महोदय को धन्यवाद देना चाहूंगा कि उन्होंने कारखाने की स्वीकृति प्रदान कर दी। इसके बाद हमारा दुःख डीएमएफटी मद को लेकर है कि हमारे क्षेत्र से करोड़ों रुपया इस मद में जाता है फिर भी क्षेत्र की ग्राम पंचायतों (केवड़ा, ओडा, सिंगटवाड़ा, नेवातलाई, भलाडिया, देवपुरा आदि) को एक फूटी कोड़ी भी नहीं मिली है। इसके बाद मेरा विधायक महोदय से आग्रह है कि वे ओडा सड़क की सुध लें। यदि ये चाहेंगे तो यह सड़क इस साल बनकर रहेगी। इस क्षेत्र का जो विकास डीएमएफटी मद से होना चाहिये, वह यहाँ के सांसद एवं विधायक महोदय के हाथ में है। क्योंकि आप जहाँ पर चाहेंगे, वहाँ पर इस मद का पैसा लगेगा। हमारे यहाँ से इस मद में जो पैसा जाता है उराका आधा भी अगर इस क्षेत्र की ग्राम पंचायतों के विकास में खर्च कर दिया जाता है तो ये पंचायतें मालामाल हो जायेगी। अतः आगे की मीटिंग से पूर्व हमारे सरपंच साहेबान से प्रस्ताव लेकर समान वितरण प्रणाली के तहत स्वीकृति जारी की जावे ताकि हमें किसी सरकार या हिन्दुस्तान जिक प्रशासन से कोई सिकवा/शिकायत नहीं रहे। हिन्दुस्तान जिक लि० द्वारा सामाजिक सरोकार के चलाये जा रहे कार्यक्रम (सखी सहेली कार्यक्रम) से क्षेत्र की महिलायें जागरूक एवं प्रेरित हुई हैं और जो महिलायें इससे पूर्व अपने घरों से बाहर नहीं निकलती थी, वे आज बाहर निकलकर मंच पर बोलना सीख गयी है, इसके लिये जिक प्रशासन का बहुत-बहुत आभार। जब हिन्दुस्तान जिक प्रशासन ने इतनी मदद कर दी है तो मेरा महिलाओं से आग्रह है कि अब वे स्वयं अपने आप चलने एवं आगे बढ़ने का प्रयास करें, क्योंकि यदि नहीं चलेगी तो अपना विकास नहीं हो पायेगा।

19. श्रीमती शंकरी देवी, निवासी चनवदा:

श्री शंकरी देवी निवासी चनवदा ने कहा कि हम महिलायें अपने घर से बाहर निकलना नहीं जानती थी लेकिन हमें हिन्दुस्तान जिक प्रशासन द्वारा मंजरी फाउण्डेशन के मार्फत जागरूक किया गया। मंजरी फाउण्डेशन की वजह से आज हम अपने पैरों पर खड़ी हुई हैं तो आगे चलना भी सीख जायेंगी। आज हमें अपनी बात रखने का जो अवसर मिला, यह सब हिन्दुस्तान जिक प्रशासन की देन है। पहले हमारे गाँव की बच्चियों को पढ़ाया लिखाया नहीं जाता था, लेकिन आज जिक प्रशासन की योजनाओं से प्रेरित होकर बच्चियाँ पढ़ लिखकर आगे बढ़ रही हैं। मुझे जिक प्रशासन द्वारा बताया गया था कि आपकी बेटी के अच्छे नम्बर आये हैं इसलिये उसे हमारे मार्फत रींगस कालेज में प्रवेश दिलाकर आगे की पढ़ाई

क्षेत्रीय अधिकारी  
मानवसंसाधन सहाय प्रशिक्षण निदेशक मुखल  
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करवावें। इस बात पर हमने अपनी बेटी को वहाँ पर प्रवेश दिलाया और आज वह सेकण्ड — ईयर बीए में अध्ययन कर रही है। अतः मेरा सभी माताओं से निवेदन है कि वे भी अपनी बेटियों को पढ़ावें और रींगस कालेज में प्रवेश दिलवावें तथा जिन प्रशासन भी आगे इस तरह के कार्य करते रहें एवं क्षेत्र के हमारे बेरोजगारों को रोजगार प्रदान करते रहें।

**20. श्रीमती फलक नाज, निवासी भलाडिया :**

श्रीमती फलक नाज निवासी भलाडिया ने आज की जन सुनवाई में उपस्थित अधिकारियों एवं क्षेत्र की जनता का स्वागत किया। उसके बाद उन्होंने कहा कि वे हिन्दुस्तान जिनक लि० द्वारा संचालित शिक्षा प्रोजेक्ट से जुड़ी हुई हैं। जिनक प्रशासन के इस कार्यक्रम से हमारे क्षेत्र के बच्चों की पढ़ाई का लेवल बढ़ा है, आज वे आईआईटी एवं इंजीनियरिंग की पढ़ाई कर रहे हैं। यह प्रोजेक्टर क्षेत्र के 10 विद्यालयों में चल रहा है। इससे बच्चों को अंग्रेजी, गणित एवं विज्ञान विषय में अच्छा फायदा मिला है एवं हमें भी पिछले 4 साल से अच्छा रोजगार मिल रहा है। जो बच्चे कभी किसी के सामने बोलना नहीं जानते थे, वे आज अपने टीचर के साथ अच्छे से बात कर रहे हैं। कोरोना महामारी के दौरान भी यह प्रोजेक्ट चालू था जिससे हमने बच्चों को पढ़ाई से जोड़ा रखा। यह प्रोजेक्ट सन् 2016 से चल रहा है जिसकी वजह से बोर्ड का परीक्षा परिणाम भी पहले से काफी बेहतर हुआ है और उन्हें आगे बढ़ने में सहायता मिल रही है। उक्त सभी के लिये हम हिन्दुस्तान जिनक प्रशासन के बहुत-बहुत शुक्रगुजार हैं।

**21. श्रीमती प्यारी कुमारी मीणा, कृष्णपुरा जावर माईन्स:**

श्रीमती प्यारी कुमारी मीणा, जावर माईन्स ने बताया कि वे हिन्दुस्तान जिनक द्वारा संचालित कार्यक्रम उँची उड़ान से जुड़ी हुई हैं। इसके तहत जिनक प्रशासन द्वारा कक्षा 11 एवं 12 के बाद दो साल तक आईआईटी एवं इंजीनियरिंग की कोचिंग करवाई जाती है। इसी कार्यक्रम के माध्यम से मैं आज जोधपुर कॉलेज से सिविल विषय में बीटेक इंजीनियर की पढ़ाई कर रही हूँ। मेरा सभी माताओं से आग्रह है कि वे भी अपनी बच्चियों को आगे पढ़ावें तथा जिनक प्रशासन भी इनका पूरा सपोर्ट करें। मेरा जिनक प्रशासन से भी आग्रह है कि वे जिस तरह बच्चियों को कोचिंग में सहायता कर रहे हैं, उसी तरह से उन्हें उच्च शिक्षा में भी सहायता प्रदान करें, क्योंकि हमारे गरीब माता-पिता उच्च शिक्षा का खर्चा वहन नहीं कर पाते हैं। कोचिंग के साथ ही कॉलेज फीस में भी जिनक प्रशासन को सहायता करनी चाहिये।

  
क्षेत्रीय अधिकारी  
राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
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
**22. श्री गौतम लाल मीणा निवासी टीडी:**

श्री गौतम लाल मीणा निवासी टीडी ने आज की जन सुनवाई में उपस्थित अधिकारियों एवं क्षेत्र की जनता का स्वागत किया। उसके बाद उन्होंने कहा कि ग्राम जावर में खनन पिछले कई सालों से चल रहा है। जिनक प्रशासन द्वारा खनन के साथ-साथ पर्याप्त मात्रा में वृक्षारोपण भी किया गया है जिसकी वजह से आज चारों तरफ हरियाली ही हरियाली नजर आ रही है। आगे भी हम चाहते हैं कि खनन के साथ-साथ क्षेत्र का पर्यावरण भी अच्छा बना रहे। मैं क्षेत्रिय अधिकारी राजस्थान राज्य प्रदूषण नियंत्रण मण्डल से यह पूछना चाहता हूँ कि खनन क्षेत्र के विस्तारीकरण से क्या हमारे लोगों को और रोजगार के अवसर प्रदान होंगे। सखी एवं समाधान परियोजना के तहत भी क्षेत्र में अच्छा कार्य हुआ है। इसके साथ-साथ क्षेत्र में मुर्गी पालन योजना भी चल रही है। क्षेत्र के किसानों के पास जमीन तो बहुत है लेकिन उसमें वे खेती नहीं कर पाते हैं, अतः मेरा उनसे आग्रह है कि वे अपनी जमीन में एक बड़ा सा खड्डा खोदकर वहाँ पर मत्स्य उद्योग प्रारम्भ करें और जीरा नाम के बीज से मछली पालन करें तो दो माह के अंतराल में ही मछली अच्छा रूप ले लेगी। इसके माध्यम से एक किसान थोड़ी से जमीन में अच्छा लाभ ले सकता है। मेरा आग्रह है कि जिनक प्रशासन को भी इस व्यवसाय को समाधान परियोजना से जोड़ना चाहिये।

**23. श्री गौतम लाल मीणा, पूर्व सरपंच ग्राम पंचायत सिंघटवाड़ा:**

श्री गौतम लाल मीणा, पूर्व सरपंच ग्राम पंचायत सिंघटवाड़ा ने आज की जन सुनवाई में उपस्थित अधिकारियों एवं क्षेत्र की जनता का स्वागत किया। उसके बाद उन्होंने कहा कि सन् 2008 में एक बार जब हिन्दुस्तान जिनक लि० बन्द हुआ था तो आस-पास के लोगों को थोड़ी बहुत दिक्कत हुई थी। उस समय मैं स्वयं यहाँ का सरपंच था और यह कारखाना केन्द्र सरकार के अधीन था। उस समय यह कारखाना 4 साल तक बन्द रहा था और इस कारखाने को पुनः चलाने के लिये आस-पास की ग्राम पंचायतों के हम सरपंच लोगों ने काफी प्रयास किये थे। उस समय हिन्दुस्तान जिनक वालों ने 5158 हेक्टेयर जमीन की एनओसी लेने के लिये जन सुनवाई करवाई थी। जब हिन्दुस्तान जिनक बन्द हुआ था तब उसके पास 1578 हेक्टेयर जमीन थी। उस समय इस क्षेत्र के आस-पास के सभी सरपंचों ने कहा था कि हम 5158 हेक्टेयर जमीन नहीं देंगे। फिर यह 3620 हेक्टेयर जमीन जिनक के पास कहीं से आई, जिसके बारे में आज जन सुनवाई करवाई जा रही है। इस क्षेत्र के लोग कहते हैं कि हम इस कारखाने को बन्द करवा देंगे जबकि हमने तो 1578 हेक्टेयर जमीन देकर कारखाने को पुनः चालू करवाया था। उस समय कारखाने को चलाने के लिये जिनक प्रशासन द्वारा जो एग्रीमेण्ट/वादे किये गये थे, उस पर जिनक प्रशासन खरा नहीं उतरा है। इस एग्रीमेण्ट में से एक भी बात नहीं

  
क्षेत्रीय अधिकारी  
राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
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अति. जिला कलक्टर  
उदयपुर



मानी गयी है। इस कारखाने में अभी केवल 5 प्रतिशत श्रमिक ही स्थानीय निवासी लगे हुये हैं बाकी सभी बाहर के लोग काम कर रहे हैं। आज तो जिनके के जनरल मैनेजर से मिलने के लिये भी हमें स्वीकृति लेनी पड़ती है। जबकि पहले हम बिना किसी रोक-टोक मिल सकते थे। आज हमारे लिये कारखाने के दरवाजे बंद कर दिये गये हैं, हमारे से नहीं मिला जाता है। इसके लिये हम स्वयं लड़ेंगे और हमारी आगे आने वाली पीढ़ी को खड़ा करेंगे। आज जिनके प्रशासन द्वारा 3620 हेक्टेयर जमीन के लिये जन सुनवाई आयोजित की जा रही है जबकि सच यह है कि इनके द्वारा किसी भी तरीके से हमारे क्षेत्र का विकास नहीं किया जा रहा है। हम चाहते हैं कि हम एक कदम बढ़ाएं और कम्पनी वाले भी एक कदम आगे बढ़ाएं, इसके बीच में किसी दलाल की भूमिका नहीं होनी चाहिये। इस एरिये के जिन लोगों ने दलाली की है, वे आज कम्पनी की गोद में बैठे हैं और हम जैसे लोगों की तौहीन की जा रही है। कम्पनी द्वारा इस एरिये में एक पैसे का भी विकास नहीं करवाया गया है बल्कि राज्य सरकार से जिस काम के लिये जो पैसा आता है, उसी पर कम्पनी द्वारा अपना बोर्ड लगाकर उसके द्वारा पैसा खर्च करना बताया जा रहा है जोकि गलत है। कम्पनी द्वारा अब तक स्थानीय कितने लोगों को रोजगार दिया गया है, इसके आँकड़े निकालकर हमें बताया जाये। यहाँ पर कार्यरत लगभग 7500 श्रमिकों में से मात्र 2000/2500 श्रमिक ही स्थानीय हो सकते हैं, बाकी सभी बाहरी लोग हैं और हमारे लोगों को उदयपुर या अन्यत्र बाहर रोजगार के लिये भटकना पड़ रहा है। जिनके कम्पनी के सिक्क्योरिटी गार्ड भी हम लोगों की पूरी निगरानी रखते हैं, क्या हमने कोई जुल्म कर दिया है जो हमारे साथ ऐसा बरताव किया जा रहा है। कम्पनी द्वारा रात्रि के समय में जो ब्लास्टिंग किया जाता है उससे हमारी नींद हराम हो रही है। अतः जिनके प्रशासन यह बात कान खोलकर सुन लें कि यह 3620 हेक्टेयर जमीन कहाँ तक आ रही है, सबसे पहले इसका सीमाज्ञान करवाया जाकर हमें बताया जाये, हम पूर्व में 1580 हेक्टेयर जमीन दे चुके हैं, आगे और जमीन नहीं देंगे।

**24. श्री प्रकाश चन्द भीणा, सरपंच, ग्राम पंचायत जावर:**

श्री प्रकाश चन्द भीणा, सरपंच ग्राम जावर ने आज की जन सुनवाई में उपस्थित सभी अधिकारियों एवं क्षेत्र की जनता का स्वागत किया। उसके बाद उन्होंने कहा कि आज हमारे गाँव में हिन्दुस्तान जिनके लि० के कार्य विस्तारीकरण के लिये लोक जन सुनवाई हो रही है। जैसा कि श्री गौतमजी ने बताया है कि कम्पनी द्वारा 3680 हेक्टेर जमीन लेने की बात की जा रही है। जब कम्पनी अपना उत्पादन बढ़ाना चाह रही है तो उसके लिये जमीन की भी जरूरत रहेगी। डीएमएफटी फण्ड में कम्पनी द्वारा काफी पैसा जमा करवाया जा रहा है लेकिन इस मद से आस-पास की ग्राम पंचायतों के विकास में नाम मात्र का (उँट के मुँह में जीरा के

क्षेत्रीय अधिकारी  
राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
उदयपुर (राज.)

अति. जिला कलक्टर  
उदयपुर

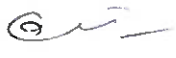
बराबर) पैसा खर्च किया जा रहा है। यहाँ का एक प्रतिशत पैसा भी यहाँ पर खर्च नहीं हो रहा है। हमारा विधायक महोदय से भी निवेदन है कि डीएमएफटी मद का पैसा हमारे आस-पास की पंचायतों के विकास में खर्च किया जाना चाहिये। यदि खनन का विस्तार होगा तो निश्चित रूप से आस-पास के गाँवों का भी विकास होगा। आज हमारे डिप्लोमा किये हुये या टेक्नीकल ट्रेनिंग किये हुये लोगों को हिन्दुस्तान जिंक के उदयपुर ऑफिस में इन्टरव्यू के लिये जाना पड़ता है और उसमें भी मात्र 2-3 प्रतिशत लोगों का सलक्शन किया जाता है, जो कि गलत है।


**25. श्री लक्ष्मी चन्द मीणा, सरपंच, ग्राम पंचायत नेवातलाई:**

श्री लक्ष्मी मीणा, सरपंच, ग्राम पंचायत नेवातलाई ने आज की जन सुनवाई में उपस्थित अधिकारियों एवं क्षेत्र की जनता का स्वागत किया। उसके बाद उन्होंने कहा कि यह बहुत खुशी की बात है कि जिंक प्रशासन द्वारा अपने खनन कार्य के विस्तारीकरण के लिये आज लोक जन सुनवाई का कार्यक्रम रखा गया है। हमारी जमीन चली जाये और हमारे लोगों को नौकरी नहीं मिले, यह दुःख की बात है, नौकरी के लिये स्थानीय लोगों की भागीदारी निश्चित की जाये। आज बाहर के आने वाले व्यक्ति ठेकेदारी करके कारों में घूम रहे हैं एवं गाँव पक्का मकान बना लिया है। हम चाहते हैं कि यहाँ पर 10 कारखाने और लगे, लेकिन उसके बदले में स्थानीय लोगों व गाँव का विकास भी होना चाहिये, लोगों को सुविधा मिलनी चाहिये। शिक्षा एवं स्वास्थ्य के क्षेत्र में भी जिंक प्रशासन को अच्छा कार्य करना चाहिये और अपने बच्चे स्कूल जा रहे हैं या नहीं, माता-पिता को भी पूरा ध्यान रखना चाहिये। चूंकि इस कम्पनी में ज्यादा जमीन नेवातलाई के लोगों की गयी है इसलिए इस कम्पनी में ज्यादा से ज्यादा रोजगार भी यहाँ के लोगों को प्राथमिकता से मिलना चाहिये। साथ ही सरकारी नौकरी वाले भी अपनी ड्यूटी को इमानदारी से करें। कम्पनी के लोगों को स्थानीय लोगों को साथ लेकर चलना चाहिये ताकि कम्पनी एवं क्षेत्र का विकास हो सके।

**26. श्री अनिल कुमार मीणा शिक्षा संम्बल ग्राम जावर:**

श्री अनिल कुमार मीणा ने आज की जन सुनवाई में उपस्थित अधिकारियों एवं क्षेत्र की जनता का स्वागत किया। उसके बाद उन्होंने कहा कि हिन्दुस्तान जिंक द्वारा मुझे कक्षा 9 एवं 10 में पढ़ाया गया, हमें अतिरिक्त क्लासें लगाकर पढ़ाई/कोचिंग करवाई गयी तथा वीण्टर केम्प लगाये गये जिसके लिये मैं कम्पनी की पूरी टीम का आभारी हूँ।

  
क्षेत्रीय अधिकारी  
राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
उदयपुर (रा.)

  
अति. जिला कलक्टर  
उदयपुर



**27. श्री भगन मीणा, पूर्व सरपंच ग्राम पंचायत टीडी:**

श्री भगन मीणा, पूर्व सरपंच ग्राम पंचायत टीडी ने आज की जन सुनवाई में उपस्थित अधिकारियों एवं क्षेत्र की जनता का स्वागत किया। उसके बाद उन्होंने कहा कि आज की लोक जन सुनवाई में हम आस-पास की ग्राम पंचायतों के लोग अपने बेहतर भविष्य, रोजगार, सामाजिक एवं आर्थिक विकास, सुरक्षा एवं आधारभूत सुविधाओं के लिये एकत्रित हुये हैं। लेकिन जिस तरह से हिन्दुस्तान जिनक प्रशासन अपना उत्पादन बढ़ाने के लिये जमीन का विस्तार करना चाहता है, उसके बारे में जैसाकि हमारे पूर्व सरपंच सा० श्री गौतमजी मीणा ने अवगत कराया, वह बात सही है कि सन् 2014 में हम सभी लोगों ने मिलकर इस क्षेत्र में खनन कार्य पुनः चालू करवाने के लिये एनओसी जारी करवाई। हमारे एरिये में खनन का विस्तार किया जाये लेकिन उसके बदले में हमें आधारभूत सुविधायें भी उपलब्ध करवाई जाये। कम्पनी को हमने पहले से ही 1580 हेक्टेयर जमीन दे रखी है, अब 3620 हेक्टेयर जमीनर और चाहिये जो कि लगभग 20000 बीघा बनती है। इसके बदले हमें कम्पनी से पूरी सुरक्षा चाहिये। हमें सबसे पहले स्थानीय लोगों के लिये रोजगार चाहिये, जो कि यहाँ के लोगों का हक भी बनता है। हम नहीं चाहते हैं कि कम्पनी को जमीन नहीं मिले लेकिन उसके बदले हमारे क्षेत्र का भी विकास होना चाहिये, हगें सुरक्षा एवं डवलपमेण्ट चाहते हैं। यहाँ के लोगों की रोजी-रोटी के अलावा और कोई माँग नहीं है, इसकी माँग करते-करते लोगों के बाल सफेद हो जाते हैं। यदि हम गाँव वाले जब अपनी जमीन देकर उद्योगों के लिये बलिदान देते हैं तो हगें भी उसका पूरा प्रतिफल मिलना चाहिये। सन् 2014 में जब इस खनन को पुनः चालू करवाया गया था तब मेरे पर लांछन लगाया गया था कि मैंने कम्पनी से 2 करोड़ रु० ले लिये हैं, जो कि गलत है। 3620 हेक्टेयर जमीन का उपयोग हिन्दुस्तान जिनक वाले अपने उद्योग के विस्तारीकरण के लिये करें लेकिन इसका सीमांकन स्पष्ट होना चाहिये, लोगों को पता चलना चाहिये कि उसकी खनन सीमा कहाँ तक है।

सन् 2014 में इस खान को पुनः चालू करवाते समय मैनेजमेंट द्वारा जो एग्रीमेण्ट का बोंड भरवाया गया था, उसकी कुछ बातें मैं आपको पढ़कर सुनाता हूँ:-

- दिनांक 11.2.2014 की ग्राम सभा में निर्णय लिया गया थाकि वेदांता ग्रुप को भविष्य में जब कभी भी जमीन की आवश्यकता होगी तो ग्रामवासियों को पूरा मुआवजा दिया जायेगा जिसकी जिम्मेदारी हिन्दुस्तान जिंग प्रशासन की होगी।
- क्लैस्टींग की वजह से घरों में दरारें आती है तो उसके लिये एक टीम गठित की जायेगी, जिसके द्वारा जाँच में प्रमाणित होने पर मैनेजमेण्ट द्वारा आवश्यक कार्यवाही की जायेगी।

क्षेत्रीय अधिकारी  
राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
उदयपुर (राज.)

अति. जिला कलक्टर  
उदयपुर

- हिन्दुस्तान जिंक द्वारा क्षेत्र के बेरोजगारों को प्रशिक्षण के लिये आईटीआई लगाने का कार्य किया जायेगा और प्रशिक्षण के बाद प्राथमिकता से रोजगार देने की व्यवस्था की जायेगी। इस क्षेत्र में स्कील डवलपमेण्ट का जो कार्य होना चाहिये था, वह नहीं हो पाया है। यहाँ के 10वीं एवं 12वीं पास बच्चों को विभिन्न ट्रेड में प्रशिक्षण देकर उन्हें अप्रेंटिसशिप करवाई जावे।
- क्षेत्र के कुए, नलकूप, तालाब आदि के सूख जाने पर हिन्दुस्तान जिंक द्वारा पेयजल एवं खेती के पानी के लिये वैकल्पिक व्यवस्था की जायेगी।
- खनन कार्य से यदि कोई जन-धन हानि होती है तो उसकी नियमानुसार भरपाई की जायेगी। इस बोण्ड से पहले कोई दुर्घटना होने पर पीड़ितों को 1-2 लाख रु० का मुआवजा मिलता था जो कि अब 20 लाख रु० तक मिलने लगा है।
- क्षेत्र की चिकित्सा एवं स्वास्थ्य सुविधाओं का विस्तार/सुधार किया जायेगा।
- श्रम कल्याण के क्षेत्र में सरकार के नियमानुसार कार्य किया जायेगा।
- सीएसआर के तहत सामाजिक सरोकार मद से अच्छा से अच्छा कार्य किया जायेगा।
- ठेकेदार श्रमिकों की भर्ती हेतु ग्राम पंचायत से स्थानीय बेरोजगार लोगों की सूची लेकर उन्हें प्राथमिकता से रोजगार मुहैया करवाया जायेगा।

हमारा आग्रह है कि इस क्षेत्र के लोगों का भौतिक सत्यापन करवाया जाकर उन्हें प्राथमिकता से रोजगार दिया जाये। यदि कम्पनी को आगे 3620 हेक्टेयर जमीन लेनी है तो उसके द्वारा पूर्व में किये गये वादों को पूरा करना चाहिये। हम सभी लोग चाहते हैं कि पूर्व में भरे गये बोण्ड के बिन्दुओं की पालना की जाये तो ही हम 3620 हेक्टेयर जमीन देने की सहमति प्रदान करेंगे।

## 28. श्रीमती मंजु निवासी टीडी:

श्रीमती मंजु निवासी ग्राम टीडी ने आज की जन सुनवाई में उपस्थित अधिकारियों एवं क्षेत्र की जनता का स्वागत किया। उसके बाद उन्होंने कहा कि वे हिन्दुस्तान जिंक द्वारा संचालित मंजरी फाउण्डेशन से जुड़ी हुई हैं। हिन्दुस्तान जिंक द्वारा कोरोना महामारी के दौरान भी क्षेत्र में अच्छे कार्य किये गये थे जिसके तहत क्षेत्र के गाँवों में राशन सामग्री का वितरण, मास्क एवं सेनेटाईजर का वितरण किया गया है तथा पहले हमारे गाँव का रास्ता नहीं था, जो कि बनवाया गया है।

## 29. श्री देवीलाल ग्राम कानपुर:

श्री गेहरी लाल ने कहा कि हिन्दुस्तान जिंक द्वारा जो बाँध बनवाया गया है, उसका पानी हमारे घरों में आ रहा है जिसकी वजह से दिक्कत हो रही है, हमें

क्षेत्रीय अधिकारी  
राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
उदयपुर (राज.)

अति. जिला कलक्टर  
उदयपुर

इसका समाधान चाहिये। हम इस पानी की जाँच करवाने की कहते हैं लेकिन न तो पानी की जाँच करवाई गयी है और न ही इसका समाधान किया गया है। हम आज भी पीने का पानी लाने के लिये 2 किमी दूर पैदल जाकर लाते हैं। अतः हमारे यहाँ पर पेयजल की व्यवस्था की जाये।

**30. श्री विष्णु मीणा, ग्राम जावर डाटा एण्ट्री ऑपरेटर:**

श्री विष्णु मीणा, डाटा एण्ट्री ऑपरेटर ने आज की जन सुनवाई में उपस्थित अधिकारियों एवं क्षेत्र की जनता का स्वागत किया। उसके बाद उन्होंने कहा कि मैं हिन्दुस्तान जिंक द्वारा संचालित एम्बुलेंस वैन पर कार्य करता हूँ। यह वैन क्षेत्र के 28 गाँवों में जाकर लोगों का इलाज कर उन्हें दवाईयों देती है। क्षेत्र के लोग हमारी वैन आने का इंतजार करते हैं और अच्छी सुविधा दी जा रही है।

**31. श्रीमती सुनिता ग्राम सिंगटवाडा :**


श्रीमती सुनिता ने बताया कि वे पिछले 3 साल से हिन्दुस्तान जिंक द्वारा संचालित सखी परियोजना से जुड़ी हुई है। इनके द्वारा हमारे क्षेत्र की सभी महिलाओं के लिये अच्छा कार्य किया जा रहा है, हम अब घर से बाहर निकलने लगी हैं। समूह शक्ति का अच्छा कार्य किया गया है। भूगी पालन का कार्य भी किया जा रहा है। हमें जो सहायता मिली, उसके लिये हम हिन्दुस्तान जिंक की बहुत-बहुत आभारी हैं लेकिन स्थानीय लोगों को रोजगार मिलना चाहिये।

**32. श्रीमती कुसुम मीणा ग्राम अमरपुरा:**

श्रीमती कुसुम मीणा ने बताया कि वे हिन्दुस्तान जिंक द्वारा संचालित शिक्षा सम्बल परियोजना से जुड़ी हुई है। हमें जो सहयोग मिला, उसके लिये हिन्दुस्तान जिंक प्रशसन को बहुत-बहुत धन्यवाद लेकिन आगे भी स्थानीय बच्चों को और फायदा मिलता रहना चाहिये।

**33. श्री लक्ष्मण मीणा ग्राम अमरपुरा सरपंच के पापा:**

ग्राम अमरपुरा सरपंच के पापा ने सबसे पहले आज की जन सुनवाई में उपस्थित अधिकारियों एवं क्षेत्र की जनता का स्वागत किया। उसके बाद उन्होंने कहा कि देश आजाद होने के बाद आज हम पहली बार सरपंच बने हैं। हमारा कस्बा अब बहुत बड़ा गाँव हो गया है। हमारे द्वारा गाँव के तालाब का पानी उपयोग में लिया जाता है, हम मजदूर यूनियन के पदाधिकारी से निवेदन करते हैं कि हमारी पंचायत के लोगों को भी रोजगार का अवसर दिया जाये।

  
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ग्राम अमरपुरा सरपंच  
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श्री. जितेंद्र कुलकर्णी  
उदयपुर

**34. श्री राहुल मीणा निवासी नेवातलाई:**


श्री राहुल मीणा निवासी नेवातलाई ने सबसे पहले आज की जन सुनवाई में उपस्थित अधिकारियों एवं क्षेत्र की जनता का स्वागत किया। उसके बाद उन्होंने कहा कि हिन्दुस्तान जिक प्रशासन द्वारा शिक्षा सम्बल योजना के तहत जो सहयोग दिया जा रहा है, उसके लिये मैं उसका आभारी हूँ। क्योंकि मैं भी एक तरह से बहुत कमजोर था लेकिन यहाँ की टीम ने अच्छा सहयोग दिया, हमें प्यार से समझाया जिसकी वजह से हम नहीं पढ़ना चाहते थे तो भी हमारी रुचि पढ़ने में लग गयी। हमें पढ़ने के लिये अच्छा माहौल दिया जा रहा है। इनके द्वारा समर केंद्र भी विद्या भवन में लगाया गया है ताकि वहाँ जाने वाले बच्चों को शिक्षा का महत्व समझ में आये और वे इसके प्रति प्रेरित हो सकें। इसके साथ ही सभी घर वालों को भी अपने बच्चों को सपोर्ट करना चाहिये।


**35. श्रीमती साधना मीणा निवासी जावर:**

श्रीमती साधना मीणा निवासी जावर ने सबसे पहले आज की जन सुनवाई में उपस्थित अधिकारियों एवं क्षेत्र की जनता का स्वागत किया। उसके बाद उन्होंने कहा कि हिन्दुस्तान जिक द्वारा आज जो मैसेज दिया जा रहा है, उसमें कुछ छुपाया भी जा रहा है। सन् 2007 में जैसे ही वेदांता कं० आती है, वैसे ही अपने अलग ही तरीके से काम करना शुरू कर देती है जिसकी वजह से लोगों को काफी दिक्कत आ रही है। मेरा जिला प्रशासन एवं जिक प्रशासन से कहना है कि क्षेत्र के सरपंचों ने खनन के लिये एनओसी दे दी है लेकिन उसमें जो 13 शर्तें लिखी हुई हैं, उसमें से आप इस क्षेत्र के विकास के लिये क्या-क्या करेंगे, उसका खुलासा किया जाये। यदि इन शर्तों की पालना नहीं की गयी तो आप सब लोगों की मौत बहुत नजदीक है। वेदांता एरिये में पुलिस एवं वन विभाग वालों द्वारा क्षेत्र के लोगों के साथ जो मार-पीट की जाती है, उसे बन्द किया जाये। साथ ही जिन किसानों की जितनी जमीन जिक द्वारा ली जा रही है, उतनी ही जमीन उन किसानों को कहीं अन्यत्र दी जानी चाहिये ताकि वे वहाँ पर खेती करके अपना गुजर-बसर कर सकें। साथ ही जिन लोगों की जमीन खनन में जा रही है उन्हें जिक प्रशासन द्वारा बताना चाहिये कि उनकी कितनी जमीन किस वजह से ली जा रही है, किसी पर मुकदमा करके जमीन नहीं ली जा सकती है।

**36. श्रीमती गीता देवी निवासी सराड़ा-खेरफला:**

श्रीमती गीता देवी निवासी सराड़ा-खेरफला ने कहा कि हमारे गाँव में ऑगनबाड़ी केन्द्र एवं सड़क नहीं है, जिसकी वजह से बच्चों को स्कूल जाने में दिक्कत आती है। ऑगनबाड़ी केन्द्र भी हमारे गाँव से काफी दूर पड़ती है जबकि हमारे गाँव में

  
क्षेत्रीय अधिकारी  
राजस्थान राज्य प्रभूषण नियंत्रण मण्डल  
उदयपुर (राज.)

  
अति. जिला कलक्टर  
उदयपुर

100/150 घर हैं जहाँ पर नई ऑगनबाड़ी खोली जानी चाहिये। इसके अलावा भी हमारे गाँव में अन्य सुविधायें दी जायें ताकि लोगों को फायदा मिल सके।

**37. श्रीमती चंदा देवी/राजकुमार मीणा, सरपंच:**

श्रीमती चंदा देवी/राजकुमार मीणा, सरपंच ने सबसे पहले आज की जन सुनवाई में उपस्थित अति० जिला कलक्टर महोदय, तहसीलदार एवं अन्य उपस्थित अधिकारियों तथा क्षेत्र की जनता का स्वागत किया। उसके बाद उन्होंने कहा कि हमें खुशी है कि खनन विस्तारीकरण से हमारे क्षेत्र में रोजगार के नये अवसर मिलेंगे। लेकिन हमारा निवेदन है कि अधिकांशतः स्थानीय लोगों को रोजगार दिया जाना चाहिये। यदि नहीं मिलेगा तो हमें आपत्ति रहेगी।

**38. श्रीमती धर्मीदेवी निवासी भालड़िया:**

श्रीमती धर्मीदेवी निवासी भालड़िया ने कहा कि हम यहाँ पर जन्म से ही निवास कर रहे हैं लेकिन हमारी जमीन हमारे नाम पर नहीं हो रही है। सभी बोलते हैं कि जमीन हमारे नाम हो जायेगी लेकिन नहीं हो रही है। हमारी जमीन हमारे नाम होनी चाहिये।

**39. श्री शंकरलाल मीणा निवासी अमरपुरा:**

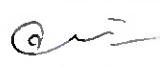
श्री शंकरलाल मीणा निवासी अमरपुरा ने कहा कि हर साल बरसात आती है और हर साल बाँध ओवरफ्लो हो जाता है जिसकी वजह से हमें अपने मवेशी निकालने में दिक्कत आती है, अतः आवश्यक सुविधा उपलब्ध करवाई जावे।


**40. श्री लक्ष्मी मीणा निवासी फलास्या:**

श्री लक्ष्मी मीणा निवासी फलास्या ने कहा कि हमारे गाँव के लोग बहुत दुखी हैं। सभी लोग काम के लिये उदयपुर जाते हैं लेकिन बराबर काम नहीं मिलता है और आने-जाने का किराया लगता है इसलिये हमें यहीं पर काम दिलाया जावे। हम गरीब लोग बहुत दुखी हैं, हमें सुविधा दी जानी चाहिये। श्रीमती लक्ष्मी निवासी फलास्या ने कहा कि ऐसा नहीं है कि वेदांता किसी को कुछ नहीं दे रहा है, यहाँ पर लोग कह रहे हैं कि कुछ नहीं दे रहा है, जो कि गलत है। कम्पनी द्वारा बीज-खाद सभी कुछ दिया जा रहा है, हेलमेट के पैसे भी वेदांता द्वारा दिये गये हैं। हमारा निवेदन है कि गरीबों के लिये आगे भी रोजगार दिया जाये।

**41. श्री गोविन्द निवासी फलास्या सराड़ा :**

श्री गोविन्द निवासी फलास्या सराड़ा ने कहा कि जावर माईन्स के एरिये में जितने भी गाँव आ रहे हैं, उनके यहाँ पर जाकर पूछें कि क्या काम हो रहा है। हमारे

  
क्षेत्रीय अधिकारी  
राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
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अति. जिला कलक्टर  
उदयपुर



साथ सौतेला व्यवहार नहीं होना चाहिये। कम्पनी वाले सभी गाँवों का पूरा ध्यान रखे अन्यथा कुछ भी हो सकता है। हमारे गाँवों से लोग उदयपुर काम के लिये जाते हैं जिस पर ध्यान दिया जाकर यहीं पर रोजगार दिया जाये अन्यथा हम एनओसी खरिज करवा देंगे। जब हमने मोदीजी को ही झुका दिया तो फिर क्या है। यदि गाँव पर ध्यान नहीं देंगे तो फिर मामला टेढ़ा है। जिन बच्चों के माँ-बाप मर गये हैं, उनके बच्चों की तरफ भी ध्यान देकर उन्हें सहायता दी जानी चाहिये। हम चेतावनी दे रहे हैं कि यदि हमारे साथ कोई चोट की जाती है तो हम किसान भी तैयार बैठे हैं। वेदांता द्वारा जो स्कूल गोद लिया गया है, उसका रास्ता बनवाना चाहिये। हमारे गाँव के आस-पास के सभी रास्ते पूरी तरह से खराब हैं जिन्हें सही करवाना चाहिये लेकिन वेदांता सो रहा है।

#### 42. श्रीमती मंजु देवी निवासी सराड़ा:

श्रीमती मंजु देवी निवासी सराड़ा ने कहा कि हमारे गाँव में 8-10 सालों से रोड़ नहीं है। बीमार होने पर लोगों/बच्चों को कपड़े में लपेट कर टीडी ले जाते हैं। हमारे गाँव में रोड़ होना चाहिये एवं ऑगनबाड़ी केन्द्र भी होना चाहिये।

#### 43. श्री गणेश राज अहारी निवासी जावर:

श्री गणेश राज अहारी निवासी जावर ने सबसे पहले आज की जन सुनवाई में उपस्थित अधिकारियों एवं क्षेत्र की जनता का स्वागत किया। उसके बाद उन्होंने कहा कि हमारा बहुत बड़ा शौभाग्य है कि आज हमें ऐसा अवसर मिला है। हमारे 10-15 किमी क्षेत्र में काफी उद्योग चल रहे हैं लेकिन हमारी पीड़ा देखने-सुनने का समय किसी को नहीं मिला। सन् 2014 में वेदांता के जीएम सा0 थे श्री दवे सा0। उनके सामने हमने माँग रखी थी जिसे दबा दिया गया है। सखी परियोजना एवं मंजरी फाउण्डेशन में जो महिलायें जुड़ी हुई हैं उनके पति कहीं पर भी काम नहीं कर रहे हैं। इस एरिये में किसान लोग ही खेती कर सकते हैं। अतः किसानों को लाभान्वित किया जाये। यहाँ से कम्पनी को जो मुनाफा होता है उसका 30 प्रतिशत पैसा आस-पास के गाँवों के विकास पर खर्च किया जाये। हर गाँव के विकास के लिये वार्डवाईज कमेटी बनाई जानी चाहिये और गरीब को प्राथमिकता दी जानी चाहिये। सन् 2014 में कम्पनी द्वारा आश्वासन दिया गया था कि 60 प्रतिशत भर्ती स्थानीय लोगों से की जायेगी, जो कि नहीं की जा रही है। महिलाओं के भी रथाई नौकरी होनी चाहिये ताकि वे अपने पति के आगे हाथ नहीं फैलाये। किसानों को अपने खेत एवं पीने के लिये पेयजल मिलना चाहिये, क्योंकि इस क्षेत्र में 500 फिट बोरिंग करने पर भी पानी नहीं आता है। यहाँ पर भी जैसलमेर जैसा पानी का सिस्टम बनाया जाये ताकि पानी की समस्या दूर हो सके।

क्षेत्रीय अधिकारी  
राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
उदयपुर (राज.)

अति. जिला कलक्टर  
उदयपुर



#### 44. श्री नरेन्द्र कुमार मीणा निवासी नेवातलाई:

श्री राहुल मीणा निवासीस नेवातलाई ने सबसे पहले आज की जन सुनवाई में उपस्थित सभी अधिकारियों एवं क्षेत्र की जनता का स्वागत किया। उसके बाद उन्होंने कहा कि हिन्दुस्तान जिंक के बारे में यदि मेरे से कोई पूछता है तो मैं कहता हूँ कि हिन्दुस्तान जिंक हमारी शान है, हमारी पहचान है, हमारा रूतबा है, क्योंकि उदयपुर सम्भाग में इस माईन्स की एक अलग ही पहचान है। आगे भी हम हिन्दुस्तान जिंक को अपने खनन के विस्तारीकरण के लिये पर्यावरणीय जन सुनवाई के लिये पूरी सहमति प्रदान करते हैं। लेकिन हमारा आग्रह है कि हिन्दुस्तान जिंक वाले वादा खिलाफी नहीं करें। पूर्व सरपंच श्री मगनजी ने जो बात कही है उसमें एक बात रह गयी है। लोग कहते हैं कि हिन्दुस्तान जिंक ने कुछ नहीं किया है, यह कहना गलत है। हिन्दुस्तान जिंक ने हर क्षेत्र में कुछ न कुछ जरूर किया है, इनके खिलाफ हम बोल भी नहीं सकते हैं लेकिन हमारा इनरो आग्रह है कि आप यहाँ से जो मुनाफा कमाते हैं उसमें से एक निश्चित राशि यहाँ के विकास पर खर्च की जानी चाहिये। क्योंकि इस मुनाफे के असली मालिक तो हम हैं, अतः मालिक जैसा बरताव हमारे साथ किया जाना चाहिये। हमें केवल चना, मूंगफली या सोलर लाईट देकर खुश नहीं करें। सन् 2014 के समझौते में एक बिन्दु यह भी था कि यहाँ पर जो केन्द्रीय विद्यालय चलता था उसे वापस चलाया जाये। इसके लिये हमने 3-4 पत्र भी लिखे थे। समझौते के समय हमने यह शर्त रखी थी कि इस विद्यालय को बन्द नहीं किया जाये और जिंक प्रशासन ने बन्द नहीं करने का आश्वासन दिया था लेकिन बाद में विद्यालय बन्द कर दिया गया। अब इस विद्यालय को पुनः चलाने के लिये हम कम्पनी से आश्वासन चाहते हैं ताकि हम लोगों के साथ धोखा नहीं हो। इस कम्पनी द्वारा एक फुटबाल अकादमी चलाई जाती है लेकिन उसमें 50 प्रतिशत से भी कम बच्चे स्थानीय क्षेत्र के हैं बाकी सभी बाहरी क्षेत्र के हैं। इसमें हमारे क्षेत्र के बच्चों की भर्ती की जानी चाहिये। कम्पनी के टेलिंग डेम के नीचे कानपुर गॉव है जिसके नीचे किसानों की जमीन एवं कुए हैं लेकिन इसकी वजह से कुओं का पानी खराब हो गया है। इस खनन के दुरगामी परिणाम आज के 50 साल बाद सामने आयेंगे जिसके बारे में कम्पनी एवं प्रशासन को अभी से सोचना चाहिये। हिन्दुस्तान जिंक को बढ़ाने के लिये सहमति दी जाये लेकिन इस बात की भी मॉनिटरिंग की जाये कि हमारे साथ मालिकाना बरताव किया जाये।

#### 45. श्री किशन मीणा, सरपंच ग्राम पंचायत नेवातलाई:

श्री किशन मीणा, सरपंच ग्राम पंचायत नेवातलाई ने सबसे पहले आज की जन सुनवाई में उपस्थित अधिकारियों एवं क्षेत्र की जनता का स्वागत किया। उसके बाद उन्होंने कहा कि आज इस लोक जन सुनवाई में हम सभी लोग यहाँ पर


क्षेत्रीय अधिकारी  
राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
उदयपुर (राज.)


अति. जिला कलक्टर  
उदयपुर

एकत्रित हुये हैं कि यहाँ पर चलने वाले कारखाने को आगे बढ़ाने की स्वीकृति दी जाये या नहीं। यह सही है कि यदि कारखाना चलेगा तो स्थानीय लोगों को भी रोजगार मिलेगा। सन् 2014 में जब समझौता करके इस उद्योग को वापस चलाया गया तो समझौते के सभी बिन्दुओं को ठण्डे बस्ते में डाल दिया गया और कोई काम नहीं किया गया। मेरे पूर्व वक्ताओं ने समझौते के 14 बिन्दुओं के बारे में अवगत कराया जिसकी पालना करने के लिये सन् 2018 में भी हमने जिला कलक्टर महोदय को ज्ञापन दिया था और हमने प्रशासन को कहा था कि यदि हगारी गॉग पूरी नहीं की जाती है तो हम भी आगे रूप-रेखा तैयार करेंगे कि हमें क्या करना है। इस पर कम्पनी ने आश्वासन दिया लेकिन आज तक कुछ नहीं किया गया है। डीएमएफटी फण्ड से हिन्दुस्तान जिंक द्वारा निःशुल्क वैन की व्यवस्था की गयी है, आईटीआई के लिये भी सहमति दी गयी है लेकिन कब तक आईटीआई चालू होगी, कोई जानकारी नहीं है। कारखाना लगना चाहिये लेकिन उसके साथ-साथ हमें पर्याप्त सुविधायें भी मिलनी चाहिये। सन् 2014 में किये गये समझौते के सभी बिन्दुओं की धरातल पर पालना होनी चाहिये। कम्पनी द्वारा प्रत्येक ग्राम पंचायत के सरपंच एवं जनप्रतिनिधियों के साथ बैठक कर क्षेत्र में सीएसआर के तहत करवाये जाने वाले कार्यों की सूची तैयार कर उन्हें प्राथमिकता से करवाना चाहिये।


श्री किशोर कुमार एस., निदेशक, मैसर्स हिन्दुस्तान जिंक लि0, जावर माईन्स:


1. आज की जन सुनवाई में जनता द्वारा जो समस्यायें बताई गयी है एवं जो सकारात्मक सुझाव दिये गये हैं, उनके लिये मैं सभी को आश्वासन करना चाहता हूँ कि आगे आने वाले समय में कार्यवाही करने का पूरा प्रयास किया जायेगा।
2. आगे विस्तारीकरण के लिये भी आप द्वारा जो सुझाव दिये गये हैं, उन पर हगारे द्वारा कार्यवाही करने के प्रयास किये जायेंगे।
3. हमने विस्तारीकरण में 120 करोड़ रु0 का प्रावधान पर्यावरण के लिये रखा है। इस मद के कार्य वन विभाग एवं भारत सरकार की गाईड लाईन के अनुसार किये जायेंगे।
4. हम खनन एवं ब्लास्टिंग नवीनतम वैज्ञानिक एवं आधुनिकतम मशीनों से करते हैं जिसका प्रदूषण भी निर्धारित सीमा तक ही रहता है। फिर भी यदि कोई समस्या है तो क्षेत्र के जनप्रतिनिधियों के साथ बैठकर उनका समाधान किया जायेगा।
5. सीएसआर के तहत जो सुझाव आये हैं, उन पर भी क्षेत्र के जनप्रतिनिधियों के साथ बैठक आयोजित कर ग्रामवार एक सूची तैयार की जायेगी और उन पर प्राथमिकता से कार्य करने का प्रयास किया जायेगा।
6. क्षेत्र के होनहार बच्चों के लिये हमारा स्कोलरशिप देने का प्रयास रहेगा।

  
क्षेत्रीय अधिकारी  
राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
उदयपुर (राज.)

  
अति. जिला कलक्टर  
उदयपुर

7. स्कील डवलपमेण्ट एवं आईटीआई के क्षेत्र में भी हम डवलपमेण्ट प्लान तैयार कर कार्य करेंगे। इसके तहत शोर्ट टर्म कोर्सेस प्रारम्भ किये जायेंगे।
8. आईटीआई के लिये हमने प्रशासन को भी बोला है कि हम भवन, पानी, विजली आदि सुविधायें देने को तैयार हैं। इसके लिये आवश्यक पत्र व्यवहार चल रहा है।
9. जहाँ तक रोजगार का प्रश्न है, हम स्वयं चाहेंगे कि ज्यादा से ज्यादा स्थानीय लोगों को रोजगार उपलब्ध कराया जाये और यदि प्रशिक्षित श्रमिक यहाँ पर नहीं मिलेंगे तो फिर आस-पास से लिये जायेंगे।
10. कानपुर का पानी से संबंधित सूझाव आया है। यहाँ पर हमने पेयजल व्यवस्था की है लेकिन यदि कोई कमी रह गयी होगी तो उसमें आवश्यक सुधार किया जायेगा।
11. डीएमएफटी मद से करवाये जाने वाले कार्यों के लिये हम जिला प्रशासन से बात करेंगे।
12. बायोगैस के लिये क्षेत्र से कोई रिक्वायरमेण्ट नहीं आई है, फिर भी यदि कहीं से कोई प्रस्ताव आता है तो इस पर भी कार्य किया जायेगा।
13. बच्चों की पढ़ाई के लिये भी आवश्यक कार्यवाही की जायेगी।
14. हमारे पास अभी जो 3620 हेक्टेयर लीज एरिया है, हम उससे बाहर नहीं जायेंगे उसी में कार्य किया जायेगा और इसके अतिरिक्त लीज भी हमें अभी नहीं चाहिये।
15. किसानों को अन्यत्र जमीन देने के बिन्दु पर मेरा कहना है कि हमारा अभी किसानों से किसी भी तरह की जमीन लेने का कोई प्लान नहीं है।
16. सीएसआर के तहत हमारे मुनाफे से एक निर्धारित सीमा तक हम अभी भी कई काम कर रहे हैं और आगे भी करते रहेंगे।
17. अण्डर ग्राउण्ड से निकलने वाले वेस्ट का भी हमारे द्वारा अच्छी तरह से उत्सर्जन किया जाता है और आगे भी करते रहेंगे।
18. यहाँ की जमीन एकदम सुरक्षित है, क्योंकि पिछले 23 साल से मैं स्वयं भी यहीं पर निवास कर रहा हूँ, कहीं कोई दिक्कत नहीं है।
19. उक्त के अलावा भी यदि कोई बिन्दु होगा तो विस्तारीकरण की जो रिपोर्ट बनेगी, उसमें सम्मिलित कर दिया जायेगा और उसके बाद स्वीकृति मिलने पर ही उस पर अगल किया जायेगा।
20. हमारे द्वारा आगे आने वाले समय में हमारी उत्पादन क्षमता में विस्तार के साथ-साथ क्षेत्र की जनता की समस्याओं/सुझावों पर आवश्यक कार्यवाही करते हुये क्षेत्र की ज्वलंत समस्याओं को दूर करने की तरफ भी काफी कार्य किये जायेंगे, इसका मैं उपस्थित जनता को विश्वास दिलाता हूँ।

  
 क्षेत्रीय अधिकारी  
 राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
 उदयपुर (राज.)

  
 अति. जिला कलक्टर  
 उदयपुर

श्री ओपी० बुनकर, अति० जिला कलक्टर एवं अति० जिला मजिस्ट्रेट (प्रशासन):

आज की जन सुनवाई में पधारे विधायक महोदय, सभी जनप्रतिनिधिगण, जिनका प्रशासन एवं क्षेत्रिय जगता का स्वागत है। आज की लोक जन सुनवाई की विडियो रिकार्डिंग भी की जा रही है तथा मिनिट्स भी बनाये जा रहे हैं। इसके अलावा भी यदि किसी व्यक्ति को अपनी तरफ से कोई बात लिखित में देनी हो तो वह अभी दे सकता है या आगे सोमवार तक मेरे कार्यालय में या मेल द्वारा भिजवाया जा सकता है जिसे इस जन सुनवाई की कार्यवाही में सम्मिलित कर लिया जायेगा। अंत में आप सभी पधारे एवं आपने जो सकारात्मक सुझाव दिये, उसके लिये आप सभी का बहुत-बहुत धन्यवाद।

आज की जन सुनवाई से पूर्व अभ्यावेदन/प्रार्थना पत्र प्राप्त हुये, परिशिष्ट "स" जिनका विवरण इस प्रकार है:-

क्र.स.	व्यक्ति/संस्था	प्राप्ति दिनांक/मेल	अभ्यावेदन	समस्या /सुझाव	मे.(एच.जेड.एल.) द्वारा जवाब
1.	अभियक्ता श्री मोहम्मद आरिफ	8.12.21 मेल	प्रार्थना पत्र	समस्या बाबत	जवाब दिनांक 20.12.21
2.	श्री परबत सिंह रायतावत	23.11.21	प्रार्थना पत्र	समस्या बाबत	—
3	समस्त ग्राम पंचायत (एच. जेड.एल. के पास की)	17.12.21	प्रार्थना पत्र	समस्या बाबत	—

आज की जन सुनवाई के दोहरान अभ्यावेदन/प्रार्थना पत्र प्राप्त हुये, परिशिष्ट "द" जिनका विवरण इस प्रकार है:-

क्र.स.	व्यक्ति/संस्था	प्राप्ति दिनांक/मेल	अभ्यावेदन	समस्या/सुझाव
1	ग्राम पंचायत अमरपुरा सरपंच वार्ड न.8	जनसुनवाई के दोहरान	प्रार्थना पत्र	समस्या बाबत
2	ग्राम पंचायत सिधंटवाडा ग्रामवासी वार्ड संख्या 5,1 1	जनसुनवाई के दोहरान	प्रार्थना पत्र	समस्या बाबत
3	ग्राम पंचायत सिमलवाडा ग्रामवासी वार्ड संख्या 1	जनसुनवाई के दोहरान	प्रार्थना पत्र	समस्या बाबत
4	ग्राम पंचायत सिमलवाडा ग्रामवासी वार्ड संख्या 4 से 7	जनसुनवाई के दोहरान	प्रार्थना पत्र	समस्या बाबत
5	ग्राम पंचायत सिमलवाडा	जनसुनवाई के दोहरान	प्रार्थना पत्र	समस्या बाबत

क्षेत्रीय अधिकारी  
राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
उदयपुर (राज.)

अति. जिला कलक्टर  
उदयपुर



	ग्रामवासी वार्ड संख्या 9 से 3	दोहरान		
6	ग्राम पंचायत सिमलवाडा ग्रामवासी वार्ड संख्या 6 से 8	जनसुनवाई के दोहरान	प्रार्थना पत्र	समस्या बाबत
7	ग्राम पंचायत जावर तहसील गिर्वा ग्रामवासी	जनसुनवाई के दोहरान	प्रार्थना पत्र	समस्या बाबत
8	ग्राम पंचायत टीडी (जावरमाला, आमलीदरा) ग्रामवासी वार्ड संख्या 9	जनसुनवाई के दोहरान	प्रार्थना पत्र	समस्या बाबत
9	ग्रामवासी कानपुर	जनसुनवाई के दोहरान	प्रार्थना पत्र	समस्या बाबत
10	ग्राम पंचायत जावर सरपंच	जनसुनवाई के दोहरान	प्रार्थना पत्र	समस्या बाबत
11	ग्राम पंचायत जावर ग्रामवासी	जनसुनवाई के दोहरान	प्रार्थना पत्र	समस्या बाबत
12	ग्राम पंचायत जावर ग्रामवासी	जनसुनवाई के दोहरान	प्रार्थना पत्र	समस्या बाबत

जन सुनवाई के पश्चात जिला कलेक्टर कार्यालय में अभ्यावेदन/प्रार्थना पत्र प्राप्त हुये, एवं क्षेत्रीय कार्यालय में मेल द्वारा प्राप्त दिनांक 03.01.2022 परिशिष्ट "य" जिनका विवरण इस प्रकार है:-

क.स.	व्यक्ति/संस्था	प्राप्ति दिनांक/मेल	अभ्यावेदन	समस्या/सुझाव
1	ग्राम पंचायत जावरमाला ग्रामवासी	जनसुनवाई के पश्चात अति.जिला. कलेक्टर द्वारा मेल दिनांक 03.01.22	प्रार्थना पत्र	समस्या बाबत
2	श्री अमित कुमार खराडी एवं ग्रामवासी ग्राम जावर	जनसुनवाई के पश्चात अति.जिला. कलेक्टर द्वारा मेल दिनांक 03.01.22	प्रार्थना पत्र	समस्या बाबत
3	ग्रामवासी खेडफला, ग्राम पंचायत चणवदा, तहसील गिर्वा ग्रामवासी	जनसुनवाई के पश्चात अति.जिला. कलेक्टर द्वारा मेल दिनांक 03.01.22	प्रार्थना पत्र	समस्या बाबत

क्षेत्रीय अधिकारी  
राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
उदयपुर (गज.)

अति. जिला कलेक्टर  
उदयपुर

पर्यावरण क्लीयरेंस हेतु जन सुनवाई

मैसर्स हिंदुस्तान जिंक लिमिटेड की जावर ग्रुप ऑफ अंडरग्राउंड सीसा (लेड) जस्ता (जिंक) माइंस का विस्तार 4.8 मिलियन मिलियन टन प्रति वर्ष से 6.5 मिलियन मिलियन टन प्रति वर्ष अयस्क उत्पादन, कुल उत्खनन: 7.78 मिलियन मिलियन टन प्रति वर्ष (सम्मिलित वेस्ट रॉक: 1.28 मिलियन टन प्रति वर्ष) और 4.8 मिलियन टन प्रति वर्ष से 7.3 मिलियन टन प्रति वर्ष तक अयस्क सज्जीकरण (बेनिफिसियेशन), खनन पट्टा क्षेत्र 3620 हेक्टेयर (एमएल नंबर 03/89), तहसील: गिरवा और सराड़ा, जिला- उदयपुर, राजस्थान की पर्यावरण स्वीकृति हेतु, दिनांक 22 दिसंबर 2021, प्रातः 11 बजे, स्थान - ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-

क्र.सं०	व्यक्ति का नाम	पता/विभाग का नाम	हस्ताक्षर
1	O. P. Bunkar	ADM, Udaipur	Bunkar
2	VINAY KATTA	R.O, RPCB, UDAIPUR	@vin
3	SHIV KUMAR	AEE, RPCB, Udaipur	Shiv Kumar
4.	C.P. Jeengar	AO & RPCB Udaipur	C.P. Jeengar
5	KISHORE KUMAR S	Director, Zawal SBU	Kishore Kumar
6	Pradeep Singh	GM-Env. & Forest Dept.	Pradeep Singh
7	Hilendra Kumar Bhuptawa	Asst. Engr., ZM	Hilendra Kumar
8	S.B. Narsode	GM (Mines)	S.B. Narsode
9	Shantilata Meghwal	"	Shantilata Meghwal
10	J.P. Chakraborty	Asst. (M)	J.P. Chakraborty
11	Manoj Kumar	नगरपालिका	Manoj Kumar
12	SANJISH KUMAR	Rebadiya	Sanjish Kumar
13	बाबू लाल	बाबूदा टिडी	बाबू



मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

अमृत लाल मीठा	जिम्मादार	मि. मीठा
प्रेम चन्द लोहार	तहसीलदार सराड़ा	प्रेम
पद्मावती	सरपंच	अम
किशोरी मीठा	सरपंच	किशोरी
प्रकाश च. मीठा	सरपंच	प्रकाश
राजकुमार मीठा SP	प. ड. वी.	राजकुमार
कैलाश च. मीठा	मालडिया	कैलाश
गोपबन्धु सिंह माला	र. म. अमरपुर	गोप
माला च. मीठा	प्र. रं. मीठा	माला
लंगाराम खराडी	कीर्तिनाथ मधुपुर	लंगाराम
संजीव कुमार	मालडिया	संजीव
पिया प्रजापत	भालडिया (पटवारी)	पिया
अमर लाल मीठा	र. म. मीठा	अमर

देवाचन्द शर्मा  
नारायण लाल मीठा  
Mangal Prasad  
मुख्य नागरिक

पटवारी देवाचन्द  
देवाचन्द  
TIDE

22/12/2021

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)

कैलाश मीणा	बोरि कुडा	कैलाश
शुरजमल	शैलजीनाथ पुसाय	शुरजमल
राजेंद्र मीणा	निहालका	राजेंद्र मीणा
फती	कृष्णपुरी	फती
महेन्द्र	गल	महेन्द्र
पुत्रलाल	गल	पुत्रलाल
अजयप्रसाद	गाल	अजय
दुरजी	पांडना	दुरजी
कन्हैयालाल	लावर	कन्हैया
बाबू लाल	कोटड़ी फल	बाबू लाल
रामचंद्राकर	जावर माला	रामचंद्राकर
लक्ष्मण	जावर	लक्ष्मण
सुरेन्द्र	दीदी	लक्ष्मण सुरेन्द्र

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

20,21 कागज कीटा	कागज	रमेश लाल/का
मोहनलाल	दिगा	मन्नागम
प्रदीप कुमार	देवाई	प्रदीप
नरेश कुमार मीणा	कागज	नरेश
सुरेश चंद	देवका	सुरेश
ललित चौधरी	नामद्वारा	ललित
सुरेश चंद मीणा	ओडा	सुरेश
मोहनलाल	ओडा	मोहनलाल
रमेश कुमार	सिधवाड़ा	रमेश कुमार
दिग्वंश लाल	दीदी	दीदी
शंकर लाल	अमरपुरा	शंकर
मोती लाल	सिधवाड़ा	मोती लाल
मोहनलाल मीणा	जंबल माईस	मोहनलाल मीणा

मैसर्स हिंदुस्तान जिक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराडा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)

अर्जुन/शक्य-रू	जावर	अर्जुन जाक
विरजी	कानपुर	विरजी
होमा	कानपुर	होमा
सुरज मेल	कानपुर	सुरज
चर्मपण्ड		चर्मपण्ड
देवी	जावर	देवी
शकेश मीणा	सिंदहरवाड़ा	शकेश
कालुलाल मीणा	सिंदहरवाड़ा	कालुलाल
शकेश	सिंदहरवाड़ा	शकेश
शकेश	सिंदहरवाड़ा	शकेश
रामा	चलाहा	रामा
नारायण	सिंदहरवाड़ा	नारायण
नारायण सिंह	सिंदहरवाड़ा	नारायण सिंह

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

[illegible]

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

क्र.सं०	व्यक्ति का नाम	पता/विभाग का नाम	हस्ताक्षर
	पंकज	जावर	पंकज
	अमित महेश	क. जावर तारि	अमित महेश
	शान्ति लाल	जावर	शान्ति लाल
	देवी लाल	क. जावर -	देवी लाल
	राम लाल	जावर	राम लाल
	अर्जुन	जावर	अर्जुन
	गोविन्द	मालडिया	गोविन्द
	गोविन्द कलत्रा	सिधवाड़ा	गोविन्द कलत्रा
	लक्ष्मी लाल भीमा	सिधवाड़ा	लक्ष्मी लाल भीमा
	शंकर लाल	जावर	शंकर
	अरुण	जावर	अरुण
	सुरेश कुमार	मालडिया	सुरेश



अन्त में क्षेत्रीय अधिकारी, राजस्थान राज्य प्रदूषण नियंत्रण मण्डल ने कहा कि आज की पर्यावरणीय जन सुनवाई में आप लोग पधारे एवं अपनी तरफ से जो समस्याएँ एवं सुझाव बताये गये, उन सभी को हमारे द्वारा कलमबद्ध कर लिये गये हैं, जिन्हें आवश्यक कार्यवाही के लिये हमारे द्वारा आगे सक्षम अधिकारियों को भिजवाये जायेंगे।

उक्त जनसुनवाई की विडियो रिकोर्डिंग की डी.वि.डी. एवं फोटो एलबम्ब की कोपी परिशिष्ट " र " पर संलग्न है।

इसके बाद उन्होंने माननीय अतिरिक्त जिला कलक्टर एवं अतिरिक्त जिला मजिस्ट्रेट (प्रशासन) महोदय उदयपुर, तहसीलदार सराड़ा एवं उपस्थित समस्त ग्रामवासियों का आभार व्यक्त करते हुये धन्यवाद के साथ पर्यावरणीय जन सुनवाई समाप्ति की घोषणा की।



(विनय कट्टा)

क्षेत्रीय अधिकारी

राजस्थान प्रदूषण नियंत्रण मण्डल,  
उदयपुर

क्षेत्रीय अधिकारी

राजस्थान राज्य प्रदूषण नियंत्रण मण्डल  
उदयपुर (राज.)



(ओ.पी. बुनकर)

अति० जिला कलक्टर एवं  
अति० जिला मजिस्ट्रेट, उदयपुर  
अति. जिला कलक्टर  
उदयपुर

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

	कंठु	बाबर	
	बनसी	बाबर	बनसी
	राहु	बाबर	राहु
	राहु शाली	मालीया	शाली
	श्रीश	बाबर	श्रीश
	मनेश	बेलाई	मनेश कुमार
	करन सिंह	त्रिकावर	करन सिंह
	दिनेश कुमार मीना	बेलाई	दिनेश
	मुकेश	सिंहवाड़ा	मुकेश
	बालू	माला कनई	बालू
	मुकेश	पटवार	मुकेश
	बापु	अमरपुरा	बापु
	काली	बाबर	

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

	मुकेश कुमार	लाल	मुकेश कुमार
	लाली देवी	लाल देवी	लाल देवी
	मोहम्मद शमी	मोहम्मद शमी	मोहम्मद शमी
	मोहम्मद शहीद	मोहम्मद शहीद	मोहम्मद शहीद
	नरेश	नरेश	नरेश
	फारुख	फारुख	फारुख
	अश्विन जैन	अश्विन जैन	अश्विन जैन
	हिरा देवी	हिरा देवी	हिरा देवी
	गोपाल लाल	गोपाल लाल	गोपाल लाल
	गोपाल	गोपाल	गोपाल
	गुला	गुला	गुला
	जीजा	जीजा	जीजा
	जमन	जमन	जमन

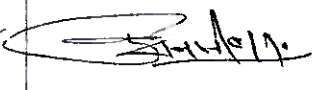



मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

रामलाव	पाडला	<del>रामलाव</del>
रेलुकार	सिजाडा	रेलुकार
देवीलाल	हीडी	देवीलाल
पुनी लाल	हीडी	पुनीलाल
कमल लाल	सिजाडा	कमल
राजकुमार	नेवालमाई	राजकुमार
मनीष कुमार	हीडी	मनीष
शंकल लाल	हीडी	शंकर
हरिहर	मालडिमा	हरिहर
शंकल लाल	नेवालमाई	शंकल
पुनी लाल	नेवालमाई	पुनीलाल
शंकल लाल	मालडिमा	शंकल
मगनलाल	मालडिमा	मगनलाल

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

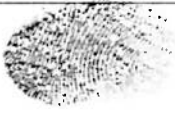
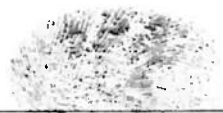

बापु	वाराणाल	बाबु
रामजी रामजी नेवातलाई	नेवातलाई	रामजी
सुजनी लाल	जावर	सुजनी लाल
Zanil	Zawar Minu	
Ramesh choudhary	Singat wada	Ramesh
Vind Choudhary	Singhet wada	
सुगना	नेवातलाई	सुगना
श्रीवा	जावर	
मीन	जावर	
अरुण	कानपुर	अरुण
संजित	खेतराडा	संजित
Rakesh	meratalal	Rakesh
लक्ष्मी लाल	रिन्धवाडा	लक्ष्मी लाल

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

	Kishanlal meena	Premalager	
	शम्भुलाल	जीवातलाई	शम्भुलाल
	गणेश लाल	सिंघटवाड़ा	गणेश
	राम लाल	केवड़ा	रामलाल मीना
	लालू	चाँदनी सिंघटवाड़ा	लालू
	पप्पुलाल	पाटिया	पप्पुलाल
	हरीशं कुमार	होरी	
	मनीष कुमार	दीड़ी	मनीष
	मंजू	जावर माता	
	मंजू	जावर माता	
	कमलेश	परतावर	कमलेश
	मुकेश	पडल	मुकेश
	प्रमद	कारापाल	प्रमद



मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराडा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

सोहन	सोहन	सोहन
दिनेश	दीने	दिनेश
कुमारी	दीदी	
डिनेश	सिंह.रा.रा.	डिनेश
चम्पा	जावर	
का.कु.का.का.	मे.का.का.का.	
सुमन	गुगुगुगु	सुमन
जगदीश	दीदी	जगदीश
पंकज	वाडी	पंकज
कमला	भालडिया	
नेहा	का.पु.र.	नेहा
रामपाल जीजा	केवडा बुद्ध	रामपाल जीजा
जीजा	नांदी	जीजा

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

रामा	नेवातलाई	रामा
	मिथलपुर	Prakash Kumar
सुरवेंद्र	प्रतापपुरा	सुरवेंद्र
वेसा	दुर्गा नगर	वेसा
सि.दांतवास	राजेन्द्र	
उदय कुमार	धनपूर	
मोहम्मद	नेवातलाई	
हिरेश	नेवातलाई	
गोवर लाल	सि.दांतवास	
कालू लाल	जोहरमाई	रंजीत
रामलाल	नेवातलाई	रामलाल
शैल लाल मीना	कल्याणपुरा वाडी	शैल लाल मीना
देवी लाल मीना	सि.दांतवास	

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

आशु राम / आशु जी	जावर	आशु राम
सुरेश	दीडी	सुरेश
केशू लाल	दीडी	केशू लाल
मानो	दीडी	मानो
हरि लाल	डोड	हरि लाल
अरवि कुमार	पूरा व सोराडा	अरवि
गोतम लाल मीठा	जावर	<del>गोतम</del>
मोती लाल	नेवातलाई	मोती लाल
<del>मोती</del>	मावड माल	<del>मोती</del>
Mehendra Singh	Ram Nayan	<del>महेंद्र</del>
Tulsi Ram	पाटला	तुलसी राम
Shambhu	सिंघरवाड़ा	Shambhu
लक्ष्मी लाल	कानपुर	लक्ष्मी लाल



मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

दलीप	दीदी	दलीप
वेशारिछ	हलावाडीया	वेशारिछ
Pankaj	जावर	Pankaj
पुव्वीराज मीठा	जावर	पुव्वीराज
रामा ना	राजपुर	रामा ना
जगदीश	जावर	जगदीश
बिना	बलारिना	बिना
बिक्र	बालडी	बिक्र
कैलाश	रवाडा	कैलाश
बालचन्द	उनापपुर	बालचन्द
मोतीलाल	जावर	मोतीलाल
बाबु	राजपुर	बाबु
अनिल	टीडी	अनिल

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)

जाड़ी	टेबिंग डम -	बट्टी
जाड़ल	टीड़ी	जाड़ल
राज्य	मेसरिया जी	मजौर
लक्ष्मण	जावर	लक्ष्मण
आमर, डू	आमर -	आमर डू
अनिल मीणा	टीड़ी	अनिल मीणा
गोपाल मीणा	टीड़ी	गोपाल मीणा
लक्ष्मणराज	जावर मजौर	लक्ष्मणराज
कालु बाल	गोल्या	कालु
मोहन मीणा	गोल्या	मोहन मीणा
कानजी	जावर	कानजी
मोहन	जावर	मोहन
अंगवान लाल	कालुपुर	अंगवान लाल

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)

	Harish Khatri	Singhtukda	
	Virendra Singh	Bhaladiga	
	मलिन कुमार मीणा	जावर	मलिन
	शेरान मीणा	जावर	शेरान
	शिवलाल मीणा	डुमवास	डुमवाल
	पुडु लाल मीणा	नेवललाई	पुडुलाल
	देवीलाल मीणा	जावर	देवीलाल
	शंकर गुप्ता	आठुवा	शंकर गुप्ता
	देवा मीणा	जावर	देवा
	अश्वमेध मीणा	जावर	अश्वमेध
	होमा	जावर	होमा
	जगदीश सिंह	काँकरवा	जगदीश
	शंकर लाल	नेवाललाई	शंकर



मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)

	गोहन्द	जावर	महेश
	शुद्ध	बेवातलाड	शुद्ध
	शुद्ध मिर्चोडा	शुद्ध मिर्चोडा	शुद्ध
	हरिश्	शुद्ध मिर्चोडा	हरिश्
	मोतीलाल	शुद्ध मिर्चोडा	मोतीलाल
	सोहन लाल	जावर	शुद्ध मिर्चोडा
	कालु लाल	शुद्ध मिर्चोडा	कालु लाल
	मोहन लाल	पांडला	मोहन
	शुद्ध	पांडला	शुद्ध
	सोहन	लाल मिर्चोडा	शुद्ध
	पुष्पा	पांडला	पुष्पा
	सोहन	जावर	शुद्ध
	शुद्ध लाल	पांडला	शुद्ध लाल

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

	Bharat Nath	Ashok Nagar	Maharaj
	शिवल	दीदी	शिवल
	पुष्पलाल	दीदी	पुष्पलाल
	राहुल शर्मा	जावर	राहुल
	कोमलु लाल	दीदी	कोमलु लाल
	दलवी जी	जावर (मोता)	दीदी
	मोहनलाल	मेवातलाई	मोहनलाल
	शंकर लाल	मेवातलाई	शंकर
	भगवाना	मेवातलाई	भगवाना
	प्रकाश	पाइला	प्रकाश
	लक्ष्मण लाल	बेला	लक्ष्मण लाल
	लक्ष्मी लाल	सिन्धवाड़ा	लक्ष्मी
	सूरजमल	सिन्धवाड़ा	सूरज

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)

	सुन्दर लाल	टीडी	Sunder
	गोपीलाल मल्ल	टीडी	Gopi
	बलराम	टीडी	Balram
	जंशी लाल	टीडी	Janshi Lal
	हुन्नीलाल मीठा सरपंच - चणार		Hunnilal
	मेशलाल	ओरडी	Mesh Lal
	जितेन्द्र	टीडी	Jitendra
	भागीलाल	टीडी	Bhagilal
	शान्ति लाल	भावनपुर	Shantilal
	रमेश	मानपुर	Ramesh
	प्रकाश	टीडी	Prakash
	रूपलाल	टीडी	Rup Lal
	नरेश मीठा	जावर	Narash

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

रमेश चंद्र	दीड़ी	रमेश
विजय	दीड़ी	विजय
संतोष	दीड़ी	संतोष
मोहन लाल मीना	दीड़ी	मोहन
कन्हैया लाल	जावर माइंस	कन्हैया
अर्जुन	जावर माइंस	अर्जुन
मौगी लाल	मिथलवाड़ा	मौगी लाल
कालिक	पाइला	कालिक
नारायण लाल	पाइला	नारायण
नानि लाल	चण्डा	नानि
रमेश जी	बारा	रमेश
देवी लाल	कानपुर	देवी लाल
हरिश्	सरसिया	हरिश्

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

रमेश चंड	रीडी	रीडी
लीलू राम	सिधेवाड़ा	लाकू राम
नाशा मण	रीडी	नारायण
शंभु मीठा	भालडिया	शंभु मीठा
मोहन लाल	नोवागलह	मोहन लाल
पकाश	पीलीडा	प्रकाश
गोआर	अमरपुरा	गोआर
विशाल	देवपुरा	विशाल
नारायण	चौगावडी	नारायण
लीलूजी	जालडा	लीलूजी
किष्करा राम	सिधेवाड़ा	किष्करा राम
दशरथ चंड	सिधेवाड़ा	दशरथ
मोना	सिधेवाड़ा	मोना

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)

प्रकाश मीणा	जावर	Prakash
दीपक मीणा	जावर	Deepak
मोरनी	नीला व फला	
जीजा	सिंदरवाड़ा	
मोहनी	नीला व फला	
दीपक	टीडी	दीपक
तुलसी	टीडी	तुलसी
कडम चन्द	पांडवा	कडम चन्द
मेषक कुमार	पुलाप पुरा	meshuk
नारायण	सिंदरवाड़ा	
दुरमा	जावर	दुरमा
अमरा जी	पांडवा	अमरा जी
अविनाश	मानपुर	अविनाश



मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

नाम	पद	स्थिति
पल्लु	पद -	पल्लु
बाबुलाल	बाबुलाल	बाबुलाल
दीना	दीना	दीना
माता	माता	माता
मिना	मालडिया	मिना
देवीलाल	मालडिया	
काता	मालडिया	
पंकज	दीना	पंकज
राहुल	दीना	राहुल
राम लाल	दीना	राम लाल
देवीलाल	दीना	देवीलाल
बाबुलाल	दीना	बाबुलाल

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

बाबूजी यादव	हिंडी	नवनी
काशी कामर	चण्डापुरा	<del>काशी कामर</del>
पुष्पा राज	अगरपुरा जिवा	Puthari
वसन्ती लाल जी	परसाफ	<del>वसन्ती लाल जी</del>
शमभूषण	बाहल	शमभूषण
Babul Ram	परसाफ	परसाफ <del>काशी कामर</del>
शमभूषण	बाहल	शमभूषण
Raj Lal	भालडिया	Raj Lal
मनीष कुमार	नेवा लाल	<del>मनीष कुमार</del>
प्रकाश मीरा	नेवा लाल	<del>प्रकाश मीरा</del>
प्रकाश मीरा	नेवा लाल	प्रकाश मीरा
शमभूषण	भालडिया	शमभूषण
मुकेश कुमार	नेवा लाल	मुकेश कुमार

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

मेहेश	प्रतापपुरा	मेहेश
मंगलराम	भालडिया	Mang
नवलदास	भालडिया	Nawal
विप्रेर	भालडिया	Dinash
प्रेमदास	रामनगर	प्रेम
निलेश	प्रतापपुरा	निलेश
नारायण	प्रा.डा.	नारायण
B. Lal n. ram	भालडिया	B. Lal
Aksh Choudhary	भालडिया	Aksh
कमलेश मीरप	गौज्या	कमलेश
लालचंद मीरप	गौज्या	लालचंद
गौज्या	जावर	गौज्या
शिवलाल	जावर	शिवलाल

मैसर्स हिंदुस्तान जिनक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

प्रकाश ओडिया	जावर	प्रकाश
नारायण	गालडिया	नारायण
कान्हा	पारस	कान्हा
पारस	दीदी	पारस
पारस	दीदी	पारस
बिजोय कुमार शीमा	शैलजा	बिजोय
हार्दय शर्मा	पारस	हार्दय
दीपक शर्मा	दीदी	दीपक
लक्ष्मण शर्मा	दीदी	लक्ष्मण
जे. लक्ष्मण	दीदी	लक्ष्मण
ब्रह्म	वसुध	ब्रह्म
अपराजित	सिंहवाडी	अपराजित
अरुण	भालडिया	अरुण

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

	जवली	हुण्डा	सी वली
	हजा	हुण्डा	
	बाबुलाल	टीडी	बाबुलाल
	मोहनमन	थीरी	मोहनमन
	Rajal Pargi	रामेर	रामेर .
	प्रकाश जैन	नेवामर	प्रकाश जैन
	रामा	जावर	रामा
	जवली	टीडी	जवली
	शंकर	हुण्डा	शंकर
	मुनिमन	नेवामर	मुनिमन
	वी. आर. मी. न.	माममाम	
	शंकर	हुण्डा	शंकर
	नानालाल	हुण्डा	नानालाल

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)


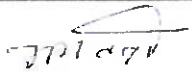
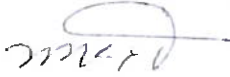
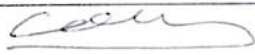
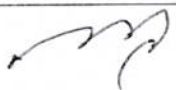
सुशिला कुमारी	साकडीया	सुशिला
खन्ना जी	जावर	खन्ना
विनीत	जावर	जाति विनीत
मोहन काका	जावर	मोहन
खर्क जी	जावर	खर्क
धुली वार्ड	नेवातवाडी	
खेतचन्द जी सरपंच	नेवातवाडी	खेतचन्द
लोकेश जी	नेवातवाडी	लोकेश
अनिल भावा	नेवातवाडी	अनिल
रैफचन्द	नेवातवाडी	रैफ
लालू राम जी	जावर	लालू राम
दिनेश	खैरवाडी	दिनेश
मुकेश भावा	काया	मुकेश भावा



मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)

	केशु लाल	पि पल्लव	केशु लाल
	श्री दुर्गा लाल	चौधरी	श्री दुर्गा लाल
	जालिम चंद	चौधरी	जालिम चंद
	देव	राम चंद	देव
	वैश्वराम	पांडव	वैश्वराम
	लक्ष्मण	पिपलहरा	लक्ष्मण
	संजय मीणा	श्वारा	संजय मीणा
	Khemraj	चौधरी	चौधरी
	वीरेंद्र लाल	श्री लाल	वीरेंद्र लाल
	नारायण लाल	टीडी	नारायण लाल
	श्री लाल	टीडी	श्री लाल
	Sant/dum	पेदातल	Sant/dum
	सोमेश्वर	जावर	सोमेश्वर

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

Purusha Raloti	Pantappa	
उमिल मीना	पारिभा	उमिल मीना
लालु राम	कानपुर	लालु राम
नरेन्द्र खत्री	भालडिया	नरेन्द्र खत्री
	जावर	
लोकेश चन्द	जावर	
हनुमान लाल	लोखरवा	हनुमान
भूत सिंह जी		बोगत लाडू
कमल सिंह मीना	नवलपरा	कमल सिंह मीना
भाबरा	जावर भालाजी	भाबरा
मौसम	जावर भालाजी	मौसम
लोकेश	समलगर	लोकेश मीना
पिपील	जावर	पिपील
(दिलीप)		

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

	शंकर	जावर	शंकर
	मानसिंह	मिश्रा	मानसिंह
	Tabalum	मानसिंह	मानसिंह
	सनेह लता	मानसिंह	सनेह लता
	महेन्द्र कुमार	लीडी	महेन्द्र
	सतीश कुमार	जावर	जावर सतीश कुमार
	पुत्र लाल	ओड	पुत्र लाल
	महेन्द्र	चौधरी	महेन्द्र
	Deepak	जावर	डीपक
	शंकर	जावर	शंकर
	Jawahar Singh	जावर	जावर
	गुरी माई	नेवाला	नेवाला
	ईश	नेवाला	नेवाला

[illegible]

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)

	ब/बुलगा	जावर माइंस	ब/बुलगा
	प्रकाश चन्द	रवो	प्रकाश चन्द
	शैश मीणा	सिधवाड़ा	शैश मीणा
	सुरेश	पारिया	सुरेश
	Manish	जावर माइंस	Manish
	के. मा.	डेटा मा.	के. मा.
	आशिषा	गोलमडर	
	वीलाराज	चक्रवर्ती	Wali R.
	अमरजी	टीडी	अमरजी
	महिन लाल खोड़ा	सिधवाड़ा	M.H.
	कलनिक मीणा	सिधवाड़ा	Wali R.
	Lalit	Zawar Mines	
	रवेमा	पिपलडा	रवेमा

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)



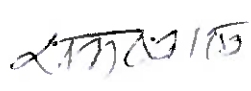
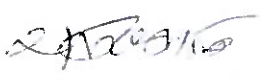

	शंकर	दीदी	शंकर
	प्रभाकर	दीदी	प्रभाकर
	अलका राम	कानूर	अलका राम
	मुकेश	सीधरवास	मुकेश
	लालु लाल	पांडुलाल	लालु
	मानक चन्द अर	मानक चन्द अर	मानक चन्द अर
	सदाशिव मोहन	प्रताप मुश	सदाशिव
	हरिलाल	जतिर	हरिलाल
	गणेश/अ/अ	जावर	गणेश
	गोविन्द	जावर	गोविन्द
	सुरज	जावर	सुरज
	रमेश	नलिशाला	रमेश
	शान्तिनाथ डी	शान्तिनाथ	शान्तिनाथ



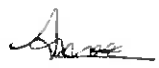
मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

क्र.सं.	व्यक्ति का नाम	पता/विभाग का नाम	हस्ताक्षर
	अजय	राम नगर	
	अजय	राजपुरा	
	शंकर प्रसाद	राम नगर	
	म		
	Dilkhush	जावर	Dilkhush
	मनोहर नाथ	सिधरवास	Manchor
	विलास कुमार मीणा	पाटला	2104
	देवी	पाटला	देवी
	MUHAMMAD SHARIF	जावर	मोशरीफ
	राजेश	जावर	राजेश
	संदीप	जावर	संदीप
	प्रकाश	जावर	प्रकाश

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

क्र.सं.	व्यक्ति का नाम	पता/विभाग का नाम	हस्ताक्षर
		उदर	
	राकेश	वास.नं.	Rakesh
		11/5/11	
	दिनेश कुमार	मिचलवाड़ा	दिनेश
	नारायण	माइना	नारायण
	अर्जुनलाल मीणा	दिनी खारा	अर्जुनलाल मीणा
	शंकरलाल	चांदनी	शंकर
	मृकेश	चांदनी	मृकेश
	पुष्प	दि. ग. (वा.)	पुष्प
	पुष्पा लाल	दे. पू. रा.	पुष्पा
	रतन		रतन
	मुकेश मीणा	चलावड़ा	मुकेश मीणा
	नरेंद्र मीणा	जावर	नरेंद्र मीणा

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

क्र.सं.	व्यक्ति का नाम	पता/विभाग का नाम	हस्ताक्षर
	जालमा	115001	जालमा
	डामर-चन्द शर्मा	रिश्तारवादी	
	रंजीत शर्मा	रिश्तारवादी	रंजीत
	पुत्र	पुत्र	पुत्र
	Ramchandra	Chenavada	Ramchandra
	गोविंद	जावर	गोविंद
	रमेश	रमेश जावर	रमेश
	नारायण लाल	चौहान	नारायण
	मंगल लाल	पुत्र	मंगल लाल
	सुरेंद्र कुमार	नेवा लाल	सुरेंद्र
	रमेश	नवा लाल	रमेश
	रमेश	जावर	रमेश
	नारायण लाल	जावर	Narayana

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

214-2022	21492	2
Amir Khandi मोदी नगर मी	Zaurar सिखलवाडा	Amir मोदी नगर
सुरजमल मी	जावर	सुरज
पुकाश	दीडा	Pinkash
गोपाल मी	साराडा	पट्टा गोपाल
दी नमरा	मडगा	हुमना
देवाडा	मडगा	
3-31 देवा	मडगा	देवा
पुलावरी	मडगा	पुलावरी
गोपाल मी मडगा	सिखलवाडा	Catur
मडगा	दी	मडगा
पुलावरी	जावर	पुलावरी

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

	रामचन्द्र	चण्णवदा	रामचन्द्र मीना
	प्रधान मुख्तार	जगतमोहन	<u>Prudh</u>
	रमेश	नारायण	रमेश
	रमेश महेन्द्र	जादव	<u>रमेश</u>
	हररा	नारायण	
	चन्द्र	प्रधान मुख्तार	<u>Chand</u>
	प्रकाश	कानपुर	प्रकाश
	रमेश	ली	
	प्रकाश	जादव	<u>Prudh</u>
	रमेश चन्द्र	जादव	<u>Ramesh</u>
	कुमार	नारायण	<u>Kumar</u>
	करीम महेन्द्र	नारायण	<u>Karim</u>
	वि.वि.	जादव	वि.वि.

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)

	नाम/पिता	जावर	डॉक-3
	बन्नेलाल	जावर	बन्नेलाल
	जीवा	जावर	जीवा
	श्री/विन्द	कानपुर	श्री/विन्द
	रामा	जावरमाला	रामा
	गौतम	कानपुर	गौतम
	सुभुलाल	रीडी	सुभुलाल
	लालूराम	जावर	लालूराम
	सुरजमल	हनुमपुरा	सुरजमल
	चतरा	नैपातलाई	
	मोहनलाल म/म/	जिपलदल	मोहनलाल म/म/
	नाथ	रवा	नाथ
	पूलचैद	रीडी	पूलचैद



[illegible]

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

(1)	शिवन कुमार	21/12/21	शिवन कुमार
	काहुआला	काहुआ	काहुआ
	मंगलसिंह	लीड	मंगलसिंह
	जीवन लाल	मंगलसिंह	जीवन
	राम लाल	काहुआ	राम लाल
	देवी लाल	लीड	देवी लाल
	शिवन कुमार	मंगलसिंह	शिवन कुमार
	कुडुवा	काहुआला	काहुआला
	शिवन लाल नेवा	काहुआ	शिवन लाल
	शिवन	काहुआ	शिवन
	शिवन	नेवा लाल	शिवन
	शिवन	लीड	शिवन
	चेतन	काहुआ	चेतन

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

	देहापट्टा	जालडीहा	(12)
	शेखर सिंह	भालडीहा	<del>हिंदु</del>
	पुष्पा शर्मा	लीट	पुष्पा
	प्रकाश जी.	जावर	
	विश्वजी	नेवातलडी	
	नारायणजी	नेवातलडी	
	रूपमालि	जावरमालि	रूपमालि
	राजगी जैन	जावर माइन्स	<del>रूप</del>
	सुरज	नेवातलडी	सुरज
	लक्ष्मण	कवडी	लक्ष्मण
	बुनिया	खिगंवाड़ा	बुनिया
	गीता	खिगंवाड़ा	गीता
	नारायण लाल	चण्डा	नारायण लाल

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

नाथूलाल	रीडी	राइल
लक्ष्मी	रीडी	नक्ष्मी
Kaish Meen	Zawar	Kaish
Devanand Sharma	Zawar	DL
Farooq mohammed	SVIN ZAWAR MINES	Farooq
Bhenukef	Zawar	B!
राइल	जावर	राइल
MANFISH	पाइला	Manish
रमेश	सिमला	Ramash
दिनेश	पाइला	Dinesh
चनराज	सिमला	चनराज
नाजनी	नैवातलाई	नाजनी
मोहन	नैवातलाई	मोहन

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

	जीवा	जावर	जीवा
	चम्पा	जावर	
	मैलू	जावर	
	मधुमणि	नेवातलाई	बामन
	सुन्दर	टीडी	सुन्दर
	राज कुमार	जावर	
	Ravi	Udipur	
	केवल चन्द भोला	तेरना तालाब	केवल चन्द
	पुनमचन्द	जावर	पुनमचन्द
	माधुलाल	जावर	माधुलाल
	महाशिवराज	टीडी	
	चन्दा देवी	पाडला	चन्दा
	शुरेश	भालडिया	शुरेश पट्ट

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

प्रभु लाल	भांडोडा	प्रधान
Trishu Lal Meghwal	सराड़ा	Trishu
बारायण लाल मीठा	भालडीया	प्रधान
हेमेश दास	भालडीया	हेमेश
रविशंकर	सीडी.	रविशंकर
शिवराम	भांडोडा	शिवराम
पुल्लु	भांडोडा	
महेश दाधीरा	भालडीया	Mahesh Dadli
चारा	सीडी	चारा
Dr. Mahomed Anif	Ketn	Anif
Pandit Singh	Mandol Singh	
भांडोडा	भांडोडा	
भांडोडा चन्द	सिधलवाडी	भांडोडा चन्द



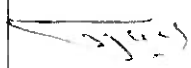

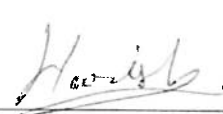
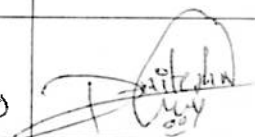
मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

लक्ष्मी लाल मीणा	सिंदूरवास	लक्ष्मी लाल
शालकुमार मधवाल	लोथरवास	शालकुमार
शालकुमार मीणा	जावर	शालकुमार
नन्द लाल	दीडी	नन्द लाल
संदीप मीणा	दीडी	संदीप मीणा
सोमलाल मीणा	सिंदूरवास	सोमलाल मीणा
विजयराज	जावर	विजयराज
नंदर	जावर	
अमरचंद	जावर	अमरचंद
अमरी लाल	जावर	अमरी लाल
अमरी लाल	जावर	अमरी लाल
अमरी लाल	दीडी	अमरी लाल
अमरी लाल	नेवातल	अमरी लाल

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

पट्टा.	सी गेटवाट्टा क्रम	पट्टा
नमनारा अहारी	सेवा मंदिर अहारी	नमनारा
शिवराम	जावर	शिवराम
धनजी	जावर	धनजी
खेमा	जावर	खेमा
काबुलाल	टीडी	काबुलाल
लक्ष्मी	टीडी	लक्ष्मी
Kankariya	Ajmer	नमनारा
Chetani	Udaipur	नमनारा
शेकराम	गोडिया	शेकराम
हिरालाल	मानपुर	हिरालाल
काऊट	सीडी	काऊट
हमरा	सीडी	हमरा

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

गोपाल कृष्ण शीखा	रतनगिरा	
गिरिश कुमार	देरा फाला	गिरिश कुमार
अशोक कुमार	गुरु मोकेश	अशोक कुमार
उमरालाल मोदी	गुरु मोकेश	
हिरेश कुमार	रिडी	
गिरिश कुमार	कानपुर	गिरिश कुमार
गोतम	पांडना	गोतम
Bitesh Kumar	Zawar mines	
विकास लाल	राडी	विकास
सौरभ लाल	सैन मोकेश	सौरभ
हिरेश	रिडी	हिरेश
कैलाश	जावर माइंस	कैलाश
किशन ल	मोकेश	किशन



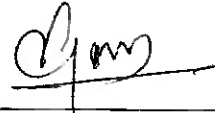





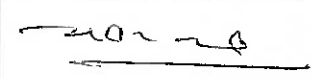
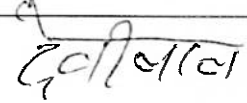
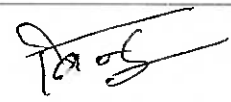

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

दीनराम मीठा	सोहरवाड़ा	दीनराम
काजिम मोदिम	भूफ	काजिम
बकीमाम मीठा	पट्टा	बकीमाम
विश्व मीठा	मालडीरा	विश्व
मनीज	जावर	मनीज
रमेश	रीड़ा	रमेश
नाथ	नेवागवाड़ा	नाथ
तारा मीठा	उगडा	तारा मीठा
दीपा	उगडा	दीपा
बसन्ती मीठा	उगडा	बसन्ती मीठा
रोहनलाल	जावर मीठा	रोहनलाल
मोहन लाल	सिंघवाड़ा	मोहन
नानाजी	जावर	नानाजी






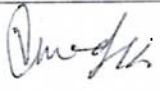
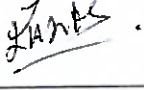
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मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

	इमिज्जु मीर	अशोक मीर	
	Vinit Dusey	प.म	
	Praveen Singh	प.म	
	Chaitan Lal Meena	उदयपुर	
	गोपाल	पांडवा	
	लालू राम	सिंधु वार्ड	
	चनर लाल	रवा जावर	
	देवीबाल	टिंडी	
	राजकुमार	हिंडी	राजकुमार
	मिठू लाल मीर	चणक	मिठू लाल मीर
	Bindu	राजमर	
	विशाल	पणवरा	
	अशोक	प्रताप धरा	अशोक

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)

ग्राम	नाम	पता	हस्ताक्षर
	Keelar Nathji	B-23 New Nagar	
	Ravi Sharma	Udipur	
	Laxmi Devi	Ram Nagar	
	VINOD	Udipur	
	प्रमकुमार	रेशावा	प्रमकुमार
	अम्बालाल	चावडी	अम्बालाल
	गोपाल	फलासिरी	गोपाल
	JP Kumar	Udipur	
	अम्बालाल	गिराहा	अम्बालाल
	VINOD KUMAR	Ram Nagar	
	Devendra RAO	RAM NAGAR	Devi
	Jayaram	Ram Nagar	Jayaram
	FALAK ENAPZ.	MC/5 Pratapgarh Zaver Minas.	

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

क्र.सं.	नाम	पता	हस्ताक्षर
	Sanjayali	Zawar mines	Sanjayali
	Shykhin	Zawar mines	Shy
	Dilip Sen	Zawar mine	Dilip
	Shubham	Zawar mines	Shubh
	Sanjay	Zawar mines	Sanjay
	Amit	Zawar Mines	Amit
	शम-डी-जोशी	Bem Nagar	जोशी
	इकबाल उमर	BHL	इकबाल
	प्रदीप खज्जा	जावर माइंस	प्रदीप
	Anil Jain	Uda	Anil
	Maya Khatri	Zawar	Maya
	Manish	UDAIPUR	Manish
	Sham	UDAIPUR	Sham

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

क्र.सं.	व्यक्ति का नाम	पता/विभाग का नाम	हस्ताक्षर
	मीना झा	परसापुरा मालडिया	हीही
	जोगेरा मीना	टीडी	जोगेरा
	दुर्गा डी	सिद्धी (गड)	दुर्गा
	Devi Lal Jha	मालडिया	Devi Lal
	SAMJISH KUMAR	मालडिया	Samjish
	दीपलाल	जावरमाला	दीपलाल
	दीपलाल	जावरमाला	दीपलाल
	Dimple	बालडीया	Dimple
	गुगुन लाल	पराविया	गुगुनलाल
	मुकुंद कुमार	गड	Mukul
	Mamanku Jha	परसापुरा	Mamanku
	मालदीया	बालडीया	मालदीया
	Mamanku Lal	Padla	Mamanku

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, तिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)

क्र.सं.	नाम	पता	दस्तावेज
	गोपाल सिंह मीना	सीडी	
	Dipak Sharma	Zavaniwara	Dipak
	मंजोल मंत्री	जावर माइंस	
	प्रद्युम्न रामा	जावर माइंस	
	काजल मोड	जावर माइंस	फ़िजु-1 Mod
	Vikas	Udaipur	De.
	Ashwini Chhetri	CSC	Ashwini
	लीला	नला	लीला देवी
	गंगा	चौलखड़ा	गंगा
	विद्या	नला	विद्या
	रीना कुमारी	अमरपुरा	रीना देवी
	सुरजप्रताप मीना	पिपलडा	सुरजप्रताप
	जमना	अमरपुरा	जमना

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

क्र.सं.	नाम	पता	हस्ताक्षर
	सज्जीर 31 वषुर	न्यू मार्केट	James
	लोकेश भुर्गी	न्यू मार्केट	Lokesh Bhargava
	चलारू	पलकटा	Chalaru
	रमेशा द्विवेदी	जावर माइंस	Ramesha Dwivedi
	नरेश को	राजगढ़	Narash Kohli
	गीता	गला	गीता
	इन्द्रा देवी	चणव 1561	इन्द्रा
	इलाश देवी	चणव 1561	इलाश
	प्रमीला	चणव 1561	प्रमीला
	जारे लाल	जावर माइंस	Jare Lal
	प्रकाश माधुवा	जावर माइंस	प्रकाश
	इमा मीणा	जावर माइंस	इमा
	सीना मीणा	बोरीकुंभा	सीना



मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

क्र.सं.	नाम	पता	हस्ताक्षर
1	N. L. Chandra	साराड़ा	[Signature]
2	P. K. Bhatt	साराड़ा	[Signature]
3	श्री. कलाश्री	भालडिया	श्री. कलाश्री
4	अजीत सिंह	भालडिया	[Signature]
5	हरीश कुमार शर्मा	भालडिया	[Signature]
6	लोचन सिंह	भालडिया	[Signature]
7	दिनेश	जावर	दिनेश
8	योगेश लाल	हाराड़ा	योगेश
9	गिरजा देवी	भालडिया	गिरजा देवी
10	रमेश-शर्मा	भालडिया	[Signature]
11	B. K. Sahu	साराड़ा	[Signature]
	श्री. माता	अमरपुरा	श्री. माता
	शुलकी माई	अमरपुरा 22.12.21	शुलकी

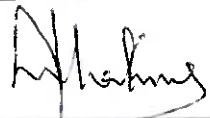

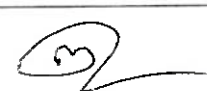
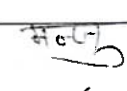

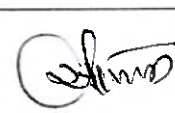
मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

पेतावलाल मीठा	कृष्णपुरा	पेतावलाल
पार्वी मीठा	हल्दीपुरा	पार्वी मीठा
भुरी मीठा	पटुणा	भुरी मीठा
शीला	लोरी कुआ	शीला
सन्तोष	पटुणा	सन्तोष
इन्द्रा मीठा	पटुणा	इन्द्रा
मन्जु मीठा	नेवातलाई	मन्जु
गीता मीठा	धावडी तलार	गीता
अनिता देवी	पोहिया	अनिता
मंगली	नेवातलाई	मंगली
कमला	नेवातलाई	कमला
कमला	टी डी	कमला
लक्ष्मी	नेवातलाई	लक्ष्मी

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

क्र.सं.	नाम	पता	लिंग/वर्ग
	तिरमा	हनुमानपुरा	विरमा
	शर्मा	पांडला	शर्मा
	इन्डा	दीडी	इन्डा
	दुर्गा	दीडी	दुर्गा
	आलगा	गाँव	आलगा
	जमना	रता	जमना
	वीरेंद्र सिंह	जमना	वीरेंद्र सिंह
	Prabhu Lal Solvi	udaipur	Prabhu Lal Solvi
	राखी मीना	दीडी	राखी मीना
	राखी	पांडला	राखी
	दोली	पांडला	दोली
	रमेश	जानर	रमेश

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:--(दिनांक 22.12.2021)

	Kishore Kumar S.	Bhaladina	
	Ratni	Chamarda	
	राति	चामड़ा	राति
	M-1. Ghanshyam	मालडिया	
	नडगरी	चामड़ा	लक्ष्मी
	मालडिया	कमलपुरा	
	सुगना	कमलपुरा	सुगना
	गागुडी बर	पडुगरी	गागुडी
	शान्तिनाथ	पडुगरी	शान्तिनाथ
	सुशीला मीणा	बालपुरा	सुशीला मीणा
	आशा मीणा	डीडी	आशा
	प्रद्युम्न	उदयपुर	
	स्वीव	मालडिया	

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम  
पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में  
उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)  
पता ६२४६१६

1	जागु	जावर	जागु
2	सागर लाल	जावर	सागर लाल
3	शिव लाल	शिव लाल	शिव लाल
4	मोहरी लाल गुजरात	मोहरी लाल गुजरात	मोहरी लाल
5	रमेश जीना	रमेश जीना	रमेश जीना
	नारा	चंनावड़ा	नारा
	शमरी देवी	चंनावड़ा	शमरी देवी
	सीता	चंनावड़ा	सीता
	जिमरे देवी	चंनावड़ा	जिमरे देवी
	युन्दर देवी	कोरीकुडा	युन्दर देवी
	रमिला	अमरपुरा	रमिला
	अमरी बाई	पडुना	अमरी बाई
	रमिला	अमरपुरा	रमिला

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

नितेन्द्र	पासमा	नितेन्द्र
Prashant Taneja	Udaipur	R
Somesh S	Udaipur	
Maitreyee	Udaipur	
Tanish	Udaipur	J.T. 88
दीप्ती	उदयपुर	
मन्जु	मानपुर	मन्जु
मन्जु देवी	दीप्ती	मन्जु
तारा देवी	जावर	तारा
जयवन्त सिंह	मानडीया	जयवन्त सिंह
आशा कुमारे	सिंदरवाड़ा	आशा
C. T. Ramachandra	Blachre	
डियन गजपति	मानडीया	



मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)

पार्वती	रीडी	पार्वती
लक्ष्मी सीपा	रीडी	लक्ष्मी सीपा
रीना	जावर	रीना
तारा	भैरवजीन चावी	तारा
वीमिता	रीडी	वीमिता
अनिता	भालडीया	अनिता
इन्दरा	भालडिया	इन्दरा
सुरजा	जावर	सुरजा
मन्मोहन चौधरी	जावर	मन्मोहन
तारा सीमा	सिंघटवाडा	तारा
लाजुराम	सिंघटवाडा	लाजुराम
दीपक कुमार	रीडी	दीपक कुमार
गोविन्द	कानपुर	गोविन्द

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराडा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

	मीना मीना	देवी कुंआ	मीना
	रश्मा	पिपल दरा	Rashma
	मीरा देवी	पिपल दरा	मीरा
	कमला	दावडी तलाई जावे (पंचायत)	कमला
	लाली	दावडी तलाई	लाली
	जमला बार्ह	टीडी	कमला
	गीता	जावर	गीता
	लता	जावर	लता
	सुनिता	सिधवाडा	सुनिता
	मनू	टीडी	मनू
	तूलसी	पिण्ड वाला तालाव वाला	तुमकी
	मनाजा	जावर	मनिजा
	डीडी चन्द	पिपली	डीडी चन्द

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)

रमिला मीणा	सीडी	रमिला मीणा
पुष्पा	पुष्पा	पुष्पा
मंजु	मंजु	मंजु
सुनीता	सुनीता	सुनीता
संगीता कुंवर	संगीता कुंवर	संगीता कुंवर
लालु राम मीणा	लालु राम मीणा	लालु राम मीणा
शारदा मीणा	शारदा मीणा	शारदा मीणा
काली	काली	काली
काशी	काशी	काशी
देवीलाल	देवीलाल	देवीलाल
शंकर लाल	शंकर लाल	शंकर लाल
कालु	कालु	कालु
प्रकाश	प्रकाश	प्रकाश

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)

रतन	पांडव	रतन
शंकर	पांडव	शंकर
दिनेश	समा लंछ	दिनेश
मुकेश	लीडी	मुकेश
रामपाल मीणा	लीडी	
अजीत	नैवातलई	अंजित
प्रमिला	सिंघटवाड़ा	Pramila
थावरी	भालीघाटी	
भवरी	सिंघटवाड़ा	भवरी
हरिशंकर	लीडी	हरिशंकर
गारामठा	चणवड़ा	गारामठा
केवा	सिंघटवाड़ा	केवा
चमी	आलडिया	चमी



मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

धुली देवी	चावड़ी तलाई	धुली
बढ़नी	रवा,	बढ़नी
सुगना	हीड़ी	सुगना
अरुणा कुंवर	मिगटवाड़ा	अरुणा
सुकमणी	मला गांव	सुकमणी
कमला	हीड़ी गांव	कमला
विन्दु	पाटिया	
वसु	हीड़ी	वसु
मोगा लाल	लावट	मोगा लाल
ली लाल	रवा	ली लाल
रश्मिता	जावर	रश्मिता
हरिशेखर शर्मा	हीड़ी	Harish
शंकर नाना	हीड़ी	शंकर



मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

हकदार	प्लॉट नं.	हकदार
कालु	जावर	कालु
मुनेश	जावर	मुनेश
<del>शेखर</del> मंडी	जावर	लक्ष्मी
मोहन	प्लॉट नं.	मोहन
दीपक मीणा	प्लॉट नं.	
रंजय मीणा	सिंघवाड़ा	रंजय मीणा
गौतम	जावर	गौतम
धरम चंद	सिंघवाड़ा	धरम चंद

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)

क्र.सं.	व्यक्ति का नाम	पता/विभाग का नाम	हस्ताक्षर
	शिव	सराड़ा	शिव
	तेजाराज	कोडिगाम	तेजाराज
	संतोष	सिंधवाड़ा	संतोष
	दुर्गा	जावर	दुर्गा
	सुनिता	सीडी	सुनिता
	Vijay Kumar	पांडना	विजय कुमार
	Rakesh	जावर	Rakesh
	Dinesh	जावर	Dinesh
	संतोष	जावर	संतोष
	रीना	जावर	रीना
	कान्ति लाल	सिंधवाड़ा	कान्ति लाल
	दीपक	सिंधवाड़ा	दीपक
	गिरधर सिंह	सिंधवाड़ा	गिरधर

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराडा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

	कुष्ठा	जावर	कुष्ठा
	मणी	जावर	मणी
	लाजवंती	मिंदरवाड़ा	लाजवंती
	ममता मीणा	दीडी	ममता मीणा
	मीरा मीणा	दीडी	मीरा मीणा
	लीला	दीडी	लीला
	सुरेश	बेवातल	Suresh
	Shankar	दीडीवाल	Shankar
	Damresh cum	C-1-S-F cum	Damresh
	लक्ष्मण	दीडी	लक्ष्मण
	Suresh	Zawar	(Suresh)
	केसरी	कुष्ठापुरा	केसरी
	वरजु	कुष्ठापुरा	वरजु

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)

	रत्न लाल	सिधलवाड़ा	Khaddu
	पूजा लाल	पाटला	पुजालाल
	लक्ष्मण	सिधलवाड़ा	लक्ष्मण
	देवा लाल	शेलेपिमा	देवीलाल
	कालू मीठा	नई पुर	कालुमीठा
	SUNIL KALAL	पावर माइंस	Sunil
	RAVINDRA MEENA	Seengatnagar	Ravindra
	Monali Dholale	Federation Manager Mangri	Monali
	Pramila Meena	Singhwarada.	Pramila
	लक्ष्मण लाल मीठा	टीडी	लक्ष्मण
	लक्ष्मण मीठा	टीडी	लक्ष्मण
	विजय	पाटला	Vijay
	काठुरीय	टीडी	काठुरीय

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

	पुष्कलाल	हिंडी	पुष्कलाल
	बाबू	गौजरा	बाबू
	मंगल सिंह	सिधु व/डा	मंगल सिंह
	सीत	जाहर	सीत
	मालूम लाल	दीदी	मालूम लाल
	गोपाल लाल	पांडा	गिरि-
	KAIL TAL	मालडीया	का
	अमर	लसाडिया	
	दिनेश	अदलाश	दिनेश
	जगदीश	पांडा	जगदीश
	जशा जैन	मालडीया	जशा
	शुविचन्द्र वैष्णव मालडीया	मालडीया मालडीया	शुविचन्द्र मालडीया
	जीत	बामसिया	जीत

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)

अनिल मीणा	जावर	अनिल
राजदेवी	पांडा	राजदेवी
पंकज	रिहा	Rohit
आमरा खरडी	हीडी	आमरा
अनन्य सुभाषीणा	खिंडवाडा	अनन्य
दिलीप कुमार मीणा	जावर	दिलीप मीणा
Raj Kumar, owner	समाधान	Raj
खेमचंद	पानेडा	खेमचंद
गोकुल	पानेडा	गोकुल
बिजय	नेवा ललाहू	बिजय
मोदीलाल	गोलमार्हेट	मोदीलाल
कोकिला मीणा	केवडा कला	कोकिला मीणा
रूपमान	रूपमान	रूपमान



मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

क्र.सं.	नाम	पता	हस्ताक्षर
	महेश्वर लाल मिश्रा	जावर	महेश्वर लाल मिश्रा
	काबु लाल	शेर	काबु लाल
	देवा	देवा तला	देवा
	गोविंद कुमार मीणा	जावर	गोविंद कुमार मीणा
	सोन-कुमार मीणा	जावर	सोन-कुमार
	Magnum Meena	TIDT	TIDT पुर्वोत्तर (2010-15)
	Amol Kr	ZM Bh	
	लक्ष्मी शेर	वामनिश	लक्ष्मी
	बंनो लाल	पाइला	बंनो लाल
	देव कुमार	जावर	देव कुमार
	गोविंद	विजय	गोविंद
	मालाकिंद	किंग टाटा	मालाकिंद
	श्याम जी	जेलमाल	श्याम




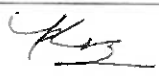
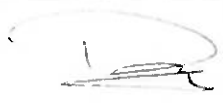
मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

[illegible]

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:- (दिनांक 22.12.2021)

हस्ताक्षर मीठा	अध्यक्ष	हस्ताक्षर मीठा
हीमा दुला	जावर	हीमा
मुबारिक	जावर	मुबारिक
गजेन्द्र सिंह	प्रमोद	गजेन्द्र सिंह
धीरज	धीरज	गोवर्धन
नगाराम	गोवर्धन	नगाराम
गोश्वामी	जावर	गोश्वामी
सीमा मीठा	परतपुरा	सीमा
विष्णु मीठा	जावर	विष्णु
प्रेमचंद	जावर	प्रेमचंद
देवक टंडन	उदयपुर	देवक टंडन
राजेश मीठा	जावर रवां	राजेश

मैसर्स हिंदुस्तान जिंक लिमिटेड के जावर ग्रुप ऑफ अंडरग्राउंड माइंस की विस्तार परियोजना हेतु ग्राम पंचायत भवन भालडिया तहसील सराड़ा, जिला-उदयपुर, राजस्थान में आयोजित जन सुनवाई में उपस्थित अधिकारी एवं स्थानीय नागरिकगण:-(दिनांक 22.12.2021)

क्र.सं.	नाम	पता	हस्ताक्षर
	महु काई	पांडना	
	इ-31	जावर	इन्द्रा
	देवीसिंह	जावर माइंगल भालडिया	
	गोपाल सोनी	मे बाडिया	हिं
	दुल चन्द श्रीवा	जाम डीवा	इन्द्रा
	सुरजमल गोवाल	गेवातलाई	
	महु काई	जावर	
	DEVENDRA MALI	JAVAR	
	Rojan	Rojan	Rojan



and Urban Affairs Ministry on Saturday. adjudged the second and third cleanest state in the country. In

bad and Tirupati (Andhra Pradesh) emerged as the "Fastest and third position respectively.

**OFFICE OF THE CHIEF EXECUTIVE OFFICER, NATHDWARA TEMPLE BOARD, NATHDWARA (RAJASTHAN)**  
No.7066/Purchase/2021 Date - 19/11/2021  
**E-Bid No. 04/2021-22 (Notice Inviting Bids)**  
Nathdwara Temple Board invites bids from eligible, interested and competent parties of Hotel Business for the followings:  
S.No. Item  
01 Operation, Maintenance and Development of "Shri Damodar Dham" building owned and managed by Nathdwara Temple Board.  
The interested bidders may visit and download the bid document from <https://eproc.raajasthan.gov.in>, <https://sppp.raajasthan.gov.in> and [www.nathdwaratemple.org](http://www.nathdwaratemple.org) and apply online through <https://eproc.raajasthan.gov.in>  
(JITENDRA OZHA)  
Chief Executive Officer,  
Nathdwara Temple Board

**NATIONAL COUNCIL FOR COOPERATIVE TRAINING (NCCT)**  
(An Autonomous Society under Ministry of Cooperation, Govt. of India)  
3rd Floor, NCCT Building-3, Sri Institutional Area, August Kranti Marg, New Delhi-110016  
**NCCT invites application for the post of Jr. Consultant (Academic & Skill Development) on Contract basis. Interested candidates may send their resume through e-mail at [ncctpers@gmail.com](mailto:ncctpers@gmail.com)**  
For eligibility, terms & conditions, remunerations, other details and application form etc. please visit our website: [www.ncct.ac.in](http://www.ncct.ac.in)  
Deputy Director (Pers.)  
9811708991

## Nigerian national held with heroin in Delhi

**New Delhi:** Delhi Police have arrested a Nigerian national with Heroin worth Rs 2 crore in the international market, an official said here on Sat. Furnishing details, DCP Shankar Choudhary, said information regarding

**राजस्थान सरकार**  
**Government of Rajasthan**  
**निदेशालय, खान एवं भू विज्ञान**  
**DIRECTORATE OF MINES & GEOLOGY**  
खनिज भवन/Khanij Bhavan उदयपुर/Udaipur-313001  
दूरभाष/Phones: 2415091-95 फैक्स/Fax: (0294) 2410526  
क्रमांक: निदे/अनिखा/वन/डाप-बंशीगढ़ाडपुर-बंश बरौडा/भरत/2021/1426 दिनांक  
**प्रेस विज्ञापन**  
भारत सरकार पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, नई दिल्ली के पत्रांक एफसी दिनांक 24.01.2013 से माननीय राष्ट्रीय हरित प्राधिकरण के निर्णय दिनांक 07.11.21 में भारत सरकार द्वारा जारी राजस्थान राज्य के भरतपुर जिले में खनन एवं रोजगार सुवर्ण क्षेत्र के ब्लॉक ए व बी (बन्ध बरौडा) तहसील रूपवास जिला भरतपुर में केन्द्र सरकार की से स्टेज-1 क्षेत्रफल 398.0085 हेक्टेयर के सम्बंध में पत्र दिनांक 11.06.2021 विषय [www.mines.raajasthan.gov.in](http://www.mines.raajasthan.gov.in) पर उपलब्ध है।  
(पी.आर. आ  
अतिरिक्त निदेशा  
(पर्यावरण एवं  
DIPRC/11682/2021

**CITY UNION BANK LIM**  
**Credit Recovery and Management Department**  
Administrative Office : No. 24-B, Gandhi Naga  
Kumbakonam - 612 001. E-Mail id : [crmd@cityunionbank.com](mailto:crmd@cityunionbank.com)  
Ph : 0435-2432322, Fax : 0435-2431746

**RE-TENDER-CUM-AUCTION SALE NOTICE UNDER SARFAESI**  
The following property/ies mortgaged to City Union Bank Limited will be sold cum-Public Auction by the Authorised Officer of the Bank, under Rule 8 (6) & 9, Interest (Enforcement) Rules, 2002, under the SARFAESI Act, 2002, for recovery Rs.29,65,934/- (Rupees Twenty Nine Lakh Sixty Five Thousand Nine Hundred Four Only) as on 17-02-2021 together with further interest to be charged from onwards, other expenses and any other dues to the bank by the borrower No.1) M/s. Tikkiwal Boutique, B-1, Hanuman Plaza, Bhiwara - 311 001. No.2) M/s. Tikkiwal, S/o. Shankar Lal Tikkiwal, Gulmandi, Bhiwara - 311 001. No.3) M/s. Tikkiwal, W/o. Shyam Lal Tikkiwal, Patodiya Gali, Gulmandi, Bhiwara - 311 001.  
**Immovable Property Mortgaged to our Bank**  
(Property Owned by Mr. Shyam Lal Tikkiwal, S/o. Shankar Lal Tikkiwal, Commercial Shop No. B-1 situated at Basement, Hanuman Plaza, over Plot No. Patel Bhawan, Bhopalganj, Bhiwara - 311 001, Rajasthan measuring 13 x 9 as under: North : Plot No.553, South: Passage, East: Shop No.B-2, West: Shop No. B-3.  
**Reserve Price: Rs.15,00,000/- (Rupees Fifteen Lakh Only)**  
**RE-AUCTION DETAILS**  

Date of Re-Tender-cum-Auction Sale	Venue
09-12-2021	City Union Bank Limited, Bhiwara Shop No.3-7, Srinath Tower, Gangapur Road, Bhiwara - 311 001, Telephone No.01482-247722, Cell No. 9309387725

**Terms and Conditions of Re-Tender-cum-Auction Sale:**  
(1) The intending bidders should be present in person for the auction and put a declaration in writing to the effect that he/she is bidding for himself and give a declaration in writing to the effect that he/she is bidding for himself. (2) The intending bidders may obtain the Tender Forms from The Manager, City Union Bank Limited, Bhiwara Branch, Shop No.3-7, Srinath Tower, Gangapur Chohra, Pur Road, Bhiwara. (3) The intending bidders should submit their bids only in the Tender Form pre-enclosed addressed to The Authorised Officer, City Union Bank Ltd., to the Order / Demand Draft for an EMD of 10% of the Reserve Price, drawn in favour of "City Union Bank Ltd.", on or before 12.00 Noon on the date of Tender-cum-Auction Sale hereat. (4) The successful bidder shall have to pay 25% (inclusive of the EMD) of the Reserve Price immediately on completion of sale and the balance amount of 75% shall be paid by the successful bidder on the date of confirmation of sale, failing which the initial deposit of 25% shall be forfeited. (5) The property/ies are sold on "As-is-what-is" and "whatever there is" basis. (6) The sealed tenders will be opened on the date of the auction at 01.00 p.m. on the date of Tender-cum-Auction Sale. (7) The successful bidder shall have to pay 25% (inclusive of the EMD) of the Reserve Price immediately on completion of sale and the balance amount of 75% shall be paid by the successful bidder on the date of confirmation of sale, failing which the initial deposit of 25% shall be forfeited. (8) The successful bidder shall be liable to pay the charges/fees payable for conveyance, registration fee etc., as applicable under law. (9) The successful bidder shall be liable to pay the dues (lawful house tax, electricity charges and other dues), TDS, GST if any, Government Undertaking and local bodies. (10) The Authorised Officer shall accept or reject the bids or postpone or cancel the sale without assigning any reason therefor.  
Place : Kumbakonam, Date : 19-11-2021  
Regd. Office : 149, T.S.R. (Big) Street, Kumbakonam, Thanjavur District, Tamil Nadu - 612 001, CIN - L65110TN1904PLC0012  
Telephone No. 0435-2402322, Fax : 0435-2431746, Website : [www.cityunionbank.com](http://www.cityunionbank.com)

**भूमि**  
**क्षेत्रीय कार्यालय**  
**राजस्थान राज्य प्रदूषण नियंत्रण मण्डल**  
एफ. 470, यू.सी.सी.आई. भवन के पास, मेवाड़ औद्योगिक क्षेत्र, मादडी, उदयपुर (राज.)  
ई-मेल : [rpcbudaipur@gmail.com](mailto:rpcbudaipur@gmail.com) फोन नं. : 0294-2491269  
No.: RPCB/RO U/UDR/  
**पर्यावरण स्वीकृति हेतु लोक सुनवाई के लिये आम सूचना**  
विषय: मैसर्स हिन्दुस्तान जिंक लि. द्वारा प्रस्तावित परियोजना जावर गुप ऑफ अंडरग्राउण्ड लेड जिंक माइंस का विस्तार 4.8 मिलियन टन प्रतिवर्ष से 8.5 मिलियन टन प्रतिवर्ष अयस्क उत्पादन, कुल उत्खनन : 7.78 मिलियन टन प्रतिवर्ष (सम्मिलित वेस्ट रॉक : 1.28 मिलियन टन प्रतिवर्ष) और अयस्क सज्जीकरण (बेनिफिसियेशन) 4.8 मिलियन टन प्रतिवर्ष से 7.3 मिलियन टन प्रतिवर्ष, खनन पट्टा क्षेत्र 3620 हेक्टेयर (एम्.एल.नं 03/89), ग्राम- जावर, तहसील-गिर्वा एवं सराडा, जिला-उदयपुर हेतु पर्यावरण स्वीकृति के लिए लोक सुनवाई।  
1. सर्व साधारण को सूचित किया जाता है कि मैसर्स हिन्दुस्तान जिंक लि. द्वारा प्रस्तावित परियोजना जावर गुप ऑफ अंडरग्राउण्ड लेड जिंक माइंस का विस्तार 4.8 मिलियन टन प्रतिवर्ष से 8.5 मिलियन टन प्रतिवर्ष अयस्क उत्पादन, कुल उत्खनन : 7.78 मिलियन टन प्रतिवर्ष (सम्मिलित वेस्ट रॉक : 1.28 मिलियन टन प्रतिवर्ष) और अयस्क सज्जीकरण (बेनिफिसियेशन) 4.8 मिलियन टन प्रतिवर्ष से 7.3 मिलियन टन प्रतिवर्ष, खनन पट्टा क्षेत्र 3620 हेक्टेयर (एम्.एल.नं 03/89), ग्राम- जावर, तहसील-गिर्वा एवं सराडा, जिला-उदयपुर हेतु प्रस्तावित परियोजना का प्रस्ताव राजस्थान राज्य प्रदूषण नियंत्रण मण्डल (यहां तथा बाद में मण्डल के नाम से अभिलिखित) के समक्ष प्रस्तुत किया है तथा परियोजना की पर्यावरणीय स्वीकृति के लिए लोक सुनवाई बाबत आवेदन किया गया है।  
2. और चूंकि मण्डल को उक्त परियोजना हेतु वन, पर्यावरण एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार, नई दिल्ली द्वारा जारी अधिसूचना संख्या एस.ओ. 1533 दिनांक 14.9.2006 के अनुसार लोक सुनवाई हेतु इस आशय की सूचना जारी कर 30 दिनों का नोटिस दिया जा आवश्यक है।  
3. उक्त परियोजना से सम्बंधित पर्यावरणीय प्रभाव आकलन रिपोर्ट एवं संक्षिप्त अमिलेख (कार्यकारी स्मारांश) निम्नांकित कार्यालयों पर उपलब्ध है:-  
1) कार्यालय जिला कलेक्टर, उदयपुर  
2) जिला परिषद, उदयपुर  
3) महाप्रबन्धक, जिला उद्योग केंद्र, उदयपुर  
4) उपखण्ड अधिकारी, गिर्वा / सराडा जिला-उदयपुर  
5) पंचायत सचिव, गिर्वा / सराडा / जयसमन्द जिला-उदयपुर  
6) राजस्थान राज्य प्रदूषण नियंत्रण मण्डल, 4, संस्थानिक क्षेत्र, झालाना डूंगरी, जयपुर  
7) एकीकृत क्षेत्रीय कार्यालय, वन, पर्यावरण एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार, ए-216, अन्त्य भवन, संस्थानिक क्षेत्र, झालाना डूंगरी, जयपुर।  
8) क्षेत्रीय अधिकारी, राजस्थान राज्य प्रदूषण नियंत्रण मण्डल, एफ-470, मेवाड़ औद्योगिक क्षेत्र, मादडी उदयपुर (राज.)  
अतः सर्व साधारण को नोटिस के माध्यम से एतद द्वारा सूचित किया जाता है कि उक्त परियोजना के लिए पर्यावरणीय स्वीकृति से सम्बंधित लोक सुनवाई दिनांक 22.12.2021 (बुधवार) को प्रातः 11:00 A.M. बजे, ग्राम पंचायत भवन, मालडिया तह, सराडा, जिला-उदयपुर में उपस्थित होकर अपने सुझाव/अक्षेप, कोविड-19 कोशिका महामारी को ध्यान में रख एवं सामाजिक दूरी, मास्क व सैनेटाइजर का उपयोग करते हुए Covid appropriate Behaviour की पालना करते हुए प्रस्तुत कर सकते हैं।  
साथ ही इस सम्बन्ध में लिखित सुझाव/आपत्ति, इस सूचना के प्रकाशन की तिथि से 30 दिनों के अन्दर क्षेत्रीय कार्यालय, राजस्थान राज्य प्रदूषण नियंत्रण मण्डल, एफ. 470, यू.सी.सी.आई. भवन के पास, मेवाड़ औद्योगिक क्षेत्र, मादडी, उदयपुर में भी प्रस्तुत किये जा सकते हैं। जन सुनवाई में उपस्थित सभी व्यक्तियों को राज्य सरकार द्वारा कोविड-19 की रोकथाम हेतु समय-समय पर जारी दिशा-निर्देशों की पालना करना अनिवार्य है।  
क्षेत्रीय अधिकारी





- ✓ कमर व पेड़ू में दर्द
- ✓ खून की कमी, कमजोरी
- ✓ हथेली व तलवों में जलन
- ✓ खून साफ़ करे, रुप निखारे
- ✓ तनाव कम करे
- आदि में सहायक

इम्यूनिटी बढ़ाए  
सुरक्षित रखे

हेमपुष्पा

मिलती-जुलती पैकिंग व विज्ञापन से भ्रमित न हों, सर्वोत्तम हेमपुष्पा है

## दुर्घटना घायल ने उपचार के दौरान तोड़ा दम

उदयपुर. भोण्डर, नगर के सूरजपोल से गिरवर पोल सड़क मार्ग पर देर रात हुए सड़क हादसे में घायल युवक की शनिवार को ईलाज के दौरान मौत हो गई, मृतक को पहचान नहीं होने से शव को एमबी चिकित्सालय उदयपुर मोर्चरी में रखवाया गया है। रात करीब साढ़े दस बजे तेली समाज के नोहरे के पास कार चालक ने खाड़े युवक को टक्कर मार दी, जिससे वह गंभीर घायल हो गया। घटना की जानकारी पुलिस को देने के बाद मौके पर पहुंचे पुलिस ने आनन-फानन में घायल को चिकित्सालय पहुंचाया। जहां प्राथमिक उपचार के बाद 108 द्वारा उदयपुर रेफर कर दिया गया। यहां उपचार के दौरान उसकी मौत हो गई।

## अलमारी का ताला तोड़ 25 तोल

उदयपुर. परसाद थाना क्षेत्र के पीपली गांव के एक घर में घुसे चोर अलमारी का ताला खोलकर 25 तोला सोने और चांदी के जेवर चुरा ले गए। प्रभुलाल कलाल के मकान में चोरी हुई। चोर मुख्य द्वार की जाली काटकर मकान में घुसे। प्रभुलाल की बेटी कल्पना और पत्नी रहीं थी, लेकिन उनसे चोरी नहीं हुई। चोरों ने घर अलमारी का ताला तोड़कर सोने और चांदी के जेवर चुरा लिए। इसके काफी देर बाद चोरों को पकड़ा गया।

**भारत**

क्षेत्रीय कार्यालय  
राजस्थान राज्य प्रदूषण नियंत्रण मण्डल

एक: 470, यू.सी.सी.आई. भवन के पास, मेवाड़ औद्योगिक क्षेत्र, मादडी, उदयपुर (राज.)  
ई-मेल : [rajpcbudapure@gmail.com](mailto:rajpcbudapure@gmail.com) फोन नं. : 0294-2491269  
No.: RPCH/RO/UDR/

**पर्यावरण स्वीकृति हेतु लोक सुनवाई के लिये आम सूचना**

विषय: मेवाड़ हिन्दुस्तान लिमिटेड लि., द्वारा प्रस्तावित परियोजना जावर ग्रुप ऑफ अंडरग्राउंड लेड जिंक माइंस का विस्तार 4.8 मिलियन टन प्रतिवर्ष से 6.5 मिलियन टन प्रतिवर्ष अयस्क उत्पादन, कुल उत्खनन : 7.78 मिलियन टन प्रतिवर्ष (सम्मिलित वेस्ट रॉक : 1.28 मिलियन टन प्रतिवर्ष) और अयस्क सज्जीकरण (सिनिफिकैशियन) 4.8 मिलियन टन प्रतिवर्ष से 7.3 मिलियन टन प्रतिवर्ष, खनन पट्टा क्षेत्र 3620 हेक्टेयर (एम्.एल.नं 03/89), ग्राम- जावर, तहसील-गिरवा एवं सराडा, जिला-उदयपुर हेतु पर्यावरण प्रभाव आकलन रिपोर्ट एवं संक्षिप्त अभिलेख (कार्यकारी सारांश) निम्नांकित कार्यालयों पर उपलब्ध है:-

- 1) कार्यलय जिला कलेक्टर, उदयपुर
- 2) जिला परिषद, उदयपुर
- 3) महाप्रबंधक, जिला सरोज केन्द्र, उदयपुर
- 4) एमएसडी अधिकारी, गिरवा/ सराडा जिला-उदयपुर
- 5) पर्यावरण सचिव, गिरवा/ सराडा/ जयसमन्द जिला-उदयपुर
- 6) राजस्थान राज्य प्रदूषण नियंत्रण मण्डल, 4, संस्थानिक क्षेत्र, झालाना दुंगरी, जयपुर
- 7) एकीकृत क्षेत्रीय कार्यालय, वन, पर्यावरण एवं जलसमु परितंत्र मंत्रालय, भारत सरकार, ए-216, अरुण भवन, संस्थानिक क्षेत्र, झालाना दुंगरी, जयपुर।
- 8) क्षेत्रीय अधिकारी, राजस्थान राज्य प्रदूषण नियंत्रण मण्डल, एक-470, मेवाड़ औद्योगिक क्षेत्र, मादडी उदयपुर (राज.)

अतः सभी साधारण को नोटिस के माध्यम से एतद द्वारा सूचित किया जाता है कि उक्त परियोजना के लिए पर्यावरणीय स्वीकृति से सम्बन्धित लोक सुनवाई दिनांक 22.12.2021 (बुधवार) को प्रातः 11:30 A.M. बजे, ग्राम पंचायत भवन, मालडिया तह. सराडा, जिला-उदयपुर में उपस्थित होकर अपने सुझाव/आशय, कांवेड-19 कोटेशन महामारी को ध्यान में रख एवं सामाजिक दूरी, मास्क व सेंटाइज़र का उपयोग करते हुए, Covid appropriate Behaviour की पालना करते हुए प्रस्तुत कर सकते हैं।

सूचना ही इस सम्बन्ध में लिखित सुझाव/आशय, इस सूचना के प्रकाशन की तिथि से 30 दिवस के अन्दर क्षेत्रीय कार्यालय, राजस्थान राज्य प्रदूषण नियंत्रण मण्डल, एक: 470, यू.सी.सी.आई. भवन के पास, मेवाड़ औद्योगिक क्षेत्र, मादडी उदयपुर में भी प्रस्तुत किये जा सकते हैं। जन सुनवाई में उपस्थित सभी व्यक्तियों को राज्य सरकार द्वारा कोविड-19 कोटेशन महामारी पर जारी दिशा-निर्देशों की पालना करना अनिवार्य है।

क्षेत्रीय अधिकारी

## सम्पूर्ण च्यवन जिसकी वि

च्यवनार्थ च्यवनप्राश है सम्पूर्ण च्यवनप्राश, जो म  
जहाँ आम च्यवनप्राश बनता है तैल और घी के मि  
100% शुद्ध देती थी। इसमें 42 नहीं बल्कि पूरे 5  
और कंठर के गुण हैं, जिससे आपको मिलेगा



Rev  
311  
27/12/2021

सेवा,

श्रीमान अतिरिक्त जिला कलेक्टर महोदय

जिला उदयपुर राज.

विषय:-H.Z.L. जावर भाईन्स समुह की पर्यावरण जन सुनवाई के सम्बन्ध में।

महोदय जी,

1 :- 22/12/2021 के जावर भाईन्स की भाडलिया पंचायत में रखी गई जन सुनवाई से पहले न्यूज पेपर के सिटी एडिशन के अलावा किसी भी प्रकार की कोई जानकारी न तो ग्राम पंचायत में दी गई न ही किसी प्रकार के बैनर,पोस्टर या लाइड स्पीकर द्वारा आजपास क्षेत्रों के ग्रामवासियों को सूचित किया गया। न कोई लेटर पंचायत को भेजा गया।

2 :- इस जन सुनवाई में H.Z.L.केC.S.R. द्वारा संचालित महिला समुह कि महिलाओं को आगे लाकर बिठा कर उनकी भाषा बुलवाई जा रही थी।

श्रीमान जी से निवेदन हे कि इस जन सुनवाई का फैसला लोगों के हित को ध्यान रखते हुए लेये।

3:-H.Z.L. द्वारा लीज क्षेत्र में 2520 हैक्टर जमीन की सीमा जानकारी स्थानीय जन प्रतिनिधियों तथा ग्रामवासियों को करवाने का कष्ट करे।

4).रोजगार भर्ती में गजदूर संघ,सरपंचो के अलावा स्थानीय समाज सेवी प्रतिनिधियों की कमेटी गठन कर की जावे।

धन्यवाद

5) ग्रामसभाकी अनुमति के बाद कार्य शुरू करेंगे।  
[रूढ़ीगत ग्राम सभा अध्यक्ष 244(1), 13(3) क के अनुसार]  
समस्त ग्रामवासी

दिनांक

27/12/2021

अमित कुमार खरारी  
9636113305  
27/12/21

शंकर

अमल चव्हा

Rev  
24/12/2021

सेवामें,

श्रीमान् जिला कलेक्टर एवं मजिस्ट्रेट महोदय,  
उदयपुर (राज.)।

विषय: हिंदुस्तान जिंक एवं वेदांता ग्रुप जावर द्वारा 3620 हेक्टेयर भूमिगत  
अयस्क खनन क्षेत्र हेतु जन सुनवाई के संबंध में एवं उचित जमीन  
का मुआवजा हेतु।

महोदय जी,

उपरोक्त विषय में निवेदन है कि यदि हिन्दुस्तान जिंक एवं वेदांत ग्रुप जावर के द्वारा भूमिगत खनन क्षेत्र विस्तार के कारण जावर माला के अंतर्गत आने वाली काश्तकार कृषि भूमि पूर्ण रूप से बंजर हो चुकी है, कुएं, बावडीयों का पानी पूर्ण रूप से सुख गया है। यहां निवासरत गरीब किसान, आदिवासी, मजदूरों का जीवन यापन करना चुनौतिपूर्ण है। इसके बावजूद यहां के निवासीयों को जावर माईन्स में रोजगार के अवसर नहीं मिल रहे हैं, हम लोग जावर माला से प्रस्थान कर जहां रहने के लिये थोड़ी सी जगह मिली वहां पर गरीबी में जीवन यापन कर रहे हैं। आज हमारे पास खेती करने के लिये न तो जमीन है, न रोजगार। बाहरी लोगों को यहां पर रोजगार में प्राथमिकता दी गई है, जावर माईन्स के माईनिंग में अन्धाधुन ब्लास्ट किये जा रहे हैं। परिणाम स्वरूप हमारे मकान की दिवारें टूट एवं फट चुकी हैं। जिसके मुआवजे व जमीन के मुआवजे आज दिनांक तक भी नहीं दिये गये हैं। जिससे हम लोग विस्थापित होकर पास ही खेडफला, ग्राम पंचायत चणावदा, तह. गिर्वा में निवासरत हैं।

अतः आप महोदय से निवेदन है कि आप हमारी उक्त गंभीर समस्याओं के समाधान के लिये यदि हिन्दुस्तान जिंक व वेदांता ग्रुप जावर को प्रतिबद्ध करावें और यदि हमारी इन गंभीर समस्याओं का समाधान होता है तो हिन्दुस्तान जिंक व वेदांता ग्रुप जावर के द्वारा भूमिगत खनन क्षेत्र विस्तार किया जाये हमें कोई आपत्ति नहीं है।

दिनांक:

संलग्न: 24/12/2021

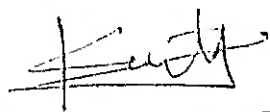
1. जमाबंदी नकल

प्रतिलिपि:

1. ए.डी.एम. महोदय, उदयपुर

2. एस.डी.एम. महोदय, उदयपुर

हस्ताक्षर प्रार्थी



24/12/2021

केशु कालमीवा

Rev  
311  
21/12/2021

सेवामें,

श्रीमान् जिला कलेक्टर एवं मजिस्ट्रेट महोदय,  
उदयपुर (राज.)।

विषय: हिंदुस्तान जिंक एवं वेदांता गुप जावर द्वारा 3620 हेक्टेयर भूमिगत  
अयस्क खनन क्षेत्र हेतु जन सुनवाई के संबंध में एवं उचित जमीन  
का मुआवजा हेतु।

महोदय जी,

उपरोक्त विषय में निवेदन है कि यदि हिन्दुस्तान जिंक एवं वेदांत गुप जावर के द्वारा भूमिगत खनन क्षेत्र विस्तार के कारण जावर माला के अंतर्गत आने वाली काश्तकार कृषि भूमि पूर्ण रूप से बंजर हो चुकी है, कुएं, बावडीयों का पानी पूर्ण रूप से सुख गया है। यहां निवासरत गरीब किसान, आदिवासी, मजदूरों का जीवन यापन करना चुनौतिपूर्ण है। इसके बावजूद यहां के निवासीयों को जावर माईन्स में रोजगार के अवसर नहीं मिल रहे हैं, हम लोग जावर माला से प्रस्थान कर जहां रहने के लिये थोड़ी सी जगह मिली वहां पर गरीबी में जीवन यापन कर रहे हैं। आज हमारे पास खेती करने के लिये न तो जमीन है, न रोजगार। बाहरी लोगों को यहां पर रोजगार में प्राथमिकता दी गई है, जावर माईन्स के माईनिंग में अन्धाधुन ब्लास्ट किये जा रहे हैं। परिणाम स्वरूप हमारे मकान की दिवारें टूट एवं फट चुकी हैं। जिसके मुआवजे व जमीन के मुआवजे आज दिनांक तक भी नहीं दिये गये हैं। जिससे हम लोग विस्थापित होकर पास ही खेडफला, ग्राम पंचायत चणावदा, तह. गिर्वा में निवासरत हैं।

अतः आप महोदय से निवेदन है कि आप हमारी उक्त गंभीर समस्याओं के समाधान के लिये यदि हिन्दुस्तान जिंक व वेदांता गुप जावर को प्रतिबद्ध करावें और यदि हमारी इन गंभीर समस्याओं का समाधान होता है तो हिन्दुस्तान जिंक व वेदांता गुप जावर के द्वारा भूमिगत खनन क्षेत्र विस्तार किया जाये हमें कोई आपत्ति नहीं है।

दिनांक:

संलग्न: 24/12/2021

1. जमाबंदी नकल

प्रतिलिपि:

1. ए.डी.एम. महोदय, उदयपुर
2. एस.डी.एम. महोदय, उदयपुर

हस्ताक्षर प्रार्थी

श्रीगोवतल्लुगल | मन्जी

लालुराज श्रीवाणी



जुहिर माइन्स  
पिन कोड - 313901

जिला - उदयपुर (राज.)

**HINDUSTAN ZINC LIMITED**  
**हिन्दुस्तान जिंक लिमिटेड**

Telephone - (0294) 2726600, Fax-2726243

Zawar Mines  
PIN Code - 313901  
Dist-Udaipur (Raj.)

HZL/ZM/ENV/2021

Date: 20.12.2021

To,

Regional Officer, RSPCB  
F-470, Near UCCI Building, Madri Industrial Area  
Udaipur-313003(Raj)

Subject: Public hearing for proposed expansion of Zawar Mines regd

Ref: Queries from Dr. Mohd Arfi Ji wrt public hearing for proposed expansion.

Sir,

With reference to the above, please find enclosed the pointwise response for the queries raised for proposed expansion project of Zawar Group of Underground Lead- Zinc Mines from 4.8 Million TPA to 6.5 Million TPA Ore Production with Total Excavation 7.78 Million TPA including Waste rock 1.28 M TPA and Beneficiation from 4.8 Million TPA to 7.3 Million TPA within ML Area of 3620 ha (ML No.03/89) at Village - Zawar, Tehsil: Girwa and Surada, District: Udaipur, Rajasthan by M/s Hindustan Zinc Ltd.

Thanking you,

For Hindustan Zinc Limited

Yours faithfully,

(Kishore Kumar S)

Director, Zawar SBU,

Hindustan Zinc Ltd  
Director Zawar SBU  
Hindustan Zinc Limited  
Zawar Mines  
Dist. Udaipur (Raj.)

Regd. Office: Yashad Bhawan, Udaipur (Rajasthan) - 313004  
Corporate Identity No. (CIN): L27204RJ1966PLC001208, Website: [www.hzindia.com](http://www.hzindia.com)

क.सं. 1	<p>प्रश्न</p> <p>प्रस्तावित विस्तार के लिए पर्यावरण प्रभाव आकलन करने से क्या कोई बाधा होगी? इस पर प्रस्तावित प्रस्तावित नकारात्मक परिणाम निकटतम ग्रामवासियों को झुगतने पड़ेंगे। इस परियोजना से लाभ कम और हानि अधिक है चाहे वो पर्यावरण के बारे में हो या सामाजिक। अतः समय समय पर समस्त विदुओं पर विचार करना अति आवश्यक हो गया है, जिस पर पूर्णतया आश्वस्त व अधोहस्ताक्षरता के हर विदु का तत्कालीन स्वीकृति लेने के पश्चात उच्च अधिकारियों की जवाबदेही तय कर समाधान होने के पश्चात ही लोक सुनवाई की कार्यवाही शुरू करें।</p>	<p>उत्तर</p> <p>प्रस्तावित परियोजना के लिए पर्यावरण प्रभाव आकलन एवं प्रबंधन योजना तैयार की गई है। रिपोर्ट के अनुसार प्रस्तावित विस्तार परियोजना का स्थानीय पर्यावरण पर न्यूनतम प्रभाव होगा एवं उचित पर्यावरण प्रबंधन, प्रौद्योगिकियों एवं उपकरणों के प्रभावी कार्यान्वयन के द्वारा नकारात्मक प्रभावों को काफी हद तक कम किया जाएगा। पर्यावरण के सभी घटकों की नियमित निगरानी की जाती है / की जाएगी।</p> <p>प्रस्तावित परियोजना में पर्यावरण प्रबंधन के लिए 120 करोड़ रु का प्रावधान किया है।</p>
2	<p>प्र. की उपरोक्त परियोजना की ड्राफ्ट ई.आई.ए. रिपोर्ट के अनुसार जो पूर्व पर्यावरण स्वीकृति (ई.सि.) की अनुपालना रिपोर्ट (E.C Compliance report) दिनांक 19.06.2020 को क्षेत्रीय अधिकारी महोदय द्वारा सर्टिफाइड की गई है, उसमें क्षेत्रीय अधिकारी महोदय द्वारा कुछ विदु लिखे गए थे जिसकी अनुपालना नहीं की गयी थी आज लगभग छठ वर्ष उपरांत क्या उन विदुओं की अनुपालना कर दी जा चुकी है, अगर हा तो संबंधित दस्तावेज भगवा कर सुनिश्चित करें और पार्थी को सूचित करें (मय दस्तावेज) अगर अगर नहीं तो इस लोक सुनवाई का कोई</p>	<p>क्षेत्रीय अधिकारी महोदय द्वारा मुझाये गए विदुओं को क्रियान्वित किया जा चुका है जिसकी रिपोर्ट 6 महीने रिपोर्ट के साथ सतर्क की गई है।</p>


Director Zonal BPA  
Ministry of P & W  
Zonal Office  
District Udaipur (Raj)  
Pin 313001

	<p>अवधि में नहीं रह जाता, बिना पूर्ण की पर्यावरण स्वीकृति की अनुपालना के कृषया लोका सुनवाई को प्रभावित करने की कृपा कर।</p>	
3	<p>यह की नियमानुसार प्रति वर्ष पर्यावरण स्वीकृति (इ.नि.) की दो अनुपालना रिपोर्ट जमा करवाई जाती है तो परियोजना प्रस्तावक से इस वर्ष की सटिफाइड अनुपालना रिपोर्ट मांगी जाये जिस से यह सशय दूर हो जायेगा की जिन बिंदुओं की अनुपालना नहीं की गयी थी वो हो चुकी है। यदि ऐसा अब तक भी नहीं हुआ है तो मानवीय जिला कलेक्टर महोदय को की अनुरोध के प्रतिनिधि के मा. सुनिश्चित करने के बाद ही लोक सुनवाई को शुरू कर।</p>	<p>नवीनतम ईसी की अनुपालना रिपोर्ट को एकीकृत क्षेत्रीय कार्यालय द्वारा सटिफाइड करवाया गया है जिसकी प्रति फाइनेल इआईए रिपोर्ट के साथ संलग्न की जायेगी।</p>
4	<p>यह की परियोजना प्रस्तावक से वर्ष 2016 से 2018 तक के प्रति माह के उत्पादन फिगर मांग कर सुनिश्चित कर की परियोजना प्रस्ताव द्वारा कर सुनिश्चित कर की परियोजना प्रस्ताव द्वारा पर्यावरण स्वीकृति में अंकित उत्पादन से अधिक का उत्पादन तो नहीं किया गया है। अगर हा तो पर्यावरण स्वीकृति हेतु लोक सुनवाई का निरस्त कर उपरोक्त प्रस्ताव को नियमानुसार उल्लंघन भेद में पर्यावरण स्वीकृति प्राप्त करने हेतु निर्देशित कर।</p>	<p>उत्पादन विवरण ईआईए रिपोर्ट के अध्याय -2 के पृष्ठ न. 78- 79 पर उल्लेखित है एवं डीएमजी (डिपार्टमेंट ऑफ माइनिंग एंड जिओलॉजी) द्वारा प्रमाणित उत्पादन विवरण ईआईए रिपोर्ट के एनक्शर-12 में संलग्न है।</p>
5	<p>यह की ड्राफ्ट रिपोर्ट में ये लिखा गया है की 50% रोजगार निकट गाम के लोगों को दिया जायेगा, भूजल आज तक परियोजना में लगे निकट गाम के लोगों की जानकारी प्राप्त की जाये (नाम, पता, तथा पद ) और माननीय कलेक्टर महोदय यह सुनिश्चित करे की 50% रोजगार निकट गाम के लोगों को दिया गया है और दिया जायेगा।</p>	<p>स्थानीय लोगों को रोजगार के क्षेत्र में हमेशा प्राथमिकता दी जाता है। वर्तमान में, 50% से अधिक कर्मचारी स्थानीय क्षेत्र से कार्यरत हैं।</p>
6	<p>यह की ड्राफ्ट रिपोर्ट में लगे संलग्नक के अनुसार परियोजना प्रस्तावक द्वारा भू-जल दोहन के लिए CGWA से अन.ओ.सि. प्राप्त की गयी थी जिनकी अवधि 10/12/16 से 10/12/19 तक थी। ड्राफ्ट रिपोर्ट में संकट नवीनीकरण के लिए एप्लीकेशन</p>	<p>सीजीडब्ल्यूए से प्राप्त नवीनतम एनओसी की प्रति संलग्न है।</p>


District Collector, District of Jharkhand




	<p>अभीष्ट की कृपा द्वारा अनाज आदि की वितरित (प्रथम प्राथमिकता को) संग्रह कर उनकी वैधता की जांच की जाये की कही उनके द्वारा बिना अनुमति के भू-जल दोहन तो नहीं किया गया है। यदि हा तो संबंधित विभाग को सूचित कर तथा कार्य को भी सूचित किया जाये।</p>	
7	<p>यह कि जिन कारखानों / भू मालिकों से परियोजना प्रस्तावक द्वारा जमीन खरीदी गयी थी, उनसे जे अनुबंध परियोजना प्रस्तावक द्वारा किया गया वह पूरा किया गया या नहीं। सुनिश्चित करने के बाद ही लोक सुनवाई शुरू की जाये।</p>	यह सुनिश्चित किया गया है।
8	<p>यह कि कृपा रिपोर्ट के अनुसार खनन भू जल को नष्ट करने पर परियोजना प्रस्तावक द्वारा कही गई संबंधित विभाग से प्राप्त अनुमति की प्रतिलिपि भंडारण या कृपा अनुमति की प्रतिलिपि भंडारण या कृपा कर प्राप्ति को सूचित करे।</p>	वी.पी.ए.ए.ए. से प्राप्त संबंधित अनुमति की प्रतिलिपि सत्यापन है।
9	<p>यह है कि ड्राफ्ट रिपोर्ट में अंकित Annexure नंबर 3/4 है वो नंबर ड्राफ्ट रिपोर्ट में कही भा अंकित नहीं है जिससे इनका मिलान संभव नहीं हो पा रहा है।</p>	रिपोर्ट में अनुलग्नकों का विवरण उपर्युक्त जगह पर दिया गया है तथा पूर्ण सूचि ईआईए रिपोर्ट के पृष्ठ न. xiv पर उपलब्ध है।
10	<p>यह कि फॉरेस्ट क्लीयरेंस में जो बिंदु दे रखे हैं उनकी अनुपालना रिपोर्ट कही भा ड्राफ्ट रिपोर्ट में सम्मिलित नहीं है। फॉरेस्ट क्लीयरेंस के बिंदु संख्या 10 में अनुसार, कृपा फॉरेस्ट क्लीयरेंस की सटीक अनुपालना रिपोर्ट प्राप्त किये बिना लोक सुनवाई शुरू की जाये।</p>	फॉरेस्ट क्लीयरेंस की अनुपालना रिपोर्ट संबंधित विभाग से नियोजित रूप से ली जा रही है।
11	<p>यह कि फॉरेस्ट क्लीयरेंस 23-01-2015 के बिंदु संख्या VI के अनुसार यह सुनिश्चित करे की Mined out area का concurrent reclamation हो रहा है या नहीं। यदि हो रहा है तो नय दस्तावेज प्राप्ति को सूचित करे और अगर नहीं हो रहा है तो Nodal Officer or Chief Conservator of Forest (Central)</p>	खनन गतिविधियाँ आइवीएण द्वारा अनुमोदित खनन योजना के अनुसार की जाती हैं।

  
 Director, SIBU  
 Hindustan Zinc Limited  
 Zaver Mines  
 District: Udaipur (Raj.)  
 313 001

	का सुनिश्चित कर खनन गतिविधियाँ निरविरत करवाए।	
12	फारेस्ट फ्लोयर्स 23-01-2015 के बिंदु संख्या XIV के अनुसार यूजर एजेंसी यह सुनिश्चित करे की CSR ACTIVITY के अंतर्गत कंपनी के एम्प्लॉयी और लैबरर्स की लाइव मापुस के बाहर एक किलोमीटर के एरिया में रहे रही है उनका 5 मीटर डिस्टेंस प्रतिवर्ष की में वितरित किया जाये, कुपण सुनिश्चित करे की वो दिए गए है या नहीं एम्प्लॉयी और लैबरर्स का नाम और जैस की एम्प्लॉयी करवा कर।	एग्जेंडेशन द्वारा स्थापित गैस एजेंसी कर्मचारियों को गैस सिलेंडर की सुविधा नियमानुसार प्रदान कर रही है।
13	उपरोक्त बिंदु के B संख्या बिंदु के अनुसार क्या कंपनी द्वारा एक किलोमीटर के एरिया के अन्दर सोलर पैंलर लाइट का इंस्टालेशन कर दिया गया, हुपया सुनिश्चित करे फोटोग्राफ्स भेज COORDINATES भेजवा कर।	पिछले 5 वर्षों में कंपनी ने आसपास के गांवों में 141 सोलर लाइटें लगाई।
14	उपरोक्त बिंदु के C संख्या बिंदु के अनुसार क्या पर्यावरण प्रस्तावक द्वारा बायो गैस प्लांट बना दिया गया है सुनिश्चित करे कोऑर्डिनेट्स भेज COORDINATES भेजवा कर।	हिंदुस्तान जैक सामाजिक विकास के लिए प्रतिबद्ध है तथा समुदायों के साथ मिलकर सब से संपर्क में रहता है । बायो-गैस प्लांट की स्थापना आवश्यकता निर्धारितिनिटी के अनुसार की जायेगी ।
15	उपरोक्त बिंदु के D संख्या बिंदु के अनुसार क्या पर्यावरण प्रस्तावक द्वारा 50 हेक्टेयर वन भूमि का संरक्षण किया गया है सुनिश्चित करे फोटोग्राफ्स भेज COORDINATES भेजवा कर।	वन विभाग के सहयोग से पिछले 5 वर्षों में आरडीएफ - 1 में 75 हेक्टेयर और आरडीएफ-द्वितीय में 150 हेक्टेयर में पुष्करोत्थन किया गया। इसके अलावा अगस्त 2020 में 50 लाख और मार्च 2021 में 50 लाख वन विभाग की जमा किए गए और बाद में वन विभाग द्वारा आरडीएफ -1 याजना में और आरडीएफ -2 याजना में वृक्षारोपण किया गया।
16	यह भी फारेस्ट फ्लोयर्स 23-01-2015 के बिंदु संख्या XVII के अनुसार वन विभाग की सहायता से यह सुनिश्चित करे की उस एरिया की फ्लोरा तथा फौसा का खनन गतिविधियाँ में किसी भी प्रकार की हानि या नुकसान हो नहीं हो रहा है।	प्रस्तावित परियोजना से मतभेद तथा कोलाहल वाले वाले प्रभाव न्यूनतम है एवं उचित पर्यावरण प्रबंधन प्रौद्योगिकियों एवं उपकरणों के प्रभावी कार्यन्वयन के द्वारा नकारात्मक प्रभावों को काफी कम कर कम किया जाएगा।

  
 Director Zila SBU  
 Hindustan Zinc Limited  
 Zila Mines  
 District: Udaipur (Raj.)  
 Pin: 345001

17	यह कि फॉरमट क्लीयरेंस 23-01-2015 के विद्यु संख्या XIX के अनुसार यह सुनिश्चित करें कि ले आउट में बिना केंद्र सरकार की अनुमति के किसी भी प्रकार का बदलाव तो नहीं किया गया है	इसकी अनुपालना की जा रही है।
18	यह कि सार्वजनिक महत्वपूर्ण बात की परियोजना परस्तावक द्वारा ToR (Term of Reference) के बिना ऑनलाइन एप्लीकेशन दिनांक 31.07.2021 को लगायी गयी थी (पोर्टल पर) और उसके द्वारा बसनेवाला स्टडी 1 जून 2021 से ही शुरू कर दि गयी थी। नियमानुसार स्टडी एप्लीकेशन जमा करवाने के बाद ही शुरू कर सकते हैं, और इस प्रकार से उनके द्वारा जमा करवाई गयी प्रोजेक्ट रिपोर्ट का कोई महत्व नहीं रह जाता और यह बात सुनवाई हो ही नहीं सकती, अतः परियोजना परस्तावक को निर्देशित कर जून बसनेवाला स्टडी करवाने के पश्चात ही लागू सुनवाई का आयोजन करें। यह देख कर ऐसा सोचित हो रहा है कि परियोजना परस्तावक द्वारा कुछ त्रुटि परस्तावक लगा बोर्ड सुनवाई करवाई जा रहा है और नियमों का पूर्ण उल्लंघन किया जा रहा है।	आधारभूत अध्ययन हैआईए अधिसूचना और उसके संशोधन के अनुसार किया गया है।

  
 Mr. Jagan Zaveri 8180  
 Jagan Zaveri Limited  
 Bhopal Branch  
 District: Udaipur (Raj.)  
 Pin: 315005

(भूजल निवारी सेतु अनापारी प्रमाण पत्र)  
**NO OBJECTION CERTIFICATE (NOC) FOR GROUND WATER ABSTRACTION**

Project Name	M/s Hindustan Zinc Ltd		
Project Address	Part Underground Mine		
Block	Jawa I	Block	Singoli
District	Udaipur	State	Rajasthan
Pin Code			
Formulation Address	Zawar Mine Site, Hindustan Zinc Limited, Sarda, Udaipur, Rajasthan - 313501		
Address of C.G.W.A. Regional Office	Central Ground Water Board Western Region, P.O., Dhalaria Dhone, Jaipur Rajasthan - 302004		

1. NOC No.	CGWA/NOC/MIN/REN/2.2021/6450						
2. Application No.	21.4.34 RJ-MIN/2019						
3. Category	Critical (GWR-002)						
4. Project Status	Existing Ground Water						
5. Valid from	11/12/2016						
6. Valid up to	12/12/2018						
7. Ground Water Abstraction Permitted							
Fresh Water		Saline Water		Declaration		Total	
m/day	m/year	m/day	m/year	m/day	m/year	m/day	m/year
0.00	0.00			100.00	36500.00		
8. Declaration regarding the abstraction of Groundwater resources							
Total Existing No. of				Total Proposed No. of			
	DW	DB	BN	DW	DB	BN	BN
Declaration Procedure	0	0	0	0	0	0	0
9. Declaration (DB/BN/BN) through DW/DB/BN							

(Compliance Conditions given overleaf)

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(भूजल निकासी हेतु अनापत्ति प्रमाण पत्र)  
**NO OBJECTION CERTIFICATE (NOC) FOR GROUND WATER ABSTRACTION**

Project Name	M/s Hindustan Zinc Limited		
Project Address	M/s Hindustan Zinc Limited		
Village	Jawad	Block	Saroda
District	Udaipur	State	Rajasthan
Pin Code			
Communication Address	Zawar Mine Sbu, Hindustan Zinc Limited, Admin. Block, Zawar Mines, Saroda Udaipur, Rajasthan - 313901		
Address of CGWB Regional Office	Central Ground Water Board Western Region, S-6, Jhalana Doongri, Jaipur, Rajasthan - 302004		

1. NOC No.:	CGWA/NOC/MIN/REN/2/2021/6449												
2. Application No.:	21-4/268/RJ/MIN/2019			3. Category:	Critical (G/A/R/2020)								
4. Project Status:	Existing Ground Water			5. NOC Type:	Renewal								
6. Valid from:	10/12/2019			7. Valid up to:	10/12/2021								
8. Ground Water Abstraction Permitted:													
Fresh Water		Saline Water		Dewatering		Total							
m <sup>3</sup> /day	m <sup>3</sup> /year	m <sup>3</sup> /day	m <sup>3</sup> /year	m <sup>3</sup> /day	m <sup>3</sup> /year	m <sup>3</sup> /day	m <sup>3</sup> /year						
0.00	0.00			108.00	38426.00								
9. Details of ground water abstraction /Dewatering structures													
Total Existing No.:1							Total Proposed No.:0						
	DW	DCB	BW	TW	MP*	MPu	DW	DCB	BW	TW	MP	MPu	
Dewatering Structure*	0	0	0	0	1	0	0	0	0	0	0	0	
*DW= Deep Well, DCB=Deepen Bore Well, BW= Bore Well, TW= Tube Well, MP= Mining Pit, MPu= Mining Pumps													
10. Ground Water Abstraction/Restoration Charges paid (Rs.)								47736.00					
11. Number of Piezometers (Observation wells) to be constructed/monitored & Monitoring mechanism.	No. of Piezometers							Monitoring Mechanism					
							Manual    DWLR**    DWLR With Telemetry						
**DWLR - Dewatering Water Level Recorder							1						

(Compliance Conditions given overleaf)

This certificate generated through CGWA portal to be signed

(भूजल निकासी हेतु अनापत्ति प्रमाण पत्र)

**NO OBJECTION CERTIFICATE (NOC) FOR GROUND WATER ABSTRACTION**

Project Name	M/s Hindustan Zinc Ltd.		
Project Address	M/s Hindustan Zinc Ltd., Salara Underground Mine		
Village	Jawa J	Block	Surada
District	Udaipur	State	Rajasthan
Pin Code			
Communication Address	Zawar Mine Sbu, Hindustan Zinc Limited, Admin. Block, Zawar Mines, Surada, Udaipur, Rajasthan - 313901		
Address of CGWA's Regional Office	Central Ground Water Board Western Region, B-a, Jhalana Dongri, Jaipur, Rajasthan - 302004		

- |  |                              |                 |            |
|--|------------------------------|-----------------|------------|
| 1. NOC No :                            | CGWA/NOC/MIN/REN/2/2021/6424 | 3. Category     | Critical   |
| 2. Applicant's No.                     | 21-4/Chauri/MIN/MPCE         | (GWRE 2020)     |            |
| 4. Project Status                      | Existing Ground Water        | 5. NOC Type     | Renewal    |
| 6. Valid from:                         | 11/12/2016                   | 7. Valid up to: | 10/12/2018 |
| 8. Ground Water Abstraction Permitted. |                              |                 |            |

Fresh Water		Saline Water		Dewatering		Total	
m³/day	m³/year	m³/day	m³/year	m³/day	m³/year	m³/day	m³/year
0.00	0.00	0.00	0.00	125.00	49215.00	125.00	49215.00

9. Details of ground water abstraction/Dewatering structures

	Total Existing No.:1						Total Proposed No.:0					
	DW	DCB	BW	TW	MP	MPu	DW	DCB	BW	TW	MP	MPu
Dewatering Structure*	0	0	0	0	1	0	0	0	0	0	0	0

\*DW-Dug Well, DCB-Dug-cum-Bore Well, BW-Bore Well, TW-Tube Well, MP-Mine Pumps, MPu-Mine Pumps

10. Ground Water Abstraction Restoration Charges paid (Rs.) 89670.00

11. Number of Piezometers (Observation wells) to be constructed/monitored & Monitoring mechanism

	No. of Piezometers	Monitoring Mechanism
DWLR - Deep Water Level Recorder	1	Manual - DWLR + DWLR With Telemetry

(Compliance Conditions given overleaf)

\*This is an auto generated document & need not to be signed

18/11, जयनगर हाउस, मानसिंह रोड, नई दिल्ली - 110011 / 18/11, Jannagar House, Mansingh Road, New Delhi-110011

Phone: (011) 23383561 Fax: 23382051, 23386743

Website: cgwa-noc.gov.in

CGWA, New Delhi

SAFETY & SECURITY



(भूजल विकास हेतु अनापत्ति प्रमाण पत्र)  
**NO OBJECTION CERTIFICATE (NOC) FOR GROUND WATER ABSTRACTION**

CENTRAL GROUND WATER BOARD			
Project Name	M/s Hindustan Zinc Ltd		
Project Address	Mochia Underground Mine		
Village	Jawal	Block	Sarada
District	Udaipur	State	Rajasthan
Pin Code			
Communication Address	Zawal Mine Site, Hindustan Zinc Limited, Sarada, Udaipur, Rajasthan - 313001		
Address of CGWB Regional Office	Central Ground Water Board Western Region, c/o. Jhalana Dongri, Jaipur, Rajasthan - 302004		

1. NOC No.:	CGWA/NOC/MIN/REN/2/2021/0423											
2. Application No.:	21-4/55/IRJ/MIN/2005			3. Category:	Critical							
				4. (GWRE 2020)								
4. Project Status:	Existing Ground Water			5. NOC Type:	Renewal							
6. Valid from:	10/12/2016			7. Valid up to:	10/12/2018							
8. Ground Water Abstraction Permitted:												
Fresh Water		Saline Water		Dewatering		Total						
m <sup>3</sup> /day	m <sup>3</sup> /year	m <sup>3</sup> /day	m <sup>3</sup> /year	m <sup>3</sup> /day	m <sup>3</sup> /year	m <sup>3</sup> /day	m <sup>3</sup> /year					
0.00	0.00			235.00	85775.00							
9. Details of ground water abstraction /Dewatering structures												
Total Existing No.:1							Total Proposed No.:0					
	DW	DCB	BW	TW	MP	MPu	DW	DCB	BW	TW	MP	MPu
Abstraction Structures*	0	0	0	0	0	0	0	0	0	0	0	0
10. Pump Well (DCB/DCB/Well/Well) / MW-Bore Well / TWT-Tube Well / MP / u. Pump/Well / Pump												
10. Ground Water Abstraction/Restoration Charges paid (Rs.)	129837.50											
11. Number of Piezometers (Observation wells) to be constructed, monitored & monitoring mechanism	No. of Piezometers Monitoring Mechanism											
	Manual						DWLR** DWLR With Telemetry					
**DWLR - Digital Water Level Recorder	1						0					

(Compliance Conditions given overleaf)

This is an auto generated document & need not to be signed.

दिनांक  
17/12/2021

①

17/12

श्रीमान क्षेत्रीय अधिकारी

राजस्थान राज्य प्रदूषण नियंत्रण मण्डल

एफ-470 मेवाड़ उर्ध्वसिद्ध क्षेत्र माहडी उदयपुर (राज)

विषय : हिन्दुस्तान जिंक लि जावर ग्रुप को पर्यावरण  
स्वीकृति नहीं देने कारण,

महोदय जी

उपरोक्त विषय में निवेदन है कि पंचायत समिति

गिरा की ग्राम पंचायत जावर, गांव. टीडी, ग्राम प. अम्बर  
गांव. चणावड़ा व पंचायत समिति सराडा (अपसमन्) के

गांव. आलाड़िया, गांव. मेवातलाई, गांव. सिवतवाड़ा, गांव. पा

गांव. आडा आदि ग्राम पंचायत M.Z.C के आस-पास

पंचायत है। M.Z.C जावर मार्केट द्वारा अंडरग्राउंड लेड जि

मार्केट का विस्तार 4.8 मि. रन प्रतिवर्ष 6.5 मि. रन प्रतिवर्ष कर

हे तो आस-पास के पंचायतों में वातावरण प्रदूषण होने

की ओर ऊपरी वातावरण दूषित होगा।

वर्तमान में आस-पास की पंचायतों में जिंक के माध्यम  
से निम्न समस्याएँ उत्पन्न हो रही हैं।

### 1. टेलिंग बाँध से उत्पन्न समस्याएँ

① टेलिंग बाँध के जहरीले पानी से पेयजल बोरिंग,  
कुएँ नदी इत्यादी का पानी बराब हो रहा है।

② टेलिंग बाँध में उठने वाले मीठी से लोग बीमार हो  
रहे हैं।

③ टेलिंग बाँध से कृषि भूमि बंजर हो रही है।

④ टेलिंग बाँध का पानी नदी नालों में आने से लोगों  
को चर्म रोग व गम्भीर बीमारी हो रही है।

लेगि बांध विस्तार से लोगों के गाँव में जाने के रास्ते बन रहे हैं।

- (f) लेगि बांध से - मवेशी जहरीला पानी पीने से मर रही है। एवं लेगि में आये दिन मवेशी धा रही है।

### माइनिंग से होने वाले नुकसान

1. माइनिंग प्लांट से मकानों में हारे आ गई हैं।

- (a) माइनिंग प्लांट से कुएँ, बोरिंग, आदि का जल स्वच्छ सुब जाता है। जिससे किसान को अपनी फसल करने में कठिनाई का सामना करना पड़ता है।

(b) माइनिंग प्लांटों के आस-पास लगे पंखे से दूधती छड़बल हो रहा है।

(c) माइनिंग से होने वाले प्लांट में जंगली जानवर कम्पेन होने से आसानी से आगये हैं जिससे जंगली जानवरों का शिकार कर रहे हैं।

(d) माइनिंग से अपने माल - परिवहन होने से ग्राहक मजदूरी होती होने से इच्छाएं हो रही हैं।

श्रीमान से विवेक है कि सिमन वाले को ६५ में रखने हुए हिन्दुस्तान जिंक लि. लापरवाह को पर्याप्त स्वीकृति नहीं देने की हूपा करें

साथ ही जाकर माइनिंग द्वारा संचालित 100 मेघा वाट व पावर प्लांट द्वारा भी ग्राम पंचायत नेवाल्गढ़ में निम्न समाचारों का सामना आस-पास के ग्रामों के

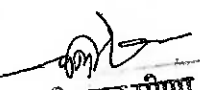
③  
 1. Power plant से उत्पन्न शेर गुल से दूधनी  
 इच्छा हो रहा है जिस से स्कूल में पढ़ने वाले  
 विद्यार्थियों के कपड़े उभाड़ित हो रहे हैं।

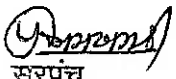
2. Power plant के कोयले के स्टोर्क से बारीक  
 कोयले के उड़ने से आम-पान के गाँव में जाने से  
 जनजीवन प्रभावित हो रहा है।

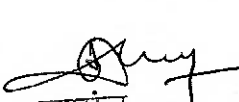
3. Power plant से उत्पन्न धुँए से आम-पान के  
 गाँव में लोग को श्वास सम्बन्धित बीमारीय हो  
 रही है।

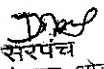
4. Power plant से उड़ने वाले सीमेंट के धुँए से आम-पान  
 के कुएँ नदी बालों में बारीक कणों से पीने का पान  
 भी प्रभावित हो रहा है।


श्रीमान से निवेदन है कि वन सब विभागों  
 को दफ्तर में रखते हुए H-2-C को पर्यावरण प्रदूषण  
 प्रदान नहीं करावे।

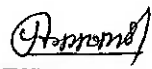
  
 चुन्नीलाल मिश्रा  
 सरपंच  
 ग्राम पंचायत-बनावदा  
 पं.स. गिरवा, जिला-उदयपुर (राज.)

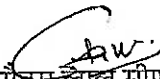
  
 सरपंच  
 ग्राम पंचायत-जावर  
 पं.स. गिरवा, जिला-उदयपुर (राज.)

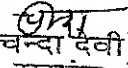
  
 सरपंच  
 ग्राम पंचायत-टीडी  
 पं.स. गिरवा (उदयपुर)


  
 सरपंच  
 ग्राम पंचायत-ओझा  
 पं.स. जयसमन्द, जिला-उदयपुर (राज.)

  
 अध्यक्ष  
 सरपंच संघ ब्लॉक  
 पं.स. जयसमन्द, जिला-उदयपुर (राज.)

  
 अध्यक्ष  
 सरपंच संघ ब्लॉक  
 पं.स. गिरवा, जिला-उदयपुर (राज.)

  
 गौतम लाल मिश्रा  
 सरपंच  
 ग्राम पंचायत-सिंचटवाड़ा  
 पं.स. जयसमन्द, जिला-उदयपुर

  
 (चन्द्रा देवी)  
 सरपंच  
 ग्राम पंचायत-पाडला  
 पं.स. जयसमन्द, जिला-उदयपुर (राज.)

  
 सरपंच  
 ग्राम पंचायत-माली  
 पं.स. जयसमन्द (उदयपुर)

	नाम	मच	पे-चायत
	केशव मीना	756856358	नेवातलाई
	कनका लाल	4450412558	दीदी
	३१ राम कुमार मीना	3680357572	पाइला
5	पुर्वी लखन धुर्वेसिन्य	9413611161	भासिडिमा
6	इवेश कुमारी मीना	3929027180	भोडा
7	गोत्रम लाल मीना	9001006780	सिधेवाडा
8	प्रकाश चंद मीना	9950968917	जावर
9	पुन्नीलाल मीना	3928623558	चठानाडा

22.12.2021 को मेसर्स हिंदुस्तान जिंक लिमिटेड द्वारा प्रस्तावित परियोजना जावर ग्रुप अंडर ग्राउंड लेड जिंक माइंस का विस्तार 4.8 मिलियन टन प्रतिवर्ष से 6.5 मिलियन टन प्रतिवर्ष अयस्क उत्पादन, कुल उत्खनन : 7.78 मिलियन टन प्रतिवर्ष (सम्मिलित वेस्ट रॉक 1.28 मिलियन टन प्रतिवर्ष) और अयस्क सज्जीकरण (बेनिफिसियन) 4.8 मिलियन टन प्रतिवर्ष से 7.3 मिलियन टन प्रतिवर्ष, खनन पट्टा {क्षेत्र 3620 हेक्टेयर (एम एल नंबर

1 message

Advocate Mohammed Arif <adv.arifenviro@gmail.com>  
To: rorpcbudaipur@gmail.com

Wed, Dec 8, 2021 at 11:07 AM

सेवा में,

श्रीमान क्षेत्रीय अधिकारी महोदय

राजस्थान राज्य प्रदूषण नियंत्रण मंडल

उदयपुर (राजस्थान),

विषय - दिनांक 22.12.2021 को मेसर्स हिंदुस्तान जिंक लिमिटेड द्वारा प्रस्तावित परियोजना जावर ग्रुप अंडर ग्राउंड लेड जिंक माइंस का विस्तार 4.8 मिलियन टन प्रतिवर्ष से 6.5 मिलियन टन प्रतिवर्ष अयस्क उत्पादन, कुल उत्खनन : 7.78 मिलियन टन प्रतिवर्ष (सम्मिलित वेस्ट रॉक 1.28 मिलियन टन प्रतिवर्ष) और अयस्क सज्जीकरण (बेनिफिसियन) 4.8 मिलियन टन प्रतिवर्ष से 7.3 मिलियन टन प्रतिवर्ष, खनन पट्टा क्षेत्र 3620 हेक्टेयर (एम एल नंबर 03/89) ग्राम जावर, तहसील- गिरवा एवं सराडा, जिला उदयपुर हेतु पर्यावरण स्वीकृति के लिए लोक सुनवाई पर आपत्तियां/ सुझाव प्रस्तुत करने बाबत ।

उपरोक्त विषय में लेख है की श्रीमान क्षेत्रीय अधिकारी महोदय द्वारा 21.11.2021 को राजस्थान पत्रिका में प्रकाशित सूचना के अंतर्गत उपरोक्त परियोजना के लिए लिखित सुझाव / आपत्तियां मांगी गयी थी जो की निम्न है :-

1. प्रथमतः यह है की खान के माध्यम से खनन करने से क्षेत्र का जो दोहन हो रहा है, इसके दूरगामी नकारात्मक परिणाम निकटतम ग्रामवासियों को भुगतने पड़ेंगे। इस परियोजना से लाभ कम और हानि अधिक है चाहे वो पर्यावरण के बारे में हो या सामाजिक। अतः सोच समझ कर समस्त बिंदुओं पर विचार करना अति आवश्यक हो गया है, जिस पर पूर्णतया आश्वस्त व अधोहस्ताक्षरकर्ता के हर बिंदु का तथ्यात्मक स्पष्टीकरण लेने के पश्चात उच्च अधिकारियों की जवाबदेही तय कर समाधान होने के पश्चात ही लोक सुनवाई की कार्यवाही शुरू करें ।
2. यह की उपरोक्त परियोजना की ड्राफ्ट ई.आई.ए. रिपोर्ट के अनुसार जो पूर्व पर्यावरण स्वीकृति (ई.सि.) की अनुपालना रिपोर्ट (E.C Compliance report) दिनांक 19.06.2020 को क्षेत्रीय अधिकारी महोदय द्वारा सर्टिफाइड की गई है, उसमें क्षेत्रीय अधिकारी महोदय द्वारा कुछ बिंदु लिखे गए थे जिनकी अनुपालना नहीं की गयी थी, आज लगभग डेढ़ वर्ष उपरांत क्या उन बिंदुओं की अनुपालना कर दी जा चुकी है, अगर हा तो संबंधित दस्तावेज मंगवा कर सुनिश्चित करें और प्रार्थी को सूचित करें (मय दस्तावेज) और अगर नहीं तो इस लोक सुनवाई का कोई औचित्य ही नहीं रह जाता, बिना पूर्व की पर्यावरण स्वीकृति की अनुपालना के कृपया लोक सुनवाई को स्थगित करने की कृपा करें।
3. यह की नियमानुसार प्रति वर्ष पर्यावरण स्वीकृति (ई.सि.) की दो अनुपालना रिपोर्ट जमा करवाई जाती है तो परियोजना प्रस्तावक से इस वर्ष की सर्टिफाइड अनुपालना रिपोर्ट मांगी जाये, जिस से यह संशय दूर हो जायेगा की जिन बिंदुओं की अनुपालना नहीं की गयी थी वो हो चुकी है । यदि ऐसा अब तक भी नहीं हुआ है तो माननीय जिला कलेक्टर महोदय जो की जनता के प्रतिनिधि हैं यह सुनिश्चित करने के बाद ही लोक सुनवाई को शुरू करें ।
4. यह की परियोजना प्रस्तावक से वर्ष 2016 से 2018 तक के प्रति माह के उत्पादन फिगर मांग कर सुनिश्चित करें की परियोजना प्रस्ताव द्वारा पर्यावरण स्वीकृति में अंकित उत्पादन से अधिक का उत्पादन तो नहीं किया गया है, अगर हा तो पर्यावरण स्वीकृति हेतु लोक सुनवाई को निरस्त कर उपरोक्त प्रस्ताव को नियमानुसार उल्लंघन केस में पर्यावरण स्वीकृति प्राप्त करने हेतु निर्देशित करें।
5. यह की ड्राफ्ट रिपोर्ट में ये लिखा गया है की 50% रोजगार निकट ग्राम के लोगों को दिया जायेगा, कृपया आज तक परियोजना में लगे निकट ग्राम के लोगों की जानकारी प्राप्त की जाये (नाम, पता, तथा पद ) और



माननीय कलेक्टर महोदय यह सुनिश्चित करे की 50% रोजगार निकट ग्राम के लोगों को दिया गया जायेगा।

6. यह की ड्राफ्ट रिपोर्ट में लगे संलग्नक के अनुसार परियोजना प्रस्तावक द्वारा भू-जल दोहन के लिए अन.ओ.सि. प्राप्त की गयी थी जिनकी वैधता 10/12/16 से 10/12/19 तक थी, ड्राफ्ट रिपोर्ट में नवीनीकरण के लिए एप्लीकेशन लगी हुई है, कृपया चारो अन.ओ.सि. की प्रतिलिपि (प्रथम नवीनीकरण) मंगवा कर उनकी वैधता की जाँच की जाये की कही उनके द्वारा बिना अनुमति के भू-जल दोहन तो नहीं किया गया है, यदि हा तो संबंधित विभाग को सूचित करे तथा प्रार्थी को भी सूचित किया जाये।

7. यह की जिन कास्तकारो / भू मालिको से परियोजना प्रस्तावक द्वारा जमीन खरीदी गयी थी, उनसे जो अनुबंध परियोजना प्रस्तावक द्वारा किया गया वह पूरा किया गया या नहीं। सुनिश्चित करने के बाद ही लोक सुनवाई शुरू की जाये।

8. यह की ड्राफ्ट रिपोर्ट के अनुसार खनन भू जल को प्रतिछेदित करेगा, परियोजना प्रस्तावक द्वारा कही भी संबंधित विभाग से प्राप्त अनुमति की प्रतिलिपि नहीं लगा रखी है, कृपया अनुमति की प्रतिलिपि मंगवाने का कृपा कर प्रार्थी को सूचित करे।

9. यह है की ड्राफ्ट रिपोर्ट में अंकित Annexure नंबर दे रखे हैं वो नंबर ड्राफ्ट रिपोर्ट में कही भी अंकित नहीं है, जिससे इनका मिलान संभव नहीं हो पा रहा है।

10. यह की फारेस्ट क्लीयरेंस में जो बिंदु दे रखे हैं उनकी अनुपालना रिपोर्ट कही भी ड्राफ्ट रिपोर्ट में संलग्न नहीं है (फारेस्ट क्लीयरेंस के बिंदु संख्या - xxiii के अनुसार), कृपया फारेस्ट क्लीयरेंस की सर्टिफाइड अनुपालना रिपोर्ट प्राप्त किये बिना लोक सुनवाई शुरू न की जाये।

11. यह की फारेस्ट क्लीयरेंस 23-01-2015 के बिंदु संख्या VI के अनुसार यह सुनिश्चित करे की Mined out area का concurrent reclamation हा रहा है या नहीं। यदि हो रहा है तो मय दस्तावेज प्रार्थी को सूचित करे और अगर नहीं हो रहा है तो Nodal Officer or Chief Conservator of Forest (Central) को सूचित कर खनन गतिविधिया निलंबित करवाए।

12. फारेस्ट क्लीयरेंस 23-01-2015 के बिंदु संख्या XIV के अनुसार यूजर एजेंसी यह सुनिश्चित करे की CSR ACTIVITY के अंतर्गत कंपनी के एम्प्लोयी और लेबर जो की जावर माइंस के बाहर एक किलोमीटर के एरिया में रह रही है उनको 9 गेस सिलिंडर प्रतिवर्ष फ्री में वितरित किये जाये, कृपया सुनिश्चित करे की वो दिए गए हैं या नहीं (एम्प्लोयी और लेबर का नाम और गेस की डायरी मंगवा कर)।

13. उपरोक्त बिंदु के B नंबर बिंदु के अनुसार क्या कंपनी द्वारा एक किलोमीटर के एरिया के अन्दर सोलर पॉवर लाइट का इंस्टालेशन कर दिया गया, कृपया सुनिश्चित करे फोटोग्राफ्स मय COORDINATES मंगवा कर।

14. उपरोक्त बिंदु के C नंबर बिंदु के अनुसार क्या परियोजना प्रस्तावक द्वारा बायो गेस प्लांट लगा दिया गया है सुनिश्चित करे फोटोग्राफ्स मय COORDINATES मंगवा कर।

15. उपरोक्त बिंदु के D नंबर बिंदु के अनुसार क्या परियोजना प्रस्तावक द्वारा 50 हेक्टेयर /वर्ष भूमि पर प्लांटेशन किया गया है सुनिश्चित करे फोटोग्राफ्स मय COORDINATES मंगवा कर।

16. यह की फारेस्ट क्लीयरेंस 23-01-2015 के बिंदु संख्या XVII के अनुसार वन विभाग की सहायता से यह सुनिश्चित करे की उस एरिया की फ्लोरा तथा फोना को खनन गतिविधिया से किसी भी प्रकार की हानि या नुकसान तो नहीं हो रहा है।

17. यह की फारेस्ट क्लीयरेंस 23-01-2015 के बिंदु संख्या XIX के अनुसार यह सुनिश्चित करे की ले आउट में बिना केंद्र सरकार की अनुमति के किसी भी प्रकार का बदलाव तो नहीं किया गया है

18. यह की सबसे महत्वपूर्ण बात की परियोजना प्रस्तावक द्वारा ToR (Term of Reference) के लिए ऑनलाइन एप्लीकेशन दिनांक 31.07.2021 को लगायी गयी थी (पोर्टल पर) और उनके द्वारा बेसलाइन स्टडी 1 मार्च 2021 से ही शुरू कर दि गयी थी। नियमानुसार स्टडी एप्लीकेशन जमा करवाने के बाद ही शुरू कर सकते हैं, और इस प्रकार से उनके द्वारा जमा करवाई गयी ड्राफ्ट रिपोर्ट का कोई महत्व नहीं रह जाता और यह लोक सुनवाई हो ही नहीं सकती, अतः परियोजना प्रस्तावक को निर्देशित कर पुनः बेसलाइन स्टडी करवाने के पश्चात ही लोक सुनवाई का आयोजन करे। यह देख कर ऐसा प्रतीत हो रहा है की परियोजना प्रस्तावक द्वारा कूट रचित दस्तावेज लगा लोक सुनवाई करवाई जा रही है और नियमों का खुला उल्लंघन किया जा रहा है।

अतः माननीय से निवेदन /आशा है की लोक सुनवाई शुरू करने से पूर्व अधोहस्ताक्षरकर्ता के सभी संबंधित बिन्दुओ परियोजना प्रस्तावक द्वारा व संबंधित विभाग द्वारा बिंदुवार तथ्यात्मक स्पष्टीकरण लेने के पश्चात ही लोक सुनवाई की कार्यवाही शुरू की जाये। जिसकी प्रार्थी प्रशासन से अपेक्षा रखता है, की इस सम्बन्ध में सभी पहलुओं पर विचार कर स्पष्टीकरण की एक प्रति अधोहस्ताक्षरकर्ता को प्रदान की जाएगी। साथ ही स्पष्ट किया जाता है की इस पत्र पर बिन्दुवार स्पष्टीकरण नहीं देने पर व इस पत्र को औपचारिक मानकर जवाबदेही तय ना कर एक तरफा निर्णय लेने पर प्रार्थी न्यायालय में जाने व हरित प्राधिकरण में शिकायत दर्ज करने के लिए स्वतंत्र रहेगा, जिसकी पूर्ण जवाबदेही आप सक्षम अधिकारी की रहेगी।

पत्र की प्रतिलिपि संलग्न

विनीत

डॉ मुहम्मद आरिफ (अधिवक्ता)

कटला मस्जिद के पास

केकड़ी (अजमेर)- 305404

ROS/NECS  
Received in  
maincom  
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C.V.  
8/12

सेवा में,

श्रीमान क्षेत्रीय अधिकारी महोदय

राजस्थान राज्य प्रदूषण नियंत्रण मंडल

उदयपुर (राजस्थान)

विषय - दिनांक 22.12.2021 को मेसर्स हिंदुस्तान जिंक लिमिटेड द्वारा प्रस्तावित परियोजना जावर ग्रुप ऑफ़ अंडर ग्राउंड लेड जिंक माइंस का विस्तार 4.8 मिलियन टन प्रतिवर्ष से 6.5 मिलियन टन प्रतिवर्ष अयस्क उत्पादन, कुल उत्खनन : 7.78 मिलियन टन प्रतिवर्ष (सम्मिलित वेस्ट रॉक 1.28 मिलियन टन प्रतिवर्ष) और अयस्क सज्जीकरण (बेनिफिसियन) 4.8 मिलियन टन प्रतिवर्ष से 7.3 मिलियन टन प्रतिवर्ष, खनन पट्टा क्षेत्र 3620 हेक्टेयर (एम एल नंबर 03/89) ग्राम जावर, तहसील- गिरवा एवं सराडा, जिला उदयपुर हेतु पर्यावरण स्वीकृति के लिए लोक सुनवाई पर आपत्तियां/ सुझाव प्रस्तुत करने बाबत ।

उपरोक्त विषय में लेख है की श्रीमान क्षेत्रीय अधिकारी महोदय द्वारा 21.11.2021 को राजस्थान पत्रिका में प्रकाशित सूचना के अंतर्गत उपरोक्त परियोजना के लिए लिखित सुझाव / आपत्तियां मांगी गयी थी जो की निम्न है :-

1. प्रथमतः यह है की खान के माध्यम से खनन करने से क्षेत्र का जो दोहन हो रहा है, इसके दूरगामी नकारात्मक परिणाम निकटतम ग्रामवासियों को भुगतने पड़ेंगे। इस परियोजना से लाभ कम और हानि अधिक है चाहे वो पर्यावरण के बारे में हो या सामाजिक। अतः सोच समझ कर समस्त बिंदुओं पर विचार करना अति आवश्यक हो गया है, जिस पर पूर्णतया आश्वस्त व अधोहस्ताक्षरकर्ता के हर बिंदु का तथ्यात्मक स्पष्टीकरण लेने के पश्चात उच्च अधिकारियों की जवाबदेही तय कर समाधान होने के पश्चात ही लोक सुनवाई की कार्यवाही शुरू करें ।
2. यह की उपरोक्त परियोजना की ड्राफ्ट ई.आई.ए. रिपोर्ट के अनुसार जो पूर्व पर्यावरण स्वीकृति (ई.सि.) की अनुपालना रिपोर्ट (E.C Compliance report) दिनांक 19.06.2020 को क्षेत्रीय अधिकारी महोदय द्वारा सर्टिफाइड की गई है, उसमें क्षेत्रीय अधिकारी महोदय द्वारा कुछ बिंदु लिखे गए थे जिनकी अनुपालना नहीं की गयी थी, आज लगभग डेढ़ वर्ष उपरांत क्या उन बिंदुओं की अनुपालना कर दी जा चुकी है, अगर हा तो संबंधित दस्तावेज मंगवा कर सुनिश्चित करें और प्रार्थी को सूचित करें (मय दस्तावेज) और अगर नहीं तो इस लोक सुनवाई का कोई औचित्य ही नहीं रह जाता, बिना पूर्व की पर्यावरण स्वीकृति की अनुपालना के कृपया लोक सुनवाई को स्थगित करने की कृपा करें।
3. यह की नियमानुसार प्रति वर्ष पर्यावरण स्वीकृति (ई.सि.) की दो अनुपालना रिपोर्ट जमा करवाई जाती है तो परियोजना प्रस्तावक से इस वर्ष की सर्टिफाइड अनुपालना रिपोर्ट मांगी जाये, जिस से यह संशय दूर हो जायेगा की जिन बिंदुओं की अनुपालना नहीं की गयी थी वो हो चुकी है । यदि

ऐसा अब तक भी नहीं हुआ है तो माननीय जिला कलेक्टर महोदय जो की जनता के प्रतिनिधि है यह सुनिश्चित करने के बाद ही लोक सुनवाई को शुरू करे।

4. यह की परियोजना प्रस्तावक से वर्ष 2016 से 2018 तक के प्रति माह के उत्पादन फिगर मांग कर सुनिश्चित करे की परियोजना प्रस्ताव द्वारा पर्यावरण स्वीकृति में अंकित उत्पादन से अधिक का उत्पादन तो नहीं किया गया है, अगर हा तो पर्यावरण स्वीकृति हेतु लोक सुनवाई को निरस्त कर उपरोक्त प्रस्ताव को नियमानुसार उल्लंघन केस में पर्यावरण स्वीकृति प्राप्त करने हेतु निर्देशित करे।
5. यह की ड्राफ्ट रिपोर्ट में ये लिखा गया है की 50% रोजगार निकट ग्राम के लोगो को दिया जायेगा, कृपया आज तक परियोजना में लगे निकट ग्राम के लोगो की जानकारी प्राप्त की जाये (नाम, पता, तथा पद ) और माननीय कलेक्टर महोदय यह सुनिश्चित करे की 50% रोजगार निकट ग्राम के लोगो को दिया गया है और दिया जायेगा।
6. यह की ड्राफ्ट रिपोर्ट में लगे संलग्नक के अनुसार परियोजना प्रस्तावक द्वारा भू-जल दोहन के लिए CGWA से अन.ओ.सि. प्राप्त की गयी थी जिनकी वैधता 10/12/16 से 10/12/19 तक थी, ड्राफ्ट रिपोर्ट में सेकंड नवीनीकरण के लिए एप्लीकेशन लगी हुई है, कृपया चारो अन.ओ.सि. की प्रतिलिपि (प्रथम नवीनीकरण की) मंगवा कर उनकी वैधता की जाँच की जाये की कही उनके द्वारा बिना अनुमति के भू-जल दोहन तो नहीं किया गया है, यदि हा तो संबंधित विभाग को सूचित करे तथा प्रार्थी को भी सूचित किया जाये।
7. यह की जिन कास्तकारो / भू मालिको से परियोजना प्रस्तावक द्वारा जमीन खरीदी गयी थी, उनसे जो अनुबंध परियोजना प्रस्तावक द्वारा किया गया वह पूरा किया गया या नहीं। सुनिश्चित करने के बाद ही लोक सुनवाई शुरू की जाये।
8. यह की ड्राफ्ट रिपोर्ट के अनुसार खनन भू जल को प्रतिछेदित करेगा, परियोजना प्रस्तावक द्वारा कही भी संबंधित विभाग से प्राप्त अनुमति की प्रतिलिपि नहीं लगा रखी है, कृपया अनुमति की प्रतिलिपि मंगवाने का कृपा कर प्रार्थी को सूचित करे।
9. यह है की ड्राफ्ट रिपोर्ट में अंकित Annexure नंबर दे रखे है वो नंबर ड्राफ्ट रिपोर्ट में कही भी अंकित नहीं है, जिससे इनका मिलान संभव नहीं हो पा रहा है।
10. यह की फारेस्ट क्लीयरेंस में जो बिंदु दे रखे है उनकी अनुपालना रिपोर्ट कही भी ड्राफ्ट रिपोर्ट में संलग्न नहीं है (फारेस्ट क्लीयरेंस के बिंदु संख्या - xxiii के अनुसार), कृपया फारेस्ट क्लीयरेंस की सर्टिफाइड अनुपालना रिपोर्ट प्राप्त किये बिना लोक सुनवाई शुरू न की जाये।
11. यह की फारेस्ट क्लीयरेंस 23-01-2015 के बिंदु संख्या VI के अनुसार यह सुनिश्चित करे की Mined out area का concurrent reclamation हा रहा है या नहीं। यदि हो रहा है तो मय दस्तावेज प्रार्थी को सूचित करे और अगर नहीं हो रहा है तो Nodal Officer or Chief Conservator of Forest (Central) को सूचित कर खनन गतिविधिया निलंबित करवाए।
12. फारेस्ट क्लीयरेंस 23-01-2015 के बिंदु संख्या XIV के अनुसार यूजर एजेंसी यह सुनिश्चित करे की CSR ACTIVITY के अंतर्गत कंपनी के एम्प्लोयी और लेबर जो की जावर माइंस के बाहर एक किलोमीटर के एरिया में रह रही है उनको 9 गेस सिलिंडर प्रतिवर्ष फ्री में वितरित किये जाये,

कृपया सुनिश्चित करे की वो दिए गए हैं या नहीं (एम्प्लोयी और लेबर का नाम और गेस की डायरी मंगवा कर)।

13. उपरोक्त बिंदु के B नंबर बिंदु के अनुसार क्या कंपनी द्वारा एक किलोमीटर के एरिया के अन्दर सोलर पॉवर लाइट का इंस्टालेशन कर दिया गया, कृपया सुनिश्चित करे फोटोग्राफ्स मय COORDINATES मंगवा कर।
14. उपरोक्त बिंदु के C नंबर बिंदु के अनुसार क्या परियोजना प्रस्तावक द्वारा बायो गेस प्लांट लगा दिया गया है सुनिश्चित करे फोटोग्राफ्स मय COORDINATES मंगवा कर।
15. उपरोक्त बिंदु के D नंबर बिंदु के अनुसार क्या परियोजना प्रस्तावक द्वारा 50 हेक्टेयर /वर्ष भूमि पर प्लांटेशन किया गया है सुनिश्चित करे फोटोग्राफ्स मय COORDINATES मंगवा कर।
16. यह की फारेस्ट क्लीयरेंस 23-01-2015 के बिंदु संख्या XVII के अनुसार वन विभाग की सहायता से यह सुनिश्चित करे की उस एरिया की फ्लोरा तथा फोना को खनन गतिविधिया से किसी भी प्रकार की हानि या नुकसान तो नहीं हो रहा है।
17. यह की फारेस्ट क्लीयरेंस 23-01-2015 के बिंदु संख्या XIX के अनुसार यह सुनिश्चित करे की ले आउट में बिना केंद्र सरकार की अनुमति के किसी भी प्रकार का बदलाव तो नहीं किया गया है
18. यह की सबसे महत्वपूर्ण बात की परियोजना प्रस्तावक द्वारा ToR (Term of Reference) के लिए ऑनलाइन एप्लीकेशन दिनांक 31.07.2021 को लगायी गयी थी (पोर्टल पर) और उनके द्वारा बेसलाइन स्टडी 1 मार्च 2021 से ही शुरू कर दि गयी थी । नियमानुसार स्टडी एप्लीकेशन जमा करवाने के बाद ही शुरू कर सकते हैं, और इस प्रकार से उनके द्वारा जमा करवाई गयी ड्राफ्ट रिपोर्ट का कोई महत्व नहीं रह जाता और यह लोक सुनवाई हो ही नहीं सकती, अतः परियोजना प्रस्तावक को निर्देशित कर पुनः बेसलाइन स्टडी करवाने के पश्चात ही लोक सुनवाई का आयोजन करे। यह देख कर ऐसा प्रतीत हो रहा है की परियोजना प्रस्तावक द्वारा कूट रचित दस्तावेज लगा लोक सुनवाई करवाई जा रही है और नियमों का खुला उल्लंघन किया जा रहा है ।

अतः माननीय से निवेदन /आशा है की लोक सुनवाई शुरू करने से पूर्व अधोहस्ताक्षरकर्ता के सभी संबंधित बिन्दुओं परियोजना प्रस्तावक द्वारा व संबंधित विभाग द्वारा बिंदुवार तथ्यात्मक स्पष्टीकरण लेने के पश्चात ही लोक सुनवाई की कार्यवाही शुरू की जाये। जिसकी प्रार्थी प्रशासन से अपेक्षा रखता है, की इस सम्बन्ध में सभी पहलुओं पर विचार कर स्पष्टीकरण की एक प्रति अधोहस्ताक्षरकर्ता को प्रदान की जाएगी। साथ ही स्पष्ट किया जाता है की इस पत्र पर बिन्दुवार स्पष्टीकरण नहीं देने पर व इस पत्र को औपचारिक मानकर जवाबदेही तय ना कर एक तरफा निर्णय लेने पर प्रार्थी न्यायालय में जाने व हरित प्राधिकरण में शिकायत दर्ज करने के लिए स्वतंत्र रहेगा, जिसकी पूर्ण जवाबदेही आप सक्षम अधिकारी की रहेगी ।

विनीत

डॉ. मुहम्मद आरिफ

कटला मस्जिद के पास

केकड़ी (अजमेर)- 305404

Regional officer  
Rajasthan State Pollution Control Board  
Udaipur [Raj]

Subject - To want report on "DEIAR" of HZL.

Respected,

I Pushpendra Singh Rathore ~~is~~ present today [23/11/21]  
in the office of 'RSPCB' and apply this  
application for getting me a copy of Report of  
"DEIAR" of HZL, <sup>Jowamir</sup> kindly provide me  
the Report file on the behalf on -

→ [ "Parbhut Singh Shekhawat"  
Bhilwara [mandalgah]  
9983766122

AD S  
@

Dated - 23/11/21

PS  
- Pushpendra Singh  
Rathore  
- 8387849226

Received in original  
CD and executive summary  
EIA and EMP Report Both

PS



received during the  
public hearing @ 22/12

12

दिनांक - 20/01/2017

श्री मान शिवेर प्रभारी नहर शाखा  
ग्राम पंचायत अमरपुरा  
40 र-1 गिरा

विषय :- ग्राम पंचायत अमरपुरा की वर्ड नं.-8 में स्कूल से  
बहाइव की सान्द्र के बीच नाल पर पुलिया निर्माण  
कार्य के सम्बन्ध में।

महोदय जी,

उपरोक्त विषयानुसार आपसे निवेदन है कि ग्राम  
पंचायत-अमरपुरा की वर्ड नं.-8 में स्कूल से बहाइव की  
शेड के बीच में एक सड़क नाला बहता है। उस नाले  
में वर्षा के समय काफी मात्रा में पानी चलता है।  
हैं एवं टीडी ऊँचा ओवर फ्लो का पानी जो इसी  
नाले में बहता है। जिसकी वजह से स्थानीय गरीब  
जनता की जन-धन हानि व वहाँ के समस्त सामाजिक  
लोगों के मवेशी व स्थानीय लोगों की अकामों में बहने  
की घटनाएँ हमेशा होती रहती हैं। इस पुलिया के  
निर्माण से अमरपुरा के बीरगाँव कला से बाहर कला के  
स्कूल विद्यार्थियों का आवागमन सुगम व सुरक्षित हो जाएगा  
व अतिथि में किसी प्रकार की जन-धन की हानि नहीं  
होगी। आप इसका निर्माण करवा दें ताँ स्थानीय लोगों  
का आवागमन सुगम हो सके। आर्थिक, सामाजिक विकास में भी  
योगदान मिलेगा। इसलिए आपसे निवेदन है कि आप इस  
पुल का निर्माण किये जाने में पुनः सहयोग प्रदान करें।

आपका  
सरपंच  
ग्राम पंचायत-अमरपुरा  
पं.स.-गिरा, जिला-उदयपुर

स. धर्मदास  
स. धर्मदास  
स. धर्मदास





कालुलाल शीवर ~~सुखमोहन~~ ०८/११/२०१७

जिला उन्तरा मोहन लक्ष्मण  
 नागजी मांगु काजी  
 नडा रशील मोहन बाबु लाल  
 गाला बाबुलाल हिरा  
 पुला पुला मांगु  
 रमेश कान्हा प्रभु  
 अखिलाल धगन प्रकाश  
 शक्ति लाल सखी सबजी  
 जयकरा रणजीत

Received during  
the public  
hearing  
@ 22/12

11

## ग्रामवासियों की अपील

दिनांक :-

ग्राम पंचायत .../22.12.12/51

वार्ड संख्या ...5.1...

तहसील .....

जिला उदयपुर राजस्थान

प्रेषित :- हिन्दुस्तान जिक जावर एवं वेदांता ग्रुप

विषय :- हिन्दुस्तान जिक जावर या वेदांता ग्रुप द्वारा 3620 हेक्टेयर भूमिगत अयस्क खनन के जन सुनवाई के सम्बन्ध में।

तहसील गिर्वा व सराडा के अंतर्गत अयस्क खनन के विस्तार हेतु आस पास की प्रभावित पंचायतो की 3620 हेक्टेयर भूमि पर अंडर ग्राउंड अयस्क खनन के लिए जमीन का उपयोग किया जाता है या नया कारखाना लगाया जाता है तो प्रभावित पंचायत की जल, जंगल व जमीन भी वास्तविक रूप से प्रदूषित व प्रभावित होगी एवं वहा पर निवासित जीव, जंतु व आदिवासी बहुलिय क्षेत्र ( TSP ) में रहने वाले हजारो गरीब व मजदुर लोगो के जीवन पर भी असर पड़ेगा।

इस प्रकार जावर ग्रुप द्वारा खनन से स्थानीय निवासित हजारो आदिवासियों की सिंचित जमीन व पानी के जल स्रोत भविष्य में पूरी तरह से बंजर व बर्बाद हो जायेंगे जिस से उनकी आजीविका व उनकी संस्कृति, सभ्यता पर बुरा असर पड़ेगा अतः पंचायतो के इस तरह पर्यावरण में जल, जंगल, जमीन पूरी तरह से प्रदूषित व बर्बाद हो जाएंगे

अतः ग्राम पंचायते भविष्य में इस तरह से पूर्व के खनन पट्टो पे प्रदुषित हो रही है जिस से हम सभी प्रभावित पंचायतो के अन्दर रहने वाले हजारो ग्रामवासी सविंधान के पैसा एक्ट कानून 1996 के नियमानुसार हम हमारी जल जंगल जमीन खनन के प्रभावित व प्रदूषित नहीं हो उसके लिए प्रतिबद्ध है अतः पूर्व 2014 में भी खनन के लिए भी जमीन दी गयी उसके सम्बन्ध में हिन्दुस्तान जिक लिमिटेड एवं वेदांता ग्रुप से आसपास की प्रभावित पंचायतो ( जावर, टीडी, सिंगतवाडा, चणावदा, भालडिया, पाडला ) के अंतर्गत निवासी स्थानीय गरीब बेरोजगारो को रोजगार व प्रभावित पंचायतो की आर्थिक शैक्षणिक व

धुमा ली दाजा . शानरा गेका  
 भोगा रत्ना देवा धर्मो धनुष भा  
 दिनेश पुजा भगला  
 कर्मा उर्मला उमा उवा गमिर लक्ष्मी  
 खातुराम पिप्य थावरी जेमकुमार लहुरी हिमतराम  
 लक्ष्मी वेला बीर कान्ती सोहन  
 उकाका खपा दिनेश भगवानलाल  
 हुकाका शिवरेलाल सुरम मला शान्ती लाल लहुरी  
 सुरम मला पांचा दिनेश लाल दिता  
 उर्मला उवा लीला करण  
 लालु होमा राहुल अमरा  
 भोर भाजय दिनेश प्रपराय लता  
 शकर अन्नु गिन्द गोविन्द  
 आशा हाका दिनेश अन्नालाल रापुदेवी  
 वाकु लाल सिपक सौमा जीवतराम  
 पुजा भूमा मोरलाल कृष्णा  
 सवजी वरुण राकेश दामजी

सामाजिक विकास के लिए हिन्दुस्तान जिंक लिमिटेड या वेदांता के साथ ग्राम पंचायतो के बीच अनुबंध (बॉण्ड) भरा गया था पर अनुबंध होने के बाद भी हिन्दुस्तान जिंक ने स्थानीय बेरोजगारों की रोजी रोटी छीन ली व प्रभावित पंचायतों के गरीब लोगों को नहीं रोजगार दिया गया नहीं पंचायतों की आर्थिक सामाजिक व शैक्षणिक विकास को गति दी गयी एवं पंचायतों का प्रत्येक नागरिक आज भी बेरोजगारी तानाशाही शोषण व अत्याचार से परेशान है व स्थानीय कुशल , अकुशल स्थानीय मजदूरों की जगह बाहरी लोगों को रोजगार दिया गया जिसकी वजह से स्थानीय बेरोजगारों में कंपनी की मोनोपोलीमी के खिलाफ काफी आक्रोश नाराजगी एवं अराजकता का माहोल है तो भविष्य में स्थानीय पंचायतों के साथ कंपनी द्वारा विश्वासघात धोखा मक्कासी एवं षडयंत्र का शिकार स्थानीय लोगों को होना पड़ता है तो क्यों हम प्रभावित स्थानीय पंचायतों हम अपनी जल, जंगल, जमीन को इनके कारखानों एवं खनन से प्रभावित होने दे । अतः जिसके वजह से स्थानीय निवासियों को रोजगार के लिए भविष्य में भीख मांगनी पड़ती है एवं इनके शोषण का शिकार होना पड़ता है अगर भविष्य में कंपनी हमारे पूर्व स्वर्गीय भेरूलाल जी मीणा बेरोजगारों की भर्ती की मोनोपोलीमी को ध्यान में रख कर भर्ती को सार्वजनिक कर स्थानीय पंचायतों की समिति के माध्यम से करे तो स्थानीय बेरोजगारों को अधिक से अधिक रोजगार प्राप्त होगा एवं भ्रष्टाचारियों व अन्यायचारियों से मुक्ति मिलेगी एवं कंपनी के लाभ का 10 प्रतिशत स्थानीय प्रभावित पंचायतों की आर्थिक, सामाजिक व शैक्षणिक विकास एवं हर प्रभावित पंचायतों में कुटीर एवं लघु उद्योग का निर्माण कंपनी के 10 प्रतिशत लाभ का देकर मदद करे तो प्रभावित पंचायतों के लोगों का खुद का रोजगार व आजीविका का निर्माण भविष्य में कर पाएंगे व 2014 में लागू कंपनी एवं पंचायतों के बीच अनुबंध को लागू करने में पूर्ण विश्वास व आपस में सहमती देने में प्रतिबद्ध हो तो हम प्रभावित पंचायतों के समस्त ग्रामवासी भविष्य में आने वाली आर्थिक, सामाजिक, शैक्षणिक बेरोजगारी से छुटकारा मिल सके तो हम हिन्दुस्तान जिंक लिमिटेड या वेदांता को यहाँ पर अयस्क खनन के लिए सहमती प्रदान करने में सहयोग करेंगे एवं किसी प्रकार की आपत्ति नहीं करेंगे है अतः श्रीमान से निवेदन है कौं खदान कौं सीमा का पूर्ण जानकारी प्रदान करवाने का कष्ट करें।

समस्त ग्रामवासीगण

सुरज निखिल आजय लोकेश केत  
मुकुश हरिश मोहित शमलाल सीखार

Rahul Dhan बंधु मेरु वहापु

Arun केशु मेहेन्द्र भीला लक्ष्मण व  
विवेक

नाथु बाशा आलर आशती भीना कालु मात

शजु काजु शक्तिश रमणीया शंकर

विनोद सादिल कुलदीप भांगीलाल धावरा

जमि कपलाल Amita Bhumi Ranjeet Kachu

सादिल रूपा

मेरु भीला

निशान्त

नेशा दिमाशु धर्मो

प्राप्तिश

अपलाल

धावरा

भांगीलाल

सीपा स्वरा उवा हजरी हकरी बंदो स्वपलाल भीना  
होमा व जीतेन्द्र दुरजी

जमजी

दितेश

अज्ञाय

दुआन्त

कमलेश

कालु भीना

दिमाशु

प्रिंस

विक्रम

केशपा वर्मा

Ramcham

गंगाराम

अवन

अविनाश मीदिनी

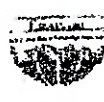
दिपक शिवा भाषिषा वसुन्धरा भीषा भूमिका भीरा

लक्ष्मी

गारिमा

पुना





## क्षेत्रीय कार्यालय

### राजस्थान राज्य प्रदूषण नियंत्रण मण्डल

एफ: 470, यू.सी.सी.आई. भवन के पास, मेवाड़ औद्योगिक क्षेत्र, मादडी, उदयपुर (राज.)

ई-मेल : [rpcbudaipur@gmail.com](mailto:rpcbudaipur@gmail.com) फोन नं : 0294 2491269

No. RPCB/RO U/UDR/

### पर्यावरण स्वीकृति हेतु लोक सुनवाई के लिये आम सूचना

विषय: गैरसी हिन्दुस्तान जिंक लि., द्वारा प्रस्तावित परियोजना जावर ग्रुप ऑफ अंडरग्राउण्ड लेड जिंक माइंस का विस्तार 4.8 मिलियन टन प्रतिवर्ष से 6.5 मिलियन टन प्रतिवर्ष अयस्क उत्पादन, कुल उत्खनन 7.78 मिलियन टन प्रतिवर्ष (सम्मिलित वेस्ट रॉक 1.28 मिलियन टन प्रतिवर्ष) और अयस्क सज्जीकरण (बेनेफिशियेशन) 4.8 मिलियन टन प्रतिवर्ष से 7.3 मिलियन टन प्रतिवर्ष, खनन पट्टा क्षेत्र 3620 हेक्टेयर (एम.एल.नं 03/89), ग्राम- जावर, तहसील-गिर्वा एवं सराडा, जिला-उदयपुर हेतु पर्यावरण स्वीकृति के लिए लोक सुनवाई ।

1. सर्व साधारण को सूचित किया जाता है कि मैसर्स हिन्दुस्तान जिंक लि., द्वारा प्रस्तावित परियोजना जावर ग्रुप ऑफ अंडरग्राउण्ड लेड जिंक माइंस का विस्तार 4.8 मिलियन टन प्रतिवर्ष से 6.5 मिलियन टन प्रतिवर्ष अयस्क उत्पादन, कुल उत्खनन : 7.78 मिलियन टन प्रतिवर्ष (सम्मिलित वेस्ट रॉक 1.28 मिलियन टन प्रतिवर्ष) और अयस्क सज्जीकरण (बेनेफिशियेशन), 4.8 मिलियन टन प्रतिवर्ष से 7.3 मिलियन टन प्रतिवर्ष, खनन पट्टा क्षेत्र 3620 हेक्टेयर (एम.एल.नं 03/89), ग्राम- जावर, तहसील-गिर्वा एवं सराडा, जिला-उदयपुर हेतु प्रस्तावित परियोजना का प्रस्ताव राजस्थान राज्य प्रदूषण नियंत्रण मण्डल (यहां तथा बाद में मण्डल के नाम से अभिलिखित) के समक्ष प्रस्तुत किया है तथा परियोजना को पर्यावरणीय स्वीकृति के लिए लोक सुनवाई बाबत आवेदन किया गया है।

2. और चूंकि मण्डल को उक्त परियोजना हेतु वन, पर्यावरण एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार, नई दिल्ली द्वारा जारी अधिसूचना संख्या एस.ओ. 1533 दिनांक 14.9.2006 के अनुसार लोक सुनवाई हेतु इस आशय की सूचना जारी कर 30 दिवस का नोटिस दिया जाना आवश्यक है।

3. उक्त परियोजना से सम्बन्धित पर्यावरणीय प्रभाव आकलन रिपोर्ट एवं संक्षिप्त अभिलेख (कार्यकारी सारांश) निम्नांकित कार्यालयों पर उपलब्ध है:-

- 1) कार्यालय जिला कलेक्टर, उदयपुर
- 2) जिला परिषद, उदयपुर
- 3) महाप्रबन्धक, जिला उद्योग केन्द्र, उदयपुर
- 4) उपखण्ड अधिकारी, गिर्वा / सराडा जिला-उदयपुर
- 5) पंचायत समिति, गिर्वा / सराडा / जयसमन्द जिला-उदयपुर
- 6) राजस्थान राज्य प्रदूषण नियंत्रण, मण्डल, 4, संस्थानिक क्षेत्र, झालाना डूंगरी, जयपुर
- 7) एकीकृत क्षेत्रीय कार्यालय, वन, पर्यावरण एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार, ए-216, अरुण भवन, संस्थानिक क्षेत्र, झालाना डूंगरी, जयपुर।
- 8) क्षेत्रीय अधिकारी, राजस्थान राज्य प्रदूषण नियंत्रण मण्डल, एफ-470, मेवाड़ औद्योगिक क्षेत्र, मादडी उदयपुर (राज.)

अतः सर्व साधारण को नोटिस के माध्यम से एतद् द्वारा सूचित किया जाता है कि उक्त परियोजना के लिए पर्यावरणीय स्वीकृति से सम्बन्धित लोक सुनवाई दिनांक 22.12.2021 (बुधवार) को प्रातः 11:00 A.M. बजे, ग्राम पंचायत भवन, भालडिया तह. सराडा, जिला-उदयपुर में उपस्थित होकर अपने सुझाव/आक्षेप, कोविड-19 कोरोना महामारी को ध्यान में रख एवं सामाजिक दूरी, मास्क व सेनेटाइजर का उपयोग करते हुए, Covid appropriate Behaviour की पालना करते हुए प्रस्तुत कर सकते हैं।

साथ ही इस सम्बन्ध में लिखित सुझाव/आपत्ति, इस सूचना के प्रकाशन की तिथि से 30 दिवस के अन्दर क्षेत्रीय कार्यालय, राजस्थान राज्य प्रदूषण नियंत्रण मण्डल, एफ: 470, यू.सी.सी.आई. भवन के पास, मेवाड़ औद्योगिक क्षेत्र, मादडी, उदयपुर में भी प्रस्तुत किये जा सकते हैं। जन सुनवाई में उपस्थित सभी व्यक्तियों को राज्य सरकार द्वारा कोविड-19 की रोकथाम हेतु समय-समय पर जारी दिशा-निर्देशों की पालना करना अनिवार्य है।

क्षेत्रीय अधिकारी



received from  
the  
Public Hearing  
@ 29/12

10

## ग्रामवासियों की अपील

दिनांक :-

ग्राम पंचायत ...12.12.15...

वार्ड संख्या ...1...

तहसील ...2.12.15...

जिला उदयपुर राजस्थान

प्रेषित :- हिन्दुस्तान जिक जावर एवं वेदांता गुप

विषय :- हिन्दुस्तान जिक जावर या वेदांता गुप द्वारा 3620 हेक्टेयर भूमिगत अयस्क खनन के जन सुनवाई के सम्बन्ध में।

तहसील गिर्वा व सराडा के अंतर्गत अयस्क खनन के विस्तार हेतु आस पास की प्रभावित पंचायतो की 3620 हेक्टेयर भूमि पर अंडर ग्राउंड अयस्क खनन के लिए जमीन का उपयोग किया जाता है या नया कारखाना लगाया जाता है तो प्रभावित पंचायत की जल, जंगल व जमीन भी वास्तविक रूप से प्रदूषित व प्रभावित होगी एवं वहां पर निवासित जीव, जंतु व आदिवासी बहुलिय क्षेत्र ( TSP ) में रहने वाले हजारो गरीब व मजदुर लोगो के जीवन पर भी असर पड़ेगा।

इस प्रकार जावर गुप द्वारा खनन से स्थानीय निवासित हजारो आदिवासियों की सिंचित जमीन व पानी के जल स्रोत भविष्य में पूरी तरह से बंजर व बर्बाद हो जायेंगे जिस से उनकी आजीविका व उनकी संस्कृति, सभ्यता पर बुरा असर पड़ेगा अतः पंचायतो के इस तरह पर्यावरण में जल, जंगल, जमीन पूरी तरह से प्रदूषित व बर्बाद हो जाएंगे

अतः ग्राम पंचायते भविष्य में इस तरह से पूर्व के खनन पट्टो पे प्रदूषित हो रही है जिस से हम सभी प्रभावित पंचायतो के अन्दर रहने वाले हजारो ग्रामवासी सर्विधान के पैसा एक्ट कानून 1996 के नियमानुसार हम हमारी जल जंगल जमीन खनन के प्रभावित व प्रदूषित नहीं हो उसके लिए प्रतिबद्ध है अतः पूर्व 2014 में भी खनन के लिए भी जमीन दी गयी उसके सम्बन्ध में हिन्दुस्तान जिक लिमिटेड एवं वेदांता गुप से आसपास की प्रभावित पंचायतो ( जावर, टीडी, सिंगतवाडा, चणावदा, भालडिया, पाडला ) के अंतर्गत निवासी स्थानीय गरीब बेरोजगारो को रोजगार व प्रभावित पंचायतो की आर्थिक शैक्षणिक व

सामाजिक विकास के लिए हिन्दुस्तान जिंक लिमिटेड या वेदांता के साथ ग्राम पंचायतो के बीच अनुबंध (बॉण्ड) भरा गया था पर अनुबंध होने के बाद भी हिन्दुस्तान जिंक ने स्थानीय बेरोजगारों की रोजी रोटी छीन ली व प्रभावित पंचायतों के गरीब लोगों को नहीं रोजगार दिया गया नहीं पंचायतों की आर्थिक सामाजिक व शैक्षणिक विकास को गति दी गयी एवं पंचायतों का प्रत्येक नागरिक आज भी बेरोजगारी तानाशाही शोषण व अत्याचार में परेशान है व स्थानीय कुशल, अकुशल स्थानीय मजदूरों की जगह बाहरी लोगों को रोजगार दिया गया जिसकी वजह से स्थानीय बेरोजगारों में कंपनी की मोनोपोलीसी के खिलाफ काफी आक्रोश नाराजगी एवं अराजकता का माहौल है तो भविष्य में स्थानीय पंचायतों के साथ कंपनी द्वारा विश्वासघात धोखा मक्काशी एवं षडयंत्र का शिकार स्थानीय लोगों को होता पड़ता है तो क्यों हम प्रभावित स्थानीय पंचायतों हम अपनी जल, जंगल, जमीन को इनके कारखानों एवं खनन से प्रभावित होने दे। अतः जिसके वजह से स्थानीय निवासियों को रोजगार के लिए भविष्य में भीख मांगनी पड़ती है एवं इनके शोषण का शिकार होना पड़ता है अगर भविष्य में कंपनी हमारे पूर्व स्वर्गीय भेरूलाल जी मीणा बेरोजगार की भर्ती की मोनोपोलीसी को ध्यान में रख कर भर्ती को सार्वजनिक कर स्थानीय पंचायतों की समिति के माध्यम से करे तो स्थानीय बेरोजगारों को अधिक से अधिक रोजगार प्राप्त होगा एवं भ्रष्टाचारियों व अन्यायचारियों से मुक्ति मिलेगी एवं कंपनी के लाभ का 10 प्रतिशत स्थानीय प्रभावित पंचायतों की आर्थिक, सामाजिक व शैक्षणिक विकास एवं हर प्रभावित पंचायतों में कुटीर एवं लघु उद्योग का निर्माण कंपनी के 10 प्रतिशत लाभ का देकर मदद करे तो प्रभावित पंचायतों के लोगों का खुद का रोजगार व आजीविका का निर्माण भविष्य में कर पाएंगे व 2014 में लागू कंपनी एवं पंचायतों के बीच अनुबंध को लागू करने में पूर्ण विश्वास व आपस में सहमती देने में प्रतिबद्ध हो तो हम प्रभावित पंचायतों के समस्त ग्रामवासी भविष्य में आने वाली आर्थिक, सामाजिक, शैक्षणिक बेरोजगारी से छुटकारा मिल सके तो हम हिन्दुस्तान जिंक लिमिटेड या वेदांता को यहाँ पर अयस्क खनन के लिए सहमती प्रदान करने में सहयोग करेंगे एवं किसी प्रकार की आपत्ति नहीं करेंगे है अतः श्रीमान से निवेदन है की खदान की सीमा का पूर्ण जानकारी प्रदान करवाने का कष्ट करे।

रमेश पप्पुलाल फूलचन्द महेन्द्र पद्मा प्राणीलाल  
 विनोद भवीलाल राजकुमार नितेश कुमार अरविन्द कुमार मोतीलाल  
 रणमित सुनिल प्रवीण सोहन समस्त ग्रामवासीगण मोतीलाल  
 सुरजमल (मोहरा) लालराम शान्तीलाल सुनिल  
 कालुसिंह लालराम पिपिने कुमारजीता नमनतीला  
 केशवलाल लालराम सुनित कुमार जीणा कान्तीलाल  
 रामा रमेश कुमार

गोपाल	राहुल कुमार मीणा	अमित कुमार	केशव लाल
मणीष	विरेंद्र कुमार	रवि कुमार	जेमा
अरेश	मनु लाल	होमा	मन्नालाल
	अमरचन्द	लक्ष्मण	मीमा
समरा	खालीलाल	नवरा	रामलाल
पन्नालाल	भोपालसिंह		

## ग्रामवासियों की अपील

Received by  
the public hearing  
22/12/21

दिनांक :-

ग्राम पंचायत १/२१.१२.२१

वार्ड संख्या ५ व ७

तहसील २१.१२.२१

जिला उदयपुर राजस्थान

प्रेषित :- हिन्दुस्तान जिक जावर एवं वेदांता ग्रुप

विषय :- हिन्दुस्तान जिक जावर या वेदांता ग्रुप द्वारा 3620 हेक्टेयर भूमिगत अयस्क खनन के जन सुनवाई के सम्बन्ध में।

तहसील गिर्वा व सराडा के अंतर्गत अयस्क खनन के विस्तार हेतु आस पास की प्रभावित पंचायतो की 3620 हेक्टेयर भूमि पर अंडर ग्राउंड अयस्क खनन के लिए जमीन का उपयोग किया जाता है या नया कारखाना लगाया जाता है तो प्रभावित पंचायत की जल, जंगल व जमीन भी वास्तविक रूप से प्रदूषित व प्रभावित होगी एवं वहा पर निवासित जीव, जंतु व आदिवासी बहुलिय शेत्र ( TSP ) में रहने वाले हजारो गरीब व मजदुर लोगो के जीवन पर भी असर पड़ेगा।

इस प्रकार जावर ग्रुप द्वारा खनन से स्थानीय निवासित हजारो आदिवासियों की सिंचित जमीन व पानी के जल स्रोत भविष्य में पूरी तरह से बंजर व बर्बाद हो जायेंगे जिस से उनकी आजीविका व उनकी संस्कृति, सभ्यता पर बुरा असर पड़ेगा अतः पंचायतो के इस तरह पर्यावरण में जल, जंगल, जमीन पूरी तरह से प्रदूषित व बर्बाद हो जाएंगे

अतः ग्राम पंचायते भविष्य में इस तरह से पूर्व के खनन पट्टो पे प्रदुषित हो रही है जिस से हम सभी प्रभावित पंचायतो के अन्दर रहने वाले हजारो ग्रामवासी सविंधान के पैसा एक्ट कानून 1996 के नियमानुसार हम हमारी जल जंगल जमीन खनन के प्रभावित व प्रदूषित नहीं हो उमके लिए प्रतिबद्ध है अतः पूर्व 2014 में भी खनन के लिए भी जमीन दी गयी उमके सम्बन्ध में हिन्दुस्तान जिक लिमिटेड एवं वेदांता ग्रुप से आसपास की प्रभावित पंचायतो ( जावर, टीडी, सिंगतवाडा, चणावडा, भालडिया, पाडला ) के अंतर्गत निवासी स्थानीय गरीब बेरोजगारो को रोजगार व प्रभावित पंचायतो की आर्थिक शैक्षणिक व

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सामाजिक विकास के लिए हिन्दुस्तान जिंक लिमिटेड या वेदांता के साथ ग्राम पंचायतों के बीच अनुबंध (बॉण्ड) भरा गया था पर अनुबंध होने के बाद भी हिन्दुस्तान जिंक ने स्थानीय बेरोजगारों की रोजी रोटी छीन ली व प्रभावित पंचायतों के गरीब लोगों को नहीं रोजगार दिया गया नहीं पंचायतों की आर्थिक सामाजिक व शैक्षणिक विकास को गति दी गयी एवं पंचायतों का प्रत्येक नागरिक आज भी बेरोजगारी तानाशाही शोषण व अत्याचार से परेशान है व स्थानीय कुशल , अकुशल स्थानीय मजदूरों की जगह बाहरी लोगों को रोजगार दिया गया जिसकी वजह से स्थानीय बेरोजगारों में कंपनी की मोनोपोलीसी के खिलाफ काफी आक्रोश नाराजगी एवं अराजकता का माहौल है तो भविष्य में स्थानीय पंचायतों के साथ कंपनी द्वारा विश्वासघात धोखा मक्काशी एवं पडयंत्र का शिकार स्थानीय लोगों को होना पड़ता है तो क्यों हम प्रभावित स्थानीय पंचायतों हम अपनी जल, जंगल, जमीन को इनके कारखानों एवं खनन से प्रभावित होने दे | अतः जिसके वजह से स्थानीय निवासियों को रोजगार के लिए भविष्य में भीख मांगनी पड़ती है एवं इनके शोषण का शिकार होना पड़ता है अगर भविष्य में कंपनी हमारे पूर्व स्वर्गीय भेरूलाल जी मीणा बेरोजगार की भर्ती की मोनोपोलीसी को ध्यान में रख कर भर्ती को सार्वजनिक कर स्थानीय पंचायतों की समिति के माध्यम से करे तो स्थानीय बेरोजगारों को अधिक से अधिक रोजगार प्राप्त होगा एवं भ्रष्टाचारियों व अन्यायचारियों से मुक्ति मिलेगी एवं कंपनी के लाभ का 10 प्रतिशत स्थानीय प्रभावित पंचायतों की आर्थिक, सामाजिक व शैक्षणिक विकास एवं हर प्रभावित पंचायतों में कुटीर एवं लघु उद्योग का निर्माण कंपनी के 10 प्रतिशत लाभ का देकर मदद करे तो प्रभावित पंचायतों के लोगों का खुद का रोजगार व आजीविका का निर्माण भविष्य में कर पाएंगे व 2014 में लागू कंपनी एवं पंचायतों के बीच अनुबंध को लागू करने में पूर्ण विश्वास व आपस में सहमती देने में प्रतिबद्ध हो तो हम प्रभावित पंचायतों के समस्त ग्रामवासी भविष्य में आने वाली आर्थिक, सामाजिक, शैक्षणिक बेरोजगारी से छुटकारा मिल सके तो हम हिन्दुस्तान जिंक लिमिटेड या वेदांता को यहां पर अयस्क खनन के लिए सहमती प्रदान करने में सहयोग करेंगे एवं किसी प्रकार की आपत्ति नहीं करेंगे है अतः श्रीमान से निवेदन है कौं खदान कौं सीमा का पूर्ण जानकारी प्रदान करवाने का कष्ट करे।

समस्त ग्रामवासीगण

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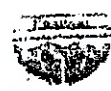
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## क्षेत्रीय कार्यालय राजस्थान राज्य प्रदूषण नियंत्रण मण्डल

एफ: 470, यू.सी.सी.आई. भवन के पास, मेवाड औद्योगिक क्षेत्र, मादडी, उदयपुर (राज.)  
ई-मेल : [rpcbudaipur@gmail.com](mailto:rpcbudaipur@gmail.com) फोन नं : 0294 2491269  
No. RPCB/RO U/UDR/

### पर्यावरण स्वीकृति हेतु लोक सुनवाई के लिये आम सूचना

विषय: मेसर्स हिन्दुस्तान जिंक लि. द्वारा प्रस्तावित परियोजना जावर ग्रुप ऑफ अंडरग्राउण्ड लेड जिंक माइंस का विस्तार 4.8 मिलियन टन प्रतिवर्ष से 6.5 मिलियन टन प्रतिवर्ष अथवा उत्पादन, कुल उत्खनन 7.78 मिलियन टन प्रतिवर्ष (सम्मिलित वेस्ट रॉक 1.28 मिलियन टन प्रतिवर्ष) और अथवा सज्जीकरण (बेनेफिशियेशन) 4.8 मिलियन टन प्रतिवर्ष से 7.3 मिलियन टन प्रतिवर्ष, खनन पट्टा क्षेत्र 3620 हेक्टेयर (एम.एल.नं 03/89), ग्राम- जावर, तहसील-गिर्वा एवं सराडा, जिला-उदयपुर हेतु पर्यावरण स्वीकृति के लिए लोक सुनवाई।

1. सर्व साधारण को सूचित किया जाता है कि मेसर्स हिन्दुस्तान जिंक लि. द्वारा प्रस्तावित परियोजना जावर ग्रुप ऑफ अंडरग्राउण्ड लेड जिंक माइंस का विस्तार 4.8 मिलियन टन प्रतिवर्ष से 6.5 मिलियन टन प्रतिवर्ष अथवा उत्पादन, कुल उत्खनन : 7.78 मिलियन टन प्रतिवर्ष (सम्मिलित वेस्ट रॉक 1.28 मिलियन टन प्रतिवर्ष) और अथवा सज्जीकरण (बेनेफिशियेशन), 4.8 मिलियन टन प्रतिवर्ष से 7.3 मिलियन टन प्रतिवर्ष, खनन पट्टा क्षेत्र 3620 हेक्टेयर (एम.एल.नं 03/89), ग्राम- जावर, तहसील-गिर्वा एवं सराडा, जिला-उदयपुर हेतु प्रस्तावित परियोजना का प्रस्ताव राजस्थान राज्य प्रदूषण नियंत्रण मण्डल (यहां तथा बाद में मण्डल के नाम से अभिलिखित) के समक्ष प्रस्तुत किया है तथा परियोजना को पर्यावरणीय स्वीकृति के लिए लोक सुनवाई बाबत आवेदन किया गया है।

2. और चूंकि मण्डल को उक्त परियोजना हेतु वन, पर्यावरण एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार, नई दिल्ली द्वारा जारी अधिसूचना संख्या एस.ओ. 1533 दिनांक 14.9.2006 के अनुसार लोक सुनवाई हेतु इस आशय की सूचना जारी कर 30 दिवस का नोटिस दिया जाना आवश्यक है।

3. उक्त परियोजना से सम्बन्धित पर्यावरणीय प्रभाव आकलन रिपोर्ट एवं संक्षिप्त अभिलेख (कार्यकारी सारांश) निम्नांकित कार्यालयों पर उपलब्ध है:-

- 1) कार्यालय जिला कलेक्टर, उदयपुर
- 2) जिला परिषद, उदयपुर
- 3) महाप्रबन्धक, जिला उद्योग केन्द्र, उदयपुर
- 4) उपखण्ड अधिकारी, गिर्वा / सराडा जिला-उदयपुर
- 5) पंचायत समिति, गिर्वा / सराडा / जयसमन्द जिला-उदयपुर
- 6) राजस्थान राज्य प्रदूषण नियंत्रण, मण्डल, 4, संस्थानिक क्षेत्र, झालाना डूंगरी, जयपुर
- 7) एकीकृत क्षेत्रीय कार्यालय, वन, पर्यावरण एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार, ए-216, अरुण भवन, संस्थानिक क्षेत्र, झालाना डूंगरी, जयपुर।
- 8) क्षेत्रीय अधिकारी, राजस्थान राज्य प्रदूषण नियंत्रण मण्डल, एफ-470, मेवाड औद्योगिक क्षेत्र, मादडी उदयपुर (राज.)

अतः सर्व साधारण को नोटिस के माध्यम से एतद् द्वारा सूचित किया जाता है कि उक्त परियोजना के लिए पर्यावरणीय स्वीकृति से सम्बन्धित लोक सुनवाई दिनांक 22.12.2021 (बुधवार) को प्रातः 11:00 A.M. बजे, ग्राम पंचायत भवन, भालडिया तह. सराडा, जिला-उदयपुर में उपस्थित होकर अपने सुझाव/आक्षेप, कोविड-19 कोरोना महामारी को ध्यान में रख एवं सामाजिक दूरी, मास्क व सेनेटाइजर का उपयोग करते हुए, Covid appropriate Behaviour की पालना करते हुए प्रस्तुत कर सकते हैं।

साथ ही इस सम्बन्ध में लिखित सुझाव/आपत्ति, इस सूचना के प्रकाशन की तिथि से 30 दिवस के अन्दर क्षेत्रीय कार्यालय, राजस्थान राज्य प्रदूषण नियंत्रण मण्डल, एफ: 470, यू.सी.सी.आई. भवन के पास, मेवाड औद्योगिक क्षेत्र, मादडी, उदयपुर में भी प्रस्तुत किये जा सकते हैं। जन सुनवाई में उपस्थित सभी व्यक्तियों को राज्य सरकार द्वारा कोविड-19 की रोकथाम हेतु समय-समय पर जारी दिशा-निर्देशों की पालना करना अनिवार्य है।

क्षेत्रीय अधिकारी

received by  
Public Hearing  
22/12/21

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## ग्रामवासियों की अपील

दिनांक :-

ग्राम पंचायत ...12.12.21...

वार्ड संख्या ...9...

तहसील ...12.12.21...

जिला उदयपुर राजस्थान

प्रेषित :- हिन्दुस्तान जिक जावर एवं वेदांता ग्रुप

विषय :- हिन्दुस्तान जिक जावर या वेदांता ग्रुप द्वारा 3620 हेक्टेयर भूमिगत अयस्क खनन के जन मुनवाई के सम्बन्ध में।

तहसील गिर्वा व सराडा के अंतर्गत अयस्क खनन के विस्तार हेतु आस पास की प्रभावित पंचायतो की 3620 हेक्टेयर भूमि पर अंडर ग्राउंड अयस्क खनन के लिए जमीन का उपयोग किया जाता है या नया कारखाना लगाया जाता है तो प्रभावित पंचायत की जल, जंगल व जमीन भी वास्तविक रूप से प्रदूषित व प्रभावित होगी एवं वहा पर निवासित जीव, जंतु व आदिवासी बहुलिय क्षेत्र ( TSP ) में रहने वाले हजारो गरीब व मजदुर लोगो के जीवन पर भी असर पड़ेगा।

इस प्रकार जावर ग्रुप द्वारा खनन से स्थानीय निवासित हजारो आदिवासियों की सिंचित जमीन व पानी के जल स्रोत भविष्य में पूरी तरह से बंजर व बर्बाद हो जायेंगे जिस से उनकी आजीविका व उनकी संस्कृति, सभ्यता पर बुरा असर पड़ेगा अतः पंचायतो के इस तरह पर्यावरण में जल, जंगल, जमीन पूरी तरह से प्रदूषित व बर्बाद हो जाएंगे

अतः ग्राम पंचायते भविष्य में इस तरह से पूर्व के खनन पट्टो पे प्रदूषित हो रही है जिस से हम सभी प्रभावित पंचायतो के अन्दर रहने वाले हजारो ग्रामवासी सविधान के पैसा एक्ट कानून 1996 के नियमानुसार हम हमारी जल जंगल जमीन खनन के प्रभावित व प्रदूषित नहीं हो उसके लिए प्रतिबद्ध है अतः पूर्व 2014 में भी खनन के लिए भी जमीन दी गयी उसके सम्बन्ध में हिन्दुस्तान जिक लिमिटेड एवं वेदांता ग्रुप से आसपास की प्रभावित पंचायतो ( जावर, टीडी, ~~सिन्धुवाडा~~ चणावदा, भालडिया, पाडला ) के अंतर्गत निवासी स्थानीय गरीब बेरोजगारो को रोजगार व प्रभावित पंचायतो की आर्थिक शैक्षणिक व

लक्ष्मी भीम आरती कुमारी

कायु लाल लक्ष्मण लाल बहा शिक्कर

सदा प्रताप दिगलाल जीवा अपलाल मुकेश कुमार

कामलेश कीरण कुमारी

विमलेश

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शिव गौरा कुमारी

अनिल सदा वसुन्धरा

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समी

सामाजिक विकास के लिए हिन्दुस्तान जिक लिमिटेड या वेदांता के साथ ग्राम पंचायतों के बीच अनुबंध (बॉण्ड) भरा गया था पर अनुबंध होने के बाद भी हिन्दुस्तान जिक ने स्थानीय बेरोजगारों की रोजी रोटी छीन ली व प्रभावित पंचायतों के गरीब लोगों को नहीं रोजगार दिया गया नहीं पंचायतों की आर्थिक सामाजिक व शैक्षणिक विकास को गति दी गयी एवं पंचायतों का प्रत्येक नागरिक आज भी बेरोजगारी तानाशाही शोषण व अत्याचार से परेशान है व स्थानीय कुशल , अकुशल स्थानीय मजदूरों की जगह बाहरी लोगों को रोजगार दिया गया जिसकी वजह से स्थानीय बेरोजगारों में कंपनी की मोनोपोलीसी के खिलाफ काफी आक्रोश नाराजगी एवं अराजकता का माहोल है तो भविष्य में स्थानीय पंचायतों के साथ कंपनी द्वारा विश्वासघात धोखा मक्काशी एवं षडयंत्र का शिकार स्थानीय लोगों को होना पड़ता है तो क्यों हम प्रभावित स्थानीय पंचायतों हम अपनी जल, जंगल, जमीन को इनके कारखानों एवं खनन से प्रभावित होने दे | अतः जिसके वजह से स्थानीय निवासियों को रोजगार के लिए भविष्य में भीख मांगनी पड़ती है एवं इनके शोषण का शिकार होना पड़ता है अगर भविष्य में कंपनी हमारे पूर्व स्वर्गीय भेरूलाल जी मीणा बेरोजगार की भर्ती की मोनोपोलीसी को ध्यान में रख कर भर्ती को सार्वजनिक कर स्थानीय पंचायतों की समिति के माध्यम से करे तो स्थानीय बेरोजगारों को अधिक से अधिक रोजगार प्राप्त होगा एवं भ्रष्टाचारियों व अन्यायचारियों से मुक्ति मिलेगी एवं कंपनी के लाभ का 10 प्रतिशत स्थानीय प्रभावित पंचायतों की आर्थिक, सामाजिक व शैक्षणिक विकास एवं हर प्रभावित पंचायतों में कुटीर एवं लघु उद्योग का निर्माण कंपनी के 10 प्रतिशत लाभ का देकर मदद करे तो प्रभावित पंचायतों के लोगों का खुद का रोजगार व आजीविका का निर्माण भविष्य में कर पाएंगे व 2014 में लागू कंपनी एवं पंचायतों के बीच अनुबंध को लागू करने में पूर्ण विश्वास व आपस में सहमती देने में प्रतिबद्ध हो तो हम प्रभावित पंचायतों के समस्त ग्रामवासी भविष्य में आने वाली आर्थिक, सामाजिक, शैक्षणिक बेरोजगारी से छुटकारा मिल सके तो हम हिन्दुस्तान जिक लिमिटेड या वेदांता को यहा पर अयस्क खनन के लिए सहमती प्रदान करने में सहयोग करेंगे एवं किसी प्रकार की आपत्ति नहीं करेंगे है अतः श्रीमान से निवेदन है की खदान की सीमा का पूर्ण जानकारी प्रदान करवाने का कष्ट करें।

समस्त ग्रामवासीगण

श्रीमान शमलाल दिनेश कुमार ज्योस गणेश भोसले  
अशोक कुमार गोबिल शैलेश लक्ष्मण  
जैश अमलाल कोरा

संजो सेवा रमेश केलाश कुमार शिव  
लक्ष्मी शशीकुमारी कान्ती  
उदायदत्त मंगलराम  
रामा फता मोहन जीवा  
जदमा लक्ष्मी करण रणजीत कुमार कुल्ला

मुकेश धीरेश विजय कुमार रामुडी शेखीलाल  
मोहन दिनेश कुमार पंचाराम  
लक्ष्मी सुनेताकुमारी अम्बारी

गंगा मंगल कल्लु अशोक  
कुरीलाल शकर देता हकरा प्रकाश चन्द रोहित  
लोकेश राहुल कुमार देता मंगला जीवा काना

किशन कुमार मार्गलाल पुनकुमार बाबुलाल  
पन्नालाल धिरा नरेश खूला  
शान्तीलाल मुकेश लक्ष्मण धुला  
लक्ष्मणलाल मोहन शाली सरीता गीता

लाली गणेश कुमार अमरा  
राजु

संजो मेरा गोहन  
लक्ष्मण धर्म शकरलाल  
राजकुमार मोतीलाल  
राकेर सोहन



received during  
the Public hearing  
25/11/21

(7)

## ग्रामवासियों की अपील

दिनांक :-

ग्राम पंचायत ... 1.2.1.516.1/51

वार्ड संख्या ... 6... 8

तहसील ... 1.2.1.516.1/51

जिला उदयपुर राजस्थान

प्रेषित :- हिन्दुस्तान जिंक जावर एवं वेदांता ग्रुप

विषय :- हिन्दुस्तान जिंक जावर या वेदांता ग्रुप द्वारा 3620 हेक्टेयर भूमिगत अयस्क खनन के जन सुनवाई के सम्बन्ध में।

तहसील गिर्वा व सराडा के अंतर्गत अयस्क खनन के विस्तार हेतु आस पास की प्रभावित पंचायतो की 3620 हेक्टेयर भूमि पर अंडर ग्राउंड अयस्क खनन के लिए जमीन का उपयोग किया जाता है या नया कारखाना लगाया जाता है तो प्रभावित पंचायत की जल, जंगल व जमीन भी वास्तविक रूप से प्रदूषित व प्रभावित होगी एवं वहां पर निवासित जीव, जंतु व आदिवासी बहुलिय क्षेत्र ( TSP ) में रहने वाले हजारो गरीब व मजदुर लोगो के जीवन पर भी असर पड़ेगा।

इस प्रकार जावर ग्रुप द्वारा खनन से स्थानीय निवासित हजारो आदिवासियों की सिंचित जमीन व पानी के जल स्रोत भविष्य में पूरी तरह से बंजर व बर्बाद हो जायेंगे जिस से उनकी आजीविका व उनकी संस्कृति, सभ्यता पर बुरा असर पड़ेगा अतः पंचायतो के इस तरह पर्यावरण में जल, जंगल, जमीन पूरी तरह से प्रदूषित व बर्बाद हो जाएंगे

अतः ग्राम पंचायते भविष्य में इस तरह से पूर्व के खनन पट्टो पे प्रदूषित हो रही है जिस से हम सभी प्रभावित पंचायतो के अन्दर रहने वाले हजारो ग्रामवासी सविधान के पैसा एक्ट कानून 1996 के नियमानुसार हम हमारी जल जंगल जमीन खनन के प्रभावित व प्रदूषित नहीं हो उसके लिए प्रतिबद्ध है अतः पूर्व 2014 में भी खनन के लिए भी जमीन दी गयी उसके सम्बन्ध में हिन्दुस्तान जिंक लिमिटेड एवं वेदांता ग्रुप से आसपास की प्रभावित पंचायतो ( जावर, टीडी, सिंगतवाडा, चणावदा, भालडिया, पाडला ) के अंतर्गत निवासी स्थानीय गरीब बेरोजगारो को रोजगार व प्रभावित पंचायतो की आर्थिक शैक्षणिक व

ललित  
अनिल  
दीनाराम  
जीवन्ताराम  
राजेश्वर

पेरा  
जीव  
कृष्ण  
शमभ्यन्द  
आम  
राम  
कान्त

अम्बाला पुष्पा

सुरज लीला हंकरा

सविता गोविन्द नारायण अनिल

रंजना हरजी सुरजमल  
रेखा शमित्रा रिधा

सुभाषा सुगना राहुल

सुमाना शंकरा अभरा सतीश  
सुगन नारायण राहुल दीनाराम  
तार मानेश प्रेम पुष्पलला

देवीशक्ति दामा मीनक मोखलाल काष्ठ अमा

अम मागशी काठ राहु दामि ललित  
ममि नेशा शक्ति उषा प्रभु  
किश

सामाजिक विकास के लिए हिन्दुस्तान जिंक लिमिटेड या वेदांता के साथ ग्राम पंचायतों के बीच अनुबंध (बॉण्ड) भरा गया था पर अनुबंध होने के बाद भी हिन्दुस्तान जिंक ने स्थानीय बेरोजगारों की रोजी रोटी छीन ली व प्रभावित पंचायतों के गरीब लोगों को नहीं रोजगार दिया गया नहीं पंचायतों की आर्थिक सामाजिक व शैक्षणिक विकास को गति दी गयी एवं पंचायतों का प्रत्येक नागरिक आज भी बेरोजगारी तानाशाही शोषण व अत्याचार से परेशान है व स्थानीय कुशल , अकुशल स्थानीय मजदूरों की जगह बाहरी लोगों को रोजगार दिया गया जिसकी वजह से स्थानीय बेरोजगारों में कंपनी की मोनोपोलीसी के खिलाफ काफी आक्रोश नाराजगी एवं अराजकता का माहौल है तो भविष्य में स्थानीय पंचायतों के साथ कंपनी द्वारा विश्वासघात धोखा मक्काशी एवं षडयंत्र का शिकार स्थानीय लोगों को होना पड़ता है तो क्यों हम प्रभावित स्थानीय पंचायतों हम अपनी जल, जंगल, जमीन को इनके कारखानों एवं खनन से प्रभावित होने दे | अतः जिसके वजह से स्थानीय निवासियों को रोजगार के लिए भविष्य में भीख मांगनी पड़ती है एवं इनके शोषण का शिकार होना पड़ता है अगर भविष्य में कंपनी हमारे पूर्व स्वर्गीय भेरूलाल जी मीणा बेरोजगार की भर्ती की मोनोपोलीसी को ध्यान में रख कर भर्ती को सार्वजनिक कर स्थानीय पंचायतों की समिति के माध्यम से करे तो स्थानीय बेरोजगारों को अधिक से अधिक रोजगार प्राप्त होगा एवं भ्रष्टाचारियों व अन्यायचारियों से मुक्ति मिलेगी एवं कंपनी के लाभ का 10 प्रतिशत स्थानीय प्रभावित पंचायतों की आर्थिक, सामाजिक व शैक्षणिक विकास एवं हर प्रभावित पंचायतों में कुटीर एवं लघु उद्योग का निर्माण कंपनी के 10 प्रतिशत लाभ का देकर मदद करे तो प्रभावित पंचायतों के लोगों का खुद का रोजगार व आजीविका का निर्माण भविष्य में कर पाएंगे व 2014 में लागू कंपनी एवं पंचायतों के बीच अनुबंध को लागू करने में पूर्ण विश्वास व आपस में सहमती देने में प्रतिबद्ध हो तो हम प्रभावित पंचायतों के समस्त ग्रामवासी भविष्य में आने वाली आर्थिक, सामाजिक, शैक्षणिक बेरोजगारी से छुटकारा मिल सके तो हम हिन्दुस्तान जिंक लिमिटेड या वेदांता को यहाँ पर अयस्क खनन के लिए सहमती प्रदान करने में सहयोग करेंगे एवं किसी प्रकार की आपत्ति नहीं करेंगे है अतः श्रीमान से निवेदन है कौं खदान कौं सोमा का पूर्ण जानकारी प्रदान करवाने का कष्ट करे।

समस्त ग्रामवासीगण

अम्बादास

दिनांक 15/09/14

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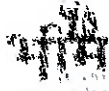
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## क्षेत्रीय कार्यालय राजस्थान राज्य प्रदूषण नियंत्रण मण्डल

एफ: 470, यू.सी.सी.आई. भवन के पास, मेवाड़ औद्योगिक क्षेत्र, मादडी, उदयपुर (राज.)

ई-मेल : [rpcbudaipur@gmail.com](mailto:rpcbudaipur@gmail.com) फोन नं : 0294 2491269  
No: RPCB/RO D/UDR/

### पर्यावरण स्वीकृति हेतु लोक सुनवाई के लिये आम सूचना

विषय: मेसर्स हिन्दुस्तान जिंक लि., द्वारा प्रस्तावित परियोजना जावर ग्रुप ऑफ अंडरग्राउण्ड लेड जिंक माइंस का विस्तार 4.8 मिलियन टन प्रतिवर्ष से 6.5 मिलियन टन प्रतिवर्ष अयस्क उत्पादन, कुल उत्खनन : 7.78 मिलियन टन प्रतिवर्ष (सम्मिलित वेस्ट रॉक 1.28 मिलियन टन प्रतिवर्ष) और अयस्क सज्जीकरण (बेनिफिशियेशन) 4.8 मिलियन टन प्रतिवर्ष से 7.3 मिलियन टन प्रतिवर्ष, खनन पट्टा क्षेत्र 3620 हेक्टेयर (एम.एल.नं 03/89), ग्राम- जावर, तहसील-गिर्वा एवं सराडा, जिला-उदयपुर हेतु पर्यावरण स्वीकृति के लिए लोक सुनवाई ।

1. सर्व साधारण को सूचित किया जाता है कि मेसर्स हिन्दुस्तान जिंक लि., द्वारा प्रस्तावित परियोजना जावर ग्रुप ऑफ अंडरग्राउण्ड लेड जिंक माइंस का विस्तार 4.8 मिलियन टन प्रतिवर्ष से 6.5 मिलियन टन प्रतिवर्ष अयस्क उत्पादन, कुल उत्खनन : 7.78 मिलियन टन प्रतिवर्ष (सम्मिलित वेस्ट रॉक 1.28 मिलियन टन प्रतिवर्ष) और अयस्क सज्जीकरण (बेनिफिशियेशन), 4.8 मिलियन टन प्रतिवर्ष से 7.3 मिलियन टन प्रतिवर्ष, खनन पट्टा क्षेत्र 3620 हेक्टेयर (एम.एल.नं 03/89), ग्राम- जावर, तहसील-गिर्वा एवं सराडा, जिला-उदयपुर हेतु प्रस्तावित परियोजना का प्रस्ताव राजस्थान राज्य प्रदूषण नियंत्रण मण्डल (यहां तथा बाद में मण्डल के नाम से अभिलिखित) के समक्ष प्रस्तुत किया है तथा परियोजना को पर्यावरणीय स्वीकृति के लिए लोक सुनवाई बाबत आवेदन किया गया है ।

2. और चूंकि मण्डल को उक्त परियोजना हेतु वन, पर्यावरण एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार, नई दिल्ली द्वारा जारी अधिसूचना संख्या एस.ओ. 1533 दिनांक 14.9.2006 के अनुसार लोक सुनवाई हेतु इस आशय की सूचना जारी कर 30 दिवस का नोटिस दिया जाना आवश्यक है ।

3. उक्त परियोजना से सम्बन्धित पर्यावरणीय प्रभाव आकलन रिपोर्ट एवं संक्षिप्त अभिलेख (कार्यकारी सारांश) निम्नांकित कार्यालयों पर उपलब्ध है:-

- 1) कार्यालय जिला कलेक्टर, उदयपुर
- 2) जिला परिषद, उदयपुर
- 3) महाप्रबन्धक, जिला उद्योग केन्द्र, उदयपुर
- 4) उपखण्ड अधिकारी, गिर्वा / सराडा जिला-उदयपुर
- 5) पंचायत समिति, गिर्वा / सराडा / जयसमन्द जिला-उदयपुर
- 6) राजस्थान राज्य प्रदूषण नियंत्रण, मण्डल, 4, संस्थानिक क्षेत्र, झालाना डूंगरी, जयपुर
- 7) एकीकृत क्षेत्रीय कार्यालय, वन, पर्यावरण एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार, ए-216, अरुण भवन, संस्थानिक क्षेत्र, झालाना डूंगरी, जयपुर ।
- 8) क्षेत्रीय अधिकारी, राजस्थान राज्य प्रदूषण नियंत्रण मण्डल, एफ-470, मेवाड़ औद्योगिक क्षेत्र, मादडी उदयपुर (राज.)

अतः सर्व साधारण को नोटिस के माध्यम से एतद् द्वारा सूचित किया जाता है कि उक्त परियोजना के लिए पर्यावरणीय स्वीकृति से सम्बन्धित लोक सुनवाई दिनांक 22.12.2021 (बुधवार) को प्रातः 11:00 A.M. बजे, ग्राम पंचायत भवन, भालडिया तह. सराडा, जिला-उदयपुर में उपस्थित होकर अपने सुझाव/आक्षेप, कोविड-19 कोरोना महामारी को ध्यान में रख एवं सामाजिक दूरी, मास्क व सेनेटाइजर का उपयोग करते हुए, Covid appropriate Behaviour की पालना करते हुए प्रस्तुत कर सकते हैं ।

साथ ही इस सम्बन्ध में लिखित सुझाव/आपत्ति, इस सूचना के प्रकाशन की तिथि से 30 दिवस के अन्दर क्षेत्रीय कार्यालय, राजस्थान राज्य प्रदूषण नियंत्रण मण्डल, एफ: 470, यू.सी.सी.आई. भवन के पास, मेवाड़ औद्योगिक क्षेत्र, मादडी, उदयपुर में भी प्रस्तुत किये जा सकते हैं । जन सुनवाई में उपस्थित सभी व्यक्तियों को राज्य सरकार द्वारा कोविड-19 की रोकथाम हेतु समय-समय पर जारी दिशा-निर्देशों की पालना करना अनिवार्य है ।

क्षेत्रीय अधिकारी

Received by  
the Public Hearing  
@ 22/12/21

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## ग्रामवासियों की अपील

दिनांक :- 22/12/2021

ग्राम पंचायत जावर.....

वार्ड संख्या .....

तहसील गिरवा.....

जिला उदयपुर राजस्थान

प्रेषित :- हिन्दुस्तान जिक जावर एवं वेदांता गुप

विषय :- हिन्दुस्तान जिक जावर या वेदांता गुप द्वारा 3620 हेक्टेयर भूमिगत अयस्क खनन के जन सुनवाई के सम्बन्ध में।

तहसील गिरवा व सराडा के अंतर्गत अयस्क खनन के विस्तार हेतु आस पास की प्रभावित पंचायतो की 3620 हेक्टेयर भूमि पर अंडर ग्राउंड अयस्क खनन के लिए जमीन का उपयोग किया जाता है या नया कारखाना लगाया जाता है तो प्रभावित पंचायत की जल, जंगल व जमीन भी वास्तविक रूप से प्रदूषित व प्रभावित होगी एवं वहां पर निवासित जीव, जंतु व आदिवासी बहुलिय क्षेत्र ( TSP ) में रहने वाले हजारों गरीब व मजदुर लोगों के जीवन पर भी असर पड़ेगा।

इस प्रकार जावर गुप द्वारा खनन से स्थानीय निवासित हजारों आदिवासियों की सिंचित जमीन व पानी के जल स्रोत भविष्य में पूरी तरह से बंजर व बर्बाद हो जायेंगे जिस से उनकी आजीविका व उनकी संस्कृति, सभ्यता पर बुरा असर पड़ेगा अतः पंचायतो के इस तरह पर्यावरण में जल, जंगल, जमीन पूरी तरह से प्रदूषित व बर्बाद हो जाएंगे

अतः ग्राम पंचायते भविष्य में इस तरह से पूर्व के खनन पट्टों पे प्रदूषित हो रही है जिस से हम सभी प्रभावित पंचायतो के अन्दर रहने वाले हजारों ग्रामवासी सविंधान के पैसा एक्ट कानून 1996 के नियमानुसार हम हमारी जल जंगल जमीन खनन के प्रभावित व प्रदूषित नहीं हो उसके लिए प्रतिबद्ध है अतः पूर्व 2014 में भी खनन के लिए भी जमीन दी गयी उसके सम्बन्ध में हिन्दुस्तान जिक लिमिटेड एवं वेदांता गुप से आसपास की प्रभावित पंचायतो ( जावर, टीडी, सिंगतवाडा, नेवातलाई, चणावदा, भालडिया, पाडला ) के अंतर्गत निवासी स्थानीय गरीब बेरोजगारों को रोजगार व प्रभावित पंचायतो की आर्थिक



शैक्षणिक व सामाजिक विकास के लिए हिन्दुस्तान जिंक लिमिटेड या वेदांता के साथ ग्राम पंचायतो के बीच अनुबंध (बॉण्ड) भरा गया था पर अनुबंध होने के बाद भी हिन्दुस्तान जिंक ने स्थानीय बेरोजगारों की रोजी रोटी छीन ली व प्रभावित पंचायतों के गरीब लोगों को नहीं रोजगार दिया गया नहीं पंचायतों की आर्थिक सामाजिक व शैक्षणिक विकास को गति दी गयी एवं पंचायतों का प्रत्येक नागरिक आज भी बेरोजगारी तानाशाही शोषण व अत्याचार से परेशान है व स्थानीय कुशल, अकुशल स्थानीय मजदूरों की जगह बाहरी लोगों को रोजगार दिया गया जिसकी वजह से स्थानीय बेरोजगारों में कंपनी की मोनोपोलीसीके खिलाफ काफी आक्रोश नाराजगी एवं अराजकता का माहोल है तो भविष्य में स्थानीय पंचायतों के साथ कंपनी द्वारा विश्वासघात धोखा मक्कारी एवं षडयंत्र का शिकार स्थानीय लोगों को होना पड़ता है तो क्यों हम प्रभावित स्थानीय पंचायतें हम अपनी जल, जंगल, जमीन को इनके कारखानों एवं खनन से प्रभावित होने दें। अतः जिसके वजह से स्थानीय निवासियों को रोजगार के लिए भविष्य में भीख मांगनी पड़ती है एवं इनके शोषण का शिकार होना पड़ता है अगर भविष्य में कंपनी हमारे पूर्व स्वर्गीय भेरूलाल जी मीणा बेरोजगार की भर्ती की मोनोपोलीसीको ध्यान में रख कर भर्ती को सार्वजनिक कर स्थानीय पंचायतों की समिति के माध्यम से करे तो स्थानीय बेरोजगारों को अधिक से अधिक रोजगार प्राप्त होगा एवं भ्रष्टाचारियों व अन्यायचारियों से मुक्ति मिलेगी एवं कंपनी के लाभ का 10 प्रतिशत स्थानीय प्रभावित पंचायतों की आर्थिक, सामाजिक व शैक्षणिक विकास एवं हर प्रभावित पंचायतों में कुटीर एवं लघु उद्योग का निर्माण कंपनी के 10 प्रतिशत लाभ का देकर मदद करे तो प्रभावित पंचायतों के लोगों का खुद का रोजगार व आजीविका का निर्माण भविष्य में कर पाएंगे व 2014 में लागू कंपनी एवं पंचायतों के बीच अनुबंध को लागू करने में पूर्ण विश्वास व आपस में सहमती देने में प्रतिबद्ध हो तो हम प्रभावित पंचायतों के समस्त ग्रामवासी भविष्य में आने वाली आर्थिक, सामाजिक, शैक्षणिक बेरोजगारी से छुटकारा मिल सके तो हम हिन्दुस्तान जिंक लिमिटेड या वेदांता को यहा पर अयस्क खनन के लिए सहमती प्रदान करने में सहयोग करेंगे एवं किसी प्रकार की आपत्ति नहीं करेंगे है

भारत सरकार

धन्यवाद





भारत सरकार

सुनीता देवी

प्रेम

रामलाल जी



समस्त ग्रामवासीगण

कैलाश मीणा

श्री मा




10/10/73

मोहन लाल

मुकेश Kailash Kumar

उज्ज्वली

जोवा मीणा

 उज्ज्वली देवी

पुष्प

व. लाल

नंद लाल मीणा

मुकेश

Pankaj

सुष्मा लाल

पप्पु

कमला

 गंगा

Banshi

अजय

 रसीदारी

Bhavya

शक्ति

लीला


रोहित

विशाल

अक्षय

वशी लाल

रुमिना

 कमलाराम

पुष्पा

पारिता

शारदा मल्ल

सीमा

माया मीणा

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माया मीणा

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 रानी दारि

अल्पना मीणा

अक्षय

मिलि कान्हा

अक्षय


 चंदी

Pritya

अदिति

लोचना

लक्ष्मी

 उज्ज्वली देवी

मनोहर

हरिश कुमार

मुकेश

खान

मोहन  
शेखरलाल  
फुलचन्द  
हरिश शंकर  
मनिषा चेतना

अम्बा मोहनलाल  
लेशु बारी अरु प्रकार मोहनलाल  
अमिल किरान

गोविन्द : नाश = देवरा = राहुल 2 रविना प्रेम  
इशान नाश  
चौरा लाल सैरा जी  
बेलद भीजा खैरा जी

देवा : नाश

इशारत : काजुराम

शंकर : नाश

विन्ने : देवा

३

कमांक जामा / प्रशा / 2014 /

दिनांक: 15.02.2014

सेवामें,

श्रीमान् सरपंच साहब

ग्राम पंचायत-जावर

विषय:- श्रीमान् विकास अधिकारी-गिरवा द्वारा आयोजित ग्रामसभा दिनांक 11.02.2014 को आयोजित दिनांक 11.02.2014 को आयोजित बैठक में हमारा द्वारा आपके मांग पत्र के संबंध में तथागतवा सहमति।

महोदय

जैसा कि आपको विदित है कि तदनुसार श्रीमान विकास अधिकारी गिरवा द्वारा एक ग्राम सभा का आयोजन दिनांक 11.02.2014 को आयोजित बैठक में हमारा द्वारा आपके मांग पत्र के संबंध में निम्नानुसार सहमति दी जाती है।

1. वैदन्ता ग्रुप को भविष्य में जब यहाँ भी खनन हेतु वीमाज लैंड के अतिरिक्त भूमि की आवश्यकता होगी तो प्रभावित ग्रामवासियों को प्रचलित नियमानुसार पुनर्वास एवं मुआवजा संबंधी कार्यवाही सुनिश्चित की जायेगी, एवं इसकी जिम्मेदारी हिन्दुस्तान जिंक प्रबन्धन की होगी।
2. कम्पनी बलस्टींग से यदि किसी ग्रामवासी के बलान्त में पत्थर आता है तो इस संबंध में हिन्दुस्तान जिंक लिमिटेड द्वारा एक टीम गठित की गई है और इस विभाग में वैदन्ता जिंक प्रबन्धन द्वारा कार्य किया जाएगा।
3. प्रबन्धन द्वारा बेरोजगारों के लिए तकनीकी एवं आवश्यक प्रशिक्षण देने हेतु प्राइवेट पार्टनर प्लेन पर हम आई टी आई लगाने हेतु प्रतिबद्ध हैं और इस दिशा में कार्य किया जा रहा है, तथा प्रशिक्षण पश्चात वरियतानुसार रोजगार देने की व्यवस्था की जाएगी।
4. खनन कार्य से यदि कोई भविष्य में जन धन की रकम होती है तो इसकी भरपाई निर्धारित दर एवं प्रक्रिया के अनुसार स्वीकार्य होगा।
5. ब्लारिटींग के समय यदि कोई कुआँ हेण्डपंप या अन्य कोई वस्तु खूब जाया है तो प्रभावित होने पर तत्काल व्यवस्था में प्रबन्धन किया जायेगा और प्रभावित क्षेत्रों में जल का खराब होना है तो निम्नलिखित जावर माइन्स उसकी भरपाई करेगा।

6. जलवायु परिवर्तन का मुकाबला सुविधा: दान हेतु प्रबंधन द्वारा विचार किया जाएगा।
7. श्रम कल्याण हेतु भविष्य में जो भी नियम सांख्यिक द्वारा निर्धारित किए जायेंगे, उसका अनुपालन हेतु हम प्रतिबद्ध हैं। हिजिलि के सीएसआर द्वारा जो प्रशिक्षण कार्यक्रम निर्धारित हैं, वे सभी कार्यक्रम पंचायतों में बटवारा हो जायेगा एवं कार्यक्रमों को सुनिश्चित किया जायेगा।
8. ठेकेदार श्रमिका की भर्ती हेतु ग्राम पंचायतों द्वारा दी गई सूची अनुसार तकनीकी एवं गैर-तकनीकी के अनुसार चयन प्रक्रिया के माध्यम से निरपेक्ष नियोजन करना सुनिश्चित किया जायेगा।
9. ठेकेदारी प्रथा में कार्यरत मजदूरों का सम्पूर्ण जीवन का ध्यान रखा जाना होगा। ग्राम पंचायतों को रखा जायेगा, इस संबंध में यदि कोई प्रसंग मौजूद हो तो सुझाव दिया जायेगा। ग्राम पंचायतों को रखा जायेगा, इस संबंध में यदि कोई प्रसंग मौजूद हो तो सुझाव दिया जायेगा। ग्राम पंचायतों को रखा जायेगा, इस संबंध में यदि कोई प्रसंग मौजूद हो तो सुझाव दिया जायेगा।
10. पर्यावरण को साफ-सुथरा रखने हेतु कम्पनी की ओर से पेड़-पौधे लगाये जायेंगे।
11. ठेकेदारी प्रथा में कार्यरत श्रमिका को स्वास्थ्य के सम्बन्ध में जागरूक बनाना प्रमाणित करने के लिए प्रमाणित किया जायेगा।
12. ग्राम पंचायत जावर के गांव कानपुर में टेलिंग डेम से प्रभावित क्षेत्र में पीने के पानी की उचित व्यवस्था की जायेगी। तथा टेलिंग डेम से जिनकी भूमि खराब हो रही है, उसका गठित समिति द्वारा निरीक्षण उपरांत उचित मुआवजा दिया जायेगा।

आशा है आप उपरोक्त बिन्दुओं से सहमत होकर कम्पनी के उत्पादन एवं उत्पादकता के निरंतर विकास में अपना सहयोग प्रदान करते रहेंगे।

(के. के. दवे)

संस्थापन प्रधान

हिजिलि दान

उदापुर



सत्यमेव जयते

# कार्यालय ग्राम पंचायत जावर

## पंचायत समिति गिर्वा, जिला उदयपुर ( राज. )

क्रमांक

दिनांक 14.6.2018

### अनापत्ति प्रमाण-पत्र

ग्राम पंचायत जावर द्वारा यह प्रमाणित किया जाता है कि ग्राम जावर के खसरा नं. 1617, 1618, 1619, 1620, 1621, 1622, 1623, 1624, 1625, 1626, 1627, 1628, 1629, 1630, 1631, 1865, 1866, 1667, 1869, 1870, 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880 क्षेत्रफल क्रमशः 0.3050, 6.5400, 0.7750, 0.0550, 0.8500, 0.4250, 0.1900, 0.3050, 0.0700, 1.1050, 1.6000, 1.1100, 0.0900, 0.3400, 0.2350, 0.2000, 0.6800, 0.3800, 0.4100, 0.2350, 1.4000, 0.3100, 0.2500, 0.7950, 0.1900, 0.5500, 1.1700, 1.3700, 0.0600, 0.5000 कुल क्षेत्रफल 22.4950 हैक्टर भूमि राजस्व रेकार्ड के अनुसार बिलानाम गैर कवर्ड कास्ट सिस्टम आबादी दर्ज है। उक्त आबादी कई वर्षों से दर्ज रेकार्ड है, लेकिन मोके पर उपर वर्णित खसरा नम्बरों में कोई भी मकान नहीं है, मोके पर उक्त भूमि पड़त पड़ी होकर झाड़ियां उगी हुई है।

ग्राम जावर में खसरा नं. 1617, 1618, 1619, 1620, 1621, 1622, 1623, 1624, 1625, 1626, 1627, 1628, 1629, 1630, 1631, 1865, 1866, 1667, 1869, 1870, 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880 कुल क्षेत्रफल 22.4950 हैक्टर भूमि पर हिन्दुस्तान निक लिमिटेड को अयस्क सज्जीकरण सयत्र लगाने के लिए भूमि आवंटित की जाती है तो ग्राम पंचायत जावर को कोई आपत्ति नहीं है।

अतः अनापत्ति प्रमाण पत्र जारी किया जाता है।

सरपंच

ग्राम पंचायत-जावर



## ग्रामवासियों की अपील

दिनांक - 22/12/2022

ग्राम पंचायत : डी पी (जावरगावा) ग्राम पंचायत

वाई संख्या : .....

तहसील : डी पी

जिला उदयपुर राजस्थान

प्रेषित : जावरगावा जिला उदयपुर  
हिन्दुस्तान जिक जावर एवं देवाता ग्रुप

विषय :- हिन्दुस्तान जिक जावर या देवाता ग्रुप द्वारा 3620 हेक्टेयर भूमिगत अदम्य खनिज के जन सूनवाई के सम्बन्ध में।

तहसील गिवा व मरावा के अंतर्गत आकर खनिज के खनन से जन पान की समस्या पंचायतों की 3620 हेक्टेयर भूमि पर अंडर ग्राउंड अदम्य खनिज के लिए जमीन का उपयोग किया जाता है या नया कारखाना लगाया जाता है तो प्रभावित पंचायत की जल जंगल व जमीन भी वास्तविक रूप से प्रदूषित व प्रभावित होगी एवं वहां पर निवासित जीव, जंतु व आदिवासी बहुलिय क्षेत्र ( TSP ) में रहने वाले हजारों गरीब व मजदूर लोगों के जीवन पर भी असर पड़ेगा।

इस प्रकार जावर ग्रुप द्वारा खनिज से स्थानीय निवासित हजारों आदिवासियों की मिंचित जमीन व पानी के जल स्रोत भविष्य में पूरी तरह से बंजर व बर्बाद हो जायेंगे जिस से उनकी आजीविका व उनकी संस्कृति, संभवता पर बुरा असर पड़ेगा अतः पंचायतों के इस तरह पर्यावरण में जल जंगल जमीन पूरी तरह से प्रदूषित व बर्बाद हो जायेंगे।

अतः ग्राम पंचायत भविष्य में इस तरह से पूर्व के खनिज पट्टों से प्रदूषित हो रही है जिस से हम सभी प्रभावित पंचायतों के अन्दर रहने वाले हजारों आदिवासी भविष्य के पैसा एकट कानून 1996 के नियमानुसार हम हमारी जल जंगल जमीन खनिज के प्रभावित व प्रदूषित नहीं हो उसके लिए प्रतिबद्ध है अतः पूर्व 2014 में भी खनिज के लिए भी जमीन दी गयी उसके सम्बन्ध में हिन्दुस्तान जिक लिमिटेड एवं देवाता ग्रुप से आसपास की प्रभावित पंचायतों ( जावर, टीडी, सिगतवाडा, चणावडा, भालडिया, पाडला ) के अंतर्गत निवासी स्थानीय गरीब बेरोजगारों को रोजगार व प्रभावित पंचायतों की आर्थिक शैक्षणिक व



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1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

श्रीमान् सारपंच साहब  
ग्राम पंचायत - जावर

**विषय** श्रीमान् विकास अधिकारी - गिरवा क्षेत्र - आसाम में समकालीन प्रशासन का विकास एवं सामाजिक हिन्दुस्तान जिक द्वारा आपके माँग पर की सेवा में सम्बन्धित सूचनाएं।

महोदय

जैसा कि आपको विदित है कि तदनुसार श्रीमान प्रमोदस आंधकारी मित्रा द्वारा एच.एम.एस.का आयोजन दिनांक 11.02.2014 को आयोजित बैठक में हमारे द्वारा आपको भाग लेने का सचिव ने अनुरोध किया है।

- [illegible]



vedanta



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6. जलवायु परिवर्तन को मुकाबिले में मदद करने हेतु प्रत्येक व्यक्ति को अपना योगदान देना चाहिए।
7. श्रम कल्याण हेतु भविष्य में जो भी नियम लागू किए जाएंगे, उन्हें लागू करने में प्रत्येक व्यक्ति को सहयोग देना चाहिए।
8. ठेकेदार श्रमिकों को भर्ती करने में प्रत्येक व्यक्ति को सहयोग देना चाहिए।
9. ठेकेदारी प्रथा में कार्यरत श्रमिकों को सुरक्षा देने के लिए प्रत्येक व्यक्ति को सहयोग देना चाहिए।
10. पर्यावरण को साफ-सुथरा रखने हेतु प्रत्येक व्यक्ति को सहयोग देना चाहिए।
11. ठेकेदारी प्रथा में कार्यरत श्रमिकों को सुरक्षा देने के लिए प्रत्येक व्यक्ति को सहयोग देना चाहिए।
12. ग्राम पंचायत जांच के माध्यम से ग्राम में प्रभावित क्षेत्रों में श्रमिकों को सुरक्षा देने की जायेगी। तथा टेलिंग डैम से जिनकी भूमि खराब हो रही है, उसका गंभीर ध्यान निरीक्षण उपरांत उचित मुआवजा दिया जायेगा।

आशा है आप उपराक्त बिन्दुओं से सहमत होकर कम्पनी के उत्पादन एवं उत्पादकों के निर्यात विकास में अपना सहयोग प्रदान करते रहेंगे।

(के वं, दवे)

संस्थापन प्रधान

1994



सामाजिक (प्राप्त) लाभ हिन्दुस्तान जिंक लिमिटेड को प्रदान कर सत्य प्राप्त पंचायतों के बीच अनुबंध (लाभ) बना गया है। परन्तु इन लाभों के बावजूद भी हिन्दुस्तान जिंक के स्थानीय बेरोजगारों की रोजी रोटी खान को न प्रभावित पंचायतों के गरीब लोगों को नही रोजगार दिया गया नही पंचायतों की आर्थिक सामाजिक व शैक्षणिक विकास की गति दी गयी एवं पंचायतों पर प्रत्येक नागरिक आज भी बेरोजगारी तानाशाही शोषण व अन्यायकार से परेशान है व स्थानीय कुशल , अकुशल स्थानीय गजदरा की जगह बाहरी लोगों को रोजगार दिया गया जिसकी वजह से स्थानीय बेरोजगारों में लोगों की मोनोपोलीमी के खिलाफ काफी आक्रोश ताराजगी एवं अराजकता का माहौल है तो भविष्य में स्थानीय पंचायतों के साथ कंपनी द्वारा विश्वासघात धोखा मक्कासे एवं पक्षधर का शिकार स्थानीय लोगों को होना पड़ता है तो क्यों हम प्रभावित स्थानीय पंचायत हम अपनी जल जंगल जमीन को उनके कारखानों एवं खनन से प्रभावित होते देखें किमंक वजह से स्थानीय निवासियों को रोजगार के लिए भविष्य में भीख मांगनी पड़ती है एवं उनके शोषण का शिकार होता पड़ता है अगर भविष्य में कंपनी हमारे पूर्व स्वर्गीय भैरुनाथ जी की भाँति बेरोजगारों की भर्ती की मोनोपोलीमी को ध्यान में रख कर भर्ती को सार्वजनिक कर स्थानीय पंचायतों की मजिद के माध्यम से करें तो स्थानीय बेरोजगारों को अधिक से अधिक रोजगार प्राप्त होगा एवं भ्रष्टाचारियों व अन्यायचारियों से मुक्ति मिलेगी एवं कंपनी के लाभ का 10 प्रतिशत स्थानीय प्रभावित पंचायतों की आर्थिक सामाजिक व शैक्षणिक विकास एवं हर प्रभावित पंचायतों में कुटीर एवं लघु उद्योग का निर्माण कंपनी के 10 प्रतिशत लाभ का देकर मदद करें तो प्रभावित पंचायतों के लोगों का खुद का रोजगार व आजीविका का निर्माण भविष्य में कर पाएंगे व 2014 में लागू कंपनी एवं पंचायतों के बीच अनुबंध को लागू करने में पूर्ण विश्वास व आपस में सहमती देने में प्रतिबद्ध हो तो हम प्रभावित पंचायतों के समस्त ग्रामवासी भविष्य में आने वाली आर्थिक, सामाजिक, शैक्षणिक बेरोजगारी से छुटकारा मिल सके तो हम हिन्दुस्तान जिंक लिमिटेड या वेदांता को यहाँ पर अग्रस्क खनन के लिए सहमती प्रदान करने में सहयोग करेंगे एवं किसी प्रकार की आपत्ति नहीं करेंगे है

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प्राशनो  
बन्नेरा  
राजू  
आशीष

समस्त ग्रामवासीगण  
पुनित मेरा जी  
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विहंग अमर-सन्ध  
पन्नालाल बाबल  
हरीशचन्द्र सागर  
आयुषी  
इरज

रैशे 31/12/21 राजु नीला

जामपंडु दुला नाकुडा  
रैशे नीला

शंकर  
पूजा शंकर  
पूजा नाथुलाल

मोतीलाल  
के सु लाल

हरली जैर  
देवीलाल शिवराम

मोतीलाल  
नाथलाल माधुलाल

हंकर देवीलाल

मोदी प्रभुलाल

काजीलाल

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31/12/21  
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31/12/21



## समस्या पत्र

सेवामें

राजस्थान राज्य प्रदूषण मण्डल

1-470 मेवाड़ औद्योगिक क्षेत्र मांदडी उदयपुर

विषय:- जावर समूह H.Z.L VEDANTA GROUP को खनन पट्टा क्षेत्र 3620 हेक्टर जमीन की स्वीकृती नहीं देने बाबत !

ग्राम जावर के राजस्व गाव कानपुर मे टेलिंग बांध से उत्पन्न समस्याए निम्न है

1. पेयजल दूषित होने के साथ चर्म रोग की समस्याए उत्पन्न हो रही है
2. पेयजल से स्वास्थ्य संबन्धित कई बीमारी से कानपुर के निवासी ग्रसित हो रहे है मवेशी भी टेलिंग मे डूबने की वजह से जनधन की हहनी हो रही है
3. बेरोजगारी की वजह से आर्थिक , शैक्षणिक , सामाजिक विकास मे वृद्धि नहीं हो पायी है
4. समस्याओं को कई बार समाचार पत्र मे देने के साथ स्थानीय जनप्रतिनिधियों तथा विधायक महोदय को भी अवगत करवाया लेकिन संतोष प्रद कार्यवाही नहीं की !
5. स्थानीय भर्ती के नाम पर बाहरी वर्कर को भर्ती कर दिया गया!
6. आसपास की ग्राम पंचायतों मे होने वाले नुकसान माइनिंग की मे ब्लास्ट की वजह से मकानों मे दरारे पड़ गयी है!
7. माइनिंग ब्लास्ट की वजह से भूमि के जल स्तर मे गिरावट हो रही है!
8. टीडी डेम के पानी के अतिदोहन की वजह आसपास के क्षेत्रों मे नदी नालों मे पानी की कमी की वजह से पशुधन को पानी पिलाने की समस्याए विशेषकर गर्मी के सीजन मे!
9. पावर प्लांट से आसपास से एरिया मे तापमान बढ़ने के कारण लोगों मे चर्म रोग संबन्धित समस्याए उत्पन्न हो रही है!
10. पावर प्लांट के धुए से आसपास के क्षेत्रों मे वायु प्रदूषण बढ़ रहा है!

प्राप्त  
11/11/20  
11/11/20

जयराज  
संदीप  
पुनर्व  
विनीत  
(20)

समस्त ग्रामवासी

हस्ताक्षर  
रमेश शीला खिंदरवाड़ा  
वासी ग्राम जावर

9-1-2001

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राजस्थान राज्य प्रदूषण मण्डल

1-470 मेवाड़ ओधगिक क्षेत्र मादड़ी उदयपुर

विषय: जावर समूह H.Z.L. वेदांता को खनन पट्टा क्षेत्र 3620 हेक्टर जमीन की स्वीकृति नहीं देने बाबत ।

उपरोक्त विषय मे निवेदन हे की दिनांक 14/06/2018 मे ग्राम पंचायत जावर सरपंच द्वारा जारी आनापति प्रमाण पत्र मे 22.4950 हेक्टर भूमि राजस्व रेकार्ड के अनुसार बिलनाम गेर काबिल काश्त किस्म की दर्ज हे लेकिन वहा पर वर्तमान पर वास्तविक स्थानीय आवासियों का कब्जा हे तथा हमारे पशुओं का चारागाह की जमीन हे बिना मोके पर जाए तथा बिना ग्राम पंचायत के निवासीयो की जानकारी के यह आनापति प्रमाण पत्र जारी किया गया हे इसे निरस्त कर जाच की जाए ओर इनके खिलाफ कानूनी कार्यवाही की जाए

खसरा न. निम्न हे ।

1617,1618,161,1620,1621,1622,1623,1624,1625,1626,1627,1628,1629,1630,  
1631,1865,1866,1867,1869,1870,1871,1872,1873,1874,1875,1876,1877,  
1878,1879,1880,

प्रति सल्वन है ।

समस्त ग्रामवासी

बंजम जेवसलरि

बंजम जेवसलरि

होम

सो.ल

संदीप

प्रमाण

दिनांक

क्रमांक: जामा/प्रशा/2018/204

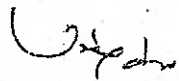
दिनांक:

सेवा में,  
श्रीमान् सरपंच महोदयजी,  
ग्राम पंचायत जावर,  
गिरवा उदयपुर

**विषय : अनापत्ति प्रमाण-पत्र चाहने हेतु ।**

ग्राम पंचायत जावर द्वारा यह प्रमाणित किया जाता है कि ग्राम जावर के खसरा नम्बर 1617, 1618, 1619, 1620, 1621, 1622, 1623, 1624, 1625, 1626, 1627, 1628, 1629, 1630, 1631, 1865, 1866, 1667, 1869, 1870, 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880 क्षेत्रफल क्रमशः 0.3050, 6.5400, 0.7750, 0.0550, 0.8500, 0.4250, 0.1900, 0.3050, 0.0700, 1.1050, 1.6000, 1.1100, 0.0900, 0.3400, 0.2350, 0.2000, 0.6300, 0.3800, 0.4100, 0.2350, 1.4000, 0.3100, 0.2500, 0.7950, 0.1900, 0.5500, 1.1700, 1.3700, 0.600, 0.5000 कुल क्षेत्रफल 22.4950 हैक्टर भूमि राज्य रेकार्ड के अनुसार बिलानाम गैर काबिल काश्त किस्म आबादी दर्ज है । उक्त आबादी कई वर्षों से दर्ज रेकार्ड है, लेकिन मौके पर उपर वर्णित खसरा नम्बरानो में कोई भी मकान नहीं है, मौके पर उक्त भूमि पड़त पड़ी होकर झाड़ियाँ उगी हुई है ।

ग्राम जावर में खसरा नम्बर 1617, 1618, 1619, 1620, 1622, 1623, 1624, 1625, 1626, 1627, 1628, 1629, 1630, 1631, 1865, 1866, 1667, 1869, 1870, 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880 कुल क्षेत्रफल 22.4950 हैक्टर भूमि पर हिन्दुस्तान जिंक लिमिटेड को अयस्क सज्जीकरण संयंत्र लगाने के लिए अनापत्ति प्रमाण पत्र जारी करने का श्रम प्रदान करें ।



हस्ताक्षर

Hindustan Zinc Limited  
Zawar Mines, District-Udaipur  
Rajasthan - 313901

**Hindustan Zinc Limited**

P.O. Zawar Mines, Udaipur - 313901

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Fax : (+91-0294) 2726243

www.hzindia.com

Regd. Office : Yashad Bhawan

Udaipur - 313004

CIN : L27204RJ1966PLC001208



सत्यमेव जयते

# कार्यालय ग्राम पंचायत जावर

पंचायत समिति गिर्वा, जिला उदयपुर ( राज. )

क्रमांक

दिनांक 14.6.2018

## अनापत्ति प्रमाण-पत्र

ग्राम पंचायत जावर द्वारा यह प्रमाणित किया जाता है कि ग्राम जावर के खसरा नं. 1617, 1618, 1619, 1620, 1621, 1622, 1623, 1624, 1625, 1626, 1627, 1628, 1629, 1630, 1631, 1865, 1866, 1667, 1869, 1870, 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880 क्षेत्रफल क्रमशः 0.3050, 6.5400, 0.7750, 0.0550, 0.8500, 0.4250, 0.1900, 0.3050, 0.0700, 1.1050, 1.6000, 1.1100, 0.0900, 0.3400, 0.2350, 0.2000, 0.6800, 0.3800, 0.4100, 0.2350, 1.4000, 0.3100, 0.2500, 0.7950, 0.1900, 0.5500, 1.1700, 1.3700, 0.0600, 0.5000 कुल क्षेत्रफल 22.4950 हेक्टर भूमि राजस्व रेकार्ड के अनुसार विलानाम गेर काविल कास्त फिस्म आवादी दर्ज है। उक्त आवादी कई वर्षों से दर्ज रेकार्ड है, लेकिन गौके पर उपर वर्णित खसरा नम्बरानों में कोई भी मकान नहीं है, गौके पर उक्त भूमि पड़त पड़ी होकर झाड़ियां उगी हुई है।

ग्राम जावर में खसरा नं. 1617, 1618, 1619, 1620, 1621, 1622, 1623, 1624, 1625, 1626, 1627, 1628, 1629, 1630, 1631, 1865, 1866, 1667, 1869, 1870, 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880 कुल क्षेत्रफल 22.4950 हेक्टर भूमि पर हिन्दुस्तान जिंक लिमिटेड को अयस्क सज्जीकरण संयंत्र लगाने के लिए भूमि आवंटित की जाती है तो ग्राम पंचायत जावर को कोई आपत्ति नहीं है।

अतः अनापत्ति प्रमाण पत्र जारी किया जाता है।

सरपंच

ग्राम पंचायत-जावर

जारी  
14/6/18

मेवामें

राजस्थान राज्य प्रदूषण मण्डल

1-470 भेवाड़ औद्योगिक क्षेत्र मांदडी उदयपुर

विषय:- जावर समूह H.Z.L VEDANTA GROUP को खनन पट्टा क्षेत्र 3620 हेक्टर जमीन की स्वीकृती नहीं देने बाबत !

उपरोक्त विषय में निवेदन है की ग्राम पंचायत जावर क्षेत्र में निवासरत परंपरागत आदिवासियों की जमीन वेदांता ग्रुप द्वारा गैर संवैधानिक तरीके से लीज में लेकर हम आदिवासियों को हमारी जमीन से बेदखल करने का काम कर रहे हैं हम आदिवासी उत्तरी जमीन पर हजारों वर्षों से निवासरत हैं लेकिन वेदांता समूह ने धोखे से यहां के आदिवासियों की जमीन पर कब्जा कर रहे हैं !

ग्रामपंचायत के आदिवासियों द्वारा अनुसूचित जनजाति एवं वन परंपरागत वीएन निवासी(वन अधिकारों की मान्यता ) अधिनियम 2006 एवं संसोधित नियम 2012 अन्तर्गत 2015 में जावर पंचायत के निवासियों द्वारा 75 फाइलों को सरकार के समक्ष पेश किया गया लेकिन बिना किसी जाँच के इनकी फाइलों को HZL लीज क्षेत्र में आने का हवाला देकर फाइलों को निरस्त कर दिया गया !

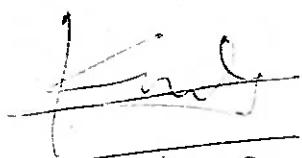
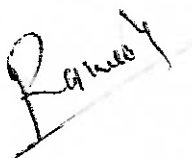
पिछले 100 वर्षों से उनके पूर्वज की जमीन पर काबिज आदिवासियों की जमीन को बिना जानकारी के वेदांता समूह को लीज में देने वाले राजस्थान सरकार के राजस्व विभाग के पंचायत पटवारी एवं पंचायत सरपंच के खिलाफ जाँच कर इनके खिलाफ कार्यवाही करावे तथा 75 कास्तकारों को उनकी जमीन का पट्टा दिलवाने का कष्ट करावे !

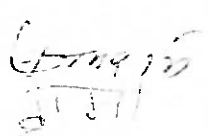
1.प्रति सत्यन है

समस्त आभवासे

धन्यवाद

जावर

  
20/10/2021  
  
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पुनगरी ऑफिस  
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शिवराज नारायण शर्मा  
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वामे

राजस्थान राज्य प्रदूषण मण्डल

1-470 गेवाड़ औद्योगिक क्षेत्र मादड़ी उदयपुर

विषय: खनन पट्टा क्षेत्र 3620 हेक्टर जमीन की स्वीकृति नहीं देने बाबत हेतु ।

श्रीमान जी पूर्व मे 2014वर्ष के समय दी गई लीज के अनुसार 12 मांगो को ध्यान मे रखते हुए लीज प्रदान की गई थी जिनमे किसी भी माँग पर अमल नहीं किया गया ।

- 1 सर्वप्रथम पूर्व मे लीज के अनुसार 12 माँगो को पूरा किया जाए ।
- 2 पूर्व मे दी गई लीज क्षेत्र का सीमांकन जानकारी प्रदान करावे ।
- 3 ग्राम पंचायत के प्रत्येक बेरोजगार युवा को नोकरी दी जाए !
- 4 पूर्व मे गैर संवैधानिक तरीके से ली गयी लीज निरस्त हो !
- 5 पूर्व लीज की मांगो को पूरा करने के लिए विशेष कमेटी का गठन किया जाए
- 6 क्षेत्र बेरोजगार भर्ती के लिए भी विशेष कमेटी का गठन होना चाहिए
- 7 टीडी डैम के पानी का अतिदोहन के कारण जावर नदी मे पानी की समस्या बढ़ गयी है!
- 8 पूर्व मे 73 वनाधिकार फ़ाइल H.Z.L के लिए मे आने से निरस्त फ़ाइलो को पुनः जांच पट्टा दिलवाया जावे !
- 9 जावर क्षेत्र के बाहरी वर्करो की सूची को सार्वजनिक किया जाए ! व बाहरी वर्करो की भर्ती को तुरन्त प्रभाव को रोका जाए!
- 10 14/06/2018 मे ग्राम प. द्वारा कुल क्षेत्र 22.4950 हेक्टर पर अनापत्ति प्रमाण पत्र दिया गया ! उसकी जांच कमेटी गठन कर प्रमाण पत्र निरस्त किया जाए !

संमस्त ग्रामवासी

श्रीमान श्रीमान  
जिंदर बाड़ा  
नारायण बाड़ा

जोधा  
संस्थाप  
प्रकाश  
मिनीप

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होम

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कमाक जमा / पत्र / 2014 /

सेवा

12-02-2014 15/02/2014

श्रीमान् यशवन्त साहब

गाम प्रमाणित जावर

विषय श्रीमान् विकास अधिकारी-गिरवा द्वारा आयोजित प्रारम्भिक दिनांक 11.02.2014 को तदनुसार हिन्दुस्तान जिंक द्वारा आपके मांग पत्र के संबंध में तथ्यात्मक सहमति।

महोदय

जैसा कि आपको विदित है कि तदनुसार श्रीमान् विकास अधिकारी गिरवा द्वारा एक ग्राम समा का आयोजन दिनांक 11.02.2014 को आयोजित बैठक में हमारे द्वारा आपके मांग पत्र के संबंध में निम्नानुसार सहमति दी जाती है।

1. वैदन्ता ग्रुप को भविष्य में जब कभी भी खनन शुरू करना खोज के अतिरिक्त मांगे की आवश्यकता होगी तो प्रमाणित ग्रामवासियों को प्रचलित नियमानुसार पूर्णवास एवं मुआवजा संबंधी कार्यवाही सुनिश्चित की जायेगी, एवं इसकी जिम्मेदारी हिन्दुस्तान जिंक प्रबन्धन की होगी।
2. कम्पनी बलस्टींग से यदि किसी ग्रामवासी के मकानों में दरार आती है तो इस संबंध में हिन्दुस्तान जिंक लिमिटेड द्वारा एक टीम गठित की गई है और इस दिशा में कार्रवाई करने का प्रयत्न हमारे द्वारा कार्य किया जायेगा।
3. प्रबन्धन द्वारा बेरोजगारों के लिए तकनीकी एवं आवश्यक प्रशिक्षण देने हेतु प्राइवेट पार्टनर पेटने पर हम आई.टी.आई लगाने हेतु प्रतिबद्ध है और इस दिशा में कार्य किया जा रहा है तथा प्रशिक्षण पश्चात बरियतानुसार रोजगार देने की व्यवस्था की जायेगी।
4. खनन कार्य से यदि कोई भविष्य में जन धन को नुकान होती है तो इसकी मर्यादा निर्धारित दर एवं प्रक्रिया के अनुसार स्वीकार्य होगा।
5. ब्लारिंग के समय यदि कोई कुआँ है पड़पड़ना शुरू हो जा तो ब्लारिंग सुख जाता है तथा नुकसान होने पर निम्नलिखित व्यवस्था में नुकसान किया जायेगा या ब्लारिंग में फासल खराब होगी तो निम्नलिखित जावर माइन्स उसकी भरपाई करेगा।





**HINDUSTAN ZINC LIMITED**

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TEL: (91 0294) 2723622 2723451

FAX: (91 0294) 2726241 2726243

Website: [www.vedantaresources.com](http://www.vedantaresources.com)

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Udaipur 313 004

6. नए नौकरों को नए गुप्त सुविधा देने हेतु प्रबंधन द्वारा दिवार किया जायेगा।
7. नए नौकरों हेतु गतिविधि में जो भी नियम लागू होना निर्धारित किए जाने के समान अनुमानित होना प्रतिक्रिया है। हिजिलि के सीएसओ द्वारा जो प्रतिक्रिया देने के लिए नए नौकरों को बताया हो जायेगा वह लागू होना निर्धारित किया जायेगा।
8. नए नौकरों की भर्ती हेतु ग्राम पंचायतों द्वारा दी गई सूची अनुसार तकनीकी एवं गैर-तकनीकी के अनुसार चयन प्रक्रिया के माध्यम से निरपेक्ष नियोजन करना सुनिश्चित किया जायेगा।
9. ठेकेदारी प्रथा में कार्यरत मजदूरों का सम्पूर्ण रूप से चयन रखा जायेगा और नए नौकरों में भी रखा जायेगा। इस सदन में यदि कोई प्रत्यक्ष मौजूद है जो अल्पकालीन है जो वापस लौटने पर एचआर विभाग को अवगत करवा दिया जायेगा और सुनिश्चित की जायेगी।
10. पर्यावरण को साफ-सुथरा रखने हेतु कम्पनी की ओर से पेड़-पौधे लगाये जायेंगे।
11. ठेकेदारी प्रथा में कार्यरत नौकरों को व्यवस्थित रूप से नौकरों द्वारा प्रमाणित किया जायेगा, नौकरों को नौकरों द्वारा प्रमाणित किया जायेगा।
12. ग्राम पंचायत जावर के गांव कानपुर में टेलिंग डेम से प्रभावित क्षेत्र में पीने के पानी की उचित व्यवस्था की जायेगी। तथा टेलिंग डेम से जिनकी भूमि खराब हो रही है, उसका गतिविधि कमिटी द्वारा निरीक्षण उपरांत उचित मुआवजा दिया जायेगा।

आशा है आप उपरोक्त बिन्दुओं से सहमत होकर कम्पनी के उत्पादन एवं उत्पादकता के निरन्तर विकास में अपना सहयोग प्रदान करते रहेंगे।

(के. के. दवे)

संस्थापन प्रधान

के. के. दवे

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बोरो

महाराष्ट्र

सोमनाथ चैतन्यदास

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१०/१०/६१

११/१०/६१  
११/१०/६१

११/१०/६१