

**ENVIRONMENTAL STATEMENT
IN
FORM-V**

(Under Rule-14, Environmental (Protection) Rules, 1986)

(2018-2019)

**FOR
CLUSTER NO. – 4
(GROUP OF MINES)
Salanpur Area
Eastern Coalfields Limited**

**Prepared at
Regional Institute – I
Central Mine Planning & Design Institute Ltd.
(A Subsidiary of Coal India Ltd.)
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A Maharatna Company
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CMPDI

ISO 9001:2015 Company

ENVIRONMENTAL STATEMENT FORM – V

Environmental statement for the financial year ending 31st March, 2019

Cluster No. – 4

FOR THE YEAR: 2018-19

CONTENTS

SL.NO.	CHAPTER	PARTICULARS	PAGE NO.
1	CHAPTER-I	INTRODUCTION	2-5
2	CHAPTER-II	ENVIRONMENTAL STATEMENT FORM-V (PART A TO I)	6-10

LIST OF ANNEXURES

ANNEXURE NO.	PARTICULARS	PAGE NO.
I	AMBIENT AIR QUALITY AND HEAVY METAL ANALYSIS	11-13
II	NOISE LEVEL REPORT	14
III	WATER QUALITY REPORT – MINE WATER QUALITY AND GROUND WATER QUALITY	15-17
IV	GROUNDWATER LEVEL REPORT	18

PLATES

I	LOCATION PLAN
II	PLAN SHOWING LOCATION OF MONITORING STATIONS

CHAPTER – I

INTRODUCTION

1.1 GENESIS:

The Gazette Notification vide G.S.R No. 329 (E) dated 13th March, 1992 and subsequently renamed to 'Environmental Statement' vide Ministry of Environment & Forests (MOEF), Govt. of India gazette notification No. G.S.R No. 386 (E) Dtd. 22nd April '93 reads as follows.

"Every person carrying on an industry, operation or process requiring consent under section 25 of the Water Act, 1974 or under section 21 of the Air Act, 1981 or both or authorisation under the Hazardous Waste Rules, 1989 issued under the Environmental Protection Act, 1986 shall submit an Environmental Audit Report for the year ending 31st March in Form V to the concerned State Pollution Control Board on or before the 30th day of September every year."

In compliance with the above and in fulfillment of condition laid out in the EC for the Cluster, the work of Environmental Statement for Cluster No. 4 was entrusted to CMPDI by GM (Environment and Forest), Eastern Coalfields Limited.

1.2 PROJECT DESCRIPTION:

Prior to 2014 – 15, a large number of taken over mines from pre – nationalization period, mostly underground mines, in the old coalfields of Raniganj and Jharia did not have environmental clearance from the MoEF&CC and were operating on the basis of 'Consents' received from the respective PCBs. It was felt that if these mines could be brought under the ambit of EC, several measures for environmental protection and pollution control could be put in place. However, the work of obtaining EC for such mines, individually, would have taken a lot of time. To circumvent the problem, it was mooted that since the environmental problems being faced were of regional nature and not confined to individual mines alone, cluster/groups of such mines could be identified for preparing cluster-wise integrated EIA & EMPs, addressing such environmental concerns comprehensively and ensuring effective co-ordination of environmental control measures within each cluster. 13 such clusters were identified in the Raniganj Coalfield of ECL and EC has been obtained on the cluster approach for 12 such clusters.

Cluster of Mines No. 4 is one of the clusters for which EC has been granted vide letter no. J-11015/106/2011-IA.II(M) dated 21st July, 2015 for a combined peak capacity of 7.71 MTY and within a ML area of 3353 Ha out of which 3.0 Ha is forest land for which forest clearance has been applied.

Meanwhile, amendment in individual mine capacity was sought in the cluster through approved Mining Plan dated 10.01.2018. The proposal of EC amendment was considered in 26th EAC meeting held on 15-16 February, 2018 and again in 28th EAC meeting held on 17-18 April, 2018. Subsequently, amendment in EC was granted vide file no. J-11015/106/2011-IA.II(M) dated 31.05.2018.

Cluster No. 4 is located in the north-western part of the Raniganj Coalfield about 12 kms north of Asansol town in Burdwan District of West Bengal. Asansol, the coal-mining-industrial centre, is the second largest city in West Bengal, after Kolkata. The cluster is well located in respect of accessibility and communications by roads and railway lines. The Eastern Railway Main line passes through the eastern part of the block. G. T. Road (NH-2) passes through the southern boundary of the block.

The area lies between latitudes 23°46'30" N & 23°49'30" N and longitudes 86°52'25" E & 87°03'46" E and is covered by the Survey of India toposheet no. 72 L/2 (R.F. 1:50,000) Raniganj Coalfield, 1976.

Mines of the Cluster No. 4 are under the administrative control of Salanpur Area, Eastern Coalfields Ltd. Location of cluster no. 4 is shown in plate no. – 1.

The revised individual capacities of each mine within the cluster after amendment in EC is as follows:

SI No.	Name of Mine	Lease Area (Ha)	Peak Production (MTY)	Mine Life (Years)	Production during 2018-19 (MT)
1	Khoirabad UG & OC	-	-	-	Nil
2	Gaurandih & Gaurandih – Begunia OC	1865.0	4.21	15	1.64
3	Itapara OCP	855.87	3.50	26	0.05
	Total	2720.87	7.71	-	1.69

1. Khoirabad UG & OC

Khoirabad UG & OC has been dropped from the revised proposal as the lease of this colliery has been transferred to other agency.

2. Gaurandih & Gaurandih – Begunia OC

The OC mine has adopted shovel-dumper combination for extracting coal and OB removal.

3. Itapara OC

The OC mine has adopted shovel-dumper combination for extracting coal and OB removal.

1.3 ENVIRONMENTAL SCENARIO:

CMPDI has been engaged to carry out routine Environmental monitoring of the clusters. The monitoring is carried out every fortnight by collecting 24 – hour samples for ambient air at 2 (two) all – weather stations, 3 (three) pre-monsoon stations and 3 (three) post-monsoon stations (based on local meteorology) and compared with standards for quality. The details of the sampling locations are given below:

Cluster 4		
Station Code	Type of Station	Name of Station
4A1	Permanent Air Station	In Pakuria village
4A2	Permanent Air Station	In Madanpur village
4A3	Post monsoon Air Station	In Baliapur village
4A4	Post monsoon Air Station	In Natundih village
4A5	Post monsoon Air Station	In Madhudanga village
4A6	Pre monsoon Air Station	In Kanskuli village
4A7	Pre monsoon Air Station	In Narayanpur village
4A8	Pre monsoon Air Station	In Rashunpur village

1 no. of sample of mine water is also collected and analysed every fortnight and compared with the MoEF Schedule – VI for discharge of effluents into land / streams. A complete analysis of the mine discharge samples which includes heavy metals and salts is carried out twice every year during September and March. Noise level is recorded at 1 location. However, since Q/E December'18, 2 more locations are being monitored. Groundwater level in the cluster area is monitored by taking measurements at 8 earmarked dugwells in the months of January, May, August and November every year. Samples of groundwater from these wells, which are also utilized by the local population

for drinking and other domestic purposes, are analysed once in a year during May and compared with the IS 10500:2012 standards for drinking water quality.

Location of the monitoring stations of air, noise & water are shown in Plate- II.

The environmental monitoring results for 24 fortnights ending 31st March, 2019 are appended as Annexures – I, II & III. The environmental monitoring results for the year 2018-19 are summarized below:

AMBIENT AIR QUALITY

The PM₁₀ concentration was found in the range of 80.2 to 91.8 µg/m³ and are within the limits as per standards. The PM_{2.5} concentration was found in the range of 28.2 to 56.5 µg/m³ and are within the limits as per NAAQS, 2009. The SO₂ concentration remained below 10.0 µg/m³ and NO_x concentration was in the range of 11.3 to 24.8 µg/m³ and was well within the limits.

ENVIRONMENTAL STANDARDS:

Environmental Standards for Ambient Air Quality (AAQ):

Station Category	<i>Environmental standard for Raniganj Coalfield vide MOEF, Govt. of India, Gazette Notification No. GSR 742 (E) dated 25.09.2000 for 24 hourly samples at 500 meters from dust generating point</i>			<i>National Ambient Air Quality Standards (NAAQS), 2009 for industrial, residential and rural areas for 24 hours samples</i>
	Pollutant Concentration (µg/m³)			
	PM₁₀	SO₂	NO_x	PM_{2.5}
Industrial	300.0	120.0	120.0	60.0
Residential	100.00	80.0	80.0	

WATER QUALITY

Ground water percolates into working area from the surrounding aquifers which have been exposed due to opencast mining. The mine is dewatered regularly to maintain dry working conditions. This mine discharge water is partly utilized for dust suppression by sprinkling at coal faces and on haul roads and the remainder is discharged onto adjoining cultivable lands for irrigation purposes. Part-B of the Environmental Statement proforma contains the detailed break-up of water consumption.

The analysis results for the mine discharge water reveal that most of the parameters are within permissible limits prescribed by MoEF&CC as General Standards Schedule – VI for Class-'A' effluent (Effluent discharged into inland surface water) and IS 10500:2012 for groundwater standards.

In order to assess the impact of mining on the groundwater level, a network of 8 dugwells has been identified for monitoring of groundwater level in the months of January, May, August and November every year. Samples from these wells are collected and analysed during May every year and compared with IS 10500:2012 standards for drinking water.

Mine water and ground water analysis results are given in Annexure-III.

Well water level results are given in Annexure – IV.

NOISE LEVEL

The day time noise level was found in the range of 62.8 to 69.4 dB(A). The noise level recorded is below permissible limit prescribed by MoEF&CC.

Noise Level Standard as per Noise Pollution (Regulation and Control) Rules, 2000 for different station categories is given below:

Station Category	Limits for noise (Leq dB (A))	
	Day Time (6am-10pm)	Night Time (10pm-6am)
Industrial	75.0	70.0
Commercial	65.0	55.0
Residential	55.0	45.0

CHAPTER - II
ENVIRONMENTAL STATEMENT FORM– V

Environmental statement for the financial year ending March, 2019

PART – A

SL. NO.	HEADING	PARTICULARS
(I)	NAME AND ADDRESS OF THE PROJECT	Cluster No. – 4 (Group of 2 Mines of ECL)
i	Gaurandih & Gaurandih – Begunia OC	Gourangdi Colliery, P.O.-Panuria, P.S. Barabani, Dist:-Burdwan, West Bengal
ii	Itapara OC	Itapara, P.O.: -R N Chowk, P.S.: - Barabani, Dist:-Burdwan, West Bengal
(II)	INDUSTRY CATEGORY	All mines in the cluster falls in red category
(III)	PRODUCTION CAPACITY	7.71 MTY
(IV)	YEAR OF ESTABLISHMENT	Itapara OC started production in 2018-19. Gaurandih & Gaurandih – Begunia OC is part of Gaurandih Colliery which was established pre-nationalisation.
(V)	DATE OF THE LAST ENVIRONMENTAL STATEMENT SUBMITTED	24.09.2018

PART – B

WATER AND RAW MATERIAL CONSUMPTION

(I) WATER CONSUMPTION (Cu.m/day)

1. Gaurandih & Gaurandih – Begunia OC

Sl. No.	Particulars	2017-18	2018-19
	A. MINING (Dust suppression, Firefighting, Others)	164.0	110.0
	B. COOLING (in radiators of trucks/HEMM)	0.0	0.0
	C. DOMESTIC		
i	Colony (Mine and PHED Water)	1000.0	1000.0
	TOTAL	1164.0	1110.0

Name of Product	Process water consumption per unit of product output (l/day/te)	
	2017-18	2018-19
Coal	0.26	0.06

2. Itapara OC

Sl. No.	Particulars	2017-18	2018-19
	A. MINING (Dust suppression, Firefighting, Others)	NIL	24.0
	B. COOLING (in radiators of trucks/HEMM)		0.0
	C. DOMESTIC		
i	Colony		0.0
	TOTAL		24.0

Name of Product	Process water consumption per unit of product output (l/day/te)	
	2017-18	2018-19
Coal	-	0.46

(II) RAW MATERIAL CONSUMPTION :

1. Gaurandih & Gaurandih – Begunia OC

Name of raw material	Name of products	Consumption of raw material per unit of output	
		During previous financial year (2017-18)	During current financial year (2018-19)
1. Explosive	Coal	1.18 kg/te	0.34 kg/te
2. Diesel		0.53 l/te	0.27 l/te
3. Lubricants		0.01 l/te	0.006 l/te

2. Itapara OC

Name of raw material	Name of products	Consumption of raw material per unit of output	
		During previous financial year (2017-18)	During current financial year (2018-19)
1. Explosive	Coal	NIL	-
2. Diesel			-
3. Lubricants			-

**PART – C
POLLUTION GENERATED**

Mine	Pollution	Quantity of pollutants discharged (mass/day)	Concentrations of pollutants discharged	Percentage variation from prescribed standards with reasons
Gaurandih & Gaurandih – Begunia OC	WATER*	Average concentration of 25.0 mg/l. Mine water discharged is 16.0 KL/day. Hence, total load is 0.40 kg/day.	Mine water discharge Analysis results are given in Annexure-III.	The analysis results reveal that most of the parameters are below permissible limits prescribed by MOEF as General Standards for class 'A' effluent (Effluent discharged into inland surface water).
	AIR**	Total pollutant load of PM ₁₀ is 795.01 kg/day while it is 166.95 kg/day for PM _{2.5} .	The main air pollutant is suspended PM ₁₀ and PM _{2.5} . The air quality results are appended as Annexure-I.	Ambient air quality results show that the values of PM ₁₀ , PM _{2.5} , SO ₂ and NO _x are within the prescribed standards as per NAAQS, 2009.
Itapara OC	WATER*	-	Mine water discharge Analysis results are given in Annexure-III.	The analysis results reveal that most of the parameters are below permissible limits prescribed by MOEF as General Standards for class 'A' effluent (Effluent discharged into inland surface water).
	AIR**	Total pollutant load of PM ₁₀ is 57.86 kg/day while it is 12.15 kg/day for PM _{2.5} .	The main air pollutant is suspended PM ₁₀ and PM _{2.5} . The air quality results are appended as Annexure-I.	Ambient air quality results show that the values of PM ₁₀ , PM _{2.5} , SO ₂ and NO _x are within the prescribed standards as per NAAQS, 2009.

* Water discharged from the mine contains pollutants in the form of suspended solids (mostly fine coal dust).

**PM₁₀ and PM_{2.5} estimation has been done using empirical formula by using Emission Factors derived from S&T studies done by CMPDI.

PART – D
HAZARDOUS WASTE
(As specified under Hazardous Waste
(Management and Handling) Rules, 1989)

1. Gaurandih & Gaurandih – Begunia OC

Hazardous waste	Total quantity		Disposal method
	During previous financial year (2017-18)	During current financial year (2018-19)	
A) From process			
i)Used oil	1600 litres	-	Dealt in Part – F
ii)Lead-Acid Batteries			
a. Automobile batteries	01 no.	-	
b. Cap-lamp batteries	Nil	Nil	
iii) Used Cotton waste	25 kg	28 kg	
iv) Metal Scrap	Nil	Nil	

2. Itapara OC

Hazardous waste	Total quantity		Disposal method
	During previous financial year (2017-18)	During current financial year (2018-19)	
A) From process			
i)Used oil		-	Dealt in Part – F
ii)Lead-Acid Batteries			
c. Automobile batteries	-	-	
d. Cap-lamp batteries		Nil	
iii) Used Cotton waste		10 kg	
iv) Metal Scrap		-	

Approximate values may be given where actual values are not available.

Note: a) The detail of used oil is to be given to concerned Pollution Control Board in Form-13 as per time mentioned in HW (M & H), Amendment Rules, 2003.

b) The detail of disposal of Lead Acid batteries is to be given to concerned State Pollution Control Board in Form-VIII as per time mentioned in Batteries (M&H) Rules, 2001.

**PART – E
SOLID WASTE**

Name of Mines	Particulars	Total quantity (In Million Cu.m)	
		During previous financial year (2017-18)	During current financial year (2018-19)
Gaurandih & Gaurandih – Begunia OC	a)From process (Mining) – overburden dump	1.37	2.15
	b)From pollution control facilities	-	-
	c)Quantity recycled or reutilized/back filled	-	-
Itapara OC	a)From process (Mining) – overburden dump	-	0.60
	b)From pollution control facilities	-	-
	c)Quantity recycled or reutilized/back filled	-	-

PART – F

PLEASE SPECIFY THE CHARACTERISTICS (IN TERMS OF CONCENTRATION AND QUANTUM) OF HAZARDOUS AS WELL AS SOLID WASTE AND INDICATE THE DISPOSAL PRACTICE ADOPTED FOR BOTH THESE CATEGORIES OF WASTE.

In general, hazardous waste generated is given in the table of PART-D which has been deposited at area store disposal stock yard.

Batteries are stored in Area Store from where replacement is taken.

Metal scraps are declared and report is sent to HQ. The scraps are then auctioned and sold through HQ.

Used oil are re-used as lubricants of pulleys, wheel and axle of coal tubs.

PART – G

IMPACT OF POLLUTION CONTROL MEASURES ON CONSERVATION OF NATURAL RESOURCES AND CONSEQUENTLY ON COST OF PRODUCTION.

In order to carry out mining in an eco-friendly manner following pollution control measures have been implemented.

1.0 AIR POLLUTION CONTROL MEASURES:

- Surfacing of all service roads/permanent roads by asphalt.
- The un-metalled roads is kept free of ruts, potholes, etc.
- Regular maintenance of HEMM engines to limit emission of harmful exhaust fumes.
- Physical removal of dust from the roads.
- Greenbelts around quarry, industrial sites, service building area besides avenue plantation along roads.
- Water spraying along the haul roads, coal transport route and railway siding to limit the dust.

2.0 WATER POLLUTION CONTROL MEASURES:

(for Mine/CHP/Workshop/Colony discharge water)

- Most of the parameters of mine water conform to General Standard of MOEF for Class- A effluent as mentioned earlier. The mine water is discharged to local nallah after settling.
- Some portion of mine water is used for domestic supply.
- Excess mine water in Gaurandih colliery is discharged in abandoned quarry used as settling tank and is discharged in local nallah through pipeline layout.

3.0 NOISE POLLUTION CONTROL MEASURES:

- Regular maintenance of machines and other equipment.
- Providing green belt around core activity area, along road side in colony and in other vacant space.
- All HEMM & light vehicle are provided with silencers.
- Noise monitoring is being carried out regularly.

PART – H

ADDITIONAL INVESTMENT PROPOSAL FOR ENVIRONMENTAL PROTECTION INCLUDING ABATEMENT OF POLLUTION.

The following are the additional investment proposals for environmental protection:

- The Environmental monitoring of the project will be continued fortnightly as per the guidelines of Ministry of Environment and Forest (MOEF).
- Necessary Consent for discharge may be taken from Competent Authority, if required.
- Different CSR activities have been carried out during 2018-19.

PART – I

ANY OTHER PARTICULAR IN RESPECT OF ENVIRONMENTAL PROTECTION AND ABATEMENT OF POLLUTION.

The Environmental Monitoring is carried out fortnightly for the project by CMPDI, RI-I as per the guideline of Ministry of Environment and Forest (MOEF) and based on the result thereof; colliery takes necessary action if needed.

Annexure – I

AMBIENT AIR QUALITY

Cluster No	Station No	Station Name	Month	Fortnight	Date of Sampling	PM ₁₀	PM _{2.5}	SO ₂	NO _x
4	4A1	In Pachurlo village	April	First	07-Apr-18	88.5	37.2	<10.0	15.8
4	4A1	In Pachurlo village	April	Second	23-Apr-18	89.2	37.4	<10.0	15.6
4	4A1	In Pachurlo village	May	First	05-May-18	90.2	37.1	<10.0	15.8
4	4A1	In Pachurlo village	May	Second	31-May-18	90.6	37	<10.0	15.6
4	4A1	In Pachurlo village	June	First	13-Jun-18	89.4	36.2	<10.0	15
4	4A1	In Pachurlo village	June	Second	20-Jun-18	89	36.1	<10.0	14.8
4	4A1	In Pachurlo village	July	First	10-Jul-18	87.2	34.5	<10.0	14
4	4A1	In Pachurlo village	July	Second	20-Jul-18	86.5	33.7	<10.0	13.7
4	4A1	In Pachurlo village	August	First	08-Aug-18	83.8	31	<10.0	12.4
4	4A1	In Pachurlo village	August	Second	18-Aug-18	83.8	31	<10.0	12.4
4	4A1	In Pachurlo village	September	First	13-Sep-18	82.5	30.6	<10.0	12.1
4	4A1	In Pachurlo village	September	Second	22-Sep-18	82.3	30.2	<10.0	12
4	4A1	In Pachurlo village	October	First	03-Oct-18	84.6	30.8	<10.0	12.9
4	4A1	In Pachurlo village	October	Second	22-Oct-18	85.1	30.5	<10.0	13.2
4	4A1	In Pachurlo village	November	First	09-Nov-18	86.2	30.8	<10.0	13.6
4	4A1	In Pachurlo village	November	Second	19-Nov-18	86.5	31.1	<10.0	13.8
4	4A1	In Pachurlo village	December	First	01-Dec-18	87.3	32.6	<10.0	13.7
4	4A1	In Pachurlo village	December	Second	21-Dec-18	87.6	32.8	<10.0	13.9
4	4A1	In Pachurlo village	January	First	03-Jan-19	88.1	36.5	<10.0	15.8
4	4A1	In Pachurlo village	January	Second	28-Jan-19	88.2	41.3	<10.0	18.3
4	4A1	In Pachurlo village	February	First	02-Feb-19	88.4	42.5	<10.0	21.3
4	4A1	In Pachurlo village	February	Second	27-Feb-19	88.5	39.6	<10.0	18.7
4	4A1	In Pachurlo village	March	First	12-Mar-19	89.6	54.2	<10.0	24.8
4	4A1	In Pachurlo village	March	Second	21-Mar-19	89.8	56.5	<10.0	21.7
4	4A2	In Madanpur village	April	First	07-Apr-18	88.4	36.8	<10.0	15.6
4	4A2	In Madanpur village	April	Second	19-Apr-18	88.6	36.9	<10.0	15.2
4	4A2	In Madanpur village	May	First	05-May-18	89.4	37.4	<10.0	15.6
4	4A2	In Madanpur village	May	Second	31-May-18	89.7	36.8	<10.0	15.2
4	4A2	In Madanpur village	June	First	13-Jun-18	88.7	35.9	<10.0	15.1
4	4A2	In Madanpur village	June	Second	30-Jun-18	88.6	35.2	<10.0	15
4	4A2	In Madanpur village	July	First	11-Jul-18	86.1	34.4	<10.0	14.2
4	4A2	In Madanpur village	July	Second	20-Jul-18	85.6	33.8	<10.0	13.8
4	4A2	In Madanpur village	August	First	06-Aug-18	84	31.1	<10.0	12.3
4	4A2	In Madanpur village	August	Second	31-Aug-18	84	31.1	<10.0	12.3
4	4A2	In Madanpur village	September	First	13-Sep-18	82.9	30.7	<10.0	12.4
4	4A2	In Madanpur village	September	Second	28-Sep-18	82.5	30.3	<10.0	12.1
4	4A2	In Madanpur village	October	First	03-Oct-18	84.2	30.9	<10.0	13.2
4	4A2	In Madanpur village	October	Second	31-Oct-18	84.8	30.6	<10.0	13.5
4	4A2	In Madanpur village	November	First	09-Nov-18	85.6	30.7	<10.0	13.7
4	4A2	In Madanpur village	November	Second	19-Nov-18	85.8	30.8	<10.0	13.6
4	4A2	In Madanpur village	December	First	01-Dec-18	86.5	31.9	<10.0	13.5
4	4A2	In Madanpur village	December	Second	18-Dec-18	86.7	32.3	<10.0	14.1
4	4A2	In Madanpur village	January	First	03-Jan-19	86.9	38.2	<10.0	17.6
4	4A2	In Madanpur village	January	Second	28-Jan-19	87	40.5	<10.0	19.6
4	4A2	In Madanpur village	February	First	02-Feb-19	87.2	41.3	<10.0	19.6
4	4A2	In Madanpur village	February	Second	27-Feb-19	87.4	38.4	<10.0	19.6
4	4A2	In Madanpur village	March	First	06-Mar-19	88.5	42.1	<10.0	19.7
4	4A2	In Madanpur village	March	Second	21-Mar-19	88.9	43.1	<10.0	17.3
4	4A3	In Baliapur village	October	First	03-Oct-18	83.6	29.8	<10.0	12.9
4	4A3	In Baliapur village	October	Second	31-Oct-18	84	30.2	<10.0	13.4
4	4A3	In Baliapur village	November	First	12-Nov-18	85.1	30.6	<10.0	13.8
4	4A3	In Baliapur village	November	Second	19-Nov-18	85.6	30.7	<10.0	13.9
4	4A3	In Baliapur village	December	First	01-Dec-18	86.2	32.2	<10.0	13.9
4	4A3	In Baliapur village	December	Second	18-Dec-18	86.3	32.4	<10.0	14.5

Environmental Statement (Form-V) Cluster No. – 4 (Group of Mines) 2018-19

Cluster No	Station No	Station Name	Month	Fortnight	Date of Sampling	PM ₁₀	PM _{2.5}	SO ₂	NO _x
4	4A3	In Baliapur village	January	First	03-Jan-19	86.5	37.2	<10.0	16.8
4	4A3	In Baliapur village	January	Second	24-Jan-19	86.6	38.7	<10.0	16.4
4	4A3	In Baliapur village	February	First	02-Feb-19	86.8	40.4	<10.0	17.5
4	4A3	In Baliapur village	February	Second	27-Feb-19	86.9	40.8	<10.0	20.7
4	4A3	In Baliapur village	March	First	11-Mar-19	88	41.9	<10.0	20.5
4	4A3	In Baliapur village	March	Second	22-Mar-19	88.3	42.5	<10.0	20.4
4	4A4	In Natundih village	October	First	15-Oct-18	86.9	31.5	<10.0	13.6
4	4A4	In Natundih village	October	Second	25-Oct-18	87.2	31.7	<10.0	13.8
4	4A4	In Natundih village	November	First	12-Nov-18	87.9	31.9	<10.0	13.7
4	4A4	In Natundih village	November	Second	19-Nov-18	88.1	32.1	<10.0	13.8
4	4A4	In Natundih village	December	First	01-Dec-18	89	33.7	<10.0	14.1
4	4A4	In Natundih village	December	Second	18-Dec-18	89.4	33.9	<10.0	14.4
4	4A4	In Natundih village	January	First	10-Jan-19	89.6	35.8	<10.0	17.5
4	4A4	In Natundih village	January	Second	24-Jan-19	89.5	39.6	<10.0	19.8
4	4A4	In Natundih village	February	First	02-Feb-19	89.7	37.8	<10.0	18.3
4	4A4	In Natundih village	February	Second	27-Feb-19	90.2	41.8	<10.0	19.4
4	4A4	In Natundih village	March	First	12-Mar-19	91.4	42.3	<10.0	18.3
4	4A4	In Natundih village	March	Second	22-Mar-19	91.8	41.6	<10.0	19.7
4	4A5	In Madhudanga village	October	First	15-Oct-18	83.9	30.2	<10.0	12.8
4	4A5	In Madhudanga village	October	Second	25-Oct-18	84.2	30.5	<10.0	12.9
4	4A5	In Madhudanga village	November	First	12-Nov-18	85.6	30.4	<10.0	13.1
4	4A5	In Madhudanga village	November	Second	19-Nov-18	86.2	30.8	<10.0	13.4
4	4A5	In Madhudanga village	December	First	01-Dec-18	86.9	32.4	<10.0	14.3
4	4A5	In Madhudanga village	December	Second	18-Dec-18	87.2	33.1	<10.0	14.7
4	4A5	In Madhudanga village	January	First	10-Jan-19	87.8	39.4	<10.0	18.4
4	4A5	In Madhudanga village	January	Second	24-Jan-19	87.4	41.5	<10.0	17.3
4	4A5	In Madhudanga village	February	First	02-Feb-19	87.5	39.4	<10.0	17.2
4	4A5	In Madhudanga village	February	Second	27-Feb-19	87.8	36.5	<10.0	18.2
4	4A5	In Madhudanga village	March	First	13-Mar-19	89	41.4	<10.0	19.7
4	4A5	In Madhudanga village	March	Second	22-Mar-19	89.5	42.7	<10.0	18.2
4	4A6	In Kansuli village	April	First	11-Apr-18	85.2	34.5	<10.0	14.2
4	4A6	In Kansuli village	April	Second	19-Apr-18	85.4	34.8	<10.0	14.4
4	4A6	In Kansuli village	May	First	04-May-18	86.8	35	<10.0	14.9
4	4A6	In Kansuli village	May	Second	29-May-18	85.8	35.2	<10.0	14.4
4	4A6	In Kansuli village	June	First	13-Jun-18	84.8	35	<10.0	14.4
4	4A6	In Kansuli village	June	Second	23-Jun-18	84.6	34.8	<10.0	14.3
4	4A6	In Kansuli village	July	First	11-Jul-18	82.3	33.5	<10.0	14
4	4A6	In Kansuli village	July	Second	20-Jul-18	82	33.1	<10.0	13.7
4	4A6	In Kansuli village	August	First	06-Aug-18	81	29.1	<10.0	12
4	4A6	In Kansuli village	August	Second	29-Aug-18	81	29.1	<10.0	12
4	4A6	In Kansuli village	September	First	13-Sep-18	80.4	28.5	<10.0	11.7
4	4A6	In Kansuli village	September	Second	22-Sep-18	80.2	28.2	<10.0	11.6
4	4A7	In Narayanpur village	April	First	11-Apr-18	87.5	35.2	<10.0	14.6
4	4A7	In Narayanpur village	April	Second	16-Apr-18	87.9	35.6	<10.0	14.8
4	4A7	In Narayanpur village	May	First	09-May-18	88.4	36.2	<10.0	15.1
4	4A7	In Narayanpur village	May	Second	29-May-18	89.6	36.4	<10.0	14.8
4	4A7	In Narayanpur village	June	First	14-Jun-18	88.7	35.7	<10.0	15
4	4A7	In Narayanpur village	June	Second	30-Jun-18	88.1	35.4	<10.0	14.8
4	4A7	In Narayanpur village	July	First	11-Jul-18	85.6	33.8	<10.0	14.2
4	4A7	In Narayanpur village	July	Second	24-Jul-18	85	33.2	<10.0	13.8
4	4A7	In Narayanpur village	August	First	06-Aug-18	83.4	30.2	<10.0	11.9
4	4A7	In Narayanpur village	August	Second	29-Aug-18	83.4	30.2	<10.0	11.9
4	4A7	In Narayanpur village	September	First	14-Sep-18	83	29.5	<10.0	11.4
4	4A7	In Narayanpur village	September	Second	18-Sep-18	82.6	29.3	<10.0	11.3
4	4A8	In Rashunpur village	April	First	04-Apr-18	89.4	36.4	<10.0	15.4
4	4A8	In Rashunpur village	April	Second	18-Apr-18	90.1	36.6	<10.0	15.6
4	4A8	In Rashunpur village	May	First	05-May-18	91.2	36.8	<10.0	16

Environmental Statement (Form-V) Cluster No. – 4 (Group of Mines) 2018-19

Cluster No	Station No	Station Name	Month	Fortnight	Date of Sampling	PM ₁₀	PM _{2.5}	SO ₂	NO _x
4	4A8	In Rashunpur village	May	Second	29-May-18	91.6	36.2	<10.0	15.6
4	4A8	In Rashunpur village	June	First	14-Jun-18	90.4	35.5	<10.0	14.8
4	4A8	In Rashunpur village	June	Second	30-Jun-18	89.5	35.2	<10.0	14.6
4	4A8	In Rashunpur village	July	First	11-Jul-18	86.3	34.5	<10.0	14
4	4A8	In Rashunpur village	July	Second	23-Jul-18	85.8	33.9	<10.0	13.9
4	4A8	In Rashunpur village	August	First	01-Aug-18	85.1	33	<10.0	13
4	4A8	In Rashunpur village	August	Second	29-Aug-18	85.1	33	<10.0	13
4	4A8	In Rashunpur village	September	First	13-Sep-18	84.2	32.1	<10.0	12.6
4	4A8	In Rashunpur village	September	Second	24-Sep-18	84	32	<10.0	12.3

Analysis of Heavy Metals in Air

Station No	Station Name	Month	Fortnight	Date of Sampling	Arsenic (As) (ng/m ³)	Cadmium (Cd) (µg/m ³)	Chromium (Cr) (µg/m ³)	Mercury (Hg) (µg/m ³)	Nickel (Ni) (ng/m ³)	Lead (Pb) (µg/m ³)
4A1	In Pachurlo village	Sept	Second	22-Sep-18	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
4A1	In Pachurlo village	March	First	12-Mar-19	<0.005	<0.001	<0.01	<0.001	<0.10	<0.005
4A2	In Madanpur village	Sept	Second	28-Sep-18	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
4A2	In Madanpur village	March	First	06-Mar-19	<0.005	<0.001	<0.01	<0.001	<0.10	<0.005
4A3	In Baliapur village	March	First	11-Mar-19	<0.005	<0.001	<0.01	<0.001	<0.10	<0.005
4A4	In Natundih village	March	First	12-Mar-19	<0.005	<0.001	<0.01	<0.001	<0.10	<0.005
4A5	In Madhudanga village	March	First	13-Mar-19	<0.005	<0.001	<0.01	<0.001	<0.10	<0.005
4A6	In Kanskuli village	Sept	Second	22-Sep-18	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
4A7	In Narayanpur village	Sept	Second	18-Sep-18	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
4A8	In Rashunpur village	Sept	Second	24-Sep-18	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005

Environmental standards:

National Ambient Air Quality Standards (NAAQS), 2009 for residential, industrial and rural areas for 24 hourly/yearly samples:

Heavy Metal	Arsenic (As) (ng/m ³)	Cadmium (Cd) (µg/m ³)	Chromium (Cr) (µg/m ³)	Mercury (Hg) (µg/m ³)	Nickel (Ni) (ng/m ³)	Lead (Pb) (µg/m ³)
Concentration	6	Not specified	Not specified	Not specified	20	0.5

Annexure – II**Noise Level**

Cluster No	Station No	Station Name	Month	Fortnight	Date of Sampling	Noise Level dB(A)
4	4N1	Pit-top Gaurandih Begunia UG	April	First	07-Apr-18	64.1
4	4N1	Pit-top Gaurandih Begunia UG	April	Second	18-Apr-18	64.2
4	4N1	Pit-top Gaurandih Begunia UG	August	First	10-Aug-18	66.7
4	4N1	Pit-top Gaurandih Begunia UG	November	First	12-Nov-18	62.8
4	4N1	Pit-top Gaurandih Begunia UG	February	First	02-Feb-19	66.8
4	4N2	Itapara OCP	February	First	02-Feb-19	69.4
4	4N3	Gaurandih D OCP	February	First	02-Feb-19	64.2

Annexure – III**Effluent Water Quality for 5 parameters**

Station No	Station Name	Month	Fortnight	Date of Sampling	pH	TSS	TDS	O&G	COD
4MW1	Gaurandih Begunia Phase- I OC Patch	April	First	07-Apr-18	7.86	22	665	<2.0	28
		April	Second	18-Apr-18	7.68	24	708	<2.0	24
		MAY	First	12-May-18	7.79	18	696	<2.0	32
		MAY	Second	30-May-18	7.37	12	718	<2.0	40
		June	First	06-Jun-18	7.89	28	376	<2.0	32
		June	Second	21-Jun-18	7.23	24	360	<2.0	40
		July	First	11-Jul-18	8.13	24	320	<2.0	36
		July	Second	20-Jul-18	8.18	14	344	<2.0	48
		August	First	06-Aug-18	7.78	32	340	<2.0	40
		August	Second	17-Aug-18	7.66	36	372	<2.0	48
		September	Second	18-Sep-18	7.55	20	368	<2.0	40
		October	First	15-Oct-18	7.98	24	330	<2.0	32
		October	Second	25-Oct-18	7.86	22	338	<2.0	44
		November	First	02-Nov-18	7.83	16	348	<2.0	36
		November	Second	28-Nov-18	7.49	18	318	<2.0	32
		December	First	01-Dec-18	8.46	20	730	<2.0	24
		December	Second	21-Dec-18	8.24	26	408	<2.0	20
		January	First	10-Jan-19	7.79	30	426	<2.0	32
		January	Second	28-Jan-19	8.54	40	440	<2.0	44
		February	First	02-Feb-19	8.16	38	464	<2.0	32
February	Second	21-Feb-19	8.28	34	454	<2.0	48		
March	Second	20-Mar-19	8.34	32	780	<2.0	44		
April	First	07-Apr-18	7.86	22	665	<2.0	28		
April	Second	18-Apr-18	7.68	24	708	<2.0	24		

Note: All units in mg/l unless otherwise specified

Effluent Water Quality Standards (MoEF Schedule – VI Standards)

Parameters	pH	TSS	TDS	Oil & Grease	COD
Limit	5.5-9.0	100	Not Specified	10	250

Effluent Water Quality for full parameters (29 parameters)

Cluster	4	4	Effluent Water (MOEF Schedule-VI Standard)
Station No	4MW1	4MW1	
Station Name	Gaurandih Begunia Phase- I OC Patch	Gaurandih Begunia Phase- I OC Patch	
Month	September	March	
Fortnight	First	First	
Date of Sampling	04-Sep-18	06-Mar-19	
Colour	3	5	Unobjectionable
Odour	Unobjectionable	Unobjectionable	Unobjectionable
TSS	20	22	100.0
pH	7.77	8.19	5.5-9.0
Temperature(Deg C)	28.4	30.4	Shall not exceed 5°C above the receiving water temp
Oil & Grease	<2.0	<2.0	10.0
Total Residual Chlorine	<0.02	<0.02	1.0
Ammonical Nitrogen	0.58	0.78	50.0
Total Kjeldahl Nitrogen	1.79	1.78	100.0
Free Amonia	<0.4	<0.02	5.0
BOD	8	4	30.0
COD	32	36	250.0
Arsenic	<0.005	<0.002	0.2
Lead	<0.005	<0.005	0.1
Hexavalent Chromium	0.02	0.03	0.1
Total Chromium	0.07	0.07	2.0
Copper	0.04	0.04	3.0
Zinc	0.03	0.03	5.0
Selenium	<0.005	<0.002	0.05
Nickel	<0.10	<0.01	3.0
Fluoride	0.34	0.30	2.0
Dissolved Phosphate	1.59	1.48	5.0
Sulphide	0.007	0.005	2.0
Phenolics	<0.001	<0.001	1.0
Manganese	0.24	0.22	2.0
Iron	0.14	0.16	3.0
Nitrate Nitrogen	2.7	2.5	10.0
Cadmium	<0.001	<0.005	0.003
Total Dissolved Solids	398	762	Not Specified

Note: All units in mg/l unless otherwise specified

Annexure – III**Groundwater Quality**

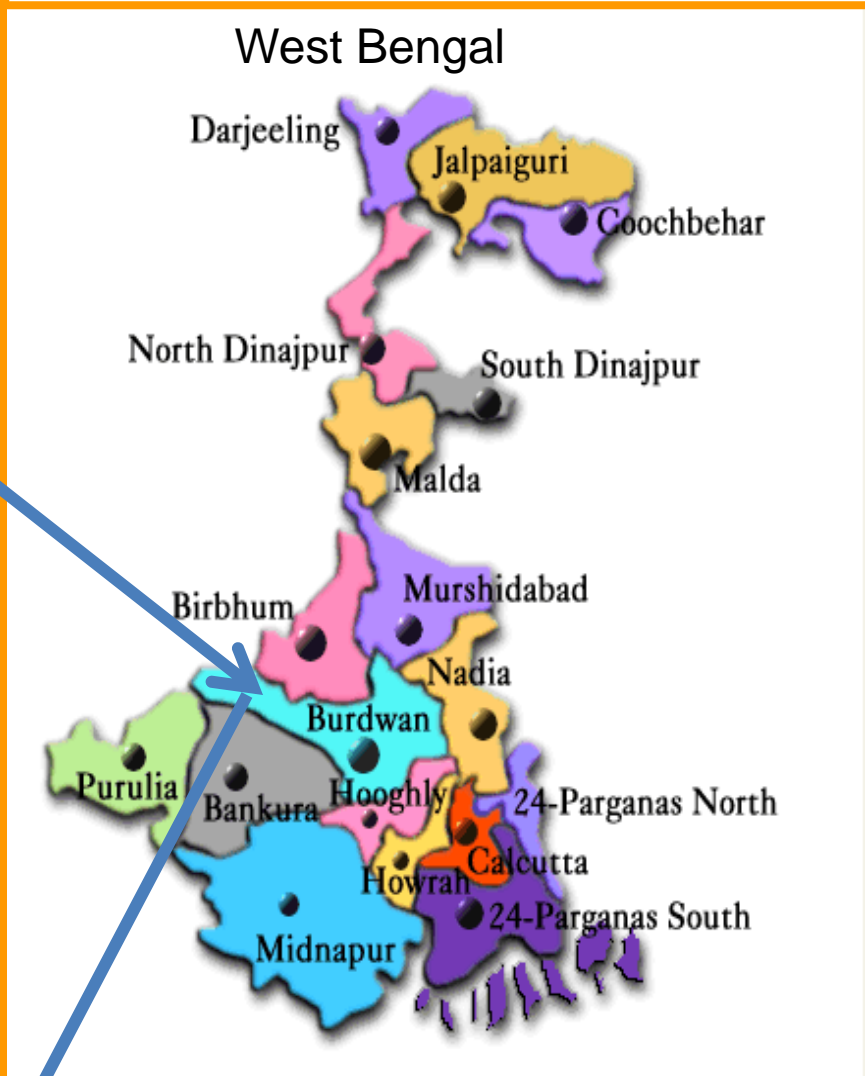
Cluster No	4	4	4	4	4	4	4	Indian Drinking Water Standard (IS-10500:2012)	
Station No	4GW8	4GW1	4GW6	4GW3	4GW4	4GW5	4GW2		
Station Name	Dugwell at Kanskuli village of Gourandi	Dugwell at Pakuria village near Mohanpur CISF camp	Dugwell at Narayanpur village near Lakshmi Mandir	Dugwell at Baliapur kalimandir	Dugwell at Nutandih primary school	Dugwell at Madhudanga village near kalimandir	Dugwell at Madanpur high school		
Month	May'18	May'18	May'18	May'18	May'18	May'18	May'18		
Fortnight	Second	Second	Second	Second	Second	Second	Second	Acceptable Limit	Permissible Limit
Date of sampling	04-May-18	04-May-18	04-May-18	09-May-18	09-May-18	09-May-18	19-May-18	5.0	15.0
Colour, Hazen unit Max	3	4	4	5	3	2	3	Agreeable	Agreeable
Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Agreeable	Agreeable
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Turbidity, NTU Max	2	1	3	2	2	1	3	1.0	5.0
pH	7.70	7.83	7.51	8.10	7.58	8.22	8.00	6.5-8.5	No relaxation
Total Hardness	576	270	588	484	492	384	564	200.0	600.0
Iron	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	0.30	No relaxation
Chlorides	280	54	302	147	253	89	329	250.0	1000.0
Res Free chlorine	0.04	0.04	0.04	0.03	0.03	0.05	0.05	0.20	1.0
Total Dissolved Solids	1028	468	1260	888	992	610	1220	500.0	2000.0
Calcium	172	84	176	148	152	116	168	75.0	200.0
Copper	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.05	1.5
Manganese	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.1	0.3
Sulphate	108	49	240	92	165	49	168	200.0	400.0
Nitrate	27.08	1.72	48.73	9.2	16.39	4.43	61.13	45.0	No relaxation
Fluoride	0.12	0.44	0.74	0.60	0.78	0.20	0.72	1.0	1.5
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	No relaxation
Total Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	0.05
Lead	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	No relaxation
Zinc	0.02	0.02	0.03	0.04	0.05	0.04	0.04	5.0	15.0
Hex Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	No relaxation
Boron	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.5	1.0
Coliforms (MPN)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Shall not be detectable in any 100 ml sample	
Phenolics	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.002
Total Alkalinity	244	188	196	212	248	168	172	200.0	600.0
Cadmium (Cd)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	No relaxation

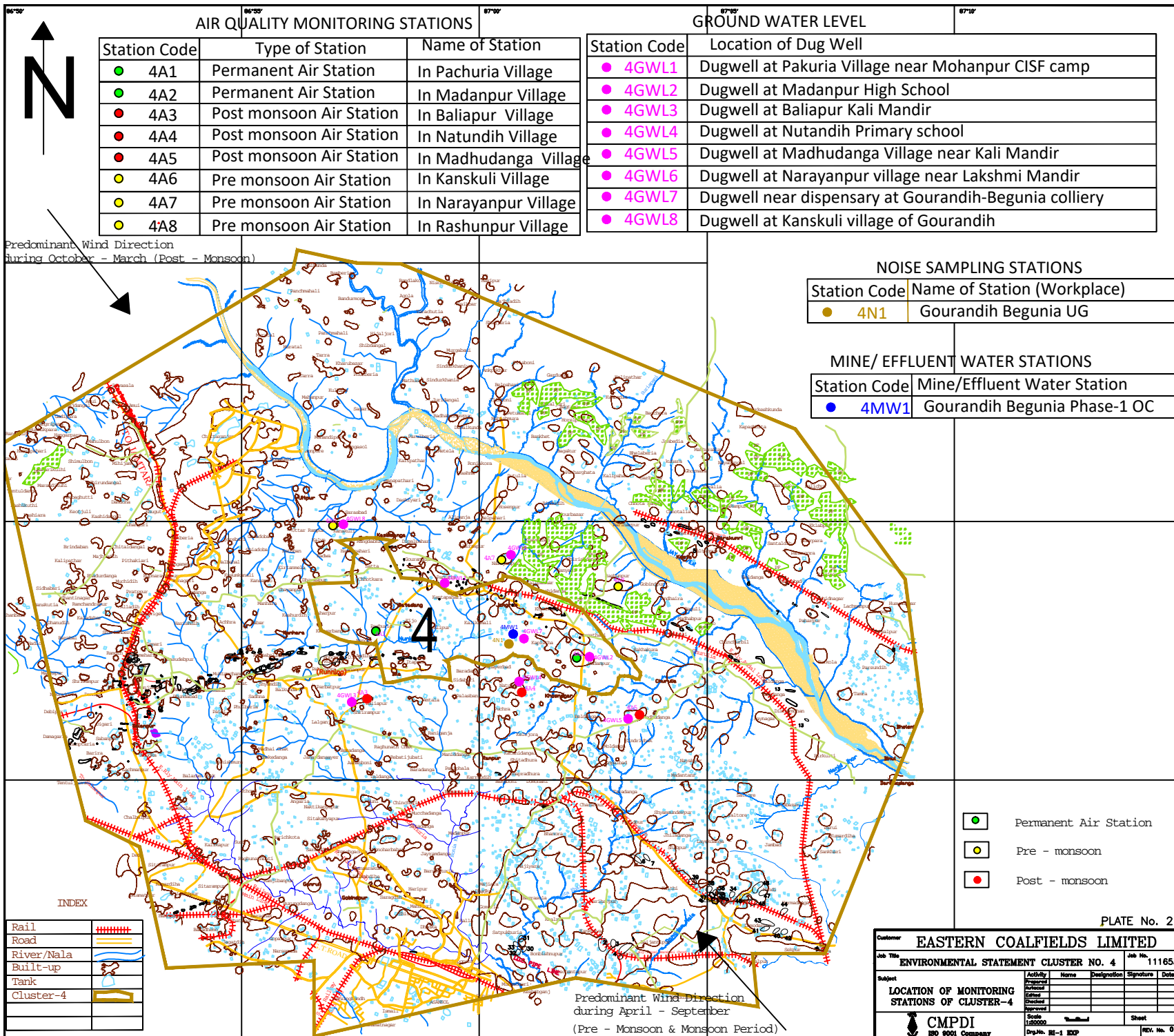
Note: All units in mg/l unless otherwise specified

Annexure – IV**Groundwater Level**

Cluster No	Station No	Station Name	Month	Fortnight	Date of Sampling	Ground Water Level BGL (mtr)
4	4GW1	Dugwell at Pakuria village near Mohanpur CISF camp	May	First	04-May-18	1.7
4	4GW1	Dugwell at Pakuria village near Mohanpur CISF camp	August	First	10-Aug-18	1.2
4	4GW1	Dugwell at Pakuria village near Mohanpur CISF camp	November	First	19-Nov-18	1.35
4	4GW1	Dugwell at Pakuria village near Mohanpur CISF camp	January	First	07-Jan-19	2.70
4	4GW2	Dugwell at Madanpur high school	May	First	09-May-18	3.1
4	4GW2	Dugwell at Madanpur high school	August	First	10-Aug-18	2.3
4	4GW2	Dugwell at Madanpur high school	November	First	30-Nov-18	3.4
4	4GW2	Dugwell at Madanpur high school	January	First	22-Jan-19	4.20
4	4GW3	Dugwell at Baliapur kalimandir	May	First	09-May-18	6.1
4	4GW3	Dugwell at Baliapur kalimandir	August	First	10-Aug-18	1
4	4GW3	Dugwell at Baliapur kalimandir	November	First	30-Nov-18	1.85
4	4GW3	Dugwell at Baliapur kalimandir	January	First	22-Jan-19	2.55
4	4GW4	Dugwell at Nutandih primary school	May	First	09-May-18	3.1
4	4GW4	Dugwell at Nutandih primary school	August	First	28-Aug-18	1.3
4	4GW4	Dugwell at Nutandih primary school	November	First	22-Nov-18	2.3
4	4GW4	Dugwell at Nutandih primary school	January	First	22-Jan-19	3.15
4	4GW5	Dugwell at Madhudanga village near kalimandir	May	First	09-May-18	1.1
4	4GW5	Dugwell at Madhudanga village near kalimandir	August	First	28-Aug-18	1.5
4	4GW5	Dugwell at Madhudanga village near kalimandir	November	First	22-Nov-18	4.15
4	4GW5	Dugwell at Madhudanga village near kalimandir	January	First	22-Jan-19	4.35
4	4GW6	Dugwell at Narayanpur village near Lakshmi Mandir	May	First	04-May-18	8.15
4	4GW6	Dugwell at Narayanpur village near Lakshmi Mandir	August	First	06-Aug-18	3.7
4	4GW6	Dugwell at Narayanpur village near Lakshmi Mandir	November	First	22-Nov-18	4.6
4	4GW6	Dugwell at Narayanpur village near Lakshmi Mandir	January	First	22-Jan-19	4.80
4	4GW8	Dugwell at Kanskuli village of Gourandi	May	First	04-May-18	2.5
4	4GW8	Dugwell at Kanskuli village of Gourandi	August	First	28-Aug-18	1.2
4	4GW8	Dugwell at Kanskuli village of Gourandi	November	First	30-Nov-18	1.75
4	4GW8	Dugwell at Kanskuli village of Gourandi	January	First	07-Jan-19	2.15

Plate – 1 Location of Cluster – 4





AIR QUALITY MONITORING STATIONS

GROUND WATER LEVEL

Station Code	Type of Station	Name of Station
● 4A1	Permanent Air Station	In Pachuria Village
● 4A2	Permanent Air Station	In Madanpur Village
● 4A3	Post monsoon Air Station	In Baliapur Village
● 4A4	Post monsoon Air Station	In Natundih Village
● 4A5	Post monsoon Air Station	In Madhudanga Village
● 4A6	Pre monsoon Air Station	In Kanskuli Village
● 4A7	Pre monsoon Air Station	In Narayanpur Village
● 4A8	Pre monsoon Air Station	In Rashunpur Village

Station Code	Location of Dug Well
● 4GWL1	Dugwell at Pakuria Village near Mohanpur CISF camp
● 4GWL2	Dugwell at Madanpur High School
● 4GWL3	Dugwell at Baliapur Kali Mandir
● 4GWL4	Dugwell at Nutandih Primary school
● 4GWL5	Dugwell at Madhudanga Village near Kali Mandir
● 4GWL6	Dugwell at Narayanpur village near Lakshmi Mandir
● 4GWL7	Dugwell near dispensary at Gourandih-Begunia colliery
● 4GWL8	Dugwell at Kanskuli village of Gourandih

NOISE SAMPLING STATIONS

Station Code	Name of Station (Workplace)
● 4N1	Gourandih Begunia UG

MINE/ EFFLUENT WATER STATIONS

Station Code	Mine/Effluent Water Station
● 4MW1	Gourandih Begunia Phase-1 OC

Predominant Wind Direction during October - March (Post - Monsoon)

Predominant Wind Direction during April - September (Pre - Monsoon & Monsoon Period)

- Permanent Air Station
- Pre - monsoon
- Post - monsoon

PLATE No. 2

INDEX

Rail	
Road	====
River/Nala	~~~~
Built-up	
Tank	○
Cluster-4	▭

Customer: **EASTERN COALFIELDS LIMITED**

Job Title: **ENVIRONMENTAL STATEMENT CLUSTER NO. 4** Job No. 111653

Subject	Activity	Name	Designation	Signature	Date
LOCATION OF MONITORING STATIONS OF CLUSTER-4	Prepared				
	Checked				
	Approved				
	Reviewed				

Scale: 1:50000 Sheet: 08

CMPDI ISO 9001 Company

Scale: 1:50000 Sheet: 08

Dr.No. E-1 EXP

REV. No. 0