दामोदर घाटी निगम
बेरमो खान, बेरमो जि. बोकारो
DAMODAR VALLEY CORPORATION
BERMO MINES, P.O: - BERMO, BOKARO

No/BM/ MoEF&CC/809 Dated:- September 1, 2016

To,
The Ministry of Environment, Forest & Climate Change
Indira Paryavaran Bhawan
Jor Bagh Road
New Delhi

Kind attention: Director, Impact Assessment (Coal Mines)

Subject: Submission of reply to EAC queries for Expansion of Bermo coal mine Project from 0.4 MTPA to 2.62 MTPA of M/s Damodar valley Corporation (DVC) in a total project area of 169.094 ha (ML area 167 ha + 2.094 ha outside the ML area for facilities)located in District Bokaro (Jharkhand) as per MOM uploaded at MoEF&CC website.

Dear Sir,

This has reference to Minutes of Meeting uploaded on website for TOR presentation held on June 24, 2016. The EAC sought some clarifications and the reply to the same are as follows:

Q.1: The proposed OB area of 100 ha is at a distance of nearly 5 km (in non-coal bearing area) from the coal mine which may not be economically and/or environmentally sustainable.

Reply 1: Yes, the transportation and dumping of OB to nearly 5 km away may not be economically and/or environmentally sustainable. Therefore, we have undertaken studies of other viable options as suggested by EAC.

Q.2: The nearby coal mine of M/s Central Coalfields Ltd may be utilized for dumping of OB, and the option needs to be explored.

Reply 2: DVC had approached Central Coalfield Limited (CCL) requesting them to identify areas which could be given to DVC for OB dumping. CCL carried out an exercise for the same and has informed DVC vide letter no GM (B&K)/Sacy./Fly Ash/137 dated 10.08.2016 and report by Survey Officer and Staff officer (P & P), B & K vide Reference No. GM(B&K)/S.O(P & P)/16/135 dated 10.08.2016 (***Attachment 1***) that no area can be made available to DVC for the OB dumping

Q.3: In case this option not found/feasible, the project proponent may go for restricting their expansion, and explore the possibility for OB dumping within the existing mine lease area.

Reply 3: The permutations and combinations of excavation and dumping were carried out for accommodating the OB within the existing ML area. It is, however pertinent to note that, it has become possible to accommodate the OB within the ML area by multiple rehandling of OB.

101.75 MCum(B) of overburden will be generated during life of mine. Out of this, 15.53 Mcum (equivalent to about initial 3 and half years) OB generated from the NE corner of area will be accommodated (temporary dump) over the SW corner of the X-X area within the ML. The OB from 2nd half of 4th year onwards will be disposed off (in temporary dump) over Y-Y area within the ML. It has

1/9/2016

been estimated that Y-Y area will be adequate to accommodate the temporary dump, till the backfilling in X-X void can be done concurrent with mining without requiring any additional area outside the ML area for external surface dump. It is important to note that the OB dumped over the coal bearing area on SW corner of X-X area and over the whole Y-Y area will be later backfilled into the void of X-X area by rehandling.

As a result of the above exercises, the Project area has been reduced from 269.094 ha to 169.094 ha. Therefore Form-1 and Pre Feasibility Report along with other Enclosures have been revised and are being submitted as ***Attachment 2***.

Considering the above reply, it is, therefore, requested to kindly process our application and assign us a date for presenting the TOR at the earliest.

Thanking you,

Yours faithfully
For DVC Bermo Mines

01/9/2016
अधीक्षण अभियंता (खनन) एवं अभिकर्त्ता
S. E. (Mining) & Agent
दा.घा.नि., बेरमो खान
D.V.C., Bermo Mines

Name: Arbind Kumar Thakur
Designation: S.E. (MINING) & Agent, DVC Bermo Mines

Enclosed: A/a

CENTRAL COALFIELDS LIMITED
A Miniratna Company,
Office of the General Manager (B&K),
Kargali, PO: Bermo, Distt.: Bokaro.

No. GM(B&K)/ Survey/ Fly Ash/137 Dt. 10.08.2016

To,
The S.E.(Mining) & Agent,
DVC, Bermo Mines.

Sub:- Dumping site in any adjoining mines of CCL for DVC Bermo Mines.

Dear Sir,

With reference to your letter no. BM/699 'A' dated 25.07.2016 and our discussions on 27.06.2016 and onwards; this is to inform you that there is no mined out working area of CCL,B&K Area of DVC Bermo for dumping of OB. A report as submitted by Area Survey Officer & Staff Officer (P&P), B&K Area is enclosed for your reference .

This is for your kind information.

GM (B&K), Kargali

Copy to :- 1. The SO(P&P),B&K Area

Central Coalfields Limited
Office of the General Manager(B&K), Kargali,
PO. Bermo, Dist. Bokaro.

Ref. No. :- GM(BRC)/S.O(P&P)/16/135 Date :- 10/08/16

Sub:- Availibility of dumping site in Mines of B&K Area for DVC, Bermo

In reference to letter No. BM/697 "A" dated 25.07.2016 of the S.E.(Mining) & Agent, DVC and the instruction of the G.M.(B&K) Area, this is to inform that after inspection, it is found that there are three adjoining mines of the area to DVC Mines , Bermo namely karo- I OCP, Kargali OC & Bokaro Colliery. The details of the present dumping and the future planning are as follows :-

Karo-I OCP :- The present status of Karo –I OCP regarding OB dumping place. As per PR Of Karo-I OCP internal dumping has been proposed and being dumped accordingly. There is proposal for expansion of the project from 3.50 MTY to 15 MTY (peak capacity). There is no scope for OB dumping by DVC mine at present .It may be mentioned that during the EAC meeting held on dt. 23.06.16 for expansion of Karo OCP, the committee directed to minimise the proposed external dumping of Karo-I OCP.

Kargali OC:- An outsourcing patch is going to be started very soon & OB dump is proposed in mined out quarry & also fly ash is being dumped continuously. Estimated quantity of OB from Kargali Outsourcing patch is -4.25 MM ^{3} When the proposed Kargali Washery patch will be started,7.60 MM^{3}OB will be removed and dumped in mined out area of Kargali OCP. There is also no scope for place of OB dump for DVC.

Bokaro Colliery:- Huge Plantation has been done after OB &fly ash dumping in mined out quarry of Bokaro colliery, Remaining area of quarry is coal bearing area. Only top seam is worked out &bottom seam is virgin at present in most of the parts of the mine.

In view of the above , there is no possibility to handover the mined out working area of these three adjoining collieries to DVC mine for dumping.

This is for your kind information.

16/8/16
Area Survey Officer
B&K Area

10.08.16
SO (P&P)
B&K Area

16/8/16
G.M.(B&K), Kargali.

FORM 1
(Issue 02, Rev 0, August 2016)

(I) Basic Information

1	Name of the Project/s :	Damodar Valley Corporation (DVC) Bermo mine
2	S. No. in the Schedule	1(A)
3	Proposed capacity/ area/ length/ tonnage to be handled/ command area/ lease area/ number of wells to be drilled	Proposed Capacity: 2.62 MTPA Mine Lease Area: 167.434 Ha Project Area: 169.094 Ha
4	New/ Expansion/ Modernization	Expansion (0.4 MTPA to 2.62 MTPA)
5	Existing capacity/ area etc	0.4 MTPA
6	Category of Project	A
7	Does it attract general condition. If yes, please specify	No, as there is no state boundary, sanctuary/ National Park/ Ecological Sensitive area/ critically polluted area in 10 km radius of the project. Nearest State Boundary- West Bengal, 22.4 km, SSE Nearest International boundary- Bangladesh, 272 km, E Nearest critically Polluted area-Jharia-43 km, E
8	Does it attract specific condition If yes, please specify	No
9	Location	Refer ***Annexure I*** for location plan
	Plot/ Survey/ Khasra no.	Several, as given in ***Annexure II***
	Village	Baidkaro, Kargali, Karo and Amlo
	Tehsil	Block - Bermo
	District	Bokaro
	State	Jharkhand

10	Nearest railway station/ airport along with distance in kms	Bermo Railway Station - 0.8 km, SW Ranchi Airport - 120 km
11	Nearest town, city, district head quarters along with distance in kms	Bokaro Steel City - 40 km District HQ - Bokaro - 40 km
12	Village Panchayats, Zilla Parishad, Municipal Corporation, Local Body (complete postal addresses with telephone nos. to be given)	PO - Bermo District - Bokaro Pin - 829104
13	Name of the applicant	M/s Damodar Valley Coorporation (DVC) Bermo Mine
14	Registered Address	DVC Towers, VIP Road, Kolkata-700054
15	Address for correspondence :	
	Name	Mr. Pramod Kumar
	Designation (Owner/ Partner/ CEO)	Executive Director (Fuel)
	Address	DVC Tower, 3rd floor, VIP Road, Kolkata
	Pin Code	700054
	Telephone no.	033-66072316, 09434742667
	Fax	-
16	Details if Alternative sites examined, if any. Location of these sites should be shown in a toposheet	Not Applicable
17	Interlinked Projects	Bokaro Thermal Power Station (BTPS) and Chandrapura Thermal Power Station (CTPS)
18	Whether separate application of interlinked project has been submitted?	Yes, EC has been granted for Bokaro Thermal Power Station (BTPS) 'A'(1*500 MW) at BTPS, Bokaro, Jharkhand
19	If yes, date of submission	EC letter is attached as ***Annexure III***.
20	If no, reason	NA
21	Whether the proposal involves approval/ clearance under : if yes, details of the same and their status to be given:	Yes

	(a) The Forest (Conservation) Act, 1980?	Forest clearance shall be required as 120.313 ha of Forest land is present within ML Area named as "GM Jungal" The Company has approached DFO and Formalities will be completed in near future.
	(b) The Wildlife (Protection) Act, 1972?	Not applicable
	(c) The CRZ Notification, 1991?	Not applicable
22	Whether there is any Government Order/ Policy relevant/ relating to the site?	Not applicable
23	Forest land involved (hectares)	120.313 ha of Forest land is present within ML Area named as "GM Jungal"
24	Whether there is any litigation pending against the project and/or land in which the project is proposed to be set up?	Nil
	(a) Name of Court	-
	(b) Case No.	-
	(c) Orders/ directions of the Court, if any and its relevance with the proposed project	-

(II) Activity

1. Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.)

Sl. No.	Information/Checklist confirmation	Yes/ No	Details there of (with approximate quantities /rates, wherever possible) with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)	Yes	Presently, the core zone is covered with mining activities with gently undulating topography. The total mine lease area is 167.434 ha, out of which 107.541 ha is excavated area and 54.932 Ha has been backfilled. At the end of life of mine, 152.44 ha of land shall be excavated by opencast mining. Rest of the area will be partly used for ancillary activity of mining and ecological development of the area. The disturbed area will comprise of excavated land,

Sl. No.	Information/Checklist confirmation	Yes/ No	Details there of (with approximate quantities /rates, wherever possible) with source of information data

infrastructure, roads, etc

Pre-mining land use is as follows:

Village/ mauza	Landuse in ML Area in acres						
	Tenancy	GMK Govt. Land (Waste land)	GMK Jungle	GM-Aam (Others)	Water body	Total	Total area in ha
Karo	3.76	11.45	36.9	0.99	1	54.1	21.893
Baidkaro	16.03	14.4	29.81	0	0	60.24	24.378
Kargali	9.72	0.87	215.5	0	1.31	227.4	92.025
Amlo	37.62	18.48	15.09	0.81	0	72	29.137
Total	**67.13**	**45.2**	**297.3**	**1.8**	**2.31**	**413.74**	**167.434**

The present land use (2015-2016) is as follows:

Sl. No.	Particular	Total area of land (Ha)
1.	Area under habitation	59.893
2.	Area under backfill	52.609
3.	Area under excavation	54.932
4.	**Total**	**167.434**

Present land use can also be seen in Present Surface Plan attached as ***Annexure IV.***

The proposed land use at end of life of mine will be as follows:

Land use pattern	Area (ha)
Backfilled area	110.5
Void area	41.94
Green Belt	6.110
Facility area	8.884
Total	**167.434**

The geological plan is given in ***Annexure V*** and geological section along A-A' and B-B' is given in ***Annexure VI.*** Proposed stage plan at the end of 5^{th} year and 21^{st} year of west pit is given in ***Annexure VIIA*** and ***VIIB*** respectively. Post Mine Closure Plan is given in ***Annexure VIIC***. Conceptual mine sections is given in ***Annexure VIII***.

Sl. No.	Information/Checklist confirmation	Yes/ No	Details there of (with approximate quantities /rates, wherever possible) with source of information data
1.2	Clearance of existing land, vegetation and buildings	Yes	Habitation/colonies of Central Coalfields Ltd. (CCL)/DVC that are present inside the ML area, shall be subsequently shifted as mine workings are progressed. These are present over "Y-Y" and X-X area, as shown in Present Surface Plan (***Annexure IV***) which will be rehabilitated before exploitation. No significant trees are anticipated to exist in forest area due to old habitation/ excavation.
1.3	Creation of new land uses	Yes	Excavated area, plantation, dumps, etc. will be there during the operational period. Mine Office, Garage, First Aid Room, Rest Shelters, Toilets, Tool/ Store Rooms, etc. are provided at mine site. In the post mining scenario, the project area will comprise of surface dump, backfilled and void area of the opencast mine besides plantation. Proposed topography and land use at the end of life (conceptual) within ML is given in Post Mine Closure Plan in ***Annexure VIIC***.
1.4	Pre-construction investigations e.g. bore holes, soil testing	Yes	Pre-construction activities are not required as the mine is already operational. Core infrastructure like Office Building, Coal Stockyard, Weigh Bridge, CHP, Workshop, Diesel Pump, Workers Accommodation etc. is present at the mine.
1.5	Construction works	Yes	Office Building, Coal Stockyard, Weigh Bridge, CHP, Diesel Pump, Workers Accommodation etc. have already been constructed and no additional construction is envisaged.
1.6	Demolition works	Yes	Habitation/ colonies of CCL/DVC that are present inside the ML area, shall be subsequently demolished and shifted as mine workings are progressed. These are present along Y-Y' area, as shown in Present Surface Plan (***Annexure IV***) which will be rehabilitated before exploitation.
1.7	Temporary sites used for construction works housing of construction workers	No	All construction activities have been completed and no additional construction work is envisaged.
1.8	Above ground buildings,	Yes	The above ground buildings and structures

Sl. No.	Information/Checklist confirmation	Yes/ No	Details there of (with approximate quantities /rates, wherever possible) with source of information data
	structures or earthworks including linear structures, cut and fill or excavations		such as Office Building, Coal Stockyard, Weigh Bridge, CHP, Diesel Pump, Workers Accommodation etc. are already present within the site. However excavation will be continued through out the life of the mine.
1.9	Underground works including mining or tunneling	No	No underground work will be done.
1.10	Reclamation works	Yes	Plantation over excavated area, dumping, road, Settling pond/reservoir and green belt will be done. Out of 167.434 Ha of proposed ML area, 152.44 Ha will be the mined out. Out of total excavated area, 110.50 Ha will be backfilled and planted, while the rest 41.94 ha will remain in the form of a void at conceptual stage and will ultimately become a water reservoir.
1.11	Dredging	No	No dredging will be done.
1.12	Offshore structures	No	Not applicable
1.13	Production and manufacturing processes	No	It is not a factory, hence manufacturing process is not applicable. Coal is excavated during mining.
1.14	Facilities for storage of goods or materials	Yes	Facilities for the storage of coal, diesel, oil, machinery, etc.have already been created.
1.15	Facilities for treatment or disposal of solid waste or liquid effluents	Yes	101.75 MCum(B) of overburden will be generated during life of mine. Out of this, 15.53 Mcum (equivalent to about initial 3 and half years) OB generated from the NE corner of area will be accommodated over the SW corner of the X-X area within the ML. The OB from 2nd half of 4th year onwards will be disposed off over Y-Y area within the ML. It has been estimated that Y-Y area will be adequate to accommodate the temporary dump, till the backfilling in X-X void can be done concurrent with mining without requiring any additional area outside the ML area for external surface dump. It is important to note that the OB dumped over the coal bearing area on SW corner of X-X area and over the whole Y-Y area will be later backfilled into the void of X-X area by rehandling.

Sl. No.	Information/Checklist confirmation	Yes/ No	Details there of (with approximate quantities /rates, wherever possible) with source of information data
			Solid waste generated from manpower is and shall be mostly of organic and recyclable nature. The organic waste shall be composted and used as manure while recyclable component will be sold to recycling agencies. The waste water from mine site offices and colony is and shall be treated in septic tank and soak pits system. The waste water from workshop is and will be treated in oil water separator followed by settling tank, which is maintained by outsourcing agency. Vehicles and machinery maintenance is being regularly done by contractor at his own facility outside the project area. The contractors are instructed to reuse the lubricant for different purposes.
1.16	Facilities for long term housing of operational workers	Yes	The mine is already operational and has experienced manpower in place. Additional manpower required for expansion will be available in the surrounding area as the mine is located in the long established coal producing part of the coalfield. Long term housing of operational workers has been planned near proposed dumping area, outside the mine lease.
1.17	New road, rail or sea traffic during construction or operation	Yes	There shall be increase in traffic since the production will increase from 0.4 MTPA to 2.62 MTPA. Coal is being dispatched by road through contractual trucks from Opencast quarry-head to Bokaro Thermal Power Station (BTPS) by the existing road. No new road for OB transportation will be required as it will be managed within the ML area.
1.18	New road, rail, air waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc	Yes	Coal is being dispatched by road through contractual trucks from Opencast quarry-head to Bokaro Thermal Power Station (BTPS) and Chandrapura Thermal Power Station (CTPS) by the existing road. No new road for OB transportation will be required as it will be managed within the ML area.

Sl. No.	Information/Checklist confirmation	Yes/ No	Details there of (with approximate quantities /rates, wherever possible) with source of information data
			For coal transportation, road/ Aerial ropeway is proposed. In earlier days, coal was transported by aerial ropeway which is not operational now. Its re-commissioning is also one of the options open as alternative.
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements	Yes	No closure of existing roads needed. The existing Road, east of Karo Nala on the edge of X-X area and Y-Y area [as shown in Present Surface Plan (***Annexure IV***)], passing through coal bearing area, required to be shifted in consultation with state govt. authorities and CCL authorities.
1.20	New or diverted transmission lines or pipelines	Yes	11 KV power transmission line will be required to be diverted.
1.21	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers	Yes	There are two nalahs (Karo & Amlo) flowing in Y-Y' area [as shown in Present Surface Plan (***Annexure IV***)] which will be diverted.
1.22	Stream crossings	Yes	There are two nalahs – Karo and Amlo Nallah passing through ML Area, which will be later diverted. Karo nalah divides the DVC Bermo mines into "XX" and "YY" areas, as shown in Present Surface Plan (***Annexure IV***). Baidkaro Nallah flows parallel to the boundary in the western-most part of the ML area. Stream crossings will be made as per transportation & movement requirement on the diverted nalas.
1.23	Abstraction or transfers of water from ground or surface waters	Yes	Water requirement is Potable water 320 m^3/day & Industrial water 389 m^3/day. The mine water is collected in sump and dewatering followed by transportation to colony and local people to meet their daily requirements.
1.24	Changes in water bodies or the land surface affecting drainage or run-off	Yes	There are two nalahs flowing in Y-Y' area [as shown in Present Surface Plan (***Annexure IV***)] which are to be diverted.
1.25	Transport of personnel or materials for construction, operation or decommissioning	Yes	Coal is being dispatched by road through contractual trucks from Opencast quarry-head to Power plants of the company by the existing road.

Sl. No.	Information/Checklist confirmation	Yes/ No	Details there of (with approximate quantities /rates, wherever possible) with source of information data
1.26	Long-term dismantling or decommissioning or restoration works	Yes	Habitation/colonies of CCL/DVC are present inside the ML area and shall be shifted as mine workings progress. These are present over "Y-Y"and X-X areas, as shown in Present Surface Plan (***Annexure IV***). Other dismantling will be done only in the post mine closure period which will be detailed out 5 years prior to the end of mine life. Restoration work will be carried out simultaneously by plantation over backfill area.
1.27	Ongoing activity during decommissioning which could have an impact on the environment	No	Improvement of environment will take place
1.28	Influx of people to an area in either temporarily or permanently	Yes	There are total of 128 workers including regular staff for 0.4 MTPA production. The proposed expansion project will generate employment for 510 people, many of whom will be coming from outside and living permanently. A colony is proposed outside the ML but in the project area, near the dumping site.
1.29	Introduction of alien species	No	
1.30	Loss of native species or genetic diversity	No	
1.31	Any other actions	No	

2. Use of Natural resources for construction or operation of the Project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply)

Sl. No.	Information/checklist confirmation	Yes/ No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
2.1	Land especially undeveloped or agricultural land (ha)	Yes	The land 413.74 acres (i.e. 167.22 Ha) is private agricultural land (67.13 acres), Government waste land (45.2 acres), forest land (297.3 acres), others (1.8 acres) and water body (2.31 acres). 152.44 ha of land will get excavated in total lease, rising from current excavation of 107.541ha.

Sl. No.	Information/checklist confirmation	Yes/ No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
2.2	Water (expected source & competing users) unit: KLD	Yes	Total requirement of water for mining and allied activities is estimated as about 709 m^3/day. Industrial water required for HEMM washing, sprinkling on haul roads for dust suppression and for watering the mine site plantations, is being and will be supplied from pumping installation at mine sump and for keeping the mine workings dry. Potable water is being sourced from borewells and stored in overhead tank near the facilities area and distributed through pipe lines to different facilities area for drinking and domestic purposes. It is proposed to establish a colony in future, wherein an STP shall be established. Hence, the treated water from sewage treatment plant is recycled back to be utilized for industrial purpose.
2.3	Minerals (MT)	No	The project itself will mine coal, hence it does not require any mineral.
2.4	Construction material – stone, aggregates, sand / soil (expected source – MT)	No	
2.5	Forests and timber (source – MT)	No	
2.6	Energy including electricity and fuels (source, competing users) Unit: fuel (MT), energy (MW)	Yes	At present, almost all of the equipments are diesel operated for mining activities. Where electrical power is a must, diesel generator backup is available. 11 KvA Power shall be required for the proposed expansion phase. Power is received from DVC BTPS (located about 15 km from mine) through 33 KV overhead line. It is stepped down to 11 KV/440v.
2.7	Any other natural resources (use appropriate standard units)	No	

3. Use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health.

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/ rates, wherever possible) with source of information data
3.1	Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies)	No	The hazardous materials are engine oil, transformer oil etc., which will be stored in leak proof drums. Hence, no contamination anticipated.
3.2	Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)	No	No water borne diseases anticipated since due precautions for treatment and disposal of waste-water are and will be taken.
3.3	Affect the welfare of people e.g. by changing living conditions?	Yes	The proposed project will generate employment for 510 additional people and the existing manpower is 115. Any change will be towards betterment of life. The company is already conducting CSR activities in the vicinity of the project which shall be continued in future also.
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.	Yes	Mining and transportation activity will generate SPM in ambient air, which can affect health of vulnerable groups in nearby villages. However, with proper management planning by sprinkling of water, use of dust extractors, etc, the ambient air is and will be maintained clean.
3.5	Any other causes	No	

4. Production of solid wastes during construction or operation or decommissioning (MT/month)

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
4.1	Soil, overburden or mine wastes	Yes	101.75 MCUM of overburden generated in the entire life of mine. All the OB generated shall be backfilled ultimately. Top soil quantity of about 0.91 mcum shall be generated which will be reused for plantation.
4.2	Municipal waste (domestic and/or commercial wastes)	Yes	As per current provisions, sludge from septic tanks in mines & facilities area, is

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
			removed and used as manure. In future, STP shall be operational after establishment of a colony. Sludge from domestic wastewater will be meager quantity and can be used as manure after composting. It will be generated at the rate of 35 gm/capita/day from colony. In mine, the sludge generation will be about 10-15 gm/capita/day.
4.3	Hazardous wastes (as per Hazardous Waste Management Rules)	Yes	Used oil from transformers, generated once in two years will be sold to CPCB/ SPCB authorised recycling vendors.
4.4	Other industrial process wastes	Yes	Oil and grease from the workshop effluent will be skimmed through oil-water separator and sold to authorized recycling vendors. The generated sludge will be disposed off in specially constructed pit.
4.5	Surplus product	No	-
4.6	Sewage sludge or other sludge from effluent treatment	Yes	As given in point 4.2 above and will be used as manure in gardens/ horticulture after composting.
4.7	Construction or demolition wastes	No	
4.8	Redundant machinery or equipment	No	
4.9	Contaminated soils or other materials	No	
4.10	Agricultural wastes	No	
4.11	Other solid wastes	No	

5. Release of pollutants or any hazardous, toxic or noxious substances to air (Kg/hr)

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources	Yes	Fossil fuel (diesel) is being used in operation of machinery. The excavation and dumping activities cause mine emissions which includes SPM, RPM, SO_2 and NOx. Regular monitoring is and shall be carried out by the company at the mine site in line with the requirements of the State Pollution Control Board and Ministry of Environment, Forests &

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
			Climate Change.
5.2	Emissions from production processes	Yes	The production process involves excavation, which generates SPM.
5.3	Emissions from materials handling including storage or transport	Yes	The emissions are included in production emission above.
5.4	Emissions from construction activities including plant and equipment	No	
5.5	Dust or odours from handling of materials including construction materials, sewage and waste	No	
5.6	Emissions from incineration of waste	No	No incineration processes within the mine.
5.7	Emissions from burning of waste in open air (e.g. slash materials, construction debris)	No	No burning process within the lease area.
5.8	Emissions from any other sources	No	

6. Generation of Noise and Vibration, and Emissions of Light and Heat

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data with source of information data
6.1	From operation of equipment e.g. engines, ventilation plant, crushers	Yes	HEMM is required for excavation of OB and coal. These are high noise generating machinery in the range of 60-100 dB (A) for which noise proof air conditioned cabins has been provided for operator.
6.2	From industrial or similar processes	Yes	Plants & Machinery has been provided with suitable devices to reduce the noise level and is being maintained well within the statutory requirements. Ear plugs are being used by workers in noisy areas.
6.3	From construction or demolition	No	
6.4	From blasting or piling	No	Noise and vibration due to blasting is not anticipated as the strata are generally soft. Any hard strata may be encountered

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data with source of information data
			which may have to be blasted, hence provision of magazine has been made.
6.5	From construction or operational traffic	Yes	The plying of trucks has already increased the noise level at the time of plying. Now due to double the number of trucks, the time duration of occurrence of high noise levels shall be more.
6.6	From lighting or cooling systems	Yes	Heat generated only in immediate vicinity of light bulb, air conditioners, machinery, etc.
6.7	From any other sources	No	

7. Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
7.1	From handling, storage, use or spillage of hazardous materials	No	The hazardous materials are engine oil, transformer oil etc., which will be stored in leak proof drums. Hence, no contamination anticipated.
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)	Yes	• Run-off water from mine facilities area as well as pumped out mine water will be led to settling ponds and after removal of Suspended Solids, a part will be utilized for industrial purpose, sprinkling, greenbelt watering, etc and the excess will be disharged into natural drain. • The sewage from the pit head facility is treated in septic tanks and soak pits. • The proposed colony will have an STP to treat the waste water, which will be recycled back to be utilized for industrial purpose, sprinkling, greenbelt watering, etc • Workshop waste water is and continue to be passed through oil-water separator and subsequently through

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
			settling tank prior to reuse. In future, an ETP at new workshop is also proposed
7.3	By deposition of pollutants emitted to air into the land or into water	Yes	Water released from the mine site may result in the deposition of suspended solids. In that case, settlement of SS will be done in settlement tanks before discharging. Deposition of dust on land and plants from air due to mining activities and transportation will be there which will be minimised through sprinkling.
7.4	From any other sources	No	
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?	No	Dust falling on land/ plants will be washed off during rains.

8. Risk of accidents during construction or operation of the Project, which could affect human health or the environment

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous substances	Yes	The storage of detonating/ priming materials/ devices (if used in future) is proposed to be done at the magazine that has been provided. The magazine shall be constructed in line with applicable explosive rules, hence there is no danger of untoward incident. Risk of accidents is also from HEMM operation and crushing installation for prevention of which proper training will be given to operators. Coal itself is inflammable and precautions for handling and storage is and continue to be followed.
8.2	From any other causes	No	
8.3	Could the project be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslides, cloudburst, etc)?	No	The project is not under moderate seismic zone (Zone-III). The project area is not prone to floods, landslides or cloudburst etc.

9. Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
9.1	Lead to development of supporting facilities, ancillary development or development stimulated by the project which could have impact on the environment e.g.:		
	• Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.)	Yes	The development of road, power, medical health and education facilities to near by areas. The same will be maintained by the company as a part of its CSR activities.
	• housing development	Yes	The current facilities do not have adequate housing arrangement. Hence, a colony is proposed in the project area near dumping site. Hence, housing development shall take place.
	• extractive industries	No	
	• supply industries	Yes	Small kiosks have been set up along the road side and in parking areas to serve the requirements of the drivers.
	• other	No	
9.2	Lead to after-use of the site, which could have an impact on the environment	Yes	The mine will close as per Progressive Mine Closure Plan, which will involve rehabilitation of mined out areas by plantation & development of void that will ultimately get converted into water reservoir.
9.3	Set a precedent for later developments	No	
9.4	Have cumulative effects due to proximity to other existing or planned projects with similar effects	Yes	There are 12 industries and mines in 10 km radius. The nature and range of the pollutants from mines is mostly related to localized air pollution, pollution due to transportation and impact on surface & ground water besides ecology and land.

(III) Environmental Sensitivity

(Refer ***Annexure IX*** for topography and features map of 15 km radius around ML)

Sl. No.	Areas	Name/ Identity	Aerial distance (within 15 km.) Proposed project location boundary
1.	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	As listed in point 2	
2.	Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	***Water Bodies***	
		Damodar River	0.7,S
		Khanjo nadi	3.9, S
		Samlata nala	7.1, SW
		Garga nadi	14.9,S
		Jaria nala	10.3, E
		Barkijharia nala	7.6, ENE
		Dhakai Jhor	6.9,NE
		Nagarpath nala	8.5,NNE
		Barkijora nala	1.6,E
		Ghoragara nala	3.4,E
		Turi nala	5.0, E
		Tenughat Reservoir	13.9, WSW
		Godo nala	1.6, W
		Ghantik nala	8.9, WNW
		Konar nala	8.5,W
		Bokaro nala	8.6, W
		Pokharia nala	13.4, ESE
		Tenughat Bokaro canal	3.7, SSW
		Daiobera nala	12.9,N
		Barki nala	10.4,NNW
		Forests	
		PF near Mungo	8.7, E
		PF near Birni	7.3, ENE
		PF near Nawadih	10.5, NE
		PF near Khaiyakhar	12.6, NNE
3.	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	Forests are present as mentioned in point 2 above	
4.	Inland, coastal, marine or underground waters	Water bodies are present as mentioned in point 2 above	

Sl. No.	Areas	Name/ Identity	Aerial distance (within 15 km.) Proposed project location boundary
5.	State, National boundaries	Nil	
6.	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	***Roads***	
		NH-23, Gola to Chas	12.5 km, S
		Phusro to Dumri Road	1.8 km, E
		Phusro to Jainamore Road	2.4 km, SE
		Phusro to Nawadih Road	Within
		Tenughat Dam Road	13.8 km, SW
		Railway Line	
		Barkakana to Phularitand	0.7 km, S
		Phularitand to Kotshila	9.6 km, SE
7.	Defense installations	Nil	
8.	Densely populated or built-up area	Phusro	2.2 km, SE
9.	Areas occupied by sensitive man-made land uses *(hospitals, schools, places of worship, community facilities)*	Hospitals, Schools, Community facilities are present within 10 km of the study area. List of amenities in Villages in 10 km as per Census 2011 is given in ***Annexure X***.	
10.	Areas containing important, high quality or scarce resources *(ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)*	Nil	
11.	Areas already subjected to pollution or environmental damage. *(those where existing legal environmental standards are exceeded)*	Nil	
12.	Areas susceptible to natural hazard which could cause the project to present environmental problems (*earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions*)	The project is not under actively seismic zone (Zone-III). The project area is not prone to floods, landslides or cloudburst etc.	

(IV) Proposed Terms of Reference for EIA studies: Refer *Annexure XII*

I hereby give undertaking that the data and information given in the application and enclosures are true to the best of my knowledge and belief and I am 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 our risk and cost.

Signature of the Applicant

Date: 1.09.2016
Place: Bermo, Jharkhand

01/9/2016

Name and Full address:
Arbind Kumar Thakur
Authorized Signatory
Bermo Mines
Villages Baidkaro, Kargali, Karo and Amlo
Block Bermo
District Bokaro
Jharkhand 829104

Submit document supporting claim of authorized signatory for the specific project. (Refer ***Annexure XI).***

LIST OF ANNEXURES FOR FORM-1

Annexure No.	Description
I	Location map
II	List of Khasras
III	EC letter of Captive Power Plant (Bokaro Thermal Power Station)
IV	Present Surface plan
V	Geological plan
VI	Geological sections
VIIA	Mine Stage Plan at the end of 5th year
VIIB	Mine Stage Plan at the end of West Pit (21st year)
VIIC	Post Mine Closure Plan
VIII	Conceptual Mine sections
IX	Map showing study area 15 km radius around project
X	List of amenities in villages within 10 km radius
XI	Authorized signatory through board resolution
XII	Proposed Terms of Reference for EIA
XIII	Pre-feasibility Report

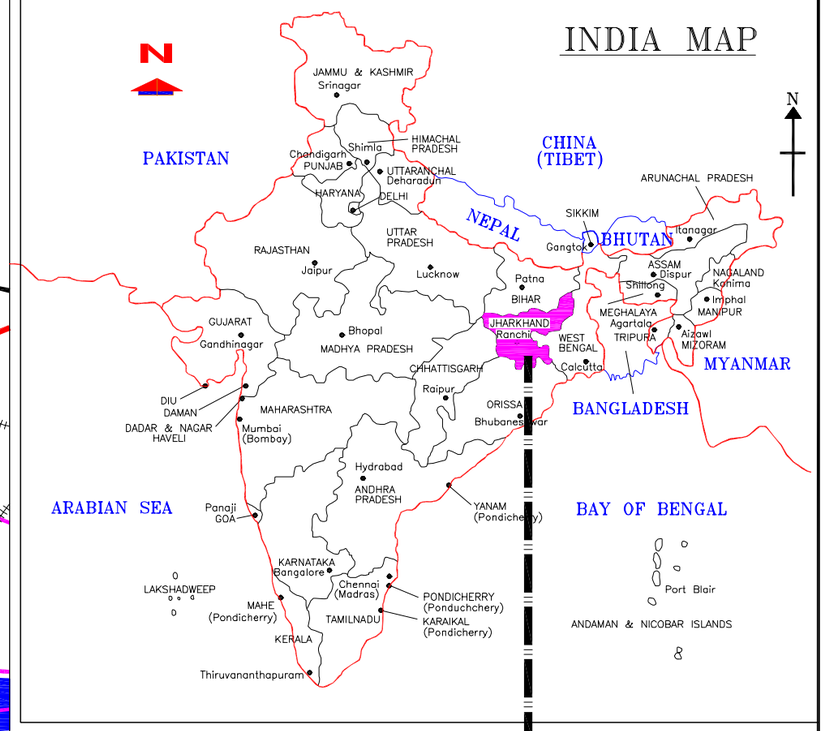
ANNEXURES TO FORM 1

Bishungarh
HAZARIBAG
Dumri
GIRIDIH
Tundi
DHANBAD
Topchanchi
NH-8
Hurlung
Kari Khurd
Anardih
Rola
Chute
Lahia
Palamu
Nawadih
Gomoh
Kanjkiro
Daridag
BOKARO
Telo
Baghmara
DHANBAD
Gumia
Kenduadih
Danea
Chandkapurha
Hasir
Bermo
Muniatand
NH-32
Jagesar
Kargali
Phusro
Jharia
Saran
Chalkari
Tantri
Damodar R.
Angwali
Kanari
Aiyar
Aluara
Talgaria
Rangadmati
Jenal
Mandwar
Sewababudih
Bandhdih
Madhunia
Sonpura
Asansal
Mahal
Bokaro Steel City
Panche R.
Silajuri
Bhojudih
Peterbar
Jaridih
Chas
Mamarkundar
Garri
Ghatiali
Kasmar
Chakalia
Charga
RAMGARH
Chandankiari
Tiro
Kauria
Madhukarpur
Runrru
Artah
Maniura
NH-23
Gola
Harnad
Tupra
Jhalbarda
Karma
Kumardaga
Gamariya
RANCHI
Jaipur
NH-32
WEST BENGAL
Jhalida

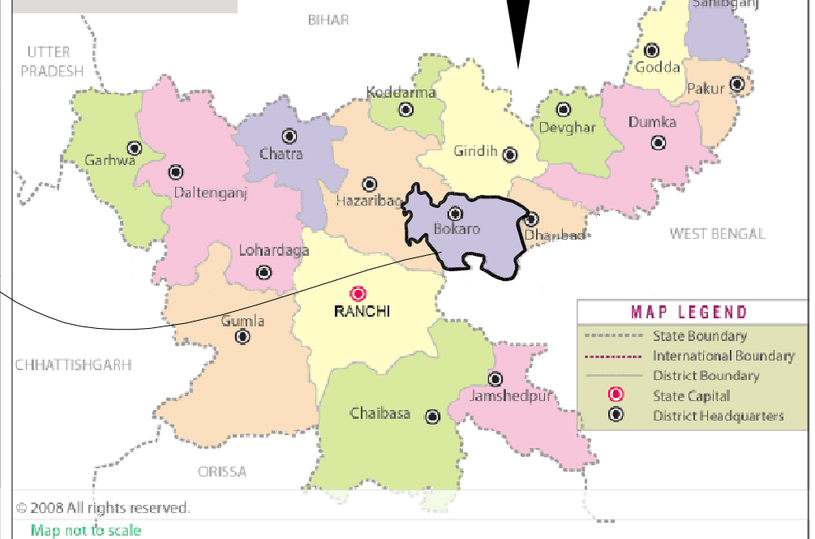
LEGEND

- DISTRICT HEADQUARTER
- TALUK HEADQUARTER
- OTHER TOWN
- DISTRICT BOUNDARY
- STATE HIGHWAY
- STATE BOUNDARY
- OTHER ROAD
- RAILWAY
- NATIONAL HIGHWAY
- RIVER
- TOURIST PLACE
- GOLDEN QUADRILATERAL
- PROJECT SITE

INDIA MAP



MAP OF JHARKHAND



Map not to scale

MIN MEC CONSULTANCY PVT. LTD.
NEW DELHI, PH. 29534777, 29535891
An ISO 9001 : 2008 Approved Company

An ISO 9001 : 2008 approved company

CLIENT:	DAMODAR VALLEY CORPORATION (DVC)
PROJECT:	BERMO MINE
TITLE:	FORM-1
	LOCATION MAP
PREPARED BY:	RANJEET K.
CHECKED BY:	RASHMI GUPTA
SCALE :	AS SHOWN
DATE :	01-06-2016

ANNEXURE : I

ANNEXURE : II

KHASRA WISE LAND USE DETAILS

Tenancy Plots of Karo Mouza under the lease hold of DVC Bermo Mines:-

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
01.	Karo	Bermo, 65	09	239	0.98	0.59	Parti Kadim
02.	do	do	04	242	0.15	0.15	Dhan Khet II
03.	do	do	07	247	2.11	2.11	Dhan Khet-III
04.	do	do	12	244	0.56	0.21	Tand-III
05.	do	do	10	251	0.96	0.50	Tand-II
06.	do	do	12	384	0.38	0.20	Dhan Khet-III
				Total		**3.76**	

GMK land details of Karo Mouza in the leasehold of DVC Bermo Mines:-

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
01.	Karo	Bermo, 65	**01**	**385**	**1.54**	**1.00**	**Nadi (**River)
02.	Karo	Bermo, 65	**01**	**200**	**59.55**	**11.45**	**GMK**
				Total		**12.45**	

GMK plots recorded as 'Jungle' in Karo Mouza in the leasehold of DVC Bermo Mines:-

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
01.	Karo	Bermo, 65	01	243	**6.74**	**3.00**	GMK Jungle
02.	do	do	01	386	**43.85**	**33.90**	GMK Jungle
				Total		**36.90**	

GM-Aam land details of Karo Mouza in the leasehold of DVC Bermo Mines:-

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
01.	Karo	Bermo, 65	30	259	1.54	**0.46**	Rasta
02.	do	do	30	374	**0.53**	**0.53**	Rasta
				Total		**0.99**	

Tenancy Plots of Baidkaro Mouza under the lease hold of DVC Bermo Mines:-

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
01.	Baidkaro	Bermo,20	49	80	0.08	0.08	Dhan Khet-III
02.	do	do	03	73	0.31	0.31	Tand-III
03.	do	do	52	77	0.06	0.06	Parti pind
04.	do	do	17	74	0.21	0.21	Parti
05.	do	do	49	75	0.04	0.04	Dhan Khet-III
06.	do	do	49	76	0.89	0.89	Dhan Khet-II
07.	do	do	56	83	0.27	0.27	Tand-II
08.	do	do	49	84	0.29	0.29	Dhan Khet-II
09.	do	do	03	86	0.08	0.08	Dhan Khet-II
10.	do	do	03	87	0.12	0.12	Dhan Khet-II
11.	do	do	03	88	0.41	0.41	Tand-III
12.	do	do	56	95	0.03	0.03	Dhan Khet-III
13.	do	do	56	96	0.12	0.12	Dhan Khet-II

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
14.	do	do	59	97	0.13	0.13	Dhan Khet-II
15.	do	do	56	99	0.15	0.15	Dhan Khet-II
16.	do	do	52	82	0.04	0.04	Parti pind
17.	do	do	54	100	0.11	0.11	Dhan Khet-II
18.	do	do	50	101	0.17	0.17	Dhan Khet-III
19.	do	do	50	102	0.04	0.04	Parti kadim
20.	do	do	63	103	0.17	0.17	Dhan Khet-III
21.	do	do	59	104	0.16	0.16	Dhan Khet-III
22.	do	do	61	105	0.16	0.16	Dhan Khet-III
23.	do	do	54	106	0.09	0.09	Dhan Khet-III
24.	do	do	50	107	0.08	0.08	Dhan Khet-III
25.	do	do	56	108	0.05	0.05	Dhan Khet-III
26.	do	do	59	109	0.05	0.05	Dhan Khet-III
27.	do	do	61	110	0.07	0.07	Dhan Khet-III
28.	do	do	65	111	0.37	0.37	Dhan Khet-III
29.	do	do	65	112	0.21	0.21	Tand-II
30.	do	do	44	117	0.53	0.53	Dhan Khet-II
31.	do	do	44	118	0.12	0.12	Dhan Khet-III
32.	do	do	18	119	0.31	0.31	Tand-III
33.	do	do	18	120	0.05	0.05	Dhan Khet-III
34.	do	do	18	121	0.18	0.18	Tand-III
35.	do	do	18	122	0.17	0.17	Dhan Khet-III
36.	do	do	18	123	0.30	0.30	Dhan Khet-II
37.	do	do	18	126	1.46	1.22	Dhan Khet-II
38.	do	do	14	129	0.07	0.07	Dhan Khet-II
39.	do	do	01	130	0.21	0.21	Dhan Khet-II
40.	do	do	14	131	0.15	0.15	Dhan Khet-II
41.	do	do	14	132	0.14	0.14	Dhan Khet-II
42.	do	do	01	133	0.27	0.27	Dhan Khet-II
43.	do	do	01	134	0.27	0.27	Dhan Khet-II
44.	do	do	14	137	0.13	0.13	Dhan Khet-II
45.	do	do	14	140	0.08	0.08	Dhan Khet-II
46.	do	do	14	141	0.09	0.09	Dhan Khet-II
47.	do	do	14	146	0.06	0.06	Dhan Khet-II
48.	do	do	14	149	0.36	0.36	Dhan Khet-II
49.	do	do	14	150	0.17	0.17	Dhan Khet-II
50.	do	do	14	151	0.12	0.12	Dhan Khet-II
51.	do	do	14	152	0.23	0.23	Dhan Khet-II
52.	do	do	14	153	0.24	0.24	Dhan Khet-II
53.	do	do	14	154	0.11	0.11	Dhan Khet-II
54.	do	do	14	155	0.33	0.33	Tand-II
55.	do	do	61	156	0.20	0.20	Dhan Khet-II
56.	do	do	54	157	0.25	0.25	Dhan Khet-II
57.	do	do	56	158	0.35	0.35	Dhan Khet-II
58.	do	do	59	159	0.37	0.37	Dhan Khet-II
59.	do	do	54	160	0.30	0.30	Tand-II
60.	do	do	59	161	0.31	0.31	Dhan Khet-III
61.	do	do	61	163	0.58	0.58	Dhan Khet-II

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
62.	do	do	01	164	0.82	0.82	Dhan Khet-II
63.	do	do	03	166	0.08	0.08	Dhan Khet-III
64.	do	do	01	167	0.12	0.12	Dhan Khet-II
65.	do	do	49	170	0.29	0.29	Dhan Khet-II
66.	do	do	01	171	1.20	1.20	Dhan Khet-I
67.	do	do	29	173	3.33	0.29	Dhan Khet-I
				Total		**16.03**	

GMK plots recorded as 'Jungle' in Baidkaro Mouza in the leasehold of DVC Bermo Mines:-

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
01.	Baidkaro	Bermo,20	83	81	**8.88**	**8.88**	GMK Jungle
02.	do	do	83	70	**0.46**	**0.46**	GMK Jungle
03.	do	do	83	113	**5.92**	**5.92**	GMK Jungle
04.	do	do	83	135	**0.70**	**0.70**	GMK Jungle
05.	do	do	83	168	**3.24**	**3.24**	GMK Jungle
06.	do	do	83	64	**258.50**	**10.24**	GMK Jungle
07.	do	do	75	85	**0.37**	**0.37**	GMK Jungle
				Total		**29.81**	

GMK land details of Baidkaro Mouza in the leasehold of DVC Bermo Mines:-

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
01.	Baidkaro	Bermo,20	75	93	**0.01**	**0.01**	Parti kadim
02.	do	do	75	94	**0.16**	**0.16**	Parti kadim
03.	do	do	75	115	**1.05**	**1.05**	Bandh
04.	do	do	75	162	**0.06**	**0.06**	Parti pind
05.	do	do	75	165	**0.25**	**0.25**	Parti aar
06.	do	do	83	169	**0.05**	**0.05**	Parti aar
07.	do	do	83	172	**0.17**	**0.15**	Parti aar
08.	do	do		1275		12.67	
				Total		**14.40**	

Tenancy Plots of Kargali Mouza under the lease hold of DVC Bermo Mines:-

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
01.	Kargali	Bermo,20		133	0.93	0.13	
02.	do	do	01	134	2.47	1.12	Jirat
03.	do	do	01	02	0.29	0.19	Jirat
04.	do	do	01	04	0.14	0.14	Jirat
05.	do	do	39	06	0.43	0.43	Jirat
06.	do	do	01	08	1.12	1.12	Jirat
07.	do	do	01	10	0.26	0.26	Jirat
08.	do	do	04	11	3.01	3.01	Dhan Khet-I
09.	do	do	04	12	0.10	0.10	Dhan Khet-III
10.	do	do	04	13	0.29	0.29	Dhan Khet-III
11.	do	do	03	15	1.27	1.27	Dhan Khet-III
12.	do	do	03	16	0.05	0.05	Parti Bandh

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
13.	do	do	22	20	0.24	0.24	Dhan Khet-I
14.	do	do	22	21	0.43	0.43	Dhan Khet-II
15.	do	do	11	22	0.31	0.22	Dhan Khet-I
16.	do	do	22	23	0.15	0.15	Dhan Khet-I
17.	do	do	22	24	0.27	0.12	Parti kadim
18.	do	do	26	26	0.05	0.05	Dhan Khet-III
19.	do	do	11	27	0.34	0.22	Tand-II
20.	do	do	09	262	0.05	0.05	Makan sahan
				Total		**9.72**	

GMK plots recorded as 'Jungle' in Kargali Mouza in the leasehold of DVC Bermo Mines:-

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
01.	Kargali	Bermo,20	27	135	**3.92**	**1.12**	GMK Jungle
02.	do	do	27	116	**79.00**	**54.03**	GMK Jungle
03.	do	do	27	01	**237.50**	**125.60**	GMK Jungle
04.	do	do	27	03	**0.16**	**0.16**	GMK Jungle
05.	do	do	27	273	**46.50**	**34.59**	GMK Jungle
				Total		**215.50**	

GMK land details of Kargali Mouza in the leasehold of DVC Bermo Mines:-

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
01.	Kargali	Bermo,20	27	132	**3.17**	**0.45**	Parti kadim
02.	do	do	27	05	**0.02**	**0.02**	Parti aar
03.	do	do	27	07	**0.04**	**0.04**	Parti aar
04.	do	do	27	09	**0.03**	**0.03**	Parti aar
05.	do	do	27	14	**0.05**	**0.05**	Parti aar
06.	do	do	27	17	**0.28**	**0.28**	Parti pind
07.	do	do	27	18	**1.31**	**1.31**	Pokhar
				Total		**2.18**	

Tenancy Plots of Emlo Mouza under the lease hold of DVC Bermo Mines:-

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
01.	Emlo	Bermo,20	17	289	1.01	0.45	Tand-III
02.	do	do	08	290	0.24	0.19	Dhan Khet-III
03.	do	do	16	291	1.94	1.94	Dhan Khet-II
04.	do	do	16	294	1.03	1.03	Dhan Khet-II
05.	do	do	16	296	0.59	0.59	Dhan Khet-II
06.	do	do	16	298	1.12	1.12	Dhan Khet-II
07.	do	do	16	299	0.49	0.49	Dhan Khet-II
08.	do	do	31	300	0.31	0.31	Dhan Khet-II
09.	do	do	13	302	0.38	0.38	Tand-III
10.	do	do	14	304	0.68	0.68	Tand-III
11.	do	do	18	305	0.39	0.39	Tand-II
12.	do	do	17	306	0.26	0.26	Tand-III

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
13.	do	do	01	308	0.95	0.95	Tand-III
14.	do	do	03	309	0.39	0.39	Tand-III
15.	do	do	17	310	0.40	0.40	Tand-III
16.	do	do	27	311	0.57	0.57	Tand-III
17.	do	do	24	312	2.39	2.39	Tand-III
18.	do	do	01	313	2.53	2.53	Tand-III
19.	do	do	20	314	0.46	0.26	Tand-III
20.	do	do	24	362	0.36	0.36	Dhan Khet-II
21.	do	do	24	363	0.22	0.22	Dhan Khet-II
22.	do	do	14	365	0.28	0.28	Bandh
23.	do	do	16	352	1.29	1.29	Dhan Khet-II
24.	do	do	01	351	2.06	2.06	Tand-III
25.	do	do	24	354	0.16	0.16	Dhan Khet-II
26.	do	do	04	355	0.39	0.39	Dhan Khet-II
27.	do	do	24	346	0.33	0.33	Dhan Khet-II
28.	do	do	01	347	1.74	1.74	Tand-III
29.	do	do	01	349	1.85	1.85	Tand-III
30.	do	do	12	316	0.60	0.20	Tand-III
31.	do	do	09	317	0.61	0.60	Tand-III
32.	do	do	12	222	0.20	0.15	Dhan Khet-III
33.	do	do	12	221	0.74	0.50	Dhan Khet-II
34.	do	do	04	340	0.17	0.17	Dhan Khet-II
35.	do	do	24	339	0.09	0.09	Dhan Khet-III
36.	do	do	11	335	0.15	0.15	Dhan Khet-III
37.	do	do	03	333	0.08	0.08	Dhan Khet-III
38.	do	do	21	322	0.42	0.42	Dhan Khet-III
39.	do	do	12	220	0.23	0.23	Dhan Khet-II
40.	do	do	12	217	0.14	0.14	Dhan Khet-II
41.	do	do	18	216	0.04	0.04	Dhan Khet-III
42.	do	do	12	214	0.50	0.50	Dhan Khet-II
43.	do	do	18	325	0.14	0.14	Dhan Khet-III
44.	do	do	24	336	0.09	0.09	Dhan Khet-II
45.	do	do	24	331	0.04	0.04	Dhan Khet-II
46.	do	do	18	327	0.08	0.08	Dhan Khet-II
47.	do	do	18	212	0.50	0.50	Dhan Khet-II
48.	do	do	37	211	0.04	0.04	Dhan Khet-II
49.	do	do	37	210	0.26	0.26	Dhan Khet-II
50.	do	do	37	206	0.47	0.47	Dhan Khet-II
51.	do	do	37	205	0.28	0.28	Dhan Khet-II
52.	do	do	04	203	0.91	0.55	Dhan Khet-II
53.	do	do	24	330	0.42	0.42	Dhan Khet-II
54.	do	do	17	453	0.29	0.29	Dhan Khet-II
55.	do	do	18	450	1.02	1.02	Dhan Khet-II
56.	do	do	24	342	0.01	0.01	Dhan Khet-III
57.	do	do	18	343	0.08	0.08	Dhan Khet-II
58.	do	do	24	345	0.05	0.05	Dhan Khet-II
59.	do	do	03	449	0.45	0.45	Dhan Khet-II
60.	do	do	04	447	0.02	0.02	Dhan Khet-II

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
61.	do	do	04	445	0.01	0.01	Dhan Khet-II
62.	do	do	04	504	0.13	0.13	Dhan Khet-II
63.	do	do	04	458	0.33	0.33	Dhan Khet-II
64.	do	do	16	208	1.79	1.70	Dhan Khet-II
65.	do	do	24	209	0.09	0.09	Dhan Khet-II
66.	do	do	04	207	0.31	0.31	Dhan Khet-II
67.	do	do	02	440	0.01	0.01	Dhan Khet-II
68.	do	do	04	508	0.17	0.17	Dhan Khet-II
69.	do	do	16	439	0.44	0.44	Dhan Khet-II
70.	do	do	24	507	0.02	0.02	Dhan Khet
71.	do	do	24	503	0.46	0.46	Dhan Khet-II
72.	do	do	27	502	0.11	0.11	Dhan Khet-II
73.	do	do	17	546	0.05	0.05	Makan sahan
74.	do	do	24	463	0.17	0.17	Dhan Khet-III
75.	do	do	24	461	0.22	0.22	Dhan Khet-III
77.	do	do	21	465	0.19	0.15	Dhan Khet-II
78.	do	do	04	499	0.61	0.61	Dhan Khet-II
79.	do	do	24	497	0.59	0.24	Dhan Khet-II
80.	do	do	16	498	0.36	0.34	Dhan Khet-II
				Total		**37.62**	

GM-Aam land details of Emlo Mouza in the leasehold of DVC Bermo Mines:-

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
01.	Emlo	Bermo,20	40	348	**0.26**	**0.26**	Rasta
02.	do	do	40	549	**0.59**	**0.55**	Rasta
				Total		**0.81**	

GMK land details of Emlo Mouza in the leasehold of DVC Bermo Mines:-

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
01.	Emlo	Bermo,20	39	295	**0.31**	0.31	Parti pathar
02.	do	do	39	318	**0.06**	0.06	Parti pathar
03.	do	do	39	319	**0.07**	0.07	Parti pathar
04.	do	do	39	338	**0.15**	0.15	Parti pathar
05.	do	do	39	334	**0.38**	0.38	Parti pathar
06.	do	do	39	323	**0.03**	0.03	Parti pathar
07.	do	do	39	218	**0.16**	0.08	Parti pathar
08.	do	do	39	324	**0.04**	0.04	Parti kadim
09.	do	do	39	326	**0.04**	0.04	Parti pathar
10.	do	do	39	213	**0.04**	0.04	Parti kadim
11.	do	do	39	344	**1.64**	1.30	Parti pathar
12.	do	do	39	446	**0.01**	0.01	Parti kadim
13.	do	do	39	448	**0.03**	0.03	Parti kadim
14.	do	do	39	457	**0.01**	0.01	Parti pathar
15.	do	do	39	464	**0.66**	0.36	Parti pathar
16.	do	do		451	**0.95**	**0.95**	
17.	do	do		456	**0.98**	**0.98**	

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
18.	do	do		264	**0.48**	**0.48**	
19.	do	do		265		**0.38**	
20	do	do		266		**0.09**	
21	do	do		267	**0.12**	**0.12**	
22.	do	do		268	**0.32**	**0.32**	
23.	do	do		269	**0.24**	**0.24**	
24.	do	do		270	**0.34**	**0.34**	
25.	do	do		273	**0.97**	**0.97**	
26.	do	do		274	**0.05**	**0.05**	
27.	do	do		275	**0.06**	**0.06**	
28.	do	do		276	**2.77**	2.40	
29.	do	do		219	**2.99**	**1.65**	
30.	do	do		187	**1.35**	**1.00**	
31.	do	do		201	**0.70**	**0.10**	
32.	do	do		202	**0.30**	**0.09**	
33.	do	do		262	**0.09**	**0.05**	
34.	do	do		263	**0.10**	**0.09**	
35.	do	do		260	**0.09**	**0.05**	
36.	do	do		545	**1.05**	**0.35**	
37.	do	do		509	**0.69**	**0.69**	
38.	do	do		544	**0.20**	**0.14**	
39.	do	do		539	**0.09**	**0.09**	
40.	do	do		541	**0.60**	**0.60**	
41.	do	do		500	**0.54**	**0.54**	
42.	do	do		506	**0.03**	**0.03**	
43.	do	do		462	**0.60**	**0.60**	
44.	do	do		542	**0.05**	**0.05**	
45.	do	do		540	**0.18**	**0.10**	
46.	do	do		536	**0.35**	**0.10**	
47.	do	do		505	**0.04**	**0.04**	
48.	do	do		366	**2.30**	**0.96**	
49.	do	do		364	**0.30**	**0.28**	
50.	do	do		460	**0.22**	**0.22**	
51.	do	do		501	**0.37**	**0.37**	
				Total		**18.48**	

<u>GMK plots recorded as 'Jungle' in Emlo Mouza in the leasehold of DVC Bermo Mines</u>:-

Sl. No.	Name of Village	Thana & Thana No.	Khata No.	Plot No.	Total area in acres	Acquired area in acres	Type of Land
01.	Emlo	Bermo,20	39	297	**10.99**	**10.99**	GMK Jungle
02.	do	do	39	301	**0.50**	**0.50**	GMK Jungle
03.	do	do	39	303	**4.24**	**3.60**	GMK Jungle
				Total		**15.09**	

ANNEXURE : III

By Speed Post

No.J- 13011/21/2006-IA.II(T)
Government of India
Ministry of Environment & Forests

Paryavaran Bhawan
CGO Complex, Lodi Road
New Delhi-110 003.

Dated 30th March, 2007

To

The Chief Environment Officer (EM&PC)
M/s Damodar Valley Corporation,
Electricity Department, 10th Floor
DVC Towers, VIP Road,
Kolkata – 700 054.

Sub: Bokaro Thermal Power Station 'A' (1x500 MW) at BTPS, Bokaro, Jharkhand by M/s Damodar Valley Corporation – Environmental clearance reg.

Sir,

The undersigned is directed to refer to your communication No. EDCON/EM&PC/BTPS'A'/2599 Dated4th January, 2007 regarding the subject mentioned above. Subsequent information submitted vide letter dated 31st Jan, 2007 has also been considered.

2. It is noted that the proposal is for grant of environmental clearance under the provisions of EIA Notification, 2006 to set up 500 MW thermal power plant as an expansion of the existing power plant at Bokaro, Jharkhand. The land requirement is 70 ha which is already available within the existing complex and no additional land would be acquired except 65 ha for ash pond which is a forest land. Coal with sulphur content of 0.4% and ash content of 40% will be used. The requirement of coal has been estimated as 2.5 Million TPA at 100% PLF. Coal will be transported through road and rail in the ratio of 60:40. The water requirement is estimated as 2015 m3/hr and will be met from the existing allocation from river Konar. No National Park/wildlife sanctuary, ecologically sensitive area is within 10 km radius. R&R is not involved. Public hearing for the project was held on 29.12.2006. The project cost is Rs 2312.60 crores including Rs 129.5 crores for environmental protection measures.

3. The proposal has been considered in accordance with the EIA Notification dated 14th September, 2006 and environmental clearance is hereby accorded under the provisions there of subject to implementation of the following terms and conditions:

(i) No additional land for any facilities/activities shall be acquired for the project except 65 ha for ash pond.

(ii) No new facilities relating to the proposed project shall be setup wit hin 50m of the HFL of the river.

(iii) Ash and sulphur content in the coal to be used in the project shall not exceed 40% and 0.4% respectively.

(iv) One single flue stack of 275 m height shall be provided with continuous online monitoring equipments. Exit velocity of 22 m/sec shall be maintained.

(v) High efficiency Electrostatic Precipitators (ESPs) with efficiency not l ess than 99.9 % shall be installed to ensure that particulate emission does not exceed 100 mg/Nm3.

(vi) Space provision shall be made for Flue Gas De-sulphurisation (FGD) unit, if required at a later stage.

(vii) Water consumption in the expansion project shall not exceed 2015 m3/hr and this quantity shall be met from the existing allocation.

(viii) Closed Cycle Cooling system with natural draft cooling tower shall be provided. Measures shall also be adopted to reduce the water demand through increasing COC and rain water harvesting.

(ix) The ash pond shall be provided with impervious lining.

(x) Adequate dust extraction system such as bag filters and water spray system in dusty areas such as coal and ash handling areas, transfer areas and other vulnerable areas shall be provided.

(xi) Fly ash shall be collected in dry form and ash generated shall be used in a phased manner as per provisions of the notification on Fly Ash Utiliza tion issued by the Ministry in September, 1999 and its amendment. By the end of 9th year full fly ash utilization should be ensured. Unutilized ash shal l be disposed off in the ash pond in the form of High Concentration Slurry.

(xii) The effluents to be discharged into the river shall conform to the standards prescribed by the State Pollution Control Board.

(xiii) Rain water harvesting shall be practiced. A detailed scheme for rain water harvesting to recharge the ground water aquifer shall be prepared in consultation with Central Ground Water Authority/State Ground Water Board and a copy of the same shall be submitted within three month s to the Ministry.

(xiii) Greenbelt shall be raised all around the ash pond area. Green belt development shall be started along with the construction activity.

(xiv) First aid and sanitation arrangements shall be made for the drivers and other contract workers during construction phase.

(xv) Leq of Noise level should be limited to 75 dBA and regular maintenance of equipment be undertaken. For people working in the high noise areas, personal protection devices should be provided.

(xvi) Regular monitoring of the ambient air quality shall be carried out in and around the power plant and records maintained. The location of the monitoring stations and frequency of monitoring shall be decided in consultation with SPCB. Periodic reports shall be submitted to the Regional Office of this Ministry.

(xvii) The project proponent shall advertise in at least two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned, informing that the project has been accorded environmental clearance and copies of clearance letters are available with the State Pollution Control Board/ Committee and may also be seen at Website of the Ministry of Environment and Forests at http://envfor.nic.in.

(xviii) A separate environment monitoring cell with suitable qualified staff should be set up for implementation of the stipulated environmental safeguards.

(xix) Half yearly report on the status of implementation of the stipulated conditions and environmental safeguards should be submitted to this Ministry, Regional Office, CPCB and SPCB.

(xx) Regional Office of the Ministry of Environment & Forests located at *Bhubaneswar* will monitor the implementation of the stipulated conditions. Complete set of Environmental Impact Assessment Report and Environment Management Plan shall be forwarded to the Regional Office for their use during monitoring.

(xix) Separate funds should be allocated for implementation of environmental protection measures along with item-wise break-up. This cost should be included as part of the project cost. The funds earmarked for the environment protection measures should not be diverted for other purposes and year-wise expenditure should be reported to the Ministry.

(xx) Full cooperation should be extended to the Scientists/Officers from the Ministry/Regional Office of the Ministry at ***Bhubaneswar*** /the CPCB/the SPCB who would be monitoring the compliance of environmental status.

4. The Ministry reserves the right to revoke the clearance if conditions stipulated are not implemented to the satisfaction of the Ministry.

5. The environmental clearance accorded shall be valid for a period of 5 years to the start of production operations by the power plant.

6. In case of any deviation or alteration in the proposed project from that submitted to this Ministry for clearance, a fresh reference shall be made to the Ministry to assess the adequacy of the condition(s) imposed and to incorporate additional environmental protection measures required, if any.

7. The above stipulations shall be enforced along with others as under the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and rules there under, The Manufacture, Storage and Import of Hazardous Chemical Rules, 1989, Hazardous Wastes (Management and Handling) Rules, 1989, the Public Liability Insurance Act, 1991 and rules there under and the EIA Notification, 2006 and the amendments made therein from time to time.

(Dr. S.K. AGGARWAL)
DIRECTOR

Copy to:

1. The Secretary, Ministry of Power, Shram Shakti Bhawan, Rafi Marg, New Delhi-110001.
2. The Secretary, Forests & Environment Department, Government of Jharkhand, Nepal House, Dordandor, Ranchi, Jharkhand.
3. The Chairman, Central Electricity Authority, Sewa Bhawan, R.K. Puram, New Delhi-110066.
4. The Chairman, Jharkhand State Pollution Control Board, T.A. Building HEC, P.O. Dhurwa, Ranchi-834 004 - with a request to display a copy of the clearance letter at the Regional Office, District Industries Centre and Collector's office for 30 days.
5. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.
6. The Chief Conservator of Forests, Eastern Regional Office, Ministry of Environment & Forests, 194, Kharvela Nagar, Bhubaneswar-751001.
7. Director (EI), MOEF.
8. Guard file.
9. Monitoring file.

(Dr. S.K. AGGARWAL)
DIRECTOR

J-13011/21/2006 - IA. II (T)
Government of India
Ministry of Environment & Forests

Tel no: 011- 2436 4067
Paryavaran Bhavan, C.G.O. Complex,
Lodi Road, New Delhi -110003.

Dated: 04.12.2012

To

M/s Damodar Valley Corpn. Ltd.
Elecrticity Department, 10th Floor
DVC Towers, VIP Road
Kolkatta – 700 054.

Sub: Bokaro Thermal Power Station-A (1x500 MW), at Bokaro, in Jharkhand- reg.

Sir,

This has reference to your letters dated 02.06.2012 requesting the Ministry for extension of validity period of environmental clearance accorded Bokaro Thermal Power Station-A (1x500 MW), at Bokaro, in Jharkhand.

2. The request has been examined and the matter was placed before the Expert Appraisal Committee (Thermal Power) in its 54th Meeting held during August 6-7, 2012. It is now hereby informed that in view of the information / clarification furnished by you with respect to the implementation of the above mentioned expansion power project and in acceptance of the recommendation of the Expert Appraisal Committee (Thermal Power), the validity period of the environmental clearance letter issued by this Ministry's letter of even no., dated 30.03.2007 is now extended for a further period till 28.03.2017.

3. It is also further informed that under para no.3 of this Ministry's letter of even no., dated 07.06.2007, after clause no. (xx), the following additional conditions shall be implemented:

(xxi) The project proponent shall upload the status of compliance of the conditions stipulated in the environmental clearance issued vide this Ministry's letter of even no. dated 30.03.2007 in its website and updated periodically and also simultaneously send the same by e-mail to the Regional Office of the Ministry of Environment and Forests.

xxii) Criteria pollutants levels including NO_x, RSPM (PM_{10} & $PM_{2.5}$), SO_x (from stack & ambient air) shall be regularly monitored and results displayed in your website and also at the main gate of the power plant.

xxiii) A three tier thick green belts on either side of the Ash Pond shall be developed and status of implementation shall be reported to the Regional Office of the Ministry regularly.

xxiv) An amount of Rs 9.3 Crores shall be earmarked as one time capital cost for CSR programme. Subsequently a recurring expenditure of Rs 1.9 Crores per annum till the life of the plant shall be earmarked as recurring expenditure for CSR activities. Details of the activities to be undertaken shall be submitted to the regional Office of the Ministry along with road map for implementation.

xxv) CSR scheme shall be identified based on need based assessment in and around the villages within 5 km of the site and in constant consultation with the village Panchayat and the District Administration. Income generating projects consistent with the traditional skills of the people shall be undertaken. Development of fodder farm, fruit bearing orchards, vocational training etc. can form a part of such programme. Company shall provide separate budget for community development activities and income generating programmes. Vocational training programme for possible self employment and jobs shall be imparted to identify villagers free of cost.

xxvi) It shall be ensured that in-built monitoring mechanism for the schemes identified is in place and annual social audit shall be got done from the nearest government institute of repute in the region. The project proponent shall also submit the status of implementation of the scheme from time to time.

(xxvii) The project proponent shall formulate a well laid Corporate Environment Policy and identify and designate responsible officers at all levels of its hierarchy for ensuring adherence to the policy and compliance with conditions stipulated in this clearance letter and other applicable environmental laws and regulations.

4. This issues with the approval of the Competent Authority.

Yours faithfully,

(Dr Saroj)
Scirntist 'F'

Copy to:

1. The Secretary, Ministry of Power, Shram Shakti Bhawan, Rafi Marg, New Delhi 110001.
2. The Secretary (Environment), Environment Department, Government of Jharkhand.

3. The Chairman, Central Electricity Authority, Sewa Bhawan, R.K. Puram, New Delhi-110066.
4. The Chairman, Jharkhand Pollution Control Board, TA Building, HEC Complex, P.O. Dhurwa, Distt. Ranchi- with a request to display a copy of the clearance letter at the Regional Office, District Indusries Centre and Collector's office for 30 days.
5. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.
6. The Chief Conservator of Forests, Eastern Regional Office, Ministry of Environment & Forests, A/3, Chandersekharpur, Bhubaneswar 751023.
7. The District Collector, Bokaro District, Govt. of Jharkhand.
8. Guard file.
9. Monitoring file

(Dr. Saroj)
Scirntist 'F'

दामोदर घाटी निगम / DAMODAR VALLEY CORPORATION
बोकारो ताप विद्युत केन्द्र / BOKARO THERMAL POWER STATION
अधीक्षण अभियंता (यां०), अनुरक्षण योजना स्कन्ध का कार्यालय / OFFICE OF THE SE(M), MPC
बोकारो थर्मल, बोकारो (झारखण्ड) / Bokaro Thermal, Bokaro (Jh.)-829107

No: BT/B (O&M)/SE (MPC)/M-12/384 Date: 01/02/2016

To
The Chief Engineer-I & HOP
DVC, BTPS,
Bokaro Thermal

Sub: Requirement of coal on the basis of station heat rate.

Ref: No: Letter No. BM/71 dt. 21.01.16 of SE (Mining) & Agent, DVC Bermo Mines.

Dear Sir,

The yearly requirement of coal for the 1x500 MW on the basis of station coal rate is as follows.

Projected Coal rate	:	0.6 Kg/KWH
Yearly Coal requirement	:	26,20,000 MT

This is for your kind information.

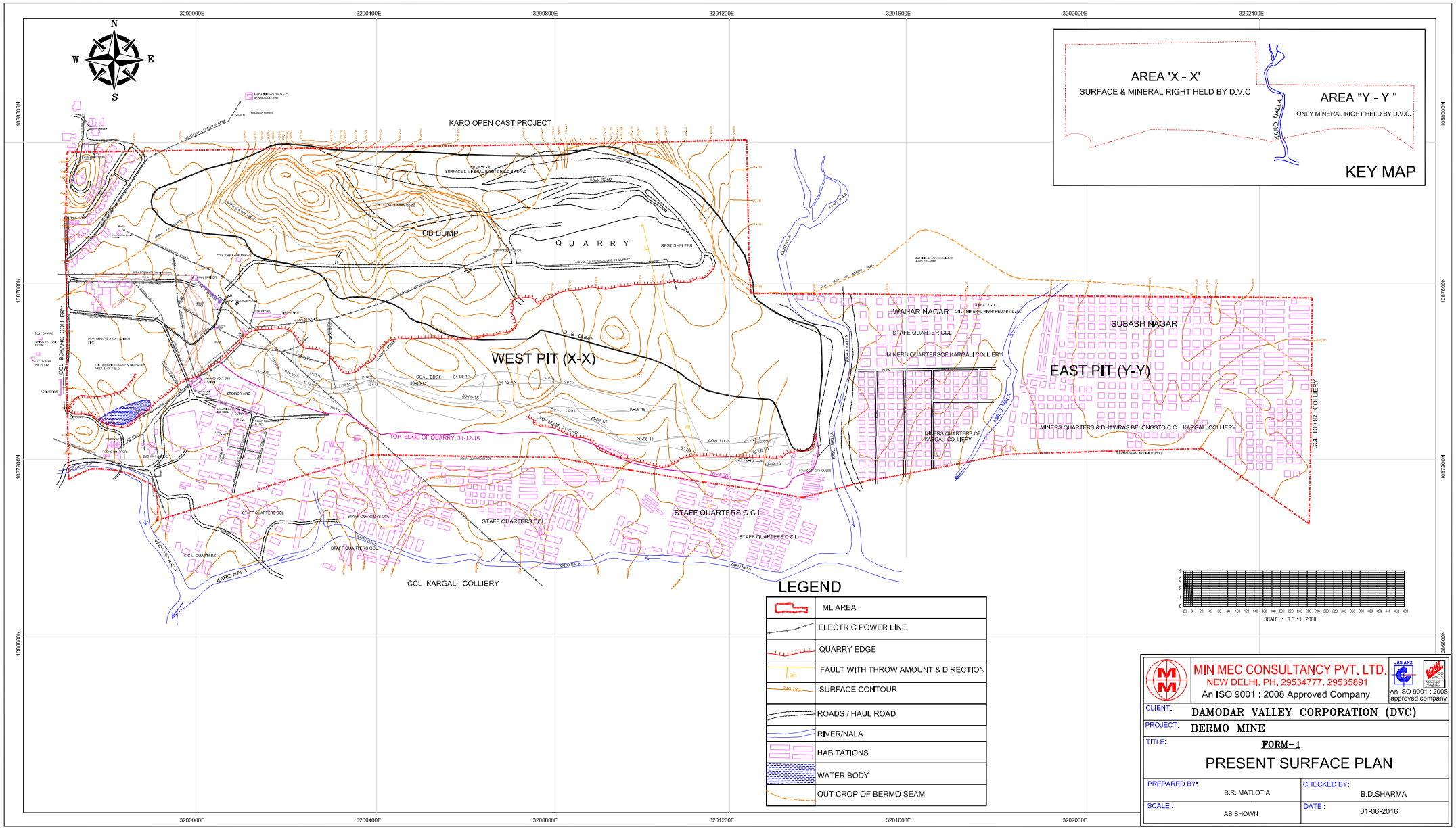
भवदीय/Yours faithfully,

अधीक्षण अभियंता(यां०), दामोदर घाटी निगम, बोकारो ताप विद्युत केन्द्र
SE (M), DVC, BTPS,
अनुरक्षण योजना स्कन्ध / Maintenance Planning Cell

Copy to:

→ The SE (Mining) & Agent, DVC Bermo Mines.

ANNEXURE : IV



LEGEND

	ML AREA
	ELECTRIC POWER LINE
	QUARRY EDGE
6m	FAULT WITH THROW AMOUNT & DIRECTION
340 330	SURFACE CONTOUR
	ROADS / HAUL ROAD
	RIVER/NALA
	HABITATIONS
	WATER BODY
	OUT CROP OF BERMO SEAM

MIN MEC CONSULTANCY PVT. LTD.
NEW DELHI, PH. 29534777, 29535891
An ISO 9001 : 2008 Approved Company

CLIENT: DAMODAR VALLEY CORPORATION (DVC)

PROJECT: BERMO MINE

TITLE: FORM-1

PRESENT SURFACE PLAN

PREPARED BY:	CHECKED BY:
B.R. MATLOTIA	B.D.SHARMA
SCALE : AS SHOWN	DATE : 01-06-2016

ANNEXURE : IV

B

A'

CMDV-04
248.09

CMDV-07
243.49

F1

40 m

40 m

F2

10 m

CMDV-16
241.93

CMDV-03
229.91

CMDV-09
223.83

CMDV-12
223.57

35 m

30 m

25 m

10 m

CMDV-13
237.99

CMDV-11
203.91

CMDV-15
237.65

CMDV-17
241.83

CMDV-08
181.50

CMDV-02
182.54

CMDV-14
235.82

CMDV-06
226.11

A

CMDV-01
234.04

B'

10 m

CMDV-85
229.60

10 m

CMDV-10
217.38

F1

F2

SCALE : R.F.:1:2000

LEGEND

	ML AREA
CMDV-01 ⊕	BOREHOLE DRILLED BY CMPDI
234.04	REDUCED LEVEL IN METER
A——A'	SECTION LINE
	SEAM INCROPS
10 m	FAULT WITH THROW AMOUNT & DIRECTION

MIN MEC CONSULTANCY PVT. LTD.
NEW DELHI, PH. 29534777, 29535891
An ISO 9001 : 2008 Approved Company

An ISO 9001 : 2008 approved company

CLIENT: DAMODAR VALLEY CORPORATION (DVC)

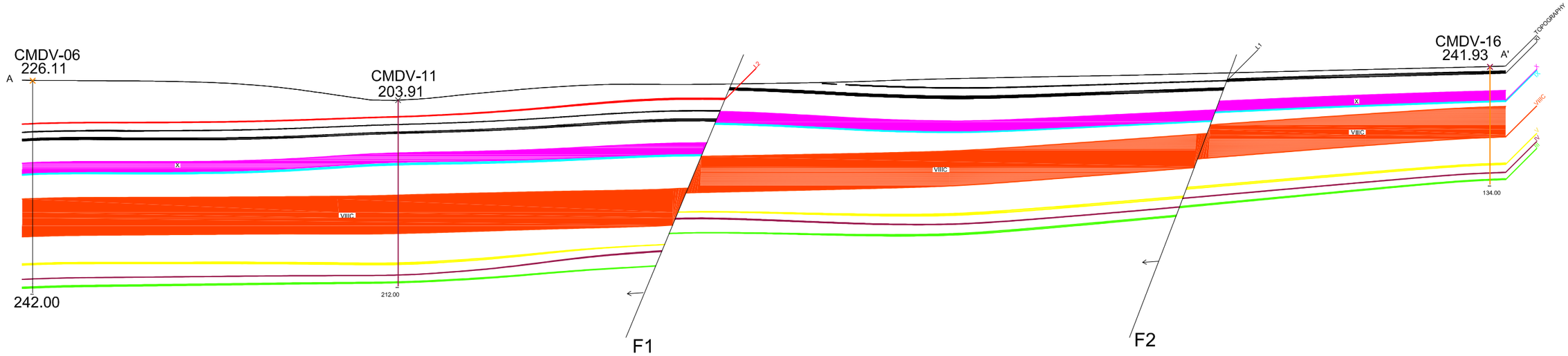
PROJECT: BERMO MINE

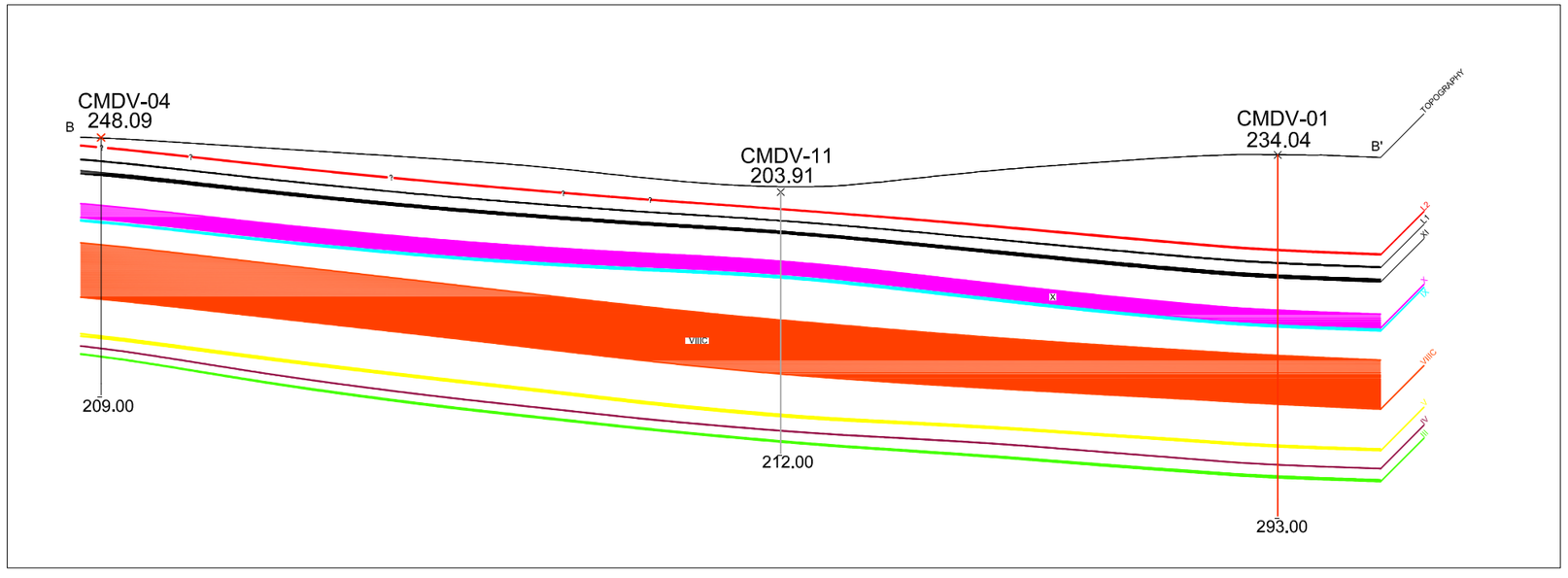
TITLE: FORM–1

GEOLOGICAL PLAN

PREPARED BY:	CHECKED BY:
B.R. MATLOTIA	B.D. SHARMA
SCALE : AS SHOWN	DATE : 01-06-2016

ANNEXURE : V





LEGEND

	BOREHOLE DRILLED BY CMPDI
234.04	REDUCED LEVEL IN METER
A——A'	SECTION LINE
	FAULT

SEAM INDEX

- Seam L2
- Seam L1
- Seam XI
- Seam X
- Seam IX
- Seam VIIIC
- Seam V
- Seam IV
- Seam III

Note: Seams Bermo, L3, & L4 have not been considered for structural Interpretations for Interim Geological Note since their occurrence is very limited because of the existing Bermo Mine, and the topography survey is yet to be finalised

MIN MEC CONSULTANCY PVT. LTD.
NEW DELHI, PH. 29534777, 29535891
An ISO 9001 : 2008 Approved Company

CLIENT: DAMODAR VALLEY CORPORATION (DVC)

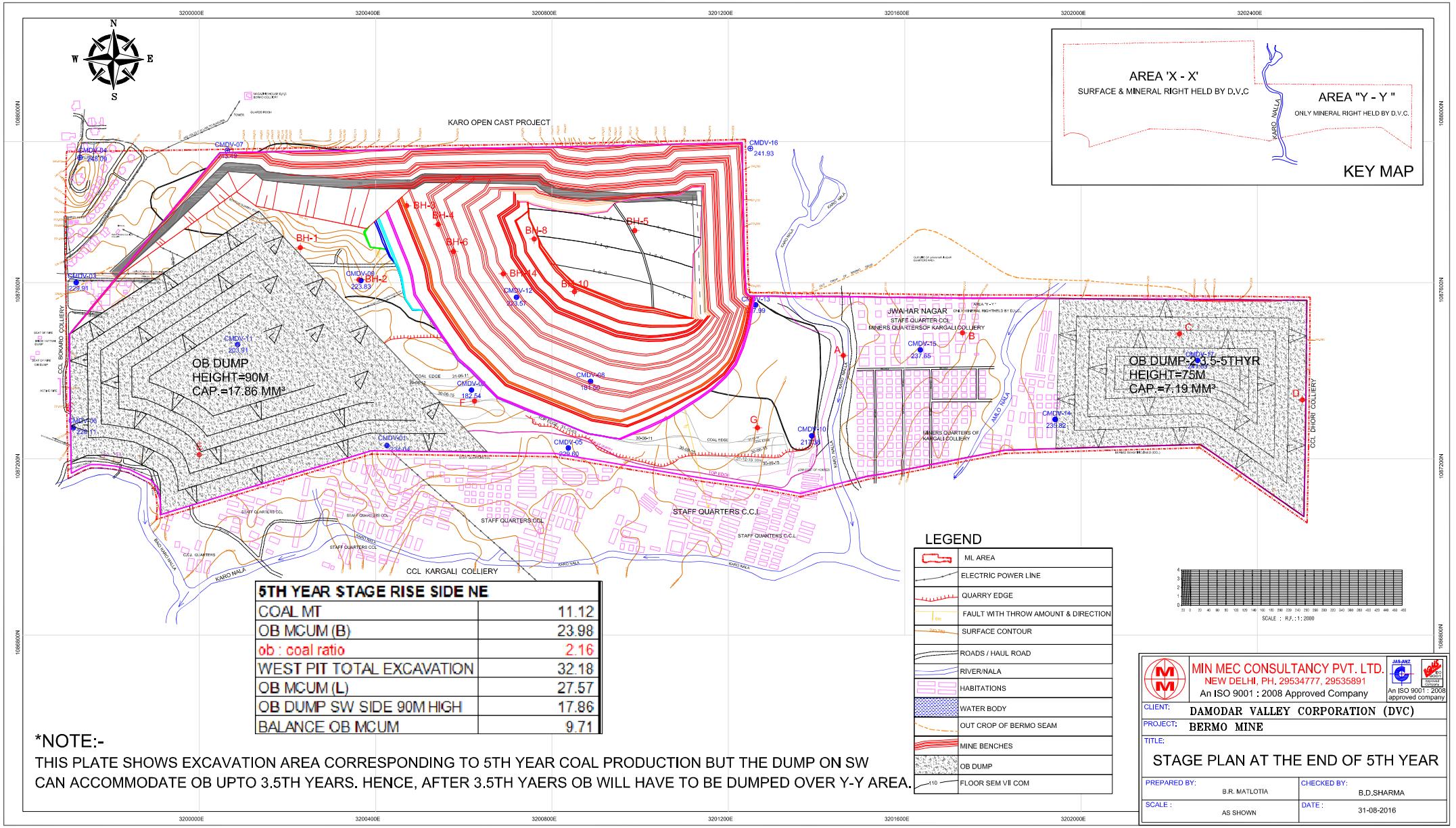
PROJECT: BERMO MINE

TITLE: FORM–1

GEOLOGICAL SECTION ALONG A-A' & B-B'

PREPARED BY:	CHECKED BY:
B.R. MATLOTIA	B.D. SHARMA
SCALE : AS SHOWN	DATE : 28-04-2016

ANNEXURE : VI



5TH YEAR STAGE RISE SIDE NE	
COAL MT	11.12
OB MCUM (B)	23.98
ob : coal ratio	2.16
WEST PIT TOTAL EXCAVATION	32.18
OB MCUM (L)	27.57
OB DUMP SW SIDE 90M HIGH	17.86
BALANCE OB MCUM	9.71

LEGEND

ML AREA
ELECTRIC POWER LINE
QUARRY EDGE
FAULT WITH THROW AMOUNT & DIRECTION
SURFACE CONTOUR
ROADS / HAUL ROAD
RIVER/NALA
HABITATIONS
WATER BODY
OUT CROP OF BERMO SEAM
MINE BENCHES
OB DUMP
FLOOR SEM VII COM

SCALE : R.F.:1: 2000

*NOTE:-

THIS PLATE SHOWS EXCAVATION AREA CORRESPONDING TO 5TH YEAR COAL PRODUCTION BUT THE DUMP ON SW CAN ACCOMMODATE OB UPTO 3.5TH YEARS. HENCE, AFTER 3.5TH YAERS OB WILL HAVE TO BE DUMPED OVER Y-Y AREA.

MIN MEC CONSULTANCY PVT. LTD.
NEW DELHI, PH. 29534777, 29535891
An ISO 9001 : 2008 Approved Company

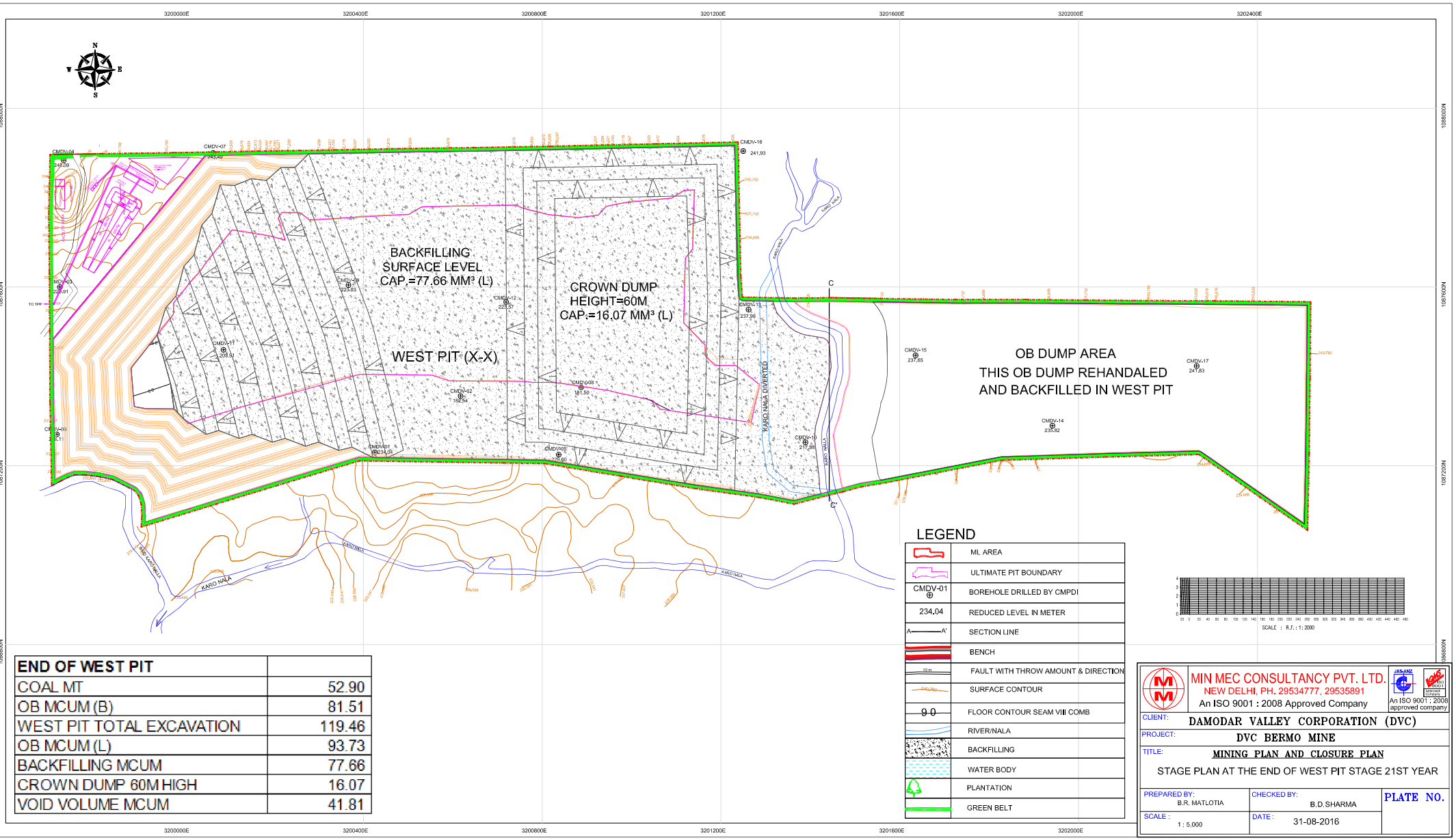
CLIENT: DAMODAR VALLEY CORPORATION (DVC)

PROJECT: BERMO MINE

TITLE: STAGE PLAN AT THE END OF 5TH YEAR

PREPARED BY:	CHECKED BY:
B.R. MATLOTIA	B.D.SHARMA
SCALE : AS SHOWN	DATE : 31-08-2016

ANNEXURE : VIIA



END OF WEST PIT	
COAL MT	52.90
OB MCUM (B)	81.51
WEST PIT TOTAL EXCAVATION	119.46
OB MCUM (L)	93.73
BACKFILLING MCUM	77.66
CROWN DUMP 60M HIGH	16.07
VOID VOLUME MCUM	41.81

LEGEND

	ML AREA
	ULTIMATE PIT BOUNDARY
CMDV-01	BOREHOLE DRILLED BY CMPDI
234.04	REDUCED LEVEL IN METER
A——A'	SECTION LINE
	BENCH
10 m	FAULT WITH THROW AMOUNT & DIRECTION
240.780	SURFACE CONTOUR
9 0	FLOOR CONTOUR SEAM VIII COMB
	RIVER/NALA
	BACKFILLING
	WATER BODY
	PLANTATION
	GREEN BELT

SCALE : R.F. : 1: 2000

MIN MEC CONSULTANCY PVT. LTD.
NEW DELHI, PH. 29534777, 29535891
An ISO 9001 : 2008 Approved Company
An ISO 9001 : 2008 approved company

CLIENT: DAMODAR VALLEY CORPORATION (DVC)

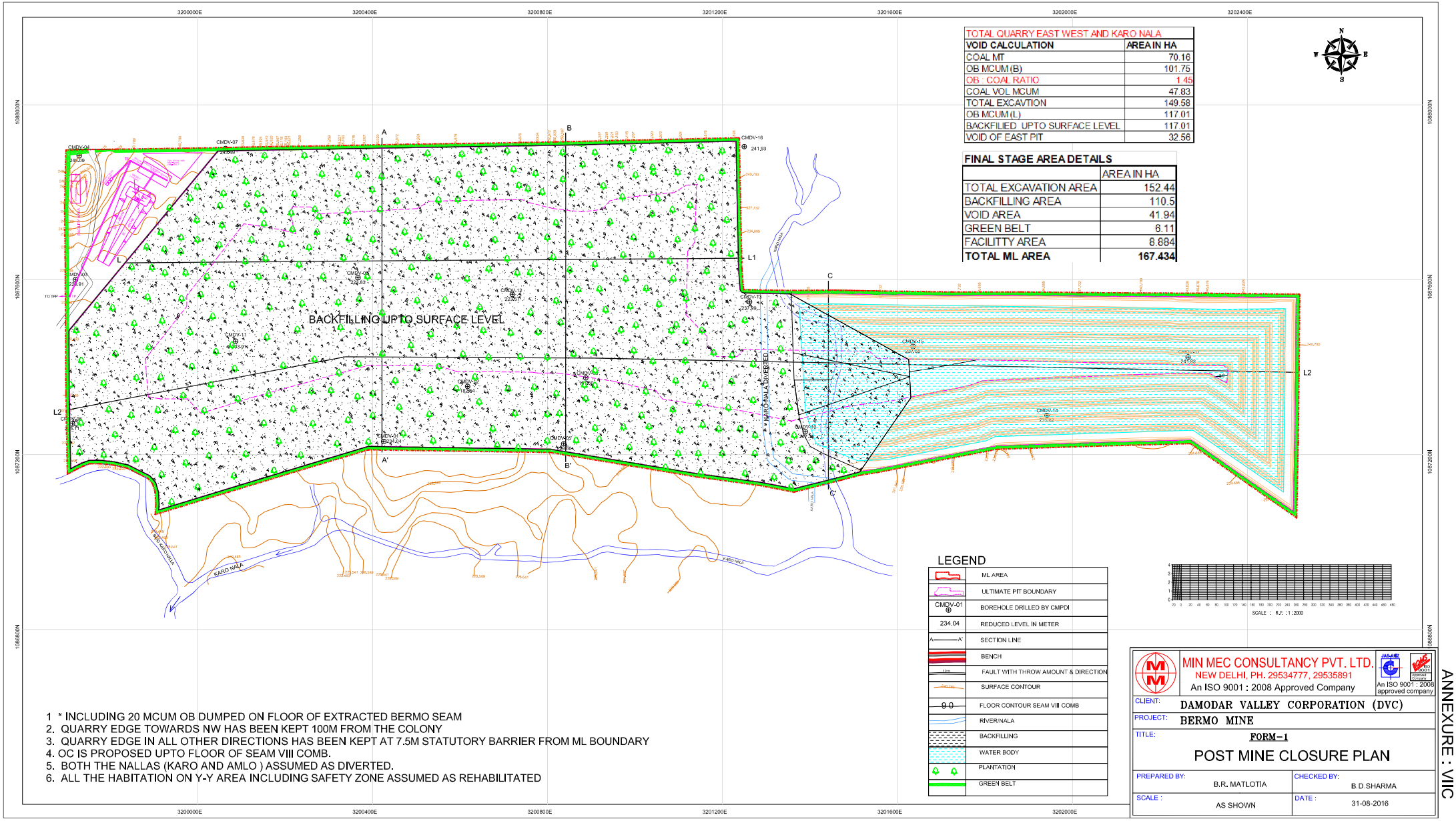
PROJECT: DVC BERMO MINE

TITLE: MINING PLAN AND CLOSURE PLAN

STAGE PLAN AT THE END OF WEST PIT STAGE 21ST YEAR

PREPARED BY:	CHECKED BY:	PLATE NO.
B.R. MATLOTIA	B.D.SHARMA	
SCALE : 1 : 5,000	DATE : 31-08-2016	

ANNEXURE : VIIB



TOTAL QUARRY EAST WEST AND KARO NALA	
VOID CALCULATION	**AREA IN HA**
COAL MT	70.16
OB MCUM (B)	101.75
OB : COAL RATIO	1.45
COAL VOL MCUM	47.83
TOTAL EXCAVTION	149.58
OB MCUM (L)	117.01
BACKFILIED UPTO SURFACE LEVEL	117.01
VOID OF EAST PIT	32.56

FINAL STAGE AREA DETAILS	
	AREA IN HA
TOTAL EXCAVATION AREA	152.44
BACKFILLING AREA	110.5
VOID AREA	41.94
GREEN BELT	6.11
FACILITTY AREA	8.884
TOTAL ML AREA	**167.434**

LEGEND

	ML AREA
	ULTIMATE PIT BOUNDARY
CMDV-01	BOREHOLE DRILLED BY CMPDI
234.04	REDUCED LEVEL IN METER
A——A'	SECTION LINE
	BENCH
	FAULT WITH THROW AMOUNT & DIRECTION
	SURFACE CONTOUR
9 0	FLOOR CONTOUR SEAM VIII COMB
	RIVER/NALA
	BACKFILLING
	WATER BODY
	PLANTATION
	GREEN BELT

SCALE : R.F. 1:2000

1 * INCLUDING 20 MCUM OB DUMPED ON FLOOR OF EXTRACTED BERMO SEAM
2. QUARRY EDGE TOWARDS NW HAS BEEN KEPT 100M FROM THE COLONY
3. QUARRY EDGE IN ALL OTHER DIRECTIONS HAS BEEN KEPT AT 7.5M STATUTORY BARRIER FROM ML BOUNDARY
4. OC IS PROPOSED UPTO FLOOR OF SEAM VIII COMB.
5. BOTH THE NALLAS (KARO AND AMLO) ASSUMED AS DIVERTED.
6. ALL THE HABITATION ON Y-Y AREA INCLUDING SAFETY ZONE ASSUMED AS REHABILITATED

MIN MEC CONSULTANCY PVT. LTD.
NEW DELHI, PH. 29534777, 29535891
An ISO 9001 : 2008 Approved Company

CLIENT: DAMODAR VALLEY CORPORATION (DVC)

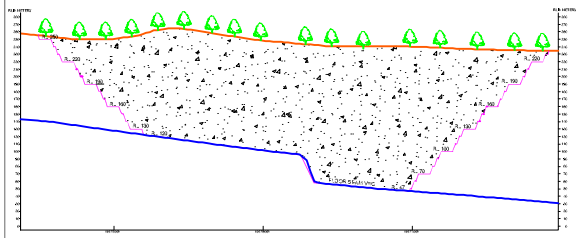
PROJECT: BERMO MINE

TITLE: FORM-1

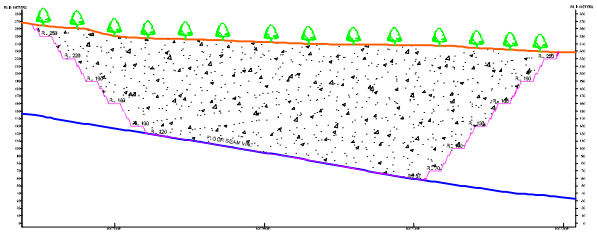
POST MINE CLOSURE PLAN

PREPARED BY:	CHECKED BY:
B.R. MATLOTIA	B.D.SHARMA
SCALE : AS SHOWN	DATE : 31-08-2016

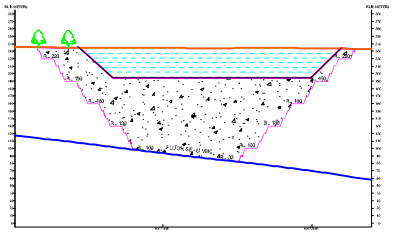
ANNEXURE : VIIC



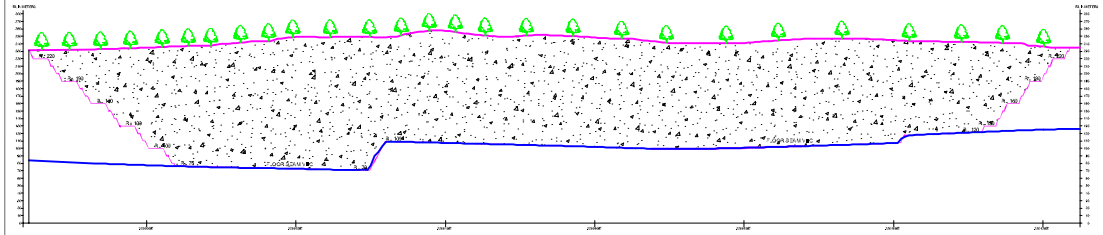
SECTION ALONG A-A'



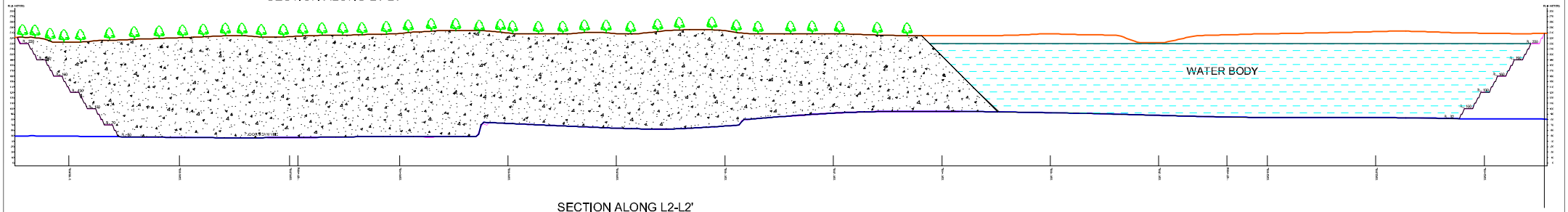
SECTION ALONG B-B'



SECTION ALONG C-C'



SECTION ALONG L1-L1'



SECTION ALONG L2-L2'

LEGEND

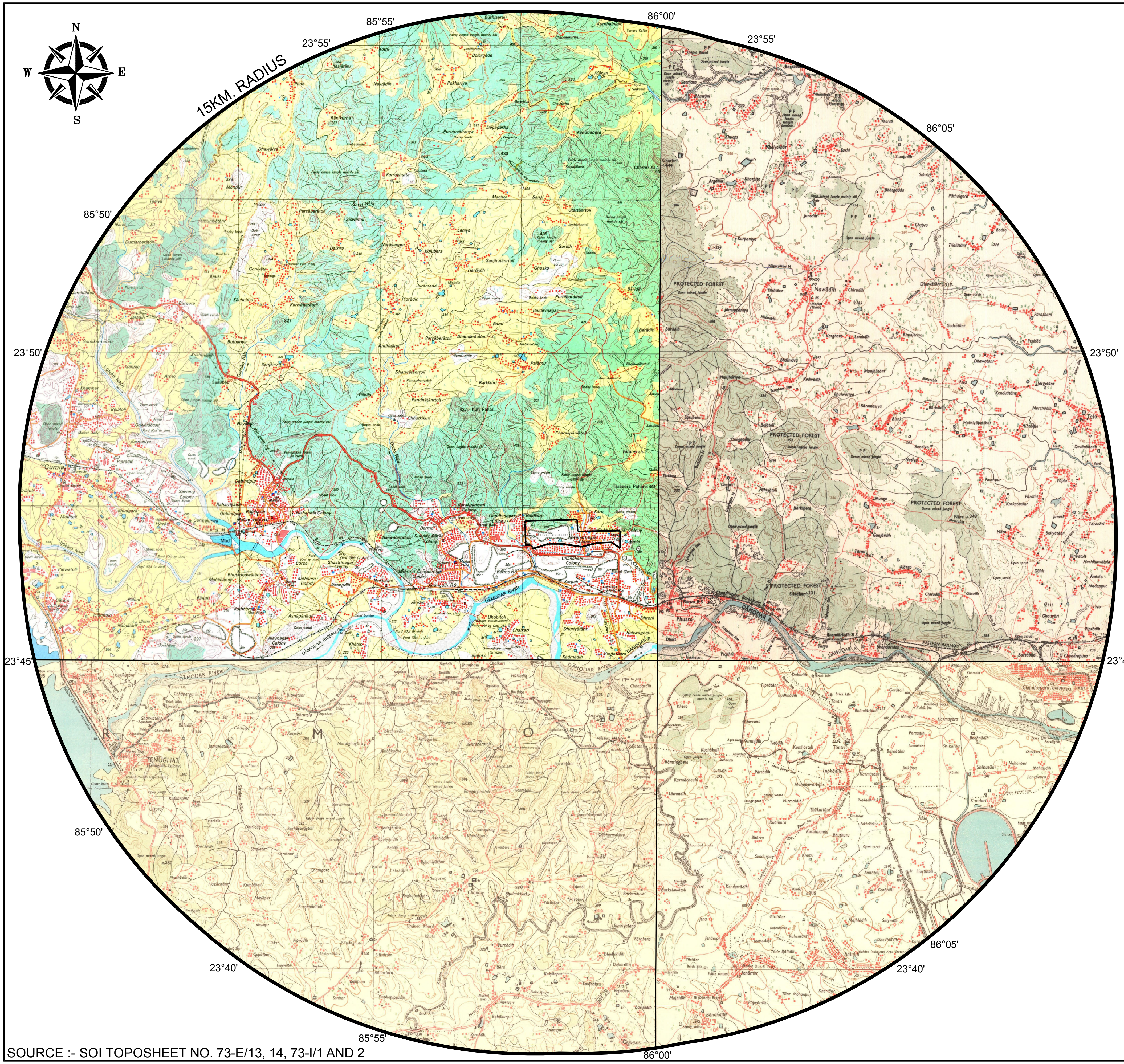
- SURFACE LINE
- FLOOR LINE
- ULTIMATE PIT LIMIT
- BACKFILLING
- WATER BODY
- PLANTATION

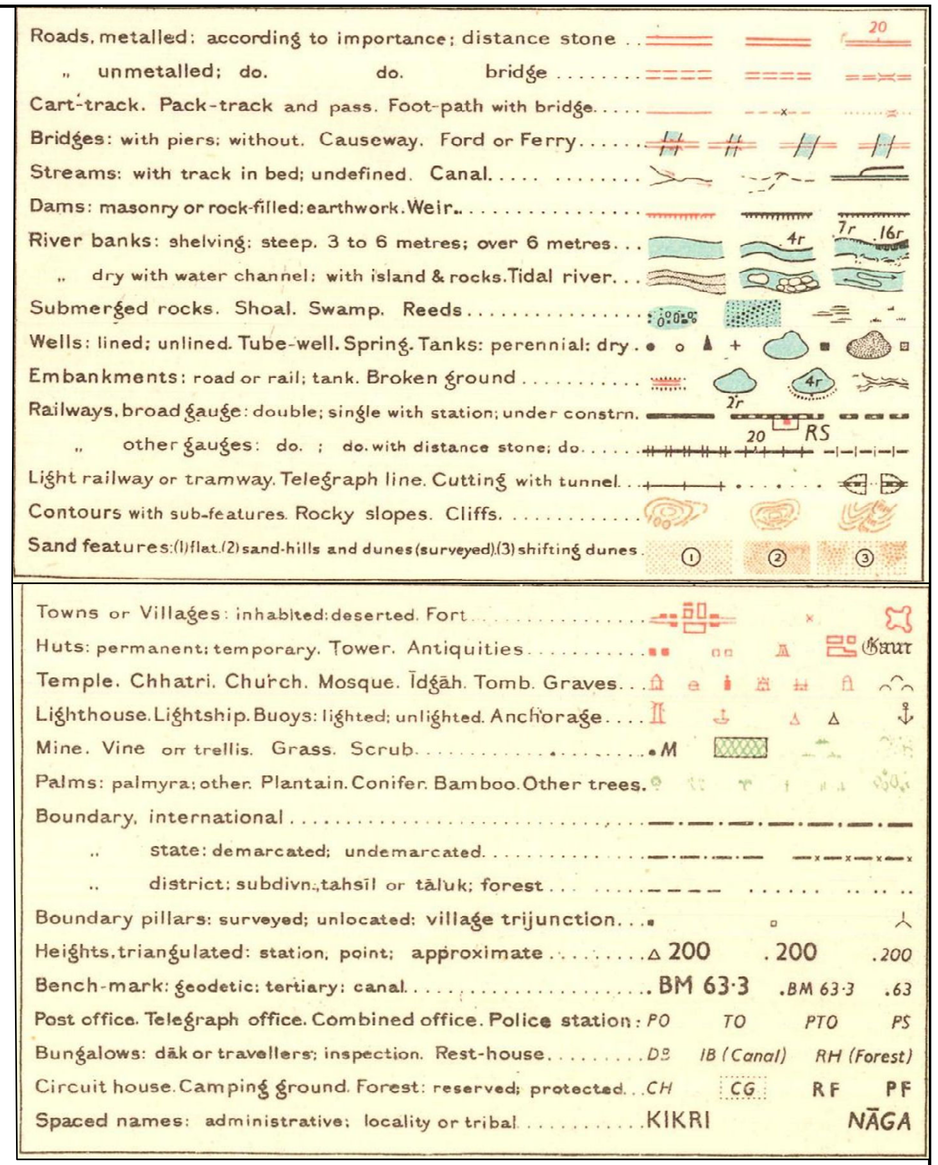
MIN MEC CONSULTANCY PVT. LTD.
NEW DELHI. PH. 29534777, 29535891
An ISO 9001 : 2008 Approved Company

CLIENT:	DAMODAR VALLEY CORPORATION (DVC)
PROJECT:	BERMO MINE
TITLE:	FORM-1
	CONCEPTUAL MINE SECTIONS
PREPARED BY:	B.R. MATLOTIA
CHECKED BY:	B.D. SHARMA
SCALE:	AS SHOWN
DATE:	31-08-2016

ANNEXURE : VIII

ANNEXURE : IX





MINE LEASE BOUNDARY

0 2 4 6 8km

SCALE

SOURCE :- SOI TOPOSHEET NO. 73-E/13, 14, 73-I/1 AND 2

MIN MEC CONSULTANCY PVT. LTD.
NEW DELHI, PH. 29534777, 29535891
An ISO 9001 : 2008 Approved Company

An ISO 9001 : 2008 approved company

CLIENT:	DAMODAR VALLEY CORPORATION (DVC)
PROJECT:	BERMO MINE
TITLE:	FORM–1 STUDY AREA WITHIN 15KM RADIUS
PREPARED BY: RANJEET K.	CHECKED BY: RASHMI GUPTA
SCALE : AS SHOWN	DATE : 01-06-2016

ANNEXURE : X

SUMMARY OF AMENITIES AVAILABLE (CENSUS 2011) IN VILLAGES WITHIN THE STUDY AREA OF BERMO COAL MINE OF DAMODAR VALLEY CORPORATION IN JHARKHAND

AMENITIES	NOS.	AMENITIES	NOS.	AMENITIES	NOS.
EDUCATION FACILITIES		**DRINKING WATER FACILITY**		**APPROACH TO VILLAGE**	
PPS (Pre-Primary School)	19	TWT (Tap Water-Treated)	2	NH (National Highway)	2
PS (Primary school)	69	TWUT (Tap Water Untreated)	0	SH (State Highway)	9
MS (Middle school)	38	CW (Covered Well)	3	MDR (Major District Road)	11
SS (Secondary school)	15	UW (Uncovered Well)	44	ODR (Other District Road)	21
SSS (Sr. Sec. School)	2	HP (Hand Pump)	44	BTPR (Black Topped (pucca) Road)	44
DCAS (Deg. College Arts & Science only)	1	TW/ BW (Tube Wells/Borehole)	5	GCR (Gravel (kuchha) Roads)	44
EC (Engg. College)	0	S (Spring)	4	WBM (Water Bounded Macadam)	33
MC (Medicine College)	0	R/C (River/Canal)	13	AWR (All Weather Road)	31
MI (Management Institute)	0	T/P (Tank/Pond/Lake)	44	NWR/C (Navigable Waterways (River/Canal))	3
P (Polytechnic)	0	WO (Others)	1	FP (Foot Path)	44
VTS/ITI (Vocational Trg School/ITI)	1				
NFTC (Non Formal Training Centre)	0	**COMMUNICATION SYSTEM**		**BANKS AND COMMERCIAL SOCIETIES**	
SFD (School For Disabled)	0	PO (Post Office)	16	ATM (ATM)	1
EO (Others)	0	SPO (Sub Post Office)	12	CB (Commercial bank)	6
		P&T (Post & Telegraph office)	1	COB (Co-operative bank)	2
MEDICAL FACILITIES		PIN (Village PIN code)	44	ACS (Agricultural Crredit Societies)	3
CHC (Community Health Centres)	0	T (Telephone (landline))	10	SHG (Self-Help Group (SHG))	20
PHC (Primary Health Centre)	5	PCO (Public Call Office/ Mobile PCO)	18	PDS (Public Distribution System (PDS))	28
PHSC (Primary Health Sub-Centre)	10	MPC (Mobile phone coverage)	32	M/RM (Mandis/Regular Market)	5
MCWC (Maternity And Child Welfare Centre)	3	IC/CSC (Internet Cafes/Common Service Centre)	3	WH (Weekly Haat)	9
TBC (TB Clinic)	0	PCF (Private Courier Facility)	1	AMS (Agricultural Marketing Society)	6
HA (Hospital Allopathic)	3			NCICDS (Nutritional Centres-ICDS)	39
HAM (Hospiltal Alternative Medicine)	1	**TRANSPORT SYSTEM**		NCAC (Nutritional Centres-Anganwadi Centre)	39
D (Dispensary)	5	PBS (Public Bus Service)	1	NCO (Nutritional Centres-Others)	10
VH (Veterinary Hospital)	1	PvtBS (Private Bus Service)	12	ASHA (ASHA)	44
MHC (Mobile Health Clinic)	0	RS (Railway station)	1	CC-TV (Community Centre with/without TV)	8
FWC (Family Welfare Centre)	2	MA (Auto/Modified Autos)	4		
NGMF-OP (Non Govt. Med. facilities Out Patient)	2	Taxi (Taxi)	7	**SPORTS AND ENTERTAINMENT**	
NGMF-IOP (Non Govt. Med. facilities In And Out Patient)	1	Van (Vans)	10	SF (Sports Field)	9
NGMF-C (Non Govt. Med. facilities Charitable)	1	T (Tractors)	14	SC/RC (Sports Club/Recreation Centre)	2
NGMF-MBBS (Non Govt. Med. facilities Medical Prctitioner with MBBS Degree)	1	CPR-Man (Cycle-pulled Rickshaws (manual driven))	18	C/VH (Cinema/Video Hall)	2
		CPR-Mec (Cycle-pulled Rickshaws (machine driven))	0	PL (Public Library)	1
NGMF-OD (Non Govt. Med. facilities Medical Prctitioner with other Degree)	6	CDA (Carts Drivens by Animals)	40	PRR (Public Reading Room)	1
		S/R/FS (Sea/River/Ferry Service)	0	DNS (Daily Newspaper Supply)	35
NGMF-ND (Non Govt. Med. facilities Medical Practitioner with no Degree)	12			APS (Assembly Polling Station)	29
		POWER SUPPLY		BDRO (Birth and Death Registration Office)	11
NGMF-TPFH (Non Govt. Med. facilities Traditional Practitioner and Faith Healer)	4	PSDU (Power Supply For Domestic Use)	33		
		PSIAU (Power Supply ForAgriculture Use)	9		
NGMF-MS (Non Govt. Med. facilities Medicine Shop)	6	PSCU (Power Supply For Commercial Use)	0		
NGMF-O (Non Govt. Med. facilities Others)	2	PSALL (Power Supply For All Users)	8		

ANNEXURE : X Contd..

SUMMARY OF AMENITIES AVAILABLE (CENSUS 2011) IN TOWNS WITHIN THE STUDY AREA OF BERMO COAL MINE OF DAMODAR VALLEY CORPORATION IN JHARKHAND

AMENITIES	NOS.	AMENITIES	NOS.	AMENITIES	NOS.
EDUCATION		Private-MS Office (Nos.)	0	**WATER SUPPLY AND SANITATION**	
Govt. Primary School (Nos.)	1	Govt.-Desk Top Publishing (Nos.))	0	Latrines-Pit (Nos.)	10
Private Primary School (Nos.)	1	Private-Desk Top Publishing (Nos.)	0	Latrines-Flush/Pour Flush (Nos.)	400
Govt. Middle School (Nos.)	0	Govt.-Vocational(Others) (Nos.))	0	Latrines-Service (Nos.)	1
Private Middle School (Nos.)	0	Private-Vocational(Others) (Nos.)	0	Latrines-Others (Nos.)	0
Govt. Secondary School (Nos.)	0	Govt.-Non Formal Education (Nos.))	0	Protected Water Supply Source-1	0
Private Secondary School (Nos.)	0	Private-Non Formal Education (Nos.)	0	Capacity Source-1 (KL)	485
Govt. Senior Secondary School (Nos.)	0	Govt.-Special School for Disabled (Nos.))	0	Protected Water Supply Source-2	0
Private Senior Secondary School (Nos.)	1	Private-Special School for Disabled (Nos.)	0	Capacity Source-2 (KL)	0
Govt. Degree College-Art Only (Nos.)	0	Govt.-Others(Specify) (Nos.))	0	Protected Water Supply Source-3	0
Private Degree College-Art Only (Nos.)	0	Private-Others(Specify) (Nos.)	0	Capacity Source-3 (KL)	0
Govt. Degree College-Science Only (Nos.)	0	**MEDICAL**		Protected Water Supply Source-4	0
Private Degree College-Science Only (Nos.)	0	Hospital Allopathic (Nos.)	0	Capacity Source-4 (KL)	153
Govt. Degree College-Commerce Only (Nos.))	0	Hospital Alternative Medicine (Nos.)	0	Protected Water Supply Source-5	0
Private Degree College-Commerce Only (Nos.)	0	Dispensary/Health Centre (Nos.)	0	Capacity Source-5 (KL)	0
Govt. Degree College-Art and Science Only (Nos.))	0	Family Welfare Centre (Nos.)	0	**TRANSPORT**	
Private Degree College-Art and Science Only (Nos.)	0	Maternity and Child Welfare Centre (Nos.)	0	Bus Route Road Distance (in kms.)	0
Govt. Degree College-Art and Commerce Only (Nos.))	0	Maternity Home (Nos.)	0	Pucca Road Length (in kms.)	5.0
Private Degree College-Art and Commerce Only (Nos.)	0	Maternity Home Nearest facility Distance (in kms.)	8	Kutcha Road Length (in kms.)	2
Govt. Degree College-Art,Science and Commerce (Nos.))	0	T.B. Hospital/ Clinic (Nos.)	0	**ENTERTAINMENT AND COMMODITY**	
Private Degree College-Art,Science and Commerce (Nos.)	0	Nursing Home (Nos.)	0	Govt.-Stadium (Nos.))	0
Govt. Degree College-Law (Nos.))	0	Veterinary Hospital (Nos.)	0	Private-Stadium (Nos.)	1
Private Degree College-Law (Nos.)	0	Mobile Health Clinic (Nos.)	0	Govt.-Cinema Theatre (Nos.))	0
Govt. Degree College-University (Nos.))	0	Others (Nos.)	0	Private-Cinema Theatre (Nos.)	0
Private Degree College-University (Nos.)	0	Non-Government Out-Patient (Nos.)	0	Govt.-Auditorium/Community Hall (Nos.))	0
Govt. Degree College-Others (Nos.))	0	Non-Government In and Out Patient (Nos.)	0	Private-Auditorium/Community Hall (Nos.)	0
Private Degree College-Others (Nos.)	0	Non-Government Charitable-Hospital/Nursing Home (No	0	Govt.-Public Library (Nos.))	0
Govt.-Medical College (Nos.))	0	Non-Government Medicine Shop (Nos.)	0	Private-Public Library (Nos.)	0
Private-Medical College (Nos.)	0	**ELECTRICITY**		Govt.-Public Reading Room (Nos.))	0
Govt.-Engineering College (Nos.))	0	Electricity-Domestic Connection (Nos.)	998	Private-Public Reading Room (Nos.)	0
Private-Engineering College (Nos.)	0	Electricity-Industrial Connection (Nos.)	1	Manufactured Commodity (First)	0
Govt.-Management Institute (Nos.))	0	Electricity-Commercial Connection (Nos.)	40	Manufactured Commodity (Second)	0
Private-Management Institute (Nos.)	0	Electricity-Road Lighting Connection (Nos.)	0	Manufactured Commodity (Third)	0
Govt.-Polytechnic (Nos.))	0	Electricity-Others Connection (Nos.)	0	**HELP HOMES**	
Private-Polytechnic (Nos.)	0	**FINANCIAL**		Govt.-Orphanage Home (Nos.))	0
Govt.-Shorthand (Nos.))	0	Nationalised Bank (Nos.)	1	Private-Orphanage Home (Nos.)	0
Private-Shorthand (Nos.)	0	Private Commercial Bank (Nos.)	0	Govt.-Working Women's Hostel (Nos.))	0
Govt.-Typewriting (Nos.))	0	Co-operative Bank (Nos.)	0	Private-Working Women's Hostel (Nos.)	0
Private-Typewriting (Nos.)	0	Agricultural Credit Society (Nos.)	0	Govt.-Old Age Home (Nos.))	0
Govt.-Shorthand and Typewriting (Nos.))	0	Non-Agricultural Credit Society (Nos.)	0	Private-Old Age Home (Nos.)	0
Private-Shorthand and Typewriting (Nos.)	0	**FIRE FIGHTING**			
Govt.-MS Office (Nos.))	0	Fire Fighting Service (Status A(1)/NA(2))	0		

ANNEXURE : XI

DAMODAR VALLEY CORPORATION

D.V.C. TOWERS. V.I.P. ROAD.
KOLKATA -700 054

No. HQ/Mining/31/ 77 dated 06.05.2016

TO WHOM IT MAY CONCERN

This is to certify that Mr. ***ARBIND KUMAR THAKUR, SUPERINTENDING ENGINEER(MINING) & AGENT*** is hereby Authorized to look after and take all the necessary initiatives in connection with Environmental and related Clearances for expansion of Bermo Coal Mines from 0.327 MTPA to 2.62 MTPA at villages Baidkaro, Kargali, Karo & Amlo of Bermo circle, Bokaro district of Jharkhand

Mr. ***ARBIND KUMAR THAKUR***, is hereby authorized to appear and represent, liaise, submit and sign papers documents, letters, for and on behalfof the Corporation in all matters before the Ministry of Environment, Forest and Climate Change, Government of India and with all other State and Central Departments for various matters connected with expansion of Bermo Coal Mines

For Damodar Valley Corporation

Signature : Pkumar

Name: **Pramod Kumar**

Designation: Executive Director (Fuel) & Nominated Owner

PROPOSED TERMS OF REFERENCE FOR EIA STUDY

The terms of reference on the basis of which the EIA will be prepared are given below:

1.0 DATA GENERATION

The data that will be generated during Post Monsoon Season from September 2016 to November 2016 by NABL/ MOEF accredited laboratory in accordance with the requirement of statutory agencies, is given in Table 1. The monitoring and testing will be done as per the guidelines of MOEF and the IS standards. Monitoring will be conducted for the following parameters:

TABLE 1 :DATA GENERATED

Sl. No.	Description	No. of locations	Total No of samples
1.0	AIR Ambient air monitoring (24 hourly samples), twice a week for 3 months forone season Parameters : PM10, PM 2.5, SO2, NOx,	8 (one in core zone and 7 in buffer zone)	192
1.1	Meteorological parameters will be measured at hourly duration simultaneously at one air monitoring station for 3 months. Parameters : A. Wind speed, direction B. Relative humidity C. Temperature D. Rainfall	1	90 days
2.0	WATER Water samples to be collected from various locations (surface and ground water) in core and buffer zone (10 km radius). Parameters tested for physical and chemical and biological parameters as well as according to applicable standards	Ground water 8 and surface water 8 samples	upto 16
3.0	SOIL	2	2
4.0	NOISE Hourly readings taken for 24 hours (Leq)	10	10 sets
5.0	TRAFFIC DENSITY	1	1 sets

2.0 DATA COLLECTION

10 km radius (buffer zone), both of which comprising the 'study area'. The following data, through field survey and other sources will be generated by consultant for preparing the EIA/EMP of the proposed project with related facilities:

i Study of fauna, flora, forests and cropping pattern.

ii Major habitats, ecologically sensitive areas, biosphere reserves, wildlife sanctuaries within 15 km of the project site.

iii Major industries and places of historical/ archaeological importance.

iv Land use pattern within core zone and buffer zone.

v Geo-hydrological aspects based on available data from various secondary sources.

vi Demography and socio-economic status based on last available census data for the entire study area.

vii Relevant meteorological data for the previous decades from Indian Meteorological Department (IMD).

viii Identification of water bodies, hills, roads etc.

ix In case of operational plant, emission data and details of implemented pollution control systems.

3.0 PREPARATION OF EMP

The EMP will include the following details:

a. Study of the reports, like Project report, FR for plant available with the client regarding the project.

b. Present Environmental Setting

   The base line data generated and collected as per para 1.0 and 2.0 will be used to establish the present environmental scenario.

c. Identification, prediction and evaluation of Anticipated Environmental Impacts due to the Proposed Plant and related facilities

The environmental impacts would be anticipated in core and buffer zone on:

- Topography
- Climate
- Water resources & quality (Surface/Ground)
- Air quality
- Noise Levels
- Flora and Fauna
- Traffic density
- Land-Use

- Socio-Economic Conditions
- Habitats
- Health, culture, human environment including public health
- Occupational health and safety
- Sensitive Places/Historical Monuments

The impacts would be anticipated based on experience of similar projects.

d. Proposed Environmental Safeguards and Monitoring Mechanism

Relevant guidelines, as per Environmental Impact Assessment (EIA) Notification no. S.O. 1533 dated the 14th September, 2006 and its amendments till date under the Environment (Protection) Act, 1986, will be kept in mind while spelling out mitigation measures. The following aspects would be covered.

i Reclamation of areas disturbed during construction but not required for any activity during operation.
ii Measures to control the surface and ground water pollution due to various effluents to be discharged.
iii Measures to control air pollution due to proposed activities/ operation.
iv Green belt development and identification of flora species which can be planted in and around the project.
v Measures to contain noise pollution and mitigate adverse impact on workers and habitat in core and buffer zone.
vi Pronounce the improvement in socio-economic conditions and benefits the people will get on implementation of the project.
vii Measures to control health hazard of workers and surrounding population.
viii Total and specific cost of implementation of pollution control measures.
ix Environmental monitoring, implementation organization and feedback mechanism to effect mid course corrections.
x Solid Waste Management

The experience of similar project(s) will be made use of for envisaging the pollution control measures by pronouncing the success in the past.

The EIA report shall be prepared as per the generic structure prescribed in MOEF Notification dated 14.09.2006 with following chapters :

1. An introduction covering background, location, surrounding features, compliance to TOR and salient features (Chapter 1)

2. Study of the approved mining plan (to prepare Chapter 2).

3. Present Environmental Setting
   The base line data generated by NABL/ MOEF accredited lab will be used to establish the present environmental scenario. (Chapter 3)

4. Identification, prediction and evaluation of Anticipated Environmental Impacts due to the Mining and related facilities (Chapter 4)

5. Justification of project technology (Chapter 5)

6. Environmental monitoring and control mechanisms with budget (Chapter 6) which will include

   - Total investment for improving/mitigating environment
   - Recurring expenditure during stage of production

7. Additional studies – Public consultation, Risk Assessment or any other study prescribed in TOR(Chapter 7)

8. Project benefits and commitment of the company to social welfare in surrounding areas (Chapter 8)

9. EMP (Chapter 9)

10. Summary & Conclusion (Chapter 10)

11. Disclosure of consultants engaged (Chapter 11)

M/s DAMODAR VALLEY CORPORATION

P.O. BOKARO THERMAL- 829 107, DIST. BOKARO, JHARKHAND

PRE-FEASIBILITY REPORT

FOR

BERMO COAL MINES

AT

VILLAGES BAIDKARO, KARGALI, KARO AND AMLO BLOCK BERMO, DISTRICT BOKARO, JHARKHAND

(EXTENT OF ML: 167.434 Ha., EXPANSION FROM 0.4 TO 2.62 MTPA)

AUGUST, 2016

(Issue 02, Rev 0)

Prepared by:

MIN MEC CONSULTANCY PVT. LTD.

A-121, Paryavaran Complex, IGNOU Road, New Delhi – 110 030

Ph : 29534777, 29532236, 29535891 ; Fax: +91-11-29532568

Email :min_mec@vsnl.com; Web site : http://www.minmec.co.in

Estb. 1983

An ISO 9001:2008 approved company

CONTENTS

LIST OF TABLES

PRE-FEASIBILITY REPORT

1.0 EXECUTIVE SUMMARY

The salient features of the project are given below:

<table>
<tr><td>Project name</td><td>DVC Bermo Mine</td></tr>
<tr><td>Project proponent</td><td>Damodar Valley Corporation</td></tr>
<tr><td>Villages in the ML area</td><td>Baidkaro, Kargali, Karo & Amlo of Bermo circle</td></tr>
<tr><td>Latitude</td><td>23°46’42.6288” to 23°47’24.0324”</td></tr>
<tr><td>Longitude</td><td>85°57’28.9008 to 85°59’9.5784”</td></tr>
<tr><td>Total ML Area</td><td>413.74 acres / 167.434 Ha</td></tr>
<tr><td>Land ownership break up</td><td>
<table>
<tr><th>Land pattern</th><th>Area (ha)</th></tr>
<tr><td>Agricultural land (Private land)</td><td>27.166</td></tr>
<tr><td>Waste Land (Govt. Land)</td><td>18.292</td></tr>
<tr><td>Water body (Govt. land)</td><td>0.935</td></tr>
<tr><td>Forest Land (GMK land recorded as Jungle) (Govt. land)</td><td>120.313</td></tr>
<tr><td>Others (Govt. land)</td><td>0.728</td></tr>
<tr><td>Total</td><td>167.434</td></tr>
</table>
</td></tr>
<tr><td>Reserve</td><td>Total geological reserve = 148.548 MT
Total extractable reserves = 81.38 MT
Reserves already extracted = 11.22 MT
Balance extractable reserves = 70.16 MT</td></tr>
<tr><td>Rated capacity</td><td>Expansion from 0.4 MTPA to 2.62 MTPA</td></tr>
<tr><td>Life of the mine</td><td>28 years</td></tr>
<tr><td>Stripping ratio</td><td>1.45 cum/t</td></tr>
<tr><td>Annual OB Generation</td><td>3.8 Mcum</td></tr>
<tr><td>Method of Mining</td><td>Opencast Mechanized</td></tr>
<tr><td>Blasting</td><td>Overburden requires drilling and blasting prior to excavation.</td></tr>
<tr><td>Storage of explosives</td><td>Shed/Magazine</td></tr>
<tr><td>Working days</td><td>330 days, 6 hours, 3 shift</td></tr>
<tr><td>Manpower</td><td>510 proposed and existing 128</td></tr>
<tr><td>Transportation</td><td>By road</td></tr>
<tr><td>Expected cost of the project</td><td>Rs. 125 Cr</td></tr>
<tr><td>Elevation</td><td>The elevation based on RLs of Bore holes drilled in Bermo seam in 1950 varies between 233.17 and 243.84 m.</td></tr>
<tr><td>Topography</td><td>The topography is gentle and is almost flat and general slope is towards South.</td></tr>
<tr><td>Drainage diversion</td><td>Two nalas (Karo and Amlo) are proposed to be diverted.</td></tr>
</table>

Water requirement	Potable water 320 m^3/day & Industrial water 389 m^3/day
Source of water	Potable water is met from bore well and industrial water requirement is met from mine sump and surface water reservoir of the existing Mine.
Power requirement	11 KVA
Power source	Power is received from DVC BTPS (located about 15 km from mine) through 33 KVA overhead line. It is stepped down to 11 KVA/440v.

2.0 INTRODUCTION

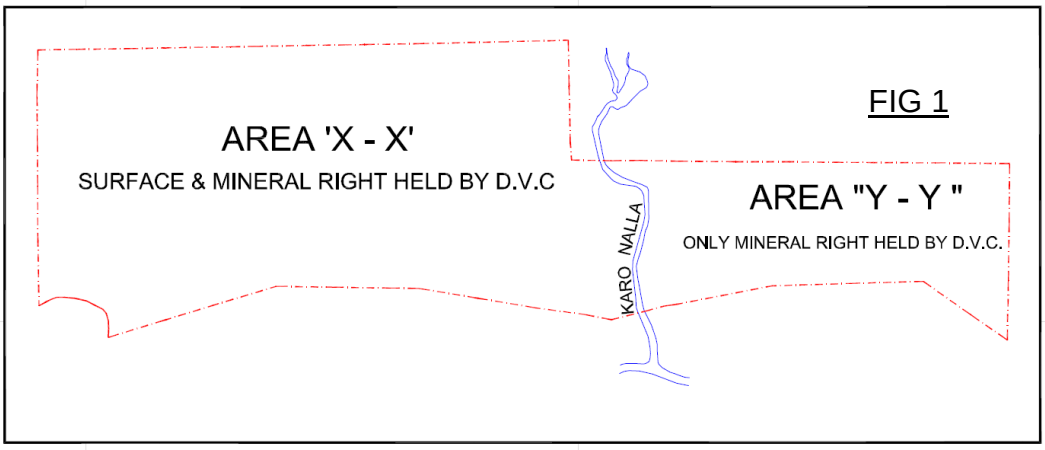
2.1 Identification of project and project proponent

The Damodar Valley Corporation (DVC) is Public company which operates several power stations in the Damodar River area of West Bengal and Jharkhand states of India. The company operates both thermal power stations and hydel power stations under the Ministry of Power Govt of India. DVC is headquartered in the city of Kolkata, West Bengal. With time DVC developed and expanded its infrastructure- six thermal power stations, three hydro-electric power stations with a capacity of 144 MW and one gas turbine station with a capacity of 82.5 MW contribute to a total installed capacity of 6357.3 MW. Presently DVC has 35 sub-stations and receiving stations more than 5500-circuit km of transmission and distribution lines. DVC has also four dams, a barrage and a network of canals that play an effective role in water management. The construction of check dams, development of forests and farms and upland and wasteland treatment developed by DVC play a vital role in eco conservation and environment management. ***(Source: https://en.wikipedia.org/wiki/Damodar_Valley_Corporation)***

Damodar Valley Corporation is operating Bermo Mines of East Bokaro Coalfield, located in the Bokaro district of Jharkhand state, since last over 50 years. Prior to that, this mine was owned by the Indian Railways and DVC had taken over this mine from the Indian Railways in 1951. It is a captive mine for Bokaro Thermal Power Station (BTPS)/Chandrapura Thermal Power Station (CTPS) of DVC. Opencast mining was done in the past and the mining was restricted in the low cover area of the incrop zone, which was later abandoned and coal mining continued exclusively by underground method. Thus, from 1951 to 1975, Coal winning was done by opencast method and from 1976 to 1992, by underground Bord & Pillar method (development only). From 1993 onwards, Coal winning is being done by mechanized Opencast method.

All the mining operations referred to are confined to Bermo seam only. This seam has been extensively developed in two sections by U/G Bord & Pillar Method.

Looking at Present Surface Plan given in Annexure IV to Form 1, presently, opencast working is being done in X-X area (west of Karo nalla), which is almost exhausted. The Y-Y area (east of Karo nalla) is fully virgin and is occupied by surface build-up/quarters of Central Coalfields Ltd which is to be shifted/rehabilitated before exploitation of this area by opencast method. For future planning the total area of the block has been considered as one block and X-X and Y-Y portions have not been considered separately for simplicity of planning and operation. The X-X and Y-Y areas are shown in Fig 1 for quick view:



DVC Bermo Mine is a captive mine for Bokaro Thermal Power Station (BTPS) at Bokaro/Chandrapura Thermal Power Station (CTPS) at Chandrapura of D.V.C. To meet the increased demand of coal in above captive power stations, it has become necessary to enhance the capacity from 0.4 MTPA to 2.62 MTPA.

2.2 Brief description of nature of the project

Damodar Valley Corporation possesses coal block DVC Bermo Mine with lease area of 167.434 Ha in villages Baidkaro, Kargali, Karo & Amlo of Bermo circle in District Bokaro, Jharkhand. The production level of DVC Bermo Mine has already been achieved at 0.4 MTPA during 2015-2016. Now the production is proposed to be expanded to 2.62 MTPA without any change in lease area. Anticipated balance life of mine would be 28 years. Opencast mining method is selected. Mine is captive to the Bokaro Thermal Power Station (BTPS) at Bokaro having capacity of 630 MW {(3x 210) + 550 MW (proposed)} and Chandrapura Thermal Power Station (CTPS) at Chandrapura of D.V.C. having capacity of 890 MW (2x 250 + 130x3).

2.3 Need for the project and its importance to the country and or region

Coal is regarded as the backbone of power generation in India. There is huge demand for power in India. Power is essential and most important factor for industrial and business set up. India's coal position is quite encouraging and it offers good prospects for the development of this industry. During 2011, India was the third largest coal producing country in the world. Hence, coal is an important constituent of the present Indian economy. The total reserves of coal in India have been over 290 billion

metric tons. The coalfields in India are located mostly in Jharkhand, Odisha, Madhya Pradesh, Chhattisgarh, Uttar Pradesh, Meghalaya, Telangana, West Bengal, Sikkim, Arunachal Pradesh and Bihar. India has the fifth largest coal reserves in the world. Of the total reserves, nearly 88% are non-coking coal reserves, while tertiary coals reserves account for a meager 0.5 % and the balance is coking coal. The Indian coal is characterised by its high ash content (45%) and low sulphur content. The power sector is the largest consumer of coal followed by the iron and steel and cement segments. India is the world's fifth largest energy consumer, accounting for 4.1% of the global energy consumption. Maharashtra is the leading state in electricity generation. The current per capita consumption of energy in India is 0.5 toe against the global average of 1.9 toe, indicating a high potential for growth in this sector. Of the total electricity consumed in the country, approximately 80% is produced from coal. ***(Source:https://www.pwc.in/assets/pdfs/industries/power-mining/icc-coal-report.pdf)***

2.4 Demand-supply gap

The overall long-term demand of coal is closely linked to the performance of the end-use sectors. In India, the end-use sectors of coal mainly include electricity, iron and steel and cement. Demand from the unorganised small scale sector comprising primarily of the brick and ceramic industry is relatively large though infirm as users switch between coal, firewood and biomass depending on their relative prices. Other industries using coal have only a marginal impact on the long-term demand for coal. The report of the Working Group of Coal and Lignite for the 12th Five Year Plan projects the coal demand in India to grow at a CAGR of 7.1% till 2016-17 and reach 980.5 MT annually under realistic demand. At a CAGR of 7.0%, the demand is expected to reach 1,373 MT by 2021-22.The current shortage of coal stands at 84 MT and the same is expected to rise to 300 MTPA in medium-term if all the letters of assurance issued by the state-owned coal companies materialise. Some of this shortfall will be met by supplies from captive coal blocks and rest through imports. Also, the choice between the supplies from domestic and imported coal is mainly driven by timely availability of coal from domestic sources, quality requirements and the economics of landed cost of coal at the end-use plant. Captive coal mining in India was, gradually, being permitted by amending the Coal Mines Nationalisation Act, primarily in iron and steel making, power generation and cement production. However, the capacity augmentation from captive coal blocks was dismal as only 30 mines could come online as compared to a targeted 76 mines. Hence, it became important for India to secure coal through imports from international market to meet their significantly rising coal demand. However, import is mainly dependent on availability of coal in global market, increasing competitive scenario and affordability. ***(Source:https://www.pwc.in/assets/pdfs/industries/power-mining/icc-coal-report.pdf)***

2.5 Imports vs. indigenous production

There will not be any import for the proposed enhancement in capacity from 0.4 to 2.62 MTPA of mine.

2.6 Export possibility

There will not be any export of coal from the coal block. Mine is captive to the Bokaro Thermal Power Station (BTPS) at Bokaro having capacity of 630 MW {(3x 210) + 550 MW (proposed)} and Chandrapura Thermal Power Station (CTPS) at Chandrapura of D.V.C. having capacity of 890 MW (2x 250 + 130x3).

2.7 Domestic / export markets

Entire coal produced from the mine shall be used for power plant of the company.

2.8 Employment generation (direct and indirect)

As the production is proposed to be enhanced from 0.4 MTPA to 2.62 MTPA, additional manpower is envisaged. Total manpower after expansion shall be about 510. The existing mining establishment provides employment opportunities under various cadres viz. management, supervisory, highly skilled, skilled, semi skilled and unskilled workmen etc.

3.0 PROJECT DESCRIPTION

The DVC mining area is divided into two sections (areas/portions), namely. “X-X area” and “Y-Y area” as seen in Fig 1 earlier and the Present Surface Plan given in Annexure IV to Form 1.

The mine is being worked by mechanized Opencast method over developed underground galleries with diesel operated shovels/backhoes (1.9 – 3.0 cum bucket capacity) working with 25 T rear dumpers. The mine is working in close proximity of dwelling houses, which has restricted the bench height, diameter of the holes, total charge per blast and no. of holes per blast. The OB and coal bench height is 6 m as permitted by the DGMS & 100 mm dia. holes are drilled.

Diesel operated shovels/backhoes (2.5 cum bucket capacity) working with 25 T rear dumpers has been proposed for coal production and for OB removal 4.5 cum diesel operated shovels with 35 T rear dumpers have been proposed.

3.1 Type of Project including interlinked and interdependent projects

The coal from the mine will be used for power generation in captive power plants.

3.2 Location with coordinates

DVC Bermo Mine is present in villages Baidkaro, Kargali, Karo & Amlo of Bermo circle. Please refer Annexure I of Form 1 for the location map of the project.

The mining lease area falls in the Survey of India Toposheet no. No. 73 E/13 and bounded by following co-ordinates:

Latitude	:	23° 46' 42.6288" to 23° 47' 24.0324"
Longitude	:	85° 57' 28.9008" to 85° 59' 9.5784"

3.3 Details of alternate sites & Environmental considerations

Mining being site specific, no alternatives site is under consideration. Moreover, it is the expansion of an existing mine. Environmental considerations and protection measures assume greater importance for the project. DVC Bermo Mine shall ensure that the proposed mine causes minimum adverse impact on the area.

The proposed project is planned to meet all environmental norms and further improve the environs in the area. Regular monitoring is being carried out by DVC Bermo Mine at the mine site in line with the requirements of the Jharkhand Pollution Control Board and Ministry of Environment, Forests and Climate Change.

3.4 Size or magnitude of operation

The total extent of the proposed mining lease area is 167.434 Ha and the project area is 169.094 Ha as an area of 1.66 ha has been acquired for pit head facilities outside ML area. From the lease area, there will be increase in production from 0.4 million tonnes to 2.62 million tonnes per annum.

3.5 Project description with process details

The total extent of the mining lease area is 167.434 Ha. From the lease area, there will be increase in production from 0.4 MTPA to 2.624 MTPA. To achieve this rate of production it is proposed to adopt mechanised opencast method on three-shift basis. The coal production process from the mine will involve deployment of shovels, dumpers and levelling machinery respectively (Drill machines are deployed wherever necessary to deal with hard strata), loading and transportation of coal and OB to respective destination viz. coal to the captive power plants and OB to the external dumps as the internal dumping can be started only after sufficient void with sufficient safety barrier from the working bench is generated. Overburden, is mined with 4.5 cum diesel hydraulic shovel and 35 T dumpers. Coal is mined by using 2.5 cum diesel hydraulic shovel and 25 T dumpers. Overburden benches are to be worked by shovel-dumper combination with bench height of 10 m. the cut width of shovel benches is proposed to be 20m.

Presently, the mine has reached to a depth of 50 m from surface. Controlled blasting operation has been adopted, as proposed by CMRI, Dhanbad in June, 1994. Wet operated drills are in operation. Provision has been made for one magazine of 10 T for storage of explosive. Partly backfilling will be

started from 8th year. The overall slope of the surface dump would be maintained at 26°.

Year wise production for the life of the mine is tabulated in Table 1.

TABLE 1
CALENDAR PROGRAMME OF DVC BERMO MINES
(PRODUCTION OF 2.62 MTPA)

Year	Year No.	Coal (MT)		OB (Mcum)		Stripping ratio
		Progressive	Cumulative	Progressive	Cumulative	
2017-18	1*	1.00	1.00	1.45	1.45	1.45
2018-19	2	1.80	2.80	2.70	4.15	1.50
2019-20	3	2.50	5.30	3.68	7.83	1.47
2020-21	4	2.62	7.92	3.80	11.63	1.45
2021-22	5	2.62	10.54	3.80	15.43	1.45
2022-23	6	2.62	13.16	3.80	19.23	1.45
2023-24	7	2.62	15.78	3.80	23.03	1.45
2024-25	8	2.62	18.40	3.80	26.83	1.45
2025-26	9	2.62	21.02	3.80	30.62	1.45
2026-27	10	2.62	23.64	3.80	34.42	1.45
2027-28	11	2.62	26.26	3.80	38.22	1.45
2028-29	12	2.62	28.88	3.80	42.02	1.45
2029-30	13	2.62	31.50	3.80	45.82	1.45
2030-31	14	2.62	34.12	3.80	49.62	1.45
2031-32	15	2.62	36.74	3.80	53.42	1.45
2032-33	16	2.62	39.36	3.80	57.22	1.45
2033-34	17	2.62	41.98	3.80	61.02	1.45
2034-35	18	2.62	44.60	3.80	64.82	1.45
2035-36	19	2.62	47.22	3.80	68.61	1.45
2036-37	20	2.62	49.84	3.80	72.41	1.45
2037-38	21	2.62	52.46	3.80	76.21	1.45
2038-39	22	2.62	55.08	3.80	80.01	1.45
2039-40	23	2.62	57.70	3.80	83.81	1.45
2040-41	24	2.62	60.32	3.80	87.61	1.45
2041-42	25	2.62	62.94	3.80	91.41	1.45
2042-43	26	2.62	65.56	3.80	95.21	1.45
2043-44	27	2.62	68.18	3.80	99.01	1.45
2044-45	28	1.98	70.16	2.74	101.75	1.39

**** The year 1 will start from the date when all the clearances are in place.***

Balance life of the mine, considering a capacity of 2.62 MT coal production per annum, will be 28 years and the average stripping ratio of the mine works out to1.45 cum/t. Coal is being dispatched by road through trucks from Opencast quarry-head to Power plants.

3.6 Mining method

Opencast mining method has been selected for the proposed enhancement of production. Shovel Dumper Mining Technology shall be used for coal and overburden.

For Coal - Shovel Dumper Mining Technology

Due to existence of inseam bands contributing for coal seam thickness, selective band removal may not be feasible while mining by continuous miner, therefore combination of shovel dumper is preferred. Moreover, for production of better grade coal and requirement of sized coal, mining by continuous mining technology may not be the most suitable option. However, a hydraulic backhoe/shovel has been proposed to meet the selective mining requirement.

For Overburden - Shovel Dumper Mining Technology

Overburden has been proposed to be mined by this technology. Application of shovel dumper technology for OB is envisaged due to the following reasons:

a) Moderate thickness of coal seam.

b) Parting thickness averaging between 0.36 – 21.40m.

c) Flexible and easy operation.

3.6.1 Blasting pattern

Three diesel drills of 100 mm size is required for drilling OB benches. Coal is being mined by shovel/ backhoe deployed on coal benches, drilling and blasting is performed by a 160 mm drill provided for the purpose. Magazines for storing explosives has been kept.

3.7 Raw material required along with estimated quantity, likely source, marketing area of final product's, Mode of transport of raw material and Finished product

No raw material is required. Only diesel is required for transportation vehicles, operation of HEMM and generators in case of emergency. Coal is being dispatched for captive use in BTPS and CTPS located at Bokaro and Chandrapura by Road.

3.8 Resource optimization/ recycling and reuse envisaged in the project

The Coal does not require any beneficiation. The ROM coal is processed at CHP useable in TPS. The resources which are used in the mining will be recycled by various methods. Spent oil from transformers, once in one or two years is sold to the authorized vendors. Mine water is discharged from quarry through adequate number of pumps (as required) and is being used for mining activity.

3.9 Availability of water its source, energy / power requirement and source

3.9.1 Water

Requirement: Water requirement after expansion will be 320 KLD for potable and 389 KLD for industrial purpose.

Source: The mine water is collected in sump and dewatering is done to keep mine working dry. Dewatered water as well as any surface run off during rain is led to settling tank for settlement of suspended solids. Thereafter, the water is used for industrial purpose, sprinkling, greenbelt watering, etc. Excess water is and will be discharged to natural drain after settlement of suspended solids. The potable requirement will be met through borewells. The waste water in Workshop will be treated and recycled.

3.9.2 Power

The total power is being sourced from Bokaro Thermal Power Station which is about 15 km from the Mine through 33 KVA over head line. It is stepped down to 11KVA then to 440v.

3.10 Quantity of wastes to be generated (liquid and solid) and scheme for their management / disposal

101.75 MCum(B) of overburden will be generated during life of mine. Out of this, 15.53 Mcum (equivalent to about initial 3 and half years) OB generated from the NE corner of area will be accommodated over the SW corner of the X-X area within the ML. The OB from 2nd half of 4th year onwards will be disposed off over Y-Y area within the ML. It has been estimated that Y-Y area will be adequate to accommodate the temporary dump, till the backfilling in X-X void can be done concurrent with mining without requiring any additional area outside the ML area for external surface dump. It is important to note that the OB dumped over the coal bearing area on SW corner of X-X area and over the whole Y-Y area will be later backfilled into the void of X-X area by rehandling.

Solid waste generated from manpower is mostly of organic and recyclable in nature. The organic waste is and will continue to be composted and used as manure while recyclable component are and will be sold to recycling

agencies. The waste water from mine site offices is and will continue to be treated in septic tank- soak pit system.

The mine sump water is regularly monitored for pH level and treated, if required, prior to discharge. The waste water from workshop is treated in oil water separator followed by settling tank and reused in washing. It is planned to relocate workshop outside (over the NW corner of ML) adjoining to ML and install an ETP in addition to oil-water separator at new location.

3.11 Schematic representations of the feasibility drawing which give information of EIA purpose

The conceptual plan of mine lease is given in Annexure VI to Form 1.

4.0 SITE ANALYSIS

The Mine site is located in Block Bermo New, villages Baidkaro, Kargali, Karo & Amlo of Bermo circle, District Bokaro, Jharkhand.

The Coordinates of mine are:

Latitude	:	23° 46' 42.6288" to 23° 47' 24.0324"
Longitude	:	85° 57' 28.9008" to 85° 59' 9.5784"

The topography is gentle and is marked by the absence of any high hill or deep depressions. The general slope of the ground is towards south. The elevation based on RLs of Bore holes drilled in Bermo seam in 1950 varies between 233.17 and 243.84 m.

4.1 Connectivity

Road: The coal mine is located in the East Bokaro coalfield near Kargali and other mines of CCL. The mine is well connected with BTPS by a metalled road. The mine is located about 50 km away from Bokaro township. Bermo Railway Station is connected through road.

Railway Line: The nearest Railway Station is Bermo at a distance of about 3 Km towards south from the block on Gomoh-Chandrapur, Barkakana-line of the East Central Railway.

Airport: The nearest airport is Ranchi and Kolkata at a distance of about 120 and 330 km. respectively.

4.2 Land form, Land use and land ownership

Total project area is 169.094 ha. This includes Mine Lease area of 167.434 Ha and 1.66 Ha proposed to be used for facilities adjoining to the NW corner of ML. No increase in existing ML area is proposed for increasing the production from 0.40MTPA to 2.62 MTPA.

Pre Mining, present and post mining landuse is given in Table 2, 3 and 4 respectively.

TABLE 2
PRE-MINING LAND USE

Land pattern	Area (ha)
Agricultural land (Private land)	27.166
Waste Land (Govt. Land)	18.292
Water body (Govt. land)	0.935
Forest Land (GMK land recorded as Jungle-Govt. land)	120.313
Others (Govt. land)	0.728
Total	**167.434**

TABLE 3
PRESENT LAND USE

Land use pattern	Area (ha)
Area under habitation	59.893
Area under backfill	52.609
Area under excavation	54.932
Total	**167.434**

TABLE 4
POST-MINING LAND USE

Land use pattern	Area (ha)
Backfilled area	110.50
Void area	41.94
Green Belt	6.110
Facility area	8.884
Total	**167.434**

4.3 Topography

Topography is gentle, no high hills or deep depression being present. However the area has a footprint of mining due to presence of coal mines of Central Coalfields Ltd and DVC in the coalfields. The elevation in the 10 km radius of the project (also referred to as buffer zone) varies from 312 m to 211 m MSL. The elevation based on RLs of Bore holes drilled in Bermo seam in 1950 varies between 233.17 and 243.84 m.

4.4 Existing infrastructure

Complete site facilities are important for smooth working of any mine. Core infrastructure like Office Building, Coal Stockyard, Weigh Bridge, CHP, Workshop, Diesel Pump, Workers Accommodation etc. is present at the mine as mine is operational for 0.4 MTPA coal production.

Habitation/colonies of CCL/DVC that are present inside the ML area, shall be subsequently shifted as mine workings are progressed.

Residential Buildings: At present, 2126 quarters are already built and the location-wise details of colonies within the leasehold area are given in Table 5 below:

TABLE 5
COLONIES WITHIN THE LEASEHOLD AREA

Sl. No.	Particulars	Area*	No.
1	DVC Quarters	XX	450
2	CCL Quarters	YY	1676
	Total		**2126**

**** Refer Fig 1 earlier or Present Surface Plan in Annexure IV of Form 1.***

Out of the above, most of the quarters are falling within the mining area and need to be vacated/shifted.

4.5 Soil classification

Regular monitoring of soil quality is being carried out by third party laboratory at the mine site. Analysis of soil samples reveals that there is no wide variation in the natural material. Particle size analysis shows that the texture of the soil is of sandy loam in nature with moderate water holding capacity. Electrical conductivity has been observed to be in the normal range while the values of organic carbon is found to be lower. Available phosphorus and potassium have been found in medium range.

4.6 Climatic data from secondary sources

The climate of the area is dry humid and sub-tropical. It is characterised by hot and dry summer from March to May, rainy season from June to October and cold winter spreading from November to February.

Temperature

In summer, the temperature rises up to 42.5°C to 44.6°C on some summer days. During winter, the temperature drops down to 5-7°C at times. Dust storms are common in dry season (May and June) before the onset of monsoon with increase in temperature and wind speed in the afternoon coupled with low humidity.

Rainfall

Annual rainfall is about 1200 mm, a major portion of which occurs during the monsoon period and the maximum rainfall occur in the month of August. The number of rainy days in a year are about 100.

Wind Speed and wind direction

The wind speed of the area varies from 1.5 to 2.8 ms^{-1}.

Relative Humidity

The average annual relative humidity is about 67%. In summer months the relative humidity varies between 32 to 73%.

4.7 Social infrastructure available

Hospitals, school, banks etc are present in the villages in buffer zone (within 10 Km of project area). Social infrastructures are existing as per Census 2011 and are listed in Annexure X to Form 1.

5.0 PLANNING BRIEF

5.1 Planning concept

The Damodar Valley Corporation is the first multipurpose river valley project of independent India which came into being on July 7,1948 by an Act of The Constitution Assembly (Act No XIV of 1948) and is equally owned by Govt. of India, Govt. of West Bengal and Govt. of Jharkhand (earlier Bihar). It is planned to use the coal produced from the mine for Captive use by thermal power plant of the Corporation.

5.2 Population projection

Manpower position of DVC Bermo Mines as on 01.01.2016 is 128. The proposed estimated manpower strength of the mine for enhanced production of 2.62 MTPA will be around 510.

Unskilled and semi skilled (after training) are hired from in and around the mine while skilled, engineers, managerial staff and technical experts are hired from outside.

5.3 Land use planning (break up along with green belt etc.)

The pre mining and present land use of the mine lease is referred in Table 2 and Table 3. Landuse at the end of life of mine is given in Table 4 in Section 4.2 earlier.

5.4 Assessment of infrastructure demand (physical & social)

An assessment of the current facilities available in the villages in and adjacent to the mine lease area in education, health, drinking water, power supply, post and telegraph, banks, communication and approach road has been done using Census 2011 data and presented on Annexure X to Form 1.

Core infrastructure, like power distribution system, road, telecommunication, housing, service buildings viz. office, store, First Aid centre, canteen etc. have been established at the mine site.

5.5 Amenities / facilities

Education, Hospitals, drinking water, power supply, post and telegraph, banks, communication and approach roads are present in the villages in buffer zone within 10 Km of project area. Office Building, Coal Stockyard, Weigh Bridge, CHP, Diesel Pump, Workers Accommodation etc. has been constructed.

The First Aid Room, Rest Shelters, Toilets, Tool /Store Rooms etc has been provided at mine site.

6.0 PROPOSED INFRASTRUCTURE

6.1 Industrial area (processing area)

The activity wise detail of present landuse is given in Table 3 and at the end of life of mine is given in Table 4 of Section 4.2 earlier.

6.2 Residential area (non processing area)

As Bermo mine is captive to the BTPS, most of the mine employees live in BTPS colony except the few which are presently living within the ML area. It is proposed that in future, all the employees will live in BTPS colony and the existing quarters of DVC within the ML will be dismantled to mine the coal underneath them.

6.3 Green belt

In order to combat pollution effects arising out of the mining operations and to improve the ecological and aesthetic status of the area, a comprehensive three tier green belt development programme will be implemented. Keeping in view the environmental problems, plantation programme has been prepared to mitigate the problems. The areas considered for plantations are:

- All along the roads and around office, stores, workshop etc.
- In all vacant/barren places near the quarry area
- Waste dump in stages
- Over the backfilled area
- Peripheral portion of mining lease.

6.4 Social infrastructure

With the mine already in operation for over 6 decades, amenities for communication, education, health, canteen, etc have developed by BTPS and will continue to be developed and maintained in and around the project area. These amenities are and will be available to local people also, who are directly associated with the project. Even those not associated in the project related activities are benefited by these amenities. With the continuation and expansion of the mine, there will be substantial improvement in the overall economy of the local people in the form of additional income through employment, development of infrastructure in surrounding areas such as transport facility, health and education, shops and ancillary industries. Over and above, the people can avail any of the medical/ educational facilities that will be established by the company in the area. Water can also be supplied free of cost on festive occasions. Overall, the rest of the villagers will be encouraged to be self sufficient.

The objective of CSR is to:

- Significantly improve the physical quality of life
- Create opportunities for livelihood
- Improve the level of education including adult education
- Create health awareness among women and
- Ensure availability of safe drinking water

6.5 Connectivity

Road

Refer section 4.1.

Railway Line/Airport

Refer section 4.1.

6.6 Drinking water management (source & supply of water)

Refer section 3.9.1

6.7 Sewerage system & industrial waste management

A sump of adequate capacity has already been created at the present mining pit to accommodate seepage water as well as to accommodate any sudden torrential rainfall. Heavy duty pumps are operational in this sump. Water is being discharged into the main garland drain by pipeline. The pumping capacity is presently sufficient to handle any torrential rain in the

mining area. Pumps of similar capacities have been kept as standby. Water is now being utilized in sprinkling the mine working area.

6.8 Solid waste management

Refer section 3.10.

6.9 Power requirement & supply / source

Refer section 3.9.2.

7.0 REHABILITATION AND RESETTLEMENT PLAN

This matter has been covered under para 4.4 earlier. In old Colony within mining lease area approx (200 quarters) of DVC with un-authorised occupancy exist which will be taken care by DVC, These have been identified for rehabilitation and resettlement.

8.0 PROJECT SCHEDULE & COST ESTIMATES

8.1 Cost of production

The cost of production at pit head is about Rs. 500/ tonne of coal approximately.

9.0 ANALYSIS OF PROPOSAL (FINAL RECOMMENDATIONS)

This is an opencast mine of capacity 2.62 MTPA, and the extent of ML is 167.434 Ha. The balance life of mine will be 28 years. The environmental impacts are kept at minimum by adopting proper mitigation measures.