

PRE FEASIBILITY REPORT

FOR

PROPOSED BUNDER DIAMOND BLOCK
*Buxwaha Protected Forest, Sagoria Village,
Buxwaha Tehsil, Chhatarpur district, Madhya Pradesh*

AREA OF THE MINE : 364 Ha

For

**5.00 MTPA OF KIMBERLITE ORE PRODUCTION
(DIAMOND BEARING ORE)
WITH TOTAL EXCAVATION OF 25.04 MTPA (5.00 MTPA
OF KIMBERLITE ORE + 3.70 MTPA OF SOIL + 16.34 MTPA
OF OVERBURDEN WASTE)**

&

**5.00 MTPA ORE PROCESSING PLANT (BENEFICIATION
PROCESS)**

Of



ESSEL MINING & INDUSTRIES LIMITED

BASIS - PRE FEASIBILITY REPORT

This Pre-Feasibility Report (PFR) is prepared in line with the requirement of Notification of Ministry of Environment, Forest and Climate Change (MoEFCC) dated 1-12-2009 vide SO 3067 (E) and is for the purpose of submission to MoEFCC for grant of Terms of Reference (TOR).

This report is prepared based on the information and reports provided by the Government of Madhya Pradesh during auction process and data collected from secondary sources available on public domain. Following is the list of reports considered:

- ❖ Bunder Diamond block Summary provided by the GoMP
- ❖ Recast Geological Report of Bunder Diamond Block provided by the GoMP
- ❖ Prospecting reports of Bunder Diamond Block provided by the GoMP
- ❖ Copy of the Mining plan of Bunder diamond block provided by the GoMP
- ❖ DGPS Survey report and area map provided by the GoMP
- ❖ Final Environmental Impact Assessment Report of Rio Tinto submitted for Bunder Diamond Project available from public domain

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CHAPTER - 1 EXECUTIVE SUMMARY

1.0 EXECUTIVE SUMMARY

Essel Mining & Industries Limited (EMIL), an Aditya Birla Group Company has won **BUNDER DIAMOND BLOCK** through the process of e-auction notified for grant of mining lease over precise notified area of 364 Ha. of Bunder Diamond Project located in Buxwaha Protected Forest, Sagoria Village, Buxwaha Tehsil, Chhatarpur district, Madhya Pradesh.

Letter of Intent (LOI) has been issued by the Govt. of Madhya Pradesh to EMIL vide letter no. F-2-26/2019/12/1 dated 19.12.2019 (Enclosed as **Annexure - 1**).

BACKGROUND OF THE PROJECT:

The area was initially explored by Rio Tinto Exploration India Private Limited (RTEIPL). Subsequent to submission of PL reports, RTEIPL applied for mining lease over the area of 954 Ha. However RTEIPL decided not to go ahead with the project and surrendered the same to the Government of Madhya Pradesh.

Subsequently the Directorate of Geology and Mining (DGM), Government of Madhya Pradesh, in pursuant to the Mines and Minerals (Development and Regulation) Act, 1957 and the Mineral (Auction) Rules 2015 issued notice inviting tender in July, 2019 to commence the auction process for grant of Mining Lease for Bunder Diamond Project located in Chhatarpur District of Madhya Pradesh.

The e-auction process was conducted for the said mineral block and EMIL was declared as the "Preferred Bidder" and later after fulfillment of Terms and conditions, Letter of Intent (LOI) for grant of mining lease over 364 Ha area of Bunder project was issued to EMIL on 19th December 2019 vide letter no. F-2-26/2019/12/1.

The area for which the LOI has been issued is 364 Ha. only, and is part of the area proposed by RTEIPL (954 Ha). It is much smaller in extent and constitute about 40% of total area of RTEIPL.

Essel Mining & Industries Limited now proposes to obtain Prior Environmental Clearance for mining and processing of Kimberlite Ore (Diamond bearing ore) from Bunder Diamond Block spreading in 364 hectares (Ha.) area and located in Buxwaha Protected Forest, Buxwaha Tehsil, Chhatarpur district, Madhya Pradesh.

The Kimberlite (also known as Lamproite) ore Mining is proposed at 5.00 Million Tonnes Per Annum (MTPA) with Kimberlite Ore processing

plant capacity of 5.00 Million TPA (MTPA). The total excavation for 5.00 MTPA of Kimberlite Ore Production (Diamond Bearing Ore) is With Total Excavation of 25.04 MTPA (5.00 MTPA of Kimberlite Ore + 3.70 MTPA of Soil and colluvium + 16.34 MTPA of Overburden Waste).

The proposed activity is considered as Category - A project as per Environmental Impact Assessment (EIA) Notification SO 1533, of 14-09-2006 and subsequent amendments and Prior Environmental Clearance from Ministry of Environment, Forests and Climate Change (MoEFCC) is required.

The estimated recovered Diamonds from 53.70 million tonnes ore material will be approximately 34.20 million carats. It is proposed to produce about 10 mt. Kimberlite ore during the first five years and the remaining 43.7 mt of reserves will be worked for the additional period. With this, life of the mine is estimated at 14 years.

It is proposed to undertake mining by using mechanized opencast mining using drilling and blasting and shovel dumper combination up to a depth of 345m or 100mRL.

ROM mined shall be fed to the Ore processing plant proposed within the lease area. The waste/overburden and soil/colluvium shall be stored and stacked separately at designated areas within the lease.

Ore processing will involve:

- Primary Crushing
- Secondary Crushing and Dry Screening
- Tertiary Crushing
- Wet Screening and Degriting
- Dense Media Separation Plant
- Final Recovery

The quantity of diamond removed per tonne of Kimberlite is 0.63 carat per ton of ore. Thus after processing ore, there will not be any significant weight loss due to removal of diamonds. Thus whole quantity of ore processed, minus losses in process will form tailings.

The tailings generated will be treated in thickener where they are dewatered and thickened by a mechanical process (filter press) to a solids content of about 85% to 90% solids (or better). The solid cake will be disposed to tailing dumps within mining lease area

The water requirement for the mine and ore processing plant is about 16050 m³/day (5.9 Million Cubic Meters/year).

A seasonal nala located on mineralized area will be diverted by constructing dam. With the intent to keep the mine pit from surface water inundation and in turn, to keep workmen safe, construction of the embankment on the diverted stream is proposed. Required water is sourced from the reservoir formed on the upstream of the dam

The storage of water in the reservoir is estimated to be about 17.00 MCM. For tapping 16050 m³/day from this water reservoir, permission will be obtained from the Ministry of Water Resource, Government of Madhya Pradesh.

The mining will intersect ground water and necessary permission will be obtained from CGWA for working below ground water table.

All the required statutory facilities such as vocational training centre, canteen, rest shelters, first aid room, ambulances, crèche, etc will be provided.

The manpower proposed to be employed will be around 400 Persons (Direct and Indirect) for all levels including crushing and screening plant, Diamond Processing Plant and other services

The peak demand of electric power is estimated at 22 - 25 MW. EMIL will Approach Madhya Pradesh State Electricity Board for tapping the required electric power from suitable source after ascertaining the feasibility.

There are no wildlife sanctuaries, national parks, Tiger Reserves, Elephant Corridors, eco-sensitive areas within the 10 km radius of the mining lease area. The nearest National Park/Sanctuary is Panna Tiger Reserve (PTR) with its buffer zone at 19.03 km.

The capital Investment Cost is estimated as Rs. 2500 crores.

CHAPTER – 2
INTRODUCTION OF THE PROJECT / BACKGROUND
INFORMATION

2.0 Introduction of the Project / Background information

i. Identification of project and project proponent. In case of mining project, a copy of mining lease / letter of intent should be given.

The project for mining Kimberlite Ore and separation of diamonds, is located in Chhatarpur district of the State of Madhya Pradesh.

The proposed 364 ha lease area is located in Forest area of Buxwaha Protected Forests. The Kimberlite (also known as Lamproite) ore Mining is proposed at 5.00 Million Tonnes Per Annum (MTPA) with Kimberlite Ore processing plant capacity of 5.00 MTPA. The total excavation for 5.00 MTPA of Kimberlite Ore Production (Diamond Bearing Ore) is With Total Excavation of 25.04 MTPA (5.00 MTPA of Kimberlite Ore + 3.70 MTPA of Soil and colluvium + 16.34 MTPA of Overburden Waste).

The estimated recovered Diamonds from 53.70 million tonnes ore material will be approximately 34.20 million carats. It is proposed to produce about 10 mt. Kimberlite ore during the first five years and the remaining 43.7 mt of reserves will be worked for the additional period .With this, life of the mine is estimated at 14 years.

The present proposal is for obtaining Environmental Clearance from Ministry of Environment, Forests & Climate Change (MoEF&CC) as per EIA notification SO1533 dated 14th September 2006and subsequent amendments.

PROJECT PROPONENT

Essel Mining & Industries Ltd (EMIL), an Aditya Birla Group Company has been announced as preferred bidder in competitive bidding process. Letter of Intent was issued by the Government of Madhya Pradesh on 19th December 2019 vide letter no. F-2-26/2019/12/1.

ii. Brief description of nature of the project

The proposed 364 ha lease area is located in Forest area of Buxwaha Protected Forests. The Kimberlite (also known as Lamproite) ore Mining is proposed at 5.00 Million Tonnes Per Annum (MTPA) with Kimberlite Ore processing plant capacity of 5.00 MTPA. The total excavation for 5.00 MTPA of Kimberlite Ore Production (Diamond Bearing Ore) is With Total Excavation of 25.04 MTPA (5.00 MTPA of Kimberlite Ore + 3.70 MTPA of Soil and colluvium + 16.34 MTPA of Overburden Waste).

The estimated recovered Diamonds from 53.70 million tonnes ore material will be approximately 34.20 million carats. It is proposed to produce about 10 mt. Kimberlite ore during the first five years and the remaining 43.7 mt of reserves will be worked for the additional period. With this, life of the mine is estimated at 14 years.

Mechanised Opencast Method Mining by drilling, blasting, excavation, loading and transport will be adopted for Kimberlite ore mining up to a depth of 345 m below ground level (100 mRL).

It is proposed to have separate dumps for Overburden / Waste and soil, within the proposed lease area.

The steps involved in processing the ore are as under in the proposed ore processing plant:

- Primary Crushing
- Secondary Crushing and Dry Screening
- Tertiary Crushing
- Wet Screening and Degriting
- Dense Media Separation Plant
- Final Recovery

The quantity of diamond removed per tonne of Kimberlite is 0.63 carat per ton of ore. Thus after processing ore, there will not be any significant weight loss due to removal of diamonds. Thus whole quantity of ore processed, minus losses in process will form rejects.

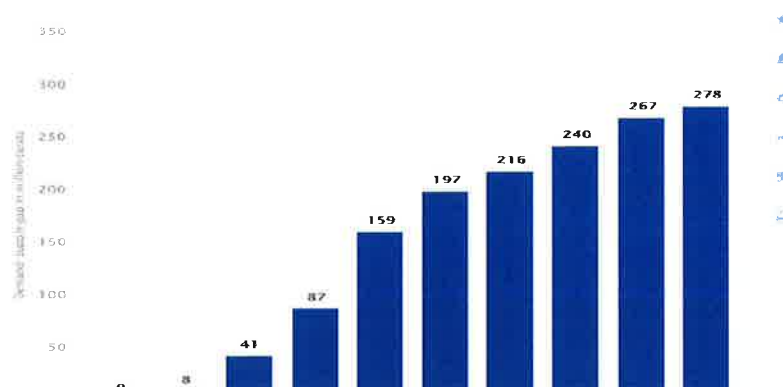
The tailings generated will be treated in thickener where they are dewatered and thickened by a mechanical process to a solids content of about 85% to 90% solids (or better). The solid cake will be disposed to dumps within mining lease area.

iii. Need for the project and its importance to the country and or region.

This statistic displays the forecast rough diamond demand-supply gap (rough diamond demand vs. mined diamond supply) worldwide from 2014 to 2050. It is forecast that by 2050, the global demand-supply shortfall of rough diamonds will be 278 million carats, a notable increase from a non-existent demand-supply gap in 2014. This predicted shortfall is expected to cause an increase in diamond prices.

Forecast for rough diamond demand-supply gap worldwide from 2014 to 2050

(in million carats)



Source: <https://www.statista.com/statistics/584826/rough-diamond-demand-supply-gap-worldwide-forecast/>

iv. Demand- supply Gap

The diamond industry experienced short-term challenges in 2019, particularly compared with 2018, in which every segment of the value chain improved. In 2019, rough diamond producers achieved near record-high production while jewellery retailers optimized and lowered their inventory needs. As a result, we expect mining and midstream revenues to decrease by 25% and 10%, respectively, in 2019 and diamond jewelry sales to be nearly stable in local currencies.

- In the second half of 2018, demand for rough diamonds began to stall, causing inventories to rise and prices to decrease. In 2019, rough diamond revenue is expected to decline 25%. In response, major mining companies are adjusting production plans for 2019, cutting their minimum purchase requirements in half and lowering rough diamond prices by about 5%. Smaller players are dropping prices more significantly (as much as 10%), and many smaller producers skipped planned auctions in the third and fourth quarters.
- After modest growth in 2018, cutting and polishing revenues are expected to decline 10% to 15% in 2019. The surge in production, combined with more sophisticated inventory management by retailers, puts pressure on revenue and margins in the midstream. Many cutting and polishing manufacturers are reporting operating margins at or below their breakeven points. To maintain factory utilization, midstream players purchased more small stones, which increased demand for smaller rough diamonds.
- Retail demand has been mixed over the past year and a half. In 2018, robust diamond jewellery sales resulted in 2% growth. But in 2019, retail sales are expected to decline by up to 2% in US dollars and

remain stable in local currencies. This is a result of the trade tension between the US and China and deteriorating consumer confidence overall. In the US, a slowdown in Chinese tourism also negatively affected sales. Weakened currencies in most major non-US markets hurt retailers' performance. Like never before, everyone is closely watching this holiday season, which will determine retail's final annual results.

- The short-term situation remains uncertain: rough diamond production is still relatively high, whereas geopolitical and economic uncertainties loom over every key market.
- Learning from past diamond industry recessions, we foresee a resolution in the next two years. If the industry is appropriately supported by marketing, and barring any unforeseen economic or political shocks, it will rebalance. Campaigns should target the mass market, which is not traditionally covered by branded advertisers.

Source: The Global Diamond Industry, 2019, Bain & Company

v. Imports Vs Indigenous production.

The diamonds is always imported in India and the production is not able to meet the domestic market.

vi. Export possibility

Export demand is always there.

vii. Domestic / export markets

Diamond processed from this project will be auctioned to domestic and overseas parties.

viii. Employment generation (direct and indirect) due to the project.

The mine will create employment for around 400 (Direct + Indirect) persons. The company has already initiated programs so that at least these jobs can be taken up by local people. Efforts are also being made so that a few skilled jobs also can be filled by trained local personnel.

In addition, to direct employment, several activities like security, sanitation, maintenance of colony etc. will be outsourced. The contractors will be encouraged to employ maximum possible local people.

CHAPTER – 3 PROJECT DESCRIPTION

3.0 Project Description

i. Type of project including interlinked and interdependent projects, if any.

The project is a mine for production Kimberlite ore mining at 5.00 MTPA with Kimberlite Ore processing at 5.0 MTPA from mining lease area of 364 Ha.

There is no interlinked project.

It is categorized as Category A Project under Schedule 1(a) as the mining lease area is more than 100.00 Ha and necessitates obtaining Environment Clearance from Ministry of Environment, Forest & Climate Change (MoEF&CC).

ii. Location (map showing general location, specific location, and project boundary & project site layout) with coordinates.

Bunder Diamond Block (MLA) is located in Buxwaha Protected Forest, Buxwaha Tehsil, Chhatarpur District, Madhya Pradesh, and is part of Survey of India topo sheet No. 54 P/7 and bounded by the following geo coordinates.

Latitudes : 24°18'28.85"N - 24°20'4.89"N
Longitudes : 79°16'52.61"E - 79°18'6.98"E

The location map of the Mining Lease Area is shown in **Fig - 1**.

Nearest railway head on the line connecting Sagar – Chhatarpur is at around 55.0 km. Key map showing the location of various features around the MLA is shown in **Fig - 2**. Chhatarpur is major town at 71.0 km in NNE direction.

The National Highway (NH-86) connecting Sagar – Chhatarpur is located at about 7.0 km in WNW direction. The nearest railway station is Damoh which is at around 55.0 km.

Nearest village to the Mining Lease Area are

- Kasera – 2.1 km – W
- Hirdepura – 0.9 km – W
- Sepura – 1.6 km – S
- Sagoria – 0.9 km – NW

Nearest Reserved Forests to the Mining Lease Area are :

- Buxwaha Protected Forest – Adjacent
- Hirapur Reserved Forest – 3.8 km – WNW
- Birgarh Protected Forest – 7.8 km – SSW
- Khera Protected Forest – 6.8 km – SSW

There are no major industries or mines within 10 km radius.

Salient features of MLA are given in **Table – 1**. **Fig – 3** shows 10 km radius study area around the Mining Lease Area

The site Photographs are shown in **Fig-4**

There are no eco-sensitive areas like National Parks, Sanctuaries, Elephant Reserves, Tiger sanctuaries or migratory routes of the fauna within 10 km radius from the boundary of the lease. The nearest National Park/Sanctuary is Panna Tiger Reserve (PTR) with its buffer zone at 19.03 km.

The area falls under Seismic zone – I and is seismically least active zone.

FIG - 1

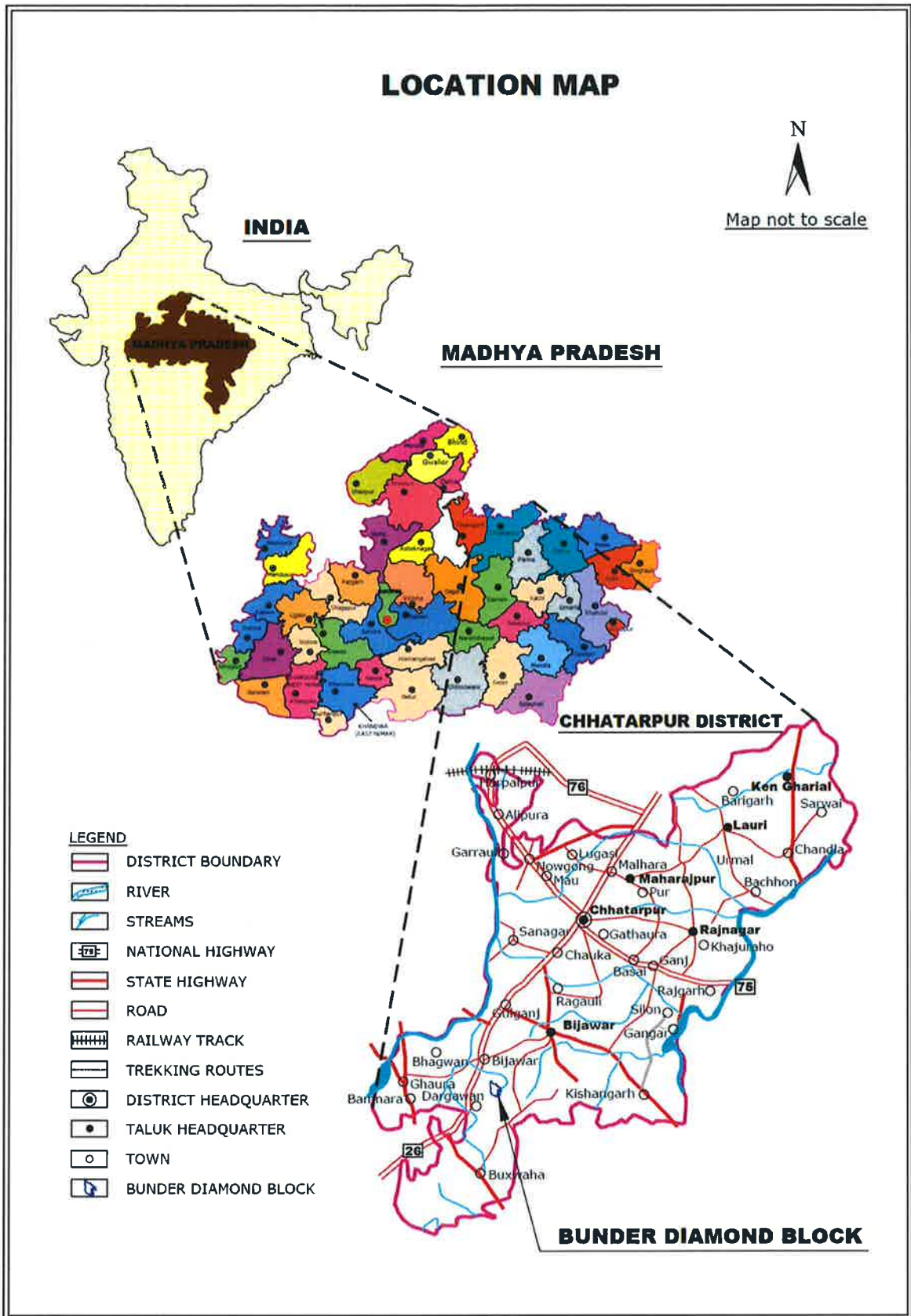
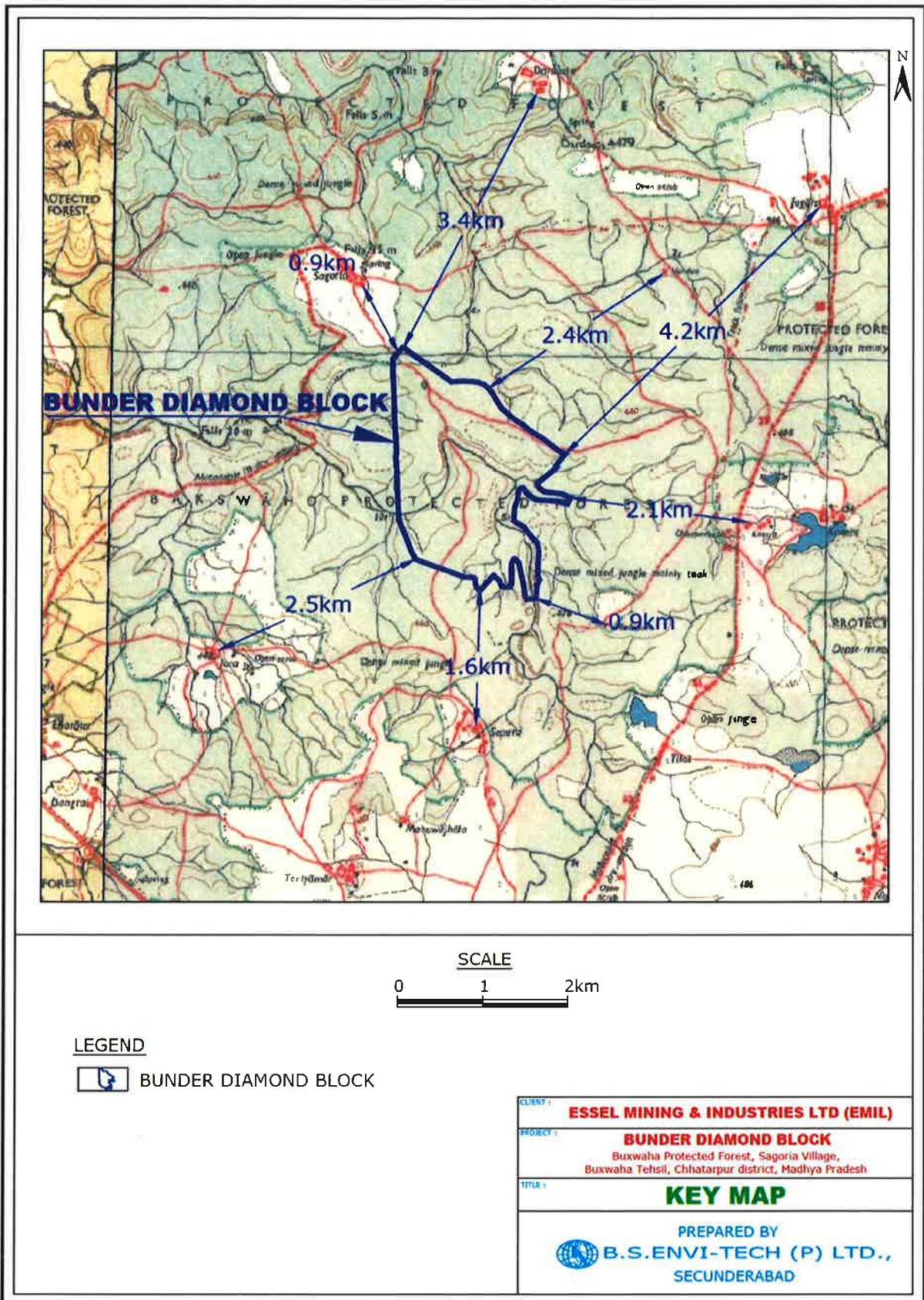


FIG – 2: KEY MAP



SCALE



LEGEND

 BUNDER DIAMOND BLOCK

CLIENT :	ESSEL MINING & INDUSTRIES LTD (EMIL)
PROJECT :	BUNDER DIAMOND BLOCK Buxwaha Protected Forest, Sagoria Village, Buxwaha Tehsil, Chhatarpur district, Madhya Pradesh
TITLE :	KEY MAP
	PREPARED BY  B.S. ENVI-TECH (P) LTD., SECUNDERABAD

TABLE - 1
SALIENT FEATURES OF THE MINING LEASE AREA

Feature	Details
Altitude	442 - 454 m above MSL
Latitude & Longitude	Latitudes : 24°18'28.85"N - 24°20'4.89"N Longitudes : 79°16'52.61"E - 79°18'6.98"E
Village, Tehsil, District, State	Sagoria Village, Buxwaha Tahsil, Chhatarpur District, Madhya Pradesh
Max. Temp., °C	47.4
Min. Temp., °C	1.4
Relative Humidity,%	24 - 90%
Annual rainfall, mm	1195.3 mm
Nearest Water Bodies	A seasonal stream is passing through the ML Area Sira Nadi - 4.5 km - NNW Kalidahar Nadi - 4.6 km - NW
Nearest Highway	<ul style="list-style-type: none"> • National Highway (NH-86) - Sagar - Chhatarpur - 7.6 km - WNW. • National Highway (NH-12A) - Tikamgarh - Jabalpur - 5.2 km - WSW. • State Highway (SH-37) - Hirapur - Damoh - 5.2 km - WSW. • State Highway (SH-51) - Surajpura Rd - Hatta - 10.8 km - NE. • Major Road - Shobha - Buxwaha - 2.3 km - SE.
Nearest Railway station	Chhatarpur - 69.0 km - NE Sagar - 75.0 km - SW Damoh - 55.0 km - SSE
Nearest Industries	Pilot Plant (Non Operational) of the Diamond ore - 4.1 km - S
Nearest Village	<ul style="list-style-type: none"> • Kasera - 2.1 km - W • Hirdepura - 0.9 km - W • Sepura - 1.6 km - S • Sagoria - 0.9 km - NW
Nearest Town	Chhatarpur - 71.0 km - NNE
Inter State Boundary	Madhya Pradesh - Uttar Pradesh - 31.0 km - W
National parks,	Panna Tiger Reserve (PTR) with its buffer zone at 19.03 km
Nearest Air port	Kajuraho - 82.0 km - ENE
Nearest Forest	Buxwaha Protected Forest - Adjacent Hirapur Reserved Forest - 3.8 km - WNW
Historical places	Archaeological Museum - 87.0 km - NE

****all distances mentioned in the above table are aerial distances***

FIG - 3: 10 KM RADIUS STUDY AREA AROUND THE MINING LEASE AREA

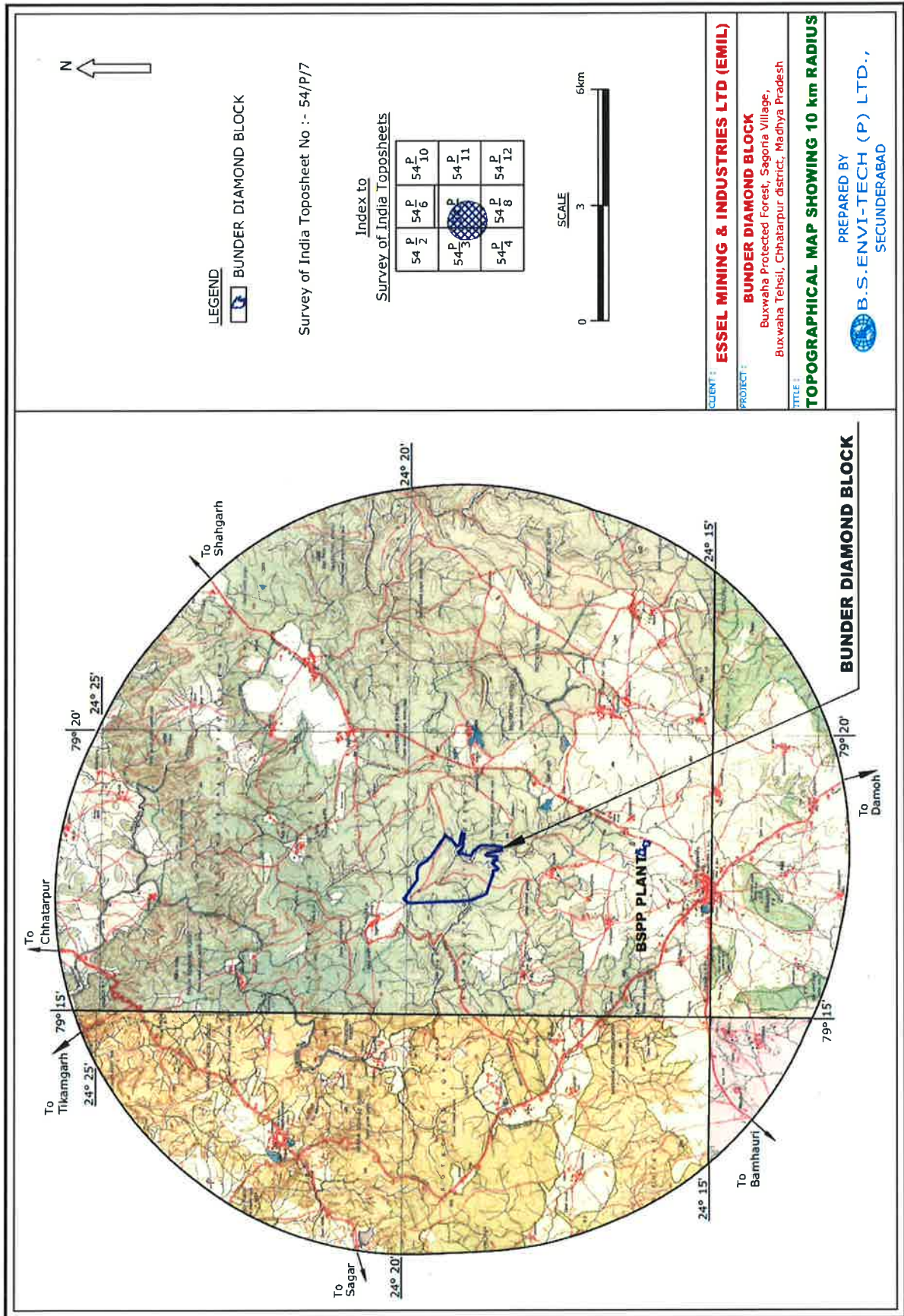


FIG - 4
PHOTOGRAPHS OF THE MINING LEASE AREA



iii. Details of alternate sites considered and the basis of selecting the proposed site, particularly the environmental considerations gone into should be highlighted.

No alternate sites were considered as the project is mineral specific.

iv. Size or magnitude of operation.

The proposed 364 ha lease area is located in Forest area of Buxwaha Protected Forests. The Kimberlite (also known as Lamproite) ore Mining is proposed at 5.00 Million Tonnes Per Annum (MTPA) with Kimberlite Ore processing plant capacity of 5.00 MTPA. The total excavation for 5.00 MTPA of Kimberlite Ore Production (Diamond Bearing Ore) is With Total Excavation of 25.04 MTPA (5.00 MTPA of Kimberlite Ore + 3.70 MTPA of Soil and colluvium + 16.34 MTPA of Overburden Waste).

v. Project description with process details (a schematic diagram/ flow chart showing the project layout, components of the project etc. should be given)

The project is a Mechanized Opencast Mine for mining of Kimberlite ore at 5.00 MTPA with Kimberlite Ore processing at 5.0 MTPA. It is proposed to mine Kimberlite ore bearing diamonds, up to a maximum depth of 345 m below ground level.

The 364 ha Mining Lease area is characterized by gently sloping and undulating terrain in the Buxwaha Protected Forest.

The lease area is part of Buxwaha Protected forest. The ownership of land is with the Forest Department of Government of Madhya Pradesh. The estimated recovered Diamonds from 53.70 million tonne ore material will be approximately 34.20 million carats.

The estimated mineable ore reserves are about 53.70 Million tonnes. It is proposed to produce 10 million tonnes. Kimberlite ore during the first five years and the balance ore will be worked for the additional period. With this, life of the mine is estimated at 14 years.

The kimberlite pipe is nearly vertical and is spread over a small area of 16.6 ha.

Mechanised Opencast Method Mining by drilling, blasting, excavation, loading and transport will be adopted for Kimberlite ore mining up to a depth of 345 m below ground level (100 mRL).

Necessary permission from DGMS will be obtained before commencement of mining operations.

The capacity of processing plant is proposed at 5.0 MTPA. Entire ore mined will be processed to separate diamonds.

All the soil and OB /waste removed during life of the project will be transported by dumpers and dumped externally, within lease area. For this 86.04 Ha area is earmarked for OB dump and 12.00 Ha area is earmarked for three soil dumps.

The lease is predominantly covered by soil of between 0.0 m to 2.0 m depth. This soil is clayey in texture and is of medium fertility up to a depth of 60cm. This material (top 60cm) will be selectively scraped with bulldozers to form top soil heaps. These heaps will then be loaded by front end loaders into dumpers and transported to the area identified for Top Soil dumping. Soil will also be loaded and hauled by shovel-dumper combination where the soil is thicker. Top soil and colluvium generation for the life of mine is about 4.029 Mt which will be removed and stacked separately. The top soil and colluvium dump will occupy approximately 12.00 Ha of land.

The side walls of the Kimberlite pipe consist of Sandstone, Conglomerate, Quartzite, Pegmatite, Dolomite, Shale etc proceeding to depth from surface. These will be drilled, blasted and removed for developing pit benches, spiralling downward in an anticlockwise direction with gradient of 1 in 20 or steeper, as permitted by DGMS. The total quantum of hard overburden / side burden to be drilled, blasted and loaded into dumpers and transported to the waste dumps is estimated to 118.76 million tonnes (44.5 Mm³ solid) for the life of mine when mine extends to a depth of 100 mRL. It will be dumped on the location for the waste dump. The dump area is about 86.04 Ha .

KIMBERLITE ORE PROCESSING PLANT

The ore characteristic of Bunder Kimberlite ore and processing studies were studied from the available data. The conceptual flow sheet also was prepared and the same is given in **Fig-5**

The steps involved in processing the ore are as under:

- Primary Crushing
- Secondary Crushing and Dry Screening
- Tertiary Crushing
- Wet Screening and Degritting
- Dense Media Separation Plant
- Final Recovery

1.0 ROM PAD, PRIMARY CRUSHING AND CRUSHED ORE

STOCKPILE

ROM is delivered by trucks at the static grizzly (1000mm square opening) on top of the tipping bin. The bin is equipped with a level transmitter which controls signal lights. Light signals inform dumper operator if the ROM load can be discharged. Oversized lumps are broken on top of the grizzly by rock breaker. The apron feeder discharges directly into the primary crusher selected to be a mineral Sizer (MMD 850) due to the brittle and low abrasive nature of the Bunder Kimberlite.

2.0 SECONDARY CRUSHING AND DRY SCREENING

The purpose of the secondary crushing and dry screening installation is to reduce material to less than 50mm size and thus ensure the downstream HPRC (or equivalent) feed top size is not exceeded. A single central longitudinal slot below the stockpile feeds a stockpile reclaim conveyor which directly feeds the secondary crusher (The secondary crusher selected is a mineral sizer).

Product from the sizer is transferred via the secondary crusher product conveyor to the primary (dry) screen. This screen returns +50mm oversize material to the secondary crusher via conveyor. The screen undersize is transferred onto a long stockpile feed conveyor which transfers nominally 100% passing 50mm crushed ore to a luffing conveyor. From the stockpile 50mm crushed ore transferred to the tertiary crushing area HPRC (or equivalent) feed bin via conveyor. There are no washing sprays on the primary sizing screen, in accordance with the current understanding of the nature of the Bunder ore, and thus the whole primary and secondary crushing circuit operates dry.

3.0 TERTIARY CRUSHING AND RECRUSH CRUSHING

The High Pressure Rolls Crusher (HPRC) (or equivalent) liberates locked diamonds whilst simultaneously performing a large size reduction on the accompanying material. The -50mm size fraction

from the secondary crushing/screening section is transferred to the HPRC feed bin via the HPRC (or equivalent) feed conveyor.

The recrushed material returned to the HPRC feed bin on the HPRC feed conveyor is the +25mm material in the HPRC product after wet screening and the +6mm “coarse floats” from the two DMS modules.

The HPRC unit selected is with roll dimensions 1.85m diameter by 1.5m wide, and is powered by two 1400kW variable speed motors. The roll surfaces are lined with tungsten carbide studs in a pattern which promotes the formation of an autogenous layer of ore on the rolls. This layer protects the roll surfaces from wear, and thus reduces the maintenance downtime significantly compared to earlier, smooth or profiled roll surfaces.

4.0 WET SCREENING AND DEGRITTING

HPRC product is transferred on the scrubber feed conveyor to the wet screening area. Space provision for the addition of a future scrubber has however been made. A horizontal, single deck screen produces a +25mm oversize material, which is returned to the HPRC feed bin via the scrubber screen O/S conveyor. The scrubber discharge screen undersize is split in two, and feeds the two degrit screens. Oversize from the degritting screens, in the size range -25+1mm discharges onto the DMS feed conveyor. Undersize from the degritting screen, -1mm, flows into the degrit screen sump, from where it is pumped by the degrit screen underflow pumps to the desand cyclones.

5.0 DENSE MEDIUM SEPARATION PLANT

DMS feed conveyor transports the -25+1mm material into the DMS feed bin using a shuttle conveyor to distribute material into the two pockets of the DMS feed bin. Clam shell gates are provided to control discharge of material from the bin on the two DMS module feeders. These then feed the two DMS module feed conveyors, which feed the two DMS modules of 300tph nominal capacity each.

Each primary DMS module comprises 6 x 420mm diameter cyclones treating the entire feed material. The DMS modules will be sourced as “vendor items”. ADP DMS modules have been specified for the Bunder project. The following describes one of the DMS modules. The description applies equally to the other module.

Ore Flow

Ore in the size range 1-25mm is mixed with ferrosilicon medium at the correct density. The ore/ferrosilicon slurry mixture gravitates to one of two cyclone feed pumps one of which is a stand by. The Operating

pump delivers the slurry to a 6-way splitter from where the 6 separation cyclones are fed

Inside the DMS cyclones a gravity separation is performed on the ore with the low specific gravity (partly waste) particles, together with most of the medium, reporting to the cyclone overflow. Heavy minerals, including diamonds, together with some misplaced low specific gravity particles and the rest of the medium report to the spigot of the cyclone.

Cyclone overflow and underflow products are separately drained and rinsed. Cyclone overflow product (floats) is separated at 6mm, with material greater than 6mm reporting to the HPRC and material less than 6mm disposed of by conveyor as CPK

Combined DMS cyclone spigot product passes over a sinks drain and rinse screen. The sinks screen discharges into a surge bin. As called for by the recovery section, concentrates are withdrawn from the bin using a jet-pump and delivered to the recovery feed dewatering section

6.0 RECOVERY PLANT

The purpose of the recovery plant is to concentrate the DMS sink fractions to either caustic / acid grade or to a grade suitable for hand sorting. The recovery plant includes the following sections:

- Recovery Feed Sizing and Storage
- Recovery Primary Sorting
- Recovery Reconcentration
- Recovery Recrush
- Recovery Grease

The recovery plant receives concentrates from the DMS modules in batches via jet-pumps.

6.1 GENERAL

Access to the enclosed recovery section is restricted to authorized personnel, and controlled via a single-entry booth with anti-pass back provision.

6.2 RECOVERY FEED SIZING AND STORAGE

DMS concentrates are stored in dedicated secure hoppers in each DMS module, and batch transferred via jet-pump to one of two dewatering screens and hence into one of two storage. The purpose of this is to provide a “cut-off” between incoming and in-circuit material for the purposes of metallurgical accounting. Recovery feed is

extracted from one of the two storage bins and sized into 4 fractions for primary sorting.

6.3 RECOVERY PRIMARY SORTING

The recovery primary X-ray sorting area operates on a batch basis by size range in two streams. All primary sorters are the same model, calibrated in each case through software changes to the size range being treated on a batch basis. The sorters are Debtech dual wavelength X-ray sorters. As the sorters are single-pass, two sorters are arranged in series to obtain the required two passes of sorting, so as to maximize diamond recovery.

X-ray sorter feed is subjected to a beam of X-rays, and diamonds and some other X-ray luminescent material detected and ejected from the sorter using high pressure air-jets. These pass into a jet-pump for transfer to the recovery Reconciliation section

6.4 RECOVERY RECONCENTRATION SECTION

Recovery re-concentration is a dry process section, as it has been found repeatedly that material flow characteristics of fine material are more predictable if dry, and hence upgrading X-ray streams where diamonds have already been proven to be recoverable is more effective if dry rather than wet.

6.5 RECOVERY RECRUSHING

The recovery recrushing facility is intended to ensure that diamonds larger than 3mm cannot leave the recovery circuit, as no material of >3mm size exits the recovery building. The value of any remaining diamonds in the <3mm stream - following two passes through X-ray and two passes over grease - is expected to be too low to justify the expense of stage crushing all material in closed circuit with the primary X-ray sorters to any smaller size. To achieve a high degree of size reduction with minimal risk of damage to any diamonds present, a high pressure grinding roll has been chosen as the Comminution technology.

6.6 RECOVERY GREASE

A grease section has been included in the recovery plant flowsheet to provide an "alternative" technology for the recovery of diamonds that two stages of X-ray sorting have not captured, and which would otherwise exit the recovery plant in the fines rejects stream. Grease belt rejects join the DMS section fine floats as part of the CPK stream.

7.0 DISPOSAL OF REJECTS

The quantity of diamond removed per tonne of Kimberlite is 0.63 carat per ton of ore. Thus after processing ore, there will not be any significant weight loss due to removal of diamonds. Thus whole quantity of ore processed, minus losses in process will form rejects.

8.0 TAILINGS DISPOSAL

Around 85% to 90% of tailings these are expected to be Coarse Processed Kimberlite (CPK) (-) 6 mm to 1 mm, grits 1.0 mm + 0.1mm and rest will be Fine Processed Kimberlite (FPK). The CPK and grits will be disposed off as solids initially by conveyor followed by dumpers.

The quantities of these during 11 years life is estimated at 31.9 Mt of CPK plus grits and 21.26 Mt of FPK. CPK will be mostly disposed off to overburden and waste dump.

The CPK will have less than 5%moisture while FPK will be in slurry form consisting of 30% to 55% solids and will be transported through pipe line for treated in belt filter and thickener where they are dewatered and thickened by a mechanical process to a solids content of about 60% solids (or better). The solid cake will be disposed to dumps within mining lease area

vi. 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. Explosive requirement is about 1 kg for 5 tonne material breaking of ore and Water requirement is about 16050 m³/day.

Mining Strategy:

The Kimberlite ore mined will be transported by dumpers to crushing plant where it will be crushed in primary & secondary crushers for onward transportation to processing plant.

ROM ore produced will be transported to the processing plant with in the lease, for rough diamond recovery. Final recovery of raw diamonds will be completed by x-ray sorting machines.

Rough diamonds will be auctioned as per Schedule VII of Mine Development and Production Agreement (MDPA) which will be signed with the State Government.

vii. Resource optimization / recycling and reuse envisaged in the Project, if any, should be briefly outlined.

The ore processing is so designed that no effluent goes out of the lease area. All effluent from processing plant is collected for treatment of tailings and water recirculated so as to minimize use of fresh water. The tailings will be disposed after dewatering to tailing dump. Tailings handling is so designed that minimum water surface is exposed to air so as to reduce evaporation of water.

The details of water conservation measure proposed is in following two modes.

1. Processing plant operation by zero discharge concept, whereby conservation of water to re-circulate to extent of 85 %
2. Conservation of fresh water resources by rain water harvesting.

viii. Availability of water its source, energy /power requirement

The water requirement for the mine and ore processing plant is estimated to be about 16050 m³/day (5.9 Million Cubic Meters/year).

A seasonal nala located on mineralized area will be diverted by constructing dam. With the intent to keep the mine pit from surface water inundation and in turn, to keep workmen safe, construction of the embankment on the diverted stream is proposed. Required water is sourced from the reservoir formed on the upstream of the dam

The storage of water in the reservoir is estimated to be about 17.00 MCM. For tapping 16050 m³/day from this water reservoir, permission will be obtained from the Ministry of Water Resource, Government of Madhya Pradesh.

HIGH TENSION ELECTRIC SUBSTATION

The peak demand of electric power is estimated at 22 - 25 MW. EMIL will Approach Madhya Pradesh State Electricity Board for tapping the required electric power from suitable source after ascertaining the feasibility.

In the event of insufficient/ reliability of power from MPSEB, provision of DG sets of 2 X 500 kVA capacity has also been made for uninterrupted mining and plant operations.

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

TOP SOIL MANAGEMENT

The lease is predominantly covered by soil of between 0.0 m to 2.0 m depth. Over the North of ore Domain area the thickness of soil increases to 10-12m. This soil is clayey in texture and is of medium fertility up to a depth of 60cm. This material (top 60cm) will be selectively scraped with bulldozers to form top soil heaps. These heaps will then be loaded by front end loaders into dumpers and transported to the area identified for Top Soil dumping. Soil will also be loaded and hauled by shovel-dumper combination where the soil is thicker. Top soil generation for the life of mine is about 2.12 million cum which will be removed and stacked separately. The top soil and colluvium dump will occupy approximately 12.00 Ha of land.

SOLID WASTE MANAGEMENT

The side walls of the Kimberlite pipe consist of Sandstone, Conglomerate, Quartzite, Pegmatite, Dolomite, Shale etc proceeding to depth from surface. These will be drilled, blasted and removed for developing pit benches, spiralling downward in an anticlockwise direction with gradient of 1 in 20 or steeper, as permitted by DGMS. The total quantum of hard overburden / side burden to be drilled, blasted and loaded into dumpers and transported to the waste dumps is estimated to 118.76 million tonnes for the life of mine when mine extends to a depth of 100 mRL. It will be dumped on the location for the waste dump. The dump area is about 86.04 Ha.

The solid waste generation from the mine is given below

SOLID WASTE GENERATION FROM THE PROJECT

		Quantity
Ore Mining	Soil and colluvium	2.12 mcum
	Overburden	44.5 mcum
Ore processing plant	Ore Reject/Tailings	53.16 million tonnes

WASTEWATER MANAGEMENT

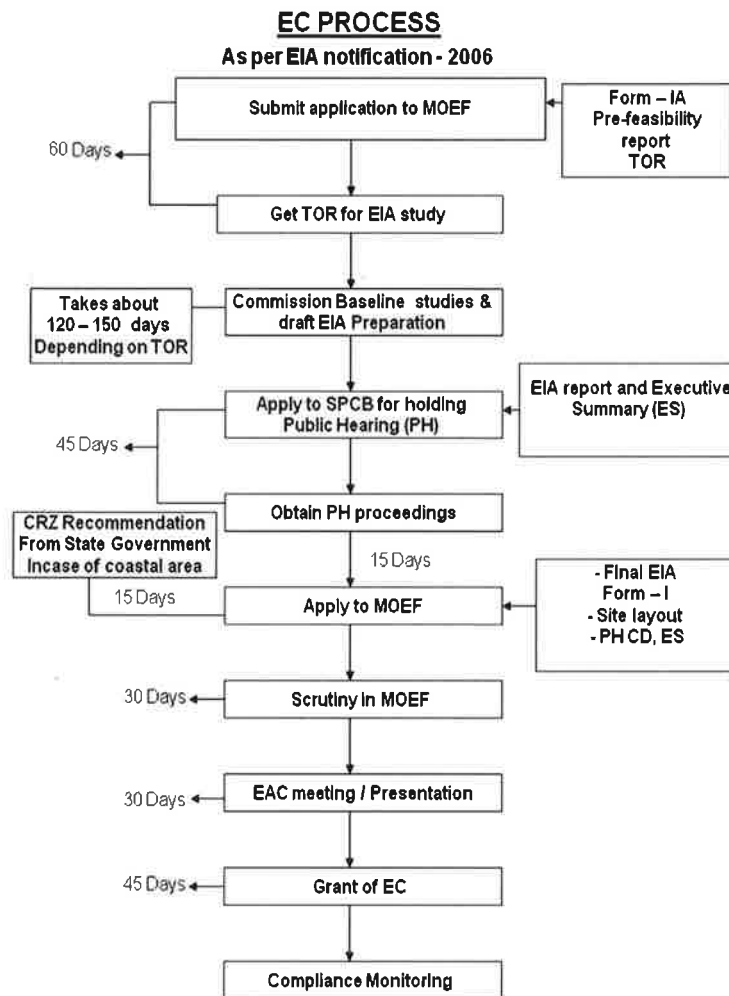
The wastewater generation from the mine is mainly from the following two areas:

1. Workshop Wastewater
2. Domestic wastewater

Wastewater generation from the workshop containing oil and grease will be treated for oil & grease removal. Treated water is used for plantation.

The wastewater generated from the domestic front will be treated in Sewage Treatment Plant. Treated wastewater will be used for greenbelt development.

x. Schematic representations of the feasibility drawing which give information of EIA purpose.



Total EC process is expected to take about 11 – 12 months

CHAPTER - 4
SITE ANALYSIS

4.0 Site Analysis

i. Connectivity.

Nearest railway line connecting Sagar – Chhatarpur is at 55.0 km. Chhatarpur is major town at 71.0 km in NNE direction.

The National Highway (NH-86) connecting Sagar – Chhatarpur is located at about 7.0 km in WNW direction. The nearest railway station is Damoh which is at 54.0 km.

ii. Land form, land use and land ownership.

Land use:

The entire area of 364 ha is forest land. It is proposed to be diverted and the application is under submission to MoEFCC.

Of the total 364 ha, about 66.00 Ha will be broken under mining activity for ore production.

Landuse pattern of the ML Area during operational phase of the mine is given in table below.

PROPOSED LANDUSE PATTERN OF THE ML AREA

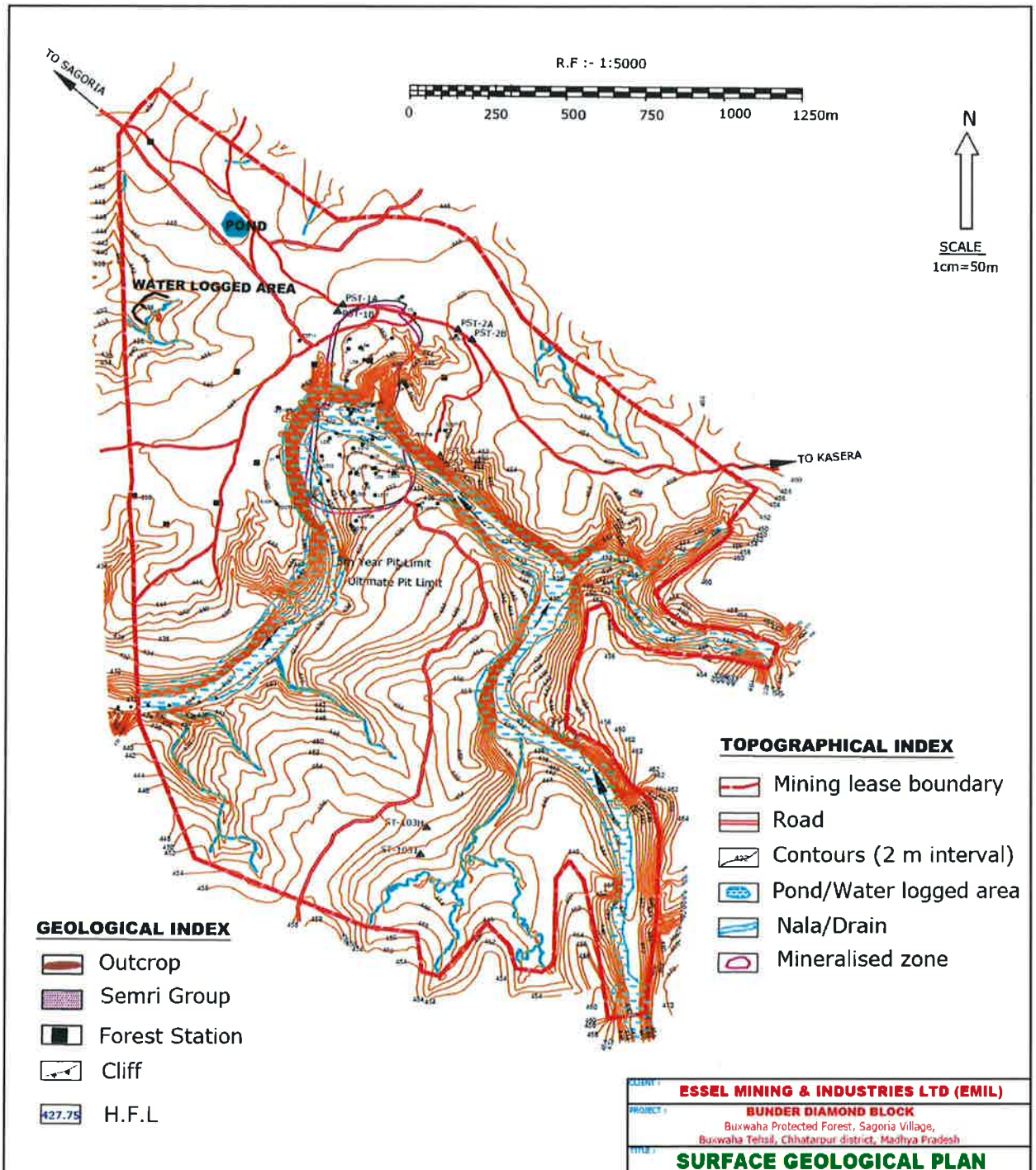
Sr. No.	Type of Land use	Area at the end of Mine Life (Ha)
1	Mined out area	66.00
2	OB & waste dump*	86.04
3	Soil Dump*	12.00
4	Crushing & Processing Plant	10.00
5	Tailing Dump*	50.24
6	Water reservoir and spillway	72.40
7	Infrastructure	14.00
8	7.5 m Safety boundary zone along lease boundary*	7.84
9	Mine road and drains	10.00
10	Green Belts*	3.80
11	Area required for Road diversion	5.00
12	Intermediate areas (100M barrier around mine pit)*	26.68
		364.00

*** Area proposed to be covered by plantation (186.60 Ha)**

Topography (along with map)

The topography of the area is undulated with RL ranging from 466m to 408m **Fig - 6** shows the surface plan of mining lease area.

FIG - 6: SURFACE PLAN



- iii. Existing land use pattern (agriculture, non-agriculture, forest, water bodies (including area under CRZ), shortest distances from the periphery of the project to periphery of the forests, national park, wild life sanctuary, eco sensitive areas, water bodies (distance from the HFL of the river), CRZ, in case of notified industrial area, a copy of the Gazette notification should be given.**

The total Mining lease area is 364 Ha is forest land.

The drainage of the area follows a dendritic pattern flowing in all directions. A seasonal nalla flows across the proposed lease area from SE to West. This nalla will be diverted

There are no eco-sensitive areas like National Parks, Sanctuaries, Elephant Reserves, Tiger sanctuaries or migratory routes of the fauna within 10 km radius from the boundary of the lease. The nearest National Park/Sanctuary is Panna Tiger Reserve (PTR) with its buffer zone at 19.03 km.

Nearby Settlements from the Mining lease area are :

- Hirdepura – 0.9 km – W
- Sepura – 1.6 km – S
- Sagoria – 0.9 km – NW

Nearest Reserved Forests from the Mining Lease Area

- Buxwaha Protected Forest – Adjacent
- Hirapur Reserved Forest – 3.8 km – WNW
- Birgarh Protected Forest – 7.8 km – SSW
- Khera Protected Forest – 6.8 km – SSW

There are no major industries and mines within 10 km radius.

iv. Existing infrastructure

None within the mining lease.

v. Soil classification

The lease is predominantly covered by soil of between 0.0 m to 2.0 m depth. Over the area the thickness of soil increases to 10-12m. This soil is clayey in texture and is of medium fertility up to a depth of 60cm

vi. Climatic data from secondary sources

The climate of the area is hot in summer and cold in winter. The maximum temperature was 46.2°C. Lowest temperature recorded was 1.1°C. The Relative Humidity varied between 29% to 90%. The 30 year average rainfall is 1291.6 mm with number of rainy days averaging 55.9. The average wind velocities were above 7.0 kmph during all twelve months and it exceeds 10 kmph during June to August.

The wind direction was predominantly from N, NE, NW, S and SW during eight months except from June to September, during which it was predominantly from S, SW and NW.

vii. Social infrastructure available

Almost all villages have a Primary School. The Secondary Schools are there in Buxwaha. With virtually no public transport in the area, it is more difficult for students from villages to reach Buxwaha for education. There is only one Public Health Centre in Buxwaha. Thus most of the villagers are dependent on indigenous medical practitioners for treatment.

The facilities like banking, PDS shop, drinking water etc. are not available to most of the village population.

CHAPTER – 5
PLANINIG BRIEF

5.0 Planning Brief

i. Planning concept (type of industries, facilities, transportation etc.) Town and country planning / development authority classification

The proposed 364 ha lease area is located in Forest area of Buxwaha Protected Forests. The Kimberlite (also known as Lamproite) ore Mining is proposed at 5.00 Million Tonnes Per Annum (MTPA) with Kimberlite Ore processing plant capacity of 5.00 MTPA. The total excavation for 5.00 MTPA of Kimberlite Ore Production (Diamond Bearing Ore) is With Total Excavation of 25.04 MTPA (5.00 MTPA of Kimberlite Ore + 3.70 MTPA of Soil and colluvium + 16.34 MTPA of Overburden Waste).

The estimated recovered Diamonds from 53.70 million tonnes ore material will be approximately 34.20 million carats. It is proposed to produce about 10 mt. Kimberlite ore during the first five years and the remaining 43.7 mt of reserves will be worked for the additional period. With this, life of the mine is estimated at 14 years.

ii. Population projection

The mine will be a first major project in an area, where there is not even medium scale industry. The mine will create employment for 400 persons (Direct + Indirect).

iii. Land use planning (breakup along with greenbelt etc.)

The post mining land use pattern is furnished in the following table based on the anticipated excavation of total ore reserves.

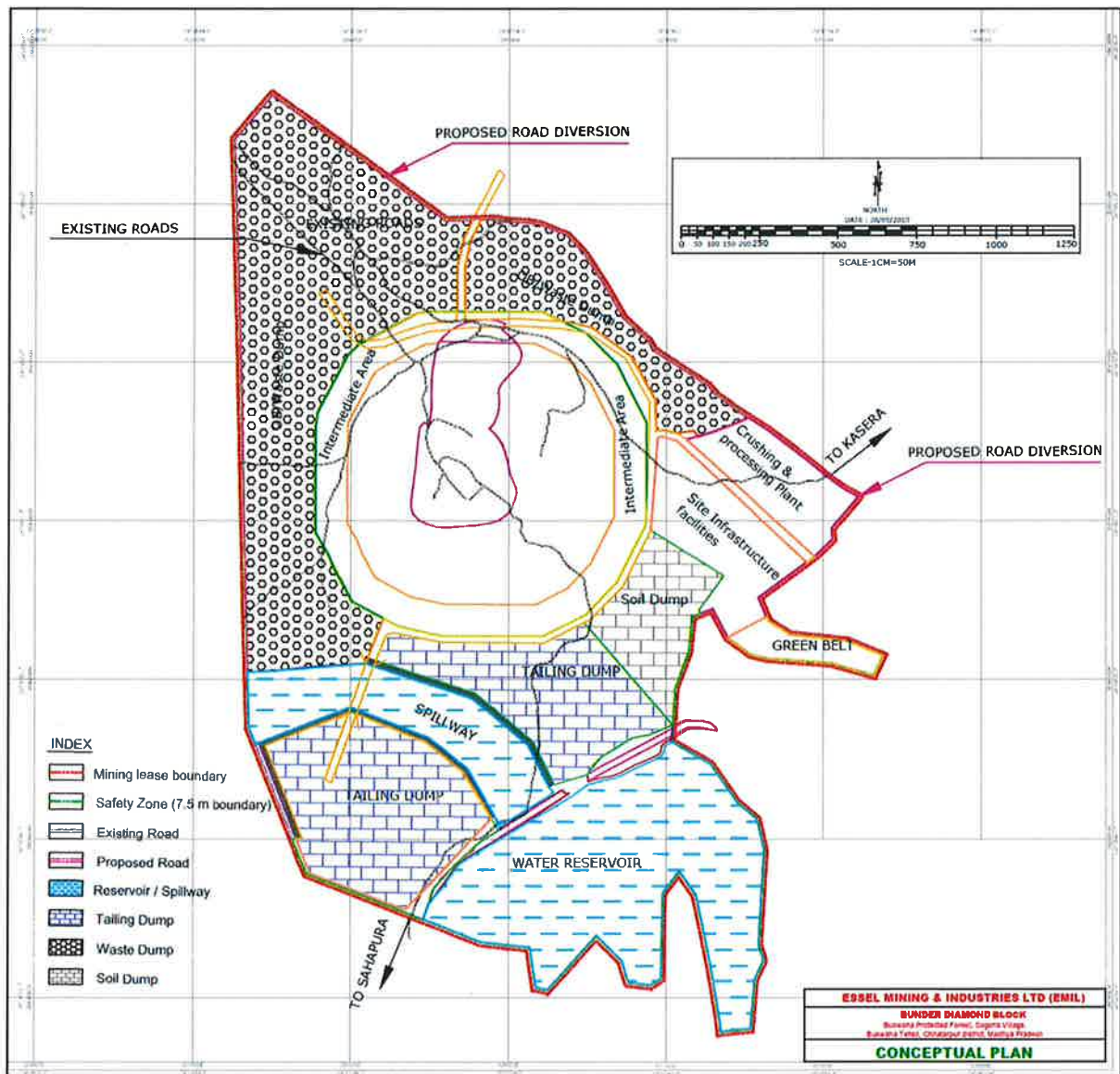
POST MINING LANDUSE AND RECLAMATION AREA (HA)		
Sr. No.	Type of Land use	Area at the end of Mine Life (Ha)
1	Mined out area	66.00
2	OB & waste dump*	86.04
3	Soil Dump*	12.00
4	Crushing & Processing Plant	10.00
5	Tailing Dump*	50.24
6	Water reservoir and spillway	72.40
7	Infrastructure	14.00
8	7.5 m Safety boundary zone along lease boundary*	7.84
9	Mine road and drains	10.00
10	Green Belts*	3.80
11	Area required for Road diversion	5.00

Sr. No.	Type of Land use	Area at the end of Mine Life (Ha)
12	Intermediate areas (100M barrier around mine pit)*	26.68
		364.00

* Area proposed to be covered by plantation (186.60 Ha)

Fig - 7 shows the tentative landuse pattern of the Mining Lease Area in Conceptual Stage

FIG - 7 - CONCEPTUAL LANDUSE PATTERN



DIVERSION OF THE SEASONAL STREAM

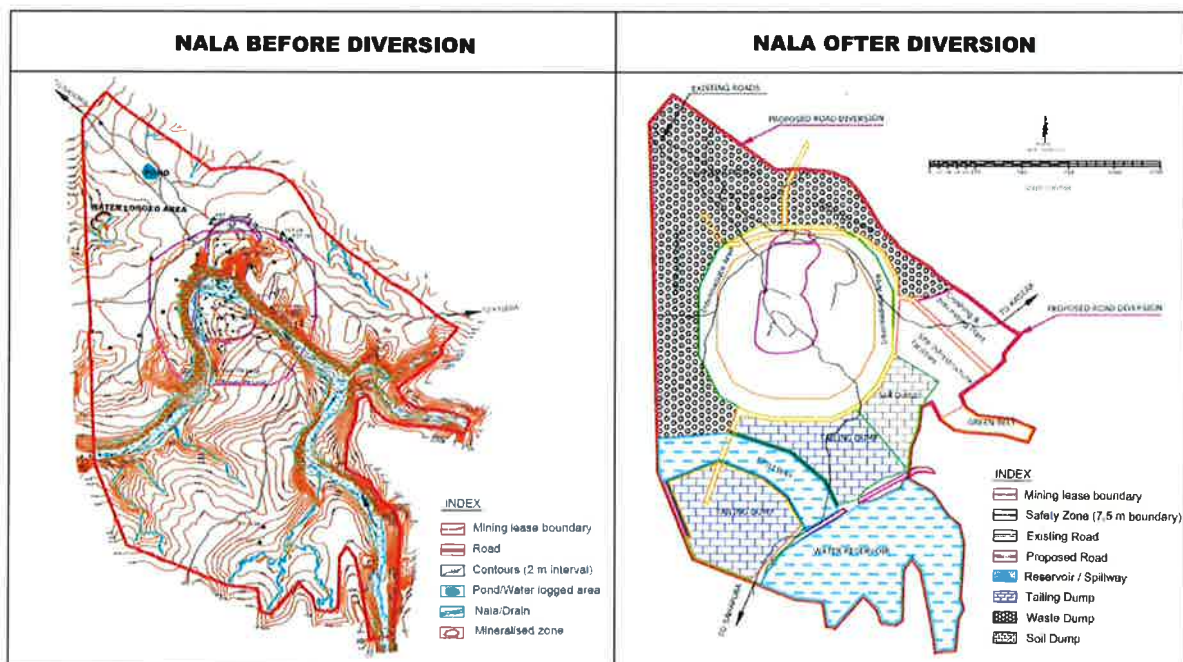
The preliminary hydrological study of Bunder Nala micro-basin of Dhasan basin have studied with a view to diversion of nala for mining purpose

The study suggested that area have potential to hold maximum of 16 MCM water at diversion point.

The model study suggests that there may be three different events of rainfall that may occur in a single day. Consequently, peak runoff generation over catchment area, of diversion in a single day under different models, is estimated.

The IMD data of Chhatarpur Station has been considered for the study and it may be recorded that maximum rainfall in 24 hours recorded on 20.10.1964 is 230 mm. Similarly, peak flow is to be predicted for the watershed area of the proposed streamlet to be channelized. The diversion has been proposed on local Nala in mining lease area. The area covered by part of watershed channel of mine at 66.5 km². The peak flow generation will be 15.29 million m³/day.

Considering all existing hydro meteorological, hydrological and drainage analysis data coupled with local hydrogeological studies, it is suggested for safety factor that a channel capable to carry a flow of **221m³/sec**, can carry the required peak runoff without any water logging and blockage. Detailed studies will be undertaken.



The diversion of local nala will not have any negative hydrological impact for the surface runoff in respect of competing users as long as there is free flow from system. The construction of dam will conserve the entire water resource for optimum utilization otherwise the maximum water resource would have been flowed out of the system. The ground water level of nearby reservoir will rise near to surface level. The competing users will be benefited from this. The overflow from the reservoir will be conserved into ground water by artificial recharge. Thus, the hydrological impact of nala diversion and construction of reservoir will be positive in respect of conservation of natural resource and their proper utilizations during the non monsoon period.

iv. Assessment of infrastructure demand (physical & social)

The mine will be a first major project in an area, where there is not even medium scale industry. The mine will create employment for 400 persons (Direct + Indirect).

Apart from the jobs, the company will provide medical and educational facilities to the employees which can also be availed by the people around the plant. Adequate recreational facilities for the staff of the company will be provided.

v. Amenities / Facilities.

The mine office with first aid room, rest shelters, toilets, tool/store room etc., will be provided as per mining rules.

CHAPTER – 6

PROPOSED INFRASTRUCTURE

6.0 Proposed infrastructure

i. Industrial area (processing area)

The major services proposed at MLA are:

- ❖ Mine Office
- ❖ Water supply
- ❖ H. T. Electric substation
- ❖ Workshop
- ❖ Stores and Ware houses
- ❖ High Speed Diesel (HSD) storage
- ❖ Explosive Magazine
- ❖ Statutory facilities – first aid room and ambulances, Canteen, rest shelters, Vocational Training Centre etc.
- ❖ Laboratory
- ❖ Weigh Bridge
- ❖ ETP / STP
- ❖ Parking Area

The Mine office building will be constructed within mining lease area at surface near the mine pit to house the offices of the mine manager and other unit heads.

The water requirement for the mine and ore processing plant is estimated to be about 16050 m³/day (5.9 Million Cubic Meters/year).

A seasonal nala located on mineralized area will be diverted by constructing dam. With the intent to keep the mine pit from surface water inundation and in turn, to keep workmen safe, construction of the embankment on the diverted stream is proposed. Required water is sourced from the reservoir formed on the upstream of the dam

The storage of water in the reservoir is estimated to be about 17.00 MCM. For tapping 16050 m³/day from this water reservoir, permission will be obtained from the Ministry of Water Resource, Government of Madhya Pradesh.

The peak demand of electric power is estimated at 22 - 25 MW. EMIL will Approach Madhya Pradesh State Electricity Board for tapping the required electric power from suitable source after ascertaining the feasibility.

In the event of insufficient/ reliability of power from MPSEB, provision of DG sets of 2 X 500 kVA capacity is proposed for emergency.

A workshop, adequately equipped with facilities to enable repairs and maintenance of heavy earth moving machinery such as high capacity hydraulic shovels, matching capacity dumpers, large diameter blast hole drills etc are proposed.

In the workshop, ancillary facilities such as electrical welding, gas welding, tube vulcaniser, tyre changers, tyre inflating equipment, lubricating pumps, battery charging units, etc. will also be provided, for day to day maintenance.

For Fuel and Lubricants, an oil marketing company to install its own oil depot near this mine will be explored.

All the required statutory facilities such as vocational training centre, canteen, rest shelters, first aid room, ambulances, crèche, etc will be provided.

It is proposed to provide a laboratory with facilities to monitor air quality, water quality, noise levels and blasting vibration measurement.

A canteen will be provided at the office building complex and will have well equipped kitchen with gas stoves, steam cooker, a store room, and a lunch / dining room with separate washing place.

Other facilities such as fire fighting, security, air conditioning, computer and information technology services etc. will also be provided for smooth functioning of the mine work.

Rest shelters and blasting shelters will be provided as per statutory requirements. All field supervisory staff will be provided with first aid boxes. A properly equipped vocational training centre will also be provided.

Method of mining is mechanized opencast for Kimberlite ore mining. Ore processing involves: Primary Crushing, Secondary Crushing, Dry Screening, Tertiary Crushing, Wet Screening, Degriting, Dense Media Separation and final Recovery.

ii. Residential area (non-processing area)

No residential area is proposed at mine.

iii. Greenbelt.

7.84 Ha area will be developed under greenbelt in 7.5 m barrier zone at the mine periphery. Conceptually about 186.60 Ha will come greenbelt in the following areas

- OB & waste dump*-86.04 Ha
- Soil Dump*-12.00 Ha
- Tailing Dump*-50.24 Ha
- 7.5 m Safety boundary zone along lease boundary*-7.84 Ha
- Green Belts*-3.80 Ha
- Intermediate areas (100M barrier around mine pit)*-26.68 Ha

iv. Social infrastructure

The mining activity carried out in the area rather has a positive socio-economic impact upon the nearby human settlement as indirect employment potential will be created due to mining and allied activities in the area. Apart from these, the company promotes health and education awareness in the area time to time by organizing health and education camps.

The area has virtually no industries except a few small ones at Buxwaha. The area also had very few communication facilities until about a decade ago.

Except at Bakswaha town, more than 90% population of the area was dependent on agriculture. Because the minimum needs of the population were not fulfilled due to uncertain rainfall, some of the population was dependent on collection of Non Timber Forest Produce (NTFP) for livelihood.

v. Connectivity (traffic and transportation road/ rail/ metro/ water ways etc.,)

Nearest railway head is Damoh on the line connecting Sagar – Chhatarpur is at 55.0 km. Chhatarpur is major town at 70.0 km in NNE direction.

The National Highway (NH-86) connecting Sagar – Chhatarpur is located at about 7.0 km in WNW direction. The nearest railway station is Damoh which is at 55.0 km.

vi. Drinking water management (source & supply of water)

The overall water consumption of the mine and ore processing plant is estimated to be about 16050 m³/day. The breakup of water balance is given below.

WATER BALANCE (m³/day)

	Requirement	Loss	Waste water
Ore processing plant – makeup water	15000	15000	0
Dust suppression	900	900	0
Workshop/Vehicle wash	100	10	90
Green belt development	30	30	0
Drinking water and water for civil use	20	4	16
Total	16050	15944	106

vii. Sewerage system

The wastewater generated from the domestic front will be treated in sewage treatment plant.

viii. Industrial waste management

Wastewater generation from the workshop is about 90 m³/day and this wastewater containing oil and grease is treated for oil removal.

The effluent generated from workshop is passed through oil separator and sand filter constructed at mines workshop. Treated water is used for plantation.

ix. Solid waste management.

The solid waste generation from the mine is given below

- Ore Mining - Top Soil
- Rocks of side walls of Kimberlite
- Ore processing plant - Ore Reject

SOLID WASTE GENERATION FROM THE PROJECT

		<u>Quantity</u>
Ore Mining	Top Soil & colluvium	4.029 million tonnes
	Over burden	118.76 million tonnes
Ore processing plant	Ore Reject/Tailings	53.16 million tonnes

Details of handling and disposal of each of the above waste along with protection measures are given below:

SOIL GENERATION, HANDLING AND DISPOSAL

Soil Thickness	0.0 -12.0 m
Soil Generation	2.12 million m ³ (4.029 million tonnes)
Nature of soil	Clayey in texture and is of medium fertility up to a depth of 60cm.
Soil Handling	This material (top 60cm) will be selectively scraped with bulldozers to form top soil heaps. heaps will then be loaded by front end loaders into dumpers and transported to the area identified for Top Soil dumping Soil will also be loaded and hauled by shovel-dumper combination where the soil is thicker.
Disposal	12.00 Ha of the area is earmarked for dumping of soil The available soil will not be fully utilized in two years. Only a part of soil will be utilised for plantation in the 7.5 meters wide area left under the Metalliferous Mines Regulations, 1961. The remaining material will be biologically preserved by planting grasses and legumes. They will also help in blinding the soil and minimise wash off during rains. Remnant soil will be used for plantation of the reclaimed overburden waste dumps
Protection measures	Soil dumps will be surrounded by a garland drain of 1m x 1m size. It will arrest soil wash offs. Before the onset of each monsoon, the garland drains will be cleaned to remove the soil wash off.

OVERBURDEN HANDLING & DISPOSAL

Waste generation, handling and disposal are given in the below table

WASTE GENERATION, HANDLING AND DISPOSAL

Waste Generation	44.5 million m ³ (118.76 million tonnes)
Occurrence	Overburden/Side burden
Nature	Sandstone, Conglomerate, Quartzite, Pegmatite, Dolomite, Shale etc.
Handling of waste	Hard overburden / side burden will be drilled, blasted and loaded into dumpers and transported to the waste dumps
Area earmarked for waste dump	86.04 Ha
Disposal	The waste rocks will be dumped from the proposed outer most boundary of the dump site towards the centre. Sand stone, Dolomite and Shale waste rocks will be separately dumped in such a way that, shale dump can be covered by the Sand stone and Dolomite. The waste material will be dumped in terraces 10 m in height. The terrace floors will be sloped at 2% in bye towards high walls for drainage of rain runoff on waste dump. It is anticipated that the hard waste rock dump will have three lifts terraces. In addition a top layer of 0.5m thick top soil on outer slopes of terraces and on the top of third / last terrace will be spread.
Protection	A retaining wall of 2.5m X 2.0 m size will be constructed five

measures	<p>meters from the toe of the dump. A garland drain measuring 1.5m x 1.0 m will be constructed outside the retaining wall. Rain water flowing down the slope of the dump will be arrested by the retaining wall and garland drain. Only clean water will be allowed to join natural water courses.</p> <p>Prior to the onset of the monsoon season, the garland drains will be cleared of arrested wash off and the retaining wall maintained to enable them to arrest rain wash off during the wet season.</p>
Reclamation	Once the first waste dump terrace is fully formed and the second terrace is under construction, remediation / reclamation of the dump can begin. This will involve planting of local species in collaboration with the local forest department.

ORE REJECT HANDLING AND DISPOSAL

The details of ore reject generation from the plant along with handling and disposal is given below

REJECTS GENERATION FROM PROCESSING PLANT (Quantities in Million Tonne)

Reject generation	53.16 million tonnes			
Rejects generation	Type	Nature	Transport Mode	Disposal
	31.9 - CPK	60% of these are expected to be Coarse Processed Kimberlite (CPK) (-) 6 mm to 1 mm, grits 1.0 mm + 0.1mm < 5 % Moisture	The CPK and grits will be disposed off as solids by dumpers.	CPK will be disposed off to overburden and waste dump.
	21.26 - FPK	40% Fine Processed Kimberlite (FPK) slurry form consisting of 30% to 55% solids	The FPK will be disposed off as solids by dumpers.	Transported to tailing thickener followed by dewatering in filter press for disposal to tailing dump using pay loader and trucks
Total Rejects Generation	53.16			

TAILINGS

60% of these are expected to be Coarse Processed Kimberlite (CPK) (-) 6 mm to 1 mm, grits 1.0 mm + 0.1mm and rest will be Fine Processed Kimberlite (FPK). The CPK and grits will be disposed off as solids by dumpers to tailing dump.

The quantities of tailings is estimated at 31.9 Mt of CPK plus grits and 21.26 Mt of FPK. CPK will be mostly utilized for construction of embankment of tailing pond and balance, if any, disposed off to overburden and waste dump.

The CPK will have less than 5% moisture while FPK will be in slurry form consisting of 30% to 55% solids and will be subjected to dewatering in thickener followed by filter press . Dewatered tailings will be disposed to designated tailings dump area.

TAILING DUMP AREA

The area chosen for tailing dump is spread over 50.24 ha.

x. Power requirement & supply / source.

The peak demand of electric power is estimated at 22 - 25 MW. EMIL will approach Madhya Pradesh State Electricity Board for tapping the required electric power from suitable source after ascertaining the feasibility.

In the event of insufficient/ reliability of power from MPSEB, provision of DG sets of 2 X 500 kVA capacity is proposed for emergency power.

CHAPTER - 7
REHABILITATION AND RESETTLEMENT (R & R) PLAN

7.0 Rehabilitation and resettlement (R & R) Plan

- i. Policy to be adopted (central / state) in respect of the project affected persons including home oustees, land oustees and landless labourers (a brief out line to be given).**

The entire 364 ha lease area is located in Protected Forests. There are neither any villages, nor a hut within the proposed 364 ha of lease area. The two nearest villages namely Sagoria and Hirdepura are about one km from the lease boundary. Thus no one loses land or household due to grant of lease. Hence, question of rehabilitation and resettlement is not applicable to this project.

CHAPTER – 8
PROJECT SCHEDULE & COST ESTIMATES

8.0 Project schedule & Cost Estimates

- i. Likely date of start of construction and likely date of completion (time schedule for the project to be given).**

Mining lease will be operated after getting EC, FC & CTO and all other regulatory clearances. Life of the mine will be about 14 years.

- ii. Estimated project cost along with analysis in terms of economic viability of the project.**

The estimated project cost is about Rs. 2500 crores

CHAPTER – 9
ANALYSIS OF PROPOSAL (FINAL RECOMMENDATIONS)

9.0 Analysis of proposal (Final Recommendations)

- i. Financial and social benefits with special emphasis on the benefit to the local people including tribal population, if any, in the area.**

EMIL is committed to development of the surrounding area. A need based study will be carried out to list the activities. Based on the public hearing demands and need based activities, CER budget will be allotted for taking up various social welfare activities

**Government of Madhya Pradesh
Mineral Resources Department
Mantralaya**

:: Letter of Intent ::

No. - F 3-26/2019/12/1

Bhopal, Date:- 19/12/2019

To,

✓ **Essel Mining & Industries Ltd.,
Aditya Birla Centre,
'B' Wing, 4th Floor,
S. K. Ahire Marg,
Mumbai, (Maharashtra) - 400030.**

Sub: Letter of Intent with reference to e-auction dated December 11, 2019 for grant of a Mining Lease for Bunder Diamond Block for Diamond in Sagoria Village, Buxwaha Tehsil, Chattarpur District on 364.00 Hectare Area of Survey of India Toposheet No. 54P/7.

1. Background:

1.1. The Directorate of Geology and Mining (DGM), Government of Madhya Pradesh, pursuant to the Mines and Minerals (Development and Regulation) Act, 1957 (the "Act") and the Mineral (Auction) Rules, 2015 as amended from time to time (the "Auction Rules"), issued the notice inviting tender dated July 05, 2019 to commence the auction process for grant of Mining Lease for Diamond located in Chattarpur District of Madhya Pradesh. The e-auction process was conducted in accordance with the tender document for the said mineral block and Essel Mining & Industries Ltd. was declared as the 'Preferred Bidder' under Rule 9(4)(b)(iii) of the Auction Rules.

1.2. As required under Rule 10(1) of the Auction Rules and the tender document for the said mineral block, Essel Mining & Industries Ltd. has made payment of the first installment, being 10% (ten percent) of the upfront payment of Rs. Rs. 27, 52, 48, 440 (Rupees Twenty Seven Crore Fifty Two Lakhs Forty Eight Thousand Four Hundred Forty only) through RTGS (with UTRN: HDFCR52019121359372005) dated December 13, 2019 which was received on December 13, 2019.

2. Grant of Letter of Intent

2.1. Accordingly, pursuant to Rule 10(2) of the Auction Rules, the Government of Madhya Pradesh is issuing this Letter of Intent for grant of Mining Lease for Bunder Diamond Block for Diamond in Sagoria Village, Buxwaha Tehsil, Chattarpur District on 364.00 Hectare Area of

Survey of India Toposheet No. 54P/7 to Essel Mining & Industries Ltd.
for a period of 50 years.

3. Conditions

- 3.1. This Letter of Intent and the subsequent grant of aforementioned Mining Lease shall be subject to the provisions of the Act and the Rules made there under, as amended from time to time, and the Essel Mining & Industries Ltd. shall be designated as the 'successful bidder' and subsequently granted the Mining Lease only upon satisfactory completion of all the requirements under the Act and the Rules made there under.
- 3.2. This Letter of Intent shall be valid only if Essel Mining & Industries Ltd. ensures that the Bid Security is valid until the Performance Security is furnished to the Government of Madhya Pradesh, failing which this Letter of Intent shall become invalid from the date of expiry of the Bid Security.
- 3.3. For reference, the requirements under the Auction Rules for designation of Essel Mining & Industries Ltd. as the 'successful bidder' and subsequent grant of the Mining Lease are reiterated below under para 3.3(a), (b) and (c). It is clarified that the requirements mentioned below under para 3.3(a), (b) and (c) are only for reference and in the event of any change in the Act or the Rules made thereunder, the requirements under the modified Act or the Rules made thereunder, as the case may be, shall be applicable.

(a) Designation as the "Successful Bidder":

Essel Mining & Industries Ltd. shall be considered to be the 'successful bidder' upon:

- (i) continuing to be in compliance with all the terms and conditions of eligibility;
- (ii) payment of the second installment being 10% (ten percent) of the upfront payment;
- (iii) furnishing performance security of Rs. 275,24,84,400 (Rupees Two Hundred and Seventy Five Crore Twenty Four Lakh Eighty Four Thousand Four Hundred) ;



- (iv) satisfying the conditions specified in clause (b) of sub-section (2) of section 5 of the Act with respect to a mining plan; and
- (v) Complying with the special condition for Bunder Diamond Block as approved by the Ministry of Mines, Government of India vide their letter no 7/46/2015-M.IB which is reproduced below:

म0प्र0 शासन द्वारा गठित अंतर्विभागीय समिति के निर्णय -

1. खदान से खनन होने वाले समस्त हीरा खनिज को नियमानुसार विभाग द्वारा प्रथम दृष्टया आंकलन कर प्रारंभिक एवं अनुमानित मूल्य वर्तमान प्रक्रिया अनुसार हीरा विशेषज्ञ के माध्यम से घोषित किया जाएगा।
2. खननकर्ता लीजधारी कंपनी द्वारा समस्त हीरा खनिज की प्रथम बार नीलामी मध्यप्रदेश में ही की जायेगी। इस हेतु लीजधारी द्वारा आरक्षित मूल्य निर्धारित किया जाएगा जो शासकीय खनिज (हीरा) विशेषज्ञ द्वारा निर्धारित मूल्य से कम नहीं होगा।

नीलामी सफल होने पर वास्तविक बिक्री मूल्य के आधार पर राज्य को रॉयल्टी प्राप्त होगी।

नीलामी असफल होने पर खननकर्ता लीजधारी कंपनी द्वारा निर्धारित आरक्षित मूल्य (जो शासकीय मूल्यांकनकर्ता द्वारा निर्धारित मूल्य से कम नहीं होगा) के आधार पर राज्य शासन को अंतरिम रॉयल्टी प्रदान की जाएगी। इसके पश्चात हीरा खनिज को निर्यात या बिक्री या मूल्य संवर्धन के लिए स्वतंत्र रूप से ले जा सकता है, लीजधारी को हीरा खनिज की बिक्री के 02 माह के अंदर राज्य शासन को उक्ताशय की सूचना देना अनिवार्य है। अंतिम रॉयल्टी का निर्धारण वास्तविक बिक्री मूल्य (जो कंपनी द्वारा सूचित किया गया हो) अथवा प्रथम बार नीलामी के समय निर्धारित किया गया, आरक्षित मूल्य दोनों में से जो भी अधिक हो, के आधार पर निर्धारित किया जाएगा।



(b) Signing of the Mine Development and Production Agreement

Essel Mining & Industries Ltd. shall sign the Mine Development and Production Agreement with the Government of Madhya Pradesh upon obtaining all consents, approvals, permits, no-objections and the like as may be required under applicable laws for commencement of mining operations.

(c) Grant of Mining Lease

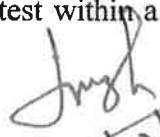
Subsequent to signing of the Mine Development and Production Agreement, Essel Mining & Industries Ltd. shall make payment of the third installment being 80% (eighty percent) of the upfront payment and thereafter the Government of Madhya Pradesh shall grant the aforementioned Mining Lease.

4. Validity

- 4.1. This letter of intent is valid for a period of 3 (three) years from the date of its issuance, within which time all the above conditions must be fulfilled and the Mining Lease deed must be executed between the Essel Mining & Industries Ltd. and the Government of Madhya Pradesh. In case there is a delay in execution of Mining Lease deed due to reasons beyond the control of the Preferred Bidder, then it may submit an application to Government of Madhya Pradesh, requesting for further extension

If the Government of Madhya Pradesh is satisfied that there is a delay in execution of Mining Lease deed due to reasons beyond the control of the Preferred Bidder longer period is required to enable the Preferred Bidder to satisfy all or any of the above conditions, then it may extend the validity of this letter of intent for such period or periods as the Government of Madhya Pradesh may specify. Provided that: (a) this letter of intent shall be extended for a maximum period of 2 years; and (b) the total period for which this letter of intent would remain valid must not exceed 5 (five) years from the date of issuance.

Kindly return the duplicate copy of this Letter of Intent duly signed by authorized signatory of the Company and furnish a suitable Board Resolution in token of having accepted the above terms and conditions. The accepted copy of Letter of Intent along with Board resolution should be submitted latest within a period of one (1) month from the date of receipt of this Letter of Intent.


19/12/19

(Prakash Pandre)

Under Secretary

**Government of Madhya Pradesh
Mineral Resources Department**

Endt. No. - F 3-26/2019/12/1

Bhopal, Date:- 19/12/2019

Copy to:

1. Secretary, Government of India, Ministry of Mines, Shastri Bhavan, New Delhi.
2. Additional Chief Secretary, Govt. of M.P., Forest Department, Mantralaya, Bhopal.
3. Chief Controller of Mines, Indian Bureau of Mines, Indira Bhavan Seminiari Hills, Nagpur.
4. Director, Geology and Mining (M.P.) Bhopal.
5. District Collector, District Chhatarpur, (M.P.).
6. Regional Head, Geology and Mining, Regional Office, Jabalpur (M.P.)
7. District Forest Officer, District Satna, (M.P.).

For information and necessary action please.

8. Guard File.

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**Under Secretary
Government of Madhya Pradesh
Mineral Resources Department**