GEOLOGICAL REPORT ON EXPLORATION OF DIAMONDS BUNDER PROJECT AREA AT VILLAGE SAGORIA,TEHSIL BAKSHWAHA,DISTRICT CHHATARPUR,MADHYA PRADESH (AREA 364 HECT OUT OF 954 HECT)



RECAST BY DIRECTORATE OF GEOLOGY AND MINING MADHYA PRADESH,BHOPAL

FROM PROSPECTING REPORT

SUBMITTED BY M/s RIO-TINTO EXPLORATION INDIA,PVT.LTD. 2006-2011 May 2017

DISCLAIMER

Government of Madhya Pradesh, in the year 2006, has granted Prospecting License for a period of 3 years with further extension of 2 years in favour of M/s Rio-Tinto Pvt. Ltd. over an area of 25 km² for exploration of diamonds in Bakshwaha tehsil district Chhatarpur. The PL period expired in 2011. The Inprinciple sanction had been given by the state for grant of Mining Lease over an area of 954 hectare in forest land after RTEI submitted PL report. IBM has conditionally approved the Mine Plan,over an area of 954 hectare in favour of RTEI,the approval was subject to condition that RTEI shall carry-out detailed Exploration at Angiras and submit the revised scheme within a period of first five years, RTEI in absence of Environmental Clearance from MoEF,decided to relinquish the area in the mean time.

The enactment of Mineral(Auction)Rules 2015 and MEMC Rules 2015 has resulted in deciding the issue that the Atri block shall be e-auctioned as M.L.(G-2 Level).However the Angiras shall be put for detailed exploration at G-2 level through NMET Fund,by outsourcing agency.The committee constituted for deciding matters has accorded approval on dt.22.04.2017 to state D.G.M. to recast geological report out of prospecting report of RTEI and Mining Plan Approved by IBM.The recast GR shall be submitted before aforesaid committee for perusal and taking appropriate decision by the state govt. Any matter arising out of recast GR shall be subject to PL report of RTEI regarding exploration of diamonds in Bakshwaha tehsil district Chhatarpur and thereafter information/data synthesized in Mining Plan, the DGM/ state govt. shall not be held liable or responsible for any such dispute/claim regarding the same

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ABSTRACT

This report summarizes the work completed by Rio Tinto Exploration India Private Limited within Bunder Prospecting License during the period of September 2006 and September 2011. The PL was executed on 6th September 2006 for a period of 3 years. A PL renewal application was submitted for a period of an additional 2 years and granted to enable additional prospecting work within the prospecting License area. With the PL renewal grant received on 29 December 2009 and executed on 25th February 2010. Soon after the drill rigs were mobilized for additional drilling on the already approved locations. The drilling on the already approved locations started on 13th March 2010. This drilling on the already approved locations continued upto April 2011, when the approved locations for drilling were exhausted, causing the drilling to stop.

Permission for additional drilling on 143 locations, applied early in 2010 with the Forest Department, was received in June 2011 leading the resumption of the drilling program which was finally culminated on 5th September 2011, when the Prospecting License has expired. All the drilling and field activities ended on 5th September 2011 with all the drilling equipments removed from the PL area. Meanwhile, the activity of sample processing in the DMS plant was taken up during this period

The area is bounded between N Lat Lat24°18′28.794″to N Lat24°20′04.981″andELong79°16′56.818″toE

long79°18′04.343″ forming part of toposheet number 54P/7 of SOI covering an area of 364 hectare out of 954 hectare within forest land .The area is located within the Chhatarpur District, Madhya Pradesh, India. Chhatarpur the administrative capital of the district by the same name is located approximately 500km southeast of New Delhi and 225 km northeast of the state capital Bhopal. Primary road access is via National Highway 72 connecting Chhatarpur to Sagar. The highway is in good condition and generally drivable between 50 and 80 km per hour. The Bunder project is located the village of

Nimani, approximately 20 km southeast of the Daruwan/ National highway junction on a road connecting to Bijna and Bakshwaha. Access to the kimberlites can be made by driving WSW along unmetalled road and series of road and series of trails from Jagara, a small village on the Bakshwaha-Bajna road.the basal unit comprises of Bundelkhand gneisses which in turn are overlain by Bijawar and Vindhyan Super Group of rocks. Vindhyan sediments particularly sandstone and shale and limestone of kaimur's host the kimberlite and is known to be the key bed horizon in the prospect area.

The Prospecting work conducted within the tenure of the Prospecting license include dominantly drilling and bulk sampling from pits at approved locations which was conducted in multiple phases since September 2006 from the grant of the Prospecting license. The drilling was conducted for the following purposes, undertaking the grade, volume delineation of the ore body, Geotechnical studies, testing of kimberlite targets and sterilization of the infrastructure within the PL area. The bulk samples were collected to get an understanding of the value of the deposit. The bulk samples collected from the pits and the samples collected from the bore holes were processed at the processing plant earlier in Bangalore and later at the project site after establishing the plant in 2009.All the prospecting work has ended on 5th September 2011.Totel of 9 trenches at six locations were laid down with a bulk sample off 36000.85 tonnes of kimberlite extracted from trenches which have yielded 1876.43 carats of Diamond recovery. In view of the exploration schedule, total of 95 numbers of bore holes in the area were drilled with total materages of the order of 24708 m drilling. The drilling was designed to assess the diamond incidence of kimberlite ore body vis-à-vis to delineate the geometry of the pipe.Out of 95 bore holes 60 number of bore holes were of HQ/NQ size, 23 number of bore holes were of 8 inch large dia size and rest 12 number of bore holes were of PQ size. The 60 number of bore holes were drilled for the purpose of volume delineation and rest 23, 12 bore holes were aimed at for grade estimation of the kimberlite ore body.

Total resources upto depth of 345 / 350 m ($100\ m$ RL) are 53.70 Mt as under:

South Atri41.56 Mt @ 0.78 ct / tNorth Atri12.14 Mt @ 0.13 ct / tThese are classified as under:

Proved- upto 200 mRL - 36.46 Mt UNFC Classification 111

Probable from 200 mRL to 100 mRL -17.24 Mt UNFC Classification 122

As on date MEMC rules 2015 has been enacted by GOI, as per MEMC rules 2015, based on exploration work the estimated resources of Atri block has been ascertained to be of the order G-2 category and has been enumerated above and deserves for auction as M.L.

1. INTRODUCTION

This report summarizes the work completed by Rio Tinto Exploration India Private Limited (RTEIPL) within Bunder Prospecting license (PL) during the period beginning September 2006 till 5th September 2011. Work during this period includes drilling for grade, delineation, target testing, geotechnical studies, ground sterilization and bulk sampling from approved locations. All the work was conducted in phases since the beginning. The other work outside the Prospecting license area, conducted at the Bunder Project during the PL period, is the sample processing at the sample processing plant at Bunder Project.

The Bunder PL is located within the Chhatarpur District, Madhya Pradesh, India. Chhatarpur the administrative capital of the district by the same name is located approximately 500km southeast of New Delhi and 225 km northeast of the state capital Bhopal. Primary road access is via National Highway 72 connecting Chhatarpur to Sagar. The highway is in good condition and generally drivable between 50 and 80 km per hour. The Bunder project is located at village of Nimani, approximately 20 km southeast of the Daruwan/ National highway junction on a road connecting to Bijna and Bakshwaha. Access to the kimberlites can be made by driving WSW along un-metalled road and series of road and series of trails from Jagara, a small village on the Bakshwaha -Bajna road.

Mean elevation in the area is 400m above sea level ranging between 350-500 meters. For the most part, topography is gentle and flat with the most of topography being accommodated in moderately steep escarpments defining the margins of gently dipping sedimentary units that define the central and northern parts of the project area. Drainage within the higher topographic level Proterozoic sediments is well developed and active with the Kalidahar and Ken Rivers and their tributaries being the predominant drainage. The creeks and rivers may frequently over flow in monsoons, and most of the water courses flow in the north direction.

The climate in the project area is semi-arid/ monsoonal with hot, frequently exceeding 45°C, and dry summers between April and July and temperature, ~5-35 °C winters from the remainder of the year. Rainfall is typically monsoonal totaling 90 to 120 cm/ annum occurring between middle June- middle September.

The Bunder area is a part of Narmada Valley dry deciduous forests Eco Region. This Region is neither exceptionally species- rich nor high in numbers of endemic species. But it does shelter several large vertebrates, including Asia's

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largest and most charismatic carnivore, the tiger. The forest type is the ecoregion has been classified into four types:

- 5A/C-1-B Southern Tropical dry deciduous Teak forest
- 5A/A-C-3 Southern Tropical dry deciduous Mixed forest
- 5A/E Dhawra Forest
- 5A/E Salai Forest

Most of the forest are open scrub influenced by human activities. In many areas, intensive livestock grazing, fire, and non-timber forest product harvest have converted the habitat to scrub. Most of the eco-region's natural habitat has been cleared or degraded.

Almost all of the forest in the Bunder PL are part of Bakshwaha subdivision of Chhattarpur Forest Division of Madhya Pradesh. The Forest of Bunder Prospect are of dry deciduous type, with Teak, Mixed, Salai and Khair forest. Factors controlling the forest flora include the Geology, soil type and soil organics, topography, and elevation from the mean sea level, slope and slope direction, temperature and humidity.

There are small natural Teak Forests in the Prospect. Teaks have a preference for hilly sectors, particularly in the wind shadow zones. Regeneration is rare due to intensive livestock grazing and fire. Chief climbers are makor and chilati and grasses such as lampa and bhurbhusi are sparsely distributed. Bamboo forest is found on the general slopes, along the creek flanks of the hills where drainage conditions are good.

Most of the forests are mixed in the prospect; live stock grazing is very common. Normally these are of IV-B, IV-A series of forest and are found in patches, with average density from 0.3 to 0.6 and natural regeneration being patchy and not up to the mark. Thorny shrubs are dominant and grasses are rare. The top canopy includes saja, bija, lendia, haldu, dhawra, kusum, tendu, achar, tinsa, papda, amaltas, amla, ghont, dhudi, teak, palas, rawjha, moyan, and salai. The lower canopy includes amla, achar, khair, amaltas and bamboo. Marodphal, dhawda, Baikal, karonda and jharbari (from the under story. Important climbers are bhurbhusi, doob and marvel, among others.

Sallai and Bomboo Forest are less in the Prospect. They grow in adverse conditions, protecting the soil from erosion and creates favorable environment for other species to grow. These are forest of dry and rocky areas with quartz rich (siliceous) regolith. The roots of salai can penetrate into a solid rock mass

Bomboo forest is found with Teak and Mixed forest, appears in small bunches and has been declared protected.

These low density forest are characteristic for the area of maximum soil erosion in the prospect. Trees attain the height of 30m, which are knocked and distorted. The associated species with khair are salai, dhawra, saja, ghont, rewjha, makor, teak.

Wildlife is found in the Bakswaha Forest subdivision. No wildlife sanctuary, tiger reserve or national park exists in the Prospect. The faunal assemblage includes both carnivores and herbivores. Common species are jungle cat, sloth bear, jackal, striped hyena, Indian fox and wild dog. Primates found in the Prospect include common languor and rhesus macaque ungulates include blue bull, found in the most of the forest area. Indian wild boar is fairly common. Rodents found in the Prospect include the common Indian hare, rats and porcupines. Common bird species found in the area are peafowl, brown fish owl, blue rock pigeon, koel, Bengal vulture, common pariah kite, gray quail, and crested hawk eagle. Reptile list includes cobra, and krait.

There are about 20 villages within and around the PL and the total population of the prospect area would be around 8000. Children and Youth (below 18) make up more than 50% of the population. Majorty population is Yadav 's and Lodhi's ~50% (milkman by tradition) followed by scheduled caste that make up 30%. Rajput and Brahmins make up about 10-15% of the population. Muslims are <2% and tribes are about 5%. Density of population approx 135per sq km.

Literacy is poor (54%). Most of the villages have a primary school (up to class 5^{th}). Govt. sponsored free noon meal scheme is common in the schools. Dropout cases are common due to poor health of children in many primary schools.

Generally people are tolerant and social. Elders are respected. Caste factor is deeply entrenched. Man to women sex ratio is 1000:850 (less than national average) People have sentimental attachment to land. Many rear cattle. Human: Cattle ratio is almost 1:1.

Economically, the local community survives on primitive agriculture, collection of (non timber forest produce, NTFP) forest products and contractual labour that are the limited opportunities for the community. Nearly 8% of the community depends on this form of livelihood. The lack of proper irrigation, infertile land and small holdings keep the agriculturists on the verge of

subsistence. A single crop, usually a lentil or soyabean a year is commonly achieved immediately after the monsoons. Thereafter the communities rely on forest produce like Mahua and the Tendu leaves. The Mahua flower is picked in March and April for country liquor, whilst the Mahua seeds are collected in May and June for oil extraction. The Tendu leaves used for manufacture of local cigarettes (Beedi) are collected in Summer. Beedi rolling provides employment to many families. Minor quarries employ a few locals. Barter system is practiced in interior area. Seasonal asset in the family and are given during marriages.

Natal mortality and infant mortality rates are higher than the national average. There are no basic medical facilities in the villages. A health centre located in Bakswaha caters to the medical needs in the Bakswaha Nayab Tehsil. More than 55% infants under 4 years of age are underweight for their age. Seasonal outbreak of diseases and water borne diseases are common. Extreme hot and cold conditions affect the old.

A few environmental and community development NGOs are working in Chattarpur District. Religious NGOs (education and health care) are found in tribal and socially weaker pockets.

Given below the Rio Tinto project assessment process. The progression of study is as follows:

Conceptual \rightarrow Order of Magnitude \rightarrow Pre-Feasibility \rightarrow Feasibility

At the completion of each stage critical decisions are made on whether to progress the project. A decision to not proceed will, in most cases end or halt the project. As a project moves through each stage, the level of detail required to be included in the assessment studies increases, as does the effort and cost of complete.

2. GEOLOGICAL SETTINGS

2.1 Regional setting

Based on the compilation from published 50,000 scale GSI geological maps, the geology of the area is defined by lithologies of the Bundelkhand Craton and overlying Proterozoic sedimentary basins. The oldest rock type includes granitoid gneiss with enclaves of dolerite, gabbro, amphilbolite and quartz reefs. Meta volcano- sedimentary rocks of paleo Proterozoic Bijawar Basin consist of an unstable rift assemblage of clastics, chert, dolomite units and basaltic flows and sills. The Bijawar group of rocks is overlain by Meso to Neo Proterozoic platformal sediments of the Vindhyan Supergroup. These rocks are exposed in the southern most part of the PL area. The Vindhyan Supergroup is thought to have been deposited from about 1400-600 Ma in a down warped zone between the Bundelkhand Craton on the north, and the early-mid Proterozoic mobil belt known as the Son-Narmada-Tapti lineament zone, or "Sonata" lineament to the south. Dates from glauconite in the Semri and Kaimur Groups metasediments suggest an age of 1400 to 900 Ma. The Supergroup consist of a monotonous sequence of sandstone, shale and limestone. There are a number of minor unconformities, disconformities and conglomerate units in the sequence indicating episodic rifting. In the west continental flood basalt (Deccan Traps) of palaeocene age cover the craton and sedimentary rocks of Bijawar and Vindhyan Supergroup. The Bunder West prospect is located within the Meso-Proterozoic Semri and Kaimur group platformal sediments extending into the Palaeo- Proterozoic Bijawar group metasediments to the north. The geology of the Bunder West PL is shown in plan no.3

Historically, in Panna Diamond Belt diamonds are recovered from three sources (i) Majhgawan and Hinota Kimberlite pipes, (ii) Diamondferous conglomerates towards the top of Lower Rewa Sand Stone and base of Jhiri Shales, and (iii) along the Quaternary alluvium of streams draining the diamond belt.

The Panna (Majhgawan) mine is located around 60km to the east north east of the Bunder Project area. The Majhgawan mine is the only hard rock diamond mine in India that produced diamonds from early 19th century until 2007. The mine was ordered closed in 2007 due to environmental concerns as it is within the Panna Tiger Reserve, a Wildlife Conservation Park. Annual production from Majhgawan is estimated to be 70,000 – 80,000 carats from ore grading around 0.1-0.14 carats per tonne (cpt) (Chatterjee, pers comm, 2007). There are

extensive alluvial diamond activities downstream of the Majhgawan mine, which has been the site of similar activities of hundreds of years.

2.2 Project Setting

The Bunder project is located within the Vindhyan sedimentary basin. TheVindhyan basin is an intra-cratonic synclinorium which abuts the Bundelkhand granite to the north and is truncated by the Narmada-Son Lineament in the south (Anand and Rajaran, 2004). The basin comprises sandstone-shale-limestone sequences which outcrop across Uttar Pradesh, Madhya Pradesh and Rajasthan (Soni et al, 1987). The Vindhyan Supergroup of rocks are divided into the Semri, Kaimur, Rewa and Bhander Groups on the basis of lithology.

In the Bunder project area a series of mainly of vent-facies olivine-kimberlite pipes are hosted within sediments of the Kaimur group comprising sandstones and shales. The kimberlite pipes are converted with a variable, through shallow thickness (4.5 to 23.5m) of colluviums comprising dominantly uncemented sandstone cobbles and boulders.

3. EXPLORATION WORK

During the prospecting operation a total 95 number of bore holes were drilled with a total meterage of 24708 mt. Out of these 60 number of volume delineation holes of HQ/NQ were drilled,23(8" LDC grade estimation) boreholes were drilled , and 12 grade estimation bore holes of PQ size were drilled in the prospecting area. Besides this 9 trenche / pits at six locations have been made in the area of interest.

3.1 SURFACE PITTING

A total of 36000.85tonnes of kimberlite samples have been collected which resulted in recovery of 1876.43 carats of Diamonds from nine pits situated at six locations(fig.4). Each individual pit was of $40m^2$ surface area. Samples were collected and separately by lithotype (i.e surface overburden and gravels, highly weathered kimberlite, and relatively fresh kimberlite).

Samples were collected in appropriately rated bulk bags. Bags were designed with a bottom "chute" in order to facilitate unloading of the sample. Bags were

clearly labeled and sealed with drawstrings, steel wires ties, and uniquely numbered chain of custody seals.

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Pits were maped at 1:2000 scale to facilitate interpretation. Pit dimensions were measured at 1m intervals along the pit.

Geological logging and sampling procedures for pits have been internally reviewed by the registered CP Resources for the project and found to be in compliance with project objectives and documented protocols.

Chain of custody records were maintained from the excavation site to the processing facility. Storage of samples was in the secured areas, fenced, under constant supervision and well lit conditions. All staff working within the sample storage area is required to sign a register.

A complete record of samples coming out of forest using appropriate "Forest Transit Permit" was maintained and verified by forest officials. Similarly, samples sent to Bangalore lab were under "Transit Permit" issued by District Mining Officer after necessary physical verification.

The samples collected from the pits are from a maximum depth of 5 m. These provide data on diamond count and approximate indicative value for the stones recovered from the surface only. In order to test the deposit parameters at depth, Large Diameter Core drilling was employed.

3.2 DRILLING

3.2.1 DELINEATION DRILLING

The delineation drilling program is an integral part of the study of an ore deposit, as it is an aimed defining the shape of the ore body to give a tonnage estimate to specific depth below surface.

A total of 14574 m drilling is completed in 60 (NQ/QH core) holes on the B28 kimberlite in the granted PL. These delineation holes were aimed-at to know the geometry of the kimberlites.

3.2.2 GRADE DRILLING

During the PL tenure, 8 inch Large Diameter Core (LDC) was considered most suitable method for assessing the grade of the B28 kimberlite body and

adopted. This LDC drilling was expected to generate information to enable the estimation of the grade, size/frequency distribution and price of the diamonds in B28 in the drill profile below surface. These are key inputs in determining a resource status at various stages of the project. Achieving these objectives enables a decision on advancing the project to the next stage of work.

In the LDC drilling program a total of 23 holes were completed in the PL tenure which finished in 2008, drilling 5205 m. Large diameter drilling has been designed to generate information to enable the estimation of the grade, size/frequency distribution and price of the diamonds in B28 in the drill profile below surface. Large diameter drilling has been predominantly carried out over B28 kimberlite, with a few holes in B8-48 kimberlite. After the renewal of prospecting license, a revised scheme of prospecting was submitted to the Indian Bureau of Mines, Nagpur to conduct additional prospecting work within the PL area.

This additional study works involves among other things, better evaluation of the resource at B28 kimberlite to a greater confidence level (±15%). This resource evaluation requires conducting sampling (drilling) to get large samples. Taking various factors into consideration, like the size of the samples generated, the pace of drilling, the geology of the deposits, a detailed study of the drilling methods were made and numerous methods including the 8 inch LDC drilling, and PQ-sized core drilling were considered. At last, a combined hybrid method of LDC-PQ method was chosen to test a hypothesis to predict grade by developing a size frequency distribution curve of the macro-micro diamonds. This method was adopted for the first stage of the study for the grade drilling in 2010. Based on the results of the first phase, the same LDC-PQ hybrid sampling approach was adopted for the second phase. The type and number of drill holes for the second stage of the grade drilling were determined based on the results of the first phase. For the first stage, the existing approved locations were for drilling. The second stage of the LDC grade drilling started only after receipt of the forestry approval to drill additional drill holes in June 2011.

3.2.3 LARGE DIAMETER CORE (LDC, 8 INCH CORE) DRILLING

The large Diameter drilling program was conducted for evaluating the grade below the surface up to 250m. The drilling program has since stopped with expiry of the prospecting license on 5th September 2011. South West Pinnacle Exploration Pvt. Ltd. From New Delhi, were contracted to complete the drilling operations using two drill rigs, one a track-mounted LF-230 drill rig, and another Hanjin P7000 rig, for holes with lesser expected depth.

LDC drilling conducted during the PL period with 23 holes on B28 kimberlite totaling 5205m.

A total of 349 samples from LDC holes on Atri weighing 208 tonnes were collected and processed for diamonds yielding147.16cartars.fig 1)

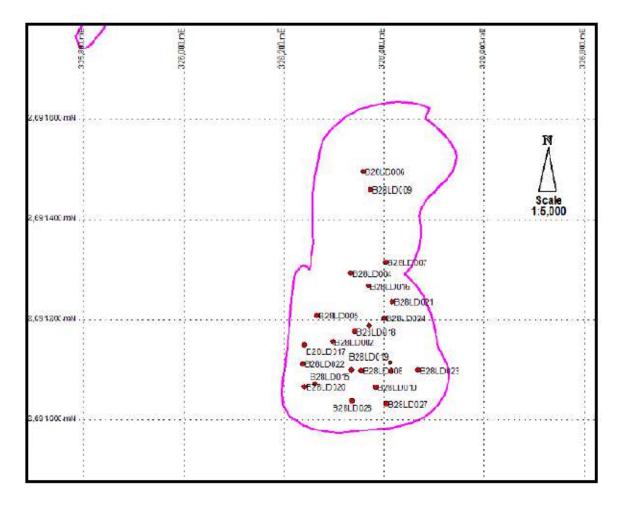


Fig.-1 Location of LDC Boreholes at Atri

3.2.4 PQ CORE DRILLING

The PQ size drilling was also conducted at the Bunder Project as a part of the hybrid grade-drilling program to determine the grade of B28 kimberlite. This type of drilling was completed as planned for earlier this year in the month of February 2011. South West Pinnacle Exploration Private Ltd., from New Delhi, were contracted to complete the drilling operations.

PQ size drilling was conducted at bunder project to delineate the boundary of ore body and to support the estimation of incidence of Diamonds from the

recovery of fine (Micro) Diamonds. during the PL period 4929 metrage of drilling in 12 holes on B28 kimberlite has been carried-out..

* Lithologs of boreholes are given in Annexure 1 and details of different types of boreholes drilled are enclosed as Annexure 2,3 and 4.



Figure 2 Drill Rig doing PQ drilling



Figure 3 Drill rig doing HQ Delineation Drilling

3.3 BULK SAMPLING

Total 9 shallow trenches have been completed at B28, to determine sample grades, preliminary diamond size/frequency distributions (with re-crushing to - 6 mm and a lower cut-off size of 0.85 mm), and a preliminary diamond price estimate. Each individual trench/pit was of 40m² surface area (20m long×2m wide×5m deep trenches), as specified in Forestry and Government approval.

In total 9 shallow trenches were tested for mini bulk samples. A total of 36000.85 tons of kimberlite was collected during 2006 and 2011 programme. A total 29 samples have been tested from 9trenches at B28, Details of shallow pits are given in table4.

These samples were processed at the sample processing plant near the project area. The results of this processing assists in further evaluating the value and grade of the Bunder deposit. This is critical to the development of a world-class diamond mine.

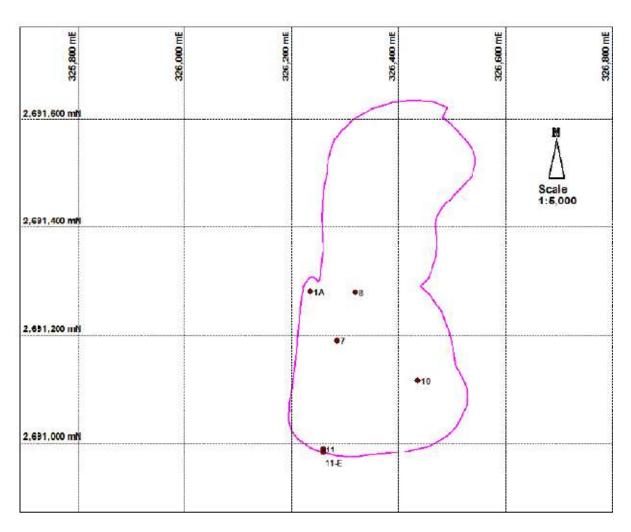


Figure 4 Locations of Atri Prospecting trenches

A total of 36000.85 tonnes of kimberlite sampled from these trenches , yielded 1876.43 carats of diamonds. The results of samples Processed in DMS Plant at Bunder are given as table4.

3.4 PROJECT BLOCK MODEL / RESOURCE MODEL

The quantities of resource / reserves and overburden / waste to be removed, is calculated through a computer programme which utilizes modified slice plan method. The area between two consecutive slices is divided into a blocks with dimensions of 50 m × 50m. the height of the blocks is 10 m, the interval between two consecutive slices. The height of the blocks has been chosen to match bench height. The blocks are further subdivided into sizes of 12.5 m × 12.5 m × 10.0 m height, at the edge of the resource or slice or at boundaries of faults and at boundaries between different geological domains. The blocks are assigned density and quality by geostatistical method through a computer programme.

To explain, slice plans at two consecutive levels of South Atri namely 360 m and 350 m are attached at **Figure 7 D/1 & 7 D/2** respectively. The areas of kimberlite of South domain shown in the figures are 72775 sq. m. and 73394 sq. m. The volume and tonnage of kimberlite is calculated as under:

Volume= ½ (Area of slice at 360 m + Area of slice at 350_m) × 10 = ½ (72775 + 73394) × 10 = 730845 Tonnage = 730845 × 2.6 = 1900197

As against thus, the tonnage calculated by block method through computer modeling is 1892161.

The slice wise reserves calculated along with waste to be excavated are given in fig and table below.

The geological, engineering, and metallurgical rock characteristics were integrated into project block models to reflect 'ore type' and country rock models, constructed by the project geology team.

INFORMATION MEMORANDUM

OF

BUNDER DIAMOND BLOCK VILLAGE SAGORIA, TEHSIL - BUXWAHA, DISTRICT- CHHATARPUR, MADHYA PRADESH (AREA 364 HECTARE)



Directorate of Geology & Mining, Madhya Pradesh

e:\auction_3rd phase\finial auctionable blocks\part iv_a_paid document\schedule v_bunder_gr.docx

INFORMATION MEMORENDUM Part IV-A

Reporting of Mineral Resources for Bunder Diamond Block, Tehsil Buxwaha, Distt. Chhatarpur, (Madhya Pradesh)

S.NO.	Contents	Explanation			
1	Title &	Directorate of Geology Mining	M.P.		
	Ownership	e-mail:- <u>dgm.auction@.mp.gov</u>	<u>/.in</u>		
		Phone & Fax No. 0755-255179	-		
		1	I report of Bunder Diamond Block village		
		– .	strict- Chhatarpur Madhya Pradesh (Area 364		
		Hectare)			
		Details of Periods of Prospecti	•		
			M/S Rio Tinto Exploration India Pvt. Ltd. 3 rd		
		- · · · · ·	narg munika III rd New Delhi 110067 India		
2	Details of the		-Sagoria, Tehsil- Buxwaha, District-		
	area	Chhatarpur M.P. 364 Hectare.			
		Survey of india Toposheet no.			
		The Area is located entirely within Protected forest of Buxwaha forest			
		Range of Chhatarpur district. The following table gives the details of forest			
		compartment number-			
		Name of forest - Buxwaha protected forest.			
		Compartment No.	Area In Hect.		
		280	28.180		
		281	12.839		
		284	140.044		
		285	140.503		
		302	5.238		
		284	9.466		
		285	27.937		
			d block of Bunder area is about 364 hect,		
			t. is Mineralized zone and rest is proposed for		
		dumping and ancillary purpose	2.		
3	Infrastructure &	Bunder Diamond Block is loca	ted within the Chhatarpur District of M.P. The		
	Environment	Block is about 20 to 25 km. Sc	outh West of Dangwan National highway, on a		

(As per Minerals Evidence of Mineral content Rules, 2015)

		road connecting Bajana and Buxwaha. Access to the block (Kimberlite rock)
		can be made by driving WSW along metal road and a series of trails from
4	Draviaus	Jagana, a small village on the Buxwaha – Bajana road.
4	Previous	The Directorate of Geology and Mining has covered present area during the
	exploration	Mineral inventory of Chhatarpur district in the year 2002-2007 and
		prepared Reconnaissance geological map on the 1:50000 scale. The
		Geological survey of India has also prepared geological map on the area
		1:50000 scale. The Rio-Tinto Exploration India limited has also worked in
		area during the Reconnaissance permit period and company selected the
		present area for further detailed prospecting in the area. The Rio-Tinto
		India Ltd. obtained prospecting license in the area.
5	Geology	The Bunder Diamond Block is located within the Meso-Protorozoic kaimur
		Group platform sediments extending into the Paleo – Proterozoic Bijawar
		Group metasediments to the North, the Kaimur group consist of
		Monotonous sequence of rocks i.e. sandstone, shale and limestone.
6	Aerial/ ground	A desktop study for providing an indicative geotechnical assessment was
	geophysical/	also conducted in earlier part of the prospecting periods on the
	geochemical data	geochemical & geophysical parameters, of particularly focusing on the pit as
		well as during the drilling in kimberlite and host Rocks.
7	Technological	Topographical survey, contouring, detail geological mapping and surface
	investigation	sampling, pit sampling and core drilling and sampling have been carried out
		during the investigation and their details are given in the geological report.
8	Location of Data	completion of prospecting work during the Prospecting period-
	Points.	1. Number of pit – 9 no.
		2. Depth (m) average 5 m
		3. Drilling-
		a) Number of boreholes completed during PL period 95 (60 volume
		delineation holes (HQ/NQ), 23 grade estimation holes. (8"Large
		Diameter core LDC and 12 Grade estimation holes.
		(PQ holes)
		b) Total drilling during the period -24,708 m
9	sampling	The Core was logged on location, sampled for determination of Diamond
_	Techniques	incidence and coreare mainly broken to a maximum size of 0.80 m.m. The
		Material was aggregated in to 10 mm intervals and transferred in to 1-3 mtr
		bulk bags. Aluminum tages inscribed with the sample number were placed
		inside the bags and sample numbers written on the side of the way samples
		bags were sealed on the top with security seal, then transported to sample
		processing's plant (SPP), the samples from LD holes were also transported
		to processing plant.
L	1	

	sampling employed	Type core core core	Make LF 230 Drill rig(Boart longyear Make) PZ 000 drill rig (henjain make	Capacity 8" LDC(203 mm Core size) 8"LDC- PQ(203 mm)	Number of Drill 1	
		core	longyear Make) PZ 000 drill rig	mm Core size) 8"LDC- PQ(203 mm)		
			0	PQ(203 mm)		
		core		and 84 mm core size	1	
			CT -14 Drill rig (At las- cafco make)	PQ & HQ (84mm 63 mm core size)	1	
		core	CS 14 Drill rig (At las- cafco make)	HQ (63 mm core size)	1	
	core	KDR- 600 Drill rig (Kores make)	HQ (63 mm core size)	3		
		Total 95 m 41.80 mts borehole often at a sent to sa details are	oove type, of drill mach umber of bore holes we in borehole number B-4 number B-28-018 were regular interval by brea ample processing plant e given in the report.	re drilled in the a 1-002 & maximu drilled in the are aking of core int (SPP) the recove	area. The max um depth of 6 ea. The core sa o 80mm size a ery of Diamor	imum dep 35.80 mts amples we and sampl nd and the
-	Sub-sampling Techniques and sample preparation	10 mts in	ole was broken into 80 m terval and transferred i o- Tinto sample processi	nto 1-3 mts bul	k bags and sa	imples we
	Quality of assay data and laboratory test	Total 349 samples of LDC holes of Atri Kimberlite Rock weighing 262.66 tons. were collected and processed into M/S Rio-Tinto sample processing plant (SPP) for recovery of diamonds 143.97 carats. diamonds have been recovered from 262.66 tonnes of materials.				
13	Moisture	N/A				
14	Bulk density	Not Requi	ired			
	Resources estimation	samples.	urces were estimated o Total 349 samples coll I by density media sep	ected from dril		

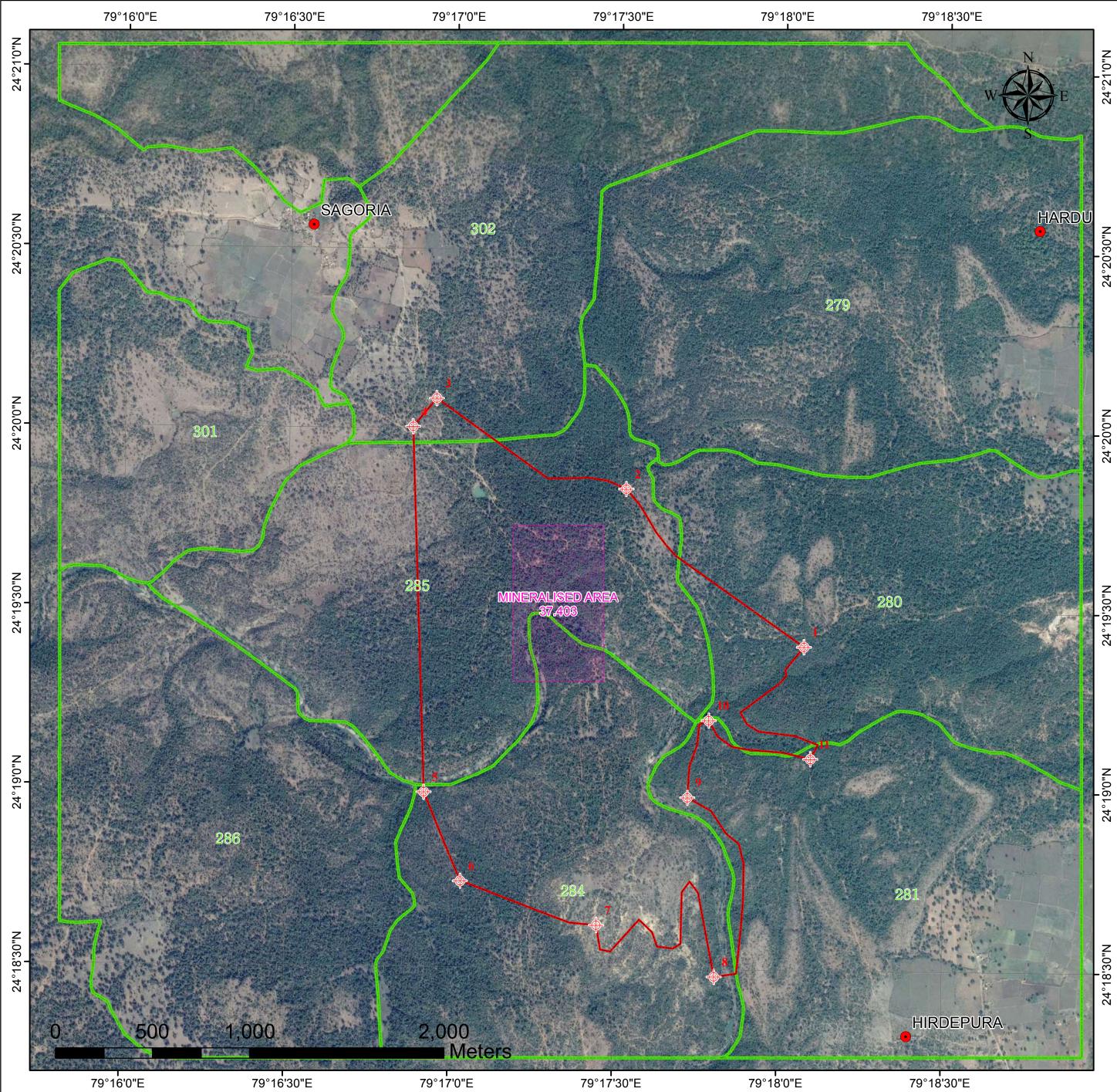
		 143.97 carats have been recovered from 262.66 tons of Kimberlite. The average grade of diamond is 0.78 carats per ton of Kimberlite rock. A total of 22115 commercial sized stones weighing a total of 2020.40 carats were recovered. In the area total reserves up to depth of 345/350 mts from (100 ms RL) are 53.70 Million Tonns of Kimberlite as under- South Atri- 41.56 Million Tons, 0.78 carats per ton. North Atri-12.14 million Tons, 0.13 carats per ton. There are classified as under. Proved Reserve- Upto 200 mts RL 36.46 million tons. UNFC classification(111) Probable Reserve- From 200 mts RL to 100 mts RL 17.24 million tone UNFC classification (122)
16	Further work	-
	Annexure /enclosures to the report	The Lithologs of boreholes and bulk samples recoveries samples reserves from LDC holes, Domainwise and level wise estimation of reserves, UNFC classification of reserves and resources estimation and survey reports. Detailed geological map on scale, contour Plan, Cross section. borehole logs and mineable block including dumps and ancillary purpose. The block has been transferred on to Forest compartment map.
18	Any other information	Based on relevant information mentioned above the Atri Block is recommended for e-auction as G-2 category M.L. block

(PART IV "B" as per Mineral (Evidence of mineral content) Rule, 2015)

Sr.No.	Content	Explanation
1	Indicator Minerals	A total of 530 numbers of Gravel samples were collected during the course of reconnaissance permit from surface and stream beds which were analyzed to delineate several catchments Shedding "Kimberlite indicator Minerals " or (KIMS) like Ilmenite, garnet, spinel, and crome diopsid to ascertain, diamondiferous Kimberlite.The Soil geochemical survey highlighted several anomalies enriched in key kimberlite Path finder elements ie, (Nb, Ce ,la ,Zr). Loam sampling, Rock sampling and Geological mapping subsequently lead to the discovery of several kimberlite outcrops and float.
2	Source of Diamonds	Total 8 number of Kimberlite Pipes were delineated at Bunder area out of 8 pipe in the Bunder area. The diamond is mainly found in primary source rock kimberlite.
3	Sample collection	 The sample were collected at various stage of the work and their details are given below 1. During the course of Reconnaissance Permit total 530 number of Gravel samples were collected and analyzed to ascertain a total of 8 number of kimberlite pipes in the Bunder area. 2. During the prospecting work, total 9 pits were Dug and total 41 number of samples have been collected, weighing 911 tons of material. Each individual pit was of 40 Sq m surface area. 3. Drilling -During the prospecting period total 349 number of samples weighing 262.66 tons kimberlite from LDC holes. of area, were collected and processed in Rio-Tinto sample processing plant (SPP).
4	Sample treatment	The bulk surface sample and LDC samples were processed at Rio-Tinto mini DMS plant (1 tone per hour) equipped with a crushing/scrubling/screening treatment, end as outlined in the Flow sheet in the report. The process follows simple heavy media separation. The media is

5	Carat	created by in agitating column of water and ferro silicon maintaining a constant sp.gr. of 3.2, after crushing through different stages as shown in the flowsheet. The sample lead to the heavy media column, where heavy minerals including diamonds sink. This concentrate of heavy minerals is collected, logged and sealed in uniquely numbered containers. The carat is measurement unit of Diamonds which is equivalent of 200 Milligram.
6	Sample Grade	A total of 349 samples weighing 262.66 tons of kimberlite have been processed from large diameter (8") core for estimation of incidence of diamonds. These samples yielded usercarats of diamonds. Each samples was 10 mts in length (probable bench hight) with a mean sample weight of 0.725 tons, incidence of diamonds was calculated as " stone per ton"(SPT) the SPT was calculated by the "mean stone size "MSS for the domain to convert the SPT grade to "carats per ton" CPT.
7	Reporting of Bulk exploration Results.	On the basis of exploration data and sample processing, total resources of kimberlite (Up to Depth of 345/350 mt. 100 mRL)are 53.70 million tons, details are as follows- South Atri- 41.56 Million Tons 0.78 carats per ton. North Atri-12.14 million Tons 0.13 carats per ton. <u>These are classified as under.</u> Proved Reserve- Upto 200 mts RL 36.46 million tonns (UNFC Classification 111) <u>Probable Reserve-</u> From 200 mts RL to 100 mts RL 17.24 million tonns UNFC classification (122)
8	Grade estimation for reporting Mineral Resources and Ore Reserves	An open pit mine with a projected diameter of 920 mts and depth of 345 m with over all slope angles 38^{0} - 40^{0} would contain 41.56 million tonns of kimberlite in the South Atri domain and 12.14 million tonns in North domains. The average incidence of diamond of the area will be 0.78 carats of diamonds per ton of Kimbierlite reserves in the South Atri and 0.13 carat per ton in North Atri. The estimated recoverable diamonds from 53.70 million tonns of diamondiferous kimberlite material will be approximately 34.20 million carats the confidence level in the tonnage and incidence of diamonds proves it to be economically minable under UNFC classification system.

9	Value estimation	Price have been estimated from LDC and trench samples processed at the bulk samples processing plant. The recovered diamonds are sorted into size, colour at quality categories that have an associated. Price based on accurately recorded market values for Atri deposits of Bunder pipe, present price estimated varies between Rs. 6227 to 7613 per carats this figure as estimate only at prize projection as subject to further changes in market condition. The price of diamond given by IBM in its website/ is average price of diamond is estimated 16400 per carats
10	Classification	Not ascertained and available

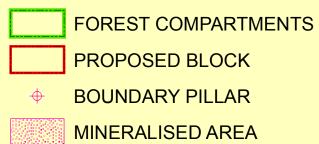


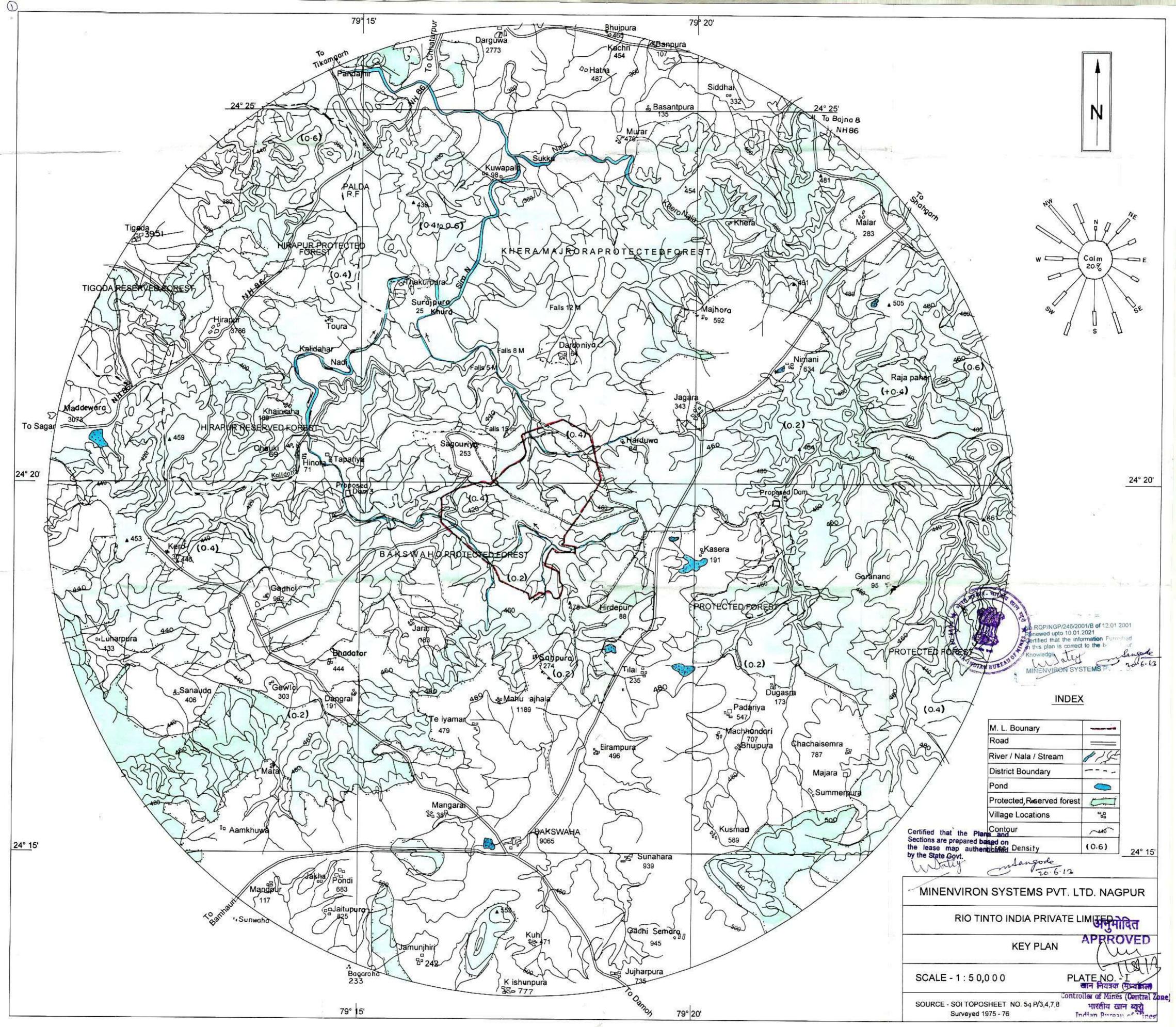
FOREST COMPARTMENT WISE GEOLOGICAL MAP OF ATRI BLOCK OF BUNDER PROJECT, TEHSIL BUXWAHA, DISTRICT CHHATARPUR (M.P.)

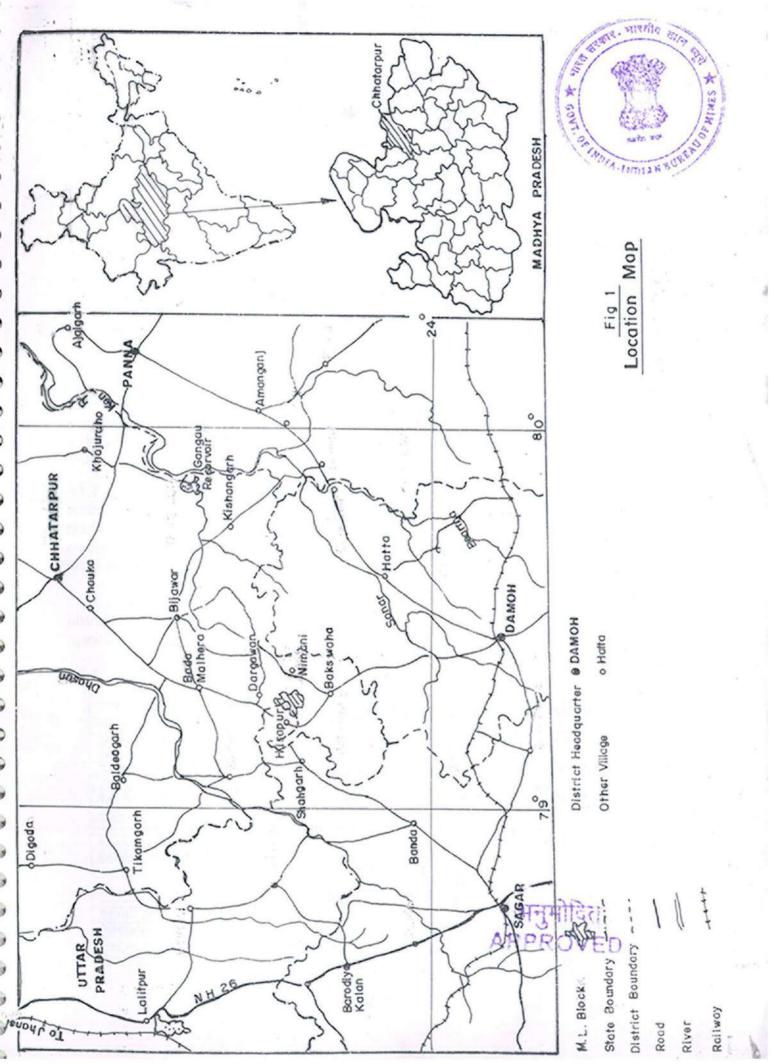
ATRI E	ATRI BLOCK (364.135 HECTARE)				
S.NO.	COMPARTMENT NUMBER	TOTAL AREA OF COMPARTMENT IN HECTARE	AREA APPLIED FOR IN HECTARE	FOREST BEAT	WORKING CIRCLE
1	280	381.810	28.108	VEERAMPURA	VEERAMPURA
2	281	525.290	12.839	VEERAMPURA	KASERA
3	284	455.270	140.044	JARA	VEERAMPURA
4	285	349.240	140.503	HINOTA	VEERAMPURA
5	302	463.170	5.238	DARDONIA	DARDONIA
Mineralised Area (37.403)					
6	284	455.270	9.466	JARA	VEERAMPURA
7	285	349.240	27.937	HINOTA	VEERAMPURA

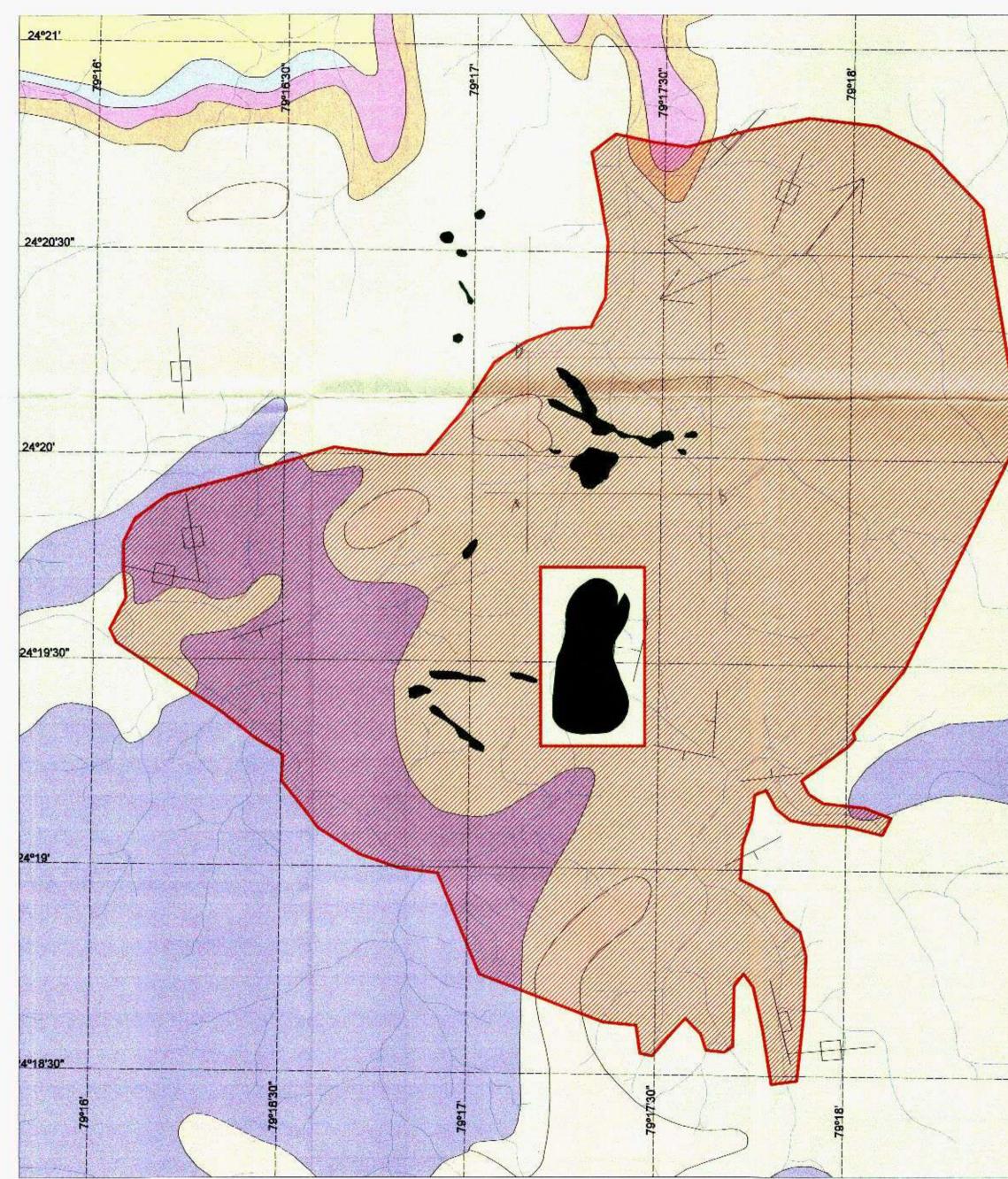
BH ID	LATITUDE	LONGITUDE
1	24° 19' 24.109" N	79° 18' 4.343" E
2	24° 19' 50.185" N	79° 17' 31.559" E
3	24° 20' 4.981" N	79° 16' 56.818" E
4	24° 20' 0.229" N	79° 16' 52.529" E
5	24° 18' 59.151" N	79° 16' 55.233" E
6	24° 18' 44.388" N	79° 17' 2.081" E
7	24° 18' 37.215" N	79° 17' 26.993" E
8	24° 18' 28.794" N	79° 17' 48.592" E
9	24° 18' 58.735" N	79° 17' 43.367" E
10	24° 19' 11.652" N	79° 17' 47.136" E

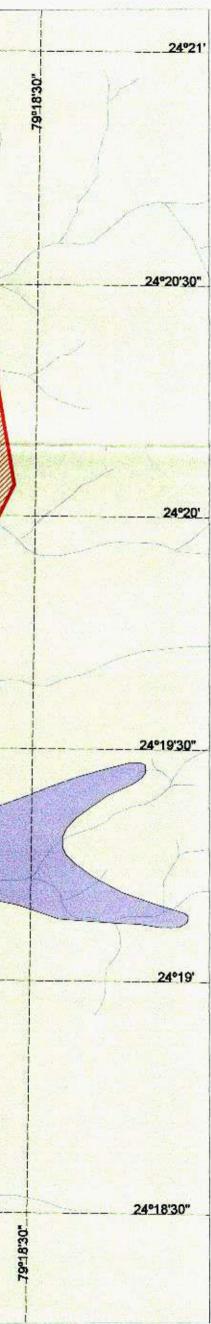














917 ha Bunder Mining Lease Application



Lamproite traces

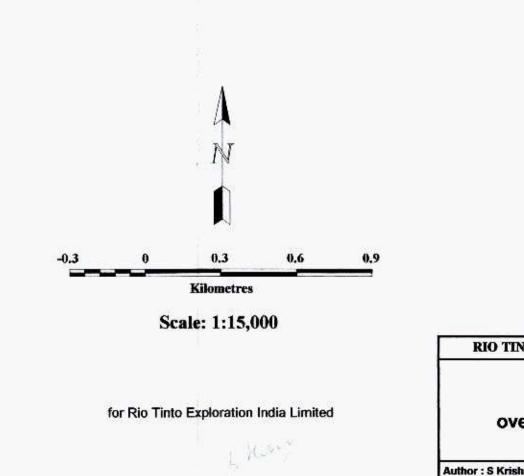
Drainage

Mapping Geology

	Palaeo to Meso - Proterozoic Bijawar Group, Hirapur Fmn (mixed shale, sst, chert, dolomit		
	Meso Proterozoic Semri Group, Pandwapall Fmn (Sandstone)		
	Meso Proterozoic Semri Group, Ken Frnn (Limestone)		
	Meso Proterozoic Semri Group, Palkawan Shale Fmn		
	Meso Proterozoic Kaimur Group, Pipartola Fmn		
	Meso Proterozoic Kaimur Group, Dhandraul Fmn		
The P	Meso Proterozoic Semri Group, Imlichouk - Sanodhashale Fmn		

Cretacaous Infratrappeans Bakswaho Fmn

Deccan Trap Basalt



S Krishnan, Director

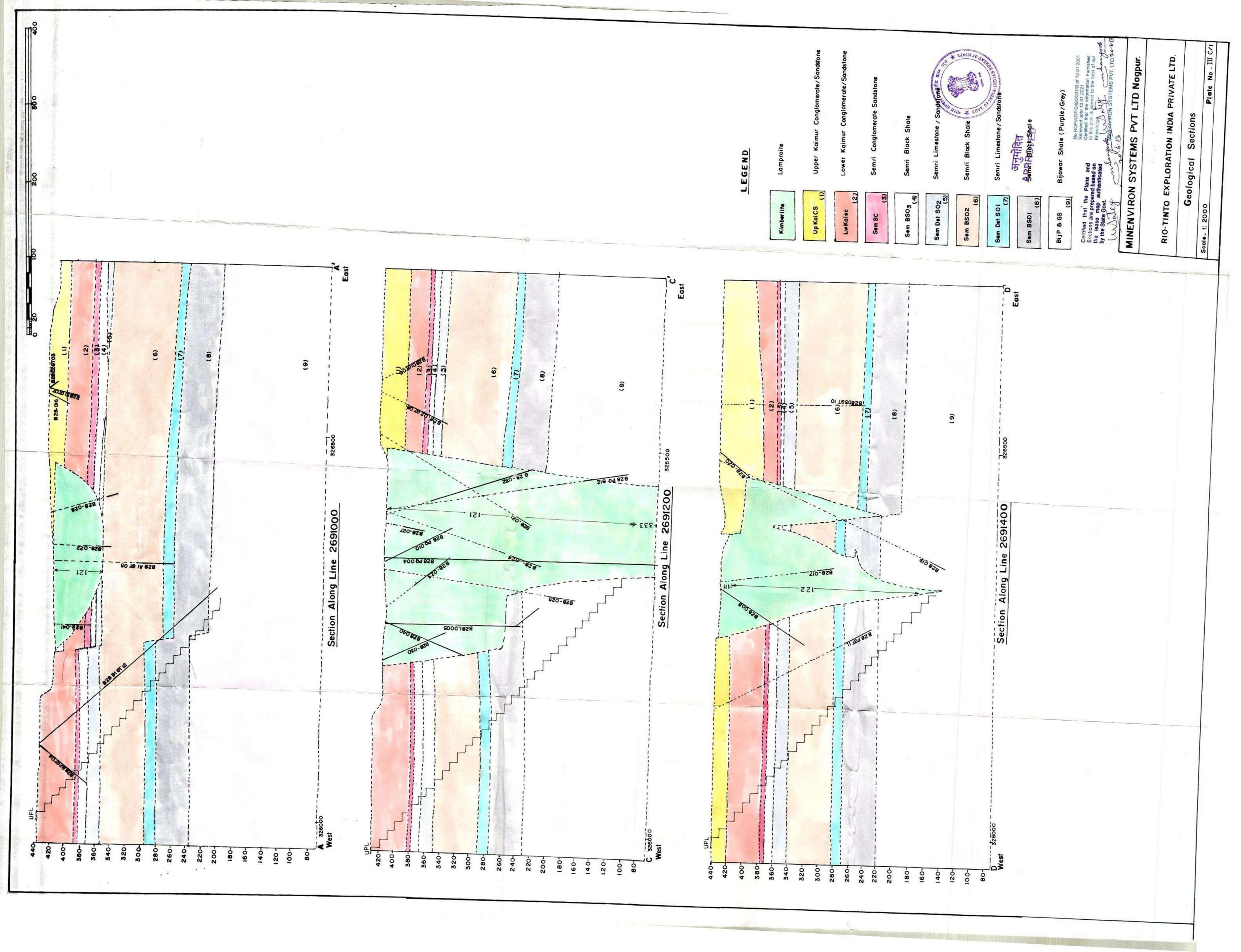
Plan 3

RIO TINTO EXPLORATION INDIA LIMITED

BUNDER DIAMONDS

Local Geology Plan over 917ha ML Application

Author : S Krishnan	Ref : Bunder ML Application
Drawn: S Babu	File Name : NDbg0788.wor
Date: June 2008	Report No :
Scale: 1: 15 000	Plan No : NDbg0788 917



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