GEOLOGICAL REPORT AND QUARRYING PLAN
(Prepared in Accordance with Rule 17 of G.C.D.R. 1999)

FOR

APPLIED AREA FOR GRANT OF BUILDING STONE

OVER AN EXTENT OF 0.4928 HA

(IN PART OF FOREST SY. NO 215A1A

OF

ARAV GRAM OF ASNOTI VILLAGE , KARWAR TALUKA, UTTARA KANNADA DISTRICT, KARNATAKA STATE)

APPLICANT

SAI RAM ENTERPRISES

(Proprietor **RAJESH R. NAIK)**
H No 4, Saileela, Gaongeri, Majali, Karwar, Karnataka.

PREPARED BY :-

A.G.Kulkarni

RQP/GOA/248/2014/A
M.Sc.,(Geology)
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CERTIFICATE

This to certify that the Permission of K.M.M.C. Rules and Rule **17 of G.C.D.R. 1999** have been observed in the Quarrying Plan and progressive Mine closure Plan of Building stone Quarry 0.4928 Ha. , in FOREST SY. NO 215A1A in Arav gram of Asnoti village, Karwar Taluka, Uttara Kannada District, Karnataka State. of Sai Ram Enterprises and wherever specific permissions are required, the lessee will approach the concerned authorities of state government of Karnataka and Department of Mines and Geology, Karnataka.

It is also certified that the information's, furnished in the Quarrying Plan and Progressive Mine Closure Plan are true and correct to the best of my knowledge.

Date: 15/09/2023

15/09/23

A. G. Kulkarni M. Sc

RQP / GOA / 248 / 2014 / A

भारत सरकार / GOVERNMENT OF INDIA
खान मंत्रालय / MINISTRY OF MINES
भारतीय खान ब्यूरो / INDIAN BUREAU OF MINES

अर्हताप्राप्त व्यक्ति के रूप में मान्यता प्रमाण पत्र

(खनिज रियायत नियमावली, 1960 के नियम २२सी के तहत)

CERTIFICATE OF RECOGNITION AS QUALIFIED PERSON

(Under Rule 22C of Mineral Concession Rules, 1960)

श्री. अजित जी. कुलकर्णी पुत्र **श्री. गोपालराव कुलकर्णी**, निवासी **1410, ग्राउंड फ्लोर, बसावन गल्ली, बेलगाम - 590 001 (कर्नाटक)** जिनका **फोटो और हस्ताक्षर** ऊपर दिया हुआ है, तथा जिन्होंने अपनी अर्हता और अनुभव का संतोषजनक साक्ष्य दिया है, को खनन योजना तैयार करने हेतु खनिज रियायत नियमावली 1960 के नियम २२सी के तहत अर्हताप्राप्त व्यक्ति के रूप में मान्यता प्रदान की जाती है।

Shri. Ajit G. Kulkarni, Son of **Shri. Gopalrao Kulkarni,** Resident of **1410, Ground Floor, Basavan Galli, Belgaum – 590 001 (Karnataka)** Whose **Photograph and signature** is affixed herein above, having given satisfactory evidence of his qualifications & experience is hereby **RECOGNISED** under Rule 22C of the Mineral Concession Rules, 1960 as a Qualified Person to prepare Mining Plans.

उनकी पंजीयन संख्या है
His registration number is **RQP / GOA / 248 / 2014 / A**

यह मान्यता **10 वर्षों** की अवधि के लिए मान्य है जो दिनांक **16 दिसम्बर 2024** को समाप्त होगी।
This recognition is valid for a period of **10** Years ending on **16.12.2024.**

उनके द्वारा प्रस्तुत खनन योजना में गलत जानकारी / दस्तावेज पाए जाने की स्थिति में यह प्रमाण पत्र वापस लिया जाएगा / निरस्त किया जाएगा ।

This certificate will liable to be withdrawn /cancelled in the event of furnishing the wrong information /documents in the Mining Plan submitted by him.

स्थान / Place : Fatorda-Margao

दिनांक / Date : 17.12.2014

(डॉ वाय. जी. काले) / (Dr. Y.G.Kale)
क्षेनीय खान नियंत्रक/ Regional Controller of Mines
भारतीय खान ब्यूरो /Indian Bureau of Mines
गोवा क्षेत्र / Goa Region

COPY
A. G. Kulkarni M. Sc.
RQP/GOA/248/2014/A

GEOLOGICAL REPORT AND QUARRYING PLAN FOR APPLIED AREA FOR SAI RAM ENTERPRISES (RAJESH NAIK) TOWARDS THE GRANT OF QUARRY LEASE FOR BUILDING STONE QUARRY TO PRODUCE BUILDING STONE QUARRY OVER AN EXTENT OF 0.4928 HA IN PART OF FOREST SY. NO 215A1A OF ARAV GRAM OF ASNOTI VILLAGE , KARWAR TALUKA, UTTARA KANNADA DISTRICT, KARNATAKA STATE.

CHAPTER -1 **ABSTRACT**

Geological survey and detailed mapping were carried out. Land over an extent of 0.4928 Ha in a part of Forest Survey No. of 215A1A located in Arav gram of Asnoti village in Karwar taluka, Uttara Kannada District of Karnataka state for Quarry lease for Building stone quarry deposit in the applied area. Based on surface exposures in the adjoining area, the total proved geological reserve of Building stone quarry material is estimated to be 38,339 MT. This area can be quarried economically for 15 years.

INTRODUCTION

The applied area for grant of quarry lease to SAI RAM ENTERPRISES (RAJESH NAIK) and is situated in Forest Survey No. 215A1A of Arav gram of Asnoti village in Karwar taluka, Uttara Kannada District of Karnataka state. Subject area in under jurisdictional authority of senior Geologist, Department of Mines & Geology, Uttara Kannada District.

Now, Quarrying plan is being prepared under Rule 8I, 8C, 8D, 8F & 8H (1) of " Karnataka Minor Mineral Concession (Amendment) Rules-2013". The Department of Forest, Bangalore has directed the applicant/lessee to obtain approval for Quarrying plan from the Competent Authority (Department of Mines & Geology) and other necessary statutory clearances.

The area is found to have prominent exposures of rock bodies covering most of the applied area. Detailed study of the area has been done by sampling the exposed blocks of stone and at various depths. In view of the proposal towards development and production of Quarry, the lessee intends to have a capacity of ROM of 38,339 MT in the fifteen years, by carrying out the method of Quarrying.

The Quarrying plan is prepared with the main emphasis on systematic and scientific method of working with an aim to ensure sustainable and orderly development of the quarry & conservation of stone deposit and protection of environment.

GENERAL INFORMATION

- **Name of Applicant:** Sai Ram Enterprises
- **Proprietor**: Rajesh R Naik
- **Status of Applicant**: Individual
- **Address of Applicant**: H No 4, Saileela, Gaongeri, Majali, Karwar, Karnataka.
- **Other Lease status**: User Agency does not hold any other Lease in the state of Karnataka.

Area in HA	**Location**	**Type of Mineral**	**Sy. no.**	**Lease Period (Years)**
0.4928	Arav gram of Asnoti village	Building stone quarry	Forest SY. No 215/A/1A	15 years

- The deposit occurring in the lease area and which the applicant intends to quarry is Building stone quarry (Granite Gneiss).
- Karwar Taluka has about 80% land in forest, 10% acquired by Navy and Kaiga power projects and remaining 10% private land which is sandy in nature.
- The period for the Quarry lease to be granted is 15 years.

NAME AND ADDRESS OF THE RQP PREPARING QUARRY PLAN

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CHAPTER - 2

LOCATION AND ACCESSIBILITY

GENERAL DETAILS OF THE AREA (Location Map-Plate 1)

Area in HA	Survey No.	Village	Taluka	District
0.4928	215A1A	Arav gram of asnoti village	Karwar	Uttara Kannada

EXISTENCE OF PUBLIC ROAD/RAILWAY LINE, IF ANY NEARBY QUARRYING AREA

Applied area for quarry lease is easily accessible at all seasons with motorable road connections. The subject area is about 4 Km from Arav gram of asnoti village and about 11 km from Karwar City. The nearest Asnoti Railway Station is 4 kms (Aerial distance) and Karwar Railway station is 10 kms (Aerial distance) from the applied area. The nearest Dabolim airport is 65 kms (Aerial distance) from the applied area. The nearest Karwar port is 13 kms (Aerial distance) from applied area.

LOCATION OF THE AREA

Location of the quarry area is marked in key plan is enclosed as location map cum key plan in plate no 1.

GPS Reading Of Corner Points

Corner Points	Northing	Easting
BP-1	N-14°054'18.73"	E-74° 09'8.83"
BP-2	N-14°054'19.08"	E-74° 09'10.32"
BP-3	N-14°054'21.47"	E-74° 09'9.24"
BP-4	N-14°054'19.71"	E-74° 09'7.88"

PRESENT LAND USE PATTERN

The subject area is a Minor forest land. Prominent outcrops and exposures of rock bodies are observed. There is no Forest cover in the area and is not suitable for agriculture and grazing purpose.

Sl. No	Present Land Use	Area in Ha
1	Quarry Workings	0.0501
2	Waste dumps	0.00
3	Roads	0.156
4	Mineral Storage	0.00
5	Proposed Buffer Zone	0.00
6	Undisturbed area	0.2867
Total		**0.4928**

CHAPTER - 3

GEOLOGY AND EXPLORATION

TOPOGRAPHY

The topography of the area consists of stony ridges and slopes/gradient in all directions. The average elevation of the subject area is 116 m above the MSL. Topography and the drainage of the area is both structurally and lithological controlled. The subject area falls within the region confined to a part of Arav gram of Asnoti village. The highest elevation is 136 m and lowest elevation is 116 m above the MSL.

REGIONAL GEOLOGY

Geologically, the region is most prominent of the younger granite is the linear belt of clospet granite. The trend of this granite is North-South and parallel to the structural grains of the host rock and gneisses are often found to be intruded by basic dykes, pegmatite, and aplitic veins with a common occurrence of basic xenolithic patches. These Xenoliths are some small, elongated bodies of amphibolite's and schists aligned along a north-south trend. The dominant strike direction is northeast, with a subsidiary concentration of apparently mainly smaller structures having an easy northeasterly

strike. These hard rocks have undergone weathering and chemical decomposition in the plains and valleys, resulting in weathered mantle ranging in thickness from 10 to 20 meters generally. Alluvium occurs as local patches along the stream courses and nallahs, which is of limited areal extent.

NEED FOR THE PROJECT AND ITS IMPORTANCE TO THE REGION

The major need of building stone is due to its high compressive strength and durability (among the hardest, dimensional & structural stones) it can effectively withstand the vagaries of nature. Fine grained granite is employed for ornamental and monumental work as well as for inscription purposes. The mineral-rich colors, and the hardness & density, makes it useful for many applications. Polished slabs and tiles are used in countertops, flooring, retaining walls and landscaping around a center fountain/pond, staircase, and many other design elements (residential and commercial applications). It is also known as the maintenance-free stone. The proposed quarry project will full fill its end users in buildings and construction, bridges, paving, monuments, and many other exterior projects. The mining and associated activities in the mineral bearing areas bring about gains in gross domestic product, i.e., there is through a minor contribution by the proposed project but will add to the gains in G.D.P. (Gross Domestic Product).

MAJOR PROJECTS IN THE SURROUNDING AREA TO JUSTIFY THE DEMAND

Due to its coastal location, Karwar experiences substantial demand for building stone (granite) to cater to various construction needs influenced by the local terrain. As one of Karnataka's prominent cities, Karwar plays a significant role and is home to numerous major national projects within the district. Consequently, the city witnesses a considerable requirement for construction materials. Here are a few noteworthy projects within the district:

a) Sagar Mala Project (GoI – Ministry of Ports, Shipping and Waterways)

- A nationwide initiative with an ambitious aim to revolutionize India's logistics sector by harnessing the potential of its coastline and waterways. The vision is to optimize infrastructure investment to reduce logistics costs for both domestic and EXIM cargo. A significant port is planned in Belekeri, Aerial distance of 30 kilometers from the quarry site.
- As indicated in the Feasibility report, there is a pronounced demand for Quarry stone to construct the Breakwater and other structures within the proposed port zone. Given the substantial nature of this project's requirements, the district is in urgent need of a Building stone quarry.

- The establishment of this significant project is poised to trigger additional growth in the vicinity, consequently generating heightened demand for essential resources like building stone.

b) **Karwar Naval Base Project Seabird (Ministry of Defence)**

- The first phase of construction of the base, was completed in 2005. The second phase of construction is further divided into 2A and 2B. This extensive undertaking encompasses a vast area spanning approximately of 11,000 acres. In this phase, the objectives encompass the establishment of eight functional jetties, two refit jetties, a supplementary dockyard for additional ships, the establishment of a Kendriya Vidyalaya, and the expansion of the hospital's capacity from its existing 141-bed capacity to accommodate 400 beds.
- Upon its culmination, this endeavor is anticipated to accommodate more than 100,000 individuals who will be both employed within the establishment and residing alongside their families in the evolving township. Given the magnitude of this undertaking on a national scale, it is poised to generate substantial demand for Building stone, not only to cater to the immediate project but also to fulfill the infrastructural requisites triggered by the establishment of additional businesses and amenities in the neighboring region.
- The area significantly necessitates the establishment of a quarry to address the substantial demands arising from these requirements of the project and other developments in the area.

c) **Karwar Airport (Ministry of Civil Aviation and Ministry of Defence)**

- The forthcoming Karwar Airport is set to be a fresh civil terminal situated in Algeri village near Karwar, within the Uttar Kannada district of Karnataka. The operational management of the civil enclave will be overseen by the Airports Authority of India, functioning within the Indian Navy's Karwar Air Base, also known as Project Seabird. Adding to the array of significant projects emerging in the Karwar area, this venture entails extensive infrastructure development.
- According to the available reports, the designated project zone is anticipated to encompass an expansive 1,328 acres. Given the substantial expanse, a considerable amount of essential resources like Building stone will be indispensable to fulfill the project's demands. Given the existing scarcity of this crucial material, the establishment of an active quarry is

strongly advised. This quarry would be instrumental in meeting the needs of not only the project at hand but also those arising from the concurrent development activities associated with the airport.

d) **Other projects and demands in Karwar**

- As Karwar progresses into a city of development, the imperative to enhance its infrastructure becomes notably pronounced. This imperative is driven by the necessity to accommodate the diverse demands of various businesses and public necessities within the district. Given the substantial scarcity of essential raw materials within the city, the local population is compelled to source resources like Building stone from adjacent districts. This dynamic leads to escalated transportation costs, which, in turn, contribute to the amplification of overall project expenses.
- Situated along the coastline, Karwar city primarily relies on agriculture and fisheries as the predominant occupations for its local residents. The substantial portion of the population belonging to the middle or lower-middle class faces challenges in managing the expenses associated with acquiring raw materials. This predicament subsequently impacts the holistic societal advancement of the area.
- Numerous small-scale government projects have encountered delays attributed to the inadequate availability of essential raw materials. The establishment of this quarry would significantly alleviate the burden of this shortage, consequently benefiting the entire populace of the district.

STRATIGRAPHIC SEQUENCE

Regional Lithostratigraphic succession of the area is given below:

Recent		Alluvium
Paleocene to Recent		Laterite
Pre Cambrain	Younger Industries	Quartz veins & Pegmatities
	200m.y. Younger Industries	Dolerite Dykes
	(2000-2400m.y.)	Closepet Granitelosepet Granite
UNCONFROMITY		

Archaean	Peninsular Gneissic complex (3000 m.y)	Gneissic granite Granitic gneiss with enclaves of older rocks Sargur group

MAIN DRAINAGE

Likely depth of water based on observation from the nearby wells and other water bodies is expected to be minimum 50m to 70m below the general ground level. Working expected to be at 108 m MSL which is much above the water table and no water is expected.

LITHOLOGY

The granitic gneisses primarily belong to the migmatite type, characterized by strong banding that varies in composition from granite to diorite. Granites are notably coarse-grained and possess a porphyritic structure. The region occupied by these gneisses forms gentle, undulating plains and hillocks, ranging in elevation from 20 to 80 meters above ground level.

The foliation in the gneisses is oriented from NNW-SSE to ENE-WSW, dipping in an easterly direction at steep angles. The presence of sheet joints is aligned parallel to the land's surface. Over time, these sturdy rocks have undergone alterations and decomposition within plains and valleys, giving rise to a weathered mantle. The thickness of this weathered layer generally spans from 20 to 30 meters, with occasional extensions reaching a maximum depth of 50 meters.

Gneisses and granites are traversed by pegmatites and dolerite dykes. Closepet granites commonly give rise to barren hillocks with flat valleys. The boundary between peninsular genesis and closepet granite is irregular and transitional. Clospet granites show comparatively more joints than the width ranging between 5 to 20 m and extend over a length of few tens of meters to several kilometers.

Laterites of Paleocene age are seen at places as capping on the gneisses. Beneath the laterites, gneisses are deeply weathered giving rise to various shades of clays and weathered rocks, which is termed as ' Saprolite'. Alluvial patches are generally seen along the stream courses and nallahs. It comprises of medium to coarse-grained sand with some gravel and pebbles associated with sit and clay at many places. The aerial

extent of these alluvial deposits in general is controlled by the topography of the basement crystalline. This Alluvium is of limited aerial extent in nature.

Gneiss is a common and widely distributed type of rock formed by high-grade regional metamorphic processes from pre-existing formations that were originally either igneous or sedimentary rocks. Gneiss rocks are usually medium to coarse foliated and largely recrystallized but do not carry large quantities of micas, chlorite or other platy minerals. Gneisses that are metamorphosed igneous rocks or their equivalent are termed granite gneisses, diorite gneisses, etc. However, depending on their composition, they may also be called garnet gneiss, biotite gneiss, albite gneiss, etc.

The most common minerals in gneiss are quartz, potassium feldspar, and sodium feldspar. Smaller amount of muscovite, biotite and hornblende are common. Gneiss can also form from gabbro or shale. Common field characters of the gneiss as observed mega-scopically in hand specimen are given below.

Color: Grey or dark bluish, but with dark streaks and layers.

Texture: Medium to coarse grained, characterized by discontinuous, altering light and dark layers, the former usually having a coarsely granular texture while the latter, which often contains mica, may be foliated.

Structure: In addition to the gneissose texture described above, gneisses tend to be banded on a large scale with layers and streaks if darker and lighter colored gneiss. Granite and quartz veins and pegmatites are common may be folded. (Geological plan as plate no.: 4).

MINERALOGY

Feldspar is found abundantly and, when combined with quartz, contributes to the formation of the granular, lighter-colored strata. Muscovite, biotite, and hornblende are frequently encountered minerals, while others characteristic of more advanced regional metamorphism might also be present.

In terms of their field relations, these formations exhibit either distinct or gradual contacts, the nature of which is determined by the prevailing physical and chemical conditions at that time.

LOCAL GEOLOGY

The exposed area primarily consists of Granite gneisses oriented in a North-South direction, with an inclination ranging from N65° to 75° towards the east in the form of a narrow belt. The texture is predominantly medium-grained with a light grey hue, petrologically identified as monzonites and monzo-granites. This geological formation is intersected by pegmatites and aplite veins displaying fine-grained grey to pink colors. The granite gneisses are consistently visible throughout the applied quarry lease area.

The quarry exposes the sheet rock, forming a ridge at an elevation of 20 meters above ground level. This region of grey-colored granite gneisses exhibits moderate disturbance and features well-defined joints. Within the Quarry applied area, the granitic gneisses are prominently displayed. The arrangement of these formations can be discerned from the Geological plan (Plate no.4).

a) The preparation of the Geological plan involves contouring the topography at 2-meter intervals. The scale of Geological plan no.4 is provided in Plate no.: 4.

b) Geological cross-sections are created along the line A-A' 4A. These sections are generated at consistent intervals and presented on a scale of 1000. They are enclosed in Plate no.: 4A.

The conducted exploration within the quarry applied block encompasses surface geological mapping, sampling, and the delineation of the granite based on existing exposures and outcrops.

GEOLOGICAL RESERVES & GRADE

Following parameters have been considered for reserve estimation of the stone material deposit.

1) The entire quarry applied block is geologically mapped. The exposed dimension of the rock body has been surveyed and measured. The digitization and maps have been generated using GIS and Auto-CAD software.
2) The influence along the strike, for cross section has been taken as half the distance from the cross section on both side & up to the demarked limit of rock bodies on the other side. The length, width & depth extension of the sick body as inferred in the cross section have been considered for volume and reserved estimation.
3) The limiting of reserves is based on the existing outcrops of rock boulders & sheets with a maximum height (dimensions) of 135 m from MSL and from existing outcrop edge general ground level 96 m from MSL is taken for proved category, further below of …m each is considered for potable category reserves

and remaining under possible resources category. The basis being the indications observed in the surrounding quarries exposures and outcrops.

4) For Building stone quarry material, reserve is calculated on the basis of the outcrops of boulders sheets maximum height & it's area. In conventional method, the total sectional area in square meters, Influence in meters and recovery factor (Quantity= Area x Influence x recovery factor). Building stone quarry material recovery is about 95% and waste (voids and mining losses) is about 5% RF (Recovery factor) test were conducted on the deposit in the field and results of the Recovery factor is 95% for Building stone quarry.
5) For calculation of reserve Sectional area method is used for proved zone.

Based on the geological map and cross sections and recovery parameters highlighted above, the different categories of reserves are calculated and presented below.

A comprehensive geological survey has been conducted across the entire expanse of the lease area to identify rock formations. The geological layout has been charted based on surface exposures and formations. An encompassing geological cross-section has been formulated to cover the entire extent of the region.

At this juncture, an average width of 45 meters has been employed for the purpose of estimating reserves. The calculation involves multiplying the cross-sectional area of each section by the average width and then further multiplying this value by a tonnage factor of 2.63. This process yields the calculated tonnage.

Geological Reserves:

Section	Sectional area in Sq.mtrs.	Influence in Mtr.	Volume (cum)	Total Reserves in Metric Tonnes	Recoverable Building stone quarry Tonnes (95%)	Waste (Voids and Mining Losses) Tonnes (5%)	UNFC Classification
A-A`	1510	45	67950	178709	169773	8935	111

Mineable Reserves (After leaving Safety Parameters)

The determination of the mineable reserves within the authorized area has been conducted in accordance with conducted field studies and geological mapping. This assessment has been performed while adhering to the safety stipulation of maintaining a

protective zone of 7.5 meters along the entire lease boundary, as specified in the Metalliferous Mines Regulations of 1962 - Chapter XI, Rule 111-3(2).

The estimations of grey granitic gneiss deposits are derived from the existing sheet rock and exposed formations that are presently accessible.

Section	Sectional area in Sq.mtrs.	Influence in Mtr.	Volume (cum)	Total Reserves in Metric Tonnes	Recoverable Building stone quarry Tonnes (95%)	Waste (Voids and Mining Losses) Tonnes (5%)	UNFC Classification
A-A`	341	45	15345	40357	38339	2018	111

e) Indicate mineable Reserves by slice plan/level plan method:

The level plan required as per the proposed quarrying parameters is indicated in annual production plan & the scale of Quarrying operation is medium semi-mechanized method.

CHAPTER - 4

MINING / QUARRYING METHOD

BRIEF HISTORY OF BUILDING STONE QUARRY IN KARWAR

In coastal sandy regions, the importance of granite building stone cannot be overstated. Unlike the loose and unstable nature of sandy soil, granite offers unparalleled durability and strength, making it an ideal choice for construction. Its dense composition provides resistance against erosion, water damage, and salt corrosion—common challenges in coastal environments. Granite's aesthetic appeal, with its intricate patterns and wide range of colors, adds an elegant touch to structures while ensuring their longevity. As a robust natural resource, granite building stone contributes to the stability and resilience of coastal architecture, safeguarding against the harsh forces of nature and maintaining the region's architectural heritage for generations to come.

Nestled along the captivating coastline of Karnataka, Karwar boasts a geography that is both breathtaking and challenging. The town's proximity to the Arabian Sea subjects it

to the relentless forces of nature, including saline-laden winds, high humidity, and occasional tropical storms. The sandy terrain prevalent in this coastal region presents a notable challenge for construction, as it lacks the stability required for building foundations. This is where the need for granite building stone becomes evident. The exceptional durability and resilience of granite make it a paramount choice for countering the erosive effects of the coastal environment. Its robust nature serves as a stable base for structures, safeguarding them against the corrosive impact of salt-laden air and providing a long-lasting solution to the unique geological challenges presented by Karwar's geography.

The establishment of a granite stone quarry in Karwar emerges as a strategic necessity to address the burgeoning demand for construction materials in the region. With the town's growing population and expanding urban landscape, the need for sturdy and reliable building resources is paramount. A local quarry would not only provide a consistent supply of high-quality granite building stone but also mitigate the logistical and cost-intensive challenges of importing such materials from distant sources. By tapping into the abundant granite resources available within the region, a quarry in Karwar would not only bolster the local economy but also promote sustainable development by reducing the carbon footprint associated with long transportation distances. This endeavor aligns with both the town's infrastructural aspirations and the imperative to preserve its unique coastal environment through responsible sourcing and utilization of essential construction materials.

The establishment of a building stone quarry in Karwar holds multifaceted significance due to its potential economic, infrastructural, and environmental benefits.

1. **Local Economic Growth:** A quarry would create employment opportunities for the local workforce, stimulating the economic development of the region. Direct employment in quarry operations, as well as indirect employment in transportation, processing, and related industries, could contribute to boosting the local economy.

2. **Infrastructure Development**: A consistent and locally sourced supply of building stone would fuel the construction industry, supporting the growth of residential, commercial, and public infrastructure in Karwar. This would contribute to urban development and improve the quality of life for residents and also help the various Government projects that are coming up in the region.

3. **Reduced Transportation Costs**: Importing building stone from distant sources can be expensive due to transportation costs. Having a local quarry

would drastically reduce transportation expenses, making construction more cost-effective and environmentally sustainable.

4. **Environmental Sustainability**: Transporting construction materials over long distances generates carbon emissions and contributes to environmental degradation. A local quarry would reduce the carbon footprint associated with transportation and promote more eco-friendly construction practices.

5. **Preservation of Architectural Heritage**: Karwar's architecture often relies on indigenous materials to maintain its cultural and historical identity. A local quarry would ensure the availability of traditional building stone, allowing for the preservation and continuation of local architectural styles.

6. **Regulation and Planning**: A well-managed quarry operation can be subject to regulatory oversight, ensuring responsible extraction practices, proper waste disposal, and reclamation of quarried areas. This helps minimize negative environmental impacts and ensures sustainable land use.

7. **Research and Innovation**: A local quarry could encourage research and innovation in the field of construction materials, presence of many institutions in the area can be largely benefited. Researchers and experts may study the unique geological characteristics of Karwar's building stone to develop advanced construction techniques and materials.

8. **Long-Term Sustainability**: Having access to a local and reliable source of building stone ensures the long-term sustainability of construction projects. This is especially important for critical infrastructure such as hospitals, schools, and government buildings.

In conclusion, the establishment of a building stone quarry in Karwar goes beyond just fulfilling construction material needs. It has the potential to drive economic growth, promote sustainable development, preserve local heritage, and contribute positively to the community and environment. Proper planning, regulation, and responsible quarry management are essential to maximize these benefits while minimizing any potential drawbacks.

MANUFACTURED-SAND AS AN ALTERNATE TO RIVER SAND

Embracing manufactured sand as a viable substitute for river sand in Karwar carries numerous advantages tailored to the local context. With Karwar's coastal location and ecological sensitivity, the use of manufactured sand alleviates the pressures on

riverbeds, preserving these delicate ecosystems and preventing environmental degradation caused by excessive sand extraction. This approach promotes responsible resource management in line with Karwar's commitment to safeguarding its natural beauty. Furthermore, the consistent quality and controlled composition of manufactured sand enhance the reliability of construction materials, vital for the region's infrastructure development. By utilizing manufactured sand, Karwar can mitigate the challenges posed by erratic river sand availability due to seasonal variations and regulatory restrictions. This practice not only ensures a steady supply of construction material but also contributes to the longevity and sustainability of the town's burgeoning urban landscape.

So, it is a need of the time to find some substitute to natural river sand. Due to non-availability of river sand resources in surrounding districts of Karwar, the Government of Karnataka has initiated steps to promote and encourage production of Manufactured Sand (Building stone quarry) from Building stone quarry mineral. In order to overcome shortage of River Sand in the region, Manufactured sand plant can be setup to overcome the shortage of River Sand.

METHOD OF WORKING

The quarrying activities planned for the designated area during the proposed period involve a semi-mechanized approach utilizing open-cast quarrying methods. Based on a range of technical factors including surface topography, quality variances, geological aspects, desired production rates, and available resources, it is intended to operate within this deposit by adopting 3-meter bench heights. The quarrying will entail medium-scale operations incorporating small-diameter jack hammer drilling, controlled blasting, and the use of hydraulic rock breakers. The prescribed bench height and width criteria set by DGMS will be adhered to, with the bench width not falling below the specified bench height.

The Plate No. 5 presents a comprehensive Year-wise Production & Development Plan, indicating the quarrying activities, waste disposal sites, and other relevant aspects. The same plate also showcases a Plan illustrating the current working positions, proposed extensions, bench specifications, and the final configuration of the pit at the culmination of the planned period.

In the quarry's design, particular attention will be given to bench layout adjustments through straightening and progressive advancement. This strategy aims to optimize both effectiveness and economic efficiency during quarrying operations.

Considering the fact that the water table lies significantly beneath the surface and that the monsoon rainfall is moderate, meticulous arrangements will be put in place to manage water drainage. This will involve the construction of appropriate channels, check

dams, and retaining walls, all meticulously designed to maintain the area's natural drainage pattern without disruption.

PRODUCTION GUIDELINES STIPULATED BY DEPARTMENT OF MINES & GEOLOGY

Upon securing all required legal approvals such as the Approved Quarry Plan and Forest Clearance, along with the fulfillment of obligations like payment of the Security Deposit and associated Royalties, the applicant will proceed to formalize a quarry lease deed. The terms and conditions specified in the KMMC Rules of 1994, as updated periodically, will apply appropriately to the lease deed thus executed.

Period Of Quarry Lease

The period of the lease will be 15 years.

YEAR WISE DEVELOPMENT AND PRODUCTION

Year wise development and production proposed for five years are presented in the table below. The approach roads are shown in the production and development plan. The year wise details are specified in the following table.

YEAR	Section	LEVELS	Sectional area in Sq.mtrs.	Influence in Mtr.	Volume in CUM	Total Reserves in Metric Tonnes	Recoverable building stone Tonnes (95%)	Waste (Voids and Mining Losses) Tonnes (5%)	UNFC Classification
I YEAR	A-A`	132/126	23	45	1035	2722	2586	136	111
Total							**2586**	**136**	
II YEAR	A-A`	126/120	16	45	720	1894	1799	95	111
		120/114	7	45	315	828	787	41	111
Total							**2586**	**136**	

III YEAR	A-A`	120/114	23	45	1035	2722	2586	136	111
Total							**2586**	**136**	
IV YEAR	A-A`	120/114	23	45	1035	2722	2586	136	111
Total							**2586**	**136**	
V YEAR	A-A`	114/108	23	45	1035	2722	2586	136	111
Total							**2586**	**136**	

The summary of the soil waste generated during quarrying operations are as furnished below:

YEAR	Soil cover in Sq.mtrs.	Influence in Mtr.	Volume in CUM	BULK DENSITY	Soil waste Tonnes
I YEAR	5	45	225	1.2	270
II YEAR	3	45	135	1.2	162
III YEAR	2	45	90	1.2	108
IV YEAR	2	45	90	1.2	108
V YEAR	1.5	45	67.5	1.2	81
			607.5		729

CONCEPTUAL MINING PLAN FOR THE ENTIRE APPLIED PERIOD

The Quarrying is proposed to be taken up with the capacity of Development & Production of RoM of about 2586 MT of Building stone quarry till the end of fifteen years planned Quarry period. Any modifications in the quantum of production will be intimated & details will be furnished to Department of Mines & Geology. The mined out pits after extraction of the Building stone quarry will be reclaimed by suitable engineering and afforestation techniques. The successive advancement of the pit at the end is depicted in the Conceptual Mining Plan vide Plate - 7 The design & layout of the quarry benches is shown on the above referred relevant plan. During the conceptual plan period the anticipated production levels of Building stone quarry for the first 5 years period will be MT with minimum production of 2586 MT. The quantity of waste /mining losses generated is very less & the same shall be utilized for formation of safety bunds, road leveling work to fill potholes etc.

The guidelines of state Government i.e., DMG will be followed during the conceptual period in respect of mineral Conservation & Environmental Management Plan.

The quantity of waste/mining losses generated is very less & the same shall be utilized for formation of safety bunds, road leveling work to fill potholes, etc.

OPENCAST MINING.

The quarry operation is intended to adopt a semi-mechanized approach. To align with the quarrying production plan, the strategy involves the deployment of various machinery for both development and production purposes. This includes the utilization of drilling equipment, hydraulic rock breakers, excavators, loaders, and tippers or tractors. The implementation of small-diameter jack hammers and controlled blasting will be part of the approach, executed under the supervision of licensed and certified blasters through contractual agreements and with the necessary approvals from the relevant authorities.

The quarrying process will involve the creation of benches with a height of 6 meters and a width exceeding the height by 6 meters. These benches will follow a general pit slope with an inclination of 45 degrees.

EXTENT OF MECHANIZATION

As outlined previously, the mechanization plan entails the utilization of various machinery within the quarrying operations. The envisioned approach encompasses the deployment of Excavators, Jack Hammer drilling machinery utilizing wet drilling techniques, facilitated by Compressors for power, and the integration of Hydraulic Rock Breakers to minimize the need for traditional blasting and reduce explosive usage. In addition, a

Loader Backhoe will be employed as auxiliary equipment. This comprehensive setup will be complemented by the inclusion of 10-ton capacity Tippers, responsible for transporting building stone quarry blocks from the excavation site to the Crushing and Screening plant, which will be established beyond the specified area.

MACHINERY REQUIREMENT FOR QUARRYING

The following machinery holds pivotal and distinct roles, guiding the journey from quarrying operations to their eventual destinations in the market:

- **Compressors**: These power the jack hammer drills, facilitating the creation of boreholes in rock formations for the purpose of blasting.

- **Hydraulic Excavators**: These machines are utilized for excavating trenches and holes, as well as for loading boulders onto tippers and trucks.

- **Rock Breakers**: Employed to fracture oversized boulders, these are crucial for various quarrying tasks such as scaling and loading explosives.

- **Tippers/Dumpers**: Serving as the primary mode of transportation, these vehicles play a key role in transporting boulders to their end users or designated sites.

DRILLING AND BLASTING

The process of quarrying building stone involves several activities such as Jack Hammer drilling and blasting to extract blocks, which are then loaded using an excavator. Additionally, the extraction of slabs will involve the use of cracking powder as needed.

The general parameters for blasting, including elements like charge per hole, blasting pattern, charge per delay, maximum holes per round, and the sequential firing method, are outlined as follows.

The blasting process will be conducted meticulously to minimize ground vibrations, employing a Controlled Blasting Methodology. Steps will be taken to ensure that noise levels remain below 90 dB. Blast holes, measuring 32 mm in diameter and 5 feet in depth, will be charged with a maximum of 187.5 grams of explosives, avoiding excessive charges. Furthermore, the drilling approach will involve vertical holes rather than inclined drilling.

LOADING AND HAULING

Mechanical loading techniques will be employed to load building stone quarry blocks onto 10-ton capacity tippers. These loaded materials will then be transported from the quarry site to their intended end users or locations. The management of mineral rejection and waste will also be conducted through mechanical means.

Within the quarry premises, the roads will be consistently maintained with a gradient of 1:16. To ensure safety during operations, an ample number of bunds and parapet walls will be constructed alongside the quarry haulage roads wherever deemed necessary. The construction of these safety features will utilize waste materials generated over the course of quarry operations.

STOCKING OF MINERAL REJECTS AND DISPOSAL OF WASTE

The intended quarry location primarily consists of a rock formation with occasional topsoil patches, leading to a relatively minimal generation of overburden or waste material. The projected waste production during the envisioned quarrying period is as follows:

Stony waste - 681 MT
Soil waste - 729 MT

The quantities of waste and mining byproducts generated will be repurposed for constructing safety embankments and road leveling activities, including the filling of potholes and related tasks.

USE OF MINERAL (BUILDING STONE)

The Building stone (Granite) extracted from the quarry will be fed primarily to satisfy demands of the domestic construction and major projects that are coming up in the area.

The Quarry location is around 8 KM away from NH 66 (Kanyakumari – Panvel) highway and 7 KM away from SH 34 (Ramnagar-Karwar) highway and allows easy access to the nearby construction activities, and there is surge of construction activities in Karwar and Uttar Kannada district which needs to be met an on-going and frequent basis.

Also, infrastructure and related activities like increase in residential and middle-income housing projects in the close vicinity have contributed to the demand of aggregate materials.

TRANSPORTATION TO FINAL DESTINATION

The transportation of building stone from the quarry to Karwar city is a pivotal logistical process that bridges the gap between raw material extraction and construction implementation. A well-organized network of transportation ensures a steady supply of essential construction materials, contributing to the region's infrastructure development. Typically, trucks or other specialized vehicles are employed to carry the extracted stone over varying distances, navigating through diverse terrains that might include hilly areas and plains. The journey demands careful coordination, considering factors such as road conditions, traffic, and weather. Efficient transportation not only supports the construction industry's demands but also influences the overall cost-effectiveness and timely completion of projects. By streamlining this crucial link in the construction chain, Karwar's urban growth can be nurtured while ensuring the sustained availability of quality building materials.

The transportation will be mainly done using Dump/Tipper trucks of various capacity as per the requirement of the end user/projects.

EMPLOYMENT POTENTIAL

Quarrying and transportation will potentially employ nearly 60 people a majority of whom can be from the locality only. Appointments of experienced and qualified statutory staff will be in accordance with the rules and necessary permissions will be obtained for any exemption if any appointment is on part-time basis for small scale production activities.

TENTATIVE EMPLOYMENT PATTERN

QUARRYING

Sl. No.	Designation	Qualification	Persons
1	Foreman	Diploma	1
2	Quarry Supervisor	Diploma	1
3	Field Executive	Diploma	1
4	Quarrying Labours - Semi skilled	Semiskilled	15
5	Quarrying labours-unskilled	Unskilled	15
6	Drivers	Skilled	5-6

ADMISTRATIVE

Sl. No.	Designation	Qualification	Persons
1	Commercial Manager	B.Com	1
2	Commercial Assistants	Diploma	2
3	Office Assistants	PUC/SSLC	1

TOTAL ESTIMATED WORK FORCE	

FACILITIES

Provisions will be there for the following Essential services for the workforce.

1. Drinking water
2. First Aid Kit
3. Canteen
4. Rest rooms

CHAPTER-5

ENVIRONMENTAL MANAGEMENT PLAN

STATUS OF BASELINE INFORMATION

The applied quarry lease encompasses the region of Arav gram of asnoti village, designated for open cast mining to extract building stone using semi-mechanized techniques. It is acknowledged that any form of quarrying will have an impact on the current ecological setup. Subsequent sections will delve into a comprehensive exploration of these effects that quarrying exerts on the environment, along with the proposed strategies to mitigate these impacts.

LAND USE PATTERN

The subject area is minor forest land. The landscape is characterized by rocky surfaces adorned with small bushes and shrubs. The intended utilization of the applied area pertains to quarrying activities, and aside from this purpose, the land remains unutilized for any other intent.

The details of the utilization of the proposed area for next fifteen years is as follows:

Sl. No.	Proposed Land Use	Area
1	Quarry workings	0.1300
2	Waste dumps	0.00
3	Roads	0.156
4	Mineral storage	0.00
5	Proposed buffer zone	0.00
6	Undisturbed area	0.2068

WATER REGIME

Within the region, there are no consistent flowing streams or springs, and the groundwater level is situated at a considerable depth in the valley outside the specified area. The watercourses, known as "nallas," run along the slopes of the terrain, holding water solely during the monsoon season. The water table itself is located Aerial distance of 150-200 meters beneath the typical ground level, and the proposed quarrying activities are not projected to disrupt the existing water dynamics.

FLORA AND FAUNA

In the context of Karwar city, the surface of the designated area is characterized by rocky outcrops. Apart from shrubs and bushes, the prevailing vegetation primarily comprises Acacia trees within the applied area. Surrounding the applied zone, the buffer area encompasses forests and agricultural lands, among other features. There is a noticeable absence of significant wildlife within the immediate vicinity of the area.

QUALITY OF AIR, AMBIENT NOISE LEVEL AND WATER

The air quality is currently within normal limits, and there are no significant sources of air pollution in the region. However, activities like manual or mechanical loading, jack hammer drilling, rock breaker shoveling, and truck transportation can lead to the

generation of airborne dust. To counter this, water sprinklers will be employed to control the dust.

The ambient noise levels remain considerably below the established threshold value. This is attributed to the serene nature of the area and the absence of human settlements within a radius of (Aerial) distance of 2 kilometers from the Quarry application site.

Water sources are absent within the immediate area. Consequently, water required for mining activities will be procured from a nearby area.

CLIMATIC CONDITIONS

In the context of Karwar city, the locale falls within a semi-arid zone. The study period revealed a peak temperature of around 36°C and a minimum temperature of 15°C. Rainfall is limited and predominantly occurs during the monsoon season.

HUMAN SETTLEMENTS

Human settlement is absent within a considerable radius surrounding the designated area. The nearest habitat in Arav gram of Asnoti village, is situated Aerial distance of 3 kilometers (aerial) southwest of the Quarry site. This spatial separation ensures a significant distance between the quarrying operations and any inhabited areas, minimizing potential impacts on local communities.

PUBLIC BUILDINGS

There are no public structures, landmarks, or wildlife reserves in the immediate vicinity of the designated area. To prevent surface runoff onto agricultural lands, the leaseholder is required to construct retaining walls and check dams. There are no accessible open wells or bore wells in the proximity of the quarrying site. The suggested quarrying zone is positioned at an elevation of Aerial distance of 60 meters higher than its surroundings, leading to the assumption that the water table will remain unaffected.

It is crucial to maintain noise levels within acceptable boundaries, and if needed, the leaseholder will seek approval from the relevant authorities.

ENVIRONMENTAL IMPACT ASSESSMENT

The core zone of the Quarry application area is designated for medium-scale operations. Quarrying will be the predominant activity in this zone and will extend to the buffer zone surrounding the applied area for the next fifteen years. There will be no detrimental

impacts on the local land environment. The majority of the buffer zone will remain untouched, maintaining its natural vegetation and topographical features.

The quarrying or mining operations will not have any impact on public infrastructure, historical monuments, or archaeological sites, as there are none in the proximity of the designated quarrying area.

AIR QUALITY

The process of quarrying for building stone primarily encompasses activities like jackhammer drilling and controlled blasting. The utilization of machinery in excavating and loading extracted minerals significantly impacts the air quality. Dust emissions occur during the loading and transportation of minerals, with their extent influenced by variables such as topography, the material's characteristics, climatic conditions, wind patterns, and the classification of the area, including its buffer zone villages.

WATER QUALITY

Surface Water - In the vicinity of the designated quarry area, only a limited number of small seasonal streams are present. Measures will be implemented to prevent the runoff from the quarry site from reaching these nearby streams. This will be achieved through the construction of check dams, gully plugs, and retaining walls.

NOISE LEVEL

Anticipated noise levels in both the core and buffer zones are projected to remain within acceptable thresholds. While the quarrying operations may lead to heightened noise levels at loading points and during jackhammer drilling, it's noteworthy that workers will not be subjected to prolonged exposure to elevated noise levels. As a result, additional precautions are not deemed necessary. Nonetheless, earplugs or earmuffs will be supplied to workers to ensure their auditory well-being.

VIBRATION LEVELS (DUE TO BLASTING)

Given the proposal for quarry operations involving moderate-scale earth-moving machinery and drilling, the resulting effects on ground vibration levels are deemed negligible, and the machinery's vibration levels during operation will adhere to acceptable limits. The employment of explosives will be limited to the essential minimum, achieved through the utilization of hydraulic rock breakers and the implementation of controlled blasting techniques.

WATER REGIME

The nearby seasonal streams adjacent to the buffer zone experience dry conditions and become active during periods of rainfall. Due to the shallow nature of these water courses and the higher elevations of the quarry workings, water-related challenges are not anticipated. Given the relatively elevated rainfall levels, the construction of adequate check dams and retaining walls will be undertaken to mitigate potential siltation and runoff issues. While stringent precautions will be implemented to prevent any disruption to the water regime, it's important to note that the water requirement at the quarry site is strictly for domestic consumption and drinking purposes, and is not intended for mineral beneficiation, washing, or similar activities.

OCCUPATIONAL HEALTH AND SAFETY

The predominant livelihood of the local population revolves around agriculture and fishing, and various quarrying-related endeavors. In recent times, an increasing number of individuals have transitioned to more lucrative roles within the quarrying industry. Moreover, in accordance with the stipulated regulations of the Director General of Mines Safety, essential safety gear such as safety shoes, helmets, goggles, leather gloves, earmuffs, and breathing masks will be supplied to all eligible workers, emphasizing our unwavering commitment to ensuring their well-being.

HISTORICAL MONUMENTS IN THE SURROUNDING.

Within a radius of 5 kilometers, no historical monuments or significant sites of importance are situated. This absence of such landmarks underscores the suitability of the area for the proposed activities.

TEMPORARY STORAGE AND UTILIZATION OF TOP SOIL

To commence, we want to express our genuine commitment to engaging in afforestation initiatives. Given that the quarrying operations are exclusively limited to the hills' slopes within the quarry block, with the topsoil thickness rarely exceeding 1 meter and confined to small areas, there is no possibility of disturbing the topsoil. Any identified topsoil within the region will be meticulously extracted for the sole purpose of afforestation, affirming our dedication to responsible land management and ecological preservation.

RECLAMATION PROPOSAL

During the initial five-year period, the plan outlines a targeted annual quarrying scale of approximately of 2586 MT. Any excess overburden resulting from the quarrying

activities will be stored in designated areas, serving as a resource for potential future pit filling endeavors aimed at reinstating the original topographical features. Notably, the quarry area is characterized by hilly terrain and the building stone quarry operations are primarily limited to the ridges and slopes, rendering the need for pit filling redundant. Infrastructure such as shelters will be dismantled, and conscientious efforts will be made to restore the land to its native state to the extent feasible.

PROGRAM OF AFFORESTATION

The plan entails the creation of a verdant zone both within and beyond the designated area, encompassing the vicinity of the haul road outside the allotted zone, once the essential permissions from relevant authorities are secured. Each year, a systematic afforestation initiative will be undertaken, involving the planting of 100 saplings within and around the designated region. Diligent attention will be devoted to safeguarding and nurturing these saplings to ensure their optimal growth. The afforestation program will predominantly feature indigenous bio-fuel species such as Honge, Neem, and Badam, contributing to sustainable ecological enrichment. The finer intricacies of this afforestation endeavor are delineated in the subsequent details.

AFFORESTATION PROGRAM FOR THE FIRST FIVE YEAR PLAN

Year	No's.	Survival	Saplings
1	100	75-80 %	Acacia
2	100		
3	100		
4	100		
5	100		
Total	500		

STABILIZATION AND VEGETATION OF DUMPS

Given the absence of pre-existing old dumps, the concepts of stabilizing and vegetating such areas do not apply. The volume of waste or mining losses produced is minimal, and these materials will be effectively repurposed for constructing safety embankments, leveling roads, and filling potholes, thereby ensuring resourceful and practical utilization.

TREATMENT AND DISPOSAL OF WATER FROM MINE

As previously clarified, there are no water sources within the vicinity of the quarry block. The allocated quarry area is situated in an elevated and hilly terrain, and the planned fifteen years of quarrying operations will be limited to the confines of the excavation pit.

This design effectively eliminates the potential for water accumulation within the pit, negating the need for water treatment and disposal from the quarry site.

MEASURES FOR MINIMIZING ADVERSE EFFECTS IN WATER REGIME

The existing water regime in the area remains unaffected, as elucidated earlier. Thorough considerations of hydrological patterns, geological features, and water management strategies have been undertaken to ensure that any potential impacts on the local water system are mitigated. Comprehensive measures, including proper drainage planning and sediment control practices, have been integrated to preserve the integrity of the water regime. Consequently, this vigilant approach highlights our dedication to upholding the ecological balance and sustaining the hydrological equilibrium within the region.

PROTECTIVE MEASURES FOR GROUND VIBRATION/AIR BLAST CAUSED BY BLASTING

Over the course of fifteen years, the production process will predominantly involve the utilization of small-diameter drill-equipped jackhammers for quarrying operations. In this proposed quarrying approach, controlled blasting techniques will be employed, ensuring that the vibrations resulting from blasting remain minimal and well within manageable levels. This meticulous approach to controlled blasting not only underscores our commitment to minimizing environmental impact but also ensures that surrounding areas and structures are safeguarded from any adverse effects. Moreover, the controlled blasting techniques signify a conscientious effort to maintain a harmonious coexistence with the surrounding community, as noise and disturbance will be effectively managed, thereby contributing to a sustainable and responsible quarrying operation.

CONSTRUCTION OF SAFETY WALL AROUND THE QUARRY

Upon the commencement of quarrying activities reaching below the ground level, it becomes imperative to construct a safety wall in accordance with the guidelines stipulated by the Mines and Geology department and the Ministry of Environment, Forest, and Climate Change (MOEF). This measure is designed to prevent any unfortunate incidents involving human beings or animals accidentally falling into the deeper sections of the quarry.

The construction of this safety wall serves a dual purpose: it ensures the well-being and safety of individuals working in or around the quarry, while also safeguarding the local wildlife from potential hazards. This proactive approach not only aligns with regulatory

requirements but also underscores a commitment to responsible and ethical quarrying practices that prioritize both human and ecological welfare.

By adhering to these directives and implementing the safety wall, the quarrying operations not only comply with regulatory mandates but also contribute to a safer and more secure working environment for all stakeholders involved.

SOCIO-ECONOMIC BENEFITS ARISING OUT OF MINING

The introduction of the Semi-mechanized Quarrying proposal is poised to offer a sustained source of employment for the labor force hailing from the adjacent villages. Presently, these individuals rely heavily on agricultural pursuits for their livelihoods. By implementing this proposal, the region stands to benefit from the creation of around 50 immediate job opportunities, in addition to indirectly generating employment for another 50 individuals.

This influx of employment avenues is anticipated to significantly bolster the economic landscape of the local community. The diversification of employment options beyond agriculture not only reduces the community's dependence on a single sector but also contributes to a more stable and prosperous economic outlook. The increased income from these employment opportunities could potentially lead to improved living standards, enhanced access to essential services, and greater overall well-being for the people residing in the area. As a result, the Semi-mechanized Quarrying proposal has the potential to positively transform the socio-economic fabric of the nearby villages.

CHAPTER - 6

PROGRESSIVE QUARRY CLOSURE PLAN

INTRODUCTION OF LESSEE

Name of Applicant: **SAI RAM ENTERPRISES (RAJESH NAIK)**
Address of Applicant: **H no 4, Saileela, Gaongeri, Majali, Karwar, Karnataka.**
Status of Applicant: **Individual**
Extent of Quarry**: – 0.4928 HA**

Type of applied area: **Forest Land**

PRESENT LAND USE

Sl. No.	Proposed Land Use	Area
1	Quarry workings	0.0501
2	Waste dumps	0.00
3	Roads	0.156
4	Mineral storage	0.00
5	Proposed buffer zone	0.00
6	Undisturbed area	0.2867
Total		**0.4928**

DETAILS OF AREA WITH LOCATION MAP

The applied area is marked on location map cum key plan (plate no 1.)

Area in HA	Survey No.	Village	Taluka	District
0.4928	215A1A	Arav gram of Asnoti village	Karwar	Uttara kannada

GPS READING

Corner Points	Northing	Easting
BP-1	N-14°054'18.73"	E-74° 09'8.83"
BP-2	N-14°054'19.08"	E-74° 09'10.32"
BP-3	N-14°054'21.47"	E-74° 09'9.24"
BP-4	N-14°054'19.71"	E-74° 09'7.88"

REASONS FOR CLOSURE

The presented plan pertains to the gradual cessation of quarrying activities (Plate 06), as a comprehensive final closure plan will be formulated and presented one year before the intended cessation of quarry operations. This aligns with the directives and proposed guidelines outlined in the Karnataka Miner Mineral Concession & Development Rules. The concept of progressively closing the quarrying operations is being explored to facilitate the restoration and revitalization of the area. The geological characteristics of the designated region and the existing quarrying activities in the vicinity suggest the presence of additional deposits for building stone quarrying at greater depths.

Considering the possibility of fully exploiting the building stone quarry deposit to its economically viable depth and the associated quarrying undertakings, it is apparent that the quarry has not reached a stage of maturity that would warrant closure within the current planning period. As a result, this plan primarily addresses measures aimed at safeguarding the area and proposals for rehabilitating the land.

STATUTORY OBLIGATIONS

The progressive Quarry Closure Plan (Plate 06) is prepared as per the directives of draft guidelines of Karnataka Minor Mineral Concession Development Rules 2010 as a component of the Quarrying plan. The applicant will abide by the terms and conditions imposed in the lease deed, comply with statutory directions of the State Department of Mines & Geology, DGMS, MOEF & Forest Department, & other State / Central Govt. Agencies from time to time**.**

MINE DESCRIPTION

Topography: As detailed in Chapter 4 Regional Geology: As detailed in Chapter 4
Stratigraphic Sequence: As detailed in Chapter 4 Lithology: As detailed in Chapter 4
Mineralogy: As detailed in Chapter 4
Local Geology: As detailed in Chapter 4
Geological Reserves and Grade: As detailed in Chapter 4

QUARRYING METHOD

The quarry operated following semi-mechanised and opencast quarrying method, as detailed in Chapter 5.

QUARRY PLAN INCLUDING FIVE YEARS PROGRESSIVE CLOSURE PLAN UP TO THE FINAL CLOSURE OF THE QUARRY

The quarry is located in Arav gram of Asnoti village, Karwar Taluk, Uttara Kannada District, spanning 0.4928 hectares, involves the implementation of a semi-mechanized opencast approach for the extraction of Building stone quarry, as detailed in preceding sections of this Quarry Plan.

ABSTRACT OF THE PROPOSALS FOR PROTECTION OF ENVIRONMENT TEMPORARY STORAGE AND UTILIZATION OF TOP SOIL

According to the outlined quarrying plan for the upcoming five-year period, a moderate volume of topsoil will be created. This equivalent amount of topsoil will then be collected and repurposed to support afforestation endeavors. This strategy reflects our commitment to sustainable practices, ensuring that materials resulting from the quarrying activities are effectively utilized for environmental enhancement.

YEAR WISE PROPOSAL FOR RECLAMATION

Considering the continued presence of Building stone deposits, simultaneous reclamation measures are not viable. Instead, reclamation through back-filling will be proposed once the excavated pits are depleted. The areas that have been mined out, as indicated in the relevant year-wise production and development plans, won't have achieved the necessary maturity for reclamation. Thus, the current plan doesn't include back-filling for reclamation of worked-out pits. Post mineral extraction, appropriate afforestation techniques will be employed for reclamation efforts. To prevent accidental animal falls and unauthorized human access to the excavated pits, comprehensive fencing will be established all around the area. This approach underscores our commitment to responsible quarry management that aligns with ecological preservation.

AFFORESTATION PROGRAMME

The plan entails establishing a green belt both within and outside the designated area. Moreover, the space adjacent to the haul road beyond the designated area will undergo afforestation activities, subject to obtaining required approvals from relevant authorities. This initiative involves planting 100 saplings each year. Carefully selected species have been chosen for the green belt, prioritizing those that exhibit rapid growth, dense foliage, and a robust canopy. This selection includes eco-friendly commercial varieties as well as

ornamental plants, collectively contributing to both ecological enhancement and aesthetic enhancement of the area.

Sl. No.	Year	Location	No. Of Saplings	Species
1	1st	7.5m safety barrier of lease boundary & Along Haul roads	100	Acacia
2	2nd	……..DO……..	100	……..DO……..
3	3rd	……..DO……..	100	……..DO……..
4	4th	……..DO……..	100	……..DO……..
5	5th	……..DO……..	100	……..DO……..

STABILIZATION OF DUMPS

The production of overburden and waste over the intended quarrying plan period is estimated to be 1410 MT, encompassing voids and mineral losses. Storage of this waste is unnecessary, as it will be efficiently repurposed for tasks such as road leveling and maintenance. This approach underscores our commitment to resource optimization and sustainable land management practices within the operational framework.

MEASURE TO CONTROL EROSION/SEDIMENTATION OF WATER

Preservation of the current watercourses remains a priority, ensuring that rainwater retains its natural flow direction. To effectively manage surface runoff, an ample number of check dams will be strategically erected within the drainage channels. Comprehensive information regarding this water management strategy is provided in the environmental management plan chapter. By implementing these measures, we are dedicated to upholding the integrity of the local water system, preventing erosion, and promoting sustainable water usage practices that align with environmental preservation goals.

TREATMENT AND DISPOSAL OF WATER FROM MINE

Given the absence of both mine water and groundwater, there is no requirement for water pumping, treatment, or disposal measures to be considered in relation to the quarry operations. Steps taken to mitigate potential water-related challenges involve maintaining the current watercourses undisturbed, allowing rainwater to follow its natural path. With no extraction or pumping of water for quarrying purposes, the existing water

regime is not expected to undergo adverse impacts. This conscientious approach reflects our dedication to ensuring the minimal ecological footprint of the quarrying activities and preserving the local hydrological balance.

MEASURE FOR PROTECTING HISTORICAL MONUMENTS AND FOR REHABILITATION OF HABITAT

There are no historical monuments situated within a 5-kilometer radius, which eliminates the necessity for protective measures in this regard. The absence of such heritage sites in close proximity simplifies the conservation considerations, allowing us to focus on the preservation of the natural environment and the sustainable management of the quarrying operations. Our commitment to responsible practices ensures that the activities conducted within this area have minimal impact and are aligned with both environmental and cultural sensitivities.

QUARRY CLOSURE PLAN

MINED OUT LAND

Given the present state of the worked-out area, the remaining Building stone quarry deposit continues to extend. Consequently, reclamation of mined-out areas is not currently planned due to the persistence of the deposit, and reclamation is envisioned only upon the cessation of quarrying activities, specifically after the complete exploitation of the deposit. In the event of any temporary suspension of quarry operations, the applicant commits to implementing suitable measures to prevent unauthorized access, institute protective measures, and secure the quarry openings, workings, and associated structures. This will include the maintenance of the quarry workings, overburden dumps, stockpiles, and any other structures in stable and secure conditions.

The designated area for operation within the initial five years is outlined in the year-wise production and development plans. The proposed reclamation activities involve afforestation in open spaces beyond the applied area. Notably, the actual worked-out areas will be periodically reclaimed by means of back-filling in the future, with the intention of creating a viable water body and restoring the environmental balance.

WATER QUALITY MANAGEMENT

The water quality remains unaffected as the Building stone quarry operations do not introduce any sources of pollution. With no contaminants originating from the quarry, the natural water quality in the area remains preserved. This commitment to maintaining the integrity of local water resources underscores our dedication to responsible quarrying practices and environmental conservation. Through vigilant monitoring and adherence to

best practices, we ensure that the surrounding water sources continue to remain pristine and untainted.

AIR QUALITY MANAGEMENT

The production of dust from the quarrying activity is minimal. The primary contributors to air pollution are the jack hammer drilling, rock breaker operations, and the loading of Building stone quarry material as well as overburden. Measures for maintaining air quality will include dust suppression through water sprinkling on haulage roads and the application of wet drilling techniques. Furthermore, it's noteworthy that there are no significant industries in the vicinity, and the deposit is being utilized on a relatively modest scale.

NOISE LEVEL AND VIBRATION MANAGEMENT

Quarrying operations exclude extensive deep hole drilling and blasting activities; instead, only small-diameter jack hammer drilling is planned. For the safety and well-being of drill operators, precautionary measures such as providing protective ear muffs, nose masks, hand grips, and safety shoes are implemented. These measures aim to mitigate the impact of noise, vibrations, and other potential hazards associated with the drilling process.

WASTE MANAGEMENT

The quarry produces minimal waste material, and this limited waste is actively repurposed for afforestation efforts. Through responsible waste management practices, we are contributing to ecological balance and sustainable land use. Our commitment to utilizing waste for afforestation underscores our dedication to environmental stewardship and resource optimization.

INFRASTRUCTURE

Furthermore, within the initial five-year plan, there are no intentions to commence closure operations. The area doesn't demand significant infrastructure attention during this phase. At present, the applied area doesn’t have any Railwayline, Telephone or Electricity lines or any such similar public utilities. Ongoing supervision and upkeep of existing infrastructural elements, including roads, structures, etc., will be diligently carried out.

DISPOSAL OF QUARRYING MACHINERY

There is no proposal of disposal of quarrying machineries during the present plan period. This will be taken care in the final Quarry closure plan.

SAFETY AND SECURITY

The applicant is committed to adhering to the existing Acts and regulations, along with any pertinent directives issued periodically by the Department of Mines and Geology, Department of Forest, or any other concerned bodies. To ensure controlled access and restrict unauthorized individuals from entering the quarrying area, the applicant will effectively enclose the excavated zone with a barbed wire fence of suitable height. The applicant will also engage security personnel to safeguard against unauthorized entry, especially on weekends, holidays, and during periods of quarrying operation discontinuation.

DISASTER MANAGEMENT OF RISK ASSESSMENT

All safety protocols during the quarrying process will adhere to the DGMS standards. Ensuring the safety of both personnel and machinery remains paramount throughout this quarrying operation. There is no risk to public safety or property, as trucks exclusively traverse public roads to transport materials from the quarry site. Notably, there are no water impoundments at elevated levels or lower contours.

CARE AND MAINTENANCE DURING TEMPORARY DISCONTINUANCE

During temporary discontinuation of the quarry, essential care and maintenance procedures will be diligently followed. The prescribed forms for notifying temporary discontinuance will be submitted to the relevant authorities, along with comprehensive details of the implemented protective measures. Security measures for the working areas, such as fencing and appropriate display boards, will be implemented throughout the temporary discontinuance period.

Regarding the economic consequences of mine closure and potential manpower retrenchments, the specifics of manpower retrenchment compensation will be incorporated into the final quarry closure plan, as its applicability is not current. However, key features are briefly outlined below. Approximately of 75% of the locally employed individuals in the quarry come from agricultural backgrounds. These individuals will be assisted in transitioning back to their original occupations, with necessary counseling provided.

Compensation, as mandated by statute, will be granted to eligible employees to support themselves and their families upon the final closure of the quarry. Satellite occupations associated with the quarrying industry, the number of engaged individuals, and the potential continuation of these businesses post-quarry closure were considered. Since many satellite occupations aren't solely reliant on quarrying, closure won't heavily impact them. Workshops, hotels, tea shops, and similar businesses will likely continue, and certain personnel will be retained for short-term essential services. In cases of prolonged operational suspension, employment will be minimized, with rehabilitation counseling offered.

Anticipated effects on the local society due to mine closure encompass economic and communication impacts, including manageable alterations in transportation. Detailed information will be provided in the final quarry closure plan.

ABANDONMENT / REHABILITATION COST AND COST ESTIMATION

The provided statement illustrates the expense-driven calculation for the tasks essential in carrying out the protective and rehabilitation measures, encompassing their ongoing maintenance and monitoring program –

Sl. No.	Activity	Recurring Cost (Rs)
1	Afforestation work	50000
2	Dust Suppression	50000
3	Environmental Monitoring	2,00,000
4	Miscellaneous	20000
5	Fencing	1,00,000
Total		4,20000

TIME SCHEDULING FOR ABANDONMENT

The current proposal outlines a proactive approach to quarry closure, wherein reclamation and rehabilitation actions are undertaken concurrently with the ongoing quarrying operations, without any intention of ceasing quarry activities. The allocation of workforce and resources for implementing protective and rehabilitation measures will be extensively addressed in the upcoming quarry closure plan, which will be presented prior to the eventual cessation of quarry operations. Aspects including afforestation within and beyond the designated quarry area, reclamation, rehabilitation, environmental monitoring

specifics, machinery performance, and the socio-economic repercussions of quarrying will be consistently supervised and reported to both the Department of Forest and the Department of Mines and Geology. Corresponding records of these activities will also be diligently maintained.

The progressive reclamation and rehabilitation measures for the proposed quarrying plan period of fifteen years as stated in following table:

Sl. No.	Activity	Recurring Cost (Rs)
1	Afforestation work	50,000
2	Environmental Monitoring: Air quality: 70,000 Water quality: 70,000 Noise quality: 70,000	2,00,000
3	Dust Suppression	50,000
4	Retaining walls, Check dams etc.	15,00,000
5	Others	2,00,000
Total		20,00,000

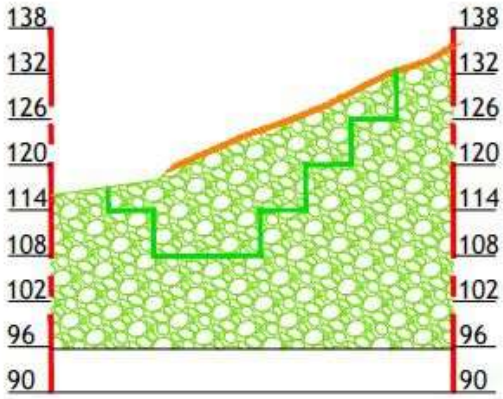
ANY OTHER RELEVANT INFORMATION

If there is an increase in demand within the district due to market changes, efforts will be made to improve the production of Building stone. Any adjustments to the quarrying process will be proposed and evaluated. Following a thorough assessment of the planned exploration activities in the designated area, the reserves will be re-evaluated and provided. This information will be communicated, and we will seek the necessary approvals and guidance from the Department of Forest and the Department of Mines and Geology.

CONCLUSION

The applied area for the grant of Sai Ram Enterprises (RAJESH NAIK) in Arav gram of Asnoti village, Karwar Taluk, Uttara Kannada District by the Department of Forest and Department of Mines and geology, Karnataka over an extent of 0.4928 Ha. Geological assessments confirm its suitability for Building stone quarrying using established methods, with an estimated economically viable deposit of 38339 metric tons;

employing systematic and advanced scientific techniques, the area can be efficiently utilized for 15 years.



SECTION A-A`

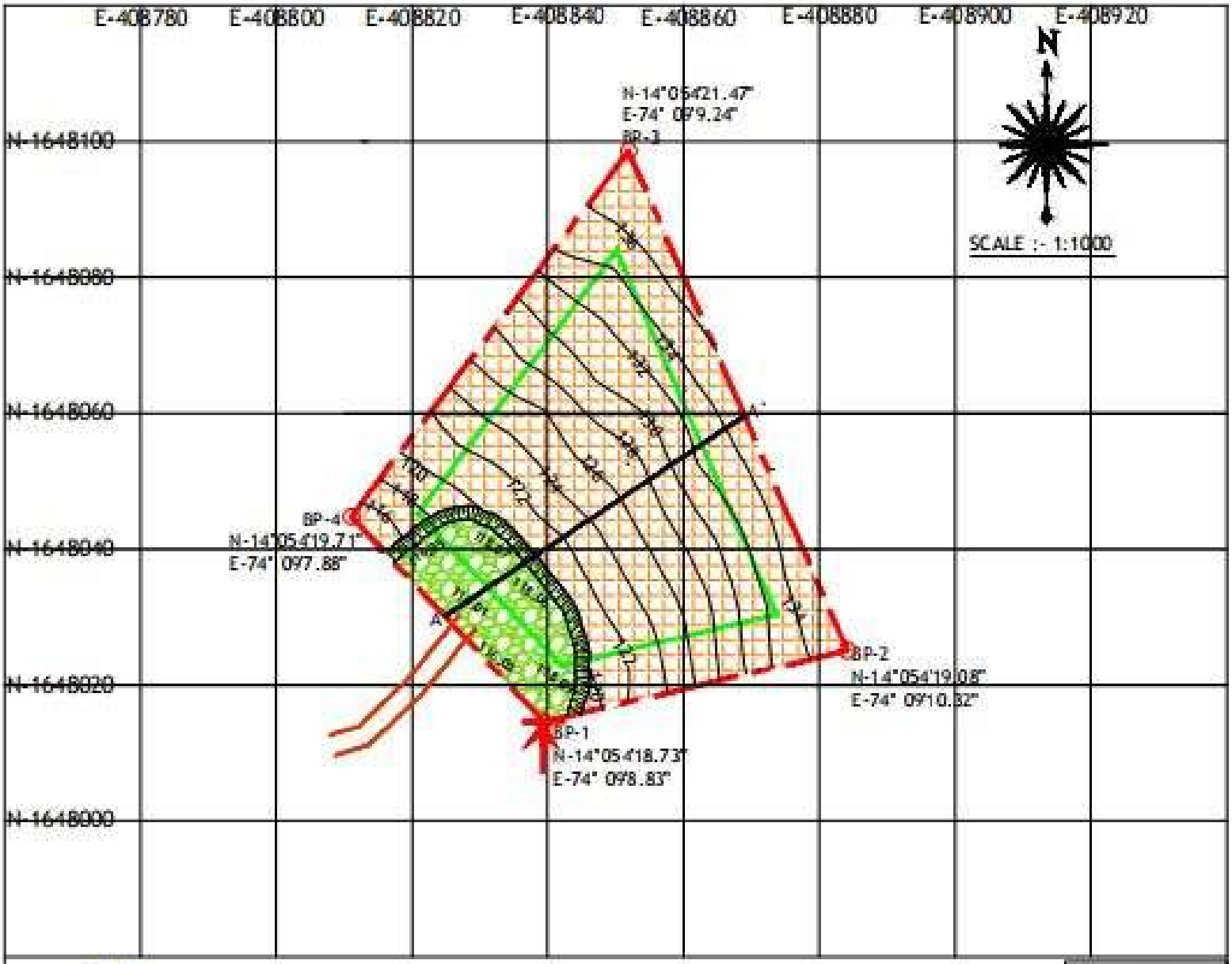
LEGEND

- LEASE BOUNDARY
- GROUND PROFILE
- 7.5M SAFETY BARRIER ZONE
- ULTIMATE PIT LIMIT
- SOIL COVER
- BUILDING STONE

This is to Certified that the plan is correct to the best of my Knowledge.

PLATE NO.:

NAME OF THE MINE :	BUILDING STONE QUARRY	
NAME OF THE OWNER :	SHRI RAJESH R. NAIK	
TITLE :	**GEOLOGICAL CROSS SECTIONS**	
SCALE :	1,000 :1	DATE OF SURVEY: 03/08/2023
PARTICULARS OF AREA :	Area: 0.3320 Ha.	**FSY. No 215/A/1A**
	Location: Arav village, Karwar Taluka, Uttar Kannada District, Karnataka State	

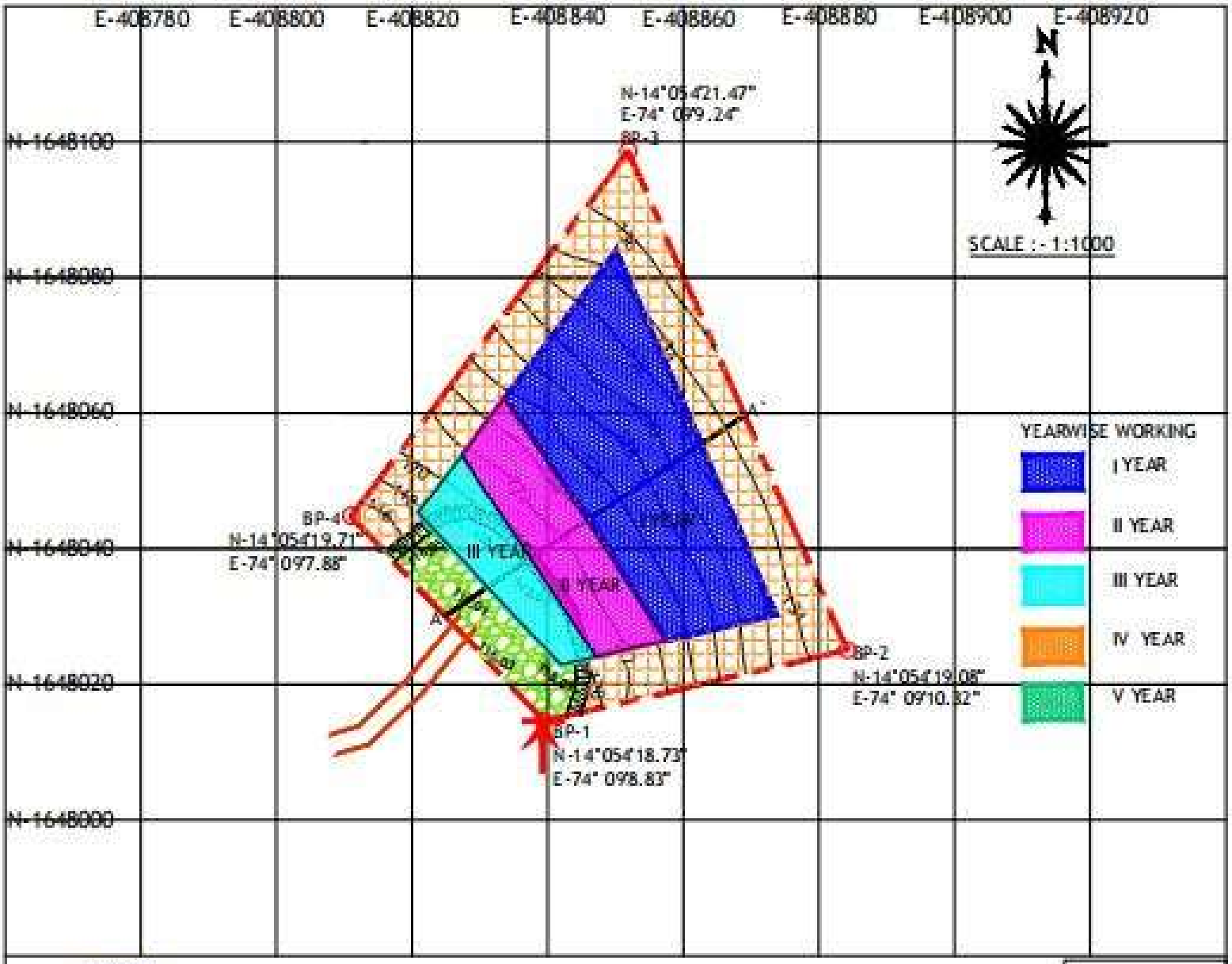


LEGEND

LEASE BOUNDARY	SOIL COVER
BP-1 BOUNDARY PILLAR	BUILDING STONE
CONTOURS	ULTIMATE PIT LIMIT
PIT	SECTION LINE
QUARRYROAD	This is to Certified that the plan is correct to the best of my Knowledge.
BENCH MARK	
7.5M SAFETY BARRIER ZONE	

PLATE NO.:

NAME OF THE MINE :	BUILDING STONE QUARRY	
NAME OF THE OWNER :	SHRI RAJESH R. NAIK	
TITLE :	GEOLOGICAL PLAN	
SCALE :	1,000 : 1	DATE OF SURVEY: 03/08/2023
PARTICULARS OF AREA :	Area: 0.3320 Ha.	FSY. No 215/A/1A
	Location: Aravv village, Karwar Taluka, Uttar Kannada District, Karnataka State	

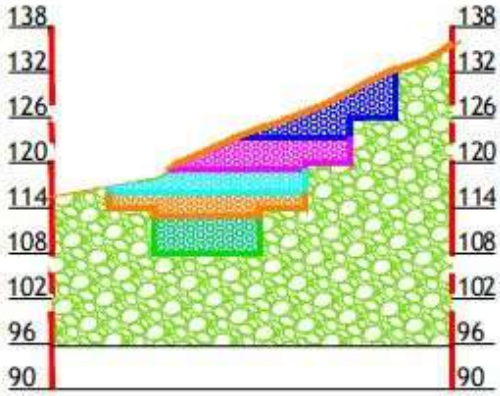


LEGEND

LEASE BOUNDARY	SOIL COVER
BP-1 BOUNDARY PILLAR	BUILDING STONE
CONTOURS	ULTIMATE PIT LIMIT
PIT	SECTION LINE
QUARRYROAD	This is to Certified that the plan is correct to the best of my Knowledge.
BENCH MARK	
7.5M SAFETY BARRIER ZONE	

PLATE NO.:

NAME OF THE MINE :	BUILDING STONE QUARRY	
NAME OF THE OWNER :	SHRI RAJESH R. NAIK	
TITLE :	PRODUCTION AND DEVELOPMENT PLAN	
SCALE :	1,000 :1	DATE OF SURVEY: 03/08/2023
PARTICULARS OF AREA :	Area: 0.3320 Ha.	FSV. No 215/A/1A
	Location: Arav village, Karwar Taluka, Uttar Kannada District, Karnataka State.	



YEARWISE WORKING

- I YEAR
- II YEAR
- III YEAR
- IV YEAR
- V YEAR

SECTION A-A`

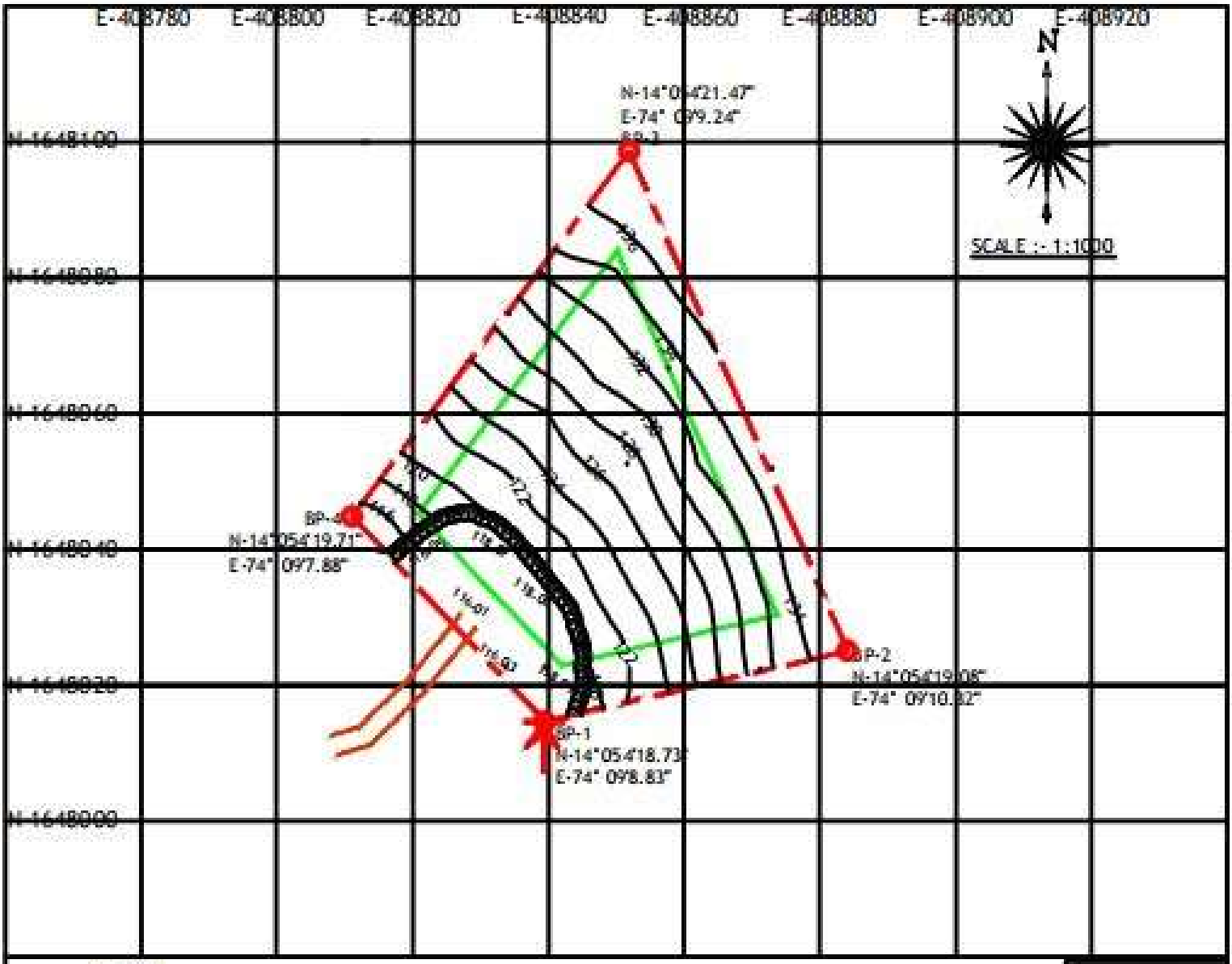
LEGEND

- LEASE BOUNDARY
- GROUND PROFILE
- 7.5M SAFETY BARRIER ZONE
- ULTIMATE PIT LIMIT
- SOIL COVER
- BUILDING STONE

This is to Certified that the plan is correct to the best of my Knowledge.

PLATE NO.:

NAME OF THE MINE :	BUILDING STONE QUARRY	
NAME OF THE OWNER :	SHRI RAJESH R. NAIK	
TITLE :	**PRODUCTION AND DEVELOPMENT SECTIONS**	
SCALE :	1,000 :1	DATE OF SURVEY: 03/08/2023
PARTICULARS OF AREA :	Area: 0.3320 Ha.	**FSY. No 215/A/1A**
	Location: Arav village, Karwar Taluka, Uttar Kannada District, Karnataka State	



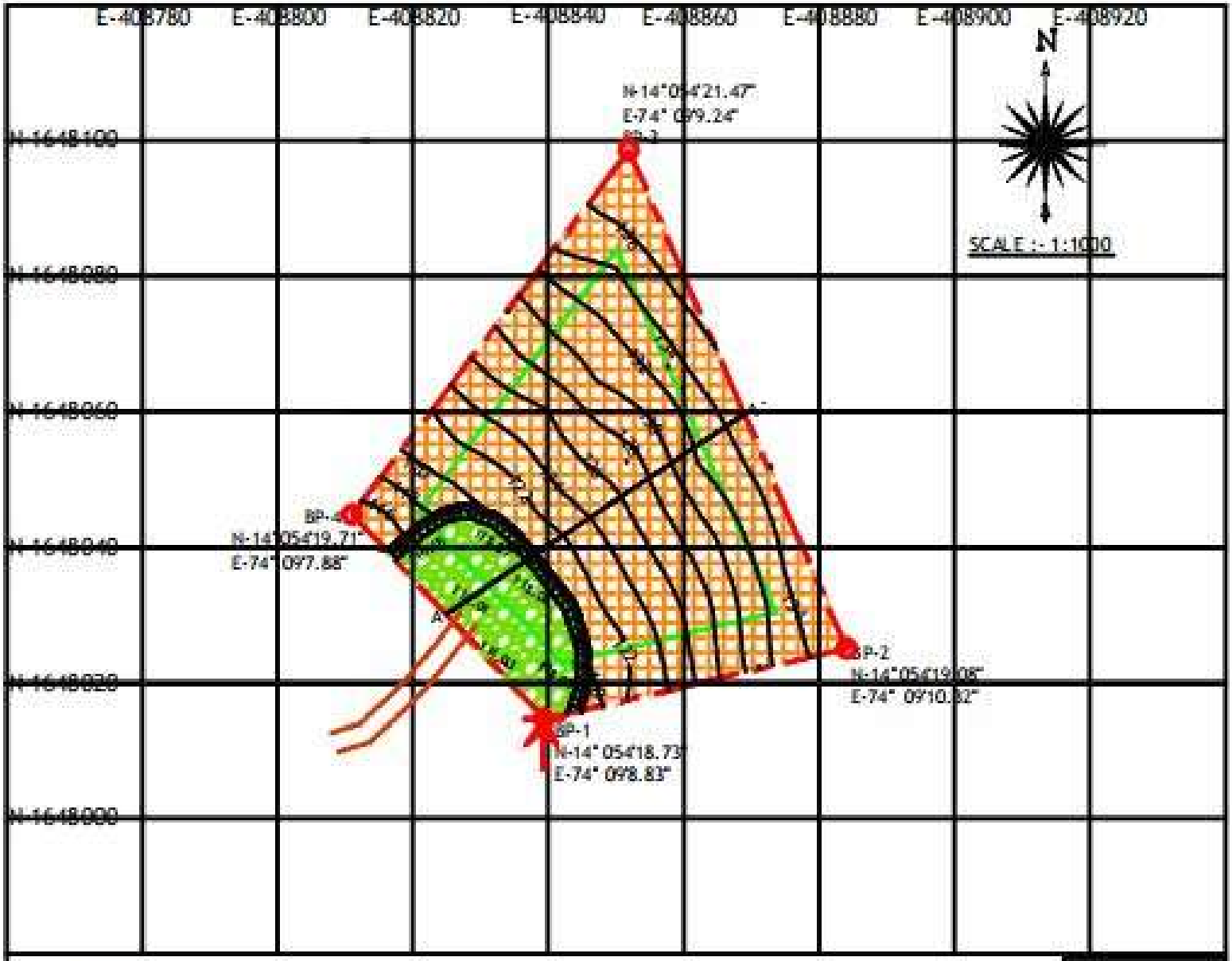
LEGEND

- LEASE BOUNDARY
- BP-1 BOUNDARY PILLAR
- CONTOURS
- PIT
- QUARRY ROAD
- BENCH MARK
- 7.5M SAFETY BARRIER ZONE

This is to Certified that the plan is correct to the best of my Knowledge.

PLATE NO.:

NAME OF THE MINE:	BUILDING STONE QUARRY	
NAME OF THE OWNER :	SHRI RAJESH R. NAIK	
TITLE :	SURFACE PLAN	
SCALE :	1,000 :1	DATE OF SURVEY: 03/08/2023
PARTICULARS OF AREA :	Area: 0.3320 Ha.	FSY. No 215/A/1A
	Location: Aldi Village, Karwar Taluka, Uttar Kannada District, Karnataka State	



LEGEND

LEASE BOUNDARY	SOIL COVER
BP-1 BOUNDARY PILLAR	BUILDING STONE
CONTOURS	ULTIMATE PIT LIMIT
PIT	SECTION LINE
QUARRY ROAD	
BENCH MARK	
7.5M SAFETY BARRIER ZONE	

This is to Certified that the plan is correct to the best of my Knowledge.

PLATE NO.:

NAME OF THE MINE :	BUILDING STONE QUARRY	
NAME OF THE OWNER :	SHRI RAJESH R. NAIK	
TITLE:	GEOLOGICAL PLAN	
SCALE:	1,000 :1	DATE OF SURVEY: 03/08/2023
PARTICULARS OF AREA :	Area: 0.3320 Ha.	FSY. No 215/A/1A
	Location: Anav Village, Karwar Taluka, Uttar Kannada District, Karnataka State.	