DISTRICT SURVEY REPORT

DISTRICT SURVEY REPORT FOR MINOR MINERALS OTHER THAN SAND MINING OR RIVER BED MINING

NASHIK DISTRICT, MAHARASHTRA

Prepared by
District Mining Officer
Collector Office, Nashik

Prepared Under

A] Appendix – X Of MoEFCC, GoI. Notification S.O. 141(E) Dated 15.1.2016 B] Sustainable Sand Mining Guidelines

C] Sand policy 2019

D] MoEFCC, GoI. Notification S.O. 3611(E) Dated 25.07.2018

E] Enforcement & Monitoring Guidelines for Sand Mining 2020

DISTRICT - NASHIK
MAHARASHTRA

PREFACE

With reference to the gazette notification dated 15th January 2016, ministry of Environment, Forest and Climate Change, the State environment Impact Assessment Authority (SEIAA) and State Environment Assessment Committee (SEAC) are to be constituted by the divisional commissioner for prior environmental clearance of quarry for minor minerals. The SEIAA and SEAC will scrutinize and recommend the prior environmental clearance of ministry of minor minerals on the basis of district survey report. The main purpose of preparation of District Survey Report is to identify the mineral resources and mining activities along with other relevant data of district. This report contains details of Lease, Sand mining and Revenue which comes from minerals in the district. This report is prepared on the basis of data collected from different concern departments. A survey is carried out by the members of DEIAA with the assistance of Geology Department or Irrigation Department or Forest Department or Public Works Department or Ground Water Boards or Remote Sensing Department or Mining Department etc. in the district.

Minerals are classified into two groups, namely (i) Major minerals and (ii) Minor minerals. Amongst these two groups minor mineral have been defined under section 3(e) of Mines and Minerals (Regulation and development) Act, 1957. The minor minerals are further governed by.

The Maharashtra Minor Minerals Rule MMME(D&R)rules2013॥.TheMinormineralsinclude building stones, Gravel, ordinary clay, ordinary sand, limestone used for lime burning, boulders, , murrum, brick earth, bentonite, road metal, slate, marble, stones used for making household utensils etc. and other minerals not defined as minor minerals in the said Act are treated as major minerals. They include coal, kyanite, sillimanite, barites, chromite, fluorite, quartz, sand used for stowing Purposes in coal mines and many other minerals used for industrial purposes.

Based on the amendments made by the Ministry of Environment, Forests and Climate Change, Government of India, in the Environment Impact Assessment Notification, 2006 notified or amendment on 15 January 2016, the Survey document of the district Nashik. The district survey document has been prepared in accordance with the Appendix-X of the said notification. The Minerals/ rivers/streams were studied based on the following parameters excluding the hill slope mining.

DMO SIGN PAGE

OBJECTIVES

The main objective of the preparation of District Survey Report (as per the Sustainable Sand Mining Guideline) is to ensure the following –

- Identification of areas of aggradations or deposition where mining can be allowed; and Identification of areas of erosion and proximity to infrastructural structures and installations where mining should be prohibited and calculation of annual rate of replenishment and allowing time for replenishment after mining in that area.
- Identification of mineral wealth in the district.

INDEX

ANNEXURE

VII	Final List of Cluster & Contiguous Cluster
VIII	10*10 Grid
IX	Bank to Bank River Cross Section
X	Public Hearing Sign Copy will be updated in DSR

Figure – Part I

Sr.No	Amendment sheet No.	Amendment Details	Amendment Date	Page No.	Amendment By
1	Amendment In DSR	Complete DSR	29.01.2020	-	DMO, Nashik
2					

DISTRICT SURVEY REPORT FOR SAND MINING OR RIVER BED MINING (PART-A)

1.0 INTRODUCTION

Nashik district is situated partly in the Tapi Basin and partly in the upper Godavari Basin. It lies between 19035' 18" North latitude to 200 53' 07" North latitude and 730 16' 07" East longitudes to 740 56' 22" East longitudes. It is surrounded by Dhule district in the North, Jalgaon and Aurangabad district in the East, Ahemadnagar district in the South, Thane district in the South-West and Gujarat state in the North-West. Nashik district has an area of 15530 square km and a population is 4987923 (2001 Census). It ranks third in terms of area and fourth in terms of population amongst the district of the state. The main stream of hills in the Sahyadri which is runs north-south in the western proportion of the district. From the main Sahyadrian range, three prominent spurs Stretch out of the east. In the extreme north is the Selbari range which approximately forms the boundary between Nashik and Dhule district. Next in the Satmala and Ajanta range which runs right across the district. It acts as a watershed between the Girna and its tributaries which drain towards the Tapi to the north and the Godavari and its tributaries to the south. Some of the ranges are flat topped and regular in height and slope, while others are conical and irregular. The district is broadly divided into three major geographical regions:

I) Downghat Konkan Tract,

II) The Girna Basin and

III) The Godavari basin.

The district is drained by two main rivers, viz. Girna and the Godavari and their tributaries. The climate of the district is generally dry except during the South-West monsoon season. The average annual rainfall for the district as a whole is 1035.5 mm. Within the district there are considerable variations in rainfall. The rainfall in generally decrease as one proceeds from West to East. Temperature begins to increase rapidly from the latter half of February. May is the hottest month with the mean daily maximum temperature at 40.6°C at Malegaon and 37.4°C at Nashik. December is the coldest month with the mean daily minimum temperature at 11.3°C at Malegaon and 10.2°C at Nashik. The soil of the district is essentially derived from the Deccan Trap which is the predominant rock formation of the district. The soil formation is mainly affected by the climatic condition and topography of the district. The soil in the Godavari, Kadava, upper reaches of the Girna and the Mosam Valley is quite deep and fertile. The relief in the rest of the district is undulating and susceptible to erosion. Light shallow soil is found on hill slopes and very coarse soils at higher elevation.

The territory now included in Nasik district was formerly partly in Khandesh district and partly in Ahmadnagar district. Yeola was then known as Patoda taluka. In 1837-38, parts of Ahmadnagar

District consisting of Sinnar, Chandvad, Dindori, Nasik including Igatpuri and the Peint state were made into a sub-collectorate under Ahmadnagar. The sub-collectorate of Nasik was, however, abolished in 1856 and its talukas incorporated in Ahmadnagar district. In 1861, Nimar peta under Sinnar and Vani peta under Dindori were abolished and a new sub-division was formed with headquarters at Niphad. Headquarters of Karnai taluka included in Trimbak peta was transferred to Igatpuri town in the year 1861-62 and the name of the taluka was changed from Karnai to Igatpuri taluka. In 1869, Nasik was made a full-fledged district, with eight sub-divisions of Ahmadnagar (viz. Nasik, Sinnar, Igatpuri, Dindori, Chandor, Niphad, Yeola and Akola) and three sub-divisions of Khandesh district (viz.

Nandgaon, Malegaon and Baglan) together with Peint state. Shortly afterwards, Akola taluka was returned to Ahmadnagar. In 1875, Baglan was divided into two talukas, Baglan or Satana and Kalwan. Peint state became British territory and was made into a sub-division in 1878.

There were no major changes in the district or taluka boundaries between 1901 & 1948. Consequent upon the merger of the Indian states a new mahal known as Surgana mahal consisting of the former princely state of Surgana, was created in 1949. In 1950, 11 enclave villages which formed part of Nandgaon taluka were transferred to Aurangabad district. Two villages (Salher and Vaghamba) from Surat district were added to this district. Four villages were transferred to West Khandesh or present Dhulia district.

Nashik as an Independent District was formed during 1869. And from 1869 District Collector started functioning here at Nashik as their head quarter. Till now 97 Collectors have hold the post. 1st Indian to hold the post of Collector was 36th Collector Mr. Kothawala who was ICS. Since then District of

13 tehsils was there and from 26th June, 1999 two new tehsils were formed viz. Deola and Trimbakeshwar. Deola was formed from Malegaon, Kalwan and Baglan (Satana) Taluka where as Trimbakeshwar was formed from Nashik, Igatpuri and Peint taluka. Alltogether area of Nashik District is 15,530 Sq. Kms.

1.1 History

Nashik was included also under Ashok's mighty empire. Later, Nashik district became very prosperous during the era of the Satavahana as it lay on the trade route to Broach (Gujarat). During Mughal period, the city was named as Gulshanabad appreciating its beauty. The old name was restored when Peshwas took over in 1751. By 1818, Nashik became an important town with two palaces, magnificent buildings and beautiful gardens and vineyards. Nashik surrendered to the British on April 19, 1818. Nashik too was in great disturbance during the freedom struggle of 1857. But it retained its peace after the struggle ended in 1860. Nashik Municipality was formed in 1864. Nashik was made a full-fledged district with its present 13 talukas in 1869. Railway tracks were constructed around that time. The city gained its popularity with the construction of Central Jail India Security Press and the Distillery, which then existed for the English soldiers at Deolali. Then, artisans skilled in making utensils and smiths excelling in silver and gold ornaments were beginning to launch their trade, and Nashik grew to be a flourishing commercial center. As far as revolutionary activities during freedom struggle were concerned, Nashik was always prominent as a centre. Great revolutionist, Anant Kanhere fired at Mr. Jackson, the then Collector of Nashik, on the night of 21st December 1909, while he was watching a play at Vijayanand Theatre. Mr Jackson died on the spot, which resulted in arrests, trails and sentences. Mahatma Gandhi's non-cooperation movement found its share of forest satyagrahas and underground activities here in Nashik as well. Dr. Ambedkar has organized his temple entry movement for the abolition of untouchability and mass Satyagraha was organized in 1932. In 1950, Session of India National Congress was held at Nashik at a place now called Nehrunagar (between Nashik and Nashik Road).

Historical Perspective

Nashik is a historically, mythologically, socially and culturally important city in the northern part of the state of Maharashtra in India. It is known for the temples on the banks of the Godavari and it has historically been one of the holy sites of the Hindu religion. It is one of the four cities that host the massive Sinhastha Kumbh Mela once every twelve years.

Nashik was known by different names in different Yugas. It was known as “Padmanagar” during Krita Yuga, “Trikantak” during Treta Yuga, “Janasthan” during Dwapar Yuga, and it ultimately became Nashik in Kali Yuga. During the Mughal period it was known as “Gulshanabad”, the city of roses. Nashik has mythological, historical, social and cultural importance. The city is situated on the banks of the Godavari River, making it one of the holiest places for Hindus all over the world. Nashik has a rich historical past, as the history has it that Lord Rama, the King of Ayodhya, made Nashik his abode during his 14 years in exile. At the same place Lord Laxman, by the wish of Lord Rama, cut the nose of "Shurpnakha" and thus this city was named as "Nashik".

After the fall of the Satavahana empire, the Abhiras or Ahirs ruled in the north east and the Chutus in Maharashtra and Kuntala. The Puranas state that ten Abhira tribes ruled for 67 years. The Nasik inscription speaks of king Madhuriputra Ishvarasena, the Abhir and a son of Shivadatla.This dynasty originated in A.D. 249-50, an era called Kalachuri or Chedi in later times.

In Kritayuga, Nashik was 'Trikantak', 'Janasthana' in Dwaparyuga and later in Kuliyuga it became 'Navashikh' or 'Nashik'. Classical Sanskrit poets like Valmiki, Kālidāsa and Bhavabhuti have paid rich tributes here. In 150 BC Nashik was the country's largest market place. From 1487 A.D, the province came under the rule of Mughals and its name was changed Gulshanabad (No such proofs or this name). It was also home of Emperor Akbar who wrote at length about Nashik in Ein-e-Akbari. It was also known as the 'Land of the Brave' during the regime of Chatrapati Shivaji Maharaj. The most important historical significance is that Kumbh Mela is conducted at Nashik once every twelve years, out of 4 places in India.

Ancient Nashik

Legend states that the name "Nashik" is derived from the Hindu epic Ramayana. During the exile of Lord Ram, Shoorpanakha, the sister of the demon king Raavan tried to seduce Ram. Angered, Ram ordered Lakshman to cut off Shoorpanakha's nose (nashika/naak). According to the Raamayan, Sita was abducted by Raavan from the area called Panchavati in the Western Ghats. Today, it is a popular religious destination within the city limits. The city got its present name in 1818 when the Peshwas got control of the city. The Peshwa rule however, did not last long and the British captured Nashik in the very same year. In 1840, one of the first modern libraries of Maharashtra (then, the Presidency of Bombay) was founded at Nashik.

Administration

Nashik division is one of the six divisions of India's Maharashtra state and is also known as North Maharashtra. The historic Khandesh region covers the northern part of the division, in the valley of the Tapti River. Nashik Division is bound by Konkan Division and the state of Gujarat to the west, Madhya Pradesh state to the north, Amravati Division and Marathwada (Aurangabad Division) to the east, and Pune Division to the south. The city of Nashik is the largest city of this division. Administratively, the district is divided into fifteen talukas, which are grouped into four sub- divisions:

- Nashik sub-division: Dindori, Igatpuri, Nashik, Nashik Road, Peth, Trimbakeshwar,
- Malegaon sub-division: Chandwad, Malegaon, Nandgaon
- Niphad sub-division: Niphad, Sinnar, Yeola
- Kalwan sub-division, Deola, Kalwan, Baglan (Satana), Surgana

- The Nashik district is under proposal to be bifiurcated and a separate Malegaon District be carved out of existing Nashik district with the inclusion of the north eastern parts of Nashik district which include Malegaon, Nandgaon, Deola, Baglan, and Kalwan talukas in the proposed Malegaon district.

Geography

Nashik district is situated partly in the Tapi Basin and partly in the upper Godavari Basin. It lies between 19035' 18" North latitude to 200 53' 07" North latitude and 730 16' 07" East longitudes to 740 56' 22" East longitudes. It is surrounded by Dhule district in the North, Jalgaon and Aurangabad district in the East, Ahemadnagar district in the South, Thane district in the South-West and Gujarat state in the North-West (map 1.1). Nashik district has an area of 15530 square km and a population is 4987923 (2001 Census). It ranks third in terms of area and fourth in terms of population amongst the district of the state. The main stream of hills in the Sahyadri which is runs north-south in the western proportion of the district. From the main Sahyadrian range, three prominent spurs Stretch out of the east. In the extreme north is the Selbari range which approximately forms the boundary between Nashik and Dhule district. Next in the Satmala and Ajanta range which runs right across the district. It acts as a watershed between the Girna and its tributaries which drain towards the Tapi to the north and the Godavari and its tributaries to the south. Some of the ranges are flat topped and regular in height and slope, while others are conical and irregular. 5 The district is broadly divided into three major geographical regions: I) Downghat Konkan Tract, II) The Girna Basin and III) The Godavari basin. The district is drained by two main rivers, viz. Girna and the Godavari and their tributaries. The climate of the district is generally dry except during the South-West monsoon season. The average annual rainfall for the district as a whole is 1035.5 mm. Within the district there are considerable variations in rainfall. The rainfall in generally decrease as one proceeds from West to East. Temperature begins to increase rapidly from the latter half of February. May is the hottest month with the mean daily maximum temperature at 40.6°C at Malegaon and 37.4°C at Nashik. December is the coldest month with the mean daily minimum temperature at 11.3°C at Malegaon and 10.2°C at Nashik. The soil of the district is essentially derived from the Deccan Trap which is the predominant rock formation of the district. The soil formation is mainly affected by the climatic condition and topography of the district. The soil in the Godavari, Kadava, upper reaches of the Girna and the Mosam Valley is quite deep and fertile. The relief in the rest of the district is undulating and susceptible to erosion. Light shallow soil is found on hill slopes and very coarse soils at higher elevation.

Demography

According to the 2011 census Nashik district has a population of 6,109,052, (11th in INDIA) (3rd in Maharashtra), roughly equal to the nation of El Salvador or the US state of Missouri. This gives it a ranking of 11th in India (out of a total of 640). The district has a population density of 393 inhabitants per square kilometre (1,020/sq mi). Its population growth rate over the decade 2001-2011 was 22.33%. Nashik has a sex ratio of 931 females for every 1000 males, and a literacy rate of 80.96%. Urban Population is 58.67 % Nashik is the fourth largest city in Maharashtra in terms of population. According to the Census of India, 2011, Nashik had a population of 1,486,053. Males constitute 782,517 of the population and females 703,536. Metropolitan Nashik population was 1,561,809 in which 821,921 were males and 739,888 were females. Nashik city had an average literacy rate of 89.85%: male literacy was 93.40%, and female literacy was 85.92%.

The sex ratio is 894 per 1000 males for Nashik city. Child sex ratio is 865 girls per 1000

boys. In Nashik, 11.42% of the population is under 6 years of age.[16] In census year 2001 the Nashik Urban Agglomeration had a population of 11,52,326. Thus it was the fourth largest urban area of Maharashtra State after Mumbai, Pune and Nagpur. The projected population of Nashik urban agglomeration (which includes abutting urban areas like Deolali) as on 11 November 2012 is 15,62,769.

2. OVERVIEW OF MINING ACTIVITY IN THE DISTRICT:

The three types of minor mineral constituents such as sand, stone and bajri are required for any type of construction apart from other material like cement and steel. In earlier times, the houses/ buildings were constructed in form of small dwellings with walls made up of mud plaster, stone and interlocking provided with wooden frames and there were negligible commercial as well as developmental activities resulting less demand of building material. However, with the passage of time when the District was carved out during new vistas of developmental activities were started. The quantity of minor mineral consumption is a thermometer to assess the quantity of developmental activities being undertaken in a particular area. In order to meet the requirement of raw material for construction, the extraction of sand from the river bed, stone and bajri from the land mining area are being carried out exclusively. The demand of sand is mainly met through river borne collection, whereas the demand of bajri/grits are met through manufactured grit by stone crushers. The demand of dressed or undressed stone is met through the broken rock material from the hill slope. The local residents used to lift sand/gravel etc. from the river beds to meet out their bonafide requirement, however after coming into being the Mines and Minerals (Development and Regulation) Act, 1957 (67 Act-1957) and Maharashtra Minor Mineral Extraction (Development and Regulation) Rules, 2013. As the mining was allowed in accordance to the rules, presently in this District, Mineral concessions are being granted through grant of mining Lease. At present 7 nos. of mining leases for minor minerals have been granted under the rules in different parts of the District and the detail is tabulated below. 7 Sand mine river Beds has put to auction.

Based on the amendments made by the Ministry of Environment, Forests and Climate Change, Government of India, in the Environment Impact Assessment Notification, 2006 notified on 15 January 2015, the Survey document of the district Nashik, The district survey document has been prepared in accordance with the Appendix-X of the said notification.

3. GENERAL PROFILE OF THE DISTRICT

Nashik District is located between 18.33 degree and 20.53 degree North Latitude and between 73.16 degree and 75.16 degree East Longitude at Northwest part of the Maharashtra State, at 565 meters above mean sea level. The District has great mythological background. Lord Rama lived in Panchvati during his vanvas. Agasti Rushi also stayed in Nashik for Tapasya. The Godavari River originates from Trimbakeshwar in Nashik. One of the 12 Jyotirlingas also at Trimbakeshwar. Nashik has to its credit many 185 well known and towering personalities like Veer Sawarkar, Anant Kanhere, Rev. Tilak, Dadasaheb Potnis, Babubhai Rathi, V.V. Shirwadkar and Vasant Kanetkar just name few. Nashik is also known as Mini Maharashtra,because the climate and soil conditions of Surgana, Peth, Igatpuri resembles with Konkan, Niphad, Sinnar, Dindori, Baglan blocks are like Western Maharashtra and Yeola, Nandgaon & Chandwad blocks are like Vidarbha Region. Nashik, Malegaon, Manmad, Igatpuri are some of the big cities situated in the Nashik District. Recently two talukas are created in the District making the total talukas to 15. Out of 15 blocks in the District, as many as 8 blocks viz Surgana, Peth, Igatpuri, Kalwan, Baglan, Dindori, Trimbakeshwar & Nashik are tribal blocks. The district also identified as tribal by the

State Government. Many important rivers of Maharashtra originate in the district. Godavari which is popularly known as Ganga of South India originates at holy place Trimbakeshwar. Another major river is Girna. Other rivers are

Darna, Mosam, Aram, Vaitarna, Manyad and Kadwa. A Taluka is an administrative block generally comprising about 90 to 100 contiguous villages, with a small town as its headquarters. On an average 8 to 10 Talukas make up a district. Nashik became full-fledged district in 1869.

At that time there were 13 talukas and Government has announced two more talukas on 26th June 1999 (Deola and Trimbakeshwar). At present 15 talukas are representing district. Malegaon taluka is the largest in area in the district, occupying 12 percent area of the district, whereas Peth is the smallest taluka having
3.36 percent area followed by Deola having 3.8 percent area; remaining talukas having on an average 5 to 9 percent area of total district. As per 2001 census, the district is having total 1931 villages out of four villages are uninhabited.

4. LOCATION OF THE DISTRICT

Nashik District is located between 18.33 degree and 20.53 degree North Latitude and between 73.16 degree and 75.16 degree East Longitude at Northwest part of the Maharashtra State, at 565 meters above mean sea level. The District has great mythological background. Lord Rama lived in Panchvati during his vanvas. Agasti Rushi also stayed in Nashik forTapasya. The Godavari River originates from Trimbakeshwar in Nashik. One of the 12 Jyotirlingas also at Trimbakeshwar.

Table No. 2: List of tahsils in Nashik district

Sr.No	District Name	Division name	Taluka name
1	Nashik	Nashik	Nashik
2		Dindori	Igatpuri
3		Igatpuri	Trimbak
4		Kalwan	Peth
5		Malegaon	Dindori
6		Chandwad	Surgana
7		Yeola	Kalwan
8		Niphad	Devola
9		Baglan	Baglan
10			Malegaon
11			Chandwad
12			Yeola
13			Nandgaon
14			Niphad
15			Sinnar

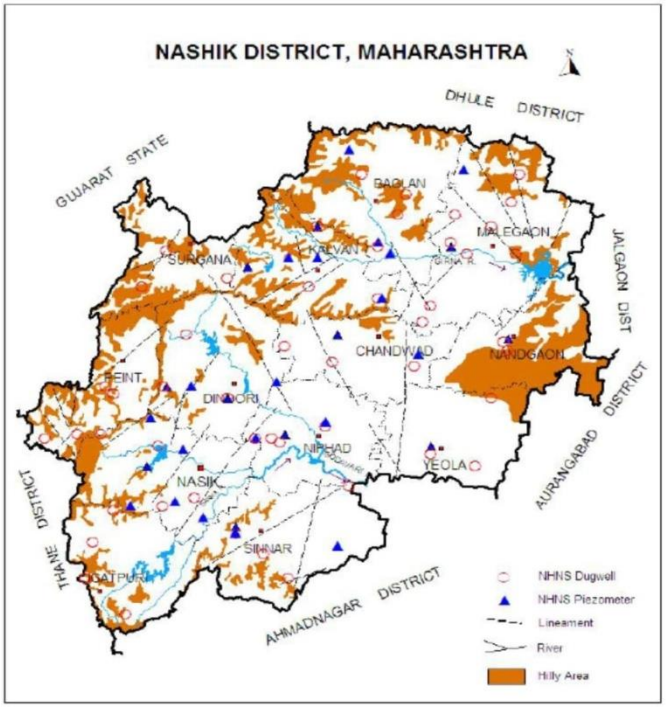
Fig.1. Location of the District

5. PHYSIOGRAPHY OF THE DISTRICT

The district forms part of Western Ghat and Deccan Plateau. Physiographically Nasik district comprises varied topography. The main system of hills is Sahayadri and its offshoots viz., Satmala, Selbari and Dolbari hill ranges. These hill ranges along with eastern and southern plains and Godavari valley are the distinct physiographic units. The northern part of the district falls under Tapi basin and is drained by easterly flowing Girna River along with its tributaries, whereas the southern part of the district falls under Godavari basin an is drained by Godavari River and its tributaries. Other important rivers in the district are Damanganga, Vaitarna, Darna, Kadva, Aram, Mosam, Panjan and Manegad. The soils of the district are the weathering products of Basalt and have various shades from gray to black, red and pink color. The soils occurring in the district are classified in the four categories namely lateritic black soil (Kali), reddish brown soil (Mal), coarse shallow reddish black soil (Koral), medium light brownish black soil (Barad). In general the soils are very fertile and suitable for growing

cereal and pulses. The black soil contains high alumina and carbonates of calcium and magnesium with variable amounts of potash, low nitrogen and phosphorus. The red soil is less common and is suitable for cultivation under a heavy and consistent rainfall.

Fig.2. Physiographical map of Nashik



6.GEOLOGY AND MINERAL WEALTH

The Deccan traps, which cover almost major portion of Maharashtra state, were erupted as horizontal lava sheets during the Cretaceous - Eocene times and are supposed to have welled out from the long and the narrow fissures in the earth crust. These formations are termed „traps" because of their step like terraced appearance, a characteristic and a common feature in the scenery of the Traps Deccan. The chief varieties of the Traps are hard, compact Basalt and vesicular Traps. Geologically Nashik district lies in the 'Deccan Trap' region o f Peninsular India. The Great Trap region o f the Deccan covers the whole district. It is entirely o f volcanic formation. The volcanic portion consists o f compact, stratified basalt and an earthy trap. The basah are of most conspicuous features. The basalt is either fine textured or it is coarse and nodular. In the western hilly portion o f the district, the basalt lies in flat-topped ranges separated by valleys trending from west to east. The absence o f laterite which caps the summits o f the hills to the south is a curious feature in the geology o f the area (District Gazetteer, 1975, p. 19). The slopes towards west, are steep and lofty. The eastern slope is gradual and with series of steps. The thickness of the trap flows is about 5000' (1500m). They are uniformly thick having more or less same elevations A number o f hills with forts are found along the border o f the district as well as on the range that crosses the district in more or less west-east direction. Locally this range is called Chandwad-Satmala range. M ost o f the hills are flat-topped or have a small peak rising out of a table-land. Below this there is a sort o f perpendicular scrap rising out o f a terrace and usually thickly wooded. In some areas like the hills in the south (Kalasubai) or in the SatmalaChandwad range the basah is columnar and has weathered into fantastic shapes. These higher trap regions contain quartz in vertical veins, crystals and zeolitic minerals (District Gazetteer, 1883).

The lithological character of the basak varies greatly. In some cases the tabular trap is of

fine texture and takes a fair polish, in others it is coarse and nodular. There are certain dyke formations exposed in the riverbed. Some o f the valleys that separate the ranges o f trap hills are of considerable width, for example, the valley at the head o f the Thai pass. Sub-aerial denudation is the main reason for it. It is therefore believed that the rivers rose much further west and that the broad plains were many miles from the sources o f the rivers. So the whole range of Sahayadris was once believed to be a sea cliff. The surveys of the portion o f the Great Indian Peninsula Railway that passes through the district show that the flows have a slight dip to the east, but to the eye they appear to be horizontal. The tabular strata o f hills many miles apart are found to be almost exactly as the same height above the sea. From this it is deduced that these ranges once formed part of an immense plateau (District Gazetteer, 1883). Topographically the Nashik district lies in the Deccan Plateau region of Peninsular India formed entirely o f volcanic formation. Broadly the district can be divided into three distinct regions:

a. The hilly region

b. The Godavari basin

c. The Girna basin

a. The Hilly Region

A part of the Western Ghats called Sahayadris, this region lies in the W estern part of the district running mainly in the north-south direction with its offshoots towards east. The general altitude of this region ranges from 900m to 1200m with the higher portion being near the western boundary of the district. Here both the flat- topped and peaked mountains are found; the flat- topped hills predominate in number but not in height. This hilly portion can be further classified into four subregions.

i. The Galan hills and Selbari range

ii. The Satmala-C hand wad range

iii. The Trimbak-Anjaneri range

iv. The Kalasubai hills.

b. The Godavari Basin –

The second geographical region of the district is formed by one of the major rivers of Peninsular India. Godavari is the longest river o f Peninsular India that flows through this district. The source and upper course o f the river lies in the southern part of the district and forms a district geographical region. This region lies to the south o f Satmala-Chandwad range and located to the east of Sahyadri hills. The river has its source on the high slopes of Trimbak-Anjaneri range 56’ N. L, 74“31’ E.L) A11 the tributaries and streams of the Godavari have considerably eroded the southern part o f the district. As a result in south-central and eastern parts of the district broad valleys with considerable alluvial deposits have been formed. The Godavari basin o f the Nashik district can be divided into following subregions.

i. The Godavari Valley

ii. The Northern Subregion

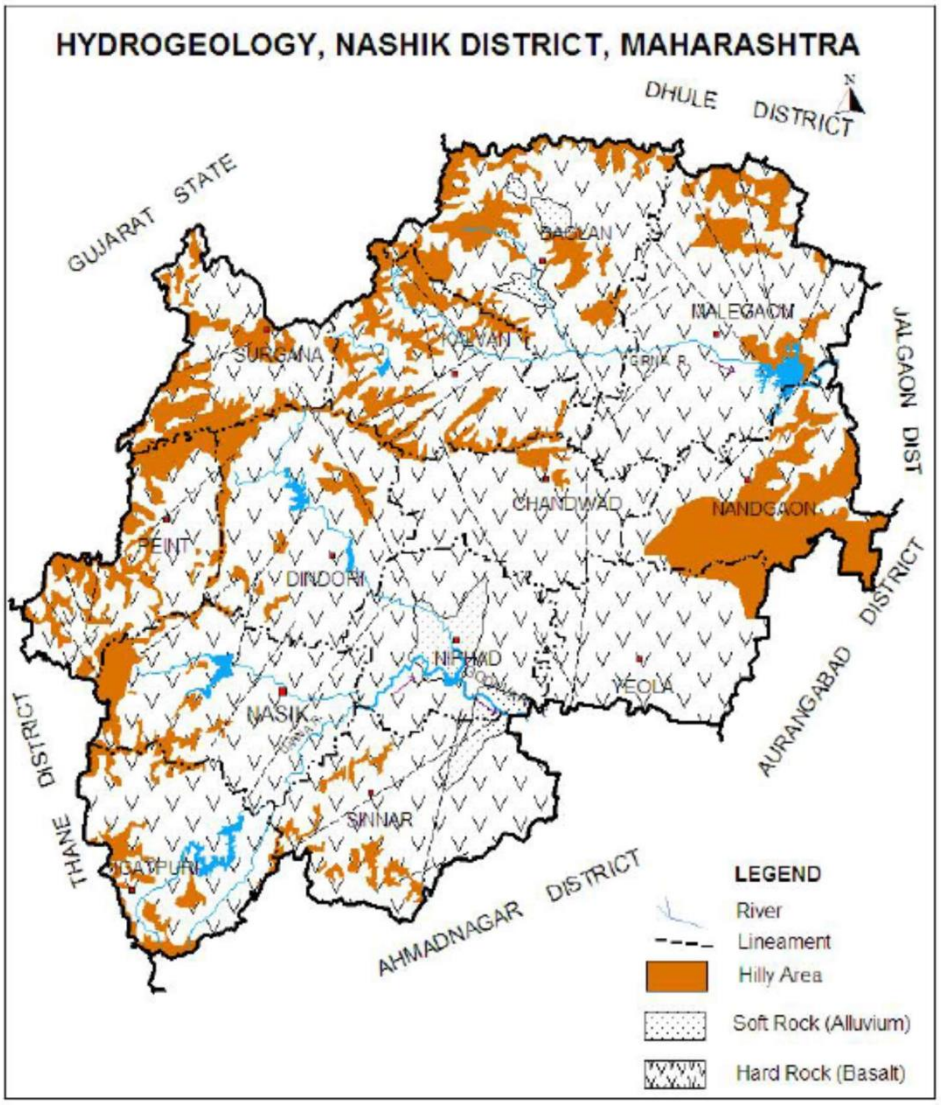
iii. The Dama Basin

iv. The Sinnar Plateau

c. The Girna Basin:

The third geographical region o f the study area is the Gima basin. It is bounded by the Sahyadri hills in the west, Satmala-Chandwad range in the south and Galan Selbari range in the north. The entire area of the district is underlain by the basaltic lava flows of upper Cretaceous to lower Eocene age. The shallow alluvial formation of recent age also occurs as narrow stretch along the banks of Godavari and Girna Rivers flowing in the area features is shown as Figure

Fig3. Geological of the Nashik



Hard Rock (Deccan Trap Basalt)

Basaltic lava flows occupies about 90% of the area of the district. These flows are normally horizontally disposed over a wide stretch and give rise to table land type of topography also known a plateau. These flows occur in layered sequences and represented by massive unit at the bottom and vesicular unit at the top of the flow. These flows are separated from each other by marker bed known as ‘bole bed’.

Soft Rock (Alluvium)

Alluvium occurs in small areas in the form of discontinuous patches along the banks and flood plains of major rivers like Godavari, Girna and their tributaries. In alluvium the granular detrital material like sand and gravel usually occurring as thin layer in the district yields water. In the district Alluvium occupies an area of 1500 sq.km and it ranges in thickness from

7- 21 meters. It consists of reddish and brownish clays with intercalations of sand, gravel and kanker. The loosely cemented coarse sands and gravels form 3-4 meters thick lower most horizons at the bottom of these alluvial pockets. Ground water in Alluvium occurs both under semi confined and confined conditions. The dugwells constructed in Alluvium has been ranging in depth from 8-12 m, whereas the borewells range in depth form 15 to 20 m and the yield of both the dugwells and borewells ranges from 13 to 22 m3 /day.

DRAINAGE SYSTEM WITH DESCRIPTION OF MAIN RIVER

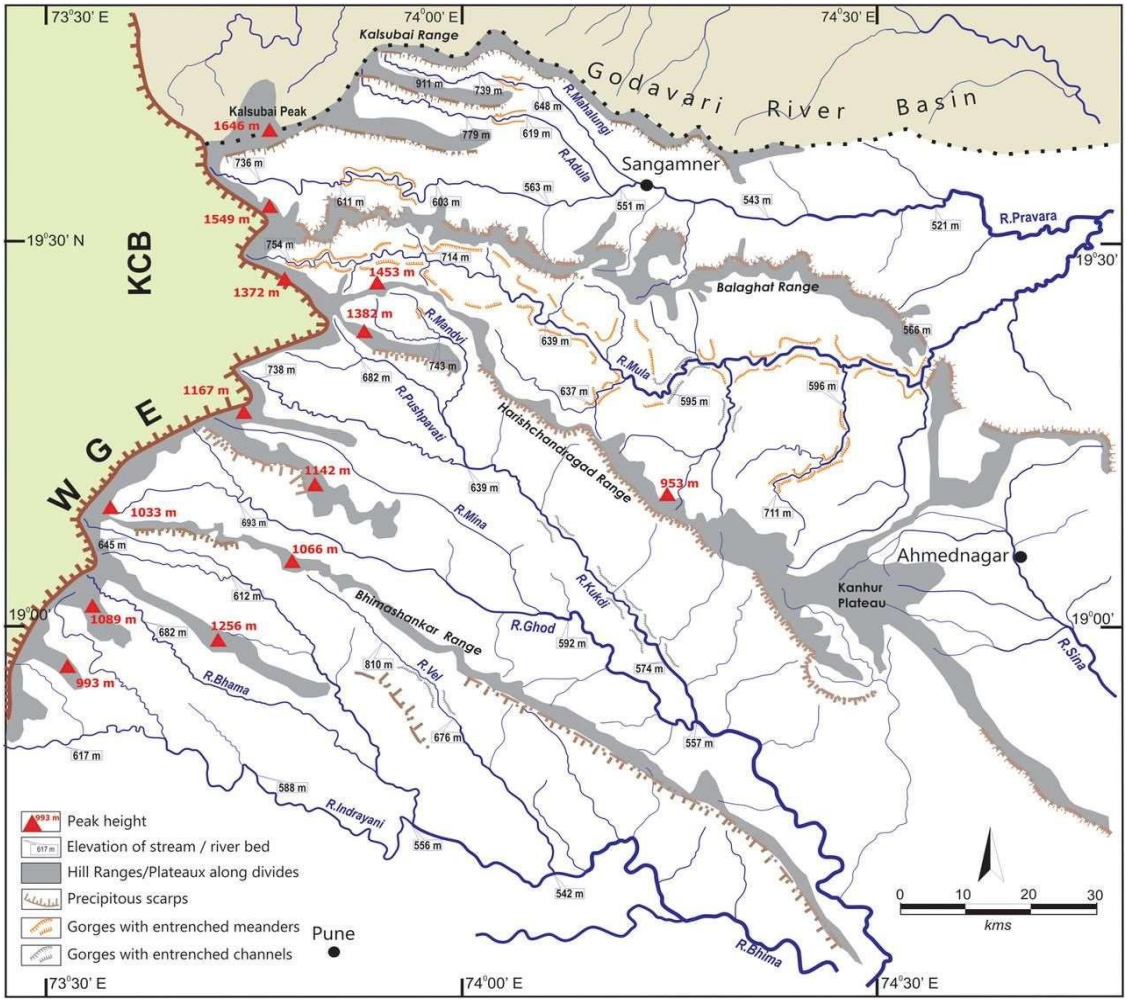


Fig.4. Hydrological Map of Nashik

The topographical maps and their study show that the drainage of the district can be divided into three broad regions:

a) **The Godavari and its tributaries**
b) **The Girna and its tributaries**
c) **The west flowing Konkan Rivers.**

The hill ranges in the district act as water divide separating the above regions. The Satmala-Chandwad range acts as a water divide between Godavari and Girna river basins while Sahyadri hills in the west act as water divide between west flowing and east flowing rivers of the district. The rocks in these hilly regions have developed three sets of master joints, running in the following direction -

i. North-south strike direction

ii. North-w est-South-east direction 19

iii. North-north-east and South-west direction.

The streams o f the region have taken advantage o f these planes of weaknesses in carving their valleys (Aruchalam, 1964 P 12)

a) Godavari and its tributaries -

Godavari and its tributaries drain the district to the south of Satmala-Chandwad range and occupy a large area than Girna basin. In the south, it is bounded by Kalasubai range. As the drainage map indicates, most of the tributaries o f Godavari comes from the Satmala-Chandwad range along the north bank o f the river. There are a few important streams in the south also. The average altitude of the basin is about 1000 m in the west and south while towards east and north east it is less and reaches upto 300 m. Nashik, Dindori, Niphad, Sinnar and Yeola tahsils are drained by these rivers.

i) Godavari - Godavari is the most important river not only of the district but also the whole of the Peninsular India. Out of its total length o f 1465 Km only 111 Km, i.e. 7.6% of length, lies in the Nashik District. It is the longest river o f M aharashtra and has its source near Trimbakeshwar in Nashik district. From the base o f the escarpment appearing on the eastern face o f the Sahyadri hills, as a result of headward erosion of the river upto Nashik, there is no perceptible slope and its broad-flat valley appears a trickle (Dixit, 1985, p. 26). Godavari also appears graded to its source. From Nashik the river flows in east-southeasterly direction. A characteristic feature of Godavari is its deep channel enclosed between its banks which are more like embankments, and the narrow alluvial flood plain. In areas not far from the Sahyadri hills the valley in general has witnessed enormous sedimentation. The sediments derived from the weathering in the heavy rainfall areas of the mountains are brought by the tributaries over a steep gradient and dumped into the river which with a lower competence finds difficult to absorb and transport it further despite a heavy discharge. This explains the enormous sediments in the right bank tributaries of Godavari close to the confluence (Dixit. r585, p. 27-28). As a result soils are comparatively good and fertile.

Agriculturally, the region is rich even though it is the upper course o f the river.

ii) Dama - Dam a rises in the Kalasubai range in the southern part of the district. The source lies 13 Km south-east o f Igatpuri. The bed is for most part wide and sandy. The length o f the river is around 80 Km draining Igatpuri, Nashik and Niphad tahsils, Alvanadnadi and Pimpari nadi are the tributaries o f Darna. A dam is constructed on this river near Nandgaon village giving rise to a storage lake called Lake Bill. On the left bank o f the tributaries that join Dama include Unduhol, Vaki, Valdevi and Dev. 20

iii. Kadwa - Kadwa is one of the most important tributaries of Godavari flowing from the north. It rises in the Satmala range in Dindori tahsil. The riverbed and banks both are rocky but the bed is wide. Irrigation works of considerable importance have been established on a number of streams that have their sources in Satmalas and this flow southward to join Kadwa. These streams drain Chandwad, Niphad and Dindori tahsils. The total length of the river is 74 Km, out o f which larger part lies in hilly areas of Dindori and Chandwad tahsils. But in Niphad the river is significant, as major source of irrigation. Kadwa joins Godavari near Niphad town where sedimentation near and along the confluence has given rise to productive fertile soil. Cash crops like sugarcane, grapes and onions are possible due to irrigation facilities and fertile soil o f this region.

iv. Kashvapi - The Kashyapi or the Kas rises in the Sahyadri hills little above W aghira village in Nashik tahsil. Near the source itself two streams named Wotki and Muli join

Kashyapi. Just at the confluence of Kashyapi and Godavari, a dam is constructed near Gangapur village and is called by the same name. It is one o f the oldest earthen dams in the district that provides water for irrigation through left and right bank canals that irrigate Nashik, Niphad, and Yeola tahsils.

v. Banganga - Among the north bank tributaries the Banganga rises a little to the north west of Ramsej hill and flows in an easterly direction. Near Ozarkhed a dam is constructed to divert the w ater into canals both the sides for irrigation. After passing Sukene, it joins Godavari.

b) The Girna and its tributaries -

The northern part of the Nashik district is drained by river Girna and its tributaries. The river basin is bounded on the south by the Satmala-Chanwad range and in the north by Galan hills. The important tributaries o f Girna includes Tambadi, Aram. Maosam, Panjhara, Punand and Maniad

i. Girna - Girna is the most important tributary o f Tapi River. It rises just south of Cherai village at about 8 Km south west of Hatgad in the Sahyadri hills and flows nearly east along a wide bed with high banks in some part and low enough to use the waterfall irrigation. This river in its upper course receives several streams o f neariy equal size and equally useful for irrigation The topography is rugged and undulating. Rainfall is heavier in the west and decreases towards east. The length of the river is 144 Km, it drains Surgana, Kalwan, Baglan and M aiegaon tahsils The north bank tributaries o f the Girna are Tambadi, Punand, Aram and Maosam that drain the northern part o f the basin. The south bank tributaries are comparatively small but are more useful which mainly includes Panjhara and Maniad.

ii. Tambadi - The first considerable stream that joins Girna on the left bank is Tambadi. This river also rises in Sahyadri hills to the north o f Hatgad and joins Girna at Chankapur. Just below the confluence a dam is constructed across the river, due to which irrigation is now available as far as Ravalgaon in M alegaon tahsil.

iii. Punand - Another tributary stream o f Girna is Punand. This river rises in the range west of Salher fort and has a long winding course. It joins the Girna at Bej, The valley o f Punand is deep and rocky.

iv. Aram - This is the important tributary o f Girna. The river rises to the south o f Salher fort in Dholbari range. The river flows in a southerly direction and then turns eastwards to pass near Satana town and further continues till it joins Girna. The river valley is wide enough with low banks; hence it is useful for irrigation. It joins the Girna five kilometers east of Thengode in Baglan tahsil.

v. Mosam - This is the northern most tributary o f the Girna. The headwater stream o f this river lies in the Sahyadri hills through Mulher, Tarahabad and Jayakheda. It is joined by a number of affluent streams. Mosam also has cut a wide valley, so it is used for irrigation on a large scale. It joins the Girna about three kilometers below Malegaon,

vi. Panjhara - This is one of the south bank tributaries o f the Girna It rises to the east of Chandwad fort on the southern slopes of the Satm ala-Chandwad range. The riverbanks are high and hence they are not useful for irrigation. This is because the river is able to cut across the Satmala watershed. Headwater is much more active as the Girna basin has much lower base level than the Godavari; it drains the Girna to the east o f M alegaon near the border of the district.

vii. Maniad - This river rises in the Satamala range near Ankai-Tankai hills. It has a deep, narrow valley with high banks due to which it is not much suitable for irrigation. It has a length o f only 48 Km and drains Nandgaon tahsil only. M ost o f the course o f the river

lies in rainshadow area resulting into drought prone region o f the district. As a result it is agriculturally a poor region. The river joins the Girna near Chalisgaon in Jalgaon district.

c) The West Flowing Konkan Rivers –

The western part o f the district is drained by a number o f small rivers and streams that flow westwards to join the Arabian sea. These rivers have 22 '•, winding course with deep valleys, gorges and waterfalls. Damanganga and Vaitarna are the two major rivers in this region

i. Damanganga - Damanganga rises in the hilly area of Sahyadri hills in Peth tahsil o f the district. The river flows through a deep ravine over rocky and winding beds. The banks are steep and well wooded and little or no use is possible o f this river for irrigation. It joins the Arabian Sea at Daman.

ii. Vaitarna - This River raises south-west of the Trimbak fort. It drains a small portion of the district. The river has cut a remarkably deep channel through the Sahyadri hills. The total length of the river is 144 Km and it joins the Arabian Sea to the north of Vasai (Bassein) in Thana district. A dam is constructed to provide drinking water to Bombay and is not useful for irrigation.

7. LAND UTILIZATION PATTERN IN THE DISTRICT: FOREST, AGRICULTURAL, HORTICULTURAL, MINING, ETC.

The fundamental utility of land is satisfying the human need of food habitation and housing materials. It is essential to choose proper mode of landuse planning and allocation to various Ingredients of optimum landuse to meet /solve the human needs Kellong (1980) has rightly pointed out that this calls for the clear understanding of land classification for successful planning and development. The application of various inputs in land may change the allocation of land to different uses. The factors, conservation and quality of our socio economic environments are most fundamental for the proper use of our land. This statement is true not only of large urban centers as well as most of the remote areas. The growing pressure of population coupled with an increasing variety of demand on land resources has brought extra pressure on available resources. In order to deal with these and to plan for optimum utilization of land, it is necessary to have accurate and up to date information in all possible details on landuse. It is therefore, the study of classification of landuse pattern in Nashik district would be helpful for preparation of the relative development plan for the district.

The objective of this chapter is to assess spatial as well as temporal landuse and suggest possible Solutions to improve existing landuse in the district in the light of physico-socioeconomic conditions.

The area of forest cover (FC), net sown area (NSA) area not available for cultivation (ANC), Fallow Land (FL) and cultivable waste (CW) have been converted into percentage to total geographical area. Further, these have been used for showing the spatial distribution of land classification with suitable cartographic maps. A line graph Exhibits the temporal variation

of land classification for a period of forty years (1960-61to 2000-01) in the district. The description of each land classification has been supplemented by numerous spot-inquires, besides information embodied by using the relative District Census Handbook, District Gazetteer and District socio economic Review of Nashik District.

CLASSIFICATION OF LAND

The aim of the classification of land is to divide land into different categories according to

single factor or set of factors. Therefore, classification of land may be different types and depending on the factors taken into consideration. The classification of land has a direct bearing on climatic factors, Soil characteristics, and slope of land, degree of erosion, water supply, drainage and similar environmental conditions. The landuse capabilities, classification portrays, physical capability of land to produce over a long period of time for selected uses, which can be provide land operation with a basis for actual practice of land (Stamp, 1968). In the recent years several attempts have been made in different countries of world to classify landuses from different points of views and for different purposes, employing varieties of methods. A stamp (1960) has cogently remarked that it is not surprising that the divergence points of view on classification of land prevail. He is well regarded as pioneer in the field of land classification. His example initiated further studies in this direction. In his work entitled "The land of Britain : Its Use and Misuse" he classified land into six categories, namely, (1)Forest and woodland (2) Arable land, (3)Meadow land and permanent grass,(4)Health and moorland,(5)Gardens orchards, nurseries and (6)Unproductive land : such as buildings, mines, wasteland, etc. In the international classification of landuse, there are nine major landuse classes have been recognized: (1) settlement and non-agricultural land, (2) Horticulture, (3) Tress and permanent crops (4)Crop land, (5) Improved permanent pastures, (6)Improved gazing land, (7)Woodland, (8)Stamps and marshes and (9)Unproductive land. In India various schemes have been proposed to classify the land into different uses. The National Atlas Organization in 1957 classified the land into nine categories Forest, Scrub, and Arable land with trees, Plantation, Pasture, and Wasteland, Alpine grass and scrub and, Glaciated region. The Damodar Valley region hasclassified land into ten major categories : (1)Field crop, (2)Orchards, (3)Dense forests, (4)Light forests, (5)Nonagricultural land, (6)Unproductive land, (7)Water bodies, (8) Cultivable waste, (9)Villages and (10)City and towns. Landuse records department has officially classified land under following categories (1) Reporting area for land utilization purposes, (2)Forest, (3)Barren and uncultivable land, (4)Land put to non-agricultural uses (i)cultivable waste, (ii)Permanent pastures and other gazing land, (5)land under miscellaneous tree crops and groves not included in net area sown; (i)Current fallows(ii)Other fallow land, (6)Net sown area, (7)Area sown more than once and (8)total cropped area. It would be convenient for a clear understanding to condense to above mentioned twelve categories into five categories as (1) Forest land, (2) Net sown area, (3) Land not available for cultivation, (4) cultivable waste and (5) Fallow land.

TEMPORAL VARIATIONS IN LANDUSE

The temporal variations in landuse pattern in the Nashik District have been studied for a period of forty years (1960-61 to 2000-01) and possible causes of changing landuse have been interpreted.

The investigator could not succeed in uncovering temporal variations of landuse for consecutive years due to paucity of data for the years concerned. However, alternative year has been taken into consideration for showing temporal variations in landuse pattern in the area under study.

The temporal variations in landuse for Nashik district are studied in five categories as follows:

a. Net area Sown (NSA)
b. Land not available for cultivation, (LNAC),
c. Cultivable Waste (CW)
d. Fallow land (FL) and

e. Forest/Forest Cover (F)

The changes occurred during the period of study are interpreted as follows:

a. Net Sown Area (Nsa)

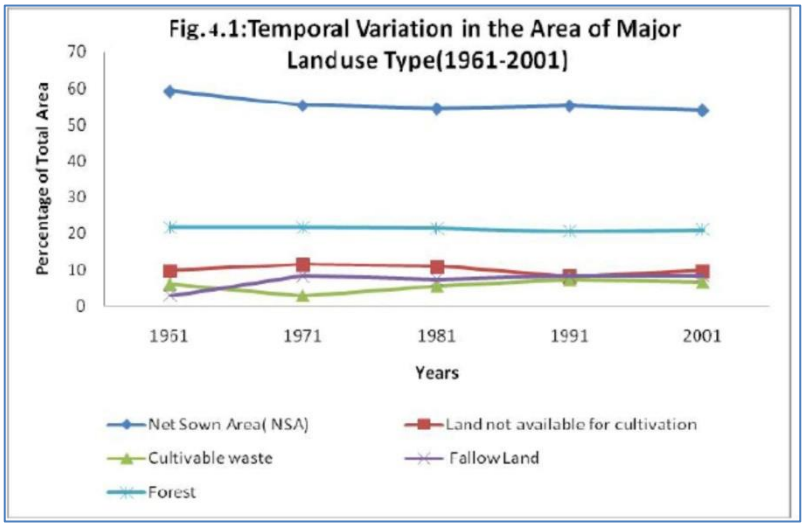
The net sown area is steadily decreased since 1960-61 to 2000-2001 (Fig. 4.1). It is seen from table 4.1 that 59.25 percent area was under cultivation in 1960-61 and it has been stepped to 53.95 percent area under cultivation in 2000-01, registering decreased by 5.3 percent. This decrease may be attributed to 90 Table 4.1: Nashik District- Temporal Variation in General Landuse Pattern from 1961to 2001 (Area in Percentages) increasing population, development of transportation routes and residential purpose. From1960-61 to 1970-71net sown areadecreased by 3.91 percent in 1970-71 and 1980-81 it has decreased by 0.88 percent; from 1980-1981 to 1990-91 there is a slight increase (0.81%). It decreased 1.32 percent from 1990-91 to 2000-01. The total decrease between the study periods is 5.3 percent. This significant decrease in net sown area may be due to more land under roads, residuals subsequently under landput to non-agricultural use, cultivable waste and fallow land. There fore, other types of land have continuously increased from 1960-61 to 2000- 01 (Table1).

Table: 1 Nashik district in the temporal variation in General Landuse From 1961 to 2001(Area in percentages)

Sr. No.	Landuse Types	Years				
		1961	1971	1981	1991	2001
1.	**Net Sown Area(NSA)**	**59.25**	**55.34**	**54.46**	**55.27**	**53.95**
2.	**Land not available for cultivation(LNAC)**	**9.83**	**11.53**	**10.96**	**8.16**	**9.75**
a)	Land put to non-agricultural use	0.05	0.07	0.44	0.89	0.68
b)	Barren and uncultivated land	9.78	11.46	10.52	7.27	9.09
3.	**Cultivable waste(CW)**	**6.11**	**3.03**	**5.68**	**7.45**	**6.74**
a)	Permanent pastures and other grazing land	4.32	1.55	3.62	3.58	2.48
b)	Miscellaneous tree crops and groves not include to Net Sown Area	0.23	0.25	0.22	0.82	1.59
c)	Cultivable waste	1.56	1.23	1.84	3.05	2.67
4.	**Fallow Land(FL)**	**3.06**	**8.42**	**7.34**	**8.43**	**8.44**
a)	Current Fallow	1.08	5.57	3.85	6.37	6.34
b)	Fallow land other than current fallow	1.98	2.85	3.49	2.06	2.10
5.	**Forest (F)**	**21.75**	**21.68**	**21.56**	**20.69**	**21.12**

(Source: Socio-Economic Abstract- Nashik District)

a. Land Not Available For Cultivation (LNAC)



This category includes the landput to non-agricultural uses, barren and uncultivated land. The area under this category has shows the cyclic change from 1960-61 to 2000-01 in the study area. The total decline during the study period is only 0.08 percent (Table 1).There is slight decline during the last two decades. The 92 land not available for cultivation has been decreasing due to the increase in the cultivable waste and fallow land. Figure 4.1 reveals the temporal variations in landput to non-agricultural uses. Non-agricultural land has been substantially increased for the study period from 1960-61 to 2000-01 (0.63%).While barren and uncultivated land slightly decrease between the study period (0.71%). More land in the past has been put to cultivation use, brought under non- agricultural use due to residential purpose and transport.

a. Cultivable Waste (CW)

In Nashik district, cultivable waste indicates less increase during the study period. In 1960-61, land under cultivable waste was 6.11 percent to the total geographical area while it is increased up to 0.63 percent in 2000-01 (table 1). The cultivable waste includes such sub types as permanent pasture and other grazing land, miscellaneous tree crops and groves not include in net sown area and cultivable waste. The trend of cultivable waste is shown in fig. 4.1. The total increase in cultivable waste is only 0.63 percent from 1960-61 to 2000- 01, that shows lightly upward trend. The permanent pasture and other grazing land decline by 1.84 percent, but miscellaneous tree and groves increased by 1.36 percent and cultivable waste increased by 1.11 percent. There was a small decline in permanent pasture and other grazing land while there was less increase in miscellaneous tree and groves and cultivable waste due to population pressure.

b. Fallow Land (FL)

The fallow land includes current fallow and other than current fallow. The current fallow means land kept uncultivated 93 for regaining fertility of soil and other purposes during the agricultural year. Other fallow land means land kept uncultivated more than five years due to various reasons i.e. non-availability of capital, lack of agricultural know-how. In study region both current fallow and other than current fallow show increased trend during the study period of 5.26 percent and 0.12 percent respectively while the total increase of fallow land is 5.38 percent (table 4.1). This fact suggests that less land under other fallow has been brought under cultivation. Moreover, there is a fluctuation inthe area under fallow land from 1970-71 to 2000-01

c. Forest (F)

In assessing the character of the vegetation type, a factor that can not be neglected in the long occupation of man and the consequent change on the vegetal carpet through agriculture. The type of vegetation met with any given locality depends on the climate, soil and past treatment has been emphasized by the leading plant ecologists. The influence of temperature and rainfall on plant life has received a special attention in the classifications of climate proposed by Koppen and Thornthwait. Nasik district has 21.75 percent and 21.68 percent of land under forest cover during 1960-61 and 1970-71 respectively. There is almost no change in forest lands during a span of ten years. Whereas during 2000-2001, land under forest increases 0.43 percent between 1990-1991 and 2000-2001. The statistics shows that 6698 hectares. Geographical area has been increased under forest between 1990-91 and 2000-2001. Forest plays a dominant role in maintaining ecological and environmental balance in the district.

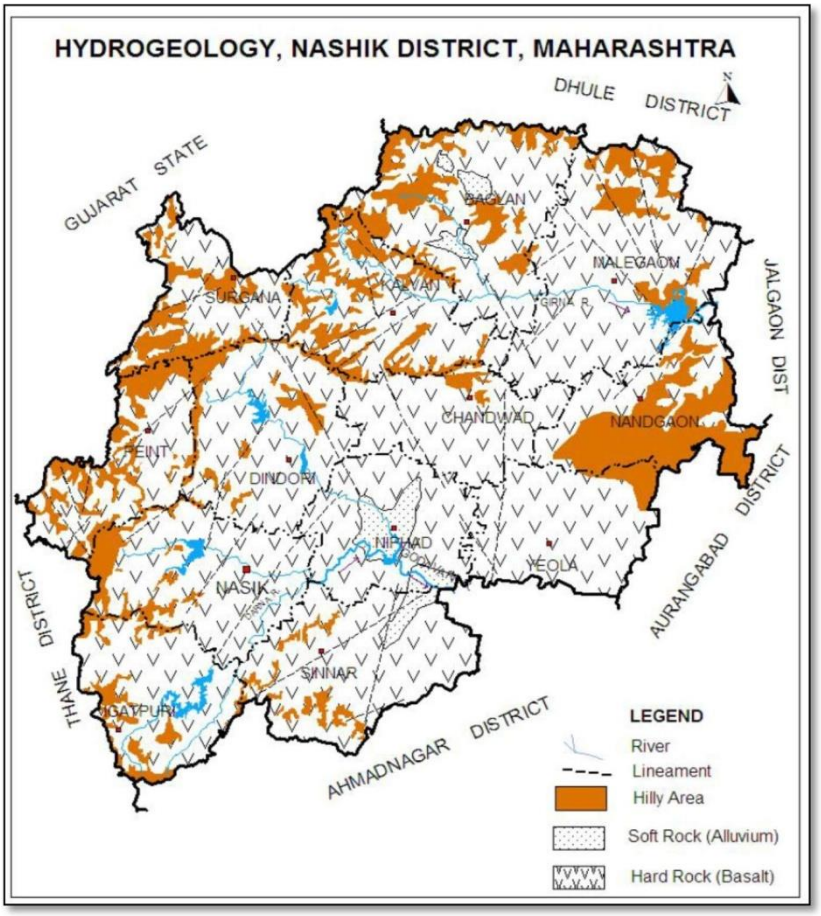
8. SURFACE WATER AND GROUND WATER SCENARIO OF THE DISTRICT

Hydrogeology

The entire area of the district is underlain by the basaltic lava flows of upper Cretaceous to lower Eocene age. The shallow alluvial formation of Recent age also occurs as narrow stretch along the banks of Godavari and Girna Rivers flowing in the area. A map depicting the hydrogeological features is shown as Figure

Hard Rock (Deccan Trap Basalt)

Basaltic lava flows occupies about 90% of the area of the district. These flows are normally horizontally disposed over a wide stretch and give rise to table land type of topography also known a plateau. These flows occur in layered sequences and represented by massive unit at the bottom and vesicular unit at the top of the flow. These flows are separated from each other by marker bed known as ‘bole bed’ are discussed below. The ground water in Deccan Trap Basalt occurs mostly in the upper weathered and fractured parts down to 20-25 m depth. At places potential zones are encountered at deeper levels in the form of fractures and inter-flow zones. The upper weathered and fractured parts form phreatic aquifer and ground water occurs under water table (unconfined) conditions. At deeper levels, the ground water occurs under semi-confined to confined conditions. The yield of dug wells tapping upper phreatic aquifer down to the depth of 12 to 15 m bgl ranges between 45 to 90 m3/day depending upon the local Hydrogeological conditions. Borewells drilled down to 70 m depth, tapping weathered and vesicular basalt are 6 found to yield 18 to 68 m 3 /day. The discharge of Piezometer ranges from 0.14 to 1.73 as seen from CGWB data.



Soft Rock (Alluvium)

Alluvium occurs in small areas in the form of discontinuous patches along the banks and flood plains of major rivers like Godavari, Girna and their tributaries. In alluvium the granular detrital material like sand and gravel usually occurring as thin layer in the district yields water. In the district Alluvium occupies an area of 1500 sq.km and it ranges in thickness from 7- 21 meters. It consists of reddish and brownish clays with intercalations of sand, gravel and kanker. The loosely cemented coarse sands and gravels form 3-4 meters thick lower most horizons at the bottom of these alluvial pockets. Ground water in Alluvium occurs both under semi confined and confined conditions. The dugwells constructed in Alluvium has been ranging in depth from 8-12 m, whereas the borewells range in depth form 15 to 20 m and the yield of both the dugwells and borewells ranges from 13 to 22 m3 /day.

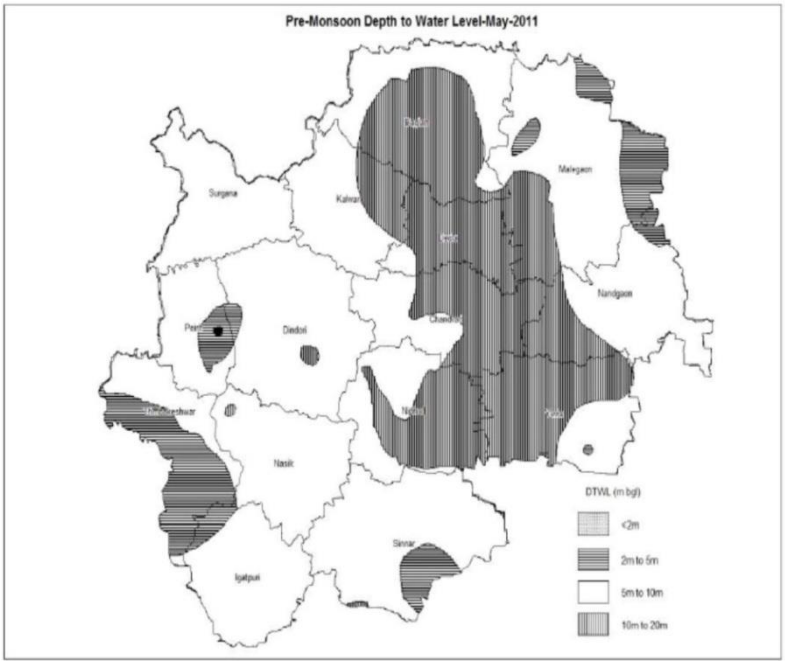
Water Level Scenario

Central Ground Water Board monitors water levels in 57 GWMW stations in the district. These GWMW are measured four times in a year viz., January, May (Pre monsoon), August and November (Post monsoon).

Depth to Water Level – Premonsoon (May 2011)

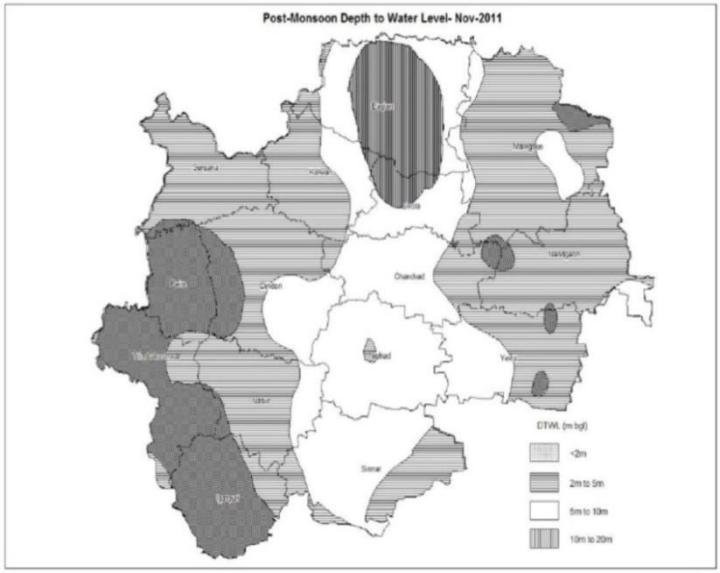
The premonsoon depth to water levels monitored during May 2011 ranges between GL (Harsul) and 19.24 m bgl (Ravalgaon). The depth to water levels during premonsoon has been depicted in Figure-3. The water levels in major part of the district covering entire western, central, north eastern and eastern parts are between 5 and 10 m bgl. Shallow water levels within 5 m bgl occur in southwestern and north eastern parts of the district in parts of Malegaon, Penth, Trimbakeshwar and Igatpuri talukas. Deeper water levels of 10 to 20 m bgl are observed in parts of Yeola, Chandwad, Kalwan, Niphad, Dindori and Baglan (Satana)

talukas.



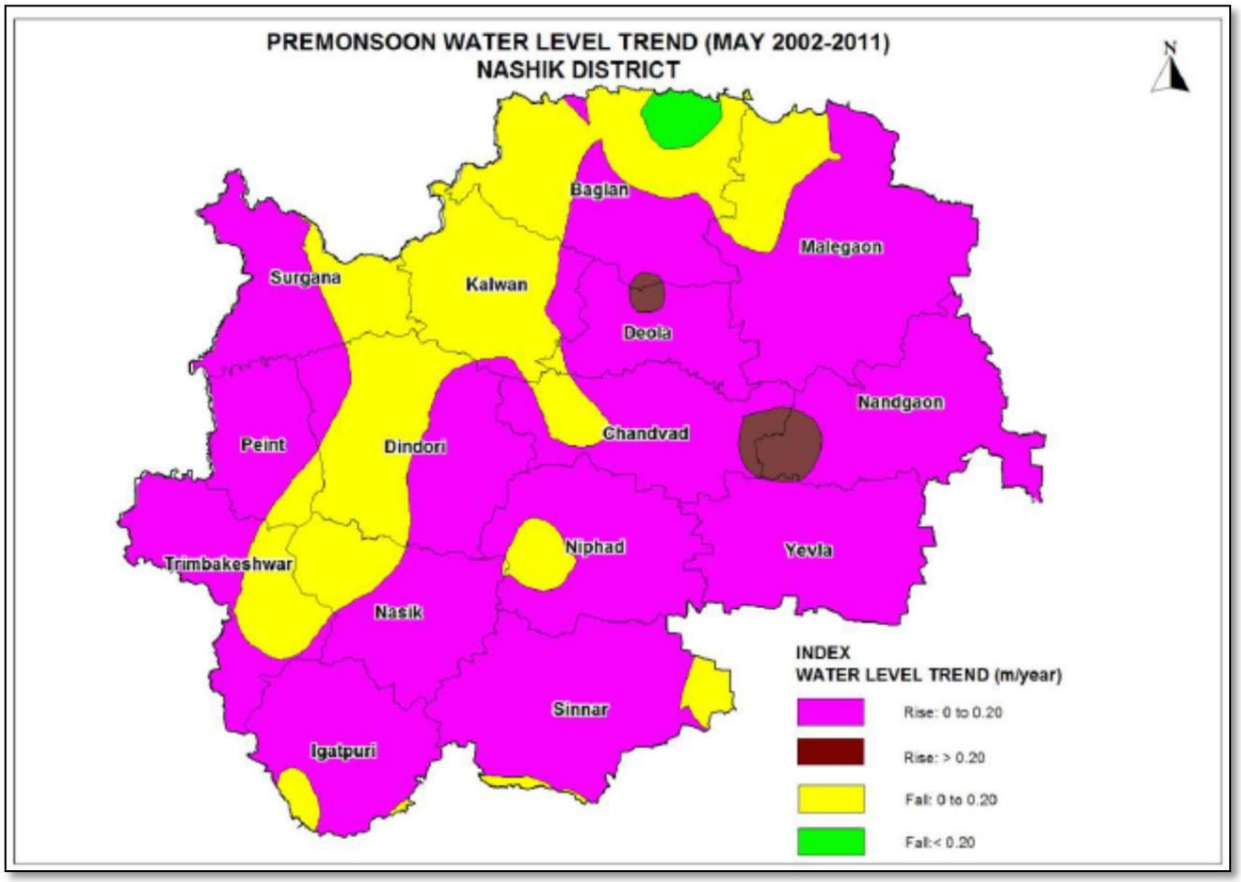
Depth to Water Level – Postmonsoon (Nov. 2011)

The depth to water level during post monsoon (Nov. 2011) ranges between 0.20 m bgl (Khambale) and 18.42 m bgl (Satana). Spatial variation in postmonsoon depth to water level is shown in Figure-4. The water levels between 5 and 10 m bgl have been observed in major parts of the district in the southern, and northern and central parts of the district. The shallow water levels within 5 m bgl are observed in southwestern, southeastern and Northeastern, Northwestern parts of the district covering parts of Nasik and Igatpuri Dindori, Kalwan,Surgana, Malegaon, Nandgaon and Yeola talukas . Deeper water levels of 10 to 20 m bgl are observed in northern and north central parts of the district in Baglan (Satana) and Deolali talukas.Very shallow water levels within 2 m bglare observed in Western and southwestern aprts in Penth,Trimbak and Igatpuri talukas as well as in small patches in Malegaon, Nandgaon and Yeola talukas.



Seasonal Water Level Fluctuation (May to Nov. 2011)

Seasonal water level fluctuation between premonsoon and postmonsoon of 2011 have been computed. Water level fluctuation in the range of 0.19 (Kona) to1.14 m (Thengode) is observed in the district. Rise in water levels in the range of 2 to 4 m is observed in major parts of the district in northeast to southwest patch. Rise of more than 4 m is mainly observed in north eastern and south eastern parts occupying almost entire Surguna and Yevla talukas. Rise of 0 to 2 m is observed in isolated patches in northern part of the district in Baglan taluka and southern part of the district in Sinnar taluka. 4.2.4 Water Level Trend (2002-2011) Trend of water levels for premonsoon and postmonsoon periods for last ten years (2002-2011) has been computed. Analysis of long term water level trend data indicates that rise in water levels in premonsoon period has been recorded at 37 NHNS and its ranges from 0.01 (Vasali) to 3.12 m/year (Thengode) and fall in water levels has been observed in 16 NHNS and it ranges between negligible (Tinghri) to 1.19 m/year (Shirpurwade-Baglan). During postmonsoon period rise in water levels has been recorded at 32 GWMW ranging from negligible (Karajgaon) to 1.27 m/year (Sakara) while at 22 GWMW fall in water level have been recorded and it ranges between negligible (Chachadgaon) and 1.00 m/year (Tinghri). Thus in major parts of the district, both during premonsoon and postmonsoon seasons declining water level trends have been recorded. The premonsoon water level trend map was also prepared for the period May 2002-2011 and the same is presented in Figure



9. RAINFALL: MONTH-WISE & CLIMATE

Climate of Nashik District

The climate of the district is on the whole is agreeable. The climate of Nashik district is characterized, by general dryness throughout the year except during the south-west monsoon season. The winter season is from December to about the middle of February followed by summer season which last up to May. 3 June to September is the south-west

monsoon season, whereas October and November constitute the post-monsoon season. The maximum temperature in summer is 42.5°C and minimum temperature in winter is less than 5.0°C. Relative humidity ranges from 43% to 62%. The normal annual rainfall in the district varies from about 500 mm to 3400 mm. It is minimum in the north eastern part of the district and increases towards west and reaches a maximum around Igatpuri in the western ghat. The chances of receiving normal rainfall are maximum (50 to 55%) in the north eastern part around Malegaon and Nandgaon and minimum in the central part of the district. The study of negative departures of the annual rainfall over normal reveals that major part of the district (about 75%) falling east of Western Ghats comprising almost entire Sinnar, Niphad, Surgana, Kalvan, Satana, Chandwad, Yeola talukas and parts of Dindori, Peint and Malegaon talukas can be categorized as drought area. The average annual rainfall for the period 2002 to 2011 ranges from about 476.7 mm (Devali) to 3508.1 mm (Igatpuri).

Nasik has a mild climate for most of the year apart from the hot summers which last from March to mid-June. The city has a semi-arid climate under the Koppen climate classification. The period from June to September is the (South West) Monsoon Season, which sees about 620 mm (25 inches) of rain. The city experiences a mild, dry winter from November to February, with warm days and cools nights, although occasional cold waves can dip temperatures. The maximum temperature ever recorded in the city was 44.8 °C (108.3 °F) on 12 May 1960 in Nasik. The lowest temperature recorded was 0.6 °C (33.1 °F) on 7 January 1945 in Nasik.

Rainfall in Nasik district

Though average rainfall of the District is between 2600 and 3000 mm, there is wide variation in the rainfall received at various blocks. Most of the rainfall is received at various blocks. Most of the rainfall is received from June to September. The maximum temperature in summer is 42.5 degree centigrade and minimum temperature in winter is less than 5.0 degree centigrade. Relative humidity ranges from 43% to 62%. Climate of the Nasik is generally compares with that of Banglore and Pune because of its pleasant nature. However in recent years it is noticed that the temperature is increasing and the rainfall is decreasing due to industrialization and fast deforestation.

Sr. No	Taluka	Rainfall Recorded During the period from 1 June to 31 September in mm.								
		2011	2012	2013	2014	2015	2016	2017	2018	2019
1	Nashik	564.0	441.0	686.5	650.0	669.9	1003.7	1094.2	601.7	1232.2
2	Igatpuri	3030.0	2684.0	3666.0	3343.0	2495.0	3326.0	3808.0	3234.0	5303.9
3	Dindori	576.0	577.0	882.1	705.0	486.0	954.9	864.0	441.0	1214.0
4	Peth	1832.0	1621.0	2263.0	1667.2	1079.0	2275.1	2459.1	2321.9	3345.0
5	Malegaon	396.0	485.0	563.0	358.6	402.0	374.8	343.8	291.0	635.0
6	Nandgaon	583.0	285.0	495.8	91.9	168.6	464.0	704.0	233.0	551.5
7	Chandwad	559.0	554.0	441.1	400.5	389.0	466.0	476.5	384.1	683.0
8	Kalwan	479.0	490.0	613.6	536.0	488.7	686.2	626.8	460.0	682.0
9	Baglan	526.0	419.0	598.9	424.0	363.5	557.5	446.5	290.2	669.2
10	Surgana	1772.0	1454.0	1801.6	1268.8	1069.4	1490.5	2288.1	2074.0	2839.7
11	Niphad	277.0	394.0	464.0	637.6	350.4	538.0	407.9	217.4	541.5
12	Sinner	469.0	340.0	505.0	413.4	398.0	690.0	671.6	345.3	756.0
13	Yeola	599.0	407.0	415.0	482.0	320.6	427.0	462.0	413.6	709.4
14	Trambakeshwar	1646.0	1343.0	2065.08	1757.0	922.0	1726.0	2321.0	1598.3	3862.0
15	Deola	283.0	322.0	417.3	331.5	282.8	577.5	549.0	324.4	495.7

10. PROCESS OF DEPOSITION OF SEDIMENTS IN THE RIVERS OF THE DISTRICT:

Deposition is the opposite of erosion. Deposition is where a river lays down or drops the Sediments or material that it is carrying. Rivers carries lots of different sediments, including

Rocks, boulders, silt, mud, pebbles and stones. Normally, a river has the power to carry Sediments. If the force of a river drops, the river cannot carry sediment. This is when the river deposits its sediment.

Constituents of Minor Mineral

The work done by a river consists of the following

1) Erosion
2) Transport of the material produced by erosion
3) Accumulation (deposition) of the transported material Constituents of minor mineral The work done by a river consists of the following

The erosion and transport of material go hand in hand with the deposition of the latter.
There is not a single river that doesn't carry fragmental material and deposit it. Even at the early stages, in the development of a river, when the erosion and transport definitely prevails over accumulation, the material carried by the river is deposited in some of the sections. During youthful stage of the river, these deposits are unstable and when the volume of water and stream velocity increases (during flood), they may start moving again downstream. The load carried by a stream includes the rock waste supplied to it by rain wash, surface creep, slumping etc. by tributaries , external agents such as glaciers, wind, together with, acquired by its own erosion work. The term load doesn't specifically mean the maximum amount of debris, that a stream could carry in a given set of conditions, that amount is referred to as the transporting power or capacity of a river.

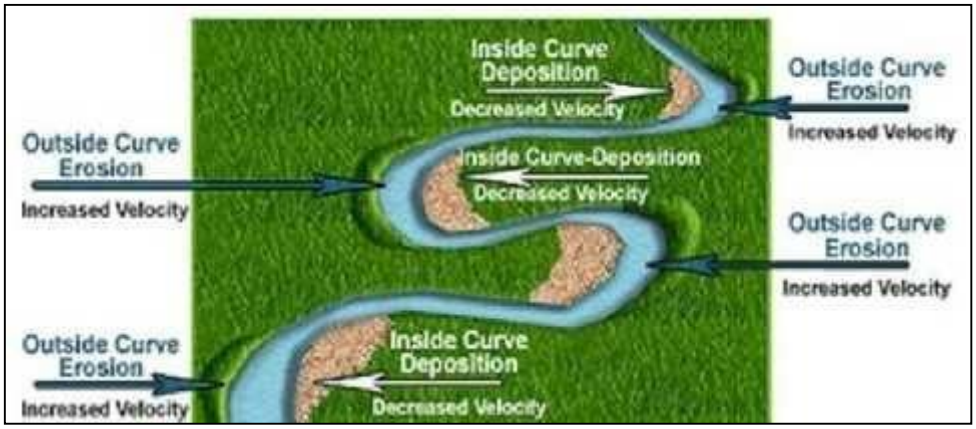


FIGURE 5: SHOWS DEPOSITION PATTERN OF THE RIVER

The term load is technically defined as the total weight of solid detritus transported in unit time. The transporting capacity of a stream rises very rapidly as the discharge and the velocity increases. Experiments show that with debris of mixed shapes and sizes, the maximum load that can be carried is proportional to something between the third and fourth power of the velocity. But the fragments of a given shape, the largest size that can be moved (not the actual mass of mixed debris) is proportional to the sixth power of the velocity, provided of course that the depth of water is also adequate for the purpose. As the velocity of a river is checked, the bed load is first to come to rest with continued slackening of the flow; the larger ingredients of the suspended load are dropped, followed by finer and finer particles. When the stream begins to flow more vigorously, the finer materials are the first to move again. A river begins to sort out its load or burden as soon as it receives it. The proportion of fine to coarse amongst the deposited materials tend on average to increase downstream, but there may be interruptions of this tendency because of addition of coarse debris from tributaries or from landslides and steepening of the banks. Both discharge and

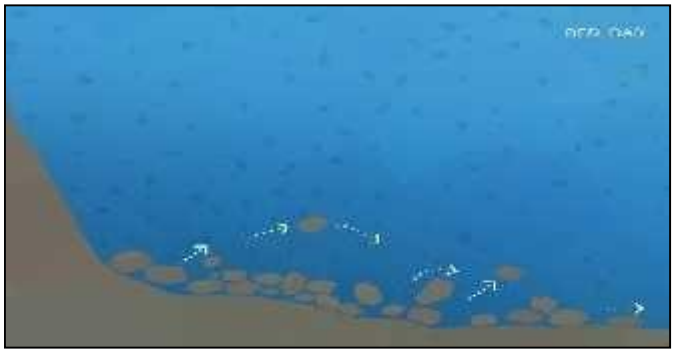
load depend on the climate and geology (lithology, structure and relief) of the river basin concerned and both co-operate in carving out the channels down.

RIVER REPLENISHMENT STUDY:

Sediment Transportation-

Sediment transport is the movement of organic and inorganic particles by water. In general, greater the flow more sediment that will be conveyed. Water flow can be strong enough to suspend particles in the water column as they move downstream, or simply push them along the bottom of a waterway. Transported sediment may include mineral matter, chemicals and pollutants, and organic material. Another name for sediment transport is sediment load. The total load includes all particles moving as bed load, suspended load, and wash load.

a. Bed Load-



Bed load particles travel with water flow by sliding or bouncing along the bottom.

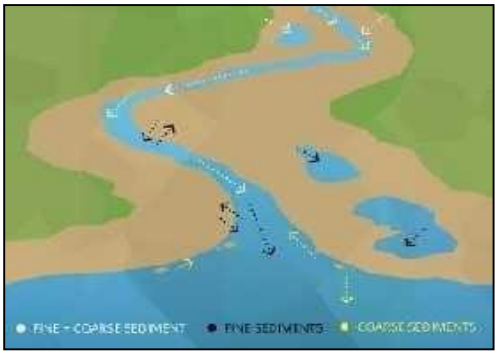
Bed load is the portion of sediment transport that rolls, slides or bounces along the bottom of a waterways. This sediment is not truly suspended, as it sustains intermittent contact with the streambed, and the movement is neither uniform nor continuous. Bed load occurs when the force of the water flow is strong enough to overcome the weight and cohesion of the sediment. While the particles are pushed along, they typically do not move as fast as the water around them, as the flow rate is not great enough to fully suspend them. Bed load transport can occur during low flows (smaller particles) or at high flows (for larger particles). Approximately 5-20% of total sediment transport is bed load. In situations where the flow rate is strong enough, some of the smaller bed load particles can be pushed up into the water column and become suspended.

b. Suspended Load-

While there is often overlap, the suspended load and suspended sediment are not the same thing. Suspended sediment are any particles found in the water column, whether the water is flowing or not. The suspended load, on the other hand, is the amount of sediment carried downstream within the water column by the water flow. Suspended loads require moving water, as the water flow creates small upward currents (turbulence) that keep the particles above the bed. The size of the particles that can be carried as suspended load is dependent on the flow rate. Larger particles are more likely to fall through the upward currents to the bottom, unless the flow rate increases, increasing the turbulence at the streambed. In addition, suspended sediment will not necessarily remain suspended if the flow rate slows.

If the water flow is strong enough to pick up sediment particles, they will become part of the suspended load.

c. Wash Load-



The wash load is the portion of sediment that will remain suspended even when there is no water flow.

When the flow rate changes, some sediment can settle out of the water, adding to point bars, channel bars and beaches.

The wash load is a subset of the suspended load. This load is comprised of the finest suspended sediment (typically less than 0.00195 mm in diameter). The wash load is differentiated from the suspended load because it will not settle to the bottom of a waterway during a low or no flow period. Instead, these particles remain in permanent suspension as they are small enough to bounce off water molecules and stay afloat. However, during flow periods, the wash load and suspended load are indistinguishable. Turbidity in lakes and slow moving rivers is typically due the wash load. When the flow rate increases (increasing the suspended load and overall sediment transport), turbidity also increases. While turbidity cannot be used to estimate sediment transport, it can approximate suspended sediment concentrations at a specific location.

What is Sediment Deposition?

Sediment is necessary to the development of aquatic ecosystems through nutrient replenishment and the creation of benthic habitat and spawning areas. These benefits occur due to sediment deposition – when suspended particles settle down to the bottom of a body of water. This settling often occurs when water flow slows down or stops and heavy particles can no longer be supported by the bed turbulence. Sediment deposition can be found anywhere in a water system, from high mountain streams, to rivers, lakes, deltas and floodplains. However, it should be noted that while sediment is important for aquatic habitat growth, it can cause environmental issues if the deposition rates are too high, or too low. Sediment transportation and Deposition is depends upon various factors like Slope of the Area, Annual Rainfall, Lithology, flow intensity of River, Geomorphology, Soil, Geology and

Landuse.

SIZE	ROUNDED, SUBROUNDED, SUBANGULAR		
256 mm-[64 mm-[4 mm--[	Fragment		Aggregate
	Boulder	↓ Roundstone ↑	Boulder gravel boulder conglomerate
	Cobble		Cobble gravel, cobble conglomerate
	Pebble		Pebble gravel, pebble conglomerate
	Granule		Granule gravel
2 mm—[1/16 mm—[1/256mm--[	Sand		Sand Sandstone
	Silt		Silt Siltstone
	Clay		Clay Shale

Transport of Sediment by Streams and Rivers-

The material transported by a stream can travel as:

1. Bedload
2. Suspended load
3. Dissolved load (salts, chemicals)

Stream capacity-

- Maximum quantity of solid material that a stream can carry
- Related to velocity(discharge)
- Higher after a rain (more sediment in water

Stream Competence (or competency)-

- Easure of the maximum size of particles the stream can transport
- Predict erosive capabilities

Types of Rivers or Streams:

1. Meandering-

These streams are very sinuous, and tend to migrate back and forth across the Floodplain (or meander), over time. The word "meander" comes from the name of a Sinuous river in Turkey, named the Menderes.

2. Braided-

These streams have lots of lenticular-shaped in-channel bars. The stream channel bifurcates around these bars, and follows a pattern resembling braided hair.

Fluvial Geomorphology:-

Erosion is the set of all processes by which soil and rock are loosened and moved Downhill or down slope. The most important process of erosion is due to running water. Erosion by running water acts in two basic forms: overland flow and channel flow.

Splash Erosion-

Most running water starts off as rain. Rain drops have diameters of between 0.5 to 7 mm and hit the ground at between 1 - 9 m/sec. The force of the impact loosens material and throws it into the air. This is called splash erosion. In violent thunderstorms over 200 tonnes/hectare can be disturbed. On a sloping surface, soil is shifted downhill as grains are moved slightly greater distances downhill than uphill. More importantly, however, it leads to a decrease in the permeability of the surface due to openings being sealed by particles.

There is therefore less infiltration and an increase in overland flow

Overland Flow-

Runoff starts as a broad sheet. The sheet exerts a drag force over the ground surface and some weathered products may be removed. This is sheet erosion. Generally, after traveling a short distance, small channels or rills are formed, which coalesce into gullies, concentrating the erosive action.

The amount of erosion of a slope depends on the

- Length and steepness of the slope
- Rainfall intensity
- Permeability and structure of the surface
- Amount of vegetation cover.

Channel Flow-

Stream erosion is "the progressive removal of mineral matter from the surfaces of a stream channel which itself may consist of bedrock or regolith" (Strahler). Erosion will only occur when the stream has an excess of energy. In mountainous streams, the rough channel walls may amount to 96% of the potential energy of the stream. Some energy is also spent in transporting load previously acquired. Erosion will result if the energy available > cohesion of particles. The quantity of water passing through the channel is termed the discharge (m^2/sec) and is equal to the channel cross-sectional area (m^2) times the average stream velocity (m/sec). The amount of sediment carried by the stream is called the stream **load** (**kg/m3)** Sub-processes of Erosion.

a. Hydraulic Action-

- The force of the running water alone. This is very important in weak alluvial deposits, especially in times of flood, when fast flowing; turbulent water undermines the channel banks.

b. Abrasion-

- The scouring caused by the impact of rock particles that are being transported. Abrasion features include plunge pools, potholes and chutes. Abrasion is proportional to velocity 2, so a three-fold increase in velocity leads to nine times as much abrasion. The mutual erosion of two particles is known as attrition

c. Solution (Corrosion)-

- Chemical reactions between ions in solution and exposed minerals. It is particularly important in limestone areas or on beds of rock salt and gypsum, but all common minerals are soluble to some extent.

Erosion Velocities-

The easiest grains to erode are in the fine to medium sand size range (see figure 1). Particles greater than this size have a proportionally greater volume to surface area ratio, so are harder to erode. For clays, ionic bonding leads to increased cohesion between clay particles, making them harder to erode. Clays are also platy minerals and form smooth surfaces. Laminar flow over the smooth surface decreases the ability of the stream to erode the particles. Clays also infill between larger grains and so are protected by the larger grains. Sands, therefore, may be moved during "normal" river flow, but it is only when floods increase the stream's velocity that the larger and smaller particles can be moved.

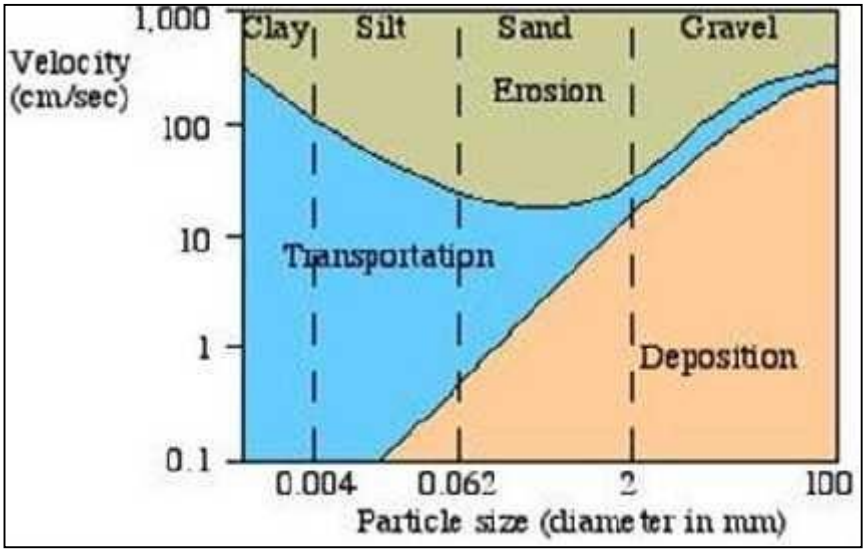


FIGURE 6: DIAGRAM SHOWING THE STREAM VELOCITY REQUIRED TO ERODE, TRANSPORT AND DEPOSIT PARTICLES OF VARIOUS SIZES.

Once the particles are being transported, there is an orderly deposition of particles with the largest being deposited first and clays being held almost indefinitely. Hence the sediment becomes sorted downstream.

Transportation:

The particles carried by streams are known as the stream load. Particles may be carried by

- Floatation of very minor significance.
- Solution. -Ions of dissolved minerals that may travel downstream indefinitely. The most common are Na, Ca, K, Mg, Cl, SO4 and HCO3. One estimate of rivers was that they carry 300 million tons of dissolved load each year, and 250 million tons of solidload.
- Suspension.-The temporary support of particles when turbulence is greater than the settling velocity of the particle. Clay and silt are normally transported in suspension, but sand may be carried this way in floods.
- Saltation.-Intermittent "jumping" of grains that are lifted by turbulence, but are too heavy to remain in suspension.
- Traction.-The sliding or rolling of particles along the stream floor. Particles moved in this way comprise the bed load. Bed load normally constitutes around 10% of the solid load, but may be up to 50% during floods, when the major work of the stream is done.

Transportation is aided by the buoyancy of water. eg. Quartz grains are Å 2000 times the density of air, but only two and a half times that of water. Unequal velocities at the top and bottom of boulders also assist transportation, as doe’s steep gradients.

The total load of particles of all sizes that a stream can carry is known as its capacity. It is proportional to discharge, which is proportional to velocity. A faster flowing stream therefore has a higher capacity. If a stream's capacity is less than its load, the stream cannot carry its load, so deposition occurs. If capacity exceeds load, the stream has excess energy (gravitational, potential energy), so it can erode more sediments. Streams switch back and forth from depositional to erosional agents, depending on load vs. capacity. A stream can erode along one stretch and deposit along another, since gradient and channel shape/size vary along the stream's course. Streams can erode during periods of higher velocity or discharge (floods) and deposit during periods of lower velocity or discharge. Anything that

alters the sediment load delivered to the channel or that alters the stream's capacity to carry that load will cause the stream's gradient or channel geometry to change in response

The largest particle that a stream can transport is known as its competence. Assuming that there is sufficient depth to cover the particles, then competence is proportional to the square of velocity.

Deposition-

Deposition will occur when a loss of energy results in a decrease in velocity. This may be due to such things as declining gradient, a decrease in water volume, an increase in cross-sectional area (particularly pools, lakes, and oceans), or by local obstructions. An excessive load produced by increased erosion in the drainage basin or tributary valleys, or from glaciofluvial outwash will also inevitably lead to deposition. The accumulations of stream deposits are called alluvium

Note: There is a constant interaction between erosion, transportation and deposition. During a flood, the bed of a stream at a particular point may be eroded, but as the flood subsides the bed is filled again. Similarly, in different parts of the stream, velocity differs and hence one part of the stream may be eroding its bank, while on the opposite bank deposition is taking place.

Downstream Adjustments:

Overall, despite some variations, effluent streams (those that receive water from the water table) generally show the following changes downstream:

- Discharge increases (due to more tributaries and a greater drainage area)
- Total load increases (due to more tributaries and a greater drainage area)
- Channel size increases (to cope with the increased discharge and load)
- Particle size decreases (due to increased abrasion/attrition and changes in velocity)
- The smoothness of the channel increases (due to decreased particle size)
- Gradient decreases

Stream velocity downstream is increased by the smoother channels, but decreased by lower gradients. Under normal conditions, velocity is proportional to discharge$^{0.1}$, so there is a slight overall increase in the average velocity of the stream - despite the appearance of faster flowing mountain streams at the headwaters. In such streams, the amount of turbulence and associated eddies and backward flowing portions of the streams means that the average velocity is lower than the smoother flowing waters downstream. During floods, however, when the major work of the stream is done, velocity is proportional to discharge^{0} (i.e. it is constant), so the increased velocity associated with floods allows the erosion and transportation of a large range of particle sizes throughout the drainage system.

It can be seen from these relationships that peak discharge conditions that occur during floods are very important in determining the form of rivers and the features associated with them, and not the "normal" river level.

These changes take place in an orderly manner and lead to a longitudinal profile that is smooth and concave. This is known as a graded profile. For a stream with an irregular profile, erosion will be more pronounced at places of higher than normal gradient, such as at falls and rapids, and sedimentation will occur in areas of low gradient, such as lakes. The "bumps" are therefore ironed out until the graded profile is achieved.

It is a "dynamic" system, as there is constant re-adjustment of the channel in response to

local variations in the volume, velocity and load that leads to a local balance between the sediment being transported and the energy available. That is, short term changes of scour and fill may occur, but in the long term the gradient and velocity are such that the available load can be transported without erosion or deposition dominating in any particular place. Over geological time, erosion dominates and the whole profile is lowered until a pediplain is developed close to base level. The base level is the lowest level that a stream can erode its channel. A temporary base level results from obstructions such as resistant outcrops, lakes, dams etc. that lead to temporary sub-profiles An increase in base level will lead to aggradations, the built up of sediment on valley floors and the development of thick deposits of alluvium.

A decrease in base level will lead to such things as nick points that migrate upstream, alluvial terraces, valley in valley topography and entrenched meanders.

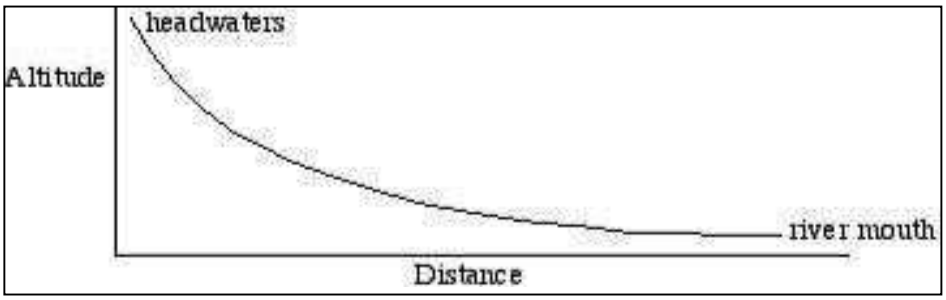


FIGURE 7: LONG PROFILE OF A GRADED STREAM, SHOWING A REGULAR CHANGE IN GRADIENT

DANDY-BOLTON EQUATION:

Dandy Bolton equation is commonly used to calculate the sedimentation yield. for specific location variability often occurs due to local factors. However this equation gives rough estimation of mean sedimentation yield. There are two equations i.e. for runoff less 2 inches & for runoff more than 2 inches.

The average annual rainfall ranges from about 476.7 mm (Devali) to 3508.1 mm (Igatpuri) and the normal annual rainfall in the district varies from about 500 mm to 3400 mm. The computations for total annual suspended and bed load sediment yield are given below. Sediment Yield-

For runoff less than 2 inches, S=1280 Q 0.26[1.43-0.26 log (A)]
For, runoff more than 2 inches, S=1965 e-0.055Q [1.43-0.26log (A)]

CALCULATION OF SEDIMENTARY YIELD FOR RIVER/NALA

S. No.	Factors		Probable Replenishment
1.	**River**	**Girna**	= 5341.68 Tone/mi2/ year or 0.00534 M. tons/yr
	Catchment Area	10061 sq.km	
	Average Annual Runoff	224 mm	
	Sediment Yield Formula: **For Q < 2 in:** S = 1280 Q0.46[1.43 - 0.26 log(A)] **For Q > 2 in:** S = 1965 e-0.055Q[1.43 - 0.26 log(A)] Here: Q (in) = Mean Annual run off = 224mm (8.81 inch)		

S. No.	Factors		Probable Replenishment
	A(mi^2) = Catchment area = 10,061 Sq.km (3884.57 Sq. mile) *Source: - Calculation of sediment yield by the Dandy-Bolton formula-@ponce.sdsu.edu*		
	Conclusion: The area 10, 06 Km^2 is representing the catchment area of the Girna River, Thus, about 4041.94 Tone/year sediment will be re-deposited every year in the catchment area.		
2.	**River**	**Godavari**	= 580 tone/mi2/year or 0.00058M. tons/yr
	Catchment Area	3,12,812 sq.km	
	Average Annual Runoff	600 mm	
	Sediment Yield Formula: **For Q < 2 in:** S = 1280 Q0.46[1.43 - 0.26 log(A)] **For Q > 2 in:** S = 1965 e-0.055Q[1.43 - 0.26 log(A)] Here: Q (in) = Mean Annual run off = 600mm (23.62) A (mi2) = Catchment area: 312,812 q.km (120777.4 Sq. mile) *Source: - Calculation of sediment yield by the Dandy-Bolton formula-@ponce.sdsu.edu*		
	Conclusion: The area 312,812 sq.km is representing the catchment area of the Godavari River, Thus, about 580 tone/year sediment will be re-deposited every year in the catchment area.		

(Physical replenishment as per Minable depth)

Sand Ghat Name	Total Available depth for 2020-21	Proposed Depth of sand (m) for excavation year (2020-21)	Increase depth in % for proposed sand ghats
Aghar Bu-2	2.00	1	100
Aghar Bu-1	2.00	1	100
Patane	2.00	1	100
Tamaswadi	2.50	0.50	50
Asoli	2.70	0.30	30
Pale Khu.	2.70	0.30	30
Desgaon	2.70	0.30	30

From the above table it seems that the average increase in depth of deposition is 30-100% as per available Mineable depth

Table no. 1: Shows GSDA observed & recommended depth of sand for mining year 2020-2021

Sr. No.	Tahsil	Name of Sand Ghat	Name of River	Depth of Sand observed by GSDA(m)	GSDA recommended sand for mining in (m)	
					Length	Width
1	Malegaon	Aghar Bu.-2	Girna	1	148	29
2	Malegaon	Aghar Bu.-1	Girna	1	473	29
3	Malegaon	Patna	Girna	1	183	55
4	Niphad	Tamaswadi	Godavari	0.5	450	70

5	Kalwan	Girna	Asoli	0.3	720	20
6	Kalwan	Girna	Pale Khu.	0.3	500	10
7	Kalwan	Girna	Desgaon	0.3	520	20

11. DRAINAGE SYSTEM WITH DESCRIPTION OF MAIN RIVERS:

Sr. no.	Name of river	Total length in district (km)	Place of origin	Catchment area Sq.km	% area drained in district
1	Godavari	111	Trambakeshwr	3,12,812	24.2 %
2	Girna	114	Surgana	10,061	45 %
3	Vaitrna	40	Igatpuri	-	-
4	Darna	80	Igatpuri	-	-
5	Kadwa	74	Dindori	-	-
6	Mosam	98	Baglan	-	-

1. The Girna River rises in Western Ghats at an elevation of 900 m at north latitude of 20°44' and an east longitude of 73°51'. The river flows first in an easterly direction up to Jaamda and then turns north. It takes a westerly turn at Nandra to join the Tapi from the left near Nanded. At this point, Tapi has already run for 340 km. Before Joining the Tapi River, the Girna River traverses a distance of 260 km. The drainage area of the river is 10,061 sq. km, which is nearly one-sixth of the total catchment of the Tapi. Girna is the second biggest tributary of Tapi in terms of catchment area. The waters of the Girna are used for irrigation in Nasik and Jalgaon districts. Due to heavy rainfall in the catchment, Girna has important influence on the floods in the Tapi basin.

2. The Godavari originates in the Western Ghats of central India near Nashik in Maharashtra, 80 km (50 mi) from the Arabian Sea. It flows for 1,465 km (910 mi), first eastwards across the Deccan Plateau then turns southeast, entering the West Godavari district and East Godavari district of Andhra Pradesh, until it splits into two distributaries that widen into a large river delta at Sir Arthur Cotton Barrage in Rajamahendravaram and flow into the Bay of Bengal. The Godavari River has a coverage area of 312,812 km2 (120,777 sq mi).

SALIENT FEATURES OF IMPORTANT RIVERS AND STREAMS

Name of the river or stream	Total length in the district in Km	Place of origin	Altitude at origin
Girna	114	Surgana	900m
Godavari	111	Trambakeshwr	463 m

12. METHODOLOGY ADOPTED FOR CALCULATING OF MINERAL POTENTIAL:

The mineral potential is calculated based on field investigation and geology of the catchment area of the river/ streams. As per the policy of the State and location, depth of minable mineral is defined. The area for removal of mineral in a river or stream can be decided depending on geomorphology and other factors, it can be 50% to 60% of the area of a particular river/stream. Other constituents like clay and silt are excluded as waste while calculating the mineral potential of particular river/stream.

The specific gravity of each mineral constituent is different. While calculating the mineral potential, the average specific gravity is taken as 2.25. The percent of mineral constituent like boulder, river Gravel, and sand also varies for different river and streams. While calculating the mineral potential the percentage of each mineral constituent is taken as, Sand 25- 30% and 5- 10% for silt and clay.

The quantum of deposition varies from stream to stream depending upon factors like

catchment lithology, discharge, river profile and geomorphology of the river course. There are certain geo- morphological features developed in the river beds such as channel bar, point bar etc. where annual deposition is more even two to three meters.

13. THE DETAIL OF RIVERS AS GIVEN BELOW- ANNUAL DEPOSITION:

Nashi District have total 7 Sand ghats for the year 2020-21 and total 18,645 brass sand from 7 sand ghat.

Sr.No.	Portion of the river or stream recommended for Mineral concession	Length of area recommended for mineral concession (In mt.)	Average width of area recommended for Mineral concession (In mt.)	Area recommended for mineral concession (in Sq. Mtr.)	Mineable mineral potential (in metric ton) (60% of total mineral potential)
	Girna	2544	163	107376	95607
	Godavari	450	70	31500	25044
Total		**2,994**	**Average - 33**	**1,38,876**	**1,20,651**

THE RATE OF ROYALTY FOR DIFFERENT MINOR MINERALS

Sr. No	Type of mineral		Mineral Royalty rate for per brass (Rs)
1.	Nashik	Stone	400/-
2.		Murrum	400/-
3.		Sand	As per upset prize comes through Auction

ROYALTY OR REVENUE RECEIVED IN LAST THREE YEARS:

Sr. No	Year	Target	Recovery	Percent%
1	**2**	**3**	**4**	**5**
1	2017-2018	10500.00	8639.27	82.27
2	2018-2019	9500.00	9517.60	100.18
3	2019-2020	9500.00	9749.74	102.63
4	F.Y 2020-2021 (30 June)	14250.00		

PRODUCTION DETAILS OF SAND OR BAJARI OR MINOR MINERALS IN LAST THREE YEARS:

FINANCIAL YEAR	MINOR MINERAL IN BRASS	MINOR MINERAL IN CUM.	MINOR MINERAL IN TONNES
F.Y.2016-17	2428997	6874062	528043
F.Y.2017-18	2159817	6112282	469525
F.Y.2018-19	237940	673370	51726
F.Y.2019-20	2437435	6897941	529877

14. Quality / Grade of Mineral available in the District:

Quality of stone available in Nashik district is building grade stone confirming IS a standard IS: 7779 (Part II/Sec 3) of 1979.

15. Use of Mineral

Basalt stone is used for building, construction works, and road works as an aggregate.

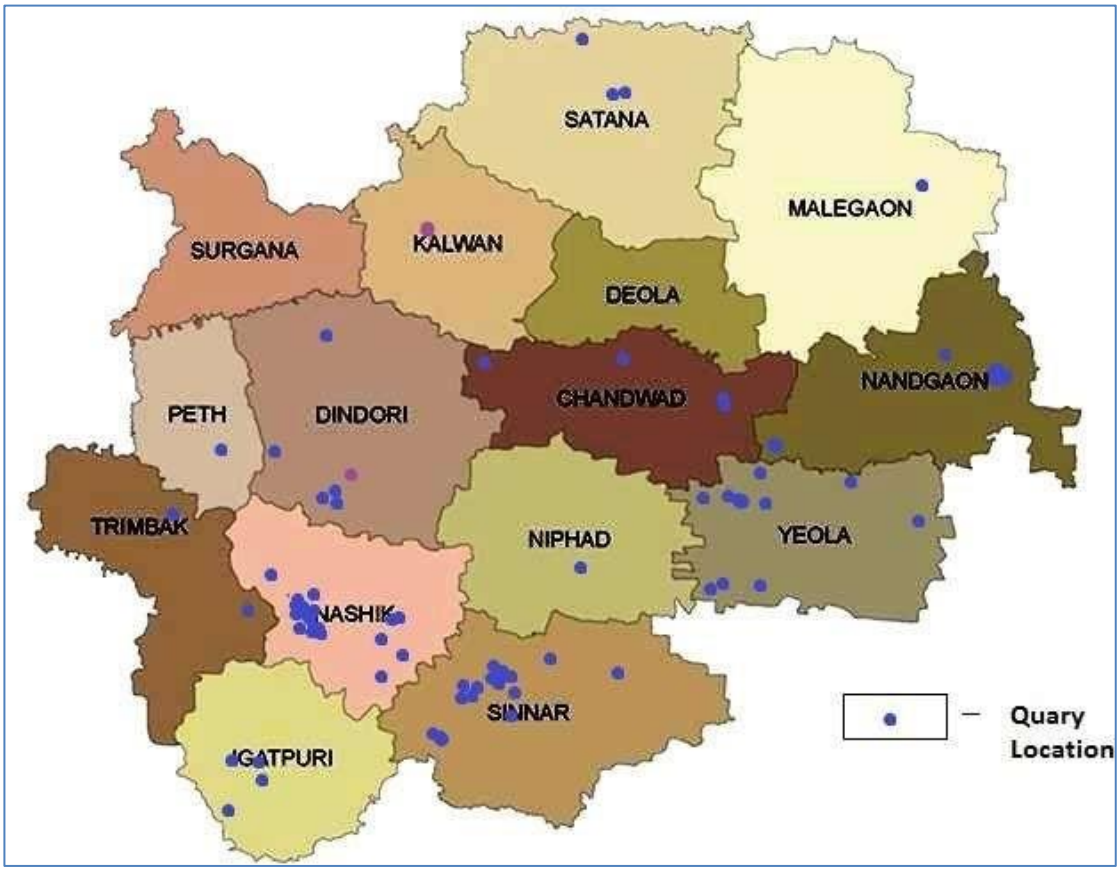
16. Demand and Supply of the Mineral in last three years

Basalt stone with variable sizes from 6mm, 12 mm, 20mm, 40mm, 60mm, 100mm, Grit, are used for construction and road works as an aggregate material. Nashik district has remarkable market requirement of building stone material for construction activity. This demand is perpetual to market requirements depending on growth of infrastructural index of the area, state and country. Requirement of the stone material may also varies with the

quality of the stone material which consist of Strength, Durability, Hardness, Toughness, Specific Gravity, Porosity etc.

Details of Production of Minor Mineral in last three years DISTRICT – NASHIK							
		2018-19		2019-20		2020-21 (upto dec)	
Name of Minerals		Demand	Supply (Brass)	Demand	Supply (Brass)	Demand	Supply (Brass)
1	Gitty/Building Stoen	622673	593022	653211	622106	659491	628087
2	Murrum	253128	241075	337068	321018	262778	250188
3	Ordinary Clay	12925	12310	17111	16297	10894	10333
4	Ordinary Sand	500000	0	500000	0	500000	2500

Mining Leases marked on District Map:



17. RECOMMENDATION OF ENFORCEMENT & MONITORING GUIDELINES FOR SAND MINING BY MOEF& CC- 2020

Introduction

The Ministry of Environment Forest & Climate Change formulated the Sustainable Sand Management Guidelines 2016 which focuses on the Management of Sand Mining in the Country. But in the recent past, it has been observed that apart from management and systematic mining practices there is an urgent need to have a guideline for effective enforcement of regulatory provision and their monitoring.

Section 23 C of MMDR, Act 1957 empowered the State Government to make rules for preventing illegal mining, transportation and storage of minerals. But in the recent past, it has been observed that there was large number of illegal mining cases in the Country and in some cases, many of the officers lost their lives while executing their duties for curbing

illegal mining incidence. The illegal and uncontrolled illegal mining leads to loss of revenue to the State and degradation of the environment.

India is developing at a faster pace and much technological advancement has already been taken place in the surveillance and remote monitoring in the field of mining. Thus, it is prudent to utilize the technological advancement for the effective monitoring of the mining activities particularly sand mining in the country.

Use of latest remote surveillance and IT services helps in effective monitoring of the sand mining activity in-country and also assist the government in controlling the illegal mining activity in the country. Thus, there is a need for an effective policy for monitoring of sand mining in the Country which can be enforced on the ground. These guidelines focus on the effective monitoring of the sand mining since from the identification of sand mineral sources to its dispatch and end-use by consumers and the general public. Further, the effective monitoring and enforcement require efforts from not only Government agencies but also by consumers and the general public. (*Source: EM guidelines, MoEF&CC, New delhi 2020*)

The need for replenishment study for river bed sand is also required in order to "nullify the adverse impacts arising due to excessive sand extraction". No riverbed mining will be allowed during the monsoon. In cases where rivers become district boundaries or state boundaries, the districts or states sharing the boundary shall constitute the combined task force for monitoring of mined materials, mining activity and participate in the preparation of District Survey Reports (DSR) by providing appropriate inputs. The guidelines say the detailed survey needs to be carried out for quantification of minerals and the demand and supply of the riverbed material through market survey, including the future demand for the next five years.

OBJECTIVE OF GUIDELINES

- Identification and Quantification of Mineral Resource and its optimal utilization.
- To regulate the Sand & Gravel Mining in the Country since its identification to its final end-use by the consumers and the general public.
- Use of IT-enabled services & latest technologies for surveillance of the sand mining at each step.
- Reduction in demand & supply gaps.
- Setting up the procedure for replenishment study of Sand.
- Post Environmental Clearance Monitoring.
- Procedure for Environmental Audit.
- To control the instance of illegal mining.

Salient Features of the Guidelines

- **District Survey Report:** The guidelines provide the procedure to be followed for identifying areas where mining can be allowed or prohibited. It provides guidelines for preparing a district survey report, which includes: Preparing a report before granting a mining lease, and Defining mining and no mining zones based on certain environmental and social factors.
- **Preventing Illegal Mining:** The guidelines suggest that sites can be monitored remotely. Drones can also be used for quantity estimation and land use monitoring. Further, the guidelines propose night surveillance of mining activity through night-vision

drones. The environmental damages incurred due to illegal mining will be assessed by a committee constituted by the District Administration.

- **Environmental Clearance:** Environmental Clearance for mining is given by regulatory authorities after considering the potential environmental impact. However, it has been observed that often the Letter of Intent (LoI) is granted for a location which is not feasible for environment-friendly mining. The guidelines provide that LoIs should be granted for those locations which have the least possibility of an impact on the environment and nearby habitation.
- The guidelines also encourage for online sale and purchase of sand and other riverbed materials to make the process transparent.

Preparation of District Survey Report

"Sustainable Sand Mining Guidelines, 2016" issued by MoEF&CC requires preparation of District Survey Report (DSR), which is an important initial step before grant of mining lease/LoI. The guidelines emphasize detailed procedure to be followed for the purpose of identification of areas of aggradation/ deposition where mining can be allowed and identification of areas of erosion and proximity to infrastructural structures and installation where mining should be prohibited. Calculation of annual rate of replenishment, allowing time for replenishment after mining, identification of ways of scientific and systematic mining; identifying measures for protection of environment and ecology and determining measures for protection of bank erosion, benchmark (BM) with respect to mean Sea Level (MSL) should be made essential in mining channel reaches (MCR) below which no mining shall be allowed.

Considering the importance of district survey report, the Ministry of Environment Forest and climate change, after consultation with experts dealing with mining-related matters, formulated the following guidelines for the preparation of comprehensive District Survey Report for sand mining.

a) District Survey Report for sand mining shall be prepared before the auction/e-auction/grant of the mining lease/Letter of Intent (LoI) by Mining department or department dealing the mining activity in respective states.

b) The first step is to develop the inventory of the River Bed Material and Other sand sources in the District. In order to make the inventory of River Bed Material, a detailed survey of the district needs to be carried out, to identify the source of River Bed Material and alternative source of sand (M-Sand). The source will include rivers, de-siltation of reservoir/dams, Patta lands/Khatedari Land, M-sand etc.

c) District Survey Report is to be prepared in such a way that it not only identifies the mineral-bearing area but also define the mining and no mining zones considering various environmental and social factors.

d) Identification of the source of Sand & M-Sand. The sources may be from Rivers, Lakes, Ponds, Dams, De-silting locations, Patta land/Khtedari lands. The details in case of Rivers such as [name, length of river, type (Perennial or Non-Perennial), Villages, Tehsil, District], in case of Lakes, Ponds, Dams, De-silting locations [Name, owned/maintained by (State Govt./PSU), area, Villages, Tehsil, District] in case of Patta land/Khtedari lands [Owner Name, Sy No, Area, Agricultural/Non-Agricultural, Villages, Tehsil, District], in case of M-Sand Plant [Owner Name, Sy No, Area, Quantity/Annum, Villages, Tehsil, District], needs to be recorded as per format given in **Annexure-I**.

e) Defining the sources of Sand/M-Sand in the district is the next step for identification of the potential area of deposition/aggradations wherein mining lease could be granted. Detailed survey needs to be carried out for quantification of minerals. The purpose of mining in the river bed is for channelization of rivers so as to avoid the possibility of flooding and to maintain the flow of the rivers. For this, the entire river stretch needs to be surveyed and original ground level (OGL) to be recorded and area of aggradations/deposition needs to be ascertained by comparing the level difference between the outside riverbed OGL and water level. Once the area of aggradations/deposition are identified, then the quantity of River Bed Material available needs to be calculated. The next step is channelization of the river bed and for this central ¾th part of the river, width needs to be identified on a map. Out of the ¾th part area, where there is a deposition/aggradations of the material needs to be identified. The remaining ¼th area needs to be kept as no mining zone for the protection of banks. The specific gravity of the material also needs to be ascertained by analyzing the sample from a NABL accredited lab. Thus, the quantity of material available in metric ton needs to be calculated for mining and no mining zone.

f) The permanent boundary pillars need to be erected after identification of an area of aggradations and deposition outside the bank of the river at a safe location for future surveying. The distance between boundary pillars on each side of the bank shall not be more than 100 meters.

g) Identifying the mining and no mining zone shall follow with defining the area of sensitivity by ascertaining the distance of the mining area from the protected area, forest, bridges, important structures, habitation etc. and based on the sensitivity the area needs to be defined in sensitive and non-sensitive area.

h) Demand and supply of the Riverbed Material through market survey needs to be carried out. In addition to this future demand for the next 5 years also needs to be considered.

i) It is suggested that as far as possible the sensitive areas should be avoided for mining, unless local safety condition arises. Such deviation shall be temporary & shall not be a permanent feature.

j) The final area selected for the mining should be then divided into mining lease as per the requirement of State Government. It is suggested the mining lease area should be so selected as to cover the entire deposition area. Dividing a large area of deposition/aggradations into smaller mining leases should be avoided as it leads to loss of mineral and indirectly promote illegal mining.

k) Cluster situation shall be examined. A cluster is formed when one mining lease of homogenous mineral is within 500 meters of the other mining lease. In order to reduce the cluster formation mining lease size should be defined in such a way that distance between any two clusters preferably should not be less than 2.5 Km. Mining lease should be defined in such a way that the total area of the mining leases in a cluster should not be more than 10 Ha.

l) The number of a contiguous cluster needs to be ascertained. Contiguous cluster is formed when one cluster is at a distance of 2.5 Km from the other cluster.

m) The mining outside the riverbed on Patta land/Khatedari land be granted when there is possibility of replenishment of material. In case, there is no replenishment then mining lease shall only be granted when there is no riverbed mining possibility within 5 KM of the Patta land/Khatedari land. For government projects, mining could be allowed on Patta

land/Khatedari land but the mining should only be done by the Government agency and material should not be used for sale in the open market. Cluster situation as mentioned in para k above is also applicable for the mining in Patta land/Khatedari land.

n) The State Government should define the transportation route from the mining lease considering the maximum production from the mines as at this stage the size of mining leases, their location, the quantity of mineral that can be mined safely etc. is available with the State Government. It is suggested that the transportation route should be selected in such a way that the movement of trucks/tippers/tractors from the villages having habitation should be avoided. The transportation route so selected should be verified by the State Government for its carrying capacity.

o) Potential site for mining having its impact on the forest, protected area, habitation, bridges etc, shall be avoided. For this, a sub-divisional committee may be formed which after the site visit shall decide its suitability for mining. The list of mining lease after the recommendation of the Committee needs to be defined in the following format given in as **Annexure-II**. The Sub-Divisional Committee after the site visit shall make a recommendation on the site for its suitability of mining and also records the reason for selecting the mining lease in the Patta land. The details regarding cluster and contiguous cluster needs to be provided as in **Annexure-III**. The details of the transportation need to be provided as in **Annexure IV.**

p) **Public consultation-**The Comments of the various stakeholders may be sought on the list of mining lease to be auctioned. The State Government shall give an advertisement in the local and national newspaper for seeking comments of the general public on the list of mining lease included in the DSR. The DSR should be placed in the public domain for at least one month from the date of publication of the advertisement for obtaining comments of the general public. The comments so received shall be placed before the sub-divisional committee for active consideration. The final list of sand mining areas [leases to be granted on riverbed & Patta land/Khatedari land, de-siltation location (ponds/lakes/dams), M-Sand Plants (alternate source of sand)] after the public hearing needs to be defined in the final DSR in the format as per **Annexure-V.**

ANNEXURE NO. - I

Compliance to Enforcement and Monitoring Guidelines for Sand Mining- 2020

a) Details of Sand / M-Sand Sources from Rivers in Nashik District:

Details of Sand Sources from Rivers in Nashik District				
Sr. No	**River Name/M-Sand Plant**	**No.of Proposed Sand Ghats**	**Total Stretch of River (in KM)**	**Type of River (Perennial or Non-Perennial)**
1	**Godavari**	**7**	**111**	**Non - Perennial**
2	**Girna**		**114**	
3	Vaitrna		40	
4	Darna		80	
5	Kadwa		74	
6	Mosam		98	
Details of M-Sand Sources from Rivers in Nashik District				
Sr. No	**Name of River**	**No.of M-Sand Plants**	**Total Stretch of River (in KM)**	**Type of River (Perennial or Non-Perennial)**
1	Nil	Nil	Nil	Nil
2	Nil	Nil	Nil	Nil
is no M-Sand Plants are established or operating for M-Sand Source from the Rivers by the Private or Govt. agency till date in Nashik District.				

a) Rivers:

River Name/M-Sand Plant	Total Stretch of River (in KM)	Type of River (Perennial or Non-Perennial)
Godavari	111	Non-Perennial
Girna	114	Non-Perennial

b) De-Siltation Location: (Lakes/Ponds/Dams etc.)

Name of Reservoir/ Dams	Maintain / Controlled by State Govt./PSU etc.	Location	District	Tehsil	Village	Size (Ha)
Nil						

c) Patta Lands/Khatedari Land:

Owner	Sy. No	Area (Ha)	District	Tehsil	Village	Agricultural Land (Yes/No)
Nil						

d) M-Sand Plants:

Plant Name	Owner	District	Tehsil	Village	Geo-location	Quantity Tonnes/Annum
Nil						

Note: For inclusion of M-Sand Plant/Patta Land in DSR. the plant/land owners need to submit the request to the Mining Department with complete details. Inclusion in DSR does not give them the right to operate the M-Sand Plant/Sand Mining lease.

ANNEXURE NO.-II

List of Proposed Mining Leases

Sr. No	River Details	Lease Details	Area (in Ha)	Distance (in KM) from PA/BR/ WC	Distance from Forest Area (in KM)	Mining leases Within 500m (if yes cluster area)	Total excavation in Brass /Annum considering digging depth max as per survey meters	Mineral to be mined (Sand/ Bajri/ RBM etc.)	Existing / Proposed
1.	Girna	Aghar Bu-2	0.43		More than 500 m	No	1517	Sand	Proposed
2.	Girna	Aghar Bu-1	1.37		More than 500 m	No	4847	Sand	Proposed
3.	Girna	Patane	1.01		More than 500 m	No	3557	Sand	Proposed
4.	Godavari	Tamaswadi	3.15		More than 500 m	No	5565	Sand	Proposed
5.	Girna	Asoli	1.44		More than 500 m	No	1527	Sand	Proposed
6.	Girna	Pale Khu.	0.50		More than 500 m	No	5000	Sand	Proposed
7.	Girna	Desgaon	1.04		More than 500 m	No	10400	Sand	Proposed

Annexure No. - III

Cluster details:

River Name	Cluster No.	Lease No	Location (Riverbed /Patta Land)	Village	Area (in Ha)	Total Excavation (Ton)	Total Mineral Excavation (Ton)
Nil							

Contiguous Clusters:

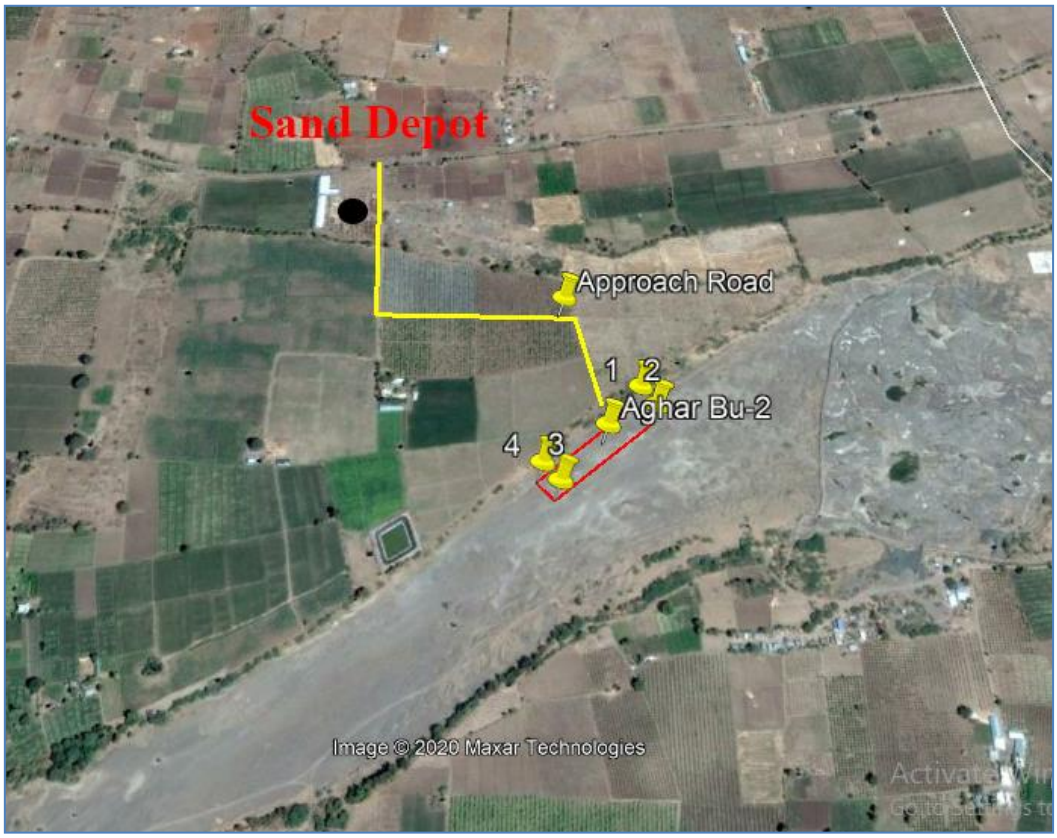
River Name	Contiguous Cluster No.	Cluster No	Number of leases in the cluster	Location (Riverbed / Patta Land)	Distance between clusters	Village	Area of Cluster (Ha)	Total Mineral Excavation (Ton)
Nil								

Annexure No. - IV

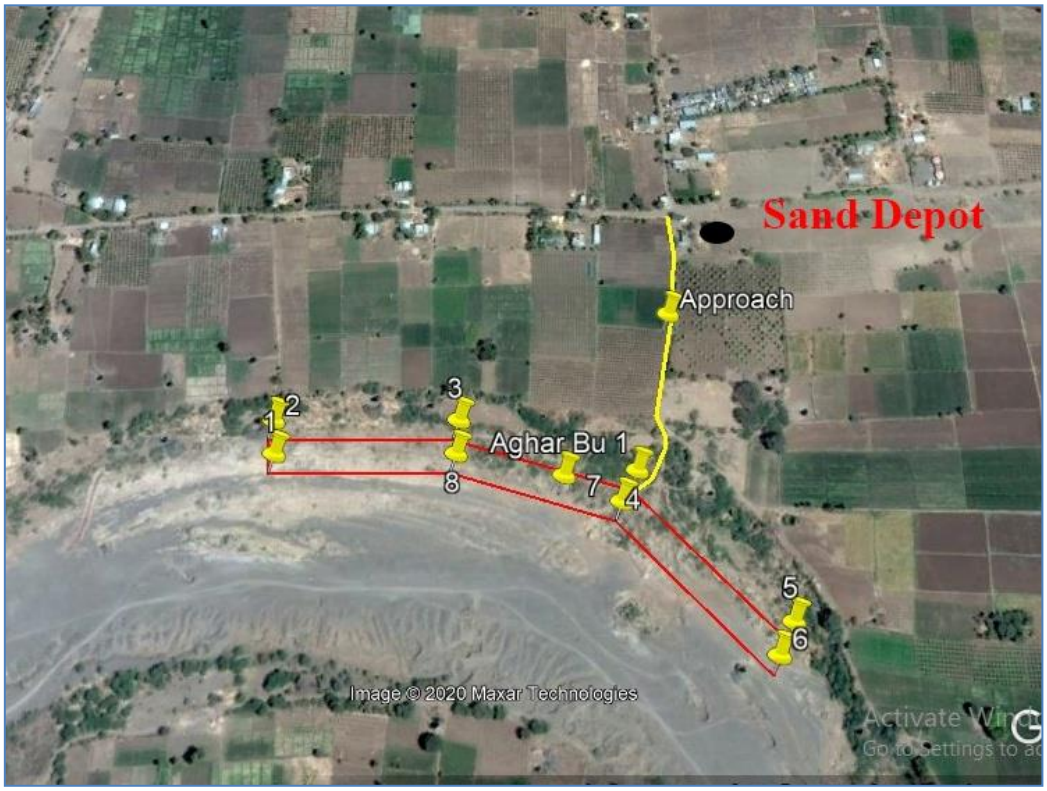
Transportation Routes for individual leases

Sr. No.	Lease Name	Transportation Route No	Number of tractors /day of lease	Number of Tractors /days of all the lease on route	Length of Route in M	Type of Road (Black Topped/ unpaved)	Recommendation for road (Black Topped/ unpaved)	The road will be Constructed by Govt/ Lease Owner	Route Map & Location
1.	Tamaswadi	1	7	7	148	Unpaved	Unpaved	Existing Road	Enclosed
2.	Aghar Bu-2	1	2	2	573	Unpaved	Unpaved	Existing Road	Enclosed
3.	Aghar Bu-1	1	6	6	267	Unpaved	Unpaved	Existing Road	Enclosed
4.	Patane	1	13	13	91	Unpaved	Unpaved	Existing Road	Enclosed
5.	Asoli	1	2	2	85	Unpaved	Unpaved	Existing Road	Enclosed
6.	Pale Khu.	1	1	1	69	Unpaved	Unpaved	Existing Road	Enclosed
7.	Desgaon	1	1	1	85	Unpaved	Unpaved	Existing Road	Enclosed

ROUTE & LOCATION MAP OF AGHAR BU.2



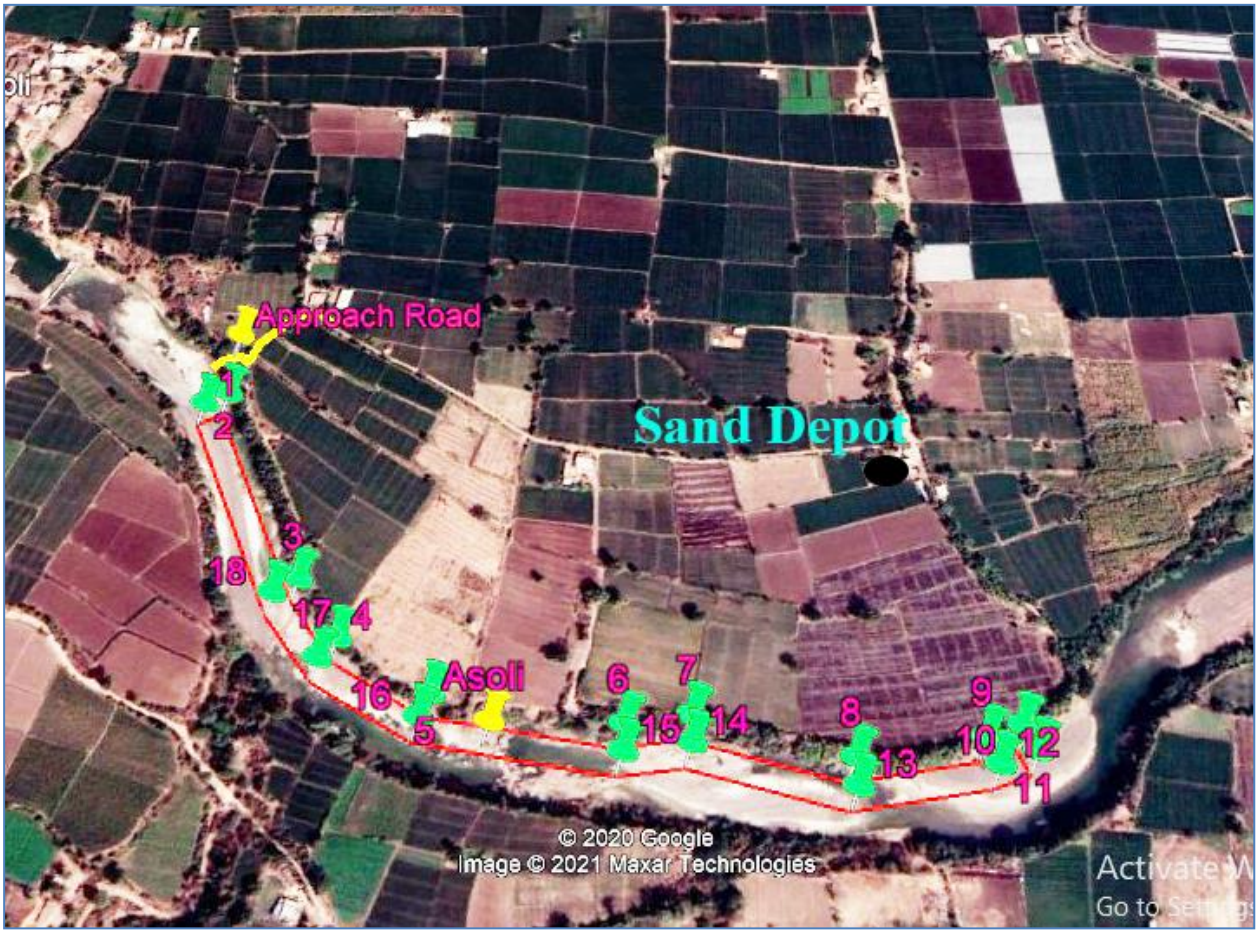
ROUTE & LOCATION MAP OF AGHAR BU.1



ROUTE & LOCATION MAP OF AGHAR PATNE

ROUTE & LOCATION MAP OF AGHAR TAMASWADI

ROUTE & LOCATION MAP OF AGHAR ASOLI



ROUTE & LOCATION MAP OF AGHAR PALE KHU.

ROUTE & LOCATION MAP OF AGHAR DESGAON

Annexure- V

List of Proposed Mining Leases 2020-2021

Sr. No	River Details	Lease Details	Area (in Ha)	Distance (in KM) from PA/BR/ WC	Distance from Forest Area (in KM)	Mining leases Within 500m (if yes cluster area)	Total excavation in Brass /Annum considering digging depth max as per survey meters	Mineral to be mined (Sand/ Bajri/ RBM etc.)	Existing / Proposed
1.	Godavari	Tamaswadi	3.15		More than 500 m	No	5565	Sand	Proposed
2.	Girna	Aghar Bu-2	0.43		More than 500 m	No	1517	Sand	Proposed
3.	Girna	Aghar Bu-1	1.37		More than	No	4847	Sand	Proposed
4.	Girna	Patane	1.01		500 m	No	3557	Sand	Proposed
5.	Girna	Asoli	1.44		More than	No	1527	Sand	Proposed
6.	Girna	Pale Khu.	0.50		500 m	No	530	Sand	Proposed
7.	Girna	Desgaon	1.04		More than	No	1102	Sand	Proposed

Annexure No. - VI

Detail Summary List

Annexure No. - VII

Final List of Cluster & Contiguous Cluster

River Name	Cluster No.	Lease No	Location (Riverbed /Patta Land)	Village	Area (in Ha)	Total Excavation (Ton)	Total Mineral Excavation (Ton)
Nil							

Contiguous Clusters:

River Name	Contiguous Cluster No.	Cluster No	Number of leases in the cluster	Location (Riverbed / Patta Land)	Distance between clusters	Village	Area of Cluster (Ha)	Total Mineral Excavation (Ton)
Nil								

Annexure No. - VIII
10*10m Grid

THIS MAP FOR DEPTH CALCULATION

MINING PLAN OF AAGHAR BU 2 SAND GHAT

The following process are followed for the estimation of sand in sandghat

1. The Demarcation of sandghat is done as per 10m*10m interval

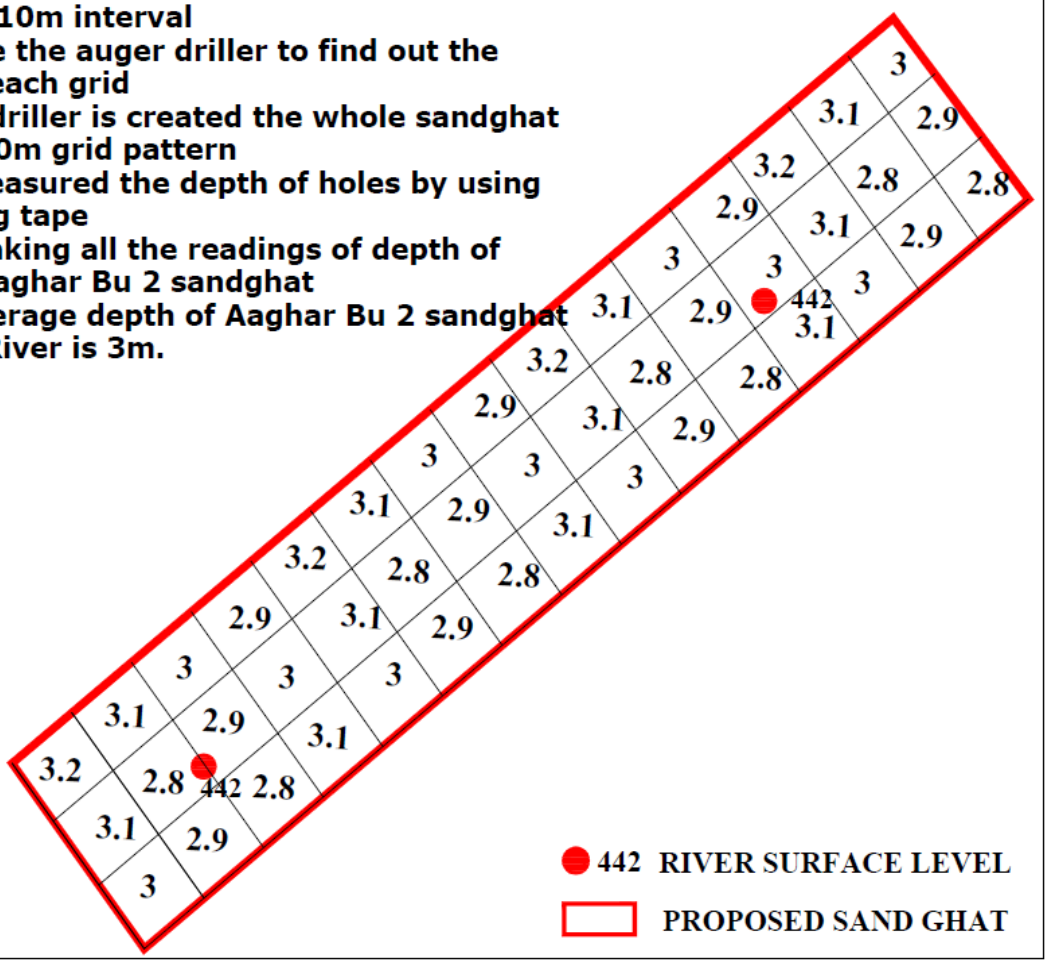
2. The use the auger driller to find out the depth of each grid

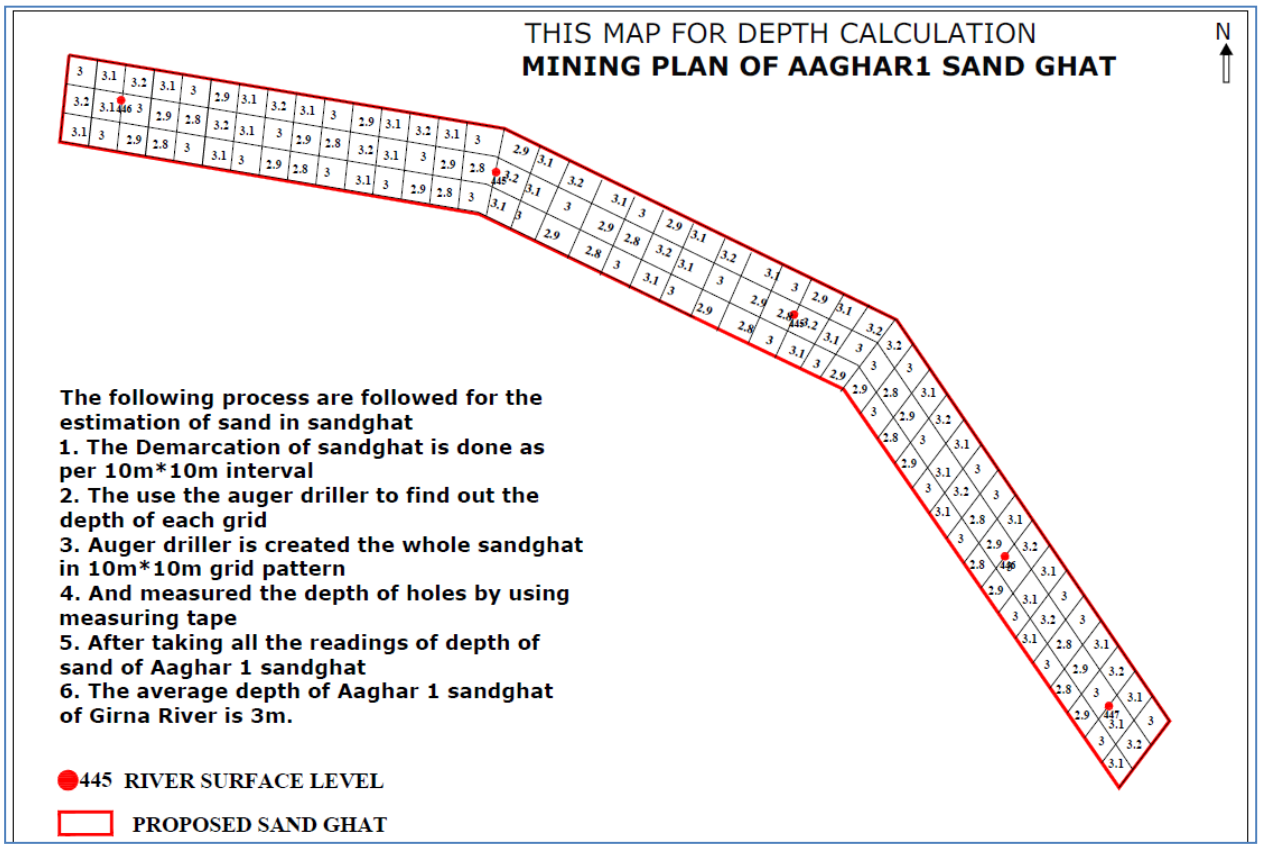
3. Auger driller is created the whole sandghat in 10m*10m grid pattern

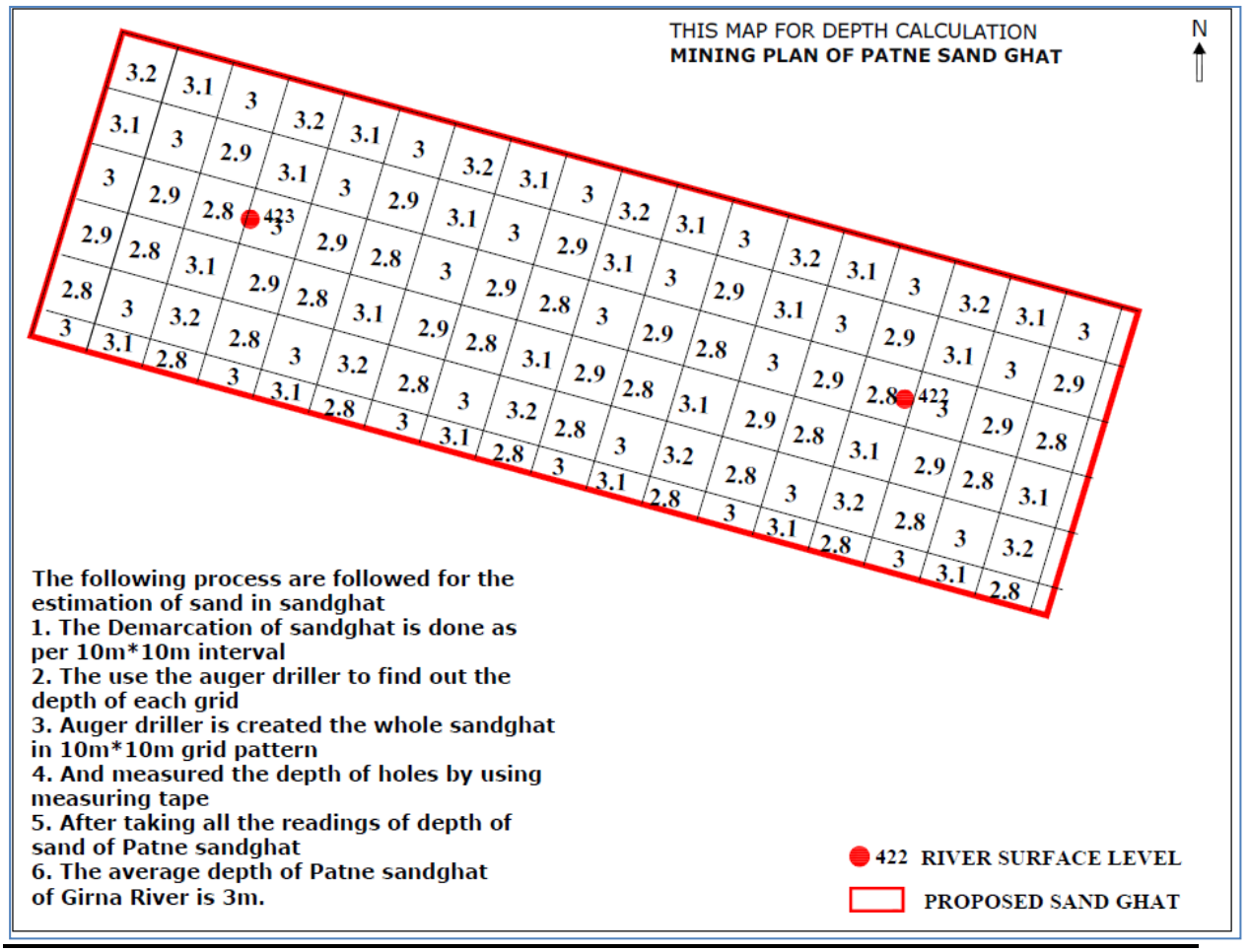
4. And measured the depth of holes by using measuring tape

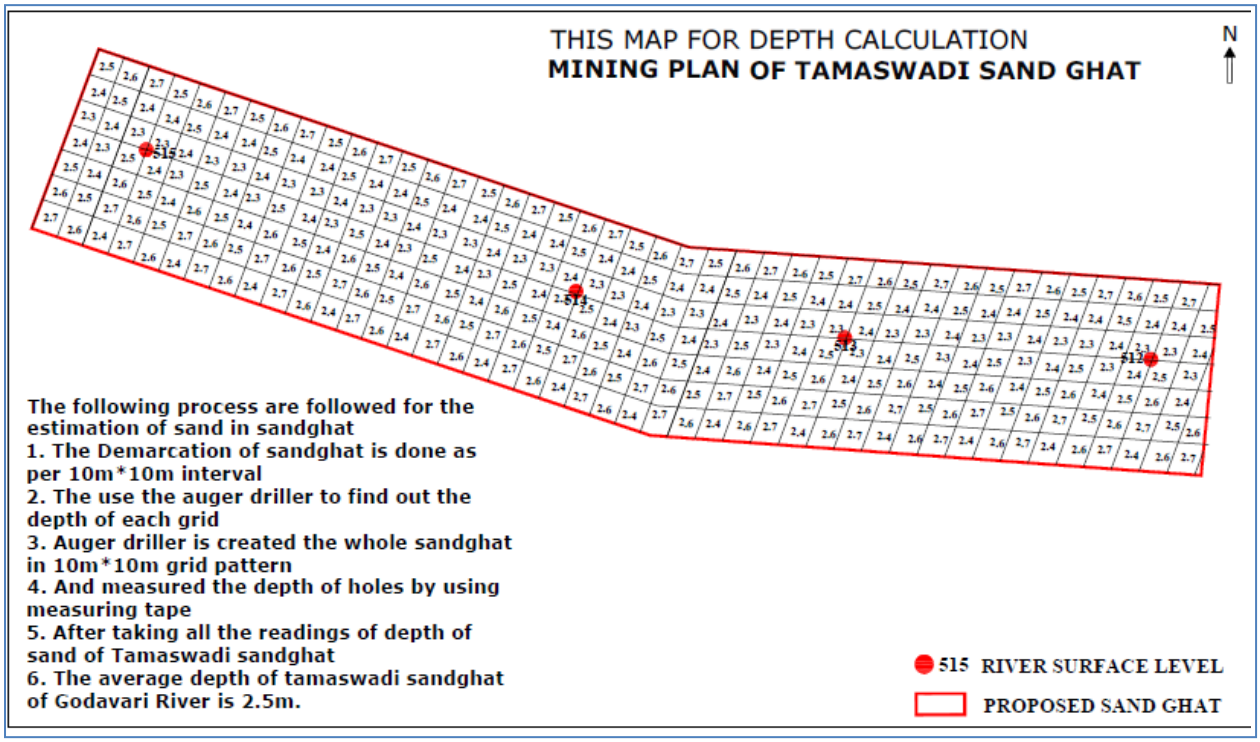
5. After taking all the readings of depth of sand of Aaghar Bu 2 sandghat

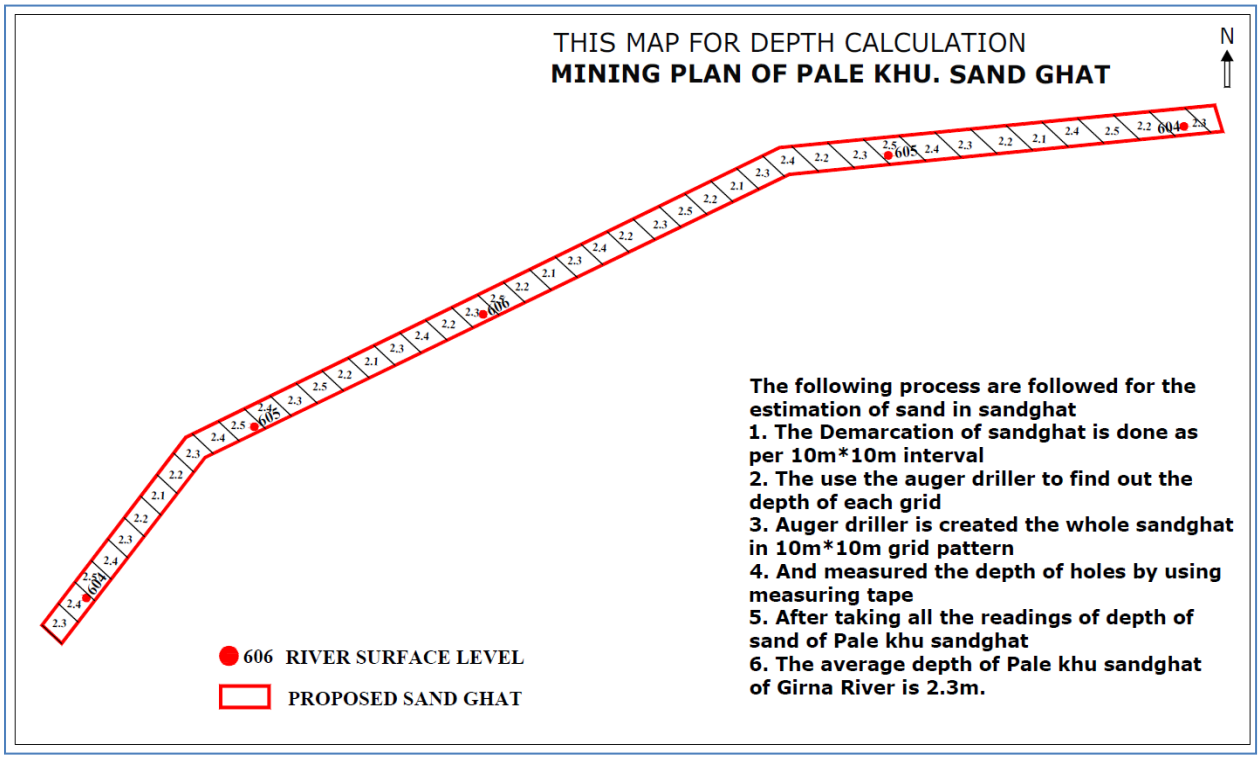
6. The average depth of Aaghar Bu 2 sandghat of Girna River is 3m.

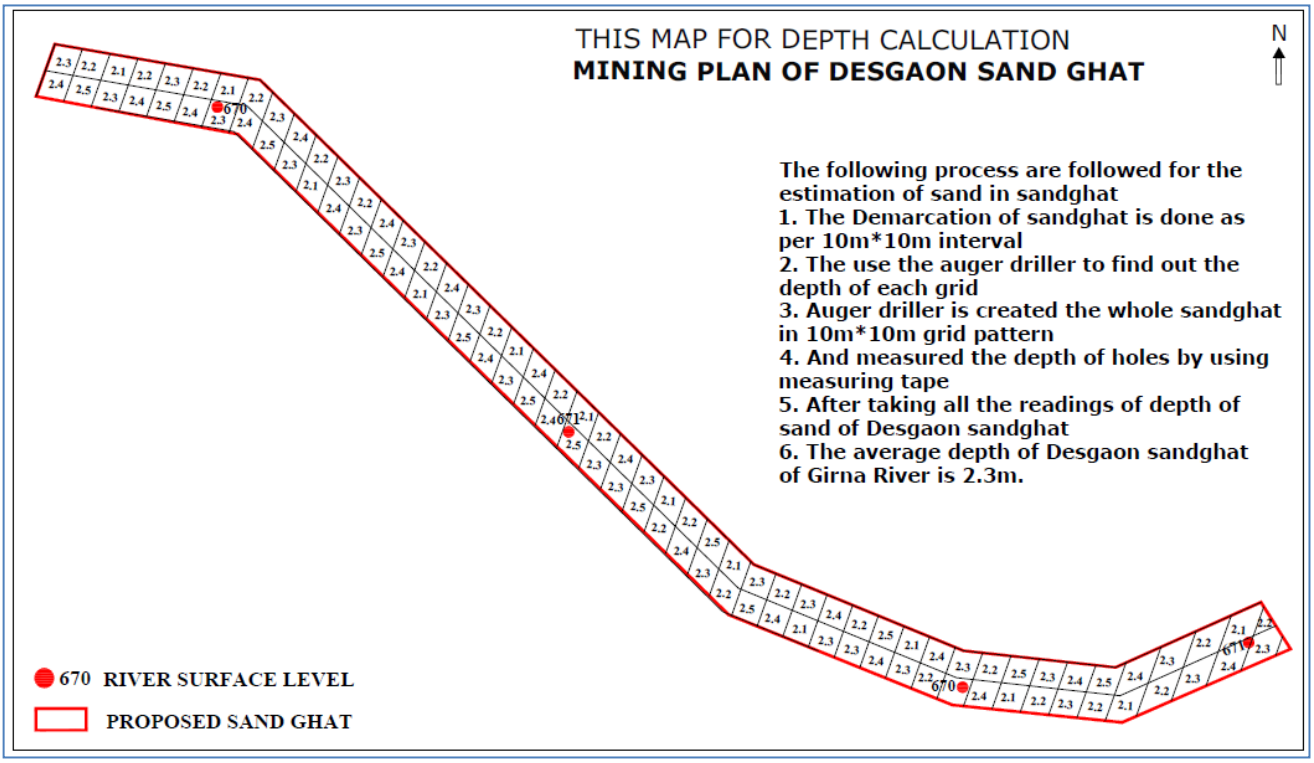


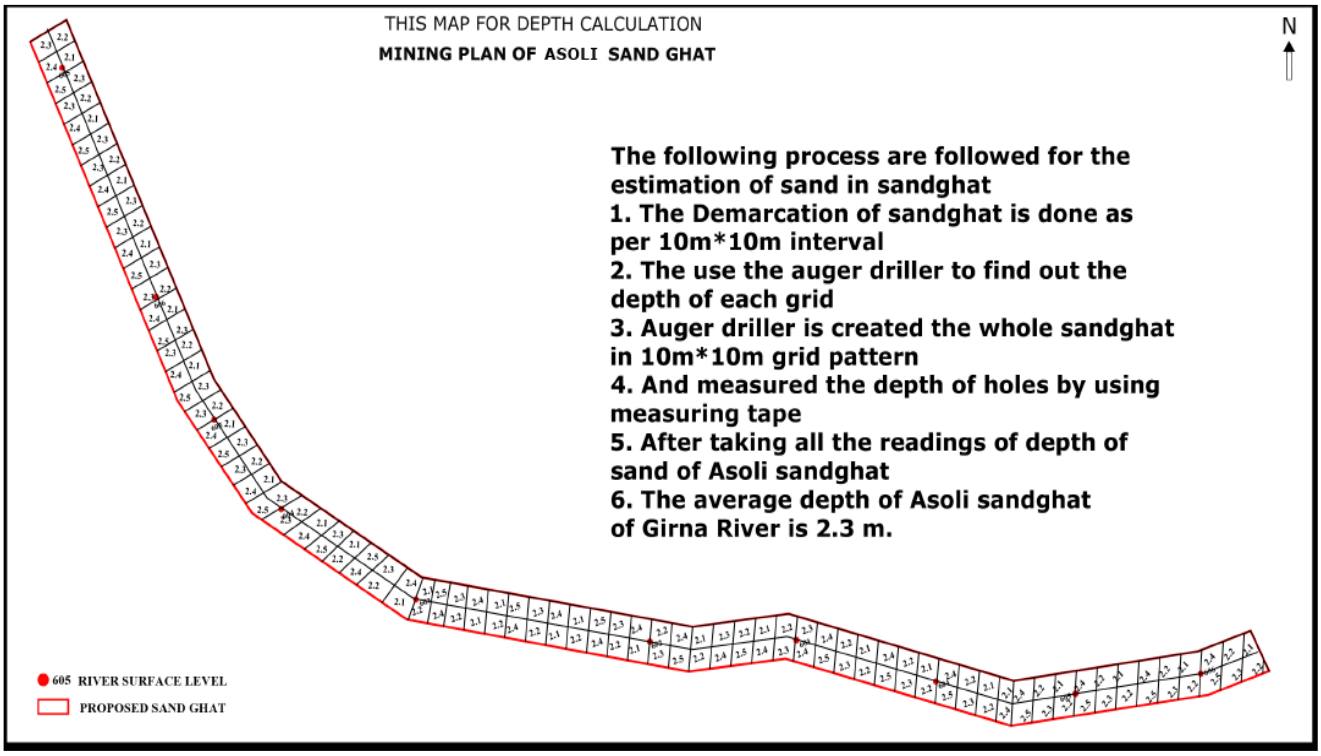

THIS MAP FOR DEPTH CALCULATION
MINING PLAN OF AAGHAR1 SAND GHAT
N
The following process are followed for the estimation of sand in sandghat
1. The Demarcation of sandghat is done as per 10m*10m interval
2. The use the auger driller to find out the depth of each grid
3. Auger driller is created the whole sandghat in 10m*10m grid pattern
4. And measured the depth of holes by using measuring tape
5. After taking all the readings of depth of sand of Aaghar 1 sandghat
6. The average depth of Aaghar 1 sandghat of Girna River is 3m.
445 RIVER SURFACE LEVEL
PROPOSED SAND GHAT


THIS MAP FOR DEPTH CALCULATION
MINING PLAN OF PATNE SAND GHAT
N
The following process are followed for the estimation of sand in sandghat
1. The Demarcation of sandghat is done as per 10m*10m interval
2. The use the auger driller to find out the depth of each grid
3. Auger driller is created the whole sandghat in 10m*10m grid pattern
4. And measured the depth of holes by using measuring tape
5. After taking all the readings of depth of sand of Patne sandghat
6. The average depth of Patne sandghat of Girna River is 3m.
422 RIVER SURFACE LEVEL
PROPOSED SAND GHAT


THIS MAP FOR DEPTH CALCULATION
MINING PLAN OF TAMASWADI SAND GHAT
N
515
514
513
512
The following process are followed for the estimation of sand in sandghat
1. The Demarcation of sandghat is done as per 10m*10m interval
2. The use the auger driller to find out the depth of each grid
3. Auger driller is created the whole sandghat in 10m*10m grid pattern
4. And measured the depth of holes by using measuring tape
5. After taking all the readings of depth of sand of Tamaswadi sandghat
6. The average depth of tamaswadi sandghat of Godavari River is 2.5m.
515 RIVER SURFACE LEVEL
PROPOSED SAND GHAT


THIS MAP FOR DEPTH CALCULATION
MINING PLAN OF PALE KHU. SAND GHAT
N
606
605
604
The following process are followed for the estimation of sand in sandghat
1. The Demarcation of sandghat is done as per 10m*10m interval
2. The use the auger driller to find out the depth of each grid
3. Auger driller is created the whole sandghat in 10m*10m grid pattern
4. And measured the depth of holes by using measuring tape
5. After taking all the readings of depth of sand of Pale khu sandghat
6. The average depth of Pale khu sandghat of Girna River is 2.3m.
606 RIVER SURFACE LEVEL
PROPOSED SAND GHAT

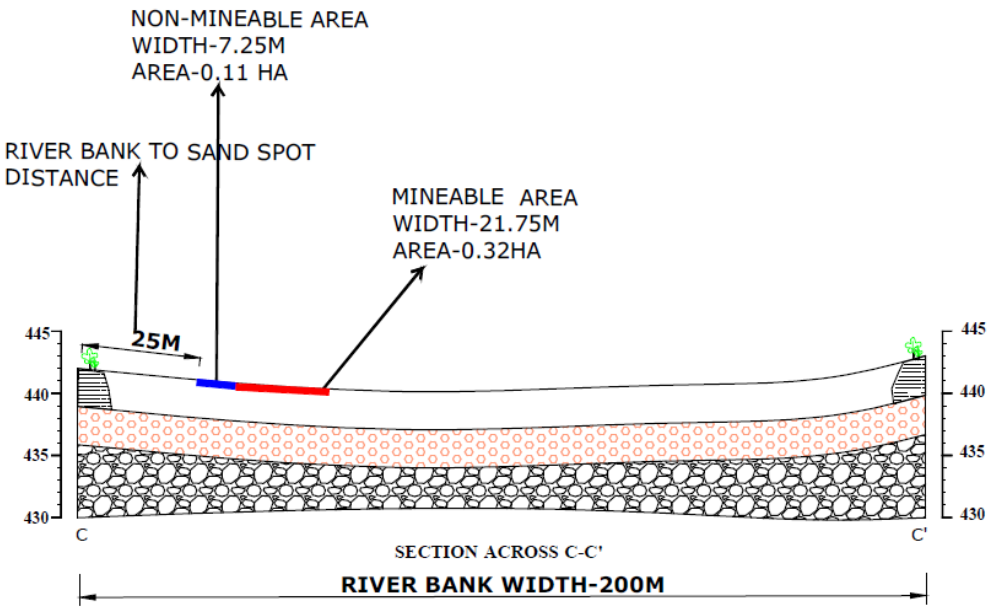

THIS MAP FOR DEPTH CALCULATION
MINING PLAN OF DESGAON SAND GHAT
N
The following process are followed for the estimation of sand in sandghat
1. The Demarcation of sandghat is done as per 10m*10m interval
2. The use the auger driller to find out the depth of each grid
3. Auger driller is created the whole sandghat in 10m*10m grid pattern
4. And measured the depth of holes by using measuring tape
5. After taking all the readings of depth of sand of Desgaon sandghat
6. The average depth of Desgaon sandghat of Girna River is 2.3m.
670 RIVER SURFACE LEVEL
PROPOSED SAND GHAT


THIS MAP FOR DEPTH CALCULATION
MINING PLAN OF ASOLI SAND GHAT
N
The following process are followed for the estimation of sand in sandghat
1. The Demarcation of sandghat is done as per 10m*10m interval
2. The use the auger driller to find out the depth of each grid
3. Auger driller is created the whole sandghat in 10m*10m grid pattern
4. And measured the depth of holes by using measuring tape
5. After taking all the readings of depth of sand of Asoli sandghat
6. The average depth of Asoli sandghat of Girna River is 2.3 m.
605 RIVER SURFACE LEVEL
PROPOSED SAND GHAT

Annexure No.- IX

Bank to Bank River Cross Section

PLATE - 5A



NOTE: 1. SCALE FOR C TO C' SECTION LINE = **1:1500**.
2. SCALE FOR DEPTH **1:500**

LEGENDS

MINEABLE AREA	
PEBBLE	
GRAVEL	
RIVER SURFACE LEVEL	442
SECTION LINE	C — C'
SOIL	
SAND	
NON MINEABLE SAND	

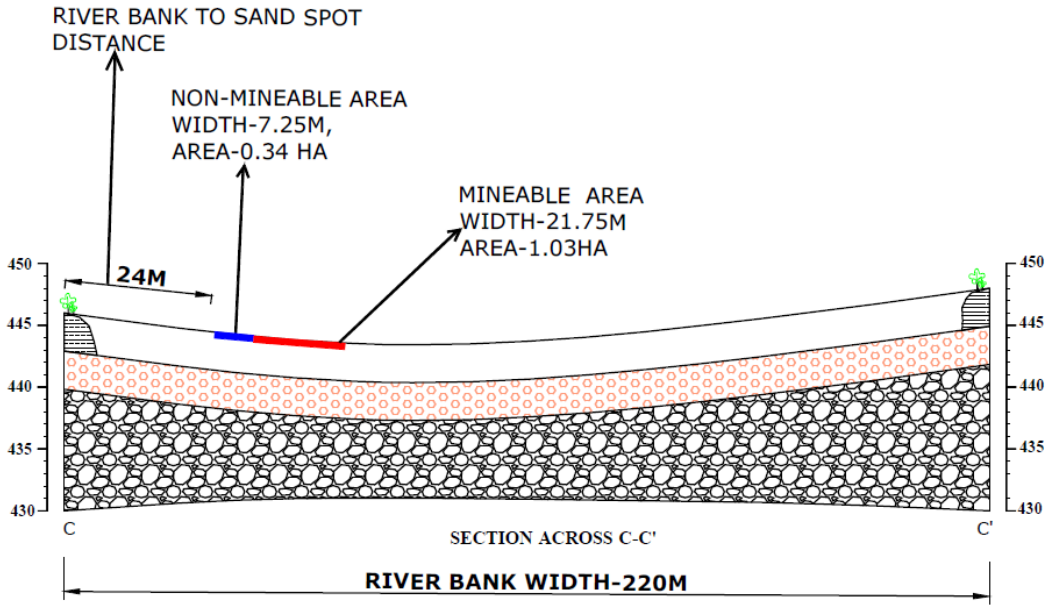
CROSS SECTION OF RIVER BANK

MINING PLAN OF AAGHAR BU. 2 SAND GHAT

VILLAGE: **AAGHAR BU**,TEHSIL: MALEGAON, DISTRICT: NASHIK, STATE: MAHARASHTRA
RIVER- GIRNA, AREA: 0.43 HA
(MINEABLE AREA-0.32HA, NON MINEABLE AREA-0.11HA), GUT NO - 509 TO 512.

NILESH L MASKE
TQP

PLATE - 5A



NOTE: 1. SCALE FOR C TO C' SECTION LINE = **1:1500**.
2. SCALE FOR DEPTH **1:500**

LEGENDS

MINEABLE AREA	
PEBBLE	
GRAVEL	
RIVER SURFACE LEVEL	445
SECTION LINE	C —— C'
SOIL	
SAND	
NON MINEABLE SAND	

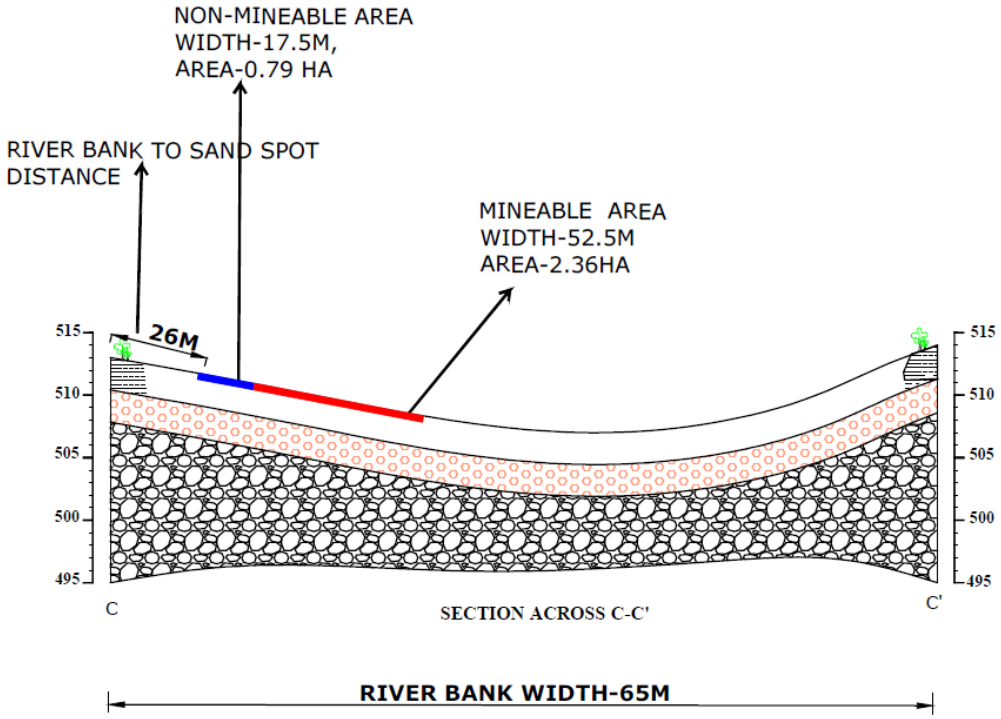
CROSS SECTION OF RIVER BANK

MINING PLAN OF AAGHAR BU. 1 SAND GHAT

VILLAGE: **AAGHAR BU.**,TEHSIL: MALEGAON, DISTRICT: NASHIK, STATE: MAHARASHTRA
RIVER- GIRNA, AREA: 1.37 HA
(MINEABLE AREA-1.03HA, NON MINEABLE AREA-0.34HA), GUT NO - 518 TO 559.

NILESH L MASKE
TQP

PLATE - 5A



NOTE: 1. SCALE FOR C TO C' SECTION LINE = **1:2000**.
2. SCALE FOR DEPTH **1:500**

LEGENDS

MINEABLE AREA	
PEBBLE	
GRAVEL	
RIVER SURFACE LEVEL	515
SECTION LINE	C —— C'
SOIL	
SAND	
NON MINEABLE SAND	

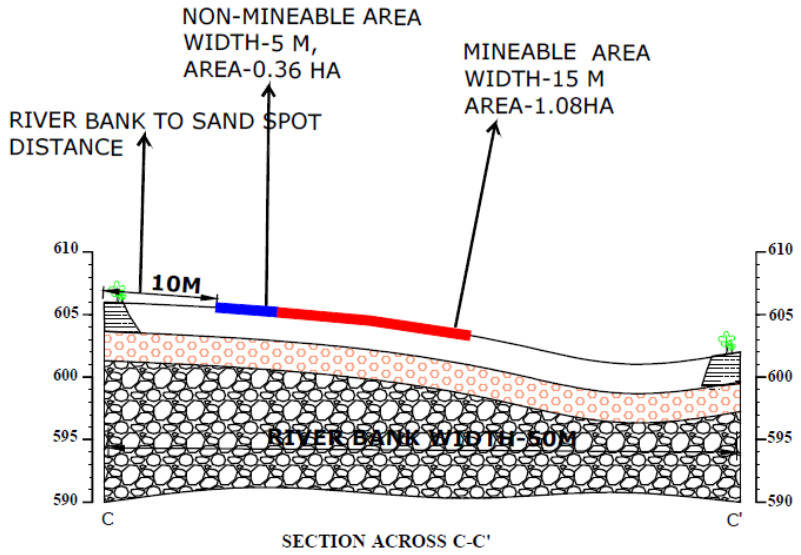
CROSS SECTION OF RIVER BANK

MINING PLAN OF TAMASWADI SAND GHAT

VILLAGE: **TAMASWADI**,TEHSIL: NIPHAD,
DISTRICT: NASHIK, STATE:
MAHARASHTRA RIVER- GODAVARI,
AREA: 3.15 HA(MINEABLE AREA-2.36 HA,
NON MINEABLE AREA-0.79 HA),
GUT NO - 495, 546 TO 548.

NILESH L MASKE
TQP

PLATE - 5A



SECTION ACROSS C-C'

NOTE: 1. SCALE FOR C TO C' SECTION LINE = **1:500**.
2. SCALE FOR DEPTH **1:500**

LEGENDS

MINEABLE AREA	
PEBBLE	
GRAVEL	
RIVER SURFACE LEVEL	605
SECTION LINE	C —— C'
SOIL	
SAND	
NON MINEABLE SAND	

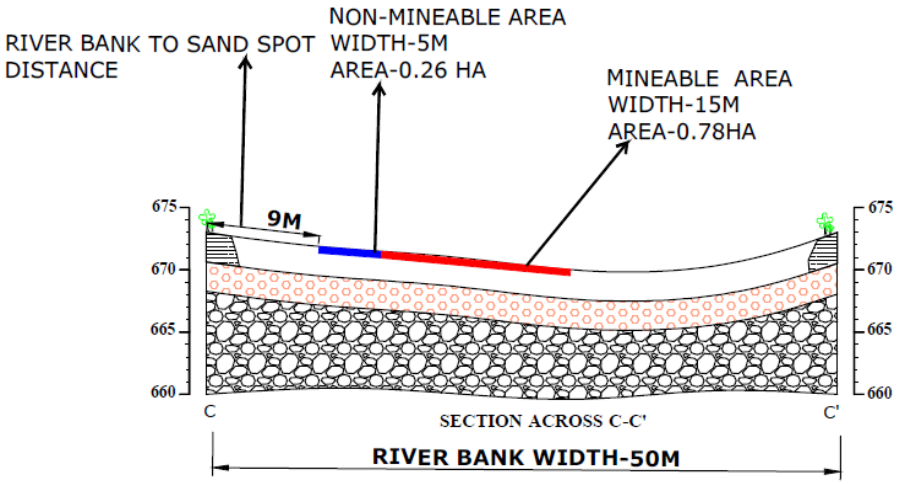
CROSS SECTION OF RIVER BANK

MINING PLAN OF ASOLI SAND GHAT

VILLAGE: **ASOLI**,TEHSIL: KALWAN, DISTRICT: NASHIK, STATE: MAHARASHTRA RIVER- GIRNA, AREA: 1.44 HA (MINEABLE AREA-0.36 HA, NON MINEABLE AREA-1.08 HA), GUT NO - 80,81,82.

NILESH L MASKE
TQP

PLATE - 5A



NOTE: 1. SCALE FOR C TO C' SECTION LINE = **1:500**.
2. SCALE FOR DEPTH **1:500**

LEGENDS

MINEABLE AREA	
PEBBLE	
GRAVEL	
RIVER SURFACE LEVEL	670
SECTION LINE	C —— C'
SOIL	
SAND	
NON MINEABLE SAND	

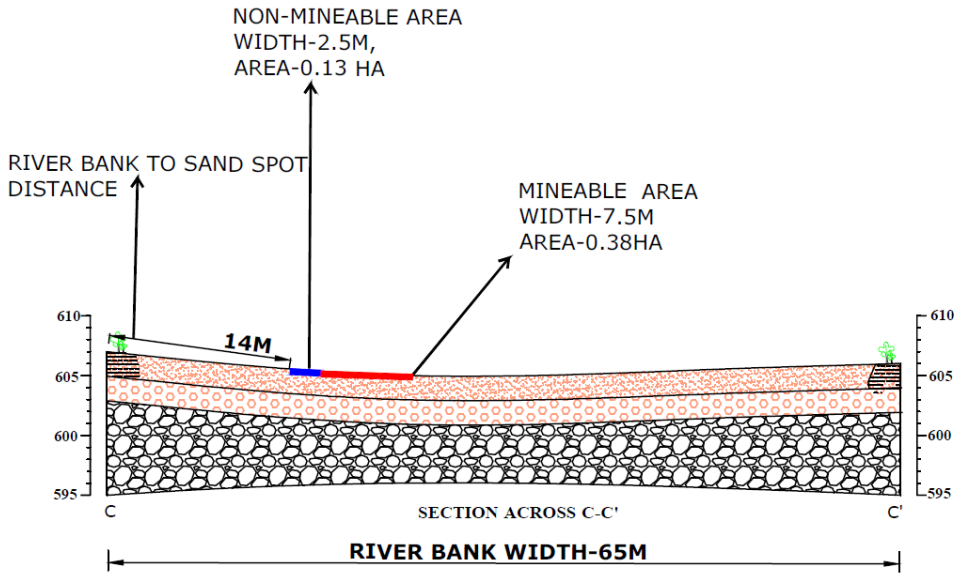
CROSS SECTION OF RIVER BANK

MINING PLAN OF DESGAON SAND GHAT

VILLAGE: **DESGAON**,TEHSIL: KALWAN, DISTRICT: NASHIK, STATE: MAHARASHTRA RIVER- GIRNA, AREA: 1.04 HA(MINEABLE AREA-0.78HA, NON MINEABLE AREA-0.26HA), GUT NO - DESGAON-53 to 58,TIRHAL-139,130,128,127.

NILESH L MASKE
TQP

PLATE - 5A



NOTE: 1. SCALE FOR C TO C' SECTION LINE = **1:500**.
2. SCALE FOR DEPTH **1:500**

LEGENDS

MINEABLE AREA	
PEBBLE	
GRAVEL	
RIVER SURFACE LEVEL	606
SECTION LINE	C —— C'
SOIL	
SAND	
NON MINEABLE SAND	

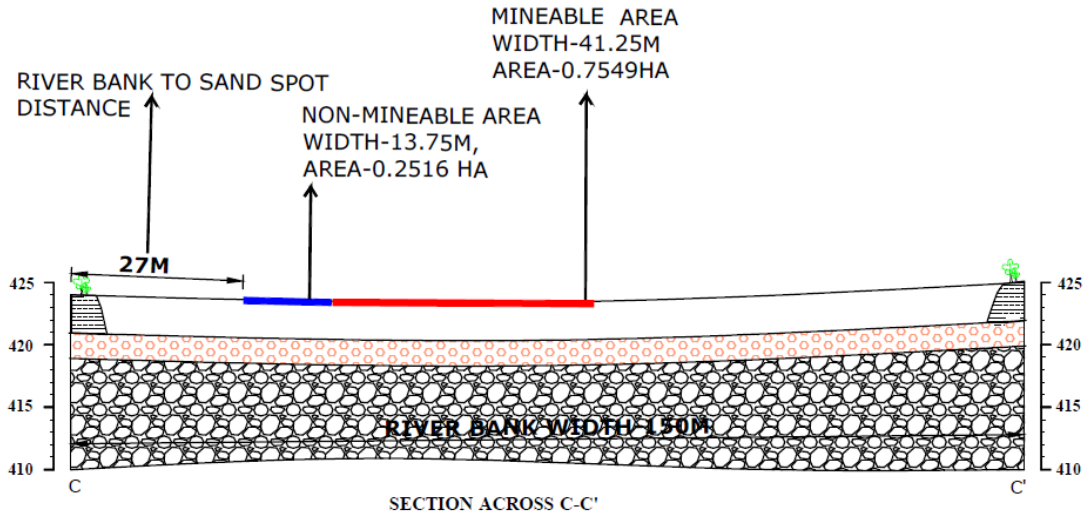
CROSS SECTION OF RIVER BANK

MINING PLAN OF PALE KHU. SAND GHAT

VILLAGE: **PALE KHU.**,TEHSIL: KALWAN, DISTRICT: NASHIK, STATE: MAHARASHTRA RIVER- GIRNA, AREA: 0.50 HA(MINEABLE AREA-0.38HA,NON MINEABLE AREA-0.13HA), GUT NO - PALE KHU.-78 to 80,PALE BU.-364,351,352,327.

NILESH L MASKE
TQP

PLATE - 5A



SECTION ACROSS C-C'

NOTE: 1. SCALE FOR C TO C' SECTION LINE = **1:1000**.
2. SCALE FOR DEPTH **1:500**

LEGENDS

MINEABLE AREA	
PEBBLE	
GRAVEL	
RIVER SURFACE LEVEL	422
SECTION LINE	C —— C'
SOIL	
SAND	
NON MINEABLE SAND	

CROSS SECTION OF RIVER BANK

MINING PLAN OF PATNE SAND GHAT

VILLAGE: **PATNE**,TEHSIL: MALEGAON, DISTRICT: NASHIK, STATE: MAHARASHTRA RIVER- GIRNA, AREA: 1.0065 HA (MINEABLE AREA-0.7549HA, NON MINEABLE AREA-0.2516HA), GUT NO - 360 TO 363.

NILESH L MASKE
TQP

Annexure No. - X

Public Hearing Sign Copy will be updated in DSR after DSR uploaded on District portal and undertaking of PH.

Nashik District level Sand Ghat Committee proceeding on dated 25-01-2021

मा. जिल्हाधिकारी नाशिक यांच्या अध्यक्षतेखाली दिनांक 12/01/2021 रोजी झालेल्या जिल्हास्तरीय वाळू सनियंत्रण समितीच्या बैठकीचे इतिवृत्त.

जिल्हास्तरीय वाळू सनियंत्रण बैठक मा. जिल्हाधिकारी नाशिक यांच्या अध्यक्षतेखाली दिनांक 12/11/2021 रोजी दुपारी 12.30 वाजता जिल्हाधिकारी कार्यालय, नाशिक येथे संपन्न झाली. सदर बैठकीस खालीलप्रमाणे सदस्य उपस्थित होते.

अ.क्र.	नाव/पदनाम	समिती मधील पद
1	मुख्य कार्यकारी अधिकारी जि.प. नाशिक यांचे प्रतिनिधी श्री.ईशाधिन शेळकंदे उपमुख्य,कार्यकारी अधिकारी जि.प..नाशिक	सदस्य
2	अपर जिल्हाधिकारी नाशिक	सदस्य
3	श्रीमती शर्मिष्ठा वालारकर, अपर पोलीस अधिक्षक,नाशिक	सदस्य
4	निवासी उपजिल्हाधिकारी नाशिक	निमंत्रित
5	उपकार्यकारी अभियंता सार्वजनिक बांधकाम विभाग नाशिक	सदस्य
6	वरीष्ठ भूवैज्ञानिक भुजल सर्वेक्षण आणि विकास यंत्रणा नाशिक	सदस्य
7	उप प्रादेशिक अधिकारी महाराष्ट्र प्रदुषण नियंत्रण मंडळ नाशिक	सदस्य
8	उप वनसंरक्षक,नाशिक (पुर्व)	सदस्य
9	उप वनसंरक्षक,नाशिक (पश्चिम)	सदस्य
10	प्रादेशिक परिवहन अधिकारी नाशिक यांचे प्रतिनिधी श्री. शिंदे,मो.वा.नि.	सदस्य
11	जिल्हा खनिकर्म अधिकारी नाशिक	सदस्य सचिव

जिल्हा खनिकर्म अधिकारी यांनी बैठकीचे प्रस्ताविक केले. जिल्हास्तरीय वाळू सनियंत्रण समितीचे बैठकीमध्ये खालील विषयावर चर्चा करण्यातआली.

1. **वाळू लिलाव सन 2020-21 नाशिक जिल्ह्यातील वाळूघाट निश्चित करणे.**

खालीलप्रमाणे तालुकास्तरीय तांत्रिक उपसमितीने सर्वेक्षण करुन जिल्हास्तरीय समितीस अहवाल सादर केले.

अ. क्र.	तांत्रिक उपसमितीमार्फत सर्वेक्षण केलेल्या वाळुघाटांची संख्या	अयोग्य वाळुघाट संख्या	योग्य वाळूघाट संख्या
1	मालेगांव	4	3
2	निफाड	9	1
3	कळवण	7	3
4	बागलाण	4	0
5	देवळा	5	0
6	दिंडोरी	2	0
7	नाशिक	1	0
	एकुण	32	7

वरीलप्रमाणे तांत्रिक उपसमितीने एकूण 39 वाळूघाटापैकी 32वाळूघाट उत्खननास अयोग्य व 07 वाळूघाट वाळूलिलावास योग्य असल्याचा अहवाल सादर केला आहे. शासकीय महसुलात घट होवून नये म्हणुन यासाठी तांत्रिक समिती मार्फत अयोग्य ठरविणेत आलेल्या 32 वाळू गटांचे फेर सर्वेक्षण उपविभागीय अधिकारी/तहसिलदार यांनी 08 दिवसात पुर्ण करावे. त्यानंतर सदरचे गट अयोग्य ठरल्यास सदर वाळु स्थळातुन अवैध उत्खनन/वाहतुक होणार नाही यासाठी आवश्यक ती उपाययोजना करावी.सदर वाळु स्थळातुन अवैध उत्खनन होत असल्याचे निदर्शनास आल्यास संबंधीत तहसिलदार यांचेवर महसुल नुकसानीची जबाबदारी निश्चित करणेत येईल.

जिल्हयातील ज्या ग्रामपंचायतीने वाळु लिलावास नकारार्थी ठराव दिलेला आहे, अश्या ग्राम पंचायतीच्या हददीत वाळु घाटातुन/नदीपात्रातुन अवैध उत्खनन आढळून आल्यास,तसेच अवैध उत्खननात पदाधिका-यांचा प्रत्यक्ष सहभाग आढळल्यास उपविभागीय अधिका-यांकडुन पडताळणी करून अशा पदाधिका-यांवर स्थानिक स्वराज्य संस्थेच्या अधिनियमातील तरतुदीनुसार कारवाई करण्यात येईल या बाबत सर्व संबंधीतांना तहसिलदार यांचे मार्फत लेखी समज देण्यात यावी.

सन 2020-21 करीता खालीलप्रमाणे वाळूघाट निश्चित करून लिलाव करण्याचे समितीने निर्णय घेतला. सदर वाळूघाटांच्या पर्यावरण विषयक अनुमती प्राप्त करण्यासाठी समितीने सर्वानुमते शिफारस प्रदान केली. जिल्हा विकास ग्रामीण विकास यंत्रणाने घरकुल योजने करीता/तसेच कार्यकारी अभियंता सार्वजनिक बांधकाम विभाग यांनी शासकिय विकास कामासाठी वाळूघाट राखीव ठेवण्याचे असल्यास जिल्हास्तरीय वाळू संनियत्रंण समितीकडे तपशिलवार माहितीसह मागणी करावी असे सुचविण्यात आले.

2. **वाळूघाटाची हातची किंमत निश्चित करणे.**

शासन निर्णय दि.3/9/2019 मधील तरतुदीनुसार जिल्ह्यामध्ये गतवर्षी/ मागील वेळच्या लिलावामध्ये प्राप्त झालेली सर्वोच्च बोली व लिलावात मंजूर एकूण वाळूसाठा यानुसार प्रतिब्रास किंवा यथास्थिती प्रति मेट्रीक टन रक्कम परिगणित करण्यात यावी व त्यात प्रति वर्ष 6% दराने वाढ करण्यात यावी अशी तरतुद करण्यात आलेली आहे.

नाशिक जिल्ह्यात सन 2017-18 च्या वाळूलिलावात गेलेल्या वाळूस्थळाची माहिती.

अ.क्र.	तालुका	वाळूघाटाचे नाव	उपलब्ध वाळू साठा ब्रास मध्ये	निश्चित केलेली हातची किंमत	लिलावात प्राप्त झालेली सर्वोच्च बोली	प्रतिब्रास दर
1	कळवण	कळवण बु	353	386535	426535	1208
2		जुनोदेन	530	580350	620350	1140
3		वरखेडा	177	106200	211000	1192
4		देसगांव	459	502605	611000	1331
5	दिंडोरी	चिंचखेड	278	166800	190000	683
6	मालेगाव	बळवाडे	530	293620	320000	604
		एकुण	2327	2036110	2378885	

वरीलप्रमाणे सरासरी प्रतिब्रास किमत रुपये 1022/- एवढी येत असून उच्चतम बोली रू. 1331/- प्राप्त झाली होती.त्यानुसार सन 2020-2021 च्या प्रस्तावित वाळू गटाची हातची किंमत प्रतिवर्ष 6% वाढ करून रु. 1585.24/- इतकी येते. त्यानुसार प्रस्तावित वाळू गटांच्या वाळुसाठ्याची हातची किमत निश्चित करण्यास समितीने सर्वानुमते मान्यता दिली.

3. **वाळू घाट लिलावा बाबत.**

शासन निर्णय दिनांक 03/09/2019 वाळूरेती/निर्गती सुधारित धोरणानुसार वाळू रेती गटाचे क्षेत्र सर्वसाधारणपणे 05 हेक्टर तसेच वाळूगट उत्खनन व वाहतुक याचा कालावधी पाच वर्षापर्यंत असू शकेल अशी तरतुद करण्यात आलेली आहे. नाशिक जिल्ह्यात 05 पेक्षा मोठे वाळूगट उपलब्ध नसल्याने व जिल्ह्यात वाळू उपलब्ध होऊन शासनास महसूल प्राप्त होईल या कारणाने समितीने 05 हेक्टर पेक्षा कमी क्षेत्र क्षेत्रफळ असलेल्या वाळू गटांचे लिलाव करण्याचा समितीने सर्वानुमते निर्णय घेतला.

4.**वाळू गटाचा उत्खनन कालावधी-**

वाळू लिलावाचा कालावधी पावसाळ्याच्या कालावधीसह समाविष्ठ असेल दि.10 जुन ते 30 सप्टेंबर हा पावसाळ्याचा कालावधी असेल व त्या कालावधीमध्ये वाळू उत्खनन करता येणार नाही असे शासन निर्णयात नमुद आहे. नाशिक जिल्ह्यात सर्व वाळू गटांचा उत्खनन कालावधी हा वाळू घाटाच्या परिमाणानुसार देण्यात यावा.

मा. अध्यक्षांचे परवानगीने सर्व उपस्थितांचे आभार व्यक्त करून बैठक संपन्न झाल्याचे जाहिर करण्यात आले.

(आनंद पाटील)
जिल्हा खनिकर्म अधिकारी तथा सदस्य सचिव,
जिल्हास्तरीय वाळु सनियंत्रण समिती नाशिक

(भागवत डोईफोडे)
निवासी उपजिल्हाधिकारी तथा निमंत्रित सदस्य
जिल्हास्तरीय वाळु सनियंत्रण समिती नाशिक

(दत्तप्रसाद नडे)
अपर जिल्हाधिकारी तथा सदस्य
जिल्हास्तरीय वाळु सनियंत्रण समिती नाशिक

(सुरज मांढरे)
जिल्हाधिकारी तथा अध्यक्ष
जिल्हास्तरीय वाळु सनियंत्रण समिती नाशिक

SAND GHAT SITE SPECIFIC ENFORCEMENT & MONITORING PLAN AS PER GUIDELINES STIPULATED IN ENFORCEMENT AND MONITORING GUIDELINES FOR SAND MINING ISSUED BY MOEF&CC IN JANUARY 2020

S. No.	Condition as Per E&M Guidelines	Compliance
1.	Three-member committee for environmental audit.	District Magistrate formed a committee for monitoring of compliances as per EM guidelines after grant of prior Environmental Clearance.
2.	LOI should be preferably granted to those locations which have least possibility of an impact on the environment and nearby habitation	Environmental feasibility will be checked before issuance of LOI.
3.	Identification of sand Ghats its quantification and feasibility considering various environmental parameters like proximity of protected are, wetlands, creeks, forest etc. and other factors such as places of archaeological importance, habitation, prohibited area etc.	All sand ghat locations are physically surveyed by technical committee and ensured that all the parameters regarding sustainable sand mining is followed.
4.	Mining plan and its initial level of mining leases at shorter interval say 25m x 25 m	Mining plans are approved by DGM, Nashik. Initial levels are recorded for preparation of surface plan.
5.	Responsibility of mine owner to obtain all statutory clearances	It will be ensured by District administration before commencement of mining.
6.	Emphasis of district survey report and its format of reporting	Draft DSR is published on 06/03/2020 in accordance with format referred in notification dated 25 July 2018.
7.	Regular replenishment study to ascertain rate of depositing, plan and section needs to be prepared.	Replenishment is calculated theoretically by using last 5 year's joint survey report which show available thickness of sand at proposed locations.
8.	Movement of transportation of mineral from mining area to end user needs to monitor.	It will be ensured by using IT enabled services as per guidelines.
Preparation of District Survey Report		
9.	Preparation of District Survey Report	DSR is prepared as per format S.O. 3611(E) dated 25.07.2018 and EM guidelines 2020 issued by MoEF&CC, New Delhi
10.	Publication of District Survey Report	Draft DSR published on district portal for public comments.
11.	Development of inventory of river bed material and other sources in the district.	Attached as **Annexure I to V** as per EM guidelines 2020
12.	District Survey Report is prepared in such a way that it is not only identifies the mineral bearing area but also defines mining and no mining zones considering environmental and social factors.	All the parameters are covered in final DSR.
13.	Identification of sources of Sand and M-sand, De silting Locations, river type perennial or non-perennial, village, tehsil, agriculture/non-agricultural land, M-sand plant etc.	Attached as **Annexure- I**
14.	Defining the sources of Sand for identification of the potential area, entire river stretch needs to be recorded and area of aggradations/deposition needs to be ascertaining by comparing the level difference between outside river bed OGL and Water Level.	Areas of deposition are identified and levels are recorded for actual replenishment. **Attached Annexure II**

S. No.	Condition as Per E&M Guidelines	Compliance
15.	Boundary Pillars needs to be erected after identification of an area of aggradation and deposition outside bank of river at safe location for future survey.	Geographical co-ordinates of leases are marked on google Earth for future reference and to monitor exact location of mining**.**
16.	Identifying mining and no mining zone shall follow sensitively.	It is ensured and bank to bank cross sections are attached as **Annexure- IX**
17.	Demand and Supply for river bed material through market survey	Demand and supply is mentioned in the report on the basis of actual demand of various departments in the District and RBI's index based method which is given in **Chapter 4.**
18.	Cluster situation shall be examined.	There is no cluster situation in the District.
19.	Mining outside river bed area on Patta/Khatedari land be granted when there is possibility of replenishment of material. For govt. projects mining could be allowed on Patta/Kahtedari land but mining should be done by Govt. agencies and material shall not be used for sale.	There is no sand mining outside the River bed.
20.	State Govt. should define transportation route from mining lease considering maximum production from mines as at this stage the size of mining leases, their location, the quantity of mineral that can be mined safely	Attached as **Annexure-IV**
21.	List of recommended sites in the format Annexure-II, Details of Cluster in Annexure-III and transportation route in Annexure IV needs to be provided.	Attached as **Annexure- II, III ,IV, VI and VII**
22.	Public Consultation	Public consultation conducted. **Attached Annexure X**
23.	Grant of Letter of Intent for leases falling in potential zone	Auction /LoI will be issued as per policy of State Govt. dated 30.09.2019 after sought of all clearances.
Mining plan		
24.	The mining plan should include the original ground level recorded at an interval not more than 10 m x 10m along and across the length of river	Surface plan is prepared keeping OGL, at an interval of 10 m x 10 m across length of river. **Attached as Annexure-VIII**
25.	In addition to this outside mine lease and bank of river up to meter needs to be recorded.	Details are given in **Annexure-IX**
26.	Time period of monsoon should be defined in the DSR/MP.	Time period of monsoon is defined as 10th June - 30th September of every year during which scooping of sand is not allowed.
27.	Details of replenishment needs to be included in the mining plan	Preparation of mining plan is done on the basis of established thickness.
28.	Parts of river reach that experience deposition or aggradations shall be identified Leaseholder/Environmental clearance holder may be allowed to extract the sand and gravel deposit in these locations to manage aggradations problems.	All the sand ghat locations are Depositional or Aggradation areas and it is ensured by Technical committee.
29.	Distance of sites for sand and gravel mining shall be depending on replenishment rate of river. Sediment rating curve shall be developed and checked against extracted volume of sand and gravel	All the parameters are covered in the replenishment study.

S. No.	Condition as Per E&M Guidelines	Compliance
30.	Sand and gravel may be extracted across the entire active channel during dry season.	It will be ensured before commencement of mining.
31.	Abandoned stream channels on the terrace and inactive flood plains are preferred rather than active channels and their deltas and flood plains. The stream should not be diverted to form inactive channel.	All sand ghat are exposed during non-monsoon period. No stream will be diverted.
32.	Layers of sand and gravel which could be removed from river bed shall depend on width of river and replenishment rate of the river.	Mineable depth is decided after physical survey so, there is no possibility of adverse impacts on River morphology.
33.	Sand ghat shall not be allowed to be extracted where erosion may occur such as concave bank.	All the sand ghat locations are Depositional or Aggradation areas and it is ensured by Technical committee.
34.	Segment of braided river system should be used preferably falling within lateral migration area of river regime that enhances feasibility of sediment replenishment.	All the sand ghat locations are Depositional or Aggradation areas and it is ensured by Technical committee.
35.	Sand and gravel shall not be extracted from the bridge subjected to 250m on the upstream and 500 meter on downstream side	All sand ghat locations are at suitable distance form bridges as per Guidelines.
36.	Mining depth should be restricted to 3 meters and distance from bank should be 1/4th of river width and should not be less than 7.5 meters	Mining depth is decided after physical survey conducted by technical committee and ensures that all the parameters is followed mentioned in the sand mining guidelines.
37.	Demarcation of mining areas with pillars and dereferencing should be done prior to start of mining.	All the sand ghat locations are demarcated and georeferenced.
38.	A buffer distance of 50m after every block of 1000m over which mining is undertaken or at such distance as may be the directed prescribed by the regulatory authority shall be maintained.	All the parameters are followed.
39.	Obtaining Environmental Clearance and other statutory clearance	No mining will be done before grant of prior Environmental Clearance.
40.	Baseline data before commencement of Mining Operations	It will be ensured that collection of baseline data before commencement of mining operation.
41.	Generic Structure of Replenishment Study	Replenishment study conducted scientifically and included in DSR.
42.	Particle size distribution and bulk density of deposited material to be assessed	It is followed

DISTRICT SURVEY REPORT FOR MINOR MINERALS OTHER THAN SAND MINING OR RIVER BED MINING

(Part-B)

1. INTRODUCTION:

Hon'ble Supreme Court of India dated 27th February, 2012 in I.A. No.12-13 of 2011 in Special Leave Petition (C) No.19628-19629 of 2009, in the matter of Deepak Kumar etc. Vs. State of Haryana and Others etc., prior environmental clearance has made mandatory for mining of minor minerals irrespective of the area of mining lease. Accordingly, Ministry of Environment, Forest & Climate Change (MoEF& CC) had issued Office Memorandum No. LllOll/47/2011- IA.II(M) dated 18th May 2013. As per this O.M. all mining projects of minor minerals would henceforth require prior Environmental Clearance irrespective of the lease area.

The stone quarry and sand quarrying projects need environmental clearance as per the MoEF guidelines and such pg. 47 projects are treated as Category 'B' even if the lease area is less than 5 Ha. Subsequently, various amendments were made as regards to obtain environmental clearance of the minor minerals.

The Hon'ble National Green Tribunal, vide its order dated the 13th January, 2015 in the matter regarding sand mining has directed for making a policy on environmental clearance for mining leases in cluster for minor minerals. As per the latest amendment S.O. 141 (E) & S.O.190(E) dated 15th January 2016 & 20th January in exercise of the powers conferred by sub-section (3) of Section 3 of the Environment (Protection) Act, 1986 (29 of 1986) and in pursuance of notification of Ministry of Environment and Forest number S.O. 1533 (E), dated the 14th September, 2006 the Central Government had constituted the District Level Environment Impact Assessment Authority (DEIAA), for grant of Environmental Clearance for Category „B2' Projects for mining of minor minerals, for all the districts in the country. But later on Hon. NGT, vide its order dated 13th Sept.2018, stated that for 0-5 Ha areas also recommendation of grant EC by SEIAA instead of DEAC/DEIAA.

The MoEF&CC in its Notification dated 15th January 2016 has prescribed Preparation of District Survey Report for Sand Mining or River Bed Mining and Mining of other Minor Minerals. A detailed procedure and format for preparation of District Survey Report is provided in the said Notification.

Further the procedure for preparation of DSR and format is amended vide MoEF&CC Notification S.O. 3611(E) dated 25.07.2018. The DSR is defined at "Appendix -X (See Paragraph 7(iii)(a)" of the notification S.O.141(E)dated 15.01.2016 and S.O. 3611(E) dated 25.07.2018

2. OVERVIEW OF MINING ACTIVITY IN THE DISTRICT:

The three types of minor mineral constituents such as sand, stone and bajri are required for any type of construction apart from other material like cement and steel. In earlier times, the houses/ buildings were constructed in form of small dwellings with walls made up of mud plaster, stone and interlocking provided with wooden frames and there were negligible commercial as well as developmental activities resulting less demand of building material. However, with the passage of time when the District was carved out during new vistas of developmental activities were started. The quantity of minor mineral consumption is a thermometer to assess the quantity of developmental activities being undertaken in a particular area. In order to meet the requirement of raw material for construction, the

extraction of sand from the river bed, stone and bajri from the land mining area are being carried out exclusively. The demand of sand is mainly met through river borne collection, whereas the demand of bajri/grits are met through manufactured grit by stone crushers. The demand of dressed or undressed stone is met through the broken rock material from the hill slope. The local residents used to lift sand/gravel etc. from the river beds to meet out their bonafide requirement, however after coming into being the Mines and Minerals (Development and Regulation) Act, 1957 (67 Act-1957) and Maharashtra Minor Mineral Extraction (Development and Regulation) Rules, 2013. As the mining was allowed in accordance to the rules, presently in this District, Mineral concessions are being granted through grant of mining Lease. At present 7 nos. of mining leases for minor minerals have been granted under the rules in different parts of the District and the detail is tabulated below. 7 Sand mine river Beds has put to auction.

Based on the amendments made by the Ministry of Environment, Forests and Climate Change, Government of India, in the Environment Impact Assessment Notification, 2006 notified on 15 January 2015, the Survey document of the district Nashik, The district survey document has been prepared in accordance with the Appendix-X of the said notification.

3. GENERAL PROFILE OF THE DISTRICT

Nashik District is located between 18.33 degree and 20.53 degree North Latitude and between 73.16 degree and 75.16 degree East Longitude at Northwest part of the Maharashtra State, at 565 meters above mean sea level. The District has great mythological background. Lord Rama lived in Panchvati during his vanvas. Agasti Rushi also stayed in Nashik for Tapasya. The Godavari River originates from Trimbakeshwar in Nashik. One of the 12 Jyotirlingas also at Trimbakeshwar. Nashik has to its credit many 185 well known and towering personalities like Veer Sawarkar, Anant Kanhere, Rev. Tilak, Dadasaheb Potnis, Babubhai Rathi, V.V. Shirwadkar and Vasant Kanetkar just name few. Nashik is also known as Mini Maharashtra,because the climate and soil conditions of Surgana, Peth, Igatpuri resembles with Konkan, Niphad, Sinnar, Dindori, Baglan blocks are like Western Maharashtra and Yeola, Nandgaon & Chandwad blocks are like Vidarbha Region. Nashik, Malegaon, Manmad, Igatpuri are some of the big cities situated in the Nashik District. Recently two talukas are created in the District making the total talukas to 15. Out of 15 blocks in the District, as many as 8 blocks viz Surgana, Peth, Igatpuri, Kalwan, Baglan, Dindori, Trimbakeshwar & Nashik are tribal blocks. The district also identified as tribal by the State Government. Many important rivers of Maharashtra originate in the district. Godavari which is popularly known as Ganga of South India originates at holy place Trimbakeshwar. Another major river is Girna. Other rivers are

Darna, Mosam, Aram, Vaitarna, Manyad and Kadwa. A Taluka is an administrative block generally comprising about 90 to 100 contiguous villages, with a small town as its headquarters. On an average 8 to 10 Talukas make up a district. Nashik became full-fledged district in 1869.

At that time there were 13 talukas and Government has announced two more talukas on 26th June 1999 (Deola and Trimbakeshwar). At present 15 talukas are representing district. Malegaon taluka is the largest in area in the district, occupying 12 percent area of the district, whereas Peth is the smallest taluka having 3.36 percent area followed by Deola having 3.8 percent area; remaining talukas having on an average 5 to 9 percent area of total district. As per 2001 census, the district is having total 1931 villages out of four villages are uninhabited.

4. Location of the District

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Table No. 2: List of tahsils in Nashik district

Sr.No	District Name	Division name	Taluka name
1	Nashik	Nashik	Nashik
2		Dindori	Igatpuri
3		Igatpuri	Trimbak
4		Kalwan	Peth
5		Malegaon	Dindori
6		Chandwad	Surgana
7		Yeola	Kalwan
8		Niphad	Devola
9		Baglan	Baglan
10			Malegaon
11			Chandwad
12			Yeola
13			Nandgaon
14			Niphad
15			Sinnar

Fig.1. Location of the District

5. PHYSIOGRAPHY OF THE DISTRICT

The district forms part of Western Ghat and Deccan Plateau. Physiographically Nasik district comprises varied topography. The main system of hills is Sahayadri and its offshoots viz., Satmala, Selbari and Dolbari hill ranges. These hill ranges along with eastern and southern plains and Godavari valley are the distinct physiographic units. The northern part of the district falls under Tapi basin and is drained by easterly flowing Girna River along with its tributaries, whereas the southern part of the district falls under Godavari basin an is drained by Godavari River and its tributaries. Other important rivers in the district are Damanganga, Vaitarna, Darna, Kadva, Aram, Mosam, Panjan and Manegad. The soils of the district are the weathering products of Basalt and have various shades from gray to black, red and pink color. The soils occurring in the district are classified in the four categories namely lateritic black soil (Kali), reddish brown soil (Mal), coarse shallow reddish black soil (Koral), medium light brownish black soil (Barad). In general the soils are very fertile and suitable for growing cereal and pulses. The black soil contains high alumina and carbonates of calcium and magnesium with variable amounts of potash, low nitrogen and phosphorus. The red soil is less common and is suitable for cultivation under a heavy and consistent rainfall.

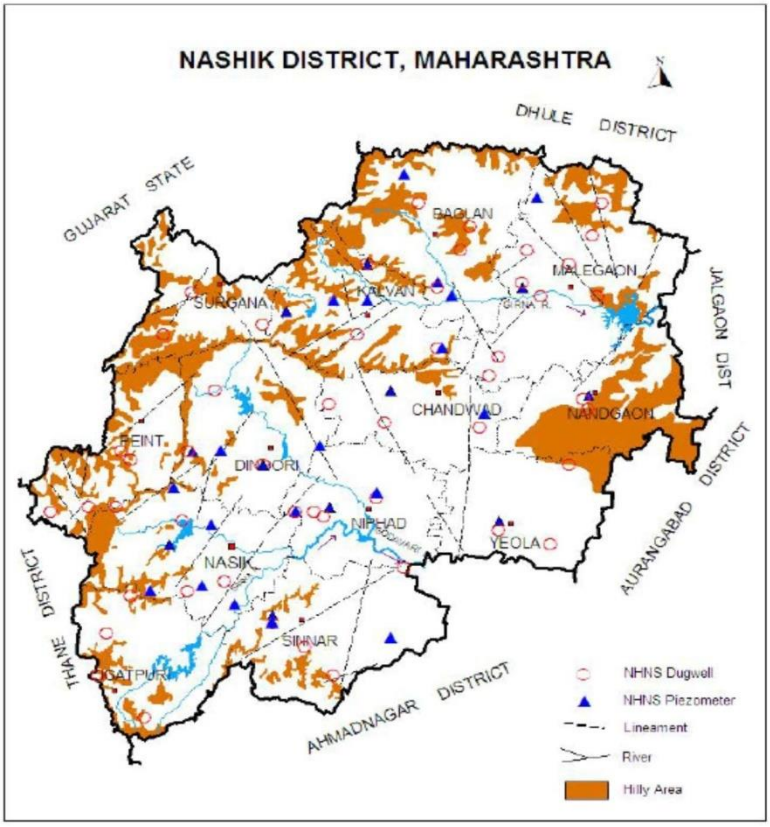


Fig.2. Physiographical map of Nashik

6. GEOLOGY OF THE DISTRICT

The Deccan traps, which cover almost major portion of Maharashtra state, were erupted as horizontal lava sheets during the Cretaceous - Eocene times and are supposed to have welled out from the long and the narrow fissures in the earth crust. These formations are termed „traps" because of their step like terraced appearance, a characteristic and a common feature in the scenery of the Traps Deccan. The chief varieties of the Traps are hard, compact Basalt and vesicular Traps. Geologically Nashik district lies in the 'Deccan Trap' region o f Peninsular India. The Great Trap region o f the Deccan covers the whole district. It is entirely o f volcanic formation. The volcanic portion consists o f compact, stratified basalt and an earthy trap. The basah are of most conspicuous features. The basalt is either fine textured or it is coarse and nodular. In the western hilly portion o f the district, the basalt lies in flat-topped ranges separated by valleys trending from west to east. The absence o f laterite which caps the summits o f the hills to the south, is a curious feature in the geology o f the area (District Gazetteer, 1975, p. 19). The slopes towards west, are steep and lofty. The eastern slope is gradual and with series of steps. The thickness of the trap flows is about 5000' (1500m). They are uniformly thick having more or less same elevations A number o f hills with forts are found along the border o f the district as well as on the range that crosses the district in more or less west-east direction. Locally this range is called Chandwad-Satmala range. M ost o f the hills are flat-topped or have a small peak rising out of a table-land. Below this there is a sort o f perpendicular scrap rising out o f a terrace and usually thickly wooded. In some areas like the hills in the south (Kalasubai) or in the SatmalaChandwad range the basah is columnar and has weathered into fantastic shapes. These higher trap regions contain quartz in vertical veins, crystals and zeolitic minerals (District Gazetteer, 1883).

The lithological character of the basak varies greatly. In some cases the tabular trap is of

fine texture and takes a fair polish, in others it is coarse and nodular. There are certain dyke formations exposed in the riverbed. Some o f the valleys that separate the ranges o f trap hills are of considerable width, for example, the valley at the head o f the Thai pass. Sub-aerial denudation is the main reason for it. It is therefore believed that the rivers rose much further west and that the broad plains were many miles from the sources o f the rivers. So the whole range of Sahayadris was once believed to be a sea cliff. The surveys of the portion o f the Great Indian Peninsula Railway that passes through the district show that the flows have a slight dip to the east, but to the eye they appear to be horizontal. The tabular strata o f hills many miles apart are found to be almost exactly as the same height above the sea. From this it is deduced that these ranges once formed part of an immense plateau (District Gazetteer, 1883). Topographically the Nashik district lies in the Deccan Plateau region of Peninsular India formed entirely o f volcanic formation. Broadly the district can be divided into three distinct regions:

a. The hilly region
b. The Godavari basin
c. The Girna basin

a. The Hilly Region –

A part of the Western Ghats called Sahayadris, this region lies in the W estern part of the district running mainly in the north-south direction with its offshoots towards east. The general altitude of this region ranges from 900m to 1200m with the higher portion being near the western boundary of the district. Here both the flat- topped and peaked mountains are found; the flat- topped hills predominate in number but not in height. This hilly portion can be further classified into four subregions.

i. The Galan hills and Selbari range
ii. The Satmala-C hand wad range
iii. The Trimbak-Anjaneri range
iv. The Kalasubai hills.

b. The Godavari Basin –

The second geographical region of the district is formed by one of the major rivers of Peninsular India. Godavari is the longest river o f Peninsular India that flows through this district. The source and upper course of the river lies in the southern part of the district and forms a district geographical region. This region lies to the south of Satmala-Chandwad range and located to the east of Sahyadri hills. The river has its source on the high slopes of Trimbak-Anjaneri range 56'N. L, 74"31' E.L) A11 the tributaries and streams of the Godavari have considerably eroded the southern part o f the district. As a result in south-central and eastern parts of the district broad valleys with considerable alluvial deposits have been formed. The Godavari basin o f the Nashik district can be divided into following subregions

v. The Godavari Valley
vi. The Northern Subregion
vii. The Dama Basin
viii. The Sinnar Plateau

a. The Girna Basin:

The third geographical region o f the study area is the Gima basin. It is bounded by the Sahyadri hills in the west, Satmala-Chandwad range in the south and Galan Selbari range in the north. The entire area of the district is underlain by the basaltic lava flows of upper Cretaceous to lower Eocene age. The shallow alluvial formation of recent age also occurs as narrow stretch along the banks of Godavari and Girna Rivers flowing in the area.

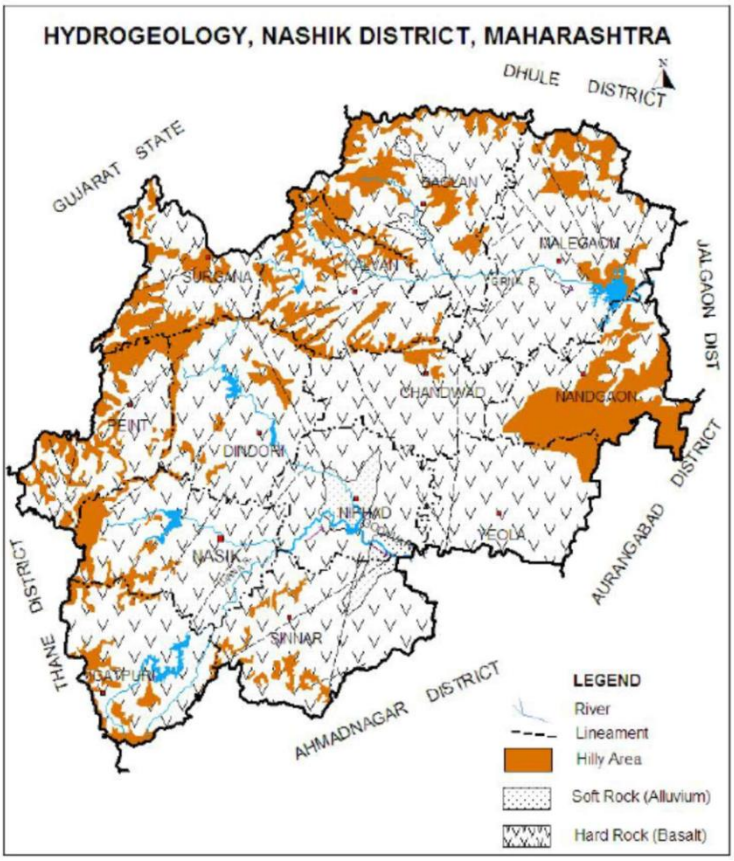


Fig3. Geological map of the Nashik

Hard Rock (Deccan Trap Basalt)

Basaltic lava flows occupies about 90% of the area of the district. These flows are normally horizontally disposed over a wide stretch and give rise to table land type of topography also known a plateau. These flows occur in layered sequences and represented by massive unit at the bottom and vesicular unit at the top of the flow. These flows are separated from each other by marker bed known as ‘bole bed’.

Soft Rock (Alluvium)

Alluvium occurs in small areas in the form of discontinuous patches along the banks and flood plains of major rivers like Godavari, Girna and their tributaries. In alluvium the granular detrital material like sand and gravel usually occurring as thin layer in the district yields water. In the district Alluvium occupies an area of 1500 sq.km and it ranges in thickness from 7- 21 meters. It consists of reddish and brownish clays with intercalations of sand, gravel and kanker. The loosely cemented coarse sands and gravels form 3-4 meters thick lower most horizons at the bottom of these alluvial pockets. Ground water in Alluvium occurs both under semi confined and confined conditions. The dug wells constructed in Alluvium has been ranging in depth from 8-12 m, whereas the borewells range in depth form 15 to 20 m and the yield of both the dugwells and borewells ranges from 13 to 22 m3 /day.

Drainage of Irrigation Pattern

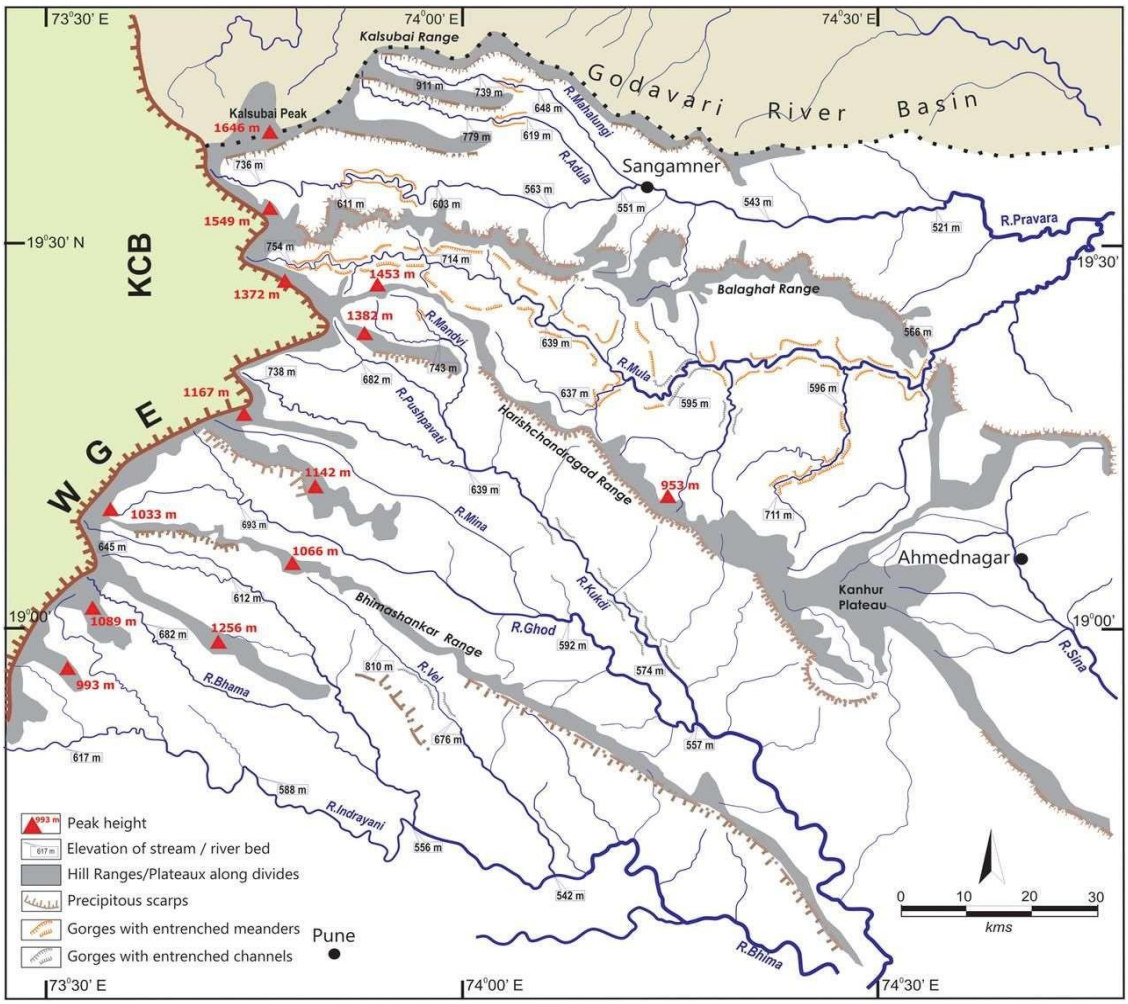


Fig.4. Hydrological Map of Nashik

The topographical maps and their study show that the drainage of the district can be divided into three broad regions:

a) The Godavari and its tributaries
b) The Girna and its tributaries
c) The west flowing Konkan Rivers.

The hill ranges in the district act as water divide separating the above regions. The Satmala-Chandwad range acts as a water divide between Godavari and Girna river basins while Sahyadri hills in the west act as water divide between west flowing and east flowing rivers of the district. The rocks in these hilly regions have developed three sets of master joints, running in the following direction -

i. North-south strike direction

ii. North-w est-South-east direction 19

iii North-north-east and South-west direction.

The streams o f the region have taken advantage o f these planes of weaknesses in carving their valleys (Aruchalam, 1964 P 12)

a) Godavari and its tributaries -

Godavari and its tributaries drain the district to the south of Satmala-Chandwad range and

occupy a large area than Girna basin. In the south, it is bounded by Kalasubai range. As the drainage map indicates, most of the tributaries o f Godavari comes from the Satmala-Chandwad range along the north bank o f the river. There are a few important streams in the south also. The average altitude of the basin is about 1000 m in the west and south while towards east and north east it is less and reaches upto 300 m. Nashik, Dindori, Niphad, Sinnar and Yeola tahsils are drained by these rivers.

iii) Godavari - Godavari is the most important river not only of the district but also the whole of the Peninsular India. Out of its total length o f 1465 Km only 111 Km, i.e. 7.6% of length, lies in the Nashik District. It is the longest river o f M aharashtra and has its source near Trimbakeshwar in Nashik district. From the base o f the escarpment appearing on the eastern face o f the Sahyadri hills, as a result of headward erosion of the river upto Nashik, there is no perceptible slope and its broad-flat valley appears a trickle (Dixit, 1985, p. 26). Godavari also appears graded to its source. From Nashik the river flows in east-southeasterly direction. A characteristic feature of Godavari is its deep channel enclosed between its banks which are more like embankments, and the narrow alluvial flood plain. In areas not far from the Sahyadri hills the valley in general has witnessed enormous sedimentation. The sediments derived from the weathering in the heavy rainfall areas of the mountains are brought by the tributaries over a steep gradient and dumped into the river which with a lower competence finds difficult to absorb and transport it further despite a heavy discharge. This explains the enormous sediments in the right bank tributaries of Godavari close to the confluence (Dixit. r585, p. 27-28). As a result soils are comparatively good and fertile.

Agriculturally, the region is rich even though it is the upper course o f the river.

iv) Dama - Dam a rises in the Kalasubai range in the southern part of the district. The source lies 13 Km south-east o f Igatpuri. The bed is for most part wide and sandy. The length of the river is around 80 Km draining Igatpuri, Nashik and Niphad tahsils, Alvanadnadi and Pimpari nadi are the tributaries o f Darna. A dam is constructed on this river near Nandgaon village giving rise to a storage lake called Lake Bill. On the left bank o f the tributaries that join Dama include Unduhol, Vaki, Valdevi and Dev. 20

iii. Kadwa - Kadwa is one of the most important tributaries of Godavari flowing from the north. It rises in the Satmala range in Dindori tahsil. The riverbed and banks both are rocky but the bed is wide. Irrigation works of considerable importance have been established on a number of streams that have their sources in Satmalas and this flow southward to join Kadwa. These streams drain Chandwad, Niphad and Dindori tahsils. The total length of the river is 74 Km, out o f which larger part lies in hilly areas of Dindori and Chandwad tahsils. But in Niphad the river is significant, as major source of irrigation. Kadwa joins Godavari near Niphad town where sedimentation near and along the confluence has given rise to productive fertile soil. Cash crops like sugarcane, grapes and onions are possible due to irrigation facilities and fertile soil o f this region.

iv. Kashvapi - The Kashyapi or the Kas rises in the Sahyadri hills little above W aghira village in Nashik tahsil. Near the source itself two streams named Wotki and Muli join Kashyapi. Just at the confluence of Kashyapi and Godavari, a dam is constructed near Gangapur village and is called by the same name. It is one o f the oldest earthen dams in the district that provides water for irrigation through left and right bank canals that irrigate Nashik, Niphad, and Yeola tahsils.

v. Banganga - Among the north bank tributaries the Banganga rises a little to the north west of Ramsej hill and flows in an easterly direction. Near Ozarkhed a dam is

constructed to divert the w ater into canals both the sides for irrigation. After passing Sukene, it joins Godavari.

b) The Girna and its tributaries -

The northern part of the Nashik district is drained by river Girna and its tributaries. The river basin is bounded on the south by the Satmala-Chanwad range and in the north by Galan hills. The important tributaries o f Girna includes Tambadi, Aram. Maosam, Panjhara, Punand and Maniad

viii. Girna - Girna is the most important tributary o f Tapi River. It rises just south of Cherai village at about 8 Km south west of Hatgad in the Sahyadri hills and flows nearly east along a wide bed with high banks in some part and low enough to use the waterfall irrigation. This river in its upper course receives several streams o f neariy equal size and equally useful for irrigation the topography is rugged and undulating. Rainfall is heavier in the west and decreases towards east. The length of the river is 144 Km, it drains Surgana, Kalwan, Baglan and M aiegaon tahsils The north bank tributaries o f the Girna are Tambadi, Punand, Aram and Maosam that drain the northern part o f the basin. The south bank tributaries are comparatively small but are more useful which mainly includes Panjhara and Maniad.

ix. Tambadi - The first considerable stream that joins Girna on the left bank is Tambadi. This river also rises in Sahyadri hills to the north o f Hatgad and joins Girna at Chankapur. Just below the confluence a dam is constructed across the river, due to which irrigation is now available as far as Ravalgaon in M alegaon tahsil.

x. Punand - Another tributary stream o f Girna is Punand. This river rises in the range west of Salher fort and has a long winding course. It joins the Girna at Bej, The valley o f Punand is deep and rocky.

xi. Aram - This is the important tributary o f Girna. The river rises to the south o f Salher fort in Dholbari range. The river flows in a southerly direction and then turns eastwards to pass near Satana town and further continues till it joins Girna. The river valley is wide enough with low banks; hence it is useful for irrigation. It joins the Girna five kilometers east of Thengode in Baglan tahsil.

xii. Mosam - This is the northern most tributary o f the Girna. The headwater stream o f this river lies in the Sahyadri hills through Mulher, Tarahabad and Jayakheda. It is joined by a number of affluent streams. Mosam also has cut a wide valley, so it is used for irrigation on a large scale. It joins the Girna about three kilometers below Malegaon,

xiii. Panjhara - This is one of the south bank tributaries o f the Girna It rises to the east of Chandwad fort on the southern slopes of the Satm ala-Chandwad range. The riverbanks are high and hence they are not useful for irrigation. This is because the river is able to cut across the Satmala watershed. Headwater is much more active as the Girna basin has much lower base level than the Godavari; it drains the Girna to the east o f M alegaon near the border of the district.

xiv. Maniad - This river rises in the Satamala range near Ankai-Tankai hills. It has a deep, narrow valley with high banks due to which it is not much suitable for irrigation. It has a length o f only 48 Km and drains Nandgaon tahsil only. M ost o f the course o f the river lies in rainshadow area resulting into drought prone region o f the district. As a result it is agriculturally a poor region. The river joins the Girna near Chalisgaon in Jalgaon district.

c) The West Flowing Konkan Rivers –

The western part o f the district is drained by a number o f small rivers and streams that flow westwards to join the Arabian Sea. These rivers have 22 '•, winding course with deep valleys, gorges and waterfalls. Damanganga and Vaitarna are the two major rivers in this region

iii. Damanganga - Damanganga rises in the hilly area of Sahyadri hills in Peth tahsil of the district. The river flows through a deep ravine over rocky and winding beds. The banks are steep and well wooded and little or no use is possible o f this river for irrigation. It joins the Arabian Sea at Daman.

iv. Vaitarna - This River raises south-west of the Trimbak fort. It drains a small portion of the district. The river has cut a remarkably deep channel through the Sahyadri hills. The total length of the river is 144 Km and it joins the Arabian Sea to the north of Vasai (Bassein) in Thana district. A dam is constructed to provide drinking water to Bombay and is not useful for irrigation.

7. **LAND UTILIZATION PATTERN IN THE DISTRICT: FOREST, AGRICULTURAL, HORTICULTURAL, MINING, ETC**

The fundamental utility of land is satisfying the human need of food habitation and housing materials. It is essential to choose proper mode of landuse planning and allocation to various Ingredients of optimum landuse to meet /solve the human needs Kellong (1980) has rightly pointed out that this calls for the clear understanding of land classification for successful planning and development. The application of various inputs in land may change the allocation of land to different uses. The factors, conservation and quality of our socio economic environments are most fundamental for the proper use of our land. This statement is true not only of large urban centers as well as most of the remote areas. The growing pressure of population coupled with an increasing variety of demand on land resources has brought extra pressure on available resources. In order to deal with these and to plan for optimum utilization of land, it is necessary to have accurate and up to date information in all possible details on landuse. It is therefore, the study of classification of landuse pattern in Nashik district would be helpful for preparation of the relative development plan for the district.

The objective of this chapter is to assess spatial as well as temporal landuse and suggest possible Solutions to improve existing landuse in the district in the light of physico-socioeconomic conditions. The area of forest cover (FC), net sown area (NSA) area not available for cultivation (ANC), Fallow Land (FL) and cultivable waste (CW) have been converted into percentage to total geographical area. Further, these have been used for showing the spatial distribution of land classification with suitable cartographic maps. A line graph Exhibits the temporal variation of land classification for a period of forty years (1960-61to 2000-01) in the district. The description of each land classification has been supplemented by numerous spot-inquires, besides information embodied by using the relative District Census Handbook, District Gazetteer and District socio economic Review of Nashik District.

CLASSIFICATION OF LAND

The aim of the classification of land is to divide land into different categories according to single factor or set of factors. Therefore, classification of land may be different types and depending on the factors taken into consideration. The classification of land has a direct bearing on climatic factors, Soil characteristics, and slope of land, degree of erosion, water

supply, drainage and similar environmental conditions. The landuse capabilities, classification portrays, physical capability of land to produce over a long period of time for selected uses, which can be provide land operation with a basis for actual practice of land (Stamp, 1968). In the recent years several attempts have been made in different countries of world to classify landuses from different points of views and for different purposes, employing varieties of methods. A stamp (1960) has cogently remarked that it is not surprising that the divergence points of view on classification of land prevail. He is well regarded as pioneer in the field of land classification. His example initiated further studies in this direction. In his work entitled "The land of Britain : Its Use and Misuse" he classified land into six categories, namely, (1)Forest and woodland (2) Arable land, (3)Meadow land and permanent grass,(4)Health and moorland,(5)Gardens orchards, nurseries and (6)Unproductive land : such as buildings, mines, wasteland, etc. In the international classification of landuse, there are nine major landuse classes have been recognized: (1) settlement and non-agricultural land, (2) Horticulture, (3) Tress and permanent crops (4)Crop land, (5) Improved permanent pastures, (6)Improved gazing land, (7)Woodland, (8)Stamps and marshesand (9)Unproductive land. In India various schemes have been proposed to classify the land into different uses. The National Atlas Organization in 1957 classified the land into nine categories Forest, Scrub, and Arable land with trees, Plantation, Pasture, and Wasteland, Alpine grass and scrub and, Glaciated region. The Damodar Valley region hasclassified land into ten major categories : (1)Field crop, (2)Orchards, (3)Dense forests, (4)Light forests, (5)Nonagricultural land, (6)Unproductive land, (7)Water bodies, (8) Cultivable waste, (9)Villages and (10)City and towns. Landuse records department has officially classified landunder following categories (1) Reporting area for land utilization purposes, (2)Forest, (3)Barren and uncultivable land, (4)Land put to non-agricultural uses (i)cultivable waste, (ii)Permanent pastures and other gazing land, (5)land under miscellaneous tree crops and groves not included in net area sown; (i)Current fallows(ii)Other fallow land, (6)Net sown area, (7)Area sown more than once and (8)total cropped area. It would be convenient for a clear understanding to condense to above mentioned twelve categories into five categories as (1) Forest land, (2) Net sown area, (3) Land not availableforcultivation, (4) cultivable waste and (5) Fallow land.

TEMPORAL VARIATIONS IN LANDUSE

The temporal variations in landuse pattern in the Nashik District have been studied for a period of forty years (1960-61 to 2000-01) and possible causes of changing landuse have been interpreted.

The investigator could not succeed in uncovering temporal variations of landuse for consecutive years due to paucity of data for the years concerned. However, alternative year has been taken into consideration for showing temporal variations in landuse pattern in the area under study.

The temporal variations in landuse for Nashik district are studied in five categories as follows:

a. Net area Sown (NSA)
b. Land not available for cultivation, (LNAC),
c. Cultivable Waste (CW)
d. Fallow land (FL) and
e. Forest/Forest Cover (F)

The changes occurred during the period of study are interpreted as follows:

a. Net Sown Area (Nsa)

The net sown area is steadily decreased since 1960-61 to 2000-2001 (Fig. 4.1). It is seen from table 4.1 that 59.25 percent area was under cultivation in 1960-61 and it has been stepped to 53.95 percent area under cultivation in 2000-01, registering decreased by 5.3 percent. This decrease may be attributed to 90 Table 4.1: Nashik District- Temporal Variation in General Landuse Pattern from 1961to 2001 (Area in Percentages) increasing population, development of transportation routes and residential purpose. From1960-61 to 1970-71net sown areadecreased by 3.91 percent in 1970-71 and 1980-81 it has decreased by 0.88 percent; from 1980-1981 to 1990-91 there is a slight increase (0.81%). It decreased 1.32 percent from 1990-91 to 2000-01. The total decrease between the study periods is 5.3 percent. This significant decrease in net sown area may be due to more land under roads, residuals subsequently under landput to non-agricultural use, cultivable waste and fallow land. There fore, other types of land have continuously increased from 1960-61 to 2000- 01 (Table1).

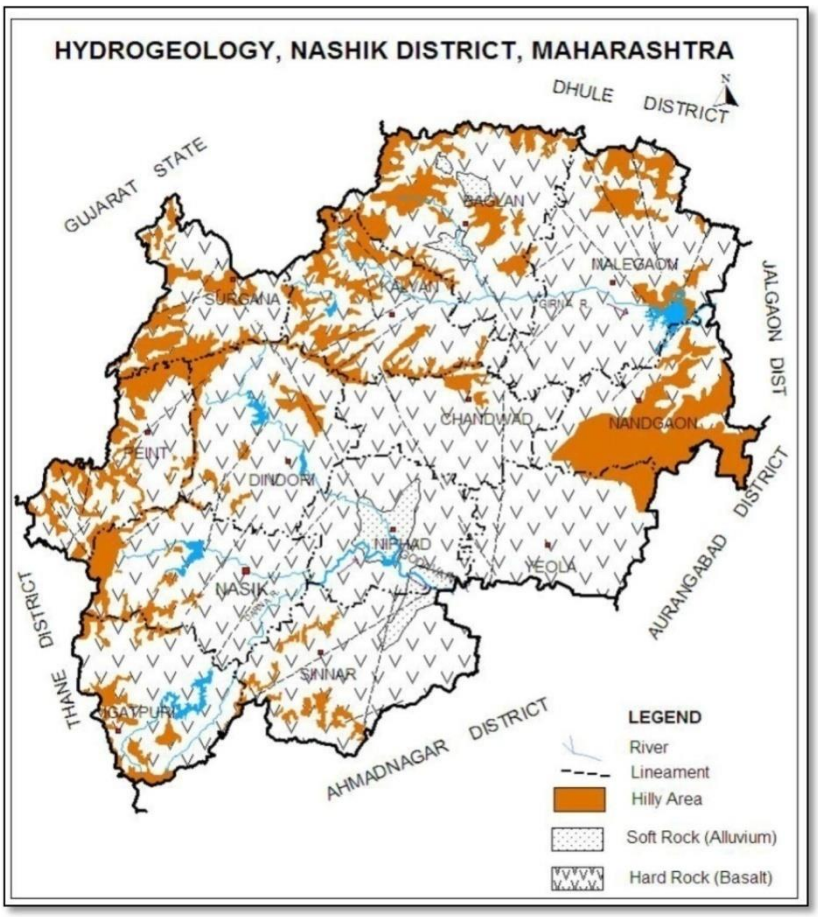
8. SURFACE WATER AND GROUND WATER SCENARIO OF THE DISTRICT

Hydrogeology

The entire area of the district is underlain by the basaltic lava flows of upper Cretaceous to lower Eocene age. The shallow alluvial formation of Recent age also occurs as narrow stretch along the banks of Godavari and Girna Rivers flowing in the area. A map depicting the hydrogeological features is shown as Figure

Hard Rock (Deccan Trap Basalt)

Basaltic lava flows occupies about 90% of the area of the district. These flows are normally horizontally disposed over a wide stretch and give rise to table land type of topography also known a plateau. These flows occur in layered sequences and represented by massive unit at the bottom and vesicular unit at the top of the flow. These flows are separated from each other by marker bed known as ‘bole bed” are discussed below. The ground water in Deccan Trap Basalt occurs mostly in the upper weathered and fractured parts down to 20-25 m depth. At places potential zones are encountered at deeper levels in the form of fractures and inter-flow zones. The upper weathered and fractured parts form phreatic aquifer and ground water occurs under water table (unconfined) conditions. At deeper levels, the ground water occurs under semi-confined to confined conditions. The yield of dugwells tapping upper phreatic aquifer down to the depth of 12 to 15 m bgl ranges between 45 to 90 m3/day depending upon the local hydrogeological conditions. Borewells drilled down to 70 m depth, tapping weathered and vesicular basalt are 6 found to yield 18 to 68 m 3 /day. The discharge of Peizometer ranges from 0.14 to 1.73 as seen from CGWB data.



Soft Rock (Alluvium)

Alluvium occurs in small areas in the form of discontinuous patches along the banks and flood plains of major rivers like Godavari, Girna and their tributaries. In alluvium the granular detrital material like sand and gravel usually occurring as thin layer in the district yields water. In the district Alluvium occupies an area of 1500 sq.km and it ranges in thickness from 7- 21 meters. It consists of reddish and brownish clays with intercalations of sand, gravel and kanker. The loosely cemented coarse sands and gravels form 3-4 meters thick lower most horizons at the bottom of these alluvial pockets. Ground water in Alluvium occurs both under semi confined and confined conditions. The dugwells constructed in Alluvium has been ranging in depth from 8-12 m, whereas the borewells range in depth form 15 to 20 m and the yield of both the dugwells and borewells ranges from 13 to 22 m3 /day.

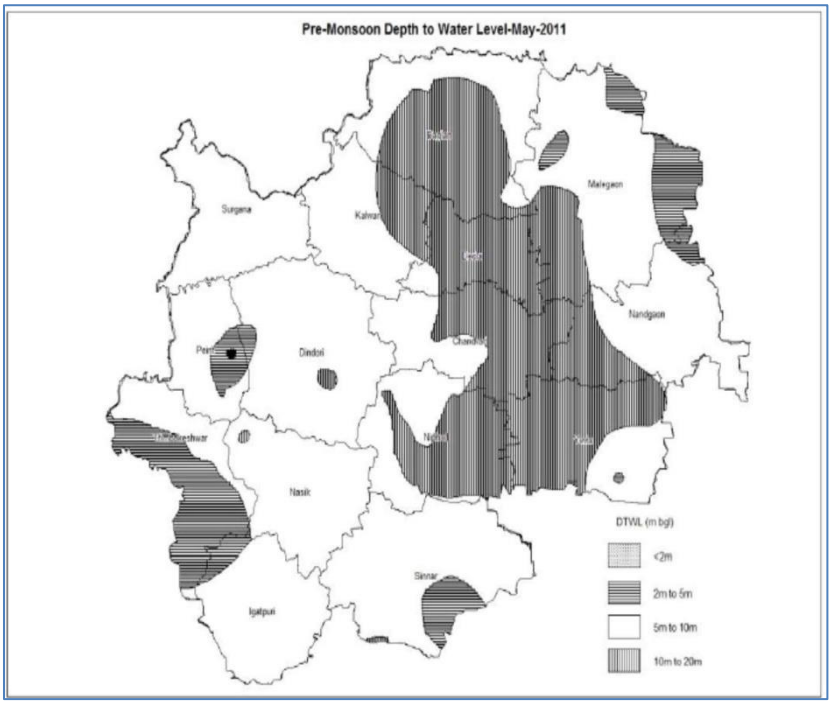
Water Level Scenario

Central Ground Water Board monitors water levels in 57 GWMW stations in the district. These GWMW are measured four times in a year viz., January, May (Pre monsoon), August and November (Post monsoon).

Depth to Water Level – Premonsoon (May 2011)

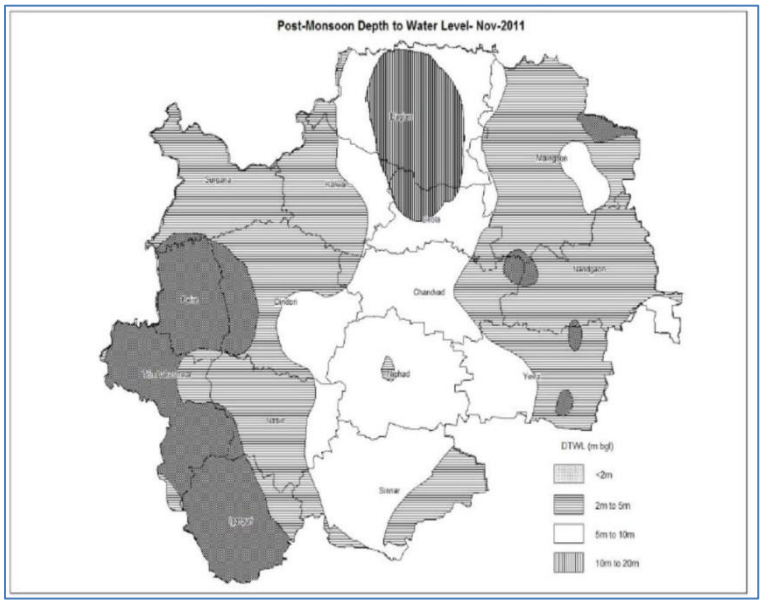
The premonsoon depth to water levels monitored during May 2011 ranges between GL (Harsul) and 19.24 m bgl (Ravalgaon). The depth to water levels during premonsoon has been depicted in Figure-3. The water levels in major part of the district covering entire western, central, north eastern and eastern parts are between 5 and 10 m bgl. Shallow water levels within 5 m bgl occur in southwestern and north eastern parts of the district in parts of Malegaon, Penth, Trimbakeshwar and Igatpuri talukas. Deeper water levels of 10 to 20 m bgl are observed in parts of Yeola, Chandwad, Kalwan, Niphad, Dindori and Baglan (Satana)

talukas.



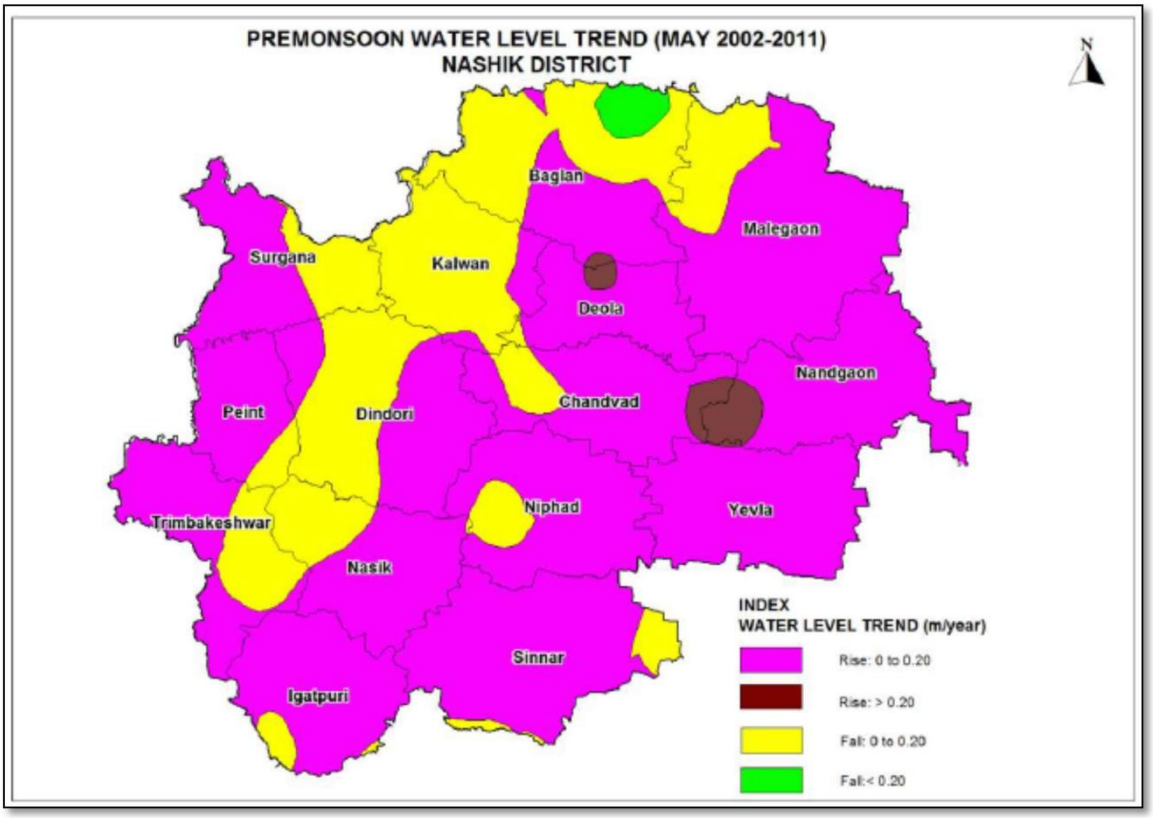
Depth to Water Level – Postmonsoon (Nov. 2011)

The depth to water level during postmonsoon (Nov. 2011) ranges between 0.20 m bgl (Khambale) and 18.42 m bgl (Satana). Spatial variation in postmonsoon depth to water level is shown in Figure-4. The water levels between 5 and 10 m bgl have been observed in major parts of the district in the southern, and northern and central parts of the district. The shallow water levels within 5 m bgl are observed in southwestern,southeastern and Northeastern, Northwestern parts of the district covering parts of Nasik and Igatpuri Dindori, Kalwan,Surgana, Malegaon, Nandgaon and Yeola talukas . Deeper water levels of 10 to 20 m bgl are observed in northern and northcentral parts of the district in Baglan (Satana) and Deolali talukas.Very shallow water levels within 2 m bglare observed in Western and southwestern aprts in Penth,Trimbak and Igatpuri talukas as well as in small patches in Malegaon, Nandgaon and Yeola talukas.



Seasonal Water Level Fluctuation (May to Nov. 2011)

Seasonal water level fluctuation between premonsoon and postmonsoon of 2011 have been computed. Water level fluctuation in the range of 0.19 (Kona) to1.14 m (Thengode) is observed in the district. Rise in water levels in the range of 2 to 4 m is observed in major parts of the district in northeast to southwest patch. Rise of more than 4 m is mainly observed in north eastern and south eastern parts occupying almost entire Surguna and Yevla talukas. Rise of 0 to 2 m is observed in isolated patches in northern part of the district in Baglan taluka and southern part of the district in Sinnar taluka. 4.2.4 Water Level Trend (2002-2011) Trend of water levels for premonsoon and postmonsoon periods for last ten years (2002-2011) has been computed. Analysis of long term water level trend data indicates that rise in water levels in premonsoon period has been recorded at 37 NHNS and its ranges from 0.01 (Vasali) to 3.12 m/year (Thengode) and fall in water levels has been observed in 16 NHNS and it ranges between negligible (Tinghri) to 1.19 m/year (Shirpurwade-Baglan). During postmonsoon period rise in water levels has been recorded at 32 GWMW ranging from negligible (Karajgaon) to 1.27 m/year (Sakara) while at 22 GWMW fall in water level have been recorded and it ranges between negligible (Chachadgaon) and 1.00 m/year (Tinghri). Thus in major parts of the district, both during premonsoon and postmonsoon seasons declining water level trends have been recorded. The premonsoon water level trend map was also prepared for the period May 2002-2011 and the same is presented in Figure



9. **Rainfall of the district and climatic conditions**

Climate of Nashik District

The climate of the district is on the whole is agreeable. The climate of Nashik district is characterized, by general dryness throughout the year except during the south-west monsoon season. The winter season is from December to about the middle of February followed by summer season which last up to May. 3 June to September is the south-west

monsoon season, whereas October and November constitute the post-monsoon season. The maximum temperature in summer is 42.5°C and minimum temperature in winter is less than 5.0°C. Relative humidity ranges from 43% to 62%. The normal annual rainfall in the district varies from about 500 mm to 3400 mm. It is minimum in the north eastern part of the district and increases towards west and reaches a maximum around Igatpuri in the western ghat. The chances of receiving normal rainfall are maximum (50 to 55%) in the north eastern part around Malegaon and Nandgaon and minimum in the central part of the district. The study of negative departures of the annual rainfall over normal reveals that major part of the district (about 75%) falling east of Western Ghats comprising almost entire Sinnar, Niphad, Surgana, Kalvan, Satana, Chandwad, Yeola talukas and parts of Dindori, Peint and Malegaon talukas can be categorized as drought area. The average annual rainfall for the period 2002 to 2011 ranges from about 476.7 mm (Devali) to 3508.1 mm (Igatpuri).

Nasik has a mild climate for most of the year apart from the hot summers which last from March to mid-June. The city has a semi-arid climate under the Koppen climate classification. The period from June to September is the (South West) Monsoon Season, which sees about 620 mm (25 inches) of rain. The city experiences a mild, dry winter from November to February, with warm days and cools nights, although occasional cold waves can dip temperatures. The maximum temperature ever recorded in the city was 44.8 °C (108.3 °F) on 12 May 1960 in Nasik. The lowest temperature recorded was 0.6 °C (33.1 °F) on 7 January 1945 in Nasik.

Rainfall in Nasik district

Though average rainfall of the District is between 2600 and 3000 mm, there is wide variation in the rainfall received at various blocks. Most of the rainfall is received at various blocks. Most of the rainfall is received from June to September. The maximum temperature in summer is 42.5 degree centigrade and minimum temperature in winter is less than 5.0 degree centigrade. Relative humidity ranges from 43% to 62%. Climate of the Nasik is generally compares with that of Banglore and Pune because of its pleasant nature. However in recent years it is noticed that the temperature is increasing and the rainfall is decreasing due to industrialization and fast deforestation.

Sr. No	Taluka	Rainfall Recorded During the period from 1 June to 31 September in mm.								
		2011	2012	2013	2014	2015	2016	2017	2018	2019
1	Nashik	564.0	441.0	686.5	650.0	669.9	1003.7	1094.2	601.7	1232.2
2	Igatpuri	3030.0	2684.0	3666.0	3343.0	2495.0	3326.0	3808.0	3234.0	5303.9
3	Dindori	576.0	577.0	882.1	705.0	486.0	954.9	864.0	441.0	1214.0
4	Peth	1832.0	1621.0	2263.0	1667.2	1079.0	2275.1	2459.1	2321.9	3345.0
5	Malegaon	396.0	485.0	563.0	358.6	402.0	374.8	343.8	291.0	635.0
6	Nandgaon	583.0	285.0	495.8	91.9	168.6	464.0	704.0	233.0	551.5
7	Chandwad	559.0	554.0	441.1	400.5	389.0	466.0	476.5	384.1	683.0
8	Kalwan	479.0	490.0	613.6	536.0	488.7	686.2	626.8	460.0	682.0
9	Baglan	526.0	419.0	598.9	424.0	363.5	557.5	446.5	290.2	669.2
10	Surgana	1772.0	1454.0	1801.6	1268.8	1069.4	1490.5	2288.1	2074.0	2839.7
11	Niphad	277.0	394.0	464.0	637.6	350.4	538.0	407.9	217.4	541.5
12	Sinner	469.0	340.0	505.0	413.4	398.0	690.0	671.6	345.3	756.0
13	Yeola	599.0	407.0	415.0	482.0	320.6	427.0	462.0	413.6	709.4
14	Trambakeshwar	1646.0	1343.0	2065.08	1757.0	922.0	1726.0	2321.0	1598.3	3862.0
15	Deola	283.0	322.0	417.3	331.5	282.8	577.5	549.0	324.4	495.7

List of Stone Quarry projects in Nashik District Grant of Environment Clearance & Mine plan

Application received till date for Stone mining

Sr. No.	Name of the Mineral	Name of the leasses	Mining lease Grant Order No. & date	Area of Mining lease (ha)	Production Capacity as Approve d mining Plan (Tone or Brass per Year)	Period of Mining lease (initial)	
						From	To
1	2	3	4	5	6	7	8
1	Stone	Avinash Madhavrao Patil	Kra. Kaksh-15/2/GAUKHANI/KAVI/469/2018	2.40H R	8000	03/12/2018	02/12/2023
2	Stone	Pratap Nanalal Joshi	Kra. Kaksh-15/2/GAUKHANI/KAVI/478/2018	1.00H R		06/12/2018	05/12/2023
3	Stone	Sampat Sadashiv Navale	Kra. Kaksh-15/2/GAUKHANI/KAVI/472/2018	0.45H R	5000	05/12/2023	04/12/2023
4	Stone	Kacharu Nathu Navale	Kra. Kaksh/15/1/GAUKHANI/249/2017	1.00H R		31/07/2017	25/09/2017
5	Stone	Shantaram Bahiru Jadhav	Kra. Kaksh-15/2/GAUKHANI/KAVI/470/2018	1.00H R	4000	03/12/2018	02/12/2018
6	Stone	Pravin Totaram Patil	Kra. Kaksh/15/1/GAUKHANI/339/2016	1.20H R	6780	26/09/2016	25/09/2016
7	Stone	Ashok Haribhau Jadhav	Kra. Kaksh/15/1/GAUKHANI/243/2017	1.00H R		29/07/2017	28/07/2022
8	Stone	Prakash Dattu Ghuge	Kra. Kaksh/15/1/GAUKHANI/245/2017	1.24H R	0	29/07/2017	28/07/2027
9	Stone	Anil Indrajeet Bhide	Kra. Kaksh/15/1/GAUKHANI/195/2018	1.61H R		03/07/2018	02/07/2023
10	Stone	Hemant Badrinath Ladhha	Kra. Kaksh-15/2/GAUKHANI/KAVI/471/2018	1.20H R	4000	03/12/2018	02/12/2023
11	Stone	Me. B. M. Chafalkar	Kra. Kaksh-15/2/GAUKHANI/KAVI/88/2018	2.92H R	18000	09/02/2018	08/02/2023
12	Stone	Arun Kisan Fulamkbar	Kra. Kaksh-15/2/GAUKHANI/KAVI/145/2018	1.20H R	9957	28/05/2018	27/05/2023
13	Stone	Shubangi Prakash Bankar	Kra. Kaksh-15/2/GAUKHANI/KAVI/475/2018	0.80H R	5000	06/12/2018	05/12/2023
14	Stone	Haribhau Kashinath Fadol	Kra. Kaksh-15/2/GAUKHANI/KAVI/466/2018	2.30H R	8000	03/12/2018	02/12/2023
15	Stone	Motiram Murlidhar Navale	Kra. Kaksh-15/2/GAUKHANI/KAVI/489/2018	1.21H R		07/12/2018	06/12/2023
16	Stone	Kailas Bhagwanta	Kra. Kaksh-15/2/GAUKHANI/KAVI/490/20	1.18H R		07/12/2018	06/12/2023

		Navale	18				
17	Stone	Yogesh Amrutlal Badrakiya	Kra. Kaksh-15/2/GAUKHANI/KAVI/474/2018	1.00HR	5000	05/12/2018	04/12/2023
18	Stone	Gajanan Bapu Navale	Kra. Kaksh-15/2/GAUKHANI/1/473/2018	3.00HR	51625	05/12/2018	04/12/2023
19	Stone	Bharatbhai Govind Kaneria	Kra. Kaksh-15/2/GAUKHANI/KAVI/476/2018	1.19HR	4000	06/12/2018	05/12/2023
20	Stone	Raman Gulati	Kra. Kaksh-15/2/GAUKHANI/KAVI/468/2018	4.80HR		03/12/2018	02/12/2023
21	Stone	Gopal Ramdasji Lal	Kra. Kaksh-15/2/GAUKHANI/KAVI/171/2018	1.06HR	9329	28/03/2018	27/03/2023
22	Stone	Nandkishor Khanderao Khatale	Kra. Kaksh-15/2/GAUKHANI/KAVI/320/2018	2.00HR	13995	25/06/2018	24/06/2023
23	Stone	Bhausaheb Punjaji Sangale	Kra. Kaksh-15/2/GAUKHANI/KAVI/172/2018	3.96HR	44423	28/03/2018	27/03/2023
24	Stone	Jitendra Sudamrao Bodhale	Kra. Kaksh/15/1/GAUKHANI/37/2017	1.00HR		14/02/2017	13/02/2022
25	Stone	Shri. N. M. Pekhle Pvt Ltd.	Kra. Kaksh/15/1/GAUKHANI/38/2017	0.80HR		14/02/2017	13/02/2022
26	Stone	Padmakar Namdev Sonawane	Kra. Kaksh/15/1/GAUKHANI/143/2017	0.40HR		02/05/2017	01/05/2022
27	Stone	Bharti Balu Bodkhe	Kra. Kaksh/15/1/GAUKHANI/145/2017	1.00HR		02/05/2017	01/05/2022
28	Stone	Dashrath Punjaji Avhad	Kra. Kaksh/15/1/GAUKHANI/244/2017	0.74HR		29/07/2017	28/07/2022
29	Stone	Ratnakar Namdev Sonawane	Kra. Kaksh/15/1/GAUKHANI/144/2017	0.40HR		02/05/2017	01/05/2022
30	Stone	Avnitbhai Giridharbhai Bavariya (Patel)	Kra. Kaksh/15/1/GAUKHANI/195/2017	1.60HR		03/07/2017	29/12/2021
31	Stone	Dilip Vishnu Chaudhari	Kra. Kaksh/15/1/GAUKHANI/242/2017	0.40HR	11969	29/07/2017	28/07/2022
32	Stone	Mohan Vittahl Shirsath	Kra. Kaksh/15/1/GAUKHANI/194/2017	0.84HR	10245	01/07/2017	30/06/2022
33	Stone	Vijay Balwantrao Patil (Jadhav)	Kra. Kaksh/15/1/GAUKHANI/193/2017	1.46HR	7138	01/07/2017	30/06/2022
34	Stone	Sayyad Hamid Sadroddin	Kra. Kaksh/15/1/GAUKHANI/279/2017	0.66HR		20/09/2017	19/09/2022
35	Stone	Sampat Lakshman Bhandure	Kra. Kaksh/15/1/GAUKHANI/123/2017	1.00HR	2502	10/04/2017	09/04/2022
36	Stone	Me. Bankar	Kra.	1.00H	15000(to	25/07/20	24/07/20

		Patil And Engineers	Kaksh/15/1/GAUKHANI/212/2018	R	n ne)	18	23
37	Stone	Sachin Ramdas Sonawane	Kra. Kaksh/15/1/GAUKHANI/429/2016	0.80HR	12500	23/12/2016	22/12/2021
38	Stone	Ganesh Muktaram Revgade	Kra. Kaksh/15/1/GAUKHANI/385/2016	2.00HR		05/11/2016	04/11/2021
39	Stone	Ram Raghunath Patil	Kra. Kaksh/15/1/GAUKHANI/387/2016	0.40HR	0	05/11/2016	04/11/2021
40	Stone	Jayantibhai Kanjibhai Patel	Kra. Kaksh/15/1/GAUKHANI/357/2019	0.72HR	12600	06/12/2019	05/12/2024
41	Stone	Vasant Karbhari Pansare	Kra. Kaksh/15/1/GAUKHANI/1491/2019	0.80HR	0	04/11/2020	03/11/2025
42	Stone	Nitin Bhaskarrao Gaikwad	Kra. Kaksh/15/1/GAUKHANI/386/2016	0.80HR	9302	05/11/2016	04/11/2021
43	Stone	Ashok Rambhau Zambare	Kra. Kaksh/15/1/GAUKHANI/430/2016	1.65HR	7037	23/12/2016	22/12/2021
44	Stone	Sopan Haribhau Aathshere	Kra. Kaksh/15/1/GAUKHANI/389/2016	1.20HR	0	05/11/2016	04/11/2021
45	Stone	Ambadas Madhavrao Aathshere	Kra. Kaksh/15/1/GAUKHANI/390/2016	0.40HR	0	05/11/2016	04/11/2021
46	Stone	Rinkesh Ravindra Narode	Kra. Kaksh/15/1/GAUKHANI/KAVI/45/2019	0.40HR	2325	05/11/2016	04/11/2021
47	Stone	Bhairawnath Trambak Kadlag	Kra. Kaksh/15/1/GAUKHANI/36/2017	0.80HR	3500	14/02/2017	13/02/2022
48	Stone	Sagar Dilip Chavan	Kra. Kaksh-15/1/GAUKHANI/KAVI/27/2019	2.42HR	24528	31/01/2019	30/01/2024
49	Stone	Shailesh Dagadu Gadakh	Kra. Kaksh-15/1/GAUKHANI/KAVI/321/2018	2.74HR	35877	25/06/2018	24/06/2023
50	Stone	Ramesh Chindha Shirsath	Kra. Kaksh-15/1/GAUKHANI/KAVI/343/2018	1.30HR	2000	25/07/2018	24/07/2023
51	Stone	Umakant Subhash Kakad	Kra. Kaksh-15/2/GAUKHANI/KAVI/306/2018	4.90HR	53880	25/06/2018	24/06/2023
52	Stone	Ajay kachardas Bedmutha	Kra. Kaksh/15/2/GAUKHANI/243/2018	1.00HR	7000	23/08/2016	22/08/2021
53	Stone	Shitalkumar Rajendrakumar Patni	Kra. Kaksh-15/2/GAUKHANI/KAVI/47/2018	4.90HR	27789	18/02/2019	02/07/2023
54	Stone	Sangita Prakash Gaikwad	Kra. Kaksh-15/2/GAUKHANI/KAVI/169/2018	2.25HR	26271	28/03/2018	27/03/2023
55	Stone	Sanjay Daulatrao Fadol	Kra. Kaksh-15/2/GAUKHANI/KAVI/325/2018	4.90HR	55468	03/07/2018	02/07/2023

56	Stone	Sidhhar Anil Deshmukh	Kra. Kaksh/15/2/GAUKHANI/75/2017	1.40HR		10/04/2017	09/04/2022
57	Stone	Shailesh Jayesh Pawar	Kra. Kaksh/15/2/GAUKHANI/133/2017	2.81HR	10000	01/07/2017	30/06/2022
58	Stone	Ramesh Kacheswar Jeughale	Kra. Kaksh/15/1/GAUKHANI/428/2016	1.15HR	0	23/12/2016	22/12/2021
59	Stone	Sakhubai Sudam Sangale	Kra. Kaksh/15/1/GAUKHANI/307/2017	0.80HR	0	27/09/2017	26/09/2022
60	Stone	Sanjay Bajirao Sawant	Kra. Kaksh-15/2/GAUKHANI/KAVI/9/2019	1.60HR	14100	08/01/2019	17/02/2022
61	Stone	Balasaheb Gulab Gangurde	Kra. Kaksh-15/2/GAUKHANI/174/2017	1.00HR	0	31/07/2017	30/07/2022
62	Stone	Mangalabai Nagraj Patil	Kra. Kaksh-15/2/GAUKHANI/KAVI/246/2018	1.00HR	9050	28/05/2018	27/05/2023
63	Stone	Ganesh Gorakh More	Kra. Kaksh-15/2/GAUKHANI/KAVI/145/2019	1.60HR	0	11/07/2019	10/07/2024
64	Stone	Dattu Arjun Khairnar	Kra. Kaksh-15/2/GAUKHANI/KAVI/25/2019	2.50HR	0	29/01/2019	28/01/2024
65	Stone	Rahul Devram Pardeshi	Kra. Kaksh/15/2/GAUKHANI/271/2016	1.00HR	3000	17/09/2016	16/09/2021
66	Stone	Mahadu Dashrath Jadhav	Kra. Kaksh-15/2/GAUKHANI/KAVI/488/2018	1.00HR	2500	11/12/2018	10/12/2023
67	Stone	Pradip Sambhajirao Pagar	Kra. Kaksh-15/2/GAUKHANI/KAVI/487/2018	1.00HR	2500	11/12/2018	10/12/2023
68	Stone	Sainath Namdevrao Gidge	Kra. Kaksh-15/2/GAUKHANI/201/2017	0.40HR	0	29/07/2017	28/07/2022
69	Stone	Mohan Popat Kadnor	Kra. Kaksh-15/2/GAUKHANI/199/2017	0.60HR	0	29/07/2017	28/07/2022
70	Stone	Sukdev Dashrath Jadhav	Kra. Kaksh-15/2/GAUKHANI/200/2017	1.00HR	0	29/07/2017	28/07/2022
71	Stone	Nitin Mohanlal Jain	Kra. Kaksh-15/1/GAUKHANI/142/2017	0.80HR	3600	02/05/2017	01/05/2022

72	Stone	Haribhau Sayaji Kekan	Kra. Kaksh-15/2/GAUKHANI/KAVI/1481/2020	2.00HR	2000	03/11/2020	02/11/2025
73	Stone	Mohit Dilip Kolapkar	Kra. Kaksh-15/2/GAUKHANI/KAVI/1449/2020	2.00HR	3000	29/10/2020	28/10/2025
74	Stone	Vijay Narayanrao Khokle	Kra. Kaksh-15/2/GAUKHANI/KAVI/1443/2020	1.20HR	2000	29/10/2020	28/10/2025
75	Stone	Tarabai Narayan Gavit	Kra. Kaksh-15/2/GAUKHANI/KAVI/981/2020	1.00HR	3000	16/12/2020	15/12/2025
76	Stone	Arjun Murlidhar Navale	Kra. Kaksh-15/2/GAUKHANI/KAVI/278/2015/20	1.00HR	5000	31/03/2020	30/03/2025
77	Stone	Pandurang Sakharam Navale	Kra. Kaksh-15/2/GAUKHANI/KAVI/378/2020	4.90HR	56369	18/02/2020	17/02/2025
78	Stone	Nileshbhai Ramjibhai Wachhani	Kra. Kaksh/15/GAUKHANI/267/2020	3.00HR	21814	06/02/2020	05/02/2025
79	Stone	Fransis Cyril Rodrigues	Kra. Kaksh-15/1/GAUKHANI/427/2016	0.82HR		23/12/2016	22/12/2021
80	Stone	Fransis Cyril Rodrigues	Kra. Kaksh-15/1/GAUKHANI/436/2016	1.00 HR		28/12/2016	27/12/2021
81	Stone	Cyril F Rodrigues	Kra. Kaksh-15/GAUKHANI/KAVI/482/2018	1.00HR	10000	07/12/2018	06/12/2023
82	Stone	Nilesh Goverdhan das Agrawal	Kra. Kaksh-15/2/GAUKHANI/KAVI/479/2018	1.60HR	4000	07/12/2018	06/12/2023
83	Stone	Nilesh Agrawal, Vipul Poddar	Kra. Kaksh-15/1/GAUKHANI/KAVI/414/2020	1.60HR		26/02/2020	25/02/2025
84	Stone	Nilesh Govardhan das Agrawal	Kra. Kaksh-15/2/GAUKHANI/KAVI/170/2018	1.62HR	4000	28/03/2018	27/03/2023
85	Stone	Cyril F Rodrigues, Jyud F Rodrigues	Kra. Kaksh-15/2/GAUKHANI/KAVI/467/2018	1.02HR	2500	03/12/2018	02/12/2023
86	Stone	Anil Mavji Patel	Kra. Kaksh-15/2/GAUKHANI/KAVI/477/2018	1.60HR	10000	12/06/2018	12/05/2023
87	Stone	Rajesh Mavji Patel	Kra. Kaksh-15/2/GAUKHANI/KAVI/184/2018	1.54H R	18336	05/04/2018	04/04/2023
88	Stone	Nilesh Goverdhan das Agrawal	Kra. Kaksh/15/1/GAUKHANI/35/2017	1.60H R	16002	14/02/2017	13/02/2022

89	Stone	Bhashan Kautik Pagar	Kra. Kaksh-15/1/GAUKHANI/KAVI/373/2017	2.28H R	0	14/08/2018	13/08/2023
90	Stone	Bhushan Kautik Pagar	Kra. Kaksh-15/2/GAUKHANI/KAVI/372/2018	2.50H R	0	14/08/2018	13/08/2023
91	Stone	Sudam Kisan Dhatrak	Kra. Kaksh/15/2/GAUKHANI/KAVI/23/2021	1.00H R	0	08/01/2021	07/01/2026
92	Stone	Kunal Chaudhari	Kra. Kaksh/15/2/GAUKHANI/KAVI/153/2028	1.00H R	0	19/03/2018	18/03/2023
93	stone	Rahul Madhukar Kedar	Kra. Kaksh-15/2/GAUKHANI/KAVI/1892/2021 Date. 04/01/2021	1.00H R	16500	04/01/2021	03/01/2026

Table no. 2: List of Stone Crusher Holder

Sr. No	Name and address of Stone Crusher Holder	Private Sector/ Government	Village/ Tehsil	Group number	Area
1	Joy Stone Metal Industries Pro. Fransis Cyril Rodrigues	Private Sector	At. Sarul, Tal- Nashik, Dist. Nashik	-	-
2	Me. Jamuna Infra Project Pvt. Ltd. Tarfe Anil Mavji Patel	Private Sector	At. Sarul, Tal- Nashik, Dist.Nashik	-	-
3	Yogesh Totaram Patil	Private Sector	At. Vilholi, Tal- Nashik, Dist.Nashik	-	-
4	Anand Construwell Pvt.Ltd.	Private Sector	At. Sarul, Tal- Nashik, Dist.Nashik	-	-
5	Sharad Vishwanath Aher	Private Sector	At. Ozer, Tal- Niphad, Dist.Nashik	-	-
6	Me. P. B. A. Infrastructure Ltd. Mumbai	Private Sector	At. Ambapur, Tal- Peth, Dist.Nashik	-	-
7	Shree Ganesh Stone Metal Tarfe Shantaram Bahiru Jadhav	Private Sector	At.Rajurbahula, Tal. Nashik Dist.Nashik	-	-
8	Pooja Quari Works, Shree Vaikunthbhai Govindbhai Kaneria	Private Sector	At. Sarul, Tal- Nashik, Dist.Nashik	-	-
9	Shree Mahalaksmi Stone Metal, PRO. PRA.	Private Sector	At. Vilholi, Tal- Nashik, Dist.Nashik	-	-
10	Manohar Vaman Narkhede	Private Sector	At.Sayyadpimpri, Tal- Nashik, Dist. Nashik	-	-
11	Me. Deepraj Construction Company Trafe Anil Indrajeet Bhide	Private Sector	At. Lakhalgaon Tal. Nashik Dist.Nashik	-	-
12	Me. Nirman Buildmat Tarfe Shri Nilesh Govardhandas Agraval	Private Sector	At. Sarul, Tal- Nashik, Dist.Nashik	-	-
13	Vijayrao Suryabhan Gadakh	Private Sector	At. Sinner Tal. Sinner Dist.Nashik	-	-
14	Arunkumar Kisan Fulambarkar	Private Sector	At. Hivergaon Tal. Sinner Dist.Nashik	-	-
15	Nirman Buildmat Bhagidar Shree Nilesh Govardhandas Agrawal	Private Sector	At. Moho Tal. Sinner, Dist.Nashik	-	-
16	Me. Vedansh Stone Metals Pro.	Private	At. Vadgaon Pingala		

	Pra. Shree Shailesh Dagadu Gadakh	e Sector	Tal. Sinner, Dist. Nashik	-	-
17	Jogeshwari Stonecrusher Pro. Nandkishore Khanderao Khatale	Private Sector	At. Vadgaon Pingala Tal. Sinner, Dist.Nashik	-	-
18	Jamuna Infra Project Pvt. Ltd.Trafe Shree Rajesh Mavji Patel	Private Sector	At. Moho Tal. Sinner, Dist.Nashik	-	-
19	B. P. Sangale Construction Tarfe Bhausaheb Punjaji Sangale	Private Sector	At. Moho Tal. Sinner, Dist. Nashik	-	-
20	Jitendra Sudamrao Bodhale	Private Sector	At. Moho Tal. Sinner, Dist. Nashik	-	-
21	Shri. N. M. Pekhle Pvt Ltd.	Private Sector	At. Wadzire Tal. Sinner Dist.ashik	-	-
22	Bharti Balu Bodkhe	Private Sector	At. Wadzire Tal. Sinner Dist. Nashik	-	-
23	Me. Black Stone Industry Tarfe Avanitbhai Giridharbhai Bavariya (Patel)	Private Sector	At. Waghera Tal. Sinner Dist.Nashik	-	-
24	Vijay Balwantrao Patil (Jadhav)	Private Sector	At. Kurnoli Tal. Igatpuri Dist.Nashik	-	-
25	Sayyad Hamid Sadroddin	Private Sector	At. Harsul Tal. Trambakeshwar Dist. Nashik	-	-
26	Me. Bankar Patil And Engineers	Private Sector	At. Murmi Tal. Yeola Dist.Nashik	-	-
27	Sopan Haribhau Athshere	Private Sector	At. Savargaon Tal. Yeola Dist.Nashik	-	-
28	ganesh stone crusher	Private Sector	At. Sarul, Tal- Nashik, Dist.Nashik	-	-
29	Sachin Ramdas Sonawane	Private Sector	At. Sarul, Tal- Nashik, Dist.Nashik	-	-
30	Ganesh Muktaram Revgade	Private Sector	At. Vilholi, Tal- Nashik, Dist.Nashik	-	-
31	Ram Raghunath Patil	Private Sector	At. Sarul, Tal- Nashik, Dist.Nashik	-	-
32	Nitin Bhaskarrao Gaikwad	Private Sector	At. Ozer, Tal- Niphad, Dist.Nashik	-	-
33	Ambadas Madhavrao Aathshere	Private Sector	At. Ambapur, Tal- Peth, Dist.Nashik	-	-
34	Me. Om Gurudev Stone Crusher	Private Sector	At.Rajurbahula, Tal. Nashik Dist.Nashik	-	-
35	Sopan Haribhau Aathshere	Private Sector	At. Sarul, Tal- Nashik, Dist.Nashik	-	-
36	Nitin Bhausaheb Madhvai	Private Sector	At. Vilholi, Tal- Nashik, Dist.Nashik	-	-
37	Me. Nileri Stone Crusher Trafe Rinkesh RavindraNarode	Private Sector	At.Sayyadpimpri, Tal- Nashik, Dist. Nashik	-	-
38	Bhairawnath Trambak Kadlag	Private Sector	At. Lakhalgaon Tal.Nashik Dist. Nashik	-	-
39	Ambadas Popat Ghuge	Private Sector	At. Sarul, Tal- Nashik, Dist. Nashik	-	-
40	Rajendra Ballkrushna Wagh	Private Sector	At. Sinner Tal. Sinner Dist. Nashik	-	-
	Vinod Luthra And Associate	Private	At. Hivergaon Tal.		

41		Sector	Sinner Dist.Nashik	-	-
42	Me. Raj Promoters And Civil Engineers	Private Sector	At. Moho Tal. Sinner, Dist.Nashik	-	-
43	Shriram Stone Crusher	Private Sector	At. Vadgaon Pingala Tal. Sinner, Dist. Nashik	-	-
44	Me. Bedmutha Industries Limited	Private Sector	At. Vadgaon Pingala Tal. Sinner, Dist. Nashik	-	-
45	Shailesh Jayesh Pawar	Private Sector	At. Moho Tal. Sinner, Dist.Nashik	-	-
46	Me. Raghvendra Stone Crusher	Private Sector	At. Moho Tal. Sinner, Dist.Nashik	-	-
47	Ramesh Kacheswar Jeughale	Private Sector	At. Moho Tal. Sinner, Dist.Nashik	-	-
48	Suryakant Shankarrao Patil	Private Sector	At. Wadzire Tal. Sinner Dist.Nashik	-	-
49	Sunil Baliram Sonawane	Private Sector	At. Wadzire Tal. Sinner Dist.Nashik	-	-
50	Dinkar Nimba Patil	Private Sector	At. Waghera Tal. Sinner Dist.Nashik	-	-
51	Prasad Prabhakar Sonawane	Private Sector	At. Kurnoli Tal. Igatpuri Dist.Nashik	-	-
52	Sunandabai Shiwaji Sonawane	Private Sector	At. Harsul Tal. Trambakeshwar Dist. Nashik	-	-
53	Ganesh Gorakh More	Private Sector	At. Murmi Tal. Yeola Dist.Nashik	-	-
54	Dipak Chila Ahire	Private Sector	At. Savargaon Tal. Yeola Dist.Nashik	-	-
55	Sanjay Bajirao Sawant	Private Sector	At. Sarul, Tal- Nashik, Dist.Nashik	-	-
56	Me. Spy Infra Project Tarfe Pravin Totaram Patil	Private Sector	At. Sarul, Tal- Nashik, Dist.Nashik	-	-
57	Shashikant Shridhar Nikam	Private Sector	At. Vilholi, Tal- Nashik, Dist.Nashik	-	-
58	Mangalabai Nagraj patil	Private Sector	At. Sarul, Tal- Nashik, Dist.Nashik	-	-
59	Mahendra Punjaram Patil	Private Sector	At. Ozer, Tal- Niphad, Dist.Nashik	-	-
60	Sunanda Bapu Nikam	Private Sector	At. Ambapur, Tal- Peth, Dist.Nashik	-	-
61	Sunita Kautik Pagar	Private Sector	At.Rajurbahula, Tal. Nashik Dist.Nashik	-	-
62	Dipak Bapurao Sonawane	Private Sector	At. Sarul, Tal- Nashik, Dist.Nashik	-	-
63	Saptashrungi Stone Metal	Private Sector	At. Vilholi, Tal- Nashik, Dist.Nashik	-	-
64	Balasaheb Gulab Gangurde	Private Sector	At.Sayyadpimpri, Tal- Nashik, Dist. Nashik	-	-
65	Dattu Arjun Khairnar	Private Sector	At. Lakhalgaon Tal. Nashik Dist.Nashik	-	-
66	Rahul Devram Pardeshi	Private Sector	At. Sarul, Tal- Nashik, Dist.Nashik	-	-
67	Mahadu Dashrath Jadhav	Private Sector	At. Sinner Tal. Sinner Dist.Nashik	-	-
68	Pradip Sambhajirao Pagar	Private Sector	At. Hivergaon Tal. Sinner Dist.Nashik	-	-
69	Me. Saikrupa Construction Tarfe Bhushan Kautik Pagar	Private Sector	At. Moho Tal. Sinner,	-	-

			Dist.Nashik		
70	Sainath Namdevrao Gidge	Private Sector	At. Vadgaon Pingala Tal. Sinner, Dist. Nashik	-	-
71	Balkrushn Popatrao Shinde	Private Sector	At. Vadgaon Pingala Tal. Sinner, Dist.Nashik	-	-
72	Kedraimata Stone Crusher Tarfe Machindra Kisan Kolpe	Private Sector	At. Moho Tal. Sinner, Dist.Nashik	-	-
73	Osiya Stone Crusher	Private Sector	At. Moho Tal. Sinner, Dist.Nashik	-	-
74	Sukdev Dashrath Jadhav	Private Sector	At. Moho Tal. Sinner, Dist.Nashik	-	-
75	Me. Preksha Stone Metal Works	Private Sector	At. Wadzire Tal. Sinner Dist.Nashik	-	-
76	Sugandha Madhukar Kedar	Private Sector	At. Wadzire Tal. Sinner Dist.Nashik	-	-
77	Pansare Stone Industries Pro. Vasant KarbhariPansare	Private Sector	At. Waghera Tal. Sinner Dist.Nashik	-	-
78	G.V.P.R.Engineers Limied	Private Sector	At. Kurnoli Tal. Igatpuri Dist.Nashik	-	-
79	Me. Tulja Bhavani Enterprises Tarfe Dipak Pundalik Mohite And Janhvi Girhe	Private Sector	At. Harsul Tal. Trambakeshwar Dist. Nashik	-	-
80	Abhiraj Stone Metal Tarfe Sanjay Sharad Jain	Private Sector	At. Murmi Tal.Yeola Dist. Nashik	-	-
81	Me. Jamuna Sands Tarfe Arjunbhai Patel	Private Sector	At. Savargaon Tal. Yeola Dist. Nashik	-	-
82	Bharat Vitthalrao Deore	Private Sector	At. Sarul, Tal- Nashik, Dist.Nashik	-	-
83	Me. Bholeshankar Metals Tarfe Bhagwan Gorakh Patil	Private Sector	At. Sarul, Tal- Nashik, Dist.Nashik	-	-
84	Suyog Innfrastructure Tarfe Ganesh Sunil Kande	Private Sector	At. Vilholi, Tal- Nashik, Dist.Nashik	-	-
85	Vaishnavi Stone Metals Tarfe Sharad Arjun Navale	Private Sector	At. Sarul, Tal- Nashik, Dist.Nashik	-	-
86	Me. Francis Cyril Rordrigues	Private Sector	At. Ozer, Tal- Niphad, Dist.Nashik	-	-
87	Haribhau Sayaji Kekan	Private Sector	At. Ambapur, Tal- Peth, Dist.Nashik	-	-
88	Mahesh Gorakhnath Kale	Private Sector	At.Rajurbahula, Tal. Nashik Dist.Nashik	-	-
89	Mohit Dilip Kolapkar	Private Sector	At. Sarul, Tal- Nashik, Dist.Nashik	-	-
90	Vijay Narayanrao Khokle	Private Sector	At. Vilholi, Tal- Nashik, Dist.Nashik	-	-
91	Me. Lakshmi Stone Crusher Tarfe Indrajeet Jiva Gavit	Private Sector	At.Sayyadpimpri, Tal- Nashik, Dist. Nashik	-	-
92	Lakshmi Stone Metal Tarfe Sangita Gavit And Jyoti Indrajeet gavit	Private Sector	At. Lakhalgaon Tal. Nashik Dist.Nashik	-	-

Details of the mining leases in the Districts:

Sr. No	Lesser name and Address	Leasees loction	Mining Plan Approved date	Environmental Clearance date	Yearly Production according to mining Plan
1	Avinash Madhavrao Patil	Sheshadri Bunglow, Kulkarni Colony, Sharanpur Road, Nashik	29.10.2018	01.11.2018	8000
2	Pratap Nanalal Joshi	At. Sarul Tal. Nashik Dist. Nashik	30.04.2014	01.11.2018	-
3	Sampat Sadashiv Navale	At. Sarul Tal. Nashik Dist. Nashik	30.10.2018	01.11.2018	5000
4	Kacharu Nathu Navale	At. Sarul Tal. Nashik Dist. Nashik	02.08.2014	31.03.2020	-
5	Shantaram Bahiru Jadhav	At. Rajurbahula, Tal. Nashik Dist. Nashik	29.10.2018	01.11.2018	4000
6	Pravin Totaram Patil	501, Sanskrutisneh Appartment, Desuza Colony, Gangapur Road, Nashik	20.04.2016	25.01.2016	6780
7	Ashok Haribhau Jadhav	Hraichandra Niwas, Anandwalli, Gangapur Road, Nashik	5.7.2014	26.06.2013	-
8	Prakash Dattu Ghuge	At. Kotamgaon Tal. Nashik Dist. Nashik	14.08.2014	25.01.2016	-
9	Anil Indrajeet Bhide	Flat No. 28, Indrajeet Appartment, Sahadevnagar, Gangapur Road, Nashik	06.05.2017	28.02.2018	-
10	Hemant Badrinath Ladhha	Sirin Mediz, Gangapur Road, Nashik	29.10.2018	01.11.2018	4000
11	Me. B. M. Chafalkar	Nashik	27.01.2016	18.07.2017	18000
12	Arun Kisan Fulamkbar	10, Ranjit Appartment, Mangalmurti nagar, Nashik- Pune Road, Nashik Road	06.05.2017	28.02.2018	9957
13	Shubangi Prakash Bankar	Pancham Society, J. B. Nagar, Vise Mala College Road, Nashik	26.10.2018	01.11.2018	5000
14	Haribhau Kashinath Fadol	Flat no. 235, Khutwad Nagar, Kamatwade, Nashik	26.10.2018	01.11.2018	8000
15	Motiram Murlidhar Navale	At. Sarul Tal. Nashik Dist. Nashik		01.11.2018	-
16	Kailas Bhagwanta Navale	At. Sarul Tal. Nashik Dist. Nashik		01.11.2018	-
17	Yogesh Amrutlal Badrakiya	Govind Nagar, Flat No. 17, Sonamrut Banglow, Nashik	26.10.2018	01.11.2018	5000
18	Gajanan Bapu Navale	At. Sarul Tal. Nashik Dist. Nashik	30.08.2017	01.11.2018	51625
19	Bharatbhai Govind Kaneria	Prabhu Krupa Banglow, Hari Om Colony, Pavan	29.10.2018	01.11.2018	4000

		Nagar,Nashik			
20	Raman Gulati	Shrinivas Appartment, Beside Nehru Garden, Nashik	26.10.2018	01.11.2018	-
21	Gopal Ramdasji Lal	Nashik	30.08.2017	28.02.2018	9329
22	Nandkishor Khanderao	At. Patole, Tal. Sinner, Dist.	06.05.2017	28.02.2018	13995
	Khatale	Nashik			
23	Bhausaheb Punjaji Sangale	Plot No. 20, Ajay Banglow, Shiwaji Nagar, Tal. Sinner, Dist. Nashik	04.12.2017	28.02.2018	44423
24	Jitendra Sudamrao Bodhale	At. Moh, Tal. Sinner, Dist.Nashik	23.07.2014	26.02.2013	-
25	Shri. N. M. Pekhle Pvt Ltd.	At. Wadzire, Tal. Sinner Dist.Nashik	28.06.2016	26.6.2013	-
26	Padmakar Namdev Sonawane	At. Manegaon, Tal. Sinner Dist.Nahsik	30.04.2014	26.06.2013	-
27	Bharti Balu Bodkhe	At. Wadzire, Tal. Sinner Dist.Nashik	21.06.2014	26.06.2013	-
28	Dashrath Punjaji Avhad	At. Mohdari, Tal. Sinner Dist.Nashik	02.08.2014	26.06.2013	-
29	Ratnakar Namdev Sonawane	At. Manegaon, Tal. Sinner Dist.Nashik	30.04.2014	26.06.2013	-
30	Avnitbhai Giridharbhai Bavariya (Patel)	At. Waghera, Tal. Igatpuri Dist. Nashik	23.07.2015	26.06.2013	-
31	Dilip Vishnu Chaudhari	At. Khambale, Post. Ghoti, Tal. Igatpuri Dist.Nashik	06.05.2017	26.06.2013	11969
32	Mohan Vittahl Shirsath	At. Ghoti, Tal. Igatpuri Dist.Nashik	06.05.2017	26.06.2013	10245
33	Vijay Balwantrao Patil (Jadhav)	At. Ghoti, Tal. Igatpuri Dist.Nashik	06.05.2017	26.06.2013	7138
34	Sayyad Hamid Sadroddin	At. Harsul Tal. TrambakeshwarDist. Nashik	02.08.2014	26.06.2013	
35	Sampat Lakshman Bhandure	Shantai Niwas, Near Shanimandir,Satpur, Nashik	27.07.2018	26.06.2013	2502
36	Me. Bankar Patil And Engineers	At. AngangaonTal. Yeola Dist. Nashik	04.10.2014	28.02.2018	3488
37	Sachin Ramdas Sonawane	At. Gorakhnagar Tal. Yeola Dist. Nashik	11.12.2014	26.6.2013	12500
38	Ganesh Muktaram Revgade	At. Savalivihir Tal. Rahata Dist. Ahamadnagar	26.06.2014	25.01.2016	-
39	Ram Raghunath Patil	Tuljai, Kirtinagar, Nandgaon Road, Manmad, Tal. Yeola, Dist.Nashik	04.10.2014	26.6.2013	-
40	Jayantibhai Kanjibhai Patel	Panchavati, Nashik	22.01.2019	18.11.2019	12600
41	Vasant Karbhari Pansare	At. Wadzire Tal. Sinner Dist.Nashik	29.05.2018	31.03.2020	-
42	Nitin Bhaskarrao Gaikwad	At. Angangaon Tal. Yeola Dist.Nashik	20.10.2014	26.06.2013	9302
43	Ashok Rambhau Zambare	At. Shevge Tal. Yeola Dist. Nashik	11.12.2014	25.01.2016	7037

44	Sopan Haribhau Aathshere	At. Angangaon Tal. Yeola Dist. Nashik	04.10.2014	26.06.2013	-
45	Ambadas Madhavrao Aathshere	At. Angangaon Tal. Yeola Dist. Nashik	04.10.2014	26.06.2013	-
46	Rinkesh Ravindra Narode	Subhadra Nagar, Kopargaon, Dist. Ahamadnagar	04.10.2014	26.06.2013	2325
47	Bhairawnath Trambak Kadlag	At. Moh, Tal. Sinner, Dist. Nashik	26.06.2013	27.12.2018	3500
48	Sagar Dilip Chavan	Plot No. 6, Shiv Sagar Apartment, Thatte Nagar, Gangapur Road, Nashik	30.08.2017	19.01.2018	24528
49	Shailesh Dagadu Gadakh	Sahadev Nagar, Pamping Station, Gangapur Road, Nashik	06.05.2017	28.02.2018	35877
50	Ramesh Chindha Shirsath	Vise Chowk, Gangapur Road, Nashik	03.06.2015	25.01.2016	2000
51	Umakant Subhash Kakad	Sundarban banglow, Mahadev Colony, Makhmalabad Road, Panchavati, nashik	20.04.2018	25.01.2016	53880
52	Ajay kachardas Bedmutha	At. Rasegaon, Tal. Dindori, Dist. Nashik	15.03.2016	25.01.2016	7000
53	Shitalkumar Rajendrakumar Patni	Gat no. 13/6, At. Ramsej, Tal. Dindori, Dist. Nashik	05.07.2018	25.01.2016	27789
54	Sangita Prakash Gaikwad	At. Chausale, Tal. Dindori, Dist. Nashik	30.08.2017	28.02.2018	26271
55	Sanjay Daulatrao Fadol	At. Dhakambe, Tal. Dindori, Dist. Nashik	20.04.2018	25.01.2016	55468
56	Sidhhar Anil Deshmukh	At. Nalegaon, Tal. Dindori, Dist. Nashik	0	25.01.2016	-
57	Shailesh Jayesh Pawar	Chaitali Niwas, Ganesh Nagar, Tal. Kalwan, Dist. Nashik	02.08.2014	25.01.2016	10000
58	Ramesh Kacheswar Jeughale	Shivray Society, Ugaon Road, Niphad, Tal. Niphad, Dist. Nashik	29.12.2014	10.3.2016	-
59	Sakhubai Sudam Sangale	At. Vadzire Tal.Sinner Dist.Nashik	21.06.2014	26.06.2013	-
60	Sanjay Bajirao Sawant	At.Sayane Tal. Malegaon Dist.Nashik	31.05.2016	28.02.2018	14100
61	Balasaheb Gulab Gangurde	At.Dodheshwar Tal.Baglan Dist.Nashik	03.06.2015	18.07.2017	-
62	Mangalabai Nagraj Patil	At.Chaugaon Tal.Baglan Dist. Nashik	06.05.2017	28.02.2018	9050
63	Ganesh Gorakh More	At. Taharabad Tal.Baglan Dist. Nashik	01.07.2017	28.02.2018	-

64	Dattu Arjun Khairnar	At.Nandgaon, Tal. Nandgaon Dist. Nashik	16.08.2018	01.11.2018	-
65	Rahul Devram Pardeshi	At.Nandgaon, Tal. Nandgaon Dist. Nashik	23.06.2015	25.01.2016	3000
66	Mahadu Dashrath Jadhav	At.Girna Nagar, Tal. Nandgaon Dist. Nashik	23.07.2015	25.01.2016	2500
67	Pradip Sambhajirao Pagar	At.Hinganwadi, Tal. Nandgaon Dist. Nashik	23.07.2015	25.01.2016	2500
68	Sainath Namdevrao Gidge	At.Kundalgaon, Tal.Chandwad Dist.Nashik	11.12.2014	26.06.2013	-
69	Mohan Popat Kadnor	At.Kundalgaon, Tal.Chandwad Dist.Nashik	09.11.2015	25.01.2016	-
70	Sukdev Dashrath Jadhav	At.Vadalibhoi, Tal. Chandwad Dist. Nashik	28.10.2014	26.06.2013	-
71	Nitin Mohanlal Jain	Arihant, Opposite Jain Bhavan, Artilary Center Road, Nashik Road, Nashik.	29.05.2018	26.06.2013	3600
72	Haribhau Sayaji Kekan	At.Angulgaon, Tal.Yeola, Dist. Nashik	28.5.2019	25.01.2016	2000
73	Mohit Dilip Kolapkar	At.Anakwade, Tal. Nandgaon, Dist. Nashik	11.09.2020	25.01.2016	3000
74	Vijay Narayanrao Khokle	At.Anakwade, Tal. Nandgaon, Dist. Nashik	24.07.2020	25.01.2016	2000
75	Tarabai Narayan Gavit	At.Behedmal, Tal. Peth, Dist.Nashik	23.01.2019	25.01.2016	3000
76	Arjun Murlidhar Navale	At.Sarul, Tal. Nashik, Dist.Nashik	08.1.2020	27.12.2018	5000
77	Pandurang Sakharam Navale	At.Waghera, Tal. Igatpuri, Dist.Nashik	20.04.2018	08.01.2020	56369
78	Nileshbhai Ramjibhai Wachhani	Krushna Complex, Hirawadi,Nashik	20.04.2018	08.01.2020	21814
79	Fransis Cyril Rodrigues	Banglow No. 6, Kalika Housing Society, Old Agra Road, Nashik	19.5.2014	26.6.2013	-
80	Fransis Cyril Rodrigues	Banglow No. 6, Kalika Housing Society, Old Agra Road, Nashik	10.6.2014	26.6.2013	-
81	Cyril F Rodrigues	Banglow No. 6, Kalika Housing Society, Old Agra Road, Nashik	30.08.2018	01.11.2018	10000
82	Nilesh Goverdhandas Agrawal	Nirman House, L. P. Poddar Marg,	26.10.2018	01.11.2018	4000

		College Road, Nashik			
83	Nilesh Agrawal, Vipul Poddar	Nirman House, L. P. Poddar Marg, College Road, Nashik	17.02.2020	08.01.2020	-
84	Nilesh Govardhandas Agrawal	Nashik	24.07.2017	28.02.2018	4000
85	Cyril F Rodrigues, Jyud F Rodrigues	Banglow No. 6, Kalika Housing Society, Old Agra Road, Nashik	03.05.2017	01.11.2018	2500
86	Anil Mavji Patel	13, 14, 15, Sai Plaza Complex, Near ICICI Bank, Nashik Road, Nashik	26.10.2018	01.11.2018	10000
87	Rajesh Mavji Patel	Nashik	06.05.2017	28.02.2018	18336
88	Nilesh Goverdhandas Agrawal	Nirman House, College Road, Nashik	28.01.2020	31.12.2016	16002
89	Bhashan Kautik Pagar	At.Kalwan, Eklahare Road, Tal.Kalwan Dist. Nashik	31.05.2016	28.02.2018	-
90	Bhushan Kautik Pagar	At.Kalwan, Eklahare Road, Tal.Kalwan Dist.Nashik	11.08.2015	28.02.2018	-
91	Sudam Kisan Dhatrak	At.Deshwandi, Tal. Sinner, Dist.Nashik	29.5.2018	31.03.2020	-
92	Kunal Chaudhari	Talegaon, dindori			-
93	Rahul Madhukar Kedar	Sayyad Pimpri, Nashik	22.01.2019	27.10.2020	16500

Sr. No	Name of Mineral	Name of lesses	Survey No Village Tahsil	Area of mining lease (Ha)	Use captive/ non captive
1	Stone	Avinash Madhavrao Patil	139/11 At.Sarul Tal.Nashik	2.40HR	Captive
2	Stone	Pratap Nanalal Joshi	126/1 At.Sarul Tal.Nashik	1.00HR	Captive
3	Stone	Sampat Sadashiv Navale	138/8 At.Sarul Tal.Nashik	0.45HR	Captive
4	Stone	Kacharu Nathu Navale	124, 125 At.Sarul Tal.Nashik	1.00HR	Captive
5	Stone	Shantaram Bahiru Jadhav	92/1 At.Rajurbahula Tal.Nashik	1.00HR	Captive
6	Stone	Pravin Totaram Patil	138/7 At.Sarul Tal.Nashik	1.20HR	Captive
7	Stone	Ashok Haribhau Jadhav	682 At.Girnare Tal. Nashik	1.00HR	Captive
8	Stone	Prakash Dattu Ghuge	387/1 At.Kotamgaon Tal. Nashik	1.24HR	Captive
9	Stone	Anil Indrajeet Bhide	340/2 At.Lakhalgaon Tal.Nashik	1.61HR	Captive
10	Stone	Hemant Badrinath Ladhha	133 At.Sarul Tal.Nashik	1.20HR	Captive
11	Stone	Me. B. M. Chafalkar	159, 161, 162, 164, 165 At.Moho Tal.Sinner	2.92HR	Captive
12	Stone	Arun Kisan Fulamkbar	368/2, 368/3 At.Hivergaon Tal.Sinner	1.20HR	Captive

13	Stone	Shubangi Prakash Bankar	139/1 At.Sarul Tal.Nashik	0.80HR	Captive
14	Stone	Haribhau Kashinath Fadol	140/2 At.Sarul Tal.Nashik	2.30HR	Captive
15	Stone	Motiram Murlidhar Navale	36/3, 36/2 At.Sarul Tal.Nashik	1.21HR	Captive
16	Stone	Kailas Bhagwanta Navale	148 At.Sarul Tal.Nashik	1.18HR	Captive
17	Stone	Yogesh Amrutlal Badrakiya	126/1 At.Sarul Tal.Nashik	1.00HR	Captive
18	Stone	Gajanan Bapu Navale	124, 125 At.Sarul Tal. Nashik	3.00HR	Captive
19	Stone	Bharatbhai Govind Kaneria	126/1 At.Sarul Tal. Nashik	1.19HR	Captive
20	Stone	Raman Gulati	140/3, 140/4 At.Sarul Tal.Nashik	4.80HR	Captive
21	Stone	GopalRamdasji Lal	185, 186 At.Moh Tal. Sinner	1.06HR	Captive
22	Stone	Nandkishor Khanderao Khatale	519/1, 520/3 At. Vadgaon Pingala Tal.Sinner	2.00HR	Captive
23	Stone	Bhausaheb Punjaji Sangale	148, 151 At.Moh Tal.Sinner	3.96HR	Captive
24	Stone	Jitendra Sudamrao Bodhale	147/2 At.Moh Tal. Sinner	1.00HR	Captive
25	Stone	Shri. N. M. Pekhle Pvt Ltd.	121/1 At.Wadzire Tal.Sinner	0.80HR	Captive
26	Stone	Padmakar Namdev Sonawane	146(143)1 At.Sinner Tal.Sinner	0.40HR	Captive
27	Stone	Bharti Balu Bodkhe	124/1/2 At.Wadzire Tal.Sinner	1.00HR	Captive
28	Stone	Dashrath Punjaji Avhad	21/B At.Mohdari Tal.Sinner	0.74HR	Captive
29	Stone	Ratnakar Namdev Sonawane	119(117)1 At.Sinner Tal.Sinner	0.40HR	Captive
30	Stone	Avnitbhai Giridharbhai Bavariya (Patel)	672 At.Waghera Tal.Ig Atpuri	1.60HR	Captive
31	Stone	Dilip Vishnu Chaudhari	428/1 At.Khambale Tal.Ig Atpuri	0.40HR	Captive
32	Stone	Mohan Vittahl Shirsath	95 At.Biturli Tal.Ig Atpuri	0.84HR	Captive
33	Stone	Vijay Balwantrao Patil (Jadhav)	236 At.Kurnoli Tal.Ig Atpuri	1.46HR	Captive
34	Stone	Sayyad Hamid Sadroddin	118 At.Harsul Tal.Trambakeshwar	0.66HR	Captive
35	Stone	Sampat Lakshman Bhandure	381/2 At.Vadholi Tal.Trambakeshwar	1.00HR	Captive
36	Stone	Me. Bankar Patil And Engineers	151/1 At.P Atoda Tal.Yeola	1.00HR	Captive
37	Stone	Sachin Ramdas Sonawane	137/3 At.Gorakhnagar Tal.Yeola	0.80HR	Captive
38	Stone	Ganesh Muktaram Revgade	52/1 At.Kolgaon Tal.Yeola	2.00HR	Captive
39	Stone	Ram Raghunath Patil	22/2 At.Visapur Tal.Yeola	0.40HR	Captive
40	Stone	Jayantibhai Kanjibhai Patel	395/1 At.Eklahare Tal.Nashik	0.72HR	Captive
41	Stone	Vasant Karbhari Pansare	121/3 At.Wadzire Tal.Sinner	0.80HR	Captive
42	Stone	Nitin Bhaskarrao Gaikwad	141 At.Erandgaon Tal.Yeola	0.80HR	Captive

43	Stone	Ashok Rambhau Zambare	57/2 At.Nilkheda Tal.Yeola	1.65HR	Captive
44	Stone	Sopan Haribhau Aathshere	319 At.Sawargaon Tal.Yeola	1.20HR	Captive
45	Stone	Ambadas Madhavrao Aathshere	500/2 At.Ankute Tal.Yeola	0.40HR	Captive
46	Stone	Rinkesh Ravindra Narode	100/3 At.Gorakhnagar Tal.Yeola	0.40HR	Captive
47	Stone	Bhairawnath Trambak Kadlag	108/2, 108/3 At.Moh Tal.Sinner	0.80HR	Captive
48	Stone	Sagar Dilip Chavan	518/B At.Vadgaon Pingla Tal.Sinner	2.42HR	Captive
49	Stone	Shailesh Dagadu Gadakh	519/3, 520/2 At.Vadgaon Pingla Tal.Sinner	2.74HR	Captive
50	Stone	Ramesh Chindha Shirsath	6/3. At.Ramsej Tal.Dindori	1.30HR	Captive
51	Stone	Umakant Subhash Kakad	6/4. At.Ramsej (Ashewadi) Tal.Dindori	4.90HR	Captive
52	Stone	Ajay kachardas Bedmutha	232 At.Rasegaon Tal.Dindori	1.00HR	Captive
53	Stone	Shitalkumar Rajendrakumar Patni	13/6 At.Ramsej Tal.Dindori	4.90HR	Captive
54	Stone	Sangita Prakash Gaikwad	126 At.Chausale Tal.Dindori	2.25HR	Captive
55	Stone	Sanjay Daulatrao Fadol	108/2/1 At.Dhakambe Tal.Dindori	4.90HR	Captive
56	Stone	Sidhhar Anil Deshmukh	154/1 At.Nalegaon Tal.Dindori	1.40HR	Captive
57	Stone	Shailesh Jayesh Pawar	162/2, 163 At.Ramsej Tal.Dindori	2.81HR	Captive
58	Stone	Ramesh Kacheswar Jeughale	68 At.Vishnunagar Tal. Niphad	1.15HR	Captive
59	Stone	Sakhubai Sudam Sangale	121 At.Wadzire Tal.Sinner	0.80HR	Captive
60	Stone	Sanjay Bajirao Sawant	543 At.Chikhalohol Tal.Malegaon	1.60HR	Captive
61	Stone	Balasaheb Gulab Gangurde	131 At.Dodheshwar Tal.Baglan	1.00HR	Captive
62	Stone	Mangalabai Nagraj Patil	557 At.Chaugaon Tal.Baglan	1.00HR	Captive
63	Stone	Ganesh Gorakh More	474/1 At.Pimpalkothe Tal.Baglan	1.60HR	Captive
64	Stone	Dattu Arjun Khairnar	52/1 At.Girna Nagar Tal.Nandgaon	2.50HR	Captive
65	Stone	Rahul Devram Pardeshi	46/1 At.Girna Nagar Tal.Nandgaon	1.00HR	Captive
66	Stone	Mahadu Dashrath Jadhav	52/2 At.Girna Nagar Tal.Nandgaon	1.00HR	Captive
67	Stone	Pradip Sambhajirao Pagar	49/2 At.Hinganwadi Tal.Nandgaon	1.00HR	Captive
68	Stone	Sainath Namdevrao Gidge	167 At.Kundalgaon Tal.Chandwad	0.40HR	Captive
69	Stone	Mohan Popat Kadnor	248 At.Kundalgaon Tal.Chandwad	0.60HR	Captive
70	Stone	Sukdev Dashrath Jadhav	1447 At.Vadalibhoi Tal.Chandwad	1.00HR	Captive
71	Stone	Nitin Mohanlal Jain	123 At.Wadzire Tal. Sinner	0.80HR	Captive
72	Stone	Haribhau Sayaji Kekan	52/2A, 55/1A/1A At. Angulgaon Tal.	2.00HR	Captive

			Yeola		
73	Stone	Mohit Dilip Kolapkar	27/6, 27/7, 27/8, 27/9 At.Anakwade Tal. Nandgaon	2.00HR	Captive
74	Stone	Vijay Narayanrao Khokle	25/1 At.Anakwade Tal.Nandgaon	1.20HR	Captive
75	Stone	Tarabai Narayan Gavit	24 At.Behedmal Tal.Peth	1.00HR	Captive
76	Stone	Arjun Murlidhar Navale	36/2/1 At.Sarul Tal.Nashik	1.00HR	Captive
77	Stone	Pandurang Sakharam Navale	667 At.Waghera Tal.Ig Atpuri	4.90HR	Captive
78	Stone	Nileshbhai Ramjibhai Wachhani	6/1C, 6/2. At.Ramsej Tal. Dindori Dist. Nashik	3.00HR	Captive
79	Stone	Fransis Cyril Rodrigues	171/1 At.Pimpalad Tal.Nashik	0.82HR	Captive
80	Stone	Fransis Cyril Rodrigues	92/2 At.Rajurbahula Tal.Nashik	1.00 HR	Captive
81	Stone	Cyril F Rodrigues	126/1 At.Sarul Tal. Nashik	1.00HR	Captive
82	Stone	Nilesh Goverdhandas Agrawal	36/2/2 At.Sarul Tal.Nashik	1.60HR	Captive
83	Stone	Nilesh Agrawal, Vipul Poddar	126/1 At.Sarul Tal.Nashik	1.60HR	Captive
84	Stone	Nilesh Govardhandas Agrawal	122/3 At.Wadzire Tal.Sinner	1.62HR	Captive
85	Stone	Cyril F Rodrigues, Jyud F Rodrigues	129 At.Sarul Tal.Nashik	1.02HR	Captive
86	Stone	Anil Mavji Patel	139/7, 139/8 At.Sarul Tal.Nashik	1.60HR	Captive
87	Stone	Rajesh Mavji Patel	223/1 At.Wadzire Tal.Sinner	1.54HR	Captive
88	Stone	Nilesh Goverdhandas Agrawal	122/4 At.Wadzire Tal.Sinner	1.60HR	Captive
89	Stone	Bhashan Kautik Pagar	188, 189 At.Eklahare Tal.Kalwan	2.28HR	Captive
90	Stone	Bhushan Kautik Pagar	84/2, 84/3 At.Dahyane Tal.Chandwad	2.50HR	Captive
91	Stone	Sudam Kisan Dhatrak	312 At.Deshwandi Tal.Sinner	1.00HR	Captive
92	Stone	Kunal Chaudhari	Talegaon, Dindori	1.00HR	Captive
93	Stone	Rahul Madhukar Kedar	Sayyad Pimpri, Nashik	1.00HR	Captive

DETAILS OF ROYALTY OR REVENUE RECEIVED IN LAST THREE YEAR

Sr. No	Financial Year	Target given by State Revenue Department (Rs. In Lac)	Revenue Collected (Rs.in Lac)	Percent Revenue Collected
1	2017-2018	10500.00	8639.27	82.27
2	2018-2019	9500.00	9517.60	100.18
3	2019-2020	9500.00	9653.05	101.61

DETAILS OF PRODUCTION OF SAND OR SAND MINOR MINERAL IN LAST THREE YEAR

Financial Year	Scooping of River Bed Sand in Brass	Scooping of River Bed Sand in Cum.	Scooping Of River Bed Sand in Tonnes
F.Y.2016-17	21228	60075	4615
F.Y.2017-18	2327	6285	506
F.Y.2018-19	Nil	Nil	Nil
F.Y.2019-20	Nil	Nil	Nil

Details of Production of Minor Mineral in last three years DISTRICT – NASHIK				
		FOR THE FINANCIAL YEAR 2017-2018	FOR THE FINANCIAL YEAR 2019-2020	FOR THE FINANCIAL YEAR 2020-2021 (up to dec)
Name of Minerals		Production (Brass)	Production (Brass)	Production (Brass)
1	Gitty/Building Stone	593022	622106	628087
2	Murum	241075	321018	250188
3	Stone Bricks/Bricks earth	-	-	-
4	Ordinary Clay	12310	16297	10333
5	Ordinary Sand		3170	9207
	Total			

List of Letter of Intent (LOI) Holders in the District Along with Its Validity as Per the Following Format:

Sr. No	Lesser name and Address	Lessee Location	Mining Plan Approved date	Environmenta Clearance date	Yearly Production according to Mining Plan
1	Nil	-	-	-	-

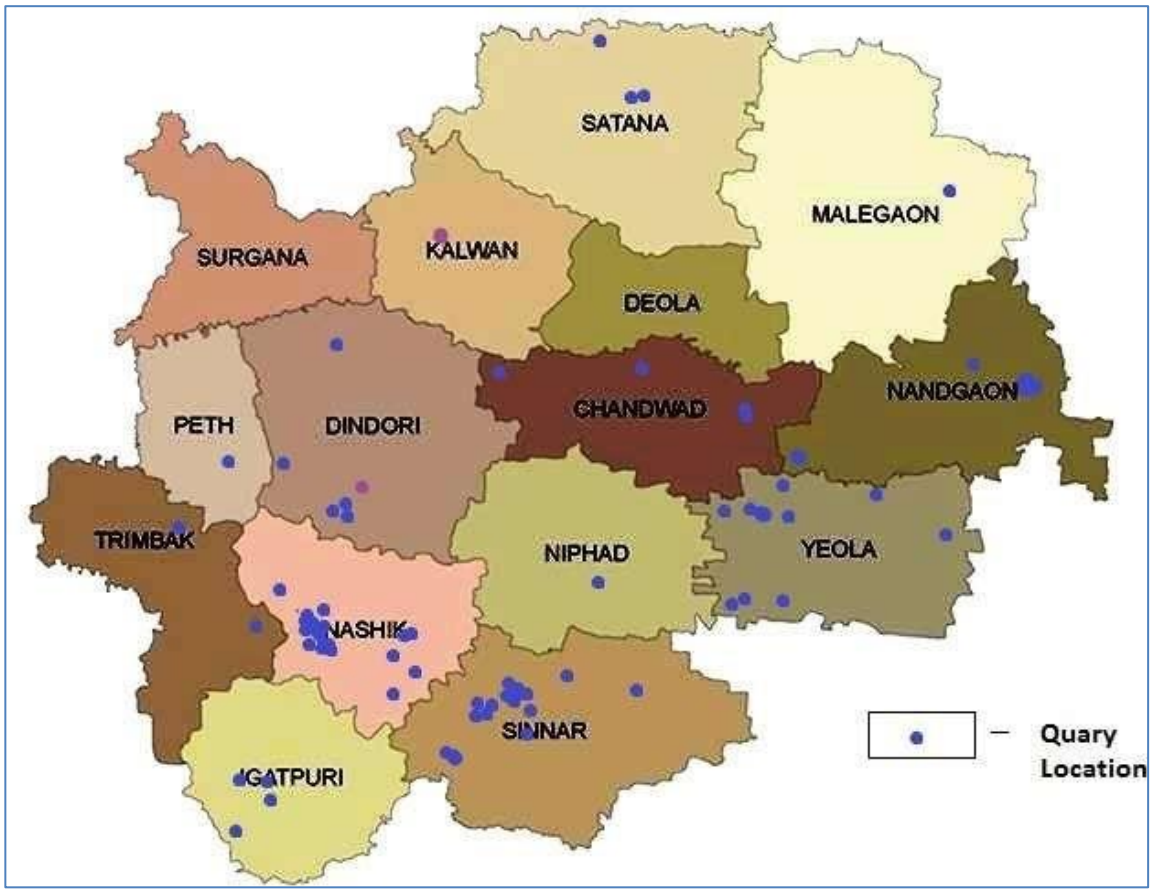
Total minerals reserve available in district:

Mineral	Mineral reserve in Brass
Stone/Murum	1064900
Sand	-

Demand and Supply of the Mineral in last three year:

Details of Production of Minor Mineral in last three years DISTRICT – NASHIK							
		2018-19		2019-20		2020-21 (upto dec)	
Name of Minerals		Demand	Supply (Brass)	Demand	Supply (Brass)	Demand	Supply (Brass)
1	Gitty/Building Stone	622673	593022	653211	622106	659491	628087
2	Murrum	253128	241075	337068	321018	262778	250188
3	Ordinary Clay	12925	12310	17111	16297	10894	10333
4	Ordinary Sand	500000	0	500000	0	500000	2500

Mining Leases marked on District Map:



10. **Mineral Wealth:**

Basalt, sand, weathered basalt Murrum), Gravels, Clay and Agate in small areas.

11. **Quality / Grade of Mineral available in the District:**

Quality of stone available in Nashik district is building grade stone confirming IS standards IS: 7779 (Part II/Sec 3) of 1979.

12.Use of Mineral

Basalt stone is used for building, construction works, and road works as an aggregate.

13. Details of the area of where there is a cluster of mining leases viz. no. of mining leases location:

Sr. No	Clustor	Quarry Name	Qurray Address and village	Gut No	lease holder name
1	Sarul	M. T. Patil Builders And Contractors Pvt. Ltd.	At.Sarul, Tal.Nashik, Dist.Nashik	139/11	Avinash Madhavrao Patil
2		Pratap Nanalal Joshi	At.Sarul, Tal.Nashik, Dist.Nashik	126/1	Pratap Nanalal Joshi
3		Bhagwati Earth Movers	At.Sarul, Tal.Nashik, Dist.Nashik	138/8	Sampat Sadashiv Navale
4		Kacharu Nathu Navale	At.Sarul, Tal.Nashik, Dist.Nashik	124, 125	Kacharu Nathu Navale
5		Pravin Totaram Patil	At.Sarul, Tal.Nashik, Dist.Nashik	138/7	Pravin Totaram Patil
6		Hemant Badrinath Ladhha	At.Sarul, Tal.Nashik, Dist.Nashik	133	Hemant Badrinath Ladhha
7		Me. Kranti Stone Metal	At.Sarul, Tal.Nashik,	139/1	Shubangi Prakash Bankar

			Dist.Nashik		
8		Haribhau Kashinath Fadol	At.Sarul, Tal.Nashik, Dist.Nashik	140/2	Haribhau Kashinath Fadol
9		Motiram Murlidhar Navale	At.Sarul, Tal.Nashik, Dist.Nashik	36/3, 36/2	Motiram Murlidhar Navale
10		Kailas Bhagwanta Navale	At.Sarul, Tal.Nashik, Dist.Nashik	148	Kailas Bhagwanta Navale
11		Shree Ram Stone crusher Company	At.Sarul, Tal.Nashik, Dist.Nashik	126/1	Yogesh Amrutlal Badrakiya
12		Gajanan Bapu Navale	At.Sarul, Tal.Nashik, Dist.Nashik	124, 125	Gajanan Bapu Navale
13		Bharatbhai Govind Kaneria	At.Sarul, Tal.Nashik, Dist.Nashik	126/1	Bharatbhai Govind Kaneria
14		Me. Anilkumar Construction Company	At.Sarul, Tal.Nashik, Dist.Nashik	140/, 140/4	Raman Gulati
15		Arjun Murlidhar Navale	At.Sarul, Tal.Nashik, Dist.Nashik	36/2/ 1	Arjun Murlidhar Navale
16		Cyril F Rodrigues, Jyud F Rodrigues	At.Sarul, Tal.Nashik, Dist.Nashik	126/1	Cyril F Rodrigues
17		Me. Nirman Buildmat	At.Sarul, Tal.Nashik, Dist.Nashik	36/2/ 2	Nilesh Goverdhandas Agrawal
18		Me. Nirman Buildmat	At.Sarul, Tal.Nashik, Dist.Nashik	126/1	Nilesh Agrawal, Vipul Poddar
19		Cyril F Rodrigues, Jyud F Rodrigues	At.Sarul, Tal.Nashik, Dist.Nashik	129	Cyril F Rodrigues, Jyud F Rodrigues
20		Jamuna Infra Projects Pvt. Ltd.	At.Sarul, Tal.Nashik, Dist.Nashik	139/, 139/8	Anil Mavji Patel
21		Shri. N. M. Pekhle Pvt Ltd.	At.Wadzire, Tal. Sinner, Dist.Nashik	121/1	Shri. N. M. Pekhle Pvt Ltd.
22		Bharti Balu Bodkhe	At.Wadzire, Tal. Sinner, Dist.Nashik	124/1 /2	Bharti Balu Bodkhe
23		Vasant Karbhari Pansare	At.Wadzire, Tal. Sinner, Dist.Nashik	121/3	Vasant Karbhari Pansare
24		Me. Preksha Stone Metal Works	At.Wadzire, Tal. Sinner, Dist.Nashik	123	Nitin Mohanlal Jain
25		Me. Nirman Buildmat	At.Wadzire, Tal.Sinner, Dist.Nashik	122/3	Nilesh Govardhandas Agrawal
26		Jamuna Infra Projects Pvt. Ltd.	At.Wadzire, Tal.Sinner, Dist.Nashik	223/1	Rajesh Mavji Patel
27		Me. Nirman Buildmat	At.Wadzire, Tal.Sinner, Dist.Nashik	122/4	Nilesh Goverdhandas Agrawal
28		Gopal Ramdasji Lal	At.Moh, Tal.Sinner, Dist.Nashik	185, 186	Gopal Ramdasji Lal
29		B. P. Sangale Construction	At.Moh, Tal.Sinner, Dist.Nashik	148, 151	Bhausaheb Punjaji Sangale
30		Jitendra Sudamrao Bodhale	At.Moh, Tal.Sinner, Dist.Nashik	147/2	Jitendra Sudamrao Bodhale
31		Bhairawnath Trambak Kadlag	At.Moh, Tal.Sinner, Dist.Nashik	108/2 , 108/3	Bhairawnath Trambak Kadlag
32		Ramesh Chindha Shirsath	At.Ramsej, Tal. Dindori, Dist. Nashik	6/3.	Ramesh Chindha Shirsath
33		Umiyaji Stone Industry	At.Ramsej, Tal. Dindori, Dist. Nashik	13/6	Shitalkumar Rajendrakumar Patni
34		Shailesh Jayesh Pawar	At.Ramsej, Tal. Dindori, Dist. Nashik	162/2 , 163	Shailesh Jayesh Pawar
35		Me. A. B. Wagh And Sundar Madhav Construction J. V.	At.Girna Nagar, Tal. Nandgaon, Dist. Nashik	52/1	Dattu Arjun Khairnar
36		Rahul Devram Pardeshi	At.Girna Nagar, Tal. Nandgaon, Dist. Nashik	46/1	Rahul Devram Pardeshi

37		Mahadu Dashrath Jadhav	At. Girna Nagar, Tal. Nandgaon, Dist. Nashik	52/2	Mahadu Dashrath Jadhav

14. Details of Eco sensitive area:

Enter ecosensitive zone as per moef guideline

Sr.No`	Taluka	Village	Sr.No.	Taluka	Village
1	Baglan	Golwad	73	Igatpuri	Bhanardarawadi
2		Jad	74		Manjargaon
3		Ajande	75		Kurungwadi
4		Bordaivat	76		Jamunde
5		Bhimkhed	77		Gondune
6		Waghambe	78		Pangarne
7		Bahwade	79		Pimpalsond
8		Manur	80		Wangan
9		Salwan	81		Malgonde
10		Malegaon Kh.	82		Sundarban
11		Vathode	83		Mohapada
12		Kelzar	84		Karanjul
13		Tatani	85		Vijaynagar
14		Wadi Chaulher	86		Khuntvihir
15	peth	Amdongara	87		Galbari
16		Sadadpada	88	surgana	Ranvihir
17		Gandole	89		Shrirampur
18		Kapurne	90		Ualdari
19		Kayare	91		Rasha
20		Dabhadi	92		Kotamba
21		Kumbhale	93		Merdand
22		Lavhali	94		Dangrale
23		Sadadpada	95		Pilukpada
24		Belpada	96		Murumdari
25		Garmal	97		Undohel
26		Andhrute	98		Warambhe
27		Tondwa	99		Bhenshet
28		Chaphachapada	100		Khobale Digar
29		Ambapani	101		Khokavihir
30		Kahandolpada	102		Khirdi
31		Kasatvihir	103		Kahandolpada
32		Khadki	104		Dolhade
33		Umbrad	105		Kathipada
34		Borpada	106		Amzar
35		Jambhulmal	107		Valutzira
36		Nachlondi	108		Karwande
37		Murmuti	109		Mothamal
38		Trinalwadi	110		Vangansule
39		Chinchale Khair	111		Patali
40		Malegaoon Bk	112		Bendwal
41		Supale Digar	113		Bhawada
42		Umbardhe	114		Umbhade
43		Sidharthnagar	115		Waghadi
44		Koswan	116		Karanjul
45		Virshet	117	Dindori	Deosane
46		Dhanoli	118		Mokhnal
47		Bahandane (Hatgad)	119		Dekhare
48		Dare Bhanago	120		Palasvihir

49	kalwan	Dharde Digar	121		Goldari
50		Shrungarwai	122	Trimbakeshwar	Chinchohol
51		Mohanbari	123		Khadak Ohol
52		Daregaon (Hatgad)	124		Behedpada
53		Inshi	125		Kadegahan
54		Kosurde	126		Hatlondhi
55		Karambhel (Hatgad)	127		Ozarkhed
56		Amdar	128		Barwal
57		Jamale Pal	129		Chinchwad
58		Dahyane	130		Mahadevnagar
59		Jasmshet	131		Rayate
60		Bhusani	132		Belpali
61		Korade (Otur)	133		Waygholpada
62		Daregaon Wadi	134		Jategaon Br.
63		Pimpri Markanda	135		Mulwad
64		Saptshrungi Gad	136		Rautmal
65		Mehadar	137		Warasvihir
66		Wadale (Wani)	138		Vatakpada
67		Machi Dhodap	139		Deola
68	sinner	Gulwanch	140		Nandgaon
69		Khopdi Bk	141		Velunje
70		Shahapur	142		Metkawara
71		Kedarpur	143		Ambai
72		Khopdi Khu.	144		Chokore
			145		Umbarande
			146		Metghar Killa
			147		Harshewadi
			148		Take Harsha
			149		Pahine
			150		Take Deogaon
			151		Met Yelyachi

15. Impact on the Environment (Air, Water, Noise Soil, Flora & Fauna, Land Use, agriculture, forest etc.) due to mining activity

Air Environment: Anticipated Impacts

Stone/metal mining is carried out by opencast manual method. The air borne particulate matter generated by mining and handling operations, transportation and screening of stone chips at crusher is the main air pollutant. The emissions of Sulphur dioxide (SO2), Oxides of Nitrogen (NOX) contributed by tractor trolley. As the number of trips of tractor trolley is less, the pollutant levels are well within prescribed limits. P District Survey Report is prepared in accordance with Para 7 (iii) (ll) of S.O. 3611 (E) dated 25th July 2018 of Ministry of Environment, Forest and Climate Change Notification, New Delhi reduction of impacts on air environment has been carried out taking into consideration proposed production and net increase in emissions. Air pollution sources in the operating mine are classified into three categories

a. Point sources

b. Area sources

c. Line sources

- Drilling & Blasting and crusher operations of the mine are considered as point sources
- As the cumulative impacts for cluster of stone quarries are to be considered, thus the cluster of stone mines is described as area sources

- Transportation of stone chips from mining pit to crusher is considered as line sources
- The other source of air pollution is the dust generated during the movement of tractor trolley. Water tankers with spraying arrangement will be used for regular water sprinkling on the haul roads to ensure effective dust suppression. The tractor trolley is well maintained so that exhaust smoke does not contribute abnormal values of noxious gases and un- burnt hydrocarbons.

Noise Environment: Anticipated Impacts:

The main sources of noise in the mine are classified as follows:

- Transportation Vehicles/tractor trolley
- Drilling & Blasting
- Crushing & Screening

Exposure of Noise may lead to hearing losses and may impact of mental health of Workers working in the vicinity.

Water Environment: Anticipated Impacts:

Mining activities cause adverse impacts due to mine drainage and siltation due to storm water. The impact on water environment has been considered under the following heads:

- Water consumption
- Mine seepage and impact on ground water
- Impact on surface water bodies
- Storm water management

Soil Environment: Anticipated Impacts

Most of the stone quarries are operated at the barren area where outcrops of basalt are Exposed having very thin layer of soil and overburden. This soil is removed and stackedseparately for plantation around peripheral area of 7.5 m.

Land Use:

These stone quarries are very small in area. After removal of stone these abandoned quarriesare used as water tank for irrigation purpose by lessee.

Forest:

No mining quarry is permitted from 10 km distance from Wildlife Sanctuary boundary in the district.

16. Remedial measures to mitigate the impact of mining on Environment: Remedial measures to mitigate air environment

a. Dust suppression arrangements like water tankers on haulage road and at all dust generation points
b. Dust extractors during crushing/ screening
c. Grading of haul roads time to time and cleaning to remove the accumulated dusty material
d. Regular maintenance of the tractor trolley.
e. Practicing wet drilling.
f. Controlled blasting using delay detonators.

g. Usage of sharp drill bits for drilling of holes
h. Avoiding of overloading of 10T tippers and covering of loaded tippers with tarpaulins during stone chip transportation
i. Dust mask provision to workers
j. Adequate barrier zone will be maintained all along the mine lease boundary and greenbelt will be maintained in the barrier zone
k. Periodical monitoring of air quality to take steps to control the pollutants

Remedial measures to mitigate noise environment:

The operations of the mining equipment, plying of tractor trolley and mine machinery like drill operations are the major sources of undesirable noise in the proposed project area.

The following control measures are proposed for bringing down the noise levels-

l. The vibration due to blasting is minimized by careful planning, supervision and execution of each blast and using milli-second(M.S) delay detonators and proper stemming top regent blow out of holes
m. Green belt will be made around the working areas to screen the noise and also for arresting fugitive dust
n. Maintenance and tuning of machinery would be ensured to reduce undesirable noise
o. Earplugs and earmuffs will be provided to the workmen
p. Limiting the speed of haulage tractor
q. Rubber lining in the chutes of Crushing/ screening plant

Remedial measures to mitigate water environment:

The only pollution anticipated in the surface drainage water is the suspended solids, due to wash off. For this purpose retaining wall with garland drain is proposed. The discharge from this drain is diverted to a settling tank unused pit workings, which allows the sediments to settle. Further to arrest the silted drainage entering into the area down below, check dams and gully plugs shall be erected in the existing natural drains. These check dams also assist in there charge of ground water system. Deliberate attempt has been made to collect this in to a garden drain. This water will be available for uses integrated above. Percolation losses will be negligible.

17. Reclamation of Mined out Area (best practice already implemented in the district, requirement as per rules and regulations, proposed reclamation plan)

As per Maharashtra Minor Mineral Extraction & Development Rule 2013,quarry after exhaustion of mineral and on abandonment, the pit be used as a water tank or be used for fish culture or be used for Municipal solid waste dump yard or the same may use for the groundwater recharge pit. As per requirement of Maharashtra Minor Mineral Extraction & Development Rule 2013 every stone quarry after exhaustion of minerals will plan Final Mine Closure Plan with the approval of Directorate of Geology and Mining GoM and abandon the stone quarry as per method of approval within time frame prescribed and approved by authority.

18. Risk Assessment and Disaster Management Plan:

Risk Assessment

The proposed project involves Stone mining through semi mechanized opencast mining. The anticipated risks are mentioned below:

Inundation

There is no chance of inundation of mine pits from surface waters such as rivers or nallas as it is situated a long away from river. The lease hold area is located in the Kolhapurdistrict of Maharashtra and the area in general receives appreciable amount of rain fall, which is in the range of 1150mm (annual average).

Pit slope & dump slope failures

Mining is restricted to an average depth of 12 m from surface levels. No permanent dumps are proposed.

Blasting

Controlled drilling and blasting using delay detonators is proposed

Surface Fire

There are no ignitable materials in Basalt deposit. Sufficient fire extinguishers of suitable type and make will be made available at strategic locations in the mine lease area to control any fire/explosion incident.

Dust from the screening & crushing operations

The hazard is the inhalation of dust which is created during the screening & crushing operations which may result in the various respiratory diseases to the workers. While it is not presently possible to totally remove the hazard, properly applied control measures can substantially reduce the risk.

The dust generated during the screening & crushing operations can be controlled by providing proper enclosure to the plant area and by installing rain guns at transfer points inside the plant.Water sprinkling at the crushing and screening plant units also forms an effective measure ofcontrolling dust generation. Provision of green belt surrounding the plant area will further suppress the spread of airborne dust to the surrounding atmosphere. The workers engaged inthese operations will be provided with dusk masks.

Noise

Loading, screening & crushing operations give rise to harmful levels of noise.Noise generated by screening & crushing can be well controlled by providing enclosure and thegreen belt. The workers engaged will be provided with ear muffs. The noise created is harmful to anyone who is within a zone around screening & crushingmachines at which the noise level is above that considered to be safe for persons to workwithout having to use control measures. Therefore wherever necessary, the workers engagedwill be provided with ear muffs.

The noise levels around screening & crushing equipment should be measured and the riskassessed. Unless control measures are in place no-one, except those necessary for the work inhand, should be allowed inside the designated noisy area.

In most cases this will be the operators. The risk is highest at older machines. Newer largemachines are provided with sound insulated systems which control the noise levels toacceptable levels.Other control measures will include training operators and providing them with ear protection,although the later should only be seen as an interim precaution until a permanent solution canbe found.

The risk is very high when no control measures are provided. However if all the control measures specified as above are provided the risk will be low.

Loading

The main hazard associated with loading is the Mineral falling on to the loading labour/tractor,tractor toppling over due to uneven ground, failure of hydraulic systems. Good housekeepingpractices, regular cleaning of the haulage roads and regular maintenance of the tractors, loading operations under supervision of competent persons, etc will be done to avoid suchaccidents.

Heavy Vehicles

Tractor used for excavation and loading and 20 tonne dumpers used for mineral and waste transport are the major heavy vehicles in the proposed mine. The main hazards arising from the use of such machines are incompetent drivers, brake failure, lack of all around visibility from the drivers position, access to the cab, vehicle movements particularly reversing, roll over, vibration, noise, dust and maintenance. Those most at risk are the driver and company employees likely to be struck by the vehicle, and drivers of smaller vehicles, which cannot be seen from the cabs of large vehicles. Visibility defects can be reduced by the use of visibility aids such rear view mirrors.

Good maintenance and regular testing are necessary to reduce the possibility of brake failure. An area shall be set out as a testing area where regular tests are carried out on the effectiveness of a vehicles braking system.

Protection guards will be provided for moving parts of the equipment and handling heavy components during maintenance work. Those most at risk will be the users of the system, vehicle operators and also company employees working in such areas may also be at risk.

Explosives

No magazine is within lease hold area. Contractual blasting is proposed.

House keeping

The provision and maintenance of a safe and healthy workplace is the most basic principle of health and safety. Dirty and untidy workplaces or walkways contribute to a very large proportion of trip and fall accidents. In the context of surface mining the provision of well defined roadways and walkways clear of obstruction and regular cleaning up of spillage will greatly reduce the potential risk for this type of accidents. Lack of maintenance may lead to roadways and walkways being unsuitable for use.

The Work

The application of risk assessment depends upon a full understanding of all aspects of the job being undertaken. In carrying out a risk assessment in relation to a particular task the evaluation must include a review of the knowledge, experience and training of those persons carrying out the work.

Personal Competence

It follows that the knowledge, experience and training of personnel involved in work is critical to evaluate any risk assessment. A knowledgeable, experienced well-trained and competently supervised workforce will be at a lower risk of accidents occurring than a poorly trained and badly supervised workforce. For this purpose all the supervisory and managerial staff qualified under MMR 1957 shall only be employed.

Co-ordination

A competent person should be given the responsibility for overseeing and coordinating work

asrequired under the Maharashtra Minor Mineral (Extraction &Development) Rule 2013. It is essential that the coordinator ensures that everyoneengaged in the work is capable and understands the role of others and their responsibility foreach other. This is particularly important when contract workers undertake part or all of thework to be carried out.

Equipment's

The prerequisite for the risk assessment is that equipment's are suitable for the work beingundertaken and have been designed, manufactured and installed to at least the minimumstandards for health and safety.Failure to meet the standard will result in people being at higher risk and remedial steps haveto be implemented to compensate the shortfall. Other interim arrangements should beimplemented to protect any persons exposed to latent danger. Maintenance of plant andequipment to agreed specification, whether original or upgraded to the latest health and safetystandards, is essential.

Dangerous parts of machinery

Parts of machinery such as revolving parts, in running nips and entrapment between reciprocating parts as defined in European and National standards should be protected meetingthose standards.

Health hazards

For the purposes of this document health hazards should be interpreted as being harmful dustand noise which is emitted during surface mining operations, as well as the handling of heavyloads.While complete elimination and often suppression at source is not practicable, in many cases,the normal threshold values of health standards should be made applicable.

Personal Protective Equipment (PPE)

The PPE should be of good construction, where ever possible ISI certified, suitable for thehazard e.g. a dust respirator fitted with the correct filter to capture the particular hazardousdust and maintained to recommended standards. As personal protective equipment onlyaffords limited protection it should only be used as a last resort and then as an interimarrangement until other steps are taken to reduce the risk of personal injury to an acceptablelevel.

Traffic Movement

The traffic movement should only take place within designated areas and over suitableRoadways. Adopting one way traffic movement systems are preferred to two directional trafficsystems. The risk of accidents due to traffic movement is much less with a one way traffic.Whenever mineral is mined the first step in winning the product is the preparation of the site.

The four main stages in the site preparation are:

1. Planning
2. Surveying
3. Clearing of site
4. Laying out

Planning

The risk of injuries can be significantly reduced if sufficient regard is given to health and safety at the planning stage of a new or developing mine. Using trained drivers can largely eliminate the danger of being struck by large moving vehicles and providing the vehicles with

suitable appliances, such as aids to ensure the driver has all round visibility. Designing and implementing one-way traffic systems and ensuring that open edges of roadways are suitably protected with parapet wall to prevent accidental driving off the edge can further reduce the danger. Additionally, ensuring that the vehicles are properly maintained in good working condition, particularly the braking system will go a long way to help the driver control the vehicle. Well-designed access and working platforms will also reduce the possibility of a fall.

Surveying

Surveying has its hazards, for example surveyors are likely to be seriously injured if they fall from heights or are thrown out of overturning vehicles. Since the hazards are created by ground formation it is unlikely that they can be removed.

Those normally at risk would be the surveying team of the surveyor and assistants. Individuals working at the edge of vertical face or on very steep undulating ground are at greater risk than those working on level ground. Driving over steep rough terrain is more dangerous than driving over gentle slopes. It is necessary to give clear positive instruction and ensure vehicles used to gain access to the areas to be surveyed are well maintained and suitable for the terrain over which access is to be gained.

Clearance

Clearance covers all the activities associated with preparing a site ready for laying out primary roads for working a face. The primary hazards are being struck by falling trees and debris from demolition of buildings, use of power saws, equipment used in the removal of the top layers of earth and trucks used to convey it to storage areas, and the possibility of being struck by trucks. The hazards are created in clearing the site. While the clearing of the site cannot be avoided adopting the safest methods to carry out the work can control hazards. For example, fully trained persons should be used in tree felling operations. Well-maintained fully protected power saws should be used and the operatives should wear full personal protection e.g. safety helmets, ear defenders, face shields, gloves, full protection for legs (trousers) and boots.

Laying out

There are many different ways of opening and development of mines but careful planning particularly concerning the mine layout will reduce hazards. Well maintained equipment is essential to reduce the risk of injuries. If suitable equipment is not used, for example if poor and badly constructed scaffolding is used there is a much higher probability of persons falling from heights or the scaffolding collapsing than if good properly constructed scaffolding is used. To reduce the risk of injuries while using large earth moving equipment and vehicles the equipment drivers and those giving signals should be well trained. The lack of training and competence in the use of such equipment is the biggest cause of such type of accidents.

Disaster Management Plan

The following natural/industrial hazards may occur during normal operation.

- Inundation of mine pit due to flood/excessive rains;· Slope failure of pits
- Accident due to explosives;
- Accident due to heavy mining equipment; and

In order to take care of above hazard/disasters, the following control measures have been

adopted.

Checking and regular maintenance of garland drains and earthen bunds to avoid any Inflow of surface water in the pit

- Provision of suitable pumps for pumping out water from the pit during heavy rains
- Entry of unauthorized persons is prohibited
- Firefighting and first-aid provisions in the mines office complex and mining area
- Provisions of all the safety appliances such as safety boot, helmets, goggles etc. are made available to the employees and regular check for their use
- Training and refresher courses for all the employees working in hazardous premises
- Working of mine, as per approved plans and regularly updating the mine plans
- Cleaning of mine faces is regularly done
- Regular maintenance and testing of all mining equipment as per manufacturer's Guidelines Suppression of dust on the haulage roads
- Increasing the awareness of safety and disaster through competitions, posters and other similar drives. The management is able to deal with the situation efficiently to reduce confusion keeping in view of the likely sources of danger in the mine.

Out Line of Disaster Management Plan

The purpose of disaster management plan is to restore the normalcy for early resumption of mining operation due to an unexpected, sudden occurrence resulting to abnormalities in the course of mining activity leading to a serious danger to workers or any machinery or the environment.

System of communication

An internal communication system for the department head and to their line of command should be maintained. Having the telephone no's and addresses of adjoining mines, rescue station, police station, Fire service station, local hospital, electricity supply agency and standing consultative committee members is another essential aspect.

Consultative committee

A standing consultative committee of 3 persons headed by Mines Manager will be formed.

Facilities & Accommodation

Accommodation and facilities for medical Centre, rescue room and for various working groupswill be provided.

First Aid & medical facilities

The mine management is having first aid for use in emergency situation. All casualties would beregistered and will be given first aid.

Stores and equipment

A detailed list of equipment available its type & capacity and items reserved for emergency willbe maintained.

Transport services

A well-defined transport control system will be provided to deal with the situation.

Functions of public relations group

A cordial relation with government officials and other social service organization and working groups shall be maintained. To liaise with representatives of the mine workers to ameliorate the situation of panic, tension, sentiments, grievances and misgivings created by any disaster. To ameliorate the injured, survivors and family members of affected persons by providing material, moral support, finance and establishing contact with relatives of victims.

Security

Strict manning of security posts during the disaster will be done.

Catering & Refreshment

Arrangements will be made for the victims, rescue teams and others for their Catering & Refreshment services.

Plantation and Green Belt Development in respect of leases already granted in the district:

District administration on yearly basis collects the compliance w.r.t. green clearance along with photographic evidences of plantation and safety measures the green belt development plan along with quarry owners individually and with their associations. District has developed a very handsome inventory of trees with pollution control measure implementation system.

19. REFERENCE:

1. Data collected of actual sand Excavation from DMO Office, Nashik.
2. Sustainable Sand Mining Management Guidelines 2016, issued by Ministry of Environment, Forest and Climate Change
3. Government Notification on Sand Mining Policy dated 2019.
4. Geology and Mineral Resource of Maharashtra by Geological Survey of India, Miscellaneous Publication 2014.
5. Other references taken from the Wikipedia & Google Search.