DISTRICT SURVEY REPORT

GRANITE

KANCHIPURAM DISTRICT

DISTRICT SURVEY REPORT FOR MINOR MINERALS
KANCHEEPURAM DISTRICT

Prepared as per the Ministry of Environment, Forest and Climate Change MoEF & CC

Gazette Notification S.O.3611 (E) Dated 25.07.2018.

MAY 2019

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KANCHEEPURAM DISTRICT

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I. INTRODUCTION

The Ministry of Environment, Forest Climate Change vide its notification in **S.O.3611 (E) dated 25.07.2018** had laid down the procedure for preparation of District Survey Report for Sand mining (or) River Bed Mining and of minor minerals other than sand mining (or) River bed mining. In pursuance to the said notification, the District Survey report of Kancheepuram District has been prepared. The objective of preparation of District Survey Report is to identify the mineral hearing areas. Quantity the available resources and there by carryout sustainable quarry operations with respect to economyand environment.

This District Survey report is a guide for systematic, scientific and sustainable utilization of natural resources, so thatpresent and posterity may be benefitted at large. The purpose of District SurveyReport (DSR) is "Identification of areas of aggradations or depositionwhere mining can be allowed; and identification of areas of erosion and proximity to infrastructural structuresand installations where miningshould be prohibited", in respect of Sand. In respect of other minor minerals all that parameters required for scientific and sustainable mining based on the nature and type of minor mineral have been incorporated

The District Survey report (DSR) contain mainly datapublished and endorsed by various Departments and websites aboutGeology of the area, Mineral Wealth details, Details of Lease and Forest, Rivers, Soil, Agriculture, Road, Transportationand Climate etc.,Miningactivity in the

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District along with Revenue of Minerals. This report alsocontains details of Forest, Rivers, Soil, Agriculture, Road, Transportationand Climate etc.,

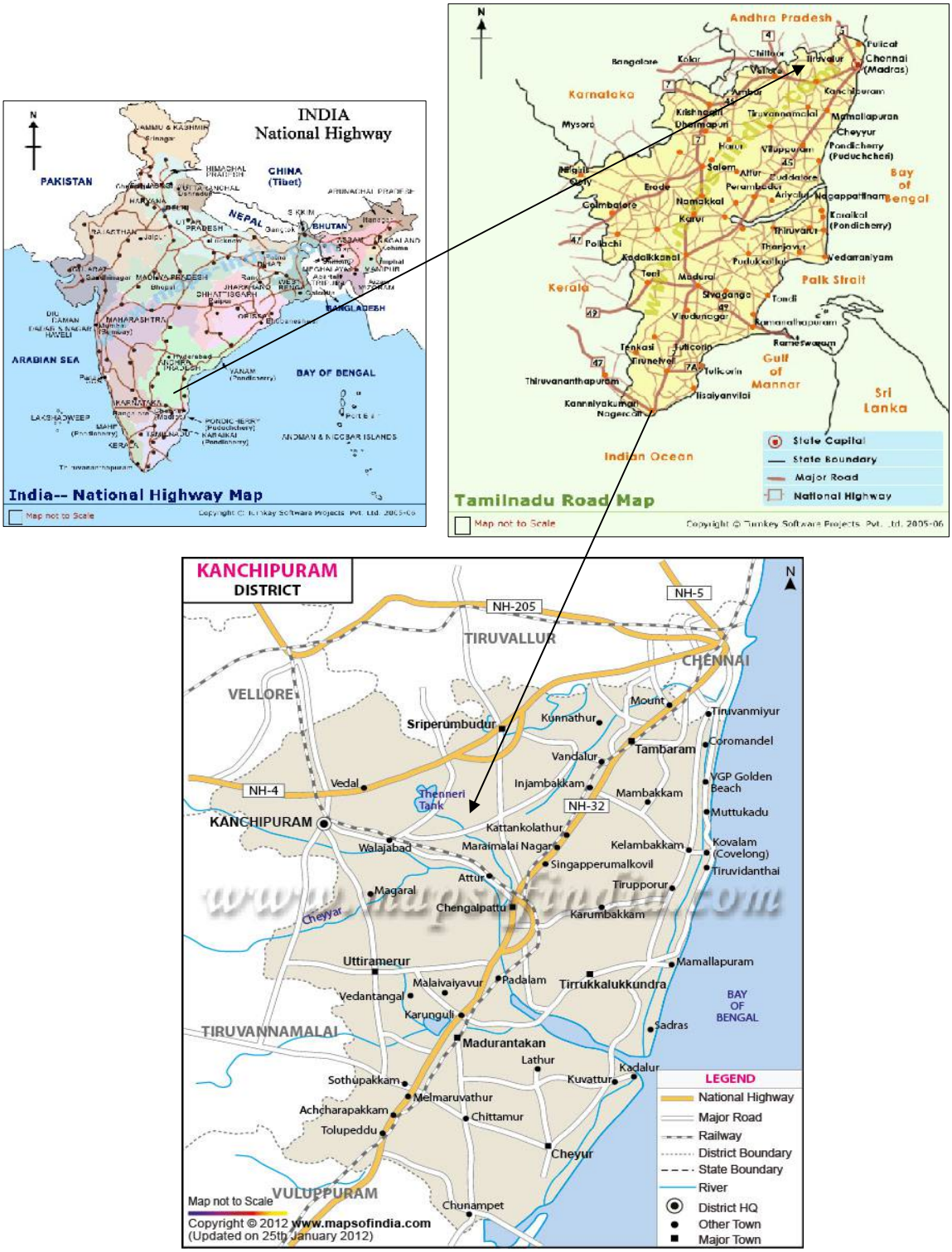

Fig. No. 1. Location of Kanchipuram district.

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Kancheepuram was the historical capital of Pallavas, having magnificent temples and unique architectural beauty that bears testimony to its ancient glorious of Dravidian heritage. It is also known for its richest silk. Mamallapuram, Uthiramerur and Sriperumpudur are some of the other historical places in the district. The district is also known for the numerous electronic and software units in the IT corridor, Giant car manufactures like ford, Hyundai, BMW, Renault Nissan, BharathBenz Telecommunication multinationals like Nokia and Flextronics and the famous glass manufacturer Saint Gobain. Kancheepuram district is having administrative divisions of 8 taluks, 13 blocks, 648 panchayats and 1137 villages as detailed below:-

Sl. No	**Taluk**	**No. of Villages**	**Block**	**No. of Villages**
1.	Kancheepuram	207	1.Kancheepuram 2.Walajabad	91 116
2	Uthiramerur	124	2 Uthiramerur	124
3	Madurantakam	195	1.Madurantakam 2.Acharapakkam	101 94
4	Cheyyur	128	1.Chittamur 2.Lattur	65 63
5	Sriperumpudur	192	1.Sriperumpudur 2. Kundrathur	101 91
6	Tambaram	66	St.Thomas Mount	66
7	Chingleput	198	1. Kattankolathur 2. Tiruporur	101 97
8	Tirukkalukkundram	104	Tirukkalukkundram	104
	Total	**1214**		1214

Table No. 1. Overall view of Kanchipuram District.

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II. Overview of Mining Activity in the District

Granite, Rough Stone / Building Stones, River Sand, Silica Sand and Clay are the minerals available in Kancheepuram district.Mining activities based on these minerals are very less. However, numerous ordinary rough stone quarries are operational for production of construction material in many of the areas in the district.

Procedure for Grant of lease for Rough stone quarries

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The office of the Assistant Director, Department of Geology and Mining is functioning under the control of District Collector, Kancheepuram, The Assistant Director, Geology and Mining is assisting the District Collector in the Mineral Administration works.

III. General Profile of The District

The district is situated on the Northern side of east coast of Tamil Nadu. It is bounded on the east by Bay of Bengal, Chennai City and Thiruvallur District on thenorth, Vellore and Thiruvannamalai Districts on the west and Villupuram District andUnion territory of Puducherry on the south. It lies between 11° 00' to 12° 00’ North latitudes and 77° 28' to 78° 50' East longitudes. The district has a total geographical area of 4433 Sq. Kms and coastline of 87.2 Kms.

Kancheepuram district generally experiences hot and humid climatic conditions. The district receives the rain under the influence of both southeast and northeast monsoons. High relative humidities between 58 and 84% prevail throughout the year. Relative humidity is maximum in the morning and minimum in the evening. Higher rates of relative humidity are observed between November and January i.e., 83 to 84%. In the months of June, the humidity is lower i.e., around 58%. Average relative humidity in the morning and evening 74 and 64%.The minimum and maximum temperatures are 20°C & 37°C. The day time heat is oppressive and the temperature is as high as 43°C. The district has a reserved forest of 23855.84 Hectares. Cashew is the only major forest produce. Total out-turn cashew in 2010-11 was 5.282 Tonnes.

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Other statistics of the district is given below:

S.No	Particular	Unit	Statistics
1	Geographical features		
(A)	Geographical Data		
	i) Latitude		11.00’ - 12.00’
	ii) Longitude		77.28’& 78.50’
	iii) Geographical Area	Hect.	4,43,210
(B)	Administrative Units		
	i)Sub divisions	Nos.	4
	ii)Tehsils / Taluks	Nos.	11
	iii)Revenue Firkas	Nos.	68
	iv)Blocks	Nos.	13
	v)Town Panchayats	Nos.	17
	vi)Village Panchayats	Nos.	633
	vii)Municipalities	Nos.	9
	xi)Revenue villages	Nos.	1,112
2.	**Population(2011)**		
(A)	Sex-wise		
	i)Male	Nos.	20,10,309
	ii) Female		19,80,588
(B)	Rural Population	Nos.	14,53,072 (36.41%)
3.	**Agriculture**		
A.	Land utilization		
	i)Total Area	Hect.	4,43,210.000
	ii)Forest cover	Hect.	23855.840
	iii)Non Agriculture Land	Hect.	147350.195
	v)Cultivable Barren land	Hect.	11007.989
4.	**Forest**		
	(i)Forest	Hect.	23,855.840

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5.	**Livestock, Poultry & Fisheries**		
A.	**Cattle**		
	i)Cattle	Nos.	6,21,651
	ii)Buffaloes	Nos.	1,54,434
	i)Goats	Nos.	3,89,190
	ii)Sheep	Nos.	3,08,342
	iii)Poultry	Nos.	12,32,833
	iv)Milk Production	Ltr.	235.529
	v)Egg Production	Lakhs	630.436
	vi)Fish Catch– Inland Marine	Tonne	7,948.54
	Railways, Roads, Communication, health and Education a. Railways		
	i)Length of rail line	Kms	221Kms
	(a)National Highway	Kms	317
	(b)State Highway	Kms	2,700.120
	(c)Corporation & Municipal Roads	Kms	1,082.717
	(d)Panchayat Union & Panchayat Roads	Kms	4,757.412
	(e)Town Panchayat Roads	Kms	363.560

Table. No. 2 Other statistics of Kanchipuram District

In Kanchipuram district, the bovine population is high in the District and therefore, the Meat gravy concentrate industry having bright future here. The District has achieved self-sufficiency in the milk production and the surplus milk can be used to produce dairy products. The fruit-based nutritious beverages are gaining popularity and are in good demand in urban areas. There is good scope for the units like mango pickles, Soft drinks, Chocolates and Chutneys. There is a good demand for dried fish, fish meal, dried shrimp, canned shrimp

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and frozen shrimp in domestic as well as export market. There is good scope for exporting these products to countries like Spain, Japan, Australia, Italy, Belgium, Hongkong, U.K. U.S.A. Sri Lanka, Saudi.

The Rain Water Harvesting Structures with public participation has begun to show results. The important rivers in the District are Palar, Cheyyar and Vegavathi, Maduranthagam, Thenneri, Damal, Kolavai Sriperumpudhur, Uthiramerur, Pillaipakkam and Sembaranmpakkam are the few lakes in the District.

The District leads in the production of fruits Vegetables and flowers in the State. The major horticultural crops are Mango, Cashew and Banana. It has been proposed to set up a Mini Flower Auction Centre at Pallikaranai near Chennai Airport at a cost of Rs.15.00 crores to cater to the needs of flower growers to market their produce both in domestic and international markets. Kattankulathur, St. Thomas Mount, Kundrathur and Walajabad are the blocks where the potentials can be exploited by undertaking agro/food processing activities. Kanchipuram District is rich in fish resources. Potential for exploitation of marine fisheries in the District is high with the coastal line of 87.2 Km.

The District has three large scale car production units with foreign collaboration at Sriperumbudur (HYUNDAI), Maraimalainagar (FORD) and Oragadam (Renault Nissan) the giant glass- manufacturing unit of Saint Gobain Glass factory near Sriperumbudur providing employment to many people, apart from a number of ancillary units.

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The dispersal of Small Scale Industries units reveals that the concentration of SSI units is in St. Thomas Mount, Kanchipuram and Kattankulathur Blocks. The major Khadi Industries include Cotton, Polyester khadhi, Silk and woolen units are in Kanchipuram District. More than 5,000 families are engaged in silk industry and their spectacular creations are marketed by a number of co- operative society.

Kanchipuram District is served by a network of 33 railway stations and 233 Kms. of the total route length shared by broad gauge (139 Kms) and meter gauge (94 Kms).

Bhabha Atomic Research Centre (BARC), has developed comprehensive technology for industrial operations in fuel reprocessing and waste management. The range of activities promoted by the Industrial Estates are vast - while Dr. Vikram Sarabai Estate at Thiruvanmiyur houses electronic industries, the Alathur Industrial Estate houses pharmaceutical industries and the Thirumidivakkam industrial estate houses leather products and finished leather.

A considerable number of Granite polishing units are concentrated in Echambakkam, Sembarambakkam, Chenglepattu and Madurantakam areas. Under the control of Industries department 8 cooperative societies are functioning and the Irula cooperative society has unique feature (Snake- antivenium production centre).

The District provides enough scope for the development and growth of industries engaged in Textiles Garments, Leather Products, Granites, Silk Alloy castings, Machine Tools and Automobile products

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Kanchipuram is a world-renowned silk city. Silk weaving in the handloom sector is clustered in and around Kanchipuram, which is famous for silk sarees. Kanchipuram's exquisite silk sarees are woven from pure mulberry silk in contrasting colours and have an enviable reputation for texture, lustre, durability and finish.The District has well developed silk and handloom weaving industries in the co-operative sector.

IV. Geology and Mineral wealth of the district

An outline on Geology of Tamil Nadu

Geologically, Tamil Nadu chiefly comprises Archaean hard rocks formation except along the coast belt where marine sedimentary formations belonging to Cretaceous and Tertiary ages, covered by recent alluvium, are found to occur. Mineral occurrences of different origin have been recorded in all these formations. Archaean rocks mostly consist of Gneisses, Schists and Charnockites. The notable geological formation found in Tamil Nadu is Cuddalore formation belonging to Tertiary age. These formations are found to have plant fossils. Besides this, the occurrences of Upper Gondwana formation also noticed near Sriperumbudur (close to Chennai) and Satyavedu (A.P. State). These are composed mainly of white to pink clays, shale and felspathic sandstone.

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Geological map of Tamilnadu and Puducherry is given below:

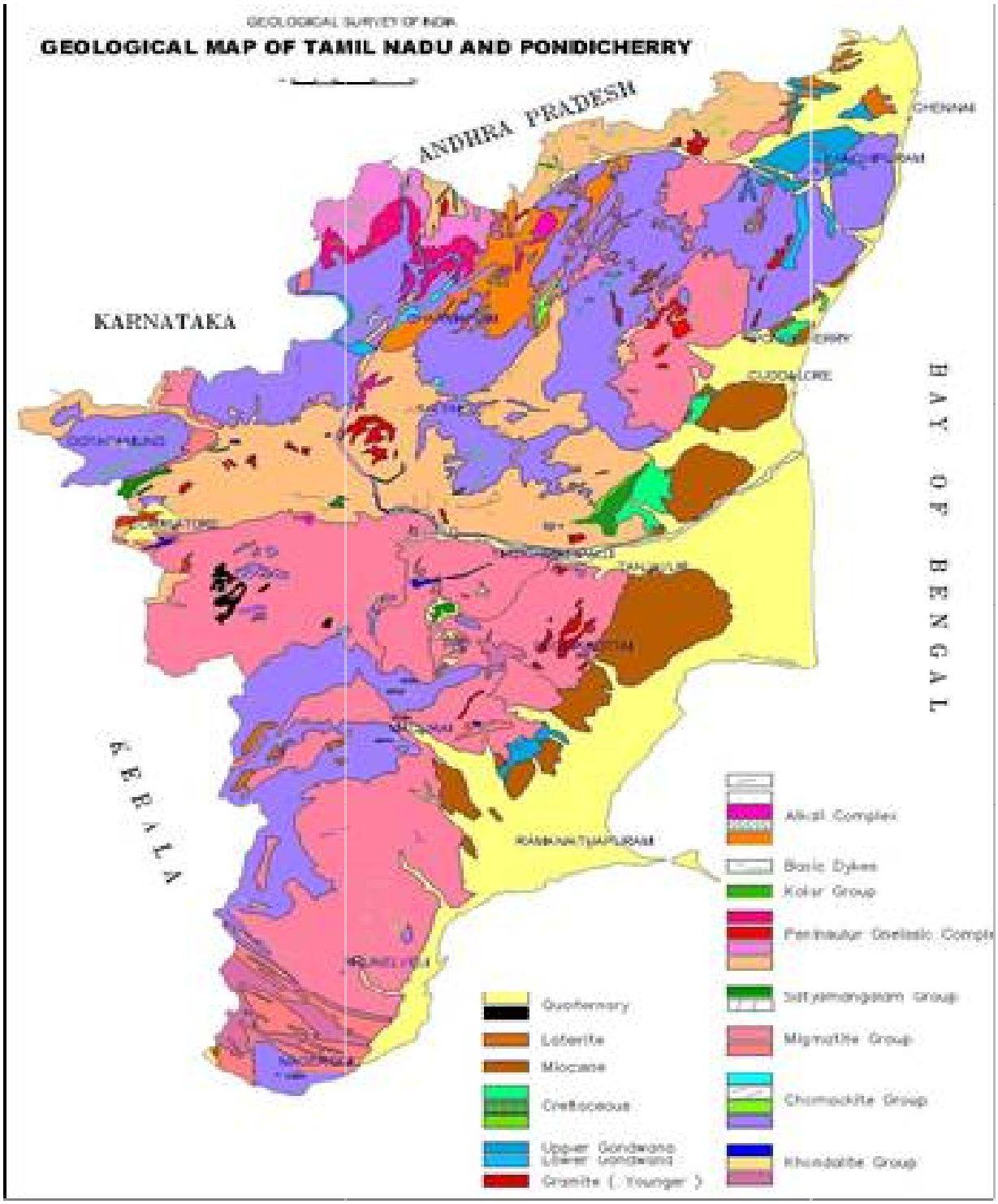

Fig. No. 2 Geological map of Tamil Nadu. (Source:Misc.Pub. 30, GSI, Chennai)

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Geology of Kanchipuram District

General Stratigraphy of the area:

Age		Formation	Group	Rock Types
Cainozoic	Recent to Late Pleistocene			Fluvial/Marine
				Laterite
	Early to middle Pleistocene			Quartz conglomerate singles (Kanchipuram gravels)
				Calcareous Gritty Sandstone and clay
	Mio Pliocene	Cuddalore		Sandstone
Mesozic	Lower Cretaceous	Sriperambudur		Sandstone/Shale/Conglomerate
Paleozoic	Permian	Talchir	Lower Gondwana	Khaki Green Shale/Conglomerate/Sandstone
Archaean		Younger Intrusives		Basic Dyke
			Migmatite Complex	Migmatite Gneiss
			Charnockite	Magnetite Quartzite Pyroxene Granulite Charnockite
			Khondalite	Garnet Sillimanite Gneiss

Kanchipuram area is endowed with a complex geological set up with crystalline rocks occurring in the Southern part of the area and the Northern part of the area The crystalline rocks occur at depths covered by sedimentary formations ranging from Gondwana to Recent. The depth at which the crystalline rocks occur progressively increase towards north. The sedimentary cover sequence is named as Palar basin and the thickness of the sediments is as high as 300 m in the northern part. The

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eastern part comprises unconsolidated sediments of fluvio-marine and marine origin. The Precambrian crystalline rocks are represented by charnockites and contain several enclaves mafic granulite. Garnetiferous biotite gneisses, leptinites and banded magnetite quartzites are also encountered as linear bands. Intrusion of dolerite dykes are also found.

GEOLOGY:

The area exposes crystalline rocks of Archaean age and sedimentary rocks of Gondwana Supergroup and the Cuddalore Formation belonging to Mio-Pliocene age. A gravel and shingle bed locally known as Kanchipuram Gravels belong to the Pliocene to lower Pleistocene age. The laterite and alluvium are related to Quatemary age.

The Archaean rocks are represented by Khondalite Group, Charnockite Group and Migmatite complex. Garnet Sillimanite Gneiss is well exposed in the Northeastern part of the district in Pachchamalai hill at Chrompet, Parangimalai and Southeast of Pallavaram. Charnockite in the predominant country rock and the type area for Charnockite is St. Thomas Mount at Pallavaram Taluk. The name Charnockite, St. Thomas Mount "Originated from the use of the rocks quarried from a central band in the St. Thomas Mount for the Tomb stone of job Charnockite, the founder of Kolhath in 1679 .In Pachchamalai hill it is essentially a quartz sillimanite rich rock with minor amount of felspar. In Tambaram hill, chamockite and metapellite are intimately interbanded, particularly along the hinge zones. Isolated outcrops are also seen on either side of National

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Highway No.45 near Kadaperi. The major part of the district is occupied by charnockite with enclaves of khondalite, leptynite and BMQ seen around St. Thomas Mount, east of Guduvancheri, Madurantakam, Paler and around Tirukkalukkunram. St. Thomas mount is an extensively studied type area for the Chamockite. It is a typical rock with bluish grey quartz, hard and compact, jointed showing recognisable foliation at places. The outcrop stands out prominently as isolated cluster of hills.

The area in and around Pallavaram, Tambaram and Pulikaradu contain several bands of pyroxene granulite. The chamockite is traversed by narrow dolerite dykes which stand out prominently as dark low ridges and seen for a few metres.

The lower Gondwana sediments (Talchirs) overlie the Archaean rocks unconformably and are seen to the northeast and south of Palar river preserved in the trough faults and comprise boulder beds, dirty white to light green, greyish yellow fine sandstone, siltstone with clasts of rock fragments and khaki green to greenish grey shales.

Mineral occurrences in Kanchipuram District

MINERAL WEALTH:

The East Coast of Kancheepuram District between Cheyyur to Perunthuravu villages were studied for taking up investigation of Silica sand deposits.

The general geology of the area comprises of Charnockite in the West, overlain by Cuddalore sand stones further to the south. This is in

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turn overlain by sedimentary rocks comprising clay, sandy clay, clayey sand and quartzite of Pleistocene age, now designated as coramandel formation. Silica sand overlies these and are covered by beach sands. The area is almost flat sandy terrain except a few charnockite out crops especially in the areas near Mahabalipuram.

The coastal villages of Maduvankaranai, Munipillaichatram, Mungalvakkam, Muttukadu, Nanganarkuppam, Odiyur, Paramankeni, Parasuramankuppam, Perunthuravu falling Survey of India Toposheet No. 66D/C along the east coast were studied for the occurrence of Silica Sand deposits.

Silica Sand of white to grey colour forms the upper part of the coramendel formation and is sandwitched between the underlying coramendel rocks and the overlying beach sands. These are rarely seen as outcrops, exposed along Odiyur, Nanganarkuppam, Munippillaichatram villages. The silica sand in these areas exhibits greyish white colour and the individual grains are rounded to sub-rounded. The Silica Sand being highly of porous and permeable acts as fresh water aquifers. Presence of fresh water mostly indicate the possible existence of silica sand below.

The entire silica sand deposits are covered with windblown coastal sands having variable thickness. They are pale yellow to straw yellow in colour and will round in nature.

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Thus the potential mineral bearing villages are identified as follows:

Sl.No	Name of the Village
1	Cheyyur
2	Maduvankaranai
3	Munipillaichatram
4	Mungalvakkam
5	Muttukadu
6	Nanganarkuppam
7	Odiyur
8	Paramankeni
9	Parasuramankuppam
10	Perunthuravu
11	Pallambakkam
12	Mudaliyarkuppam

The coastal stretch from Mugaiyur to Munipillaichtram of Kancheepuram District consists of silica sand deposits. These sands can be exploited for use in Glass industry, Chemical industry for manufacturing Silica gel, abrasives and foundries. A further detailed sampling and chemical analysis has to be carried out for the suitability of the silica sand in Glass and foundry industry.

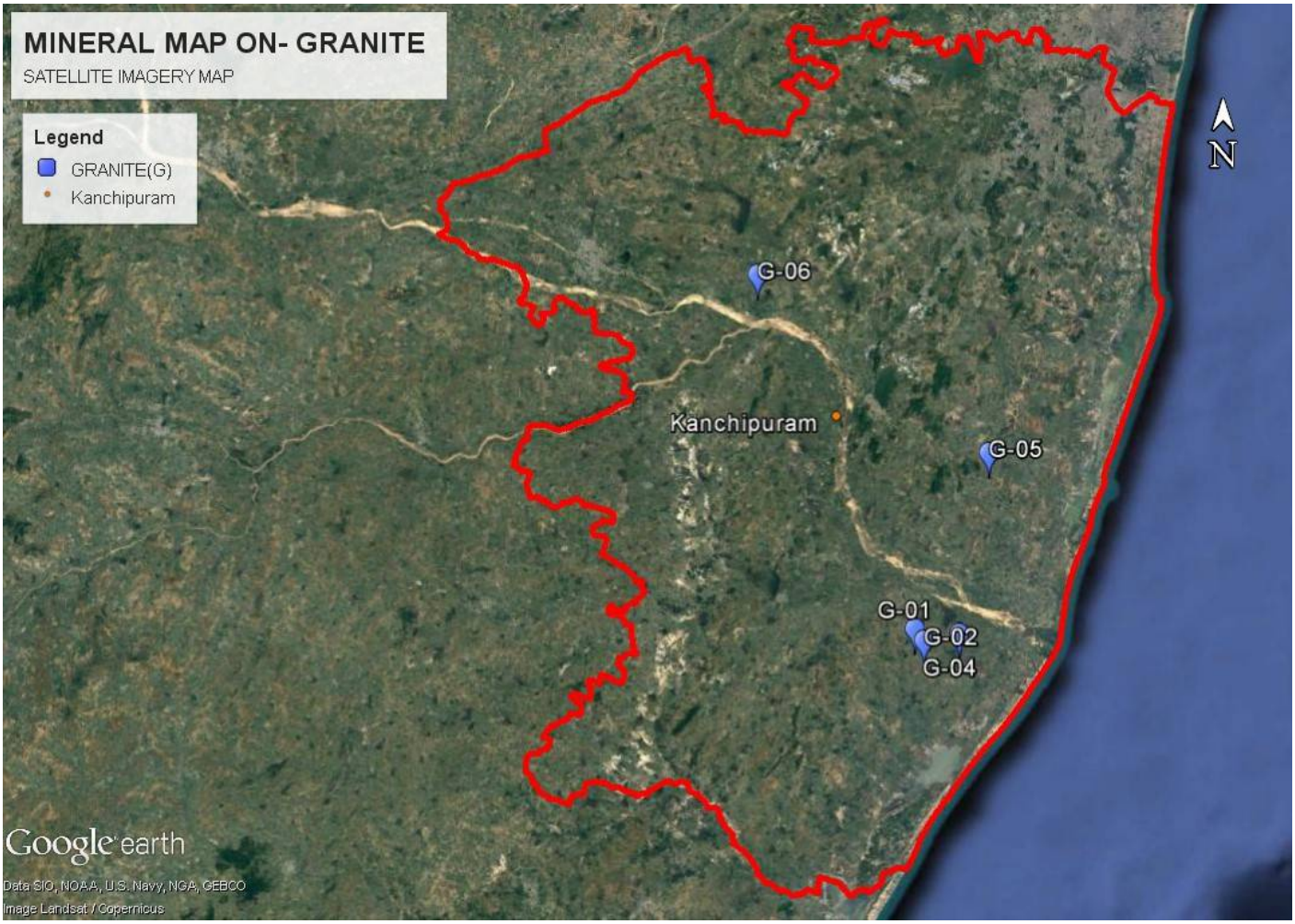

Fig. No.3 Mineral Map on Granite of Kancheepuram District.

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Clay:

The upper Gondwana clay deposits occurs in parts of Sriperumpudur the clay beds are generally horizontally reposed and occur as patches in the shales and sandstones, resting uncomfortably on the archaeans i.e. Charnockites.

The clays are plastic, white to buff coloured, ferrugious in some places and generally comprises Kaolinite and montmorillonite as major minerals with Quartz and Feldspar majority of the clay deposits are refractory.

The area of clay occurrences are Sriperumbudur, Mathur, Vallam, Vaipur, Edapaliyam, Kannanthangal, Kommantangal, Kandigai, Mahadevimangalam, Kallambedu. All the clay deposits like the shales are bedded formations. They appear to have been laid, down under lacustrine conditions in a gentle easterly sloping basin with an irregular floor. The shales represent a more indurated formation.

Estimated Availability of Mineral resources

S. No.	Name of Mineral	Estimated Availability (in M^3)
1.	Silica Sand	6,00,000
2.	White Clay	5,00,000
3.	BlackGranite	3,75.000
4.	Stone	75,00,000
5.	Sand	45,00,000

Table. No. 3. Mineral resources of Kanchipuram District.
(Source: - Dept. of mines & geology)

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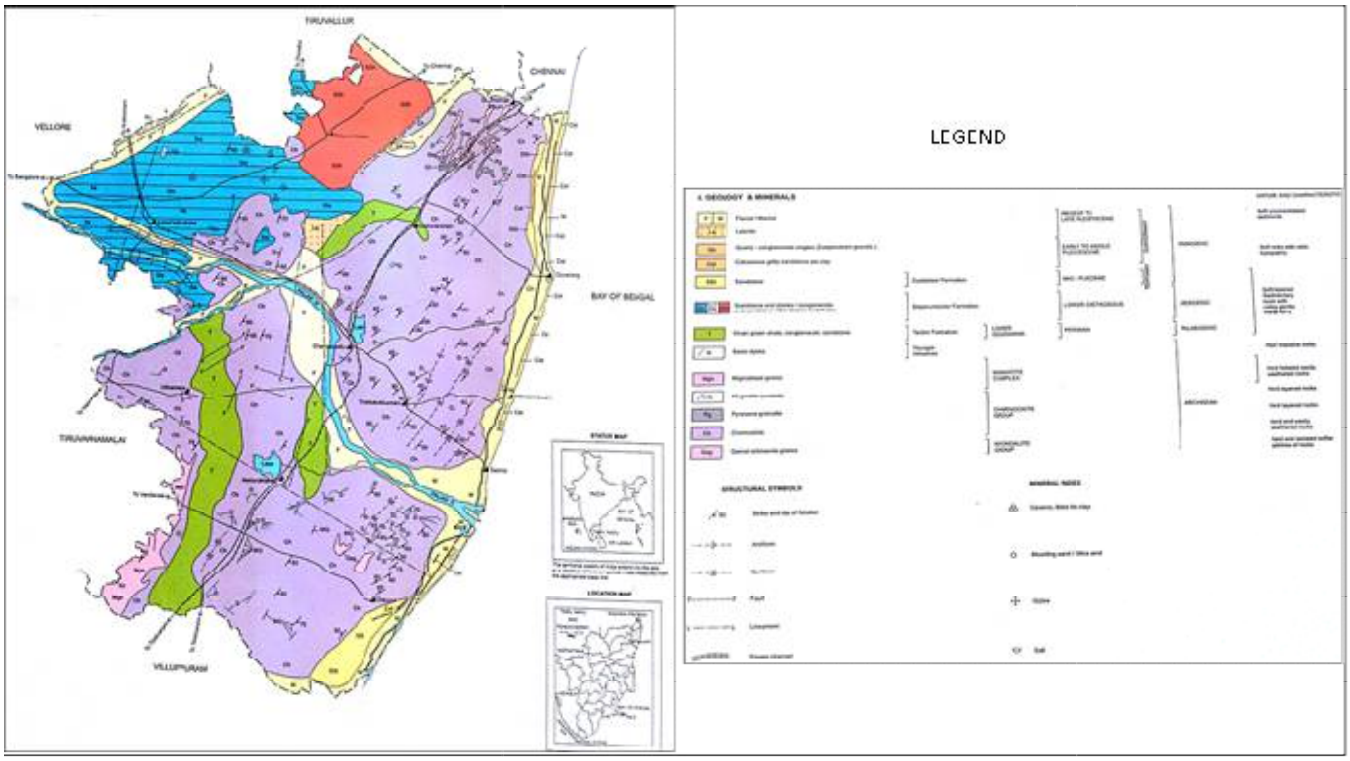

Fig. No. 4 Resource map of Kanchipuram District.

Rough Stone

Charnockite is applied to any orthopyroxene-bearing quartz-feldspar rock, composed mainly of quartz, perthite or antiperthite and orthopyroxene (usually hypersthene) formed at high temperature and pressure, commonly found in granulite facies metamorphic regions, as an end-member of the charnockite series.

Charnockite is extensively quarried for rough stone productivity / aggregates which is used as blue metals for construction of building, laying roads and manufacturing of hollow bricks. In some places, charnockite is used as grinder stone. Charnokite is exposed as excavated hills in St.Thomas Mount, Tirisoolam, Thiruneermalai, pulikhoradu, Nallambakkam, Erumaiyur. Surfacialexposes are encountered in many

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villages in the Aurimedu, Panaiyur, Vettaikkaranpudur, PeriyaVenmani villages of MadurantagamTaluk, Siruthamur, Sirumailur, Madur of WalajabadTaluk. In most of the places charnockite occurrence is sub surgical. There could be seen in the well cutting profiles.

Apart from usage as Rough stone for aggregates, certain charnockiteoccurances in the Siruthamur (S.F.No. 322 "kundruPromboke") and Sankarapuram (S.F.No.240, 259 "Kundru") had been catering to Rough Blocks for ornamentation purposes. Achieves and local enquiry provides enough information that the rocks in these areas are much sought after by the sculptures for making stone idols. The list of permissions that have been granted for removal of dimensional stones for ornamental purposes in tabulated as under.

Sl. No.	District	Taluk& Village	S. No.	Classification	Name of the lease & Address	Order No. & Date	Allotment of Qty in Cft	Remarks
1	Kanchipuram	Uthiremerur& Siruthamur	322	KundruPromboke	Dr.N.M.Veeraiyan, Chief Patron, ArulmiguBalamuruganAalayam, Ch-05	G.O.(3D) No.2 Industries (MMB-1) dept, Dt:21.03.2017	4179 cft	
2		WalajabadTaluk& Sankarapuram	240, 259	Kundru	Tvl. SirppakkalVettiEdukkum ThozhilalarkalMunnetraSangam, BajanaiKoil St, Puliyambakkam Post, Sankarapurm, WalajabadTaluk, Kanchipuram Dist.	-	-	Proposal Send Govt vide this office No.711/Q3/2017 Dt:8.11.2018

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3		Uthiremerur&Sirut hamur	322	KundruPromboke	Thiru.V.S.SubrmanianSubramanamiyaBakthaSamajam Trust, Pulipakkam village, Chengalpattu Taluk. 603 002.	G.O.(3D) No.53 Industries (MMB-1) dept, Dt:01.11. 2010	2000 cft	

Hence judicious exploitation of such deposits will encourage the artisans engaged in idol making and will get the substantial revenue to the Government.

River sand

Sand is a naturally occurring granular material composed of finely divided rock and mineral particles. It is defined by size, being finer than gravel and coarser than silt. Sand can also refer to a textural class of soil or soil type; i.e. a soil containing more than 85% sand-sized particles by mass.

The composition of sand varies, depending on the local rock sources and conditions, but the most common constituent of sand in inland continental settings and non-tropical coastal settings is silica (silicon dioxide, or SiO2), usually in the form of quartz. The entire stretch of Palar and Cheyyarriver contains substantial exploitable sand deposits. However due to the reduced run off in these river, seasonal replenishment has diminished to a greater extent. In view of the above, all types of quarrying has been banned from 13.11.2013 to 12.11.2018 by the Government. A proposal to extend the ban has been sent to the Government vide the District Collector, Kancheepuram communication in

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Rc. No 413/Q3/2012 dated. 23.08.2018 The same is under the consideration of the Government.

Silt / Ordinary Earth

Kancheepuram district is blessed with numerous tanks under the control of Public Works Department / Revenue Department / Pancharaj Departments scattered throughout the district. All the tanks contain substantial quantity of deposited silt / ordinary earth and in certain places gravel and the periodical desilting of these tank will produce a substantial quantum of silt / ordinary earth which will later to the needs of brick manufacturers and infrastructural projects for level lifting of lowlying areas.

Silt is granular material of a size between sand and clay, whose mineral origin is quartz and feldspar. Silt may occur as a soil (often mixed with sand or clay) or as sediment mixed in suspension with water (also known as a suspended load) and soil in a body of water such as a river. It may also exist as soil deposited at the bottom of a water body, like mudflows from landslides. Silt has a moderate specific area with a typically non-sticky, plastic feel. Silt usually has a floury feel when dry, and a slippery feel when wet. Silt can be visually observed with a hand lens.

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Fig. No. 1 Charnockite quarry, Umanancherry Village, Chengalpattu Taluk. (N 12°51ˈ02.67″ & E 80°06ˈ49.96″)

Fig. No. 2 Charnockite quarry, PinayurVillage, Uthiramerur Taluk. (N 12°44ˈ59.62″ & E 79°52ˈ45.20″)

Fig. No. 3 Charnockite quarry, Palayaseevaram Village, WalajabadTaluk. (N 12°47ˈ59.70″ & E 79°52ˈ47.06″)

Fig. No. 4 Sulphide mineralization Mamandur Village, (N 12°39ˈ22.34″ & E 79°57ˈ7.58″)

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Fig. No. 5 Charnockite from Mahabalipuram, Kanchipuram District. (N 12°37'36.94" & E 80°11'33.76")

Fig. No. 6 Silt mine from Sembarambakkam Village, Kanchipuram District. (N 13°00'40.79" & E 80°01'

Fig. No. 7 Silt mine from Sembarambakkam Village, Kanchipuram District. (N 13°00'40.79" & E 80°01'32.76")

V. Drainage of Irrigation Pattern

Palar and Cheyyar are the important rivers. The drainage pattern in general is sub-dendritic and radial. All the rivers are seasonal and carry substantial flows during monsoon period.

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River Palar, a major river course, which drains this district originates from Western Ghats in Karnataka state, and discharges in Bay of Bengal near Pudupattinam.

The Cheyyar, a tributary of Palar originates from the Jawadu Hills of Tiruvannamalai district. It has a northeasterly flow in Kancheepuram district and confluences with the Palar near Pazhaiyaseevaram.

Other seasonal river like Korattalaiar and Tandiar drain this district partly on the northern and southern part respectively.

1.4 Irrigation Practices

The nine-fold lands use classification for the district is given below.

S. No	Classification	Area (Ha)
1	Forests	23,856
2	Barren & Uncultivable Lands	10,948
3	Land put to non-agricultural uses	1,46,085
4	Cultivable Waste	10,430
5	Permanent Pastures & other grazing lands	18,328
6	Groves not included in the area sown	16,273
7	Current Fallows	8,156
8	Other Fallow Lands	73,136
9	Net Area sown	1,35,998
Total		**4,43,210**

VI. Land utilisation pattern in the district

Kancheepuram Local Planning Area covers Kancheepuram Municipal area along with 33 villages. Kancheepuram municipality is a selection grade Municipality. Other than this there is only one selection grade Town Panchayat (ie.Sevilimedu). The total extent of the Local Planning Area is

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8349.17 Hectares of which the developed area is 2082. 05 Hectares. In between the railway line and Vegavathi river thickly residential and commercial area are existing and also small and big temples are situated. The northern and southern parts of the Local Planning area are mostly covered by valuable agricultural lands.

Soils have been classified into 1) clayey soil, 2) red sandy or red loamy soil 3) Red sandy brown clayey soil and 4) Alluvial soil. Of the above soils brown clayey soil is the most predominant, covering more than 71 percent of the areal extent of Kancheepuram district. Alluvial soils are found on the banks of Palar, Cheyyar and other rivers. The river alluvium is transported and is seen in coastal area of this district. Sandy coastal alluvial (arenacious soil) occurs along the seacoast as a narrow belt.

Alluvial soils are found on the banks of Palar, Cheyyar and other rivers. The river alluvium is transported and is seen in coastal area of this district. Sandy coastal alluvial (arenacious soil) occurs along the seacoast as a narrow belt. Soils have been classified into 1) clayey soil, 2) red sandy or red loamy soil 3) Red sandy brown clayey soil and 4) Alluvial soil. The muddy-nature of the soil horizon indicates that during the recent past the area should have been a mud flat subjected to intertidal action and flooding during monsoon. Hence, the area can be classified as paleo-tidal flat. Evidences of tidal action comes from the occurrence of remains of gastropods and lamellibranches shells that are characteristic of marine and marginal marine environment. Increased sedimentation and development of

sand bar in the creek that connects the tidal zone with sea has stopped seawater interaction and the area has now prograded with periodical rains decreasing the salinity of the soil.

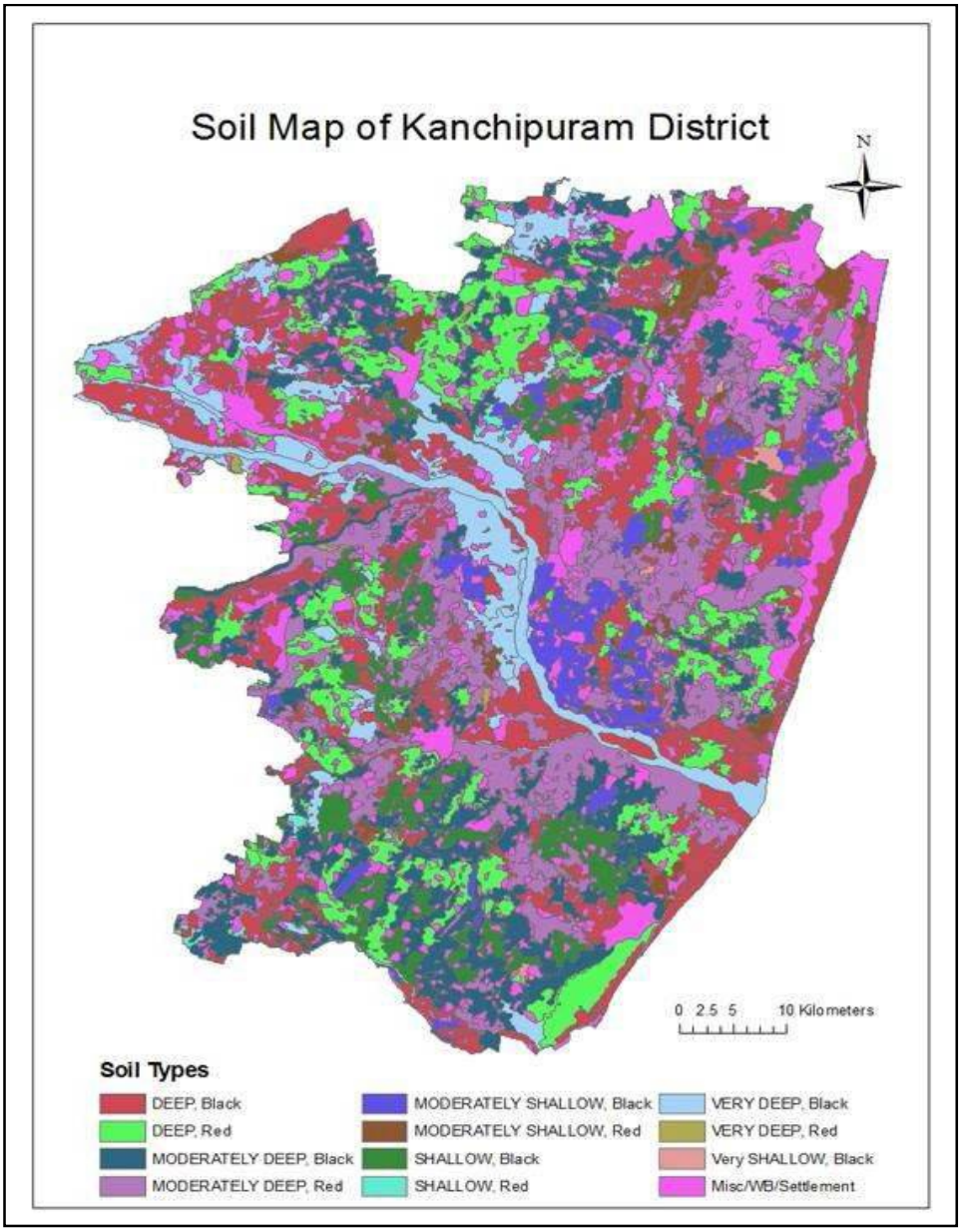

Fig.No. 5. Soil map of Kanchipuram District

(Source: NBBSSLUP)

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VII. Surface Water And Ground Water Scenario of The District

Ground Water Resources

The ground water resources have been computed jointly by Central Ground Water Board and State Ground & Surface Water Resources Data Centre (PWD, WRO, Government of Tamil Nadu) as on 31st March 2004. The salient features of the computations are furnished in Table-1. The computation of ground water resources available in the district has been done using GEC 1997 methodology.

Ground Water Quality:

Ground water in phreatic aquifers in Kancheepuram in general, is colourless, odourless and slightly alkaline in nature. The specific electrical conductance of ground water in phreatic zone (in Microsiemens at 25°C) during May 2006 was in the range of 240 to 4220 in the district. It is between 750 and 2250 µS/cm at 25°C in the major part of the district. Conductance below 750 µS/cm has been observed in ground water in parts of Chunampet, Mahabalipuram and Oragadam, where conductance exceeding 2250 µS/cm has been observed in Melmukuttu road. It is observed that the ground water is suitable for drinking and domestic uses in respect of all the constituents except total hardness and nitrate. The Total Hardness as CaCO3 is observed to be in excess of permissible limits of 7% sample analysed whereas Nitrate is found in excess of 45 mgl/l in about 25 percent samples. The incidence of high total hardness is

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attributed to the composition of lithounits constituting the aquifers in the district, whereas the Nitrate pollution is most likely due to the use of pesticides and fertilizers for agriculture. With regard to irrigation suitability based on specific electrical conductance and Sodium Adsorption Ratio (SAR), it is observed that the ground water in the phreatic zone may cause high to very high salinity hazard and medium to high alkali hazard when used for irrigation. Proper soil management strategies are to be adopted in the major part of the district while using ground water for irrigation.

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TABLE – 4

STAGE OF GROUND WATER DEVELOPMENT OF KANCHEEPURAM DISTRICT.

Sl No.	Name of Groundwater Assessment unit (Block) District / Block		Net Groundwater availability	Existing Gross Draft for Irrigation	Existing Gross Draft for Domestic and industrial water supply	Existing Gross Draft for all uses	Allocation for Domestic and Industrial Requirement supply up to next 10 years (2029)	Net Ground water availability for future irrigation Development	**(in Ham)** Stage of Ground water development	Categorization for future ground water development (Safe / Semi Critical / Critical / Over exploited)
(1)	(2)	3)	(4)	(5)	(6)	(7=5+6)	(8)	9=4-(6+8)	10=(7/4)*100	(6)
1	Kancheepuram	Acharapakkam	8355.48	5799.74	336.55	6136.59	356.22	2199.52	73	Semi critical
2	Kancheepuram	Kancheepuram	9996.49	3685.04	398.06	4083.10	421.18	5890.27	41	Safe
3	Kancheepuram	Kattankulathur	7506.20	4340.26	510.28	4850.54	539.92	2626.02	65	Safe
4	Kancheepuram	Kunrathur	7889.65	4340.26	473.45	4813.71	500.95	3048.44	61	Safe
5	Kancheepuram	Lathur	8744.55	9297.01	276.82	9573.83	292.91	-845.37	109	Over exploited
6	Kancheepuram	Maduranthagam	10385.78	6188.32	353.02	6541.34	373.53	3823.93	63	Safe
7	Kancheepuram	Sithamur	10967.37	10526.01	324.82	10850.84	343.69	97.67	99	Critical
8	Kancheepuram	Sriperumpudur	12062.35	2251.86	345.17	2597.03	365.22	9445.27	22	Safe
9	Kancheepuram	St. ThomasMount	3744.96	1877.29	908.20	2785.48	960.95	906.73	74	Semi Critical
10	Kancheepuram	Thirukalukundram	10292.26	9107.00	478.30	9585.29	506.08	679.18	93	Critical
11	Kancheepuram	Thiruporur	10211.09	7913.39	361.66	8275.05	382.67	1915.03	81	Semi Critical
12	Kancheepuram	Uthiramerur	12698.57	13666.21	390.73	14056.963	413.42	-1381.06	111	Over Exploited
13	Kancheepuram	Walajabad	11606.69	5385.82	335.89	5721.71	355.40	5865.47	49	Safe
		Total	**124461.44**	**84378.2200**	**5493.04**	**89871.26**	**5812.12**	**34271.10**		

Note: * Denotes the complete Saline Blocks.

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VIII. Rainfall Of The District And Climatic Condition :

Most of the precipitation in the Kancheepuramdistricoccurs inthe form of cyclonic storm caused due to the depressions in Bay of Bengal chiefly during northeast monsoon period. The southwestmonsoon rainfall is highly erratic and summer rains are negligible.The normal annual rainfall over the district varies from 1105 mm to1214mm. It is the minimum in the western and northwestern parts ofthe district around Uttiramerur (1105 mm) and it is the maximumaround Kovalam (1214.2 mm).

The district receives the rain under the influence of both southeast and northeast monsoons. Most of the precipitation occurs in the form of cyclonic storm caused due to the depressions in Bay of Bengal chiefly during northeast monsoon period. The southwest monsoon rainfall is highly erratic and summer rains are negligible.

The normal annual rainfall over the district varies from 1105 mm to 1214mm. It is the minimum in the western and northwestern parts of the district around Uttiramerur (1105 mm) and it is the maximum around Kovalam (1214.2 mm).

High relative humidities between 58 and 84% prevail throughout the year. Relative humidity is maximum in the morning and minimum in the evening. Higher rates of relative humidity are observed between November and January i.e., 83 to 84%. In the months of June, the humidity is lower i.e., around 58%. Average relative humidity in the morning and evening 74 and 64%.

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Month & Year wise rainfall data of the Kanchipuram district is given below:

Month	Normal	2011	2012	2013	2014	2015	2016	2017	2018
January	18	2.60	3.54	0.00	0.00	0.15	0.23	14.34	1.78
February	12	27.81	0.00	15.95	3.27	0.00	0.00	0.00	1.69
Winter Total	**30**	**30.41**	**3.54**	**15.95**	**3.27**	**0.15**	**0.23**	**14.34**	**3.47**
March	7	0.00	0.00	9.12	0.00	0.00	0.00	0.00	9.54
April	11	48.66	0.00	0.00	0.00	35.82	0.00	0.00	0.38
May	38	19.93	4.95	10.57	32.50	38.67	125.50	14.52	6.03
Summer Total	**56**	**68.59**	**4.95**	**19.69**	**32.50**	**74.49**	**125.5**	**14.52**	**15.95**
June	50	18.73	26.03	49.57	84.56	26.83	57.30	61.78	39.92
July	111	69.02	51.42	103.67	42.22	71.76	55.52	82.29	47.95
August	157	124.72	98.76	114.48	95.89	107.45	121.66	165.10	150.84
September	160	109.93	62.31	136.79	100.23	61.98	168.35	78.11	75.05
SW Monsoon Total	**478**	**322.4**	**238.52**	**404.51**	**322.9**	**268.02**	**402.83**	**387.28**	**313.76**
October	184	182.33	255.16	105.65	113.54	138.58	32.42	195.07	110.10
November	284	299.99	70.82	86.72	94.33	848.63	11.30	226.54	236.06
December	129	140.02	99.91	51.82	63.70	441.44	182.37	44.83	33.39
NE Monsoon Total	**597**	**622.34**	**425.89**	**244.19**	**271.57**	**1428.65**	**226.09**	**466.44**	**379.55**
Total	**1161**	**1043.74**	**672.90**	**684.34**	**630.24**	**1771.31**	**754.65**	**882.58**	**712.73**
Excess / Shortage		-117.26	-488.1	-476.66	-530.76	610.31	-406.35	-278.42	-448.27
Rainfall %		89.90	57.96	58.94	54.28	152.57	65.00	76.02	61.39
Shortage RainFall %		-10.10%	-42.04%	-41.06%	-45.72%	52.57%	-35.00%	-23.98%	-38.61%

Table. 6. Rainfall data of Kanchipuram District.

Normal rain fall for the year :- 1161.00 mm

Rainfall %:- 61.39

North East Monsoon rainfall %:- 63.58

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IX. Details of Mining Lease details

GRANITE

Sl.No	Name Of The Mineral	Name Of The Lessee	Address & Contact No. Of Lessee	Mining Lease Grant Order No. & Date	Ares Of Mining Lease (Hec)	Period Of Mining Lease (Initial)		Period Of MIning Lease ($1^{st}/2^{nd}$ …renewal)		Date OF Commencement Of Mining Operation	Status (Working / Non-Working / Temp. Working For Dispatch Etc.)	Captive / Non - captive	Obtained Environmental Clearance (Yes / No) , If Yes Letter No With Date Of Grant Of Ec.	Location Of The Mining Lease (Latitude & Longitude)		Method Of Mining (Opencast / Underground)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		16
						From	To	From	To							
1	**BLACK GRANITE**	Tvl.Arvind Granites	4,Kuppusamy Street, Karapakkam, Chennai-96	G.O.3 (D) No.53/Ind. (MMB-1) Dept. dt.19.7.2005	Pachambakkamvge, Cheyyur Taluk 1.50.0	28.08.05	27.08.25	-	-	28.08.05	Non Working	Non - Captive	No	$N12^{O}$ 27'20"	$E80^{0}01'$ 00"	Opencast
2	**BLACK GRANITE**	Tvl.Gem Granite, Chennai.	76/78 cathedral Road, Ch-86	G.O.3 (D) No.32/Ind. (MMB-1) Dept. dt.21.02.2007	Palur and KadugupattuCheyyurTaluk 3.73.0	20.03.07	19.03.27	-	-	20.03.07	Non Working	Non - Captive	No	$N12^{0}26'$ 40.16"	$E80^{0}01'$ 32.79"	Opencast

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3	**BLACK GRANITE**	Tvl.Tamin Ltd, Chennai-5.	31, Kamaraja rSalai, Chepauk, Ch-5	G.O.No. 283/.Ind.(MME-1) Dept .dt.27.12.1995.	Pulikundramvge, Cheyyur Taluk 2.78.5	27.12.95	26.12.15	-	-	27.12.95	Non Working	Non - Captive	No	-	-	Opencast
4	**BLACK GRANITE**	Tvl.Tamin Ltd, Chennai-5.	31, Kamaraja rSalai, Chepauk, Ch-5	G.O.No. 3(D) No.68 Ind. (MME-1) Dept. dt.20.8.07.	Nelvoyp alayamvge, Cheyyur taluk 1.10.5	20.08.07	19.08.27	-	-	20.08.07	Non Working	Non - Captive	No	N12^{0}27′ 03″	E80^{0}03′ 34″	Opencast
5	**BLACK GRANITE**	Tvl.Tamin Ltd, Chennai-5.	31, Kamaraja rSalai, Chepauk, Ch-5	G.O.No. 209/Ind. (MME-1) Dept. dt.17.7.07.	Echoorvge, Thirukazhikundramtaluk. 4.40.0	06.08.07	05.08.37	-	-	06.08.07	Non Working	Non - Captive	No	N12^{0}37′ 16″	E80^{0}05′ 16″	Opencast
6	**MULTI COLOUR GRANITE**	D. Suthan, S/o. Devid	No.50, 5th Street, Bharathi Nagar, Mudichur Road, Tambaram, Chennai – 600 063	G.O.(3D)No.31, Industries (MMB1) Department dt. 07.06.2018.	Pazhayaseevaramvge, WalajabadTaluk, 1.83.00	.06.18	.06.38	-	-	-	Non Working	Non - Captive	Yes No.SEIAA-TN/F.NO.5804/1(a)/EC.NO.3792/2016 DT:24.10.16	N12^{0}47′ 18.21″ to N12^{0}47′ 26.77″	E79^0 51′55.46″ to E79^0 51′39.54″	Opencast

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X. Details of Royalty or Revenue Received in Last Three Years

2016-2017

Sl.No.	Month & Year	Revenue Amount
1	April'16	15,467,174
2	May'16	13,617,811
3	June'16	15,609,577
4	July'16	21,978,934
5	August'16	17,154,830
6	September'16	18,385,913
7	October'16	17,022,318
8	November'16	17,764,623
9	December'16	12,957,043
10	January'17	14,986,218
11	Feburary'17	19,235,927
12	March'17	29,488,095
TOTAL		**213,668,463**

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2017-2018

Sl.No.	Month & Year	Revenue Amount
1	April'17	13,406,439
2	May'17	21,476,441
3	June'17	17,905,810
4	July'17	24,607,455
5	August'17	24,517,727
6	September'17	24,075,188
7	October'17	17,719,540
8	November'17	16,386,759
9	December'17	21,119,010
10	January'18	21,589,311
11	Feburary'18	26,040,318
12	March'18	30,812,311
	TOTAL	**259,656,309**

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2018-2019

Sl.No.	Month & Year	Revenue Amount
1	April'18	33,338,374
2	May'18	35,105,669
3	June'18	31,465,279
4	July'18	40,907,698
5	August'18	30,399,920
6	September'18	16,122,904
7	October'18	33,433,138
8	November'18	17,510,015
9	December'18	23,461,967
10	January'19	23,987,350
11	Feburary'19	25,672,104
12	March'19	34,094,688
	TOTAL	**345,499,106**

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XI. Details of Production of Minor Mineral in Last Three Years

Name of Minor Minerals	2016-17	2017-18	2018-19
	(in Cubic Meter)		
Granite	- NIL -		

XII. Mineral Map of the District.

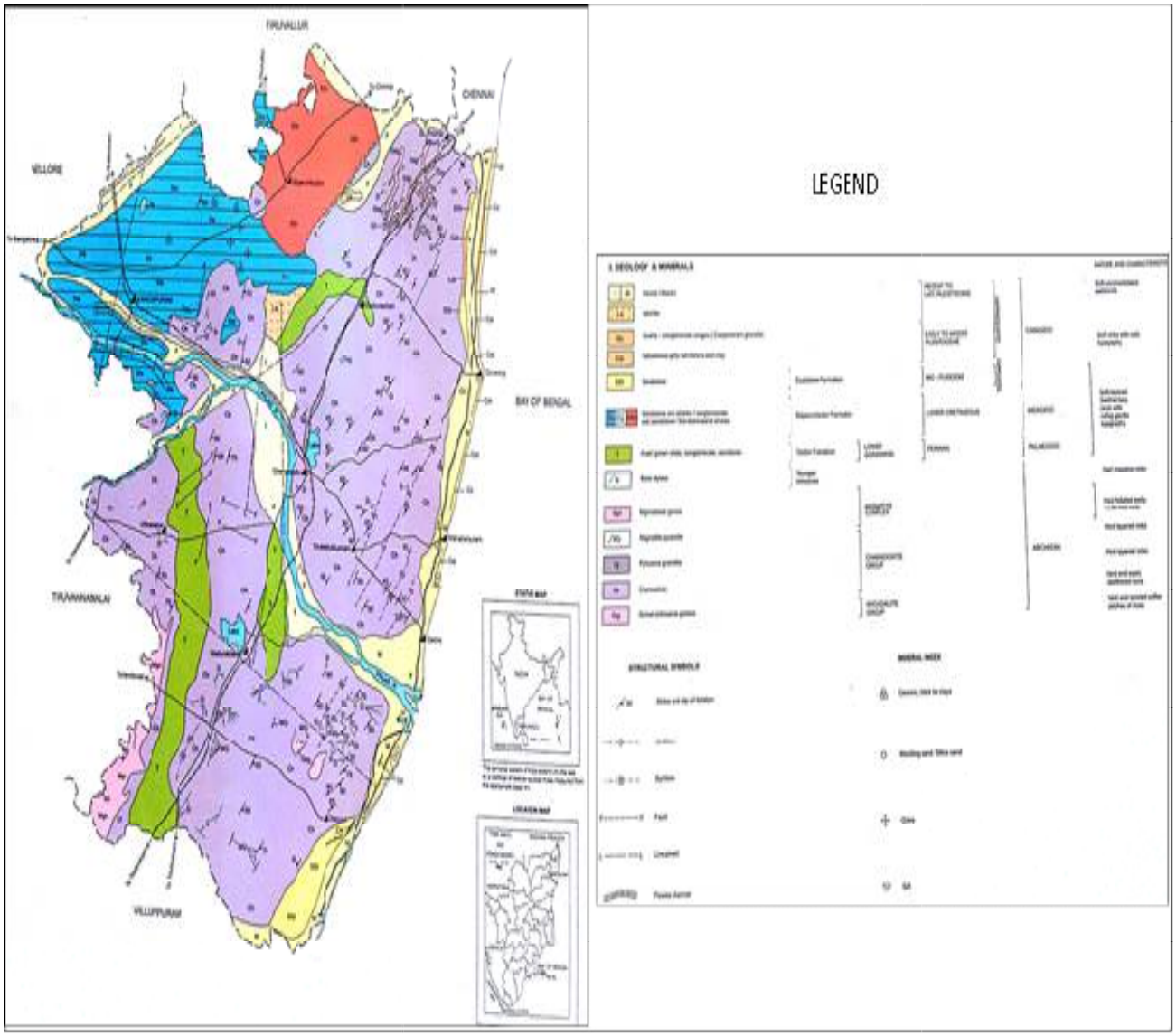

Fig. No. 6 Mineral Map of Kanchipuram District.

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XIII. List of Letter of Intent (LOI) Holders in The District Along With it's Validity As Per The Following

Sl. No.	Name Of The Mineral	Name Of The Lessee	Address & Contact No. Of Letter Of Intent Holder	Letter of Intent Grant Order No. Allotted	Ares Of Mining Lease To be Allotted	Validity Of LOI	Use (Captive / Non - Captive	Location Of The Mining Lease (Latitude & Longitude)
1	2	3	4	5	6	7	8	9
1.	Granite	NIL						

XIV. Total Mineal Reserve Available in The District:

S. NO.	NAME OF MINERAL	**Estimated Availability (in M^3)**
1.	Black Granite	3,75.000

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

S.NO.	NAME OF MINERAL	Quality / Grade
1.	Black Granite	Poor

XVI. Use of Mineral:

Granite

Granite is used in buildings, bridges, paving, monuments, and many other exterior projects. Indoors, polished **granite** slabs and tiles are used in countertops, tile floors, stair treads and many other design elements. **Granite** is a prestige material, used in projects to produce impressions of elegance and quality. Kancheepuram District cosists of a considerable dybe deposits (Black Granite) and Charnockite (Multicolour Granite) deposits, of the quarries have yielded marketable Granite Blocks. This owes to the poor quality and presence of defects.

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XVII. Demand and Supply of the Mineral in the last three years:

Name of Minor Minerals	Demand			Supply		
	2016-17	2017-18	2018-19	2016-17	2017-18	2018-19
	(in Cubic Meter)			(in Cubic Meter)		
Granite	--- NIL ---					

XVIII. Mining Leases marked on the map the district:

Fig. No. 7 Mining Leases marked on map of Kanchipuram District.

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XIX. Details of the area of where there is a cluster of mining leases viz number of mining leases, location (latitude and longitude)

- **No Cluster of mining leases area in Kancheepuram District.**

XX. Details of Eco-Sensitive Area :

Vedanthangal Bird Sanctuary Kancheepuram

It is one of the major Water Bird Sanctuaries in India.of 48 Kms from Kanchipuram. The birds nest on the branches of submerged trees. Storks, Egrets, Cormorants, Darter, Flamingos, Pelicans, moor hens,herons, kingfishers, sandpipers, white ibis,spoonbills, swans and grey wagtails are some of the birds which arrive here during season.The best season time is between October and March, when a large number of migratory birds visit. The birds can be viewed from the bank or from the watch tower.The Best time to visit this sanctuary is from November to March.The Vedanthangal lake bird sanctuary has a tradition of the people actively protecting birds coming to the area since time immemorial. The local people understood the relationship between birds and the productivity of their crops even before the concept of wildlife conservation came into vogue. They knew that the bird droppings in the water created guano which acted as fertilizer. Towards the end of the 18th century local villagers complained to the collector of officially recognized the lake as a sanctuary. In 1962 it was given the legal status of reserved forest under the madras forest act.

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Karikili Bird Sanctuary Kancheepuram

Karikili Bird sanctuary is located about 86 km from Chennai in MadurantakamTaluk of Kancheepuram District this is one of the most tranquil and beautiful place near Chennai spread over 61.21.00 hect. this comprises of two rain fed irrigation tanks. The water enriched by bird droppings results in increased yield. Beginning with the open billed storks, the birds start arriving in Sep –Oct. Karikilli is a haven for ducks and waders. Pin tailed ducks, Garganey teals, common teals, shoveller, Little Grebe or Dab chick, Herons and Egrets are the other avian visitors.

Karikili Bird sanctuary is a place of lush greenery which has huge number of birds. It is a conservative forest of barringtonia and acacia nilotica. Among the many getways around Chennai is karikili Bird sanctuary. This small sanctuary is home to a number of avian beauties especially migratory once.

XXI. Impact on the Environment (Air, Water, Soil, Flora & Fauna, land use, agriculture, forest etc.) due to mining activity:

- To avoid any possible degradable effect on the environment, all the mining leases are being permitted to operate only after obtaining consent to establish and consent to operate under Section 21 of AIR (Prevention and control of Pollution) Act, 1981 and Section 25 of WATER (Prevention and Control of Pollution) Act, 1974. Hence, all necessary steps to maintain

the ambient air quality and ground water quality are being taken.

XXII. Remedial Measures to mitigate the impact of mining on the Environment:-

- All the quarry projects in the Kancheepuram district are minor mineral projects falling under "B2" category only. Hence, these projects will have a very minimal impact on the land use pattern. In order to avoid any impact of mining on Environment, quarry leases are being granted 300 mtrs. clear of any settlements.

XXIII. Reclamation of Mined out area (best practice already implemented in the district, requirement as per rules and regulation, proposed reclamation plan):-

- The predominant mineral occurrence in respect of Kancheepuram district belongs to minor mineral category viz. Rough stone, ordinary earth, gravel and silica sand. In all the cases as almost 100% of the material mined is utilized, no specific reclamation plan has been recommended. In all the cases, the solid removed is utilized to develop green belt and the mined out pits act as best sources of rain water collection pits. Hence, proper green belt around the dugout pits, it is also ensured that, the lessee fences the quarry pits so as to

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avoid falling of persons / cattles etc. in terms of Rule 26 of Mineral Conservation and Development Rules, 2017. The best cases of reclamation of quarried pit is the case of abandoned pits in Tiruneermalai village, Pallavaramtaluk. The pits have been utilized to safe disposal of drilled earth obtained during the formation of under groundtunneling during the Chennai Metro constructions. Thus the quarried pits also serve as apt locations for safe land fills.

XXIV. Risk Assessment & Disaster Management Plan:-

In any mining operations, whether opencast and/or underground, work safety is taken care of by the Mines Act, the Coal Mines Regulation, 1957 and Rules framed there under. The risk to general public in the present case may arise from the following:

i) Failure of dumps created by stones dug from incline cutting.
ii) Flyrocks, during blasting operations, while driving inclines
iii) Plying of trucks etc on public roads

In all the Stone / Earth quarries, there will be no risk to public from any of the factors listed above as there will not be any habitation close to the mining operations. All Latitudes will be located 300mts away from the proposed area of quarrying.

The stone and earth material dug out while digging inclines for approach to the mine will be utilized for construction of ramps etc. for

haulage incline. The excess stone and rock will be placed on the ground in low height dumps which will be reclaimed through plantation.

The blasting operations for approach will be so designed so that there are no fly rocks in normal situation. The blasting operations will be carried out after warning is given to people of surrounding basis / habitations. There will not be any bulk storage of fuel and oil at quarries. The permissible quantity of diesel and lubricants will be stored after observing necessary precautions as prescribed. The tippers/trucks taking coal to linked power plant will be plying on State Highway but entry from mine to highway will be kept away from nearby Villages so than the risk to persons is reduced.

Risk assessment is all about prevention of accidents and there is a need to be aware that there is the risk of an accident before steps can be taken to prevent it happening. It may not always be obvious that a workplace task could lead to an accident. This is why risk assessments are carried out. In risk assessment the words Hazards and Risks are often used. The Hazards and Risks are defined as below:

1. A hazard is anything that has the potential to cause harm.
2. The risk is how likely it is that a hazard will cause actual harm.

Hazard analysis involves the identification and quantification of various hazards (unsafe conditions) that exist in the quarries. On the other hand, risk analysis deals with the identification and quantification of risks, the plant and mining equipment and personnel are exposed to, due to accidents resulting from the hazards present in the quarries.

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Risk analysis follows an extensive hazard analysis. It involves the identification and assessment of risks the neighbouring populations are exposed to as a result of hazards present. This requires a thorough knowledge of failure probability, credible accident scenario, vulnerability of populations etc. Much of this information is difficult to get or generate. Consequently, the risk analysis is often confined to maximum credible accident studies.

In the sections below, the identification of various hazards, probable risks in the plant, maximum credible accident analysis, and consequence analysis are addressed which gives a broad identification of risks involved in the proposed mining and coal washery project. Based on the risk estimation disaster management plan has been also been presented.

In order to avoid any risk / hazared, the following control measures will be adopted:

- All safety precautions and provisions of the Mine Act, 1955, the Coal Mines Regulation, 1957 and the Mines Rules, 1952 will be strictly followed during all mining operations;
- Entry of unauthorized persons will be prohibited;
- Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the employees and regular check for their use;
- Initial training and refresher courses for all the employees working in hazardous premises; Under mines rules all employees of mines shall have to undergo the training at a regular interval;
- Working of mine, as per approved plans and regularly updating the mine plans;
- Handling of explosives, charging and blasting will be carried out by competent persons only;

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Blasting :

Most of the accidents from blasting occur due to the projectiles, as they may sometimes go even beyond the danger zone, mainly due to overcharging of the shotholes as a result of certain special features of the local ground. Vibrations also lead to displacement of adjoining areas. Dust and noise are also problems commonly encountered during blasting operations.

Measures during Drilling and Blasting :

Following measures shall be taken while drilling and blasting operations in the quarry:

- Drilling and blasting in quarry shall be done in accordance with the provisions of Mines Act, rules and regulations;
- Adequate safety measures will be taken during blasting operations in the quarry so that men/machines are not affected;
- Ground vibration due to blasting will be controlled by following

1. Reducing the explosive charge per delay;
2. Reducing the spacing and burden per blast;
3. Reducing the amount of explosive charged per blast; and
4. Proper controlled rock movement during blast by using suitable initiating sequence and delay.

Measures Suggested to avoid Accidents due to Blasting

- Shots will not be fired except during the hours of day light between to only.
- Adequate shelters or other protective structures will be provided to the workers at all times; • The shot fire will give sufficient warning by effective signal over the entire area falling within a radius of 500-m;

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XXV. Details of the Occupational Health issues in the District. (Last five-year data of number of patients of Silicosis Tuberculosis is also needs to be submitted :-

As per the guidelines of the Mine Rules 1955, occupational health safety stipulated by the ILO/WHO. The proponent's will take all necessary precautions. Normal sanitary facilities should be provided within the lease area. The management will carry out periodic health checkup of workers.

Occupational hazards involved in mines are related to dust pollution, Noise pollution, blasting and injuries from moving machineries & equipment and fall from high places. DGMS has given necessary guidelines for safety against these occupational hazards. The management will strictly follow these guidelines.

All necessary first aid and medical facilities will be provided to the workers. The mine shall be well equipped with Personal Protective Equipment (PPE). Further all the necessary protective equipment's such as helmets, safety goggles, earplugs, earmuffs, etc. will be provided to persons working in mines as per Mines Rules. Alloperators and mechanics will be trained to handle fire-fighting equipment's.

XXVI. Plantation and Green Belt development in respect of leases already granted in the District:-

Green Belt Development

A well planned Green Belt with multi rows (Three tier) preferably with long canopy leavesϖ shall be developed with dense plantations around the boundary and haul rods to prevent air, dust

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noise propagation to undesired places. Efforts will be taken for the enhancement of survival rate since the soil is alkaline in nature.

Species Recommended for Plantation

Following points have been considered while recommending the species for plantation:

1. Natural growth of existing species and survival rate of various species.
2. Suitability of a particular plant species for a particular type of area.
3. Creating of bio-diversity.
4. Fast growing, thick canopy cover, perennial and evergreen large leaf area

Efficient in absorbing pollutants without major effects on natural growth.

The following species may be considered primarily for plantation best suited for the prevailing climatic condition in the area.

RECOMMENDED SPECIES TO PLANT IN THE GREENBELT

S. No	Name of the plant (Botanical)	Family Name	Common Name	Habit
1	Azadirachta indica	Meliaceae	Neem, Vembu	Tree
2	Albizia falcatoria	Fabaceae	Tamarind, Puliyamaram	Tree
3	Polyalthia longifolia	Annonaceae	Kattumaram	Tree
4	Borassus flabellifer	Arecaceae	Palmyra Palm	Tree

XXVII. Any other Informations:-

The Details related to occurrence of mineral resources and other date of the district are subject to updation from time to time. Before grant of any quarry lease, the parameters related to geosciences and sustainable developments are to be considered on the basis of ground reality.

The Kancheepuram district is having very large deposits of Charnockite rock which is the raw material for the production of aggregates and M-sand. M.Sand is the need of the hour to replace the utilisation of river sand. The Charnockite / Rough Stones are crushed in the crushing units for the manufacture of aggregates and M-sand which gives direct and indirect employment to the local people. Preference and encouragements can be given to the Entrepreneurs for set up of new units for the production of M-sand. The Silica Sand found in Cheyyur Taluk are the India best in the quality, but the quantity available is very less. The Silica sand from this area is utilized in the glass industry.

12/6/19

Assistant Director
Geology and Mining
Kancheepuram.

12/6/19

DISTRICT COLLECTOR /
CHAIRMAN
DEIAA KANCHEEPURAM

12/6/19.

12/06/19